



**FINAL
ENVIRONMENTAL ASSESSMENT**

**MILITARY FAMILY HOUSING PRIVATIZATION
ALTUS AIR FORCE BASE**

**United States Air Force
Air Education and Training Command
Altus Air Force Base, Oklahoma**

July 2004

Report Documentation Page				Form Approved OMB No. 0704-0188	
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE JUL 2004		2. REPORT TYPE		3. DATES COVERED 00-00-2004 to 00-00-2004	
4. TITLE AND SUBTITLE Final Environmental Assessment Military Family Housing Privatization Altus Air Force Base				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) URS Corporation,600 Montgomery Street,San Francisco,CA,94111				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT The Air Force proposes to privatize military family housing (MFH) in order to provide a feasible way to accelerate housing improvements to (1) provide adequate housing for military families, and (2) achieve the objectives of the Office of the Secretary of Defense (OSD) Planning Guidance. The OSD Planning Guidance requires all Services to "revitalize, divest through privatization, or demolish inadequate housing on or before 2010." Altus AFB has 965 military family housing (MFH) units located on the installation. According to the 1999 Altus AFB Family Housing Master Plan (FHMP) the required inventory is 726 units however, Military Construction Funding (MILCON) is not available for the necessary renovation. Given the lack of military funding for MFH renovations and the need to follow DoD Planning Guidance, Altus AFB began to consider MFH privatization. The FHMP at Altus AFB found that privatization of MFH would be the most cost-effective and time efficient way to provide adequate housing for military families. The following biophysical resources were identified for study in this EA: noise, air quality, earth resources, water resources, infrastructure and utilities, hazardous materials and wastes, biological resources, cultural resources, land use, socioeconomic resources. The proposed action would have no impact on groundwater, sanitary sewer, electricity/natural gas, biological resources cultural resources, land use, demographics, education, potable water use, hazardous materials and environmental justice. There would be minimal short-term impacts to noise, air quality earth resources, surface water resources, solid waste disposal, and traffic counts. There would be positive impacts to drainage, housing, and the economy.					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT Same as Report (SAR)	18. NUMBER OF PAGES 110	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			

FINDING OF NO SIGNIFICANT IMPACT
FINAL ENVIRONMENTAL ASSESSMENT
MILITARY FAMILY HOUSING PRIVATIZATION
ALTUS AIR FORCE BASE, OKLAHOMA

AGENCY: 97th Air Mobility Wing, Altus Air Force Base (AFB), Oklahoma.

BACKGROUND: Altus AFB has 965 military family housing (MFH) units located on the installation. The Office of the Secretary of Defense (OSD) Planning Guidance requires all Services to "revitalize, divest through privatization, or demolish inadequate housing on or before 2010." According to the 1999 Altus AFB Family Housing Master Plan (FHMP) the required inventory is 726 units; however, Military Construction Funding (MILCON) is not available for the necessary renovation of these units.

Given the lack of military funding for MFH renovations and the need to follow OSD Planning Guidance, Altus AFB began to consider MFH privatization. The FHMP at Altus AFB found that privatization of MFH would be the most cost-effective and time efficient way to provide adequate housing for military families and meet the objectives of the OSD Planning Guidance.

Pursuant to National Environmental Policy Act guidance, Title 32 Code of Federal Regulations (CFR) Part 989, and other applicable federal and local regulations, the Air Force has conducted an assessment of the potential environmental consequences of MFH privatization at Altus AFB, Oklahoma.

PROPOSED ACTION: The Air Force proposes to privatize MFH at Altus AFB by entering into a real estate transaction with a contractor to plan, design, develop, demolish, construct, renovate, replace, own, operate, maintain, and manage the MFH area for military personnel for a period of 50 years. The contractor would have the option to renovate or replace the existing MFH.

The contractor would perform the following within the first five years: (1) whole house renovations for 401 units, (2) renovation of 183 units, (3) demolition of 381 units, (4) construction of 142 units, and (5) complete necessary infrastructure improvements such as installation of utility meters, jogging trails, street drainage, and playgrounds. Whole house renovations on all units would begin in year 25 to be completed within 72 months.

SUMMARY OF FINDINGS: The potential environmental effects of the proposed action were assessed for the following resources: noise, air quality, earth resources, water resources, infrastructure and utilities, hazardous materials and wastes, biological resources, cultural resources, land use, and socioeconomic resources. Potential impacts of the proposed action to each environmental resource are summarized below.

Noise. The primary noise from project activities will be generated by vehicles and equipment involved in site clearing, grading, MFH demolition and construction, and finish work. Short duration exposures to noise levels above the ambient daytime noise level in the MFH areas will occur, and annoyances to sensitive noise receptors adjacent to the construction locations can be expected. Because construction activities are of relatively short duration, there will be no long-term increase in ambient noise levels. Therefore, the proposed action will have no significant impact on sensitive receptors located near the proposed projects.

Land Use. There will be no change in land use associated with the proposed action. The land would be leased and housing units conveyed to a private developer for MFH. Therefore, there would be no impact to land use.

Air Quality. Heavy equipment exhaust and fugitive dust emissions will be generated during remodeling/construction/demolition activities; however, these emissions are temporary in nature and are not expected to cause long-term impact to local or regional air quality. All 12 counties within Altus' Air Quality Control Region are classified as attainment or unclassified for all criteria pollutants. A conformity determination is not required. The proposed action would not be considered regionally significant.

Socioeconomic Resources. The proposed action will not cause a change in population size. The management of the MFH will be transferred to a private contractor. There will be positive impacts to housing and quality of life for military families through modernization of housing units. It may be necessary to move military families off the installation or to surplus on-base housing for the first phase of construction. There will be no change in education requirements. There will be short-term positive impacts to the economy from increased employment and funds expended for construction. It is assumed that the MFH contractor would require similar staffing levels to manage the MFH, resulting in no net loss of jobs. By definition, if the socioeconomic indicators were within the Economic Impact Forecast System (EIFS)-established Rational Threshold Values (RTVs) for that fiscal year, the social and economic effects of the action would be determined to be not significant.

Cultural Resources. There are no significant historic buildings, structures, objects, or archaeological sites located in the MFH area. Therefore, there will be no impact to cultural resources.

Hazardous Materials and Wastes. Hazardous materials (fuels, oils, lubricants, adhesives, sealants, additives) will be used in association with the construction activities and would be managed by the contractor in compliance with base management practices, as would any asbestos and lead-based paint generated by the demolition projects. Existing hazardous waste management procedures would accommodate these temporary increases. In the event soils where pesticides were applied are excavated as part of the proposed action, additional sampling and health screening may be required. This would be accomplished to determine worker safety, the potential exposure levels for soils retained on site, and to properly characterize the soil for hazardous constituents including toxicity as per applicable state and federal regulations for disposal off site. No Environmental Restoration Program (ERP) sites are located within the project area. Therefore, significant impacts to hazardous materials and wastes or ERP sites are not anticipated as a result of the proposed action.

Infrastructure/Utilities. The proposed construction activities will cause a short-term increase in solid waste generation and disposal (approximately 40,848 tons during initial phase, approximately 15,433 tons during later renovations). This short-term increase in solid waste disposal represents a 22 percent increase in solid waste disposal at the City of Altus landfill; however, there is sufficient landfill space to accommodate this increase. There will also be a short-term increase in traffic counts. There is the potential for transportation of heavy equipment, materials, and roll-off dumpsters to adversely affect road surface conditions if the roadway is not adequate to support continued heavy equipment traffic for an extended time. There will be no long-term increases in solid waste generation or traffic counts. There will be an expected on-base decrease in potable water usage, wastewater generation, and electricity/natural gas consumption due to the decrease in MFH units. However, because the overall population numbers will remain constant, there will be no overall change in community potable water usage, wastewater generation, or electricity/natural gas consumption. Construction activities require preparation and implementation of a Storm Water Pollution Prevention Plan (SWPPP), which will minimize short-term increase in soil erosion and sediment loadings in storm water runoff. Long-term impacts to the drainage system would be positive. No significant impacts to infrastructure/utilities are expected from the proposed action.

Earth Resources. Renovation and/or demolition activities associated with the proposed action will require limited soil disturbance. These activities are typical of construction projects. During construction, erosion control measures would be implemented. No significant impacts to earth resources are expected from the proposed action.

Water Resources. Construction activities will cause slight short-term impacts to surface water quality, but these impacts will be minimized through implementation of a SWPPP. Drainage improvements will have a positive effect on surface water quality. Demolition of nine MFH units within the 100-year floodplain will have a beneficial effect by restoring floodplain values. No impacts to groundwater will occur. Significant impacts to regional water quality or quantity are not expected from the proposed action.

Biological Resources. The proposed action will cause short-term impacts to non-native vegetation in construction/demolition areas; however, those areas would be revegetated upon completion of project activities. The proposed activities will not impact wildlife. No threatened or endangered species are known to exist at Altus AFB. No jurisdictional wetlands are located on or in the vicinity of the MFH, however, the unnamed tributaries to Stinking Creek located within the property are regulated waterways. The placement of dredged or fill material in these waterways would require Department of the Army authorization pursuant to Section 404 of the Clean Water Act prior to commencement. The proposed action will have no significant impact on biological resources.

ALTERNATIVE 1 – DEMOLISH 782 UNITS AND REBUILD 543 UNITS: This alternative is similar to the proposed action except that 782 MFH units would be demolished (all except Great Plains housing) and 543 new units would be constructed. The resulting 726 units would be renovated again later in the program. Impacts from Alternative 1 would be the same as the Proposed Action with the following exceptions. There would be a short-term increase in solid waste generation and disposal of approximately 60,650 tons (19,802 more than the

proposed action) over the first phase of the project (5 years). This represents a 34 percent increase in solid waste disposal at the City of Altus landfill. Increased construction and demolition activities would increase vehicular traffic and the chance of adversely affecting road surface conditions. Implementation of Alternative 1 would increase the potential for sediment loading of surface water downstream of the MFH area, which would be minimized with a SWPPP.

NO ACTION ALTERNATIVE: Under the No Action Alternative, Altus AFB would retain all 965 MFH units. Because of limited funding, there would be no whole house renovations or periodic capital repair and replacements under this alternative. As such, MFH at Altus would continue to deteriorate.

SUMMARY OF CUMULATIVE IMPACTS: The cumulative impact of implementing this proposed action along with other past, present, and future projects at Altus AFB and the surrounding community were assessed. No significant cumulative impacts were identified.

ENVIRONMENTAL JUSTICE: Activities associated with the No Action Alternative, Proposed Action, and Alternative Action will not impose adverse environmental effects on adjacent populations. Therefore, no disproportionately high and adverse effects will occur to minority populations and low-income populations.

DECISION: Based on my review of the facts and analysis contained in this environmental assessment, which are incorporated herein, I conclude the implementation of the Proposed Action will not have a significant impact either by itself or considering cumulative impacts. Accordingly, the requirements of the National Environmental Policy Act, regulations promulgated by the President's Council on Environmental Quality, and Air Force Instruction 32-7061 are fulfilled and an environmental impact statement is not required.



DAVID R. MILLER, Colonel, USAF
Chairperson, Environmental Protection Committee
Altus Air Force Base, Oklahoma

2 Nov 04

Date

**Final
Environmental Assessment**

Military Family Housing Privatization

Prepared For:

**Department of the Air Force
97th Air Mobility Wing
Altus Air Force Base, Oklahoma**

July 2004

COVER SHEET

Responsible Agency: 97th Air Mobility Wing (97 AMW), Altus Air Force Base (AFB), Oklahoma.

Proposed Action: Privatize Military Family Housing at Altus AFB, Jackson County, Oklahoma.

Point of Contact: 97 CES/CEVN, 401 "L" Avenue, Altus AFB, Oklahoma 73523-5138, (580) 481-7606.

Report Designation: Environmental Assessment (EA)

Abstract: The Air Force proposes to privatize military family housing (MFH) in order to provide a feasible way to accelerate housing improvements to (1) provide adequate housing for military families, and (2) achieve the objectives of the Office of the Secretary of Defense (OSD) Planning Guidance. The OSD Planning Guidance requires all Services to "revitalize, divest through privatization, or demolish inadequate housing on or before 2010."

Altus AFB has 965 military family housing (MFH) units located on the installation. According to the 1999 Altus AFB Family Housing Master Plan (FHMP) the required inventory is 726 units; however, Military Construction Funding (MILCON) is not available for the necessary renovation. Given the lack of military funding for MFH renovations and the need to follow DoD Planning Guidance, Altus AFB began to consider MFH privatization. The FHMP at Altus AFB found that privatization of MFH would be the most cost-effective and time efficient way to provide adequate housing for military families.

The following biophysical resources were identified for study in this EA: noise, air quality, earth resources, water resources, infrastructure and utilities, hazardous materials and wastes, biological resources, cultural resources, land use, socioeconomic resources. The proposed action would have no impact on groundwater, sanitary sewer, electricity/natural gas, biological resources, cultural resources, land use, demographics, education, potable water use, hazardous materials and environmental justice. There would be minimal short-term impacts to noise, air quality, earth resources, surface water resources, solid waste disposal, and traffic counts. There would be positive impacts to drainage, housing, and the economy.

(no document text this page)

TABLE OF CONTENTS

CHAPTER 1 PURPOSE OF AND NEED FOR ACTION	1-1
1.1 Purpose of and Need for Action.....	1-1
1.2 Location of Proposed Action	1-2
1.3 Decision to be Made	1-2
1.4 Scope of the Environmental Review.....	1-5
1.5 Applicable Regulatory Requirements	1-6
1.6 Introduction to the Organization of the Document	1-6
CHAPTER 2 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES	2-1
2.1 History of the Formulation of Alternatives.....	2-1
2.2 Identification of Alternatives Eliminated From Consideration	2-2
2.3 Detailed Description of Proposed Action	2-2
2.4 Description of the No Action Alternative	2-3
2.5 Alternative 1 – Demolish 782 Units and Rebuild 543 Units	2-4
2.6 Other Actions Planned for Altus AFB and Surrounding Community	2-4
2.7 Comparison Matrix of Environmental Effects of All Alternatives.....	2-5
2.8 Identification of the Preferred Alternative	2-5
CHAPTER 3 AFFECTED ENVIRONMENT	3-1
3.1 Description of the Affected Environment.....	3-1
3.1.1 Noise	3-1
3.1.2 Land Use	3-3
3.1.3 Air Quality	3-4
3.1.4 Socioeconomic Resources	3-9
3.1.5 Cultural Resources	3-13
3.1.6 Hazardous Materials and Waste.....	3-14
3.1.7 Infrastructure/Utilities.....	3-21
3.1.8 Earth Resources	3-24
3.1.9 Water Resources	3-25
3.1.10 Biological Resources	3-28
CHAPTER 4 ENVIRONMENTAL CONSEQUENCES	4-1
4.1 Description of the Effects of All Alternatives on the Affected Environment.....	4-1
4.1.1 Noise	4-1
4.1.2 Land Use	4-3

4.1.3	Air Quality	4-4
4.1.4	Socioeconomic Resources	4-6
4.1.5	Cultural Resources	4-10
4.1.6	Hazardous Materials and Wastes	4-11
4.1.7	Infrastructure and Utilities	4-13
4.1.8	Earth Resources	4-19
4.1.9	Water Resources	4-20
4.1.10	Biological Resources	4-22
4.1.11	Cumulative Effects.....	4-24
CHAPTER 5 LIST OF PREPARERS.....		5-1
CHAPTER 6 LIST OF PERSONS AND AGENCIES CONSULTED		6-1
CHAPTER 7 REFERENCES.....		7-1

LIST OF FIGURES

Figure 1-1	Vicinity Map	1-3
Figure 1-2	Location Map	1-4
Figure 3-1	Typical A-Weighted dBA Sound Pressure (Noise) Levels.....	3-2
Figure 3-2	Locations of ERP Sites and Other Compliance Sites	3-19
Figure 3-3	100 Year Floodplain	3-26

LIST OF TABLES

Table 1-1	Potentially Required Federal Permit, License, or Entitlement	1-9
Table 2-1	Condition Assessment Matrix	2-1
Table 2-2	Summary of Activities.....	2-3
Table 2-3	Summary of Environmental Effects	2-7
Table 3-1	National Ambient Air Quality Standards	3-6
Table 3-2	Percentage of Regional (AQCR) Emissions Contributed by Altus AFB Stationary Sources	3-8
Table 3-3	Estimated Air Emissions (Baseline) for Airfield Operations, Including Ground Support Equipment, at Altus AFB.....	3-9
Table 3-4	Altus AFB Gross Payroll (FY02).....	3-12
Table 3-5	ERP Sites Within ½ Mile of MFH	3-20
Table 3-6	Other Compliance sites Within ½ Mile of MFH.....	3-22
Table 4-1	Heavy Equipment Noise Levels at 50 Feet	4-2
Table 4-2	Expected Emissions per Construction Year	4-6
Table 4-3	Comparison of Significance Threshold RTVs to Forecasted Impacts of Proposed Action	4-7
Table 4-4	Comparison of Significance Threshold RTVs to Forecasted Impacts of Alternative 1	4-9
Table 4-5	Solid Waste Generation from Renovation, Construction, or Demolition Activity.....	4-15
Table 4-6	Comparison of Significance Threshold RTVs to Forecasted Cumulative Impacts.....	4-25

APPENDICES

- Appendix A – Interagency Coordination
- Appendix B – Public Announcement
- Appendix C – Public Comments
- Appendix D – Air Pollutant Emission Calculations
- Appendix E – Solid Waste Generation Calculations

(no document text this page)

ACRONYMS AND ABBREVIATIONS

ACM	asbestos containing material
AFB	Air Force Base
AIRFA	American Indian Religious Freedom Act
AMW	Air Mobility Wing
AQCR	Air Quality Control Region
ARPA	Archaeological Resources Protection Act
bgs	below ground surface
CAA	Clean Air Act
CAM	Condition Assessment Matrix
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CEV	Environmental Flight
CFR	Code of Federal Regulations
CO	carbon monoxide
COC	community of comparison
CWA	Clean Water Act
CY	Calendar Year
dB	Decibel
dBA	A-weighted Decibel
DNL	Day-Night Average Sound Level
DoD	Department of Defense
EA	Environmental Assessment
EBS	Environmental Baseline Survey
EIAP	Environmental Impact Analysis Process
EIFS	Economic Impact Forecast System
EIS	Environmental Impact Statement
EO	Executive Order
ERA	Environmental Restoration Account
ERP	Environmental Restoration Program
ESA	Endangered Species Act

°F	degrees Fahrenheit
FAA	Federal Aviation Administration
FHMP	Family Housing Master Plan
FIRM	Flood Insurance Rate Map
FONSI	Finding of No Significant Impact
FY	Fiscal Year
GSF	gross square feet
HQ AETC	Headquarters Air Education and Training Command
HVAC	Heating, Ventilating and Air Conditioning
IICEP	Junior Non-Commissioned Officer
KWH	kilowatt hours
LBP	lead-based paint
lbs/sf	pounds per square foot
L _p	sound pressure level
mcf	million cubic feet
MILCON	Military Construction
MFH	Military Family Housing
mg/L	milligrams per liter
msl	mean sea level
µg/m ³	micrograms per cubic meter
NAGPRA	Native American Grave Protection and Repatriation Act
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NFRAP	National Historic Preservation Act
NO ₂	nitrogen dioxide
NO _x	nitrogen oxides
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Places
O ₃	ozone
ODEQ	Oklahoma Department of Environmental Quality
OSD	Office of the Secretary of Defense
OSHA	Occupational Safety and Health Administration

PCBs	polychlorinated biphenyls
pCi/L	picocuries per liter
PM	particulate matter
PM _{2.5}	particulate matter equal or less than 2.5 micrometers in diameter
PM ₁₀	particulate matter equal or less than 10 micrometers in diameter
POL	Petroleum, Oils and Lubricants
POV	personal operated vehicle
PPA	Pollution Prevention Act
ppm	parts per million
PVC	polyvinyl chloride
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
RI	Remedial Investigation
RTV	rational threshold value
SFHAs	special flood hazard areas
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SO ₂	sulfur dioxide
SO _x	sulfur oxides
sf	square feet
SWMU	Solid Waste Management Unit
SWPPP	Stormwater Pollution Prevention Plan
tpy	tons per year
TSP	total suspended particulate
U.S.	United States
USACE	United States Army Corps of Engineers
USC	United States Code
USCB	United States Census Bureau
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service

USTs	Underground Storage Tanks
VOCs	volatile organic compounds

CHAPTER 1

PURPOSE OF AND NEED FOR ACTION

This section has six parts: a statement of the purpose of and need for action, a description of the location of the proposed action, identification of the decision to be made, a description of the scope of the environmental review, identification of applicable regulatory requirements, and an introduction to the organization of the document.

This environmental assessment (EA) was prepared pursuant to the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality (CEQ) regulations implementing the NEPA, and Air Force implementing instructions in 32 Code of Federal Regulations (CFR) Part 989.

1.1 PURPOSE OF AND NEED FOR ACTION

The Office of the Secretary of Defense (OSD) Planning Guidance requires that all Services "revitalize, divest through privatization, or demolish inadequate housing by or before 2010" (OSD 1997). In the absence of available Military Construction (MILCON) funding, the 1996 Defense Authorization Act provides the Air Force and other Services with new ways to make the goal achievable. Specifically, Services may use private capital to meet housing requirements if the installation Family Housing Master Plan (FHMP) finds that this approach is economically feasible.

FHMPs provide a strategy to integrate and prioritize construction, operations, and maintenance funding with private sector financing; and identifies the most cost-effective and time efficient investment option at the installation. Altus Air Force Base (AFB) has been identified in its 1999 FHMP as a viable site for privatization as an alternative to achieve the 97th Air Mobility Wing (AMW), Headquarters Air Education and Training Command (HQ AETC), and Department of Defense (DoD) Year 2010 objectives for military family housing.

Altus AFB currently has 965 military family housing (MFH) units in its inventory, however the required inventory is 726 units, leaving a surplus of 239 units. All of these units are considered eligible for privatization. The MFH is divided into three communities. Capehart housing contains 700 units of which 401 units require whole-house renovations, 299 units would be demolished and 60 units would be rebuilt. Bicentennial housing contains 82 units which would all be demolished and rebuilt. Great Plains housing contains 183 units that were built in Fiscal Year (FY) 1999 and require partial renovations of adding storm shelters. The 97 AMW goal is to accelerate these improvements to MFH units in order to achieve the objectives in the OSD guidance.

The 401 units requiring whole-house renovations are located in the Capehart housing area. These units were constructed in 1959 and some have had renovations since that time. Condition assessments were completed as part of the FHMP and the resultant scoring identified these units as requiring renovation.

Complete replacement of 142 units and whole-house renovation of 401 units is necessary because these units no longer meet minimum Air Force requirements for adequate, modern housing described in the OSD 2010 guidance. Of the 142 units to be replaced, 82 units are located in the Bicentennial housing area and 60 units are located in the Capehart area. These houses were built in 1959 & 1977 and have had only minor interior renovations and some exterior work performed since that time. The 82 units currently in Bicentennial are 4-bedroom Junior Non-Commissioned Officer (JNCO) quarters that have 1,593 to 1,683 gross square feet (gsf). The 142 new units would also have three and four bedrooms with up to 2,700 gsf.

Some infrastructure improvements are planned, including installation of gas and electric meters for all 726 units in order to monitor utility usage and for individual unit billing. Jogging trails and street drainage need to be repaired and the playground lots need to be upgraded.

There is a significant desire of military members to occupy MFH at Altus AFB. As of October 2003, there were 24 families on the waiting list with an average waiting period, regardless of rank and bedroom requirements, of zero to two months. The largest group (9 families) on the waiting list are JNCOs waiting 1-2 months for 2-bedroom housing. The size of the waiting list illustrates the desire of military families to occupy government housing and supports the early renovation and replacement objectives of the 97 AMW.

MFH privatization at Altus AFB would provide a feasible way to accelerate housing improvements to (1) provide adequate housing for military families, and (2) achieve the objectives of the Defense Planning Guidance.

1.2 LOCATION OF PROPOSED ACTION

Altus AFB is located in Jackson County, on the eastern end of the City of Altus, Oklahoma (Figure 1-1). The base includes approximately 5,000 acres. Urban development exists to the west, while much of the land to the east, south and north is agricultural and undeveloped land. The housing areas are all in the same general area at the edge of the base perimeter (Figure 1-2).

1.3 DECISION TO BE MADE

This EA documents analysis of the potential environmental consequences of actions associated with privatization that include renovations, construction and demolition activities. Based on this information, the Chairman of the Environmental Protection Committee at Altus AFB will determine whether to prepare a Finding of No Significant Impact (FONSI) or to prepare an Environmental Impact Statement (EIS). As required by NEPA and its implementing regulations, preparation of an environmental document must

Figure 1-1 Vicinity Map

Figure 1-2 Location Map

precede final decisions regarding the proposed project, and be available to inform decision-makers and the public of the potential environmental impacts of selecting the Proposed Action, Alternative 1, or No Action Alternative.

1.4 SCOPE OF THE ENVIRONMENTAL REVIEW

NEPA was enacted to ensure federal agencies consider the environmental effects of their actions. The intent of NEPA is to protect, restore, or enhance the environment through well-informed federal decisions. Under NEPA, federal agencies are required to systematically assess the environmental consequences of their proposed actions during the decision making process. The CEQ was created to develop implementation regulations and oversee the efforts of federal agencies to implement NEPA programs. NEPA implementation regulations were issued in 1978, and are included in Title 40 CFR Parts 1500-1508.

This EA identifies, describes, and evaluates the potential environmental impacts that are associated with privatization such as renovations and construction of MFH, taking into consideration possible cumulative impacts from other actions. As appropriate, the affected environment and environmental consequences of the action may be described in terms of a regional overview or a site-specific description. Although mitigation measures are not required, this EA will identify operating procedures that could be implemented to further minimize environmental impacts. FY2003 or the most current information is used as the baseline condition.

The following topics have been identified for study at Altus AFB: noise, air quality, earth resources, water resources, infrastructure and utilities, hazardous materials and wastes, biological resources, cultural resources, land use, and socioeconomic resources. Airspace and aircraft operations will not be evaluated as part of this EA because the proposed action and alternatives will not affect these components of the installation. Additionally, the safety and health impacts arising during the construction and maintenance of the facilities will not be evaluated as all contractors would be responsible for compliance with applicable Occupational Safety and Health Administration (OSHA) regulations specifying appropriate protective measures for all employees.

Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, was issued by the President on February 11, 1994. In the EO, the President instructed each Federal Agency to make “achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations. Adverse is defined by the Federal Interagency Working Group on Environmental Justice as ‘having a deleterious effect on human health or the environment that is significant, unacceptable, or above generally accepted norms.’ Based on analysis of impacts in this EA, a determination on significance of impacts will be made in a decision document. If impacts would be significant, the Air Force would either prepare an EIS or not implement the proposal. If impacts would not be significant, a Finding of No Significant Impacts (FONSI) would be prepared. Accordingly, Environmental Justice will be addressed either in a FONSI or in a Record of Decision (ROD) based on an EIS.

The Air Force has announced other independent actions for Altus AFB concurrent with the proposed action. The environmental impacts of these other actions have been analyzed in separate NEPA documents. In addition, other actions are planned for the surrounding community (see Section 2.6). Through the Air Force Intergovernmental and Interagency Coordination for Environmental Planning (IICEP), requests have been made for information on these and other planned actions in the surrounding community.

This EA addresses the environmental impacts of these other actions only in the context of potential cumulative impacts, if any. A cumulative impact, as defined by the CEQ (40 CFR 1508.7), is the “impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of which agency (federal or non-federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.”

1.5 APPLICABLE REGULATORY REQUIREMENTS

This EA is documentation of the Air Force Environmental Impact Analysis Process (EIAP), and complies with NEPA, the CEQ regulations, and Air Force instructions in 32 CFR 989, *Environmental Impact Analysis Process*. The EA will consider all applicable laws and regulations, including but not limited to the following:

- Air Force Instruction (AFI) 32-7060, Interagency and Intergovernmental Coordination for Environmental Planning (IICEP)
- National Historic Preservation Act (NHPA)
- Archaeological Resources Protection Act (ARPA)
- Clean Air Act (CAA)
- AFI 32-7040, Air Quality Compliance
- Clean Water Act (CWA)
- Endangered Species Act (ESA)
- Pollution Prevention Act (PPA)

Table 1-1 presents potentially required federal permits, licenses, and entitlements. Also, a storm water pollution plan would be required.

1.6 INTRODUCTION TO THE ORGANIZATION OF THE DOCUMENT

This EA is organized into seven chapters. Chapter 1 contains a statement of the purpose of and need for action, the location of the proposed action, identification of the decision to be made, a summary of the scope of the environmental review, identification of applicable regulatory requirements, and a description of the organization of the EA. Chapter 2 describes the history of

the formulation of alternatives, describes the alternatives eliminated from further consideration, provides a detailed description of the proposed action, describes the no action and other action alternatives, summarizes other actions announced for Altus AFB and surrounding community, provides a comparison matrix of environmental effects for all alternatives, and identifies the preferred alternative. Chapter 3 contains a general description of the current conditions of the biophysical resources that potentially could be affected by the proposed or alternative actions. Chapter 4 is an analysis of the environmental consequences. Chapter 5 lists preparers of this document. Chapter 6 lists persons and agencies consulted in the preparation of this EA. Chapter 7 is a list of source documents relevant to the preparation of this EA.

(no document text this page)

Table 1-1 Potentially Required Federal Permit, License, or Entitlement

Federal Permit, License, or Entitlement	Typical Activity, Facility, or Category of Persons Required to Obtain the Federal Permit, License, or Entitlement	Authority	Regulatory Agency
Title V permit under the CAA	Sources subject to the Title V permit program include: Any major source: (1) A stationary source that emits or has the potential to emit 100 tons per year (tpy) of any pollutant (major source threshold can be lower in non-attainment areas), (2) A major source of air toxics regulated under Section 112 of Title III (sources that emit or have the potential to emit 10 tpy or more of a hazardous air pollutant or 25 tpy or more of any combination of hazardous air pollutants). Any “affected source” as defined in Title IV (acid rain) of the CAA. Any source subject to New Source Performance Standards under Section 111 of the CAA. Sources required to have new source or modification permits under Parts C {Prevention of Significant Deterioration (attainment areas)} or D {New Source Review (non-attainment areas)} of Title I of the CAA. Any source subject to standards, limitations, or other requirements under Section 112 of the CAA. Other sources designated by USEPA in the regulations.	Title V of CAA, as amended by the 1990 CAA Amendments	USEPA; ODEQ
National Pollutant Discharge Elimination System permit	Discharge of pollutant from any point source into navigable waters of the United States and/or construction on sites > 5 acres, or on sites >1 acre if part of a larger common plan of development.	§ 402 of Clean Water Act; 33 USC, §1342 40 CFR 112	USEPA; ODEQ

ARPA	Excavation and/or removal of archaeological resources from public lands or American Indian lands and carrying out activities associated with such excavation and/or removal.	ARPA of 1979, 16 USC 470AA <i>et seq.</i>	US Department of the Interior - National Park Service
National Historic Preservation Act consultation	Federal undertakings which have the potential to adversely affect properties included in or eligible for inclusion in the National Register of Historic Places.	National Historic Preservation Act, §106	Oklahoma Historical Society
Endangered Species Act	Taking endangered or threatened wildlife species; engaging in certain commercial trade of endangered or threatened plants or removing such plants on property subject to federal jurisdiction.	Section 10 of Endangered Species Act, 16 USC 1539; 50 CFR 17 Subparts C, D, F, and G	USFWS
CWA	Discharge of dredged or fill materials, toxic constituents in wastewater, and storm water into the waters of the United States (to include wetlands).	33 USC 1251 <i>et seq.</i>	USEPA and USACE

ARPA= Archaeological Resources Protection Act
CAA= Clean Air Act
CWA=Clean Water Act
ODEQ=Oklahoma Department of Environmental Quality
tpy=tons per year

USACE=United States Army Corps of Engineers
USC=United States Code
USEPA=United States Environmental Protection Agency
USFWS=United States Fish and Wildlife Service

CHAPTER 2

DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

This chapter is composed of eight parts: a brief history of the formulation of alternatives, identification of alternatives eliminated from further consideration, a detailed description of the proposed action, a description of the no action alternative, a description of other action alternatives, identification of other proposed actions planned for Altus AFB, a summary of environmental impacts of all alternatives, and identification of the preferred alternative.

2.1 HISTORY OF THE FORMULATION OF ALTERNATIVES

The existing MFH at Altus AFB consists of three housing areas, the Capeheart, Bicentennial and Great Plains housing areas. The MFH requirement at Altus AFB is 726 units, and the current number of MFH units at the base is 965 units. There is a significant desire of military members to occupy MFH at Altus AFB, as illustrated by an occupancy rate of over 90 percent, a waiting list currently consisting of 24 names, and a waiting period of up to two months for a family to be accommodated in MFH (October 2003 data). The size of the waiting list illustrates the desire of military families to occupy government housing and supports the early renovation and replacement objectives of the 97 AMW.

A MFH Condition Assessment was performed and included in the August 1999 FHMP, which indicated that 43 percent of housing at Altus AFB has a condition score below the 3.75 renovation threshold set by the Air Force. Table 2-1 shows the Condition Assessment Matrix (CAM).

Table 2-1 Condition Assessment Matrix

Score	Description
1.0	Major Maintenance/Repair Required
2.0	Moderate Maintenance/Repair Required
3.0	Minor Maintenance/Repair Required
4.0	Meets Standards
5.0	Exceeds Standards

Additionally, the Air Force has established minimum, benchmark and maximum guidelines for gsf based on number of bedrooms and grade/rank (USAF 2002a). The MFH units were assessed against the minimum acceptable size and compliance with minimum functional requirements was assessed as outlined in the Air Force Family Housing Guide “Blue Book”.

Altus AFB was identified in the 1999 FHMP as a viable site for privatization. All of the 965 MFH units are considered eligible for privatization. Based on the condition, size and functionality assessments noted above, 142 units have been identified for complete replacement, 401 units require whole-house renovation, 183 units require partial renovation of adding storm shelters, and 381 units would be demolished of which 239 are surplus units. The scope of renovations required to meet the whole-house standard include roofing; soffits; siding; kitchen modernization; utilities upgrades; flooring replacement; bathroom modernization; heating, ventilation and air conditioning (HVAC) replacement; drywall replacement; interior painting; garage repair; increased square footage; installation of an underground tornado shelter for each unit; and window replacement.

In order to comply with the OSD directive and provide for necessary revisions, the 97 AMW determined that privatization is a feasible option to provide adequate housing for military families.

2.2 IDENTIFICATION OF ALTERNATIVES ELIMINATED FROM CONSIDERATION

One additional alternative to the proposed action was initially considered but ultimately eliminated from further consideration. The replacement of 461 units in Capehart was eliminated from further consideration. The Proposed Action, as described below, is the minimum amount of MFH renovation, demolition and reconstruction that the Air Force would allow a contractor to perform on Altus AFB. Alternative 1, as described below, is the maximum amount of MFH demolition, reconstruction, and renovation that the Air Force would allow to occur on Altus AFB. The MFH privatization contractor could propose an unlimited number of variations of demolition, reconstruction, and renovation on Altus AFB as long as their proposals fit the requirements as described under the Proposed and Alternative actions. Choosing the alternatives described below captures the range of effects that could occur as a result of privatization while providing the most flexibility to the privatization contractor.

2.3 DETAILED DESCRIPTION OF PROPOSED ACTION

The Air Force proposes to privatize MFH at Altus AFB by entering into a real estate transaction with a private developer to plan, design, develop, demolish, construct, renovate, replace, own, operate, maintain and manage the MFH for military personnel for a period of 50 years. Housing proposed for privatization includes the Bicentennial (82 units), Great Plains (183 units) and Capehart (700 units) housing areas (Figure 1-2). Overall, privatization would include conveyance of 965 MFH units to a private developer for a period of 50 years beginning in FY2004. All of the utility lines (water, sewer, and gas mains and laterals) in the housing areas would also be conveyed to the privatization contractor. The Government would retain ownership of the underlying land and lease it to the private developer.

According to the FHMP, there is a required inventory of MFH at Altus AFB of 726 units and there are currently 965 units. The development program would consist of whole-house renovations to 401 units and 60 new units constructed in the Capehart housing area within 5 years. The whole-house renovation requirements include roofing, siding, soffits, kitchen modernization, utilities upgrades, flooring replacement, bathroom modernization, HVAC

replacement, drywall replacement, interior painting, garage repair, increased square footage, installation of an underground tornado shelter for each unit, and window replacement. Partial renovations would occur on 183 units in the Great Plains area. The partial renovation activities would include some of the items identified above and would be based on individual unit assessment to bring them up to current standards. Necessary infrastructure improvements include installation of utility meters, jogging trails, street drainage, and playgrounds.

All 82 units in the Bicentennial housing area would be demolished and rebuilt. New underground tornado shelters would be installed for the 401 whole-house renovated units in the Capehart area, the 82 newly constructed units in the Bicentennial area, and the 60 units rebuilt in the Capehart area. There are currently 239 surplus units in the MFH inventory, these units would be demolished. Table 2-2 provides a summary of the activities discussed above.

Table 2-2 Summary of Activities

Activity Proposed	Number of Units Involved	Housing Area
Privatization	965	All
Whole-house renovation	401	Capehart
Partial renovation	183	Great Plains
Demolition	299	Capehart
	82	Bicentennial
New Construction	60	Capehart
	82	Bicentennial

Under the proposed action, all MFH would be renovated again later in the program. Renovation would be whole-house as described above except there would be no addition of square footage or construction of tornado shelters. Renovation would begin in year 25 (FY2030) of privatization for all units and would be completed within 6 years (FY2036).

Renovation and demolition/construction activities would be selectively phased as families move out to minimize displacement. Those families requiring temporary displacement to accommodate the renovation/demolition/construction schedule would be moved by the Air Force to off-base quarters until a new house becomes available for occupation. At that time, the Air Force would move families into their new homes.

2.4 DESCRIPTION OF THE NO ACTION ALTERNATIVE

Under the no action alternative the Air Force would retain all 965 MFH units at Altus AFB. Because of limited military funding, renovations and periodic repair would occur but not on a

schedule that would meet the OSD 2010 directive. As such, MFH at Altus AFB would continue to deteriorate, military families would be placed in inadequate housing, and Altus AFB would not be in compliance with the OSD 2010 directive.

2.5 ALTERNATIVE 1 – DEMOLISH 782 UNITS AND REBUILD 543 UNITS

Alternative 1 is the same as the Proposed Action except that 782 MFH units (all except Great Plains) at Altus AFB would be demolished and 543 new units would be constructed. The resulting 726 units would be renovated again later in the program as described under the Proposed Action. Activities associated with new construction under the Proposed Action, including necessary infrastructure improvements, would be the same under this alternative. Renovation of the structures later in the program, as described under the Proposed Action, would also be the same under this alternative.

2.6 OTHER ACTIONS PLANNED FOR ALTUS AFB AND SURROUNDING COMMUNITY

In addition to the proposed action, the Air Force has announced other proposed independent projects at Altus AFB, addressed in separate NEPA documents. These include:

- Construction of a new golf course maintenance facility with accompanying restrooms and covered rest area for use by golfers.
- Construction of a new C-17 cargo containment training facility adjacent to the existing facility.
- Construction of a new civil engineer complex. This would include the demolition of seven wooden, three metal and two concrete facilities totaling 60,429 square feet upon completion of the new facility. The new complex would consist of 102,806 square feet in five separate structures.
- Utilities privatization.
- Airfield Repairs, Improvements, and Adjustments to Aircrew Training.
- Change in C-17 and C-5 aircraft training.
- Replacement of 77 dilapidated fire hydrants. This action is waiting funding (Howard 2004).

Projects planned in the Altus area include construction of a new jail (complete) and Department of Human Services building, which is under construction. The Jackson County Memorial Hospital is adding 42,000 square feet to an existing building for more bed space. As far as housing is concerned, developers are not building any new subdivisions, but are adding to existing subdivisions six houses at a time. There is also general business relocation occurring in the City of Altus, the Jackson County Farm Bureau has just completed a new building, and an American car wash has been completed. The City of Altus, Dilapidated Building Commission, through the “New Altus Neighborhoods” project (begun in August 2001), has identified dilapidated homes and commercial sites and 100 abandoned vehicles (Burleson 2003).

A volunteer program raised over \$250,000 to build a children's playground, Imagination Station. The park was completed in December 2002 and is now open, but some final work is being completed, such as paving parking lots (Burleson 2003). Luscombe Aircraft Corporation on the north edge of Altus is planning a new facility to house part of their production process (Urbanski 2003). This facility will be in the airpark industrial area adjacent to the Altus Municipal Airport.

These actions are not directly related to the proposed action evaluated in this EA, but are additional actions announced for the installation and surrounding community. This EA addresses the environmental impacts of these other actions, based on available information, only in the context of potential cumulative impacts, if any.

2.7 COMPARISON MATRIX OF ENVIRONMENTAL EFFECTS OF ALL ALTERNATIVES

Table 2-3 summarizes the effects of the proposed action, alternative, and no action. The no action alternative describes the baseline conditions.

2.8 IDENTIFICATION OF THE PREFERRED ALTERNATIVE

The preferred alternative is to privatize MFH at Altus AFB as described in Section 2.3, Proposed Action.

(no document text this page)

Table 2-3 Summary of Environmental Effects

Resource	Proposed Action Conveyance of 965 MFH Units to Private Developer: Renovation and Demolition as Necessary	Alternative 1 Conveyance of 965 MFH Units to Private Developer: Demolish 782 Units and Rebuild 543 Units	No Action Alternative
Noise	Short-term increase in noise levels from renovation and demolition. No long-term increase in noise levels.	Same as proposed action.	No change.
Land Use	No change.	No change.	No change.
Air Quality	Short-term increases in heavy equipment exhaust and fugitive dust emissions from remodeling/construction activities. No long-term impacts.	Short-term emissions would be greater than those from the proposed action. No long-term impacts.	No change.
Socioeconomic Resources	No change in population size. Positive impacts to housing and quality of life for military families. No change in education requirements. Short-term positive impacts to local economy during construction.	Same as proposed action.	No change. MFH housing at Altus AFB would continue to deteriorate.
Cultural Resources	Historic buildings, structures, objects, and archaeological sites in MFH area are not eligible for the National Register of Historic Places, therefore, no impact to cultural resources.	Same as proposed action.	No change.
Hazardous Materials and Wastes	Contractor would manage hazardous materials and wastes from construction/renovation/demolition. In the event soils where pesticides were applied are excavated as part of the proposed action, additional sampling and health screening may be required. This would be accomplished to determine worker safety, the potential exposure levels for soils retained on site, and to properly characterize the soil for hazardous constituents including toxicity as per applicable state and federal regulations for disposal off site. No project activities are within Environmental Restoration Program (ERP) sites.	Same as proposed action.	No change.

Table 2-4 Summary of Environmental Effects (continued)

Resource	Proposed Action Conveyance of 965 MFH Units to Private Developer: Renovation and Demolition as Necessary	Alternative 1 Conveyance of 965 MFH Units to Private Developer: Demolish 782 Units and Rebuild 543 Units	No Action Alternative
Infrastructure/ Utilities	Short-term increase in solid waste generation and disposal. Short-term increase in traffic counts and potential for transportation of heavy equipment/materials to adversely affect road surface conditions. No long-term impacts to solid waste generation or traffic counts. Expected decrease in potable water usage, wastewater generation, and electricity/natural gas consumption due to fewer MFH units located on base after project completion, but no overall change since population size would remain the same. Construction activities require preparation and implementation of a Storm Water Pollution Prevention Plan (SWPPP), which would minimize short-term increase in soil erosion and sediment loadings in storm water runoff. Long-term impacts to drainage would be positive.	Same as proposed action except there would be more short-term solid waste generation due to increased demolition activities (19,802 tons more than the proposed action). Increased construction and demolition traffic could more adversely affect road surfaces than the proposed action.	No change.
Earth Resources	Limited soil disturbance typical of construction activities. No long-term impacts.	Same as proposed action except larger area of soil disturbance.	No change.
Water Resources	Slight short-term impacts to surface water quality, minimized by implementation of a SWPPP. Drainage improvements would have a positive effect on surface water quality. Positive long-term impacts due to restoration of 100-yr floodplain from demolition of MFH units within floodplain.	Same as proposed action except increased potential for sediment loading of surface water downstream of MFH area (minimized by SWPPP), due to larger surface disturbance.	No change. The nine MFH units currently in the floodplain would be at risk during future flood events.
Biological Resources	Short-term impacts to vegetation in construction/demolition areas. Areas would be revegetated upon completion of project activities. No long-term impacts. No wildlife impacts. No threatened or endangered species at Altus AFB. No wetlands in MFH area. Unnamed tributaries to Stinking Creek are regulated waterways and would be subject to Department of the Army authorization for placement of dredged or fill material in these waterways.	Same as proposed action	No change.

CHAPTER 3 AFFECTED ENVIRONMENT

This chapter describes the current conditions of environmental resources, either man-made or natural, that potentially would be affected by the implementation of the proposed action or alternatives. Section 3.1 focuses on conditions at Altus AFB and, where applicable, in the surrounding community. The baseline conditions presented in this chapter are described to the level of detail necessary to support the analysis of potential impacts, presented in Chapter 4, “Environmental Consequences.”

3.1 DESCRIPTION OF THE AFFECTED ENVIRONMENT

3.1.1 Noise

3.1.1.1 Background Information

Noise is usually defined as unwanted sound, a definition that includes both the physical and psychological nature of the sound (AIHA 1986). Under certain conditions, noise may cause hearing loss, interfere with human activities at home and work, or may affect human health and well being in various ways.

The characteristics of sound include parameters such as amplitude (loudness), frequency (pitch), and duration. Sound varies over an extremely large range of amplitudes. The decibel (dB) is the accepted standard unit for describing levels of sound. Decibels are expressed in logarithmic units to account for the large variations in amplitude.

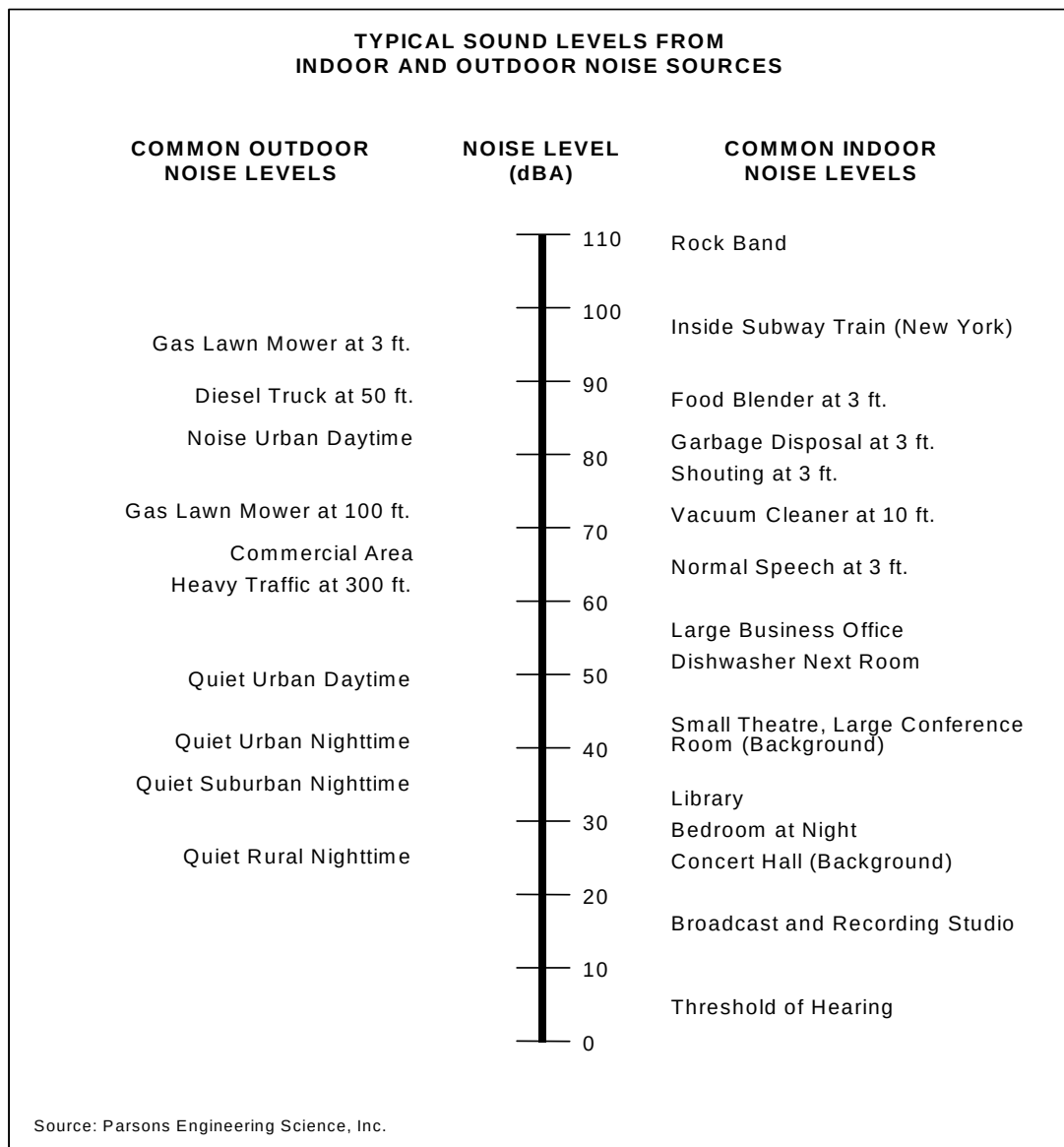
Different sounds have different frequency contents. Because the human ear is not equally sensitive to sound at all frequencies, a frequency-dependent adjustment, called A-weighting, has been devised to measure sound similar to the way the human hearing system responds. The adjustments in amplitude, established by the American National Standards Institute (ANSI 1983), are applied to the frequency content of the sound. Figure 3-1 depicts typical A-weighted sound pressure levels (dBA) for various sources. For example, 65 dBA is equivalent to normal speech at a distance of 3 feet.

Noise is defined as sound that is undesirable because it interferes with speech and hearing, is intense enough to damage hearing, or is otherwise annoying. Noise levels often change with time and the distance of the receptor from the noise source. To compare sound levels over different time periods, several descriptors have been developed that take into account this time-varying nature. These descriptors are used to assess and correlate the various effects of noise on humans.

The day-night average sound level (DNL) metric is a measure of the total community noise environment. DNL is the average A-weighted sound level over a 24-hour period, with a 10 dBA adjustment added to the nighttime levels (between 10:00 p.m. and 7:00 a.m.). This adjustment is

an effort to account for increased human sensitivity to nighttime noise events. DNL was endorsed by the USEPA for use by federal agencies and has been adopted by the Department of Housing and Urban Development, Federal Aviation Administration, and DoD.

Figure 3-1 Typical A-Weighted dBA Sound Pressure (Noise) Levels



3.1.1.2 Baseline Noise Levels

The primary source of noise in the vicinity of Altus AFB is airfield operations. These operations and the resultant baseline noise environment is that which was described and assessed as Alternative 4 in the 2002 EIS for *Proposed Airfield Repairs, Improvements, and Adjustments to Aircrew Training for Altus AFB, OK*. Based on the analysis of noise impacts in the 2002 EIS, the MFH areas lie outside the 65dBA and greater noise exposure (USAF 2002b).

3.1.2 Land Use

3.1.2.1 Altus AFB Land Use

This section describes the existing land uses and aesthetics for the base property and areas surrounding Altus AFB.

The Altus AFB General Plan (1997) provides a base-wide land use plan with an overview of present planning efforts and goals, objectives, and programs for the future development of the base. The document also serves as a reference booklet for commanders and other key officials to use when making decisions concerning future development of the installation (USAF 1997a). Altus AFB currently has a population of 7,589, with 2,714 people living in MFH and 370 living in dorms (USAF 2003a), with the remainder living off the installation. Altus AFB encompasses 4,698 acres of base-owned land and an additional 1,895 acres of easements.

A natural resources management plan for Altus AFB was developed to establish compatible land use areas for related activities and to provide assistance in the decision-making process concerning the future development and expansion of the base. Past development at Altus AFB has incorporated generally good land-use principles and policies. The grouping of compatible land uses and the separation of conflicting uses has resulted in an efficient clustering of the industrial areas and maintenance areas, has assisted in the development of a training campus, and has separated the base housing area from adverse land uses (USAF 1998a). Specific land use areas on Altus AFB have been divided into the functional areas of mission, administrative, community, housing, base support/industrial, medical, outdoor recreational, and open space (USAF 1997a). MFH is located on the west side of the installation (see Figure 1-2) in an area designated for housing use.

3.1.2.2 Community Land Use

A distinct difference exists between land uses of incorporated and unincorporated Jackson County. Around Altus AFB, land areas to the north, east, and south are unincorporated and remain predominately open agricultural, devoted to the production of cotton, wheat, and cattle. To the west, the City of Altus contains the diverse land uses expected to be found in a city of about 20,000 people. The city is a mix of residential units interspersed with small commercial centers.

East of Altus AFB, land is devoted exclusively to agriculture, with only a few houses per section (1 square mile). Land areas to the south contain large agricultural tracts and fewer homes. North of the base, land uses remain primarily agricultural. Since the decision to acquire easements was made under the Real Estate EA, demolition of approximately 100 homes has begun. West of

Altus AFB, the city of Altus serves as the Jackson County seat and as the trade and commerce center for much of the region.

Most of the city's roads are laid out on either an east west or a north-south orientation, with Tamarack Road, Falcon Road, Broadway Road, Veterans Drive, North Park Lane, and Main Street as the section boundaries. East of Main Street and south of Falcon Road, recreational and public use areas surround the Altus Reservoir. The Altus downtown district, which consists of several blocks of county municipal buildings and retail stores, surrounds the intersection of United States (U.S.) Highways 283 and 62. The U.S. Highway 283 and 62 corridors, Falcon Road between North Park Lane and Veterans Drive, and the southern portion of Veterans Drive also contain numerous commercial establishments. An industrial area containing the Bar-S plant, the National Guard Armory, and recreational areas such as the rodeo grounds, is south of U.S. Highway 62 along Veterans Drive.

3.1.3 Air Quality

3.1.3.1 Regional Meteorology

The meteorological conditions in the vicinity of Altus AFB are extremely diverse. Location, air-mass characteristics, and the jet stream combine to create a wide range of weather activity. The resulting atmospheric conditions may change suddenly and with little warning, and can sometimes spawn tornados. Oklahoma is within the area defined by the American Meteorology Society as Tornado Alley as "The area of the United States in which tornadoes are most frequent. It encompasses the great lowland areas of the Mississippi, the Ohio, and lower Missouri River Valleys. Although no state is entirely free of tornadoes, they are most frequent in the Plains area between the Rocky Mountain and Appalachians".

Maritime tropical air masses moving in from the Gulf of Mexico and hot, dry continental air masses moving in from north-central Mexico dominate the weather activity in southwestern Oklahoma. Severe weather conditions may manifest as droughts, tornadoes, or blizzards.

The average annual mean temperature for Altus AFB is 62°F. The average temperature during the summer months is 83°F, with record extremes of 49°F and 116°F. The average temperature during the winter months is 38°F, with record extremes of -4 F and 91°F. Altus AFB averages 24 days per year with temperatures above 100°F and 94 days with temperatures above 90°F. Subfreezing temperatures occur an average of 73 days per year, with 3 days per year below 10°F.

The average annual relative humidity is 72 percent in the morning and 46 percent in the early afternoon. The climate of Altus AFB is described as humid and subtropical, with the greatest amounts of rainfall occurring during the warmest 6 months of the year (USAF 1994a). Mean precipitation is 24.7 inches per year; May is the wettest month and January is the driest. Mean snowfall averages 7 inches per year, and most snowfall occurs in February.

The predominant wind direction is from the southeast. The average wind velocity is 6 knots, with a maximum-recorded wind speed of 82 knots. Thunderstorms occur an average of 46 days per year. Fog, with accompanying visibility of less than 7 miles, occurs an average of 69 days per year, with extremes of 8 days per month from December through March. Ceilings of less

than 3,000 feet and/or visibility of less than 3 statute miles occur 11 percent of the year. Ceilings of less than 1,000 feet and/or visibility of less than 2 statute miles occur 5 percent of the year. Ceilings of less than 200 feet and/or visibility of less than ½ statute mile occur 0.6 percent of the year. The lowest ceilings and worst visibility consistently occur during February (USAF, 1994a).

3.1.3.2 Air Quality Standards and Regulations

The USEPA has established primary and secondary national ambient air quality standards under the CAA. The CAA air quality standards also set emission limits for certain air pollutants from specific sources, set new source performance standards based on best demonstrated technologies, and established national emission standards for hazardous air pollutants.

The CAA specifies two sets of standards – primary and secondary – for each regulated air pollutant. Primary standards define levels of air quality necessary to protect public health, including the health of sensitive populations such as people with asthma, children, and the elderly. Secondary standards define levels of air quality necessary to protect against decreased visibility and damage to animals, crops, vegetation, and buildings. Federal air quality standards are currently established for six pollutants (known as criteria pollutants), including carbon monoxide (CO), nitrogen dioxide (NO₂), ozone (O₃), sulfur oxides (SO_x, commonly measured as sulfur dioxide – SO₂), lead, and particulate matter equal to or less than 2.5 micrometers in aerodynamic diameter (PM_{2.5}).¹ Due to the fact that PM_{2.5} emissions factors have not been developed for all operations, it is conservatively assumed that PM_{2.5} emissions are equivalent to those of PM₁₀ emissions. Although O₃ is considered a criteria pollutant and is measurable in the atmosphere, it is often not considered as a pollutant when reporting emissions from specific sources, because O₃ is not typically emitted directly from most emissions sources. It is formed in the atmosphere from its precursors – nitrogen oxides (NO_x) and volatile organic compounds (VOCs) – that are directly emitted from various sources. Thus, emissions of NO_x and VOCs are commonly reported instead of O₃.

The USEPA Office of Air Quality Planning and Standards has set national ambient air quality standards for the six criteria pollutants (see Table 3-1). Units of measure for the standards shown in this table are micrograms per cubic meter of air (µg/m³), except for ozone, which is in parts per million (ppm).

The USEPA classifies the air quality within an Air Quality Control Region (AQCR) according to whether the region meets federal primary and secondary air quality standards. An AQCR or portion of an AQCR may be classified as attainment, non-attainment, or unclassified with regard to the air quality standards for each of the six criteria pollutants. “Attainment” describes a condition in which standards for one or more of the six pollutants are being met in an area. The area is considered an attainment area for only those criteria pollutants for which the national standards are being met. “Nonattainment” describes a condition in which standards for one or more of the six pollutants are not being met in an area. “Unclassified” indicates that air quality

¹ Air quality standards for particulate matter (PM) that were promulgated on July 18, 1997, changed the aerodynamic diameter from 10 micrometers to 2.5 micrometers.

in the area cannot be classified and the area is treated as attainment. An area may have all three classifications for different criteria pollutants.

Table 3-1 National Ambient Air Quality Standards

Pollutant	Standard Value ($\mu\text{g}/\text{m}^3$) ^a	Standard Type
CO		
1 hr average	40,000	Primary
8 hr average	10,000	Primary
NO ₂		
Annual average	100	Primary and secondary
O ₃		
1 hr average	0.12	Primary and secondary
8 hr average ^b	0.08	Primary
Lead		
Quarterly average	1.5	Primary
PM ₁₀		
24 hr average ^c	150	Primary and secondary
Annual average ^d	50	Primary and secondary
PM _{2.5}		
24 hr average ^e	65	Primary
Annual average ^f	15	Primary
SO ₂		
3 hr average	1,300	Secondary
24 hr average	365	Primary
Annual average	80	Primary

CO=carbon monoxide NO₂=nitrogen dioxide O₃=ozone
SO₂=sulfur dioxide $\mu\text{g}/\text{m}^3$ =micrograms per cubic meter
PM_{2.5}=particulate matter equal or less than 2.5 micrometers in diameter
PM₁₀= particulate matter equal or less than 10 micrometers in diameter

^a Except for ppm for ozone.

^b New ozone 8 hr standard does not become effective until area demonstrates compliance with existing 1 hr standard.

^c Existing 24 hr standard for particulate matter equal to or less than 10 micrometers in aerodynamic diameter (PM₁₀) will remain in effect but will be adjusted to 99th percentile of concentrations within an area.

^d Existing PM₁₀ annual standard will remain in effect as is.

^e New PM_{2.5} 24 hr standard is based on 98th percentile of concentrations over 1 year (averaged over 3 years) at population-oriented monitors using highest measured values.

^f New PM_{2.5} annual standard is based on 3-year average of annual arithmetic means.

Air quality management at Air Force installations is established in AFI 32-7040, *Air Quality Compliance*. AFI 32-7040 requires installations to achieve and maintain compliance with all

applicable federal, state, and local standards. Air quality compliance involves prevention, control, abatement, documentation, and reporting of air pollution from stationary sources and mobile sources if located in nonattainment areas. Maintaining compliance with air quality regulations may require reduction or elimination of pollutant emissions from existing sources and control of new pollution sources.

3.1.3.3 Regional Air Quality

Altus AFB is located within southwestern Oklahoma Intrastate AQCR 189. The air quality in the region is generally good. All 12 counties within AQCR 189 are classified by the USEPA as attainment or unclassified for all criteria pollutants.

An accurate regional emissions inventory is needed for assessing the potential contribution of a source or group of sources to regional air quality. An emissions inventory is an estimate of the actual and potential pollutant emissions generated by a source or sources over a period of time, normally a calendar year. The inventory accounts for permitted stationary sources that are required to report annual emissions to the Oklahoma Department of Environmental Quality (ODEQ). The inventory does not include emissions from mobile sources. Table 3-2 summarizes the 2002 stationary source emissions for AQCR 189.

3.1.3.4 Altus AFB Air Quality

Altus AFB is located within Jackson County, one of the 12 counties within AQCR 189. Stationary sources of emissions at Altus AFB include combustion sources (e.g., boilers, emergency generators, and miscellaneous fuel burning sources) and evaporative VOC emissions sources (e.g., fuel storage tanks, surface coating operations, and use of various spray and bulk liquid solvents). Table 3-2 summarizes the 2001 stationary source (actual) emissions inventory for Altus AFB and compares individual pollutant emissions to the 2002 annual pollutant emissions for all stationary sources in AQCR 189. As shown in the table, Altus AFB stationary source emissions account for less than 1 percent of the total regional (AQCR 189) stationary source emissions for each pollutant.

Altus AFB received its Title V Operating Permit (No. 99-117-0) from the ODEQ in August 2000. Because actual emissions from Altus AFB operations are relatively small (i.e., well below the “major source” threshold of 100 tons per year [tpy]), ODEQ has categorized Altus AFB as a “minor” source. Therefore, the Title V Operating Permit is formally labeled by ODEQ as a minor permit. Because potential NO_x emissions theoretically could be greater than 100 tpy (assuming all equipment operates 24 hours a day, 365 days a year), this type of operating permit is commonly referred to as a “synthetic minor” permit.

Table 3-2 Percentage of Regional (AQCR) Emissions Contributed by Altus AFB Stationary Sources

	Annual Emissions (tpy)				
	CO	VOC	NO _x	SO ₂	PM ₁₀
2002 Regional (AQCR 189) Stationary Source Emissions ^a	6855.41	3241.89	15677.02	702.03	423.33
2001 Altus AFB Stationary Source Emissions ^b	8.72	3.27	14.4	1.16	0.97
Percent of Regional Emissions	0.13	0.10	0.09	0.17	0.23

^a As reported in the 2002 ODEQ Source Emissions Database (Moffitt, 2004).

^b As reported in the 2002 Turn Around Document for Altus Air Force Base, Oklahoma (USAF, 2002f).

In addition to the stationary sources mentioned above, mobile sources at Altus AFB generate emissions of criteria pollutants. Mobile sources that generate emissions include aircraft, aircraft ground support equipment, and motor vehicles. The proposed and alternative actions would not result in increases in personnel or changes in aircraft operations; therefore, no increase in mobile source emissions is anticipated. Table 3-3 presents estimated 2002 emissions associated with mobile sources, including airfield operations at Altus AFB. The table also includes the Altus AFB stationary source emissions, discussed above. The total mobile and stationary source emissions that are shown in Table 3-3 represent the total current, or baseline, emissions for Altus AFB (USAF 2002).

Table 3-3 Estimated Air Emissions (Baseline) for Airfield Operations, Including Ground Support Equipment, at Altus AFB

Emission Source	Estimated Annual Emissions (tpy)			
	CO	VOC	NO _x	SO ₂
Based Aircraft				
C-5	32.41	2.57	213.34	6.78
C-141	103.53	79.53	60.42	4.25
KC-135R	193.63	28.79	441.59	13.22
C-17	151.46	13.53	735.73	21.87
Transient	14.54	4.37	1.85	0.26
Subtotal	495.57	128.79	1,452.93	46.37
Airfield Ground Equipment Operations				
Based Aircraft	30.78	4.94	20.43	2.05
Transient	0.27	0.04	0.18	0.02
Subtotal	31.05	4.98	20.61	2.07
Total Mobile Sources	526.62	133.77	1,473.54	48.44
Total Stationary Sources	8.72	3.27	14.40	1.16
TOTAL EMISSIONS	535.34	137.04	1,487.94	49.60

CO=carbon monoxide

NO_x=nitrous oxide

tpy=tons per year

Source: USAF 2002b; USAF 2002f.

SO₂=sulfur dioxide

VOC=volatile organic compounds

3.1.4 Socioeconomic Resources

The City of Altus is located in southwest Oklahoma in Jackson County, approximately 10 miles north of the Texas border. Altus AFB's socioeconomic impact is assumed to be limited to Jackson County because of the rural nature of the areas surrounding the base and the City of Altus. The socioeconomic status of Altus AFB, the City of Altus, and Jackson County is addressed in this section. The scope of this section includes population, housing, education, and economic activity.

3.1.4.1 Population

According to the U.S. Census Bureau (USCB), the estimated population of Jackson County on July 1, 2002, was 27,333, a 2.3 percent decline from the 2001 estimated population of 27,990 (USCB 2003a). In 1990 Jackson County's population was 28,764 (USCB 1990a). The population decreased an estimated 0.41 percent per year from 1990 to 2002.

Approximately 21,447 people, or 75 percent, of the estimated 2000 Jackson County population resided in the city of Altus (USCB 2000c and 2000d). The city of Altus experienced a 0.48 percent decline in population from 1999 to 2000. From 1990 to 2000, the population of Altus declined from 21,910 to 21,447, which is an average annual decline of 0.2 percent (USCB 1990b and 2000c). Population growth for the state of Oklahoma from 1990 to 2000 was approximately 9.7 percent, compared with the nationwide population growth of 13.1 percent for the same period (USCB 2000a).

3.1.4.2 Housing

The 2000 census reported a total of 12,377 housing units in Jackson County, with an occupancy rate of 85.6 percent. Thus, there were an estimated 1,787 vacant housing units (14.4 percent of total units) in the county in 2000 (USCB 2000b). In 2000, 14 residential building permits were authorized in Jackson County (USCB 2003b).

In 2000 there were approximately 9,818 single-family detached units (79.3 percent of total units), 875 mobile homes (7.1 percent of total units), 40 boats/RVs/vans (0.3 percent of total units), and 1,644 apartment units (13.3 percent of total units)(USCB 2000e).

3.1.4.3 Education

There are six school systems in Jackson County: Altus School District, Navajo School District, Blair School District, Duke School District, Eldorado School District, and Olustee School District. The total January 2004 enrollment in Jackson County schools was approximately 5,553 students. Approximately 76 percent of all students in Jackson County primary and secondary schools attend school in the Altus School District.

The Altus School District has six elementary schools, one middle school, one junior high school, and one senior high school. Approximately 37 percent of children attending Altus public schools are dependents of Altus AFB military and civilian personnel (Shatswell 2004). One of the elementary schools, L. Mendel Rivers School, with classes for grades K-5, is located on Altus AFB (Hunter 2004). The student enrollment in Altus public schools in January 2004 was 4,227 (Shatswell 2004).

The Navajo School District had an enrollment of 468 students as of January 1, 2004. Approximately 35 percent of the Navajo School District's enrollment are dependents of Altus AFB military and civilian personnel. The Navajo School District has one elementary school, one junior high school, and one high school. The district consists of 146.5 square miles and borders the eastern and northern edge of the Altus School District (Montgomery 2004).

The remaining Jackson County Schools had the following enrollments in 2004:

- Blair School District—350 students, grades K-12 (Shaw 2004)
- Duke School District—198 students, grades K-12 (Houska 2004)
- Eldorado School District—128 students, grades K-12 (Edwards 2004)

- Olustee School District—202 students, grades K-12 (Bilbrey 2004)

Approximately 5 percent of the students enrolled in the Blair, Duke, Eldorado, and Olustee schools are dependents of Altus AFB military and civilian personnel (VonTunglen 2004; Peretto2004; Edwards 2004; and Allen 2004).

Higher education opportunities are offered to residents of Jackson County at Western Oklahoma State College, a 2-year college located in the City of Altus. The Air Force's voluntary education service, directed and managed by the Education Services Flight, offers on-base college and university programs that meet the needs of Altus AFB personnel. The Billman Education Center at Altus AFB offers a variety of courses at the undergraduate and graduate levels. Colleges offering courses of study include Western Oklahoma State College, University of Southern Colorado, Southern Illinois University, Cameron University, Webster University, and Embry Riddle Aeronautical University.

3.1.4.4 Economy

3.1.4.4.1 Altus AFB Economic Activity and Contribution

Altus AFB generates economic activity within Jackson County through employee payrolls, local procurements, and other expenditures. The surrounding communities and Altus AFB depend on one another for employment, goods, and services.

Altus AFB lies within the City of Altus. The base supports approximately 1,700 permanent military personnel and approximately 437 students in training per month (USAF 2002c). About 2,714 military personnel and their families live on base along with 370 personnel living in dorms (USAF 2003c). Although the number of military personnel has decreased over the past several years, employment in the nonappropriated fund and contract civilian categories has increased to offset the loss of military personnel (USAF 1999a).

In FY02, the Altus AFB payroll expenditures totaled more than \$134 million. Table 3-4 details gross payroll expenditures during FY02. The total economic contribution of Altus AFB to the Jackson County area was estimated to be \$226 million in FY02 (USAF 2002c).

Table 3-4 Altus AFB Gross Payroll (FY02)

Gross Payroll FY02	
Category	Expenditures
Appropriated fund military (military permanent party)	\$63,966,241
Appropriated fund civilian	51,764,231
Civilian non appropriated funds	2,959,655
Contract civilians	14,658,024
Other civilians	1,514,672
Military retirees (Air Force, Army, Marines, Navy, Coast Guard)	20,484,000
Total payroll	\$155,346,823

FY02=Fiscal Year 2002

Source: USAF 2002c.

As reported in the 1999 Altus AFB *Economic Impact Report* (USAF 1999a), the Air Force manages more than \$453.3 million in capital assets at Altus AFB. The base-controlled resources were valued at nearly \$4.6 billion at the end of FY99. In addition, Altus AFB construction projects and other contracts for services, materials, and equipment for FY99 totaled \$38.3 million.

3.1.4.4.2 Jackson County Employment and Income

Altus AFB provides direct employment for approximately 2,400 area residents. An estimated 1,700 area jobs are indirectly supported by the operations of the base. Approximately 98 percent of base employees reside within Jackson County (USAF 1999a). Altus AFB directly employs nearly 23 percent of the Jackson County workforce, and nearly 16 percent of the county civilian workforce.

Altus AFB is the largest employer in Jackson County. Other major employers are the public schools, Jackson County Memorial Hospital, the City of Altus, and Western Oklahoma State College. Major private employers in the county are Bar-S Foods, WalMart Supercenter, American Gypsum, Altus Athletic Manufacturing, United Super Markets, A Passmore & Sons, Inc. and 3KB Transportation, Inc. (Altus COC 2004).

The Jackson County labor force was reported to be 13,240 in October 2003, with a 3.2 percent unemployment rate, which was a slight increase from 2.6 percent in October 2002 (OESC 2003a). As of November 2003, the Jackson County labor force was estimated at 13,050, with an unemployment rate of 3.1 percent (OESC 2003b).

In 2001, Jackson County had a per capita personal income of \$21,630, which ranked it 20th among Oklahoma counties and at 86.7 percent of the state average of \$24,945. The Jackson County 2001 per capita income increased 0.84 percent from 2000 (BEA 2001c). Jackson County's 2001 total personal income was \$605 million, ranking it 32nd among Oklahoma counties. The Jackson County 2001 total personal income decreased 0.14 percent from 2000. Total personal income includes the earnings (wages and salaries, other labor income, proprietors'

income); dividends, interest, and rent; and transfer payments received by the residents of Jackson County (BEA 2001d).

Earnings by persons employed in Jackson County decreased from \$461 million in 2000 to \$449 million in 2001, a decrease of 2.7 percent (BEA 2001c). The largest industries in 2001 were military, representing 23.2 percent of earnings; federal government (civilian), 19.3 percent; and state and local government, 17.4 percent (BEA 2001d).

3.1.5 Cultural Resources

3.1.5.1 Regulations and Criteria

Cultural resources are prehistoric and historic sites, districts, structures, artifacts, or any other physical evidence of human activity considered important to a culture, subculture, or community for scientific, traditional, religious, or other reasons. Numerous laws and regulations require that possible effects on cultural resources be considered during the planning and execution of federal undertakings. These laws and regulations stipulate a process of compliance, define the responsibilities of the federal agency proposing the actions, and prescribe the relationships among involved agencies. In addition to NEPA, the primary laws that pertain to the treatment of cultural resources during environmental analysis are the NHPA (especially Sections 106 and 110), the ARPA, the American Indian Religious Freedom Act (AIRFA), and the Native American Graves Protection and Repatriation Act (NAGPRA). Under the AIRFA, Altus AFB has no known traditional cultural or ceremonial sites to which the base must provide access.

Section 106 of the NHPA requires that the federal agencies give the Advisory Council on Historic Preservation a “reasonable opportunity to comment” on the proposed actions. Federal agencies must consider whether their activities could affect historic properties that are already listed, determined eligible, or not yet evaluated under the National Register of Historic Places (NRHP). Properties that are either listed in or eligible for listing in the NRHP are provided the same measure of protection under Section 106.

The following criteria have been established as guidance for evaluating potential entries to the NRHP. “Significance” in American history, architecture, archeology, and culture is granted to districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and that

- are associated with events that have made a significant contribution to the broad patterns of history;
- are associated with the lives of persons significant in history;
- embody the distinctive characteristics of a type, period, or method of construction;
- represent the work of a master;
- possess high artistic values;

- represent a significant and distinguished entity whose components may lack individual distinction; or
- have yielded, or may likely yield, information important in prehistory or history.

3.1.5.2 Historic Resources

A cultural resource assessment conducted by the National Park Service on the base in 1995 found that 38 buildings and structures date to World War II, the Korean Conflict, and the beginning of the Cold War, all meeting the 50-year or older criterion for consideration on the NRHP. These structures must be identified prior to renovation or demolition, and if determined to be potentially eligible, then an eligibility determination and possible Section 106 consultation would be conducted with the State Historic Preservation Officer (SHPO). None of the MFH units are eligible or currently listed on the NHRP (USAF 2002d).

Within the surrounding community, only the Jackson County Courthouse, at Main Street and Broadway, is listed on the national register for its association with important events and for its architectural merit, as representative of the period during which it was constructed.

The W.C. Austin Irrigation System, which passes through Altus AFB, is considered to be eligible for listing in the NRHP (USAF 1994a). The irrigation system was constructed by the Bureau of Reclamation between 1941 and 1949 to provide water for irrigation of privately owned land in southwestern Oklahoma. Primary features of the system include Altus Dam, earthen dikes, and canals. No structures in the areas adjacent to the base are listed in the SHPO's national register handbook (SHPO 2000).

3.1.5.3 Archeological Resources

Numerous archeological surveys have been completed for Altus AFB, but no intact prehistoric or historic archeological sites have been found in the Altus AFB region. According to the 1995 cultural resource assessment carried out by the National Park Service at Altus AFB, the potential of there being intact archeological resources within the base boundaries and on adjoining properties is extremely low (De Vore 1995).

3.1.6 Hazardous Materials and Waste

3.1.6.1 Hazardous Materials

Hazardous materials use and management at Altus AFB are regulated under the Toxic Substances Control Act, the OSHA, the Emergency Planning and Community Right-to-Know Act, and Air Force Occupational Safety and Health Standards 127-43. These regulations require personnel using hazardous materials to be aware of the possible dangers, to know the location of material safety data sheets for all hazardous materials they are using, and wear the appropriate personal protective equipment required for particular hazardous materials. The Altus AFB Environmental Management Office maintains a list of all hazardous chemicals, including appropriate material safety data sheets, if applicable, used on the base.

Current operations at Altus AFB require the use of hazardous materials. They range from paints to industrial solvents and degreasers. Hazardous materials are also used by on-base contractors supporting base operations. The base requires all contractors using hazardous materials to submit a hazardous materials contingency plan prior to working on base. Spills of hazardous materials and wastes are managed in accordance with the Altus AFB Spill Prevention and Response Plan.

Airfield operations require the storage and handling of a variety of hazardous materials in quantities ranging from less than a gallon for specialized chemicals to thousands of gallons in the case of jet fuel. The base has developed a comprehensive Spill Prevention and Response Plan, and a Hazardous Waste Management and Recoverable and Waste Petroleum Plan. These plans identify locations at which hazardous materials are stored, describe procedures and equipment to prevent releases, specify the actions (including requirements for notification of regulatory agencies) to be taken in the event of a release, and identify resources available for use in containment and clean-up of accidental releases (USAF 1994c).

3.1.6.1.1 Asbestos

Based on information gathered during the Environmental Baseline Survey (EBS) (USAF 2002e), asbestos containing material (ACM) is present in the housing units. The types of ACM present include flooring mastic, floor tiles, sheetrock, transite flues, and roofing materials. ACM is likely to be present in the Capehart and Bicentennial areas, but not Great Plains. From 1999 to 2002, asbestos abatement was completed at six housing units during pre-demolition and/or pre-renovation activities. This abatement was not initiated due to the condition of the material or potential threats to the environment. An Asbestos Management Plan is in effect at Altus AFB, and qualified contractors are hired to perform and abatement and disposal activities.

3.1.6.1.2 Lead-Based Paint

Based on interviews conducted during the EBS, lead-based paint (LBP) is currently present in both interior and exterior locations at the units in the Capehart area, and is limited to trim work and soffits. There should not be any LBP in the Bicentennial or Great Plains areas (USAF 2002e).

There is a LBP Management Plan in effect at the base, which consists of assessing risk, scraping and encapsulation, and/or removal of affected parts. Past LBP abatement activities have been limited and usually involved replacement of the trim work rather than scraping and repainting. Despite the current management plan, historical painting activities at Capehart most likely did not include capturing and proper disposal of paint scrapings. Therefore, it is possible that soils in Capehart may exhibit elevated concentrations of lead (USAF 2002e).

3.1.6.1.3 Radon

Radon is a naturally occurring radioactive gas found in soils and rocks, and originates from the natural decay of radium. Radon is an odorless, colorless gas believed to be harmful at all exposure levels. Studies by the USEPA have shown an increased risk of developing lung cancer when exposed to elevated levels of radon. The USEPA has established a guidance level of 4.0

picocuries per liter (pCi/L). Concentrations above this level are thought to represent a health risk.

The USEPA has established radon zones throughout the country to help predict the likelihood of radon gas accumulating indoors. Jackson County lies in Zone 3, which has a predicted radon accumulation of less than 2.0 pCi/L. A basewide radon survey was conducted in 1990, which confirmed no levels of radon above the allowable minimum concentration were present (USAF 2002e). Based on this information, the potential for radon gas accumulation in the MFH units at Altus AFB is low.

3.1.6.1.4 Pesticides

Residents in the MFH areas are responsible for the management of general household pests such as roaches, ants, flies, silverfish and mice using commercially available insecticides. Pesticides and herbicides such as RoundUp®, ant and roach bait, Amdro®, wasp and hornet spray, and mouse traps are available through the Self Help Store located in Building 2002. For severe infestations (e.g. subterranean termites) occupants are required to contact CES Customer Service. The Entomology section must be notified if the services of an outside pest control contractor are procured by an MFH resident. Pest control products used by Pest Management include Termidor® for termites, Dragnet® (pyrethrin-based), Dursban® (chlorpyrethrin based), Amdro®, RoundUp®, and other commercially available roach traps, ant bait, wasp spray, and mousetraps (USAF 2002e).

Historic pesticide applications have occurred particularly in the Capehart and Bicentennial housing areas, which were constructed in the 1950s and 1970s, respectively. The products used reportedly included chlordane, dieldrin, aldrin, DDT and any other products commercially available at the time. These chemicals were used within appropriate guidelines for application at the time and applications were made to the surface as well as sub-slab injections. Aerial applications for mosquito control have reportedly occurred in the past, and chlordane may have been applied during construction of the Capehart housing units. The last documented use of chlordane was around 1987, and was applied sub-slab. Disclosure of chlordane use is required by law prior to the transfer of property (USAF 2002e).

Prior to the development of these areas for residential housing, the land was cultivated for agricultural purposes. Crops in this area have historically consisted of cotton and wheat. According to the Oklahoma State University Extension Service, a broad range of insecticides, herbicides and fungicides have been utilized for controlling pests in these crops in the past. Some of the more commonly known include malathion, methyl parathion, parathion, permethrin, 2,4-D, glyphosphate, MSMA, and carboxin. Additionally, defoliants are widely used in the cultivation of cotton. Current defoliants include products such as DEP® and PREP®, but as recently as the 1970s arsenic-based defoliants were used (USAF 2002e).

Surface water samples have been previously collected from the unnamed tributary of Stinking Creek, upstream and downstream of the housing areas, and analyzed for the presence of pesticides. There was no indication from these analyses to indicate a contribution of pesticides to the surface water originating from the housing areas. Therefore, no additional soil sampling

was performed for the EBS within the housing areas to test for the presence of pesticides (USAF 2002e).

3.1.6.2 Hazardous Waste

Hazardous wastes are defined by the Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act (RCRA), which was further amended by the Hazardous and Solid Waste Amendments, RCRA subtitle C (40 CFR, Parts 260 through 270). USEPA regulatory authority is subsequently delegated to the State of Oklahoma. Hazardous waste management at Altus AFB is also regulated under AFI 32-7103 (formerly AFR 19-11), *Hazardous Waste Management and Minimization*.

These regulations are implemented at Altus AFB through hazardous waste permitting procedures and the Altus AFB Hazardous Water Management and Recoverable and Waste Petroleum Plan. The plan details hazardous waste packaging, turn-in, transportation, storage, record-keeping, and emergency procedures. Approximately 63,000 pounds of hazardous waste was generated by Altus AFB in Calendar Year (CY) 02 (USAF 2003a). Hazardous waste is generated at Altus AFB from aircraft maintenance operations, spent hazardous materials, and spills. Altus AFB does not currently maintain any active permitted hazardous waste storage facilities. Air Force waste management operations at Altus AFB are registered with the USEPA under identification number OK9571824045.

Day-to-day operations generate several types of hazardous wastes that require special handling for proper disposal. These include oils and fuels, cleaning compounds, paints and solvents, batteries, mercury, and lead foil.

Hazardous wastes are collected at initial accumulation points in 55-gallon drums. Each initial accumulation point site is allowed to keep one drum for waste disposal; once the drum is filled, the Environmental Flight (CEV) must be contacted within 72 hours. CEV exchanges the full drum for an empty one and delivers the hazardous waste to a central accumulation point. Buildings 283 and 502 are permitted central accumulation points, which allow hazardous waste storage for up to 90 days until it is transferred to the Defense Reutilization and Marketing Office. Hazardous materials are checked for their reusability within the Hazardous Material Pharmacy, Building 228, prior to disposal. This facility also provides for the distribution of small quantities of materials for industrial use throughout the base and allows base housing personnel to bring their hazardous waste materials to the pharmacy for disposal.

3.1.6.3 Environmental Restoration Program

The DoD implemented the Environmental Restoration Program (ERP) (formerly known as the Installation Restoration Program [IRP]) to identify the locations and contents of past toxic and hazardous material disposal and spill sites and to eliminate the hazards to public health in an environmentally responsible manner. The objectives of the ERP are to identify and fully evaluate any areas suspected of being contaminated with hazardous materials remaining from past Air Force operations. The ERP is the basis for response actions on Air Force installations

under provisions of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), and the Superfund Amendments and Reauthorization Act of 1986, as clarified in 1991 by Executive Order (EO) 12580, *Superfund Implementation*.

The ERP at Altus AFB began in 1985 with a Phase I Records Search that identified nine sites. Between 1986 and 1996, an additional seven sites were added to the ERP. In November 1996, the USEPA assumed control of the Altus AFB program by issuing a RCRA 3008(h) Unilateral Order (the Order) and numerous sites closed by the Air Force were subsequently reopened. The base responded to the Order by submitting a revised Current Condition Report and a RCRA Facility Investigation (RFI) Work Plan to the USEPA. The RFI was initiated in 1998, resulting in the addition of eight sites to the ERP in January 2001. The total number of sites in the ERP at Altus AFB following the RFI was 24, most of which are in the Remedial Investigation (RI) phase. One has received No Further Response Action Planned (NFRAP) status (USAF 2003b). Of these 24 sites, five are located within one-half mile of the housing areas, as seen on Figure 3-2. These sites are summarized in Table 3-5.

Figure 3-2 Locations of ERP Sites and Other Compliance Sites

Table 3-5 ERP Sites Within ½ Mile of MFH

Site ID	Site Name	Regulatory Phase	Description
FT006	Fire Protection Training Area No. 6	RI	The site is located on the fairway of hole number 1 at the Altus AFB Golf Course. The site was used from 1954 to 1956 and is now covered with grass. The exact boundaries of the site are unknown, but it was believed to be less than 1 acre in size. Associated materials include contaminated fuels, waste oil, solvents, thinners, water, protein foam, chlorobromomethane, carbon tetrachloride, and dioxins. Due to its close proximity to base housing and the child daycare center, risk was evaluated based on residential standards.
SS010	Service Station	RI	The site is located in the west-central portion of the base. It was a commercial facility for automotive services from 1969 to 1999. Two fuel tanks were replaced in January – April 1993. The facility, USTs, and adjacent concrete/asphalt cover were removed in 1999 after construction of a new facility at another location. At least two of the three USTs leaked gasoline. The facility and the concrete/asphalt cover at the site were removed in April 2000.
SS016	Facility 392, Refueling Vehicle Maintenance	RI	Facility 392 is located in the southwest part of the base. The facility was constructed on a concrete slab with floor drains that historically emptied into oil/water separators. The road and parking area are paved with concrete, and remaining surface cover is grass. The facility was built in 1960 and was originally used as a liquid oxygen storage facility. The facility was redesigned in 1979 to be used as the Refueling Vehicle Maintenance Facility. Each time a fuel tanker was taken to the facility, approximately 10-gallons of fuel was released to the floor. The fuel leaked under the facility through cracks in the floor. The site was added to the ERP after the USEPA 3008(h) Unilateral Order was issued. This site is no longer an ERP site, but will be addressed as a Non-ERA site, eligible for Environmental Compliance Funding.
SS022	Group 7	RI	This site consists of impacted groundwater beneath the aircraft industrial area of the base. There is a large area of chlorinated hydrocarbon contamination.
ST012	Auto Hobby Shop Concrete Holding Tank	RI	The Auto Hobby Shop is located at the intersection of 1st Street and 6th Street in the southwestern section of Altus AFB. A drainage ditch defines the south boundary of the site. The area provides a work area where base personnel can repair and perform maintenance on their vehicles. Wastes generated at the shop include waste oils, brake and hydraulic fluid, degreasing solvents and antifreeze. A 500-gallon concrete UST located behind the Auto Hobby Shop stored used motor oil from 1959 to 1990.

AFB=Air Force Base

ERA=Environmental Restoration Account

ERP=Environmental Restoration Program

RI=Remedial Investigation

USEPA=United States Environmental Protection Agency

UST=underground storage tank

Source: USAF 2003b

3.1.6.4 Other Compliance Sites

Compliance activities, similar to restoration activities (such as investigation and cleanup) at Altus AFB, are being conducted in coordination with environmental restoration activities under the requirements of the Order. Altus AFB is required to respond to compliance-related releases of hazardous substances per the Order in the same manner as responding to ERP sites (USAF 2002e).

There are ten Solid Waste Management Unit (SWMU) sites at the base, five of which required investigation under the Order (USAF 2002e). There are five SWMUs located within one-half mile of the housing areas, of which only two (SWMUs 15 and 19) were included in the Order (Figure 3-2). SWMU 23 consists of 23 Hazardous Waste Initial Accumulation Points and two Hazardous Waste 90-day Accumulation Points. There are ten of these initial accumulation points located within one-half mile of the housing areas (Figure 3-2).

There are four regulated underground storage tanks (USTs) remaining in service at Altus AFB, located at Buildings 551 and 18. All other USTs have been taken out of service, removed, or are not regulated by the state (USAF 2002e). Two of these UST sites are located within one-half mile of the housing areas (Figure 3-2). The compliance sites at Altus AFB are summarized in Table 3-6.

3.1.7 Infrastructure/Utilities

3.1.7.1 Sanitary Sewer

Sanitary sewage from Altus AFB currently discharges to a City of Altus main near the intersection of Falcon Drive and Altus Road. All sanitary sewer flow in the MFH area operates via gravity, and there are no force mains or pump stations within the boundaries of the subject properties (USAF 2002e). The sanitary mains in the Capehart housing area are constructed of clay, and repairs in the mains have been required over time due to infiltration from tree roots and sagging (USAF 2002e). Repairs have included both total section replacement as well as pipe lining. Additionally, sanitary sewer lines in the Capehart housing area are being replaced as funding allows. Currently, 33,000 feet of sewer line remains to be replaced. Sanitary lines to each of the Capehart housing units are all currently constructed of polyvinyl chloride (PVC), as the former lines were replaced during the most recent renovations (USAF 2002e). Sanitary sewer discharge for Altus AFB in FY03 was approximately 192,000 gallons, while discharge for the MFH units was approximately 90,000 gallons (USAF 2004a).

3.1.7.2 Potable Water

Drinking water for Altus AFB is provided by the City of Altus, and is derived from water wells and surface water. The principal regional aquifers in the Altus area that provide water for domestic, municipal, industrial, and irrigation use are unconsolidated alluvial deposits associated with the Salt and North Forks of the Red River. Surface water sources in the area include Lake Altus and Tom Steed Reservoir.

Table 3-6 Other Compliance sites Within ½ Mile of MFH

Site ID	Site Name	Regulatory Phase	Description
SWMU 15	POL Tank Sludge Burial Area	RI	This area was the site for the disposal of POL tank sludge during a one-time burial event in the early 1960s. Reportedly, only two or three drums of POL tank sludge were buried. Previous site investigations included soil-gas survey work and the collection of soil and groundwater samples and suggested that no significant volatile petroleum hydrocarbon contamination was present. The site was reopened under the Order; RFI work has been performed and a report will be developed.
SWMU 19	Oil/Water Separator Holding Tank	RI	This facility has been used to strip aircraft of old paint since the early 1960s. Prior to 1994, all of these wastes were directed to an oil/water separator, which discharged to the sanitary sewer system. However, in the late 1980s, the effluent line was capped off and the water was then pumped from the separator at regular intervals. In January 1994, the separator system and associated holding tank were removed. Potential contaminants of concern at this site are classified as RCRA-listed and characteristic hazardous wastes. Samples collected during excavation activities indicated that VOCs and metals were present in removed soils. As a result of the Order, RFI work has been performed and a report will be developed.
SWMU 20	Hospital Incinerator	Removed in 1999	This incinerator was in operation from 1980 to 1997 and was used to dispose of live vaccines, outdated pharmaceutical supplies, pathological wastes, and wastes from the obstetric unit. According to the 2001 Installation Restoration Program Management Action Plan, this site is Type 3 Property, where storage, release, disposal, and/or migration has occurred, but no remedial action is required. Based on the RFA conducted in 1990, it appears that the concern with this site was related to air emissions. The incinerator was removed in 1997 and was not included in the Order.
SWMU 23	Hazardous Waste Management Areas	RFA Completed 1990	SWMU 23 consists of 25 accumulation points. These facilities have been in operation since as early as 1953. Solvents, paints, waste fuels, and waste lubricants are accumulated and stored in these areas for less than 90 days, eliminating the requirements to obtain a RCRA Part B storage permit. SWMU 23 was not included in the Order.
SWMU 24	Electronics Maintenance and Logistics	RFA Completed 1990	This facility has been active since 1953. Spent lithium, photo 22, liquid mercury, and batteries are present at this location. Based on the RFA Report, there have been no documented releases to the environment. This site was not included in the Order.
SWMU 25	Battery Maintenance Shop	RFA Completed 1990	This facility has been active since 1953. Liquid and solid components of lead and nickel/cadmium batteries are stored at this facility. This site was not included in the Order.
Building 18	UST Site	N/A	Site contains three 10,000-gallon USTs.
Building 46	Non-regulated UST Site	N/A	Site contains two USTs.

ID=Identification
POL=petroleum, oils and lubricants
RFA=RCRA Facility Assessment
RI=Remedial Investigation
UST=Underground Storage Tank
Source: USAF 2002d

N/A=Not Applicable
RCRA=Resource Conservation and Recovery Act
RFI=RCRA Facility Investigation
SWMU=Solid Waste Management Unit
VOCs=volatile organic compounds

Tom Steed Reservoir, located approximately 20 miles northeast of Altus, is reportedly the source of water used by the City of Altus, which supplies drinking water to the base and subject properties (USAF 1997a). Water quality from Tom Steed Reservoir is considered good with a hardness factor of 250 parts per million (USAF 1997a). A 16-inch main and a 10-inch main deliver water to the base at an entrance point near the front gate. Potable water is stored in two elevated on-base storage tanks with a total capacity of 750,000 gallons. Water lines in the MFH area are constructed of PVC, and usage for the base and the housing areas are metered separately for monitoring purposes (USAF 1997a). Total potable water consumption at Altus AFB for FY03 was approximately 287,000 gallons, while consumption from MFH units alone was approximately 134,000 gallons (USAF 2004a).

3.1.7.3 Solid Waste

Municipal solid waste management and compliance at Air Force installations are established in AFI 32-7042, *Solid and Hazardous Waste Compliance*. AFI 32-7042 incorporates by reference the requirements of RCRA Subtitle D, 40 CFR 240 through 244, 257, and 258, and all other applicable federal regulations, AFIs, and DoD directives. In general, AFI 32-7042 establishes the requirement for installations to have a solid waste management program that incorporates the following: a solid waste management plan; procedures for handling, storage, collection, and disposal of solid waste; record keeping and reporting; and recycling of solid waste, as addressed in AFI 32-7080, *Pollution Prevention Program*. All municipal solid waste generated at Altus AFB is managed by Air Force contractors and subsequently disposed of at the City of Altus landfill. Approximately 36,504 tons of solid waste are disposed per year at the City of Altus landfill (Coombs 2004a).

Residential solid waste generated in MFH is removed by a contractor for disposal at the city landfill (USAF 1997a). Additionally, recycling is mandatory at Altus AFB (USAF 2000). Total solid waste disposal at Altus AFB for FY03 was approximately 2,190 tons, while disposal for MFH units alone was approximately 1,086 tons (USAF 2004b).

3.1.7.4 Drainage

The stormwater collection system at Altus AFB was originally designed to accommodate on-base stormwater flows and projected increased flows associated with future base expansion. However, increased storm flow from the impervious surfaces of off-base housing developments to the northeast caused flooding problems in certain areas of the base. Floodways that discharge into Stinking Creek were installed in susceptible flood-prone areas (USAF 1994a). Additional construction of retention/detention basins through a joint effort by Altus AFB, Jackson County, and the City of Altus have also been completed. Construction activities related to new roads near the base recreation areas also have incorporated drainage improvements along the creek.

A site inspection conducted as part of the 2002 Environmental Impact Statement for *Proposed Airfield Repairs, Improvements, and Adjustments to Aircrew Training* showed existing floodways throughout the base to be in good condition, although some drainage problems persist in lower-lying areas on base. Stormwater drainage pipes ranging in size from 12 to 66 inches in diameter have been installed throughout the base to quickly drain excessive volumes of stormwater. All water collected in the stormwater collection system drains off to the south,

where the water enters Stinking Creek, or to the east via an irrigation canal (USAF 2002e). A Stormwater Pollution Prevention Plan (SWPPP), with measures such as minibooms, oil-water separators, and operable outfall gates, is in place to recover any pollutants entering the system.

MFH on Altus AFB is situated in an area that is relatively flat but slopes gently to the south-southeast. An unnamed tributary of Stinking Creek transects Capehart housing, although its original drainage pattern appears to have been slightly reconfigured during the construction of the Capehart housing area (USAF 2002e).

3.1.7.5 Transportation

Some access streets near the base become congested, particularly in areas with heavy concentrations of office and workspace. During peak traffic times, access to Altus AFB is influenced by heavy traffic, particularly at the main gate. The main gate is open 24 hours a day, 7 days a week. The south gate is open only on workdays from 6:00 a.m. to 5:00 p.m. The street system handles the traffic well during non-peak times. No scheduled on-base shuttle bus service is available for transporting personnel around the base (USAF 1994b).

Vehicle occupancy information obtained from the 97th Security Police Squadron showed that the 1996 average vehicle occupancy rate for Altus AFB was approximately 1.3 persons per vehicle. Approximately 6,540 vehicles per day passed through base gates on workdays. The 1996 average vehicle occupancy rate for Altus AFB is the most current information available (USAF 2003a).

3.1.7.6 Electricity/Natural Gas

Electricity is provided to Altus AFB by Western Farmers Cooperative, and natural gas is supplied by the City of Altus through a contract with Reliant Energy-ArkLa. Electrical consumption for Altus AFB for FY03 was approximately 63,977 kilowatt hours (KWH), while consumption for MFH was approximately 12,622 KWH. Approximate consumption of natural gas at Altus AFB was 224,732 million cubic feet (mcf) for FY03, while consumption by MFH units was approximately 68,210 mcf (USAF 2004a).

3.1.8 Earth Resources

According to the Jackson County Soil Survey, the surface rocks in the vicinity of Altus AFB belong to three geologic systems: the Recent and Quaternary deposits, and Hennessey shale (USDA 1961). The Recent formations are the alluvium of floodplains along the major streams that are subject to overflow. The Quaternary deposits are composed of loamy and sandy materials. The Hennessey shale consists of red, silty shales and clays, with some siltstone. The uppermost 5 to 40 feet of the Hennessey formation consist primarily of yellowish-gray, buff, tan, orange, yellow, or greenish-gray shale (USAF 1992).

Soils in the vicinity of Altus AFB are of two general groups: the Tillman-Hollister association and the Miles-Nobscot association. Within these two associations, the predominant soils in the areas surrounding the base include Tillman and Hollister clay loams (0 to 1 percent slopes), Miles fine sandy loams (0 to 3 percent slopes), Nobscot fine sand (0 to 5 percent slopes), and

Altus fine sandy loam (0 to 1 percent slopes) (USDA 1961).

The surface soils in the MFH area consist primarily of Tillman and Hollister clay loams with 0 to 1 slopes (TcA), as designated by the United States Department of Agriculture (USDA). These soils are the most extensive in Jackson County. These soils are deep lean clays that grade to slowly permeable clays. These soils are developed from calcareous clays of red beds and are nearly level or gently sloping (USDA 1983). Tillman and Hollister soils have slow permeability and are resistant to erosion, but have a moderate to high shrink-swell potential. TcA soils are present throughout the Capehart housing area.

Other soil types are present in the west and southwestern portion of the MFH area, near the southwest corner of Bicentennial housing and in the west and southwest portion of Great Plains housing. These other soil types consist of Tillman clay loam with 1 to 3 percent slopes (TaB), wet Spur clay loam (Sw), and Port clay loam (Po). TaB soils are gently undulating and located along the natural drains that pass through or border the TcA soils. Sw soils are generally found in narrow flood plains of tributaries of larger streams, or may be in narrow drainage ways of irrigated areas. Po soils are deep, fertile, and well drained. While Po soils are found on bottom lands that are seldom flooded, they form on sediments deposited from floodwaters of adjacent streams, have a good water-holding capacity, and are well suited to irrigation. While TcA soils are present throughout most of the Bicentennial and Great Plains housing areas, TaB soils are found at the far southwest corner of Bicentennial housing, and TaB, Po, and Sw soils are found along the western and southwestern edges of Great Plains housing.

Altus AFB is part of the Central Lowland Physiographic Province (USAF 2001). Topography at the base is typical of that found in that province, with a nearly level to gently sloping land surface that lacks distinct features. Ground surface elevations in the Capehart housing area range from approximately 1,350 to 1,375 feet above mean sea level (msl). Ground surface elevations range from approximately 1,365 to 1,375 feet above msl in the Bicentennial housing area, and range from approximately 1,360 to 1,377 feet above msl in the Great Plains housing area. Overall, surface topography gently slopes to the south-southeast, from a high elevation near the northwest corner of Great Plains housing to a low near the southeast corner of Capehart housing.

3.1.9 Water Resources

3.1.9.1 Surface Water

Several streams are located on Altus AFB and in the surrounding areas. Stinking Creek flows from the northwest to the southeast, draining the northern and eastern portion of the base and flowing diagonally to the southeast corner of the base. Stinking Creek is a tributary to the North Fork of the Red River, joining the North Fork approximately 13 miles downstream of the base. The creek drains an approximate 27-square-mile area upstream of U.S. Highway 62, which is adjacent to the southern base boundary. It is a perennial stream with a flow of less than 20 cubic feet per second, except during local rainfall (USAF 1990). As shown in Figure 3-3, an unnamed tributary of Stinking Creek flows through the MFH area.

Figure 3-3 100 Year Floodplain

An agricultural irrigation canal, the Ozark Canal, enters base property at the northern end near the old Alert area, crossing the airfield below all three runways, and exiting at the easternmost base boundary. The canal's diked banks preclude surface runoff from the base, and the base has no access to its water. The canal is used for agricultural irrigation and may be dry or ponded during the off season.

Surface water quality of the streams in the vicinity of Altus AFB is characterized as being of poor quality, with total dissolved solids concentrations of 1,000 milligrams per liter (mg/L) and higher. Water containing 500 mg/L or less of dissolved solids is generally considered satisfactory for most domestic and industrial uses.

3.1.9.2 Groundwater

The principal regional aquifers in the Altus AFB area are unconsolidated alluvial deposits associated with the Salt and North Forks of the Red River (USAF 1998c). Altus AFB is situated within an area between the principal regional aquifers, which is considered a "minor aquifer" (USAF 1998c). The primary hydrologic unit underlying Altus AFB is the Hennessey Shale, which is exposed at the surface (USAF 2001). Only minor amounts of groundwater are present in the Hennessey Shale, and actual groundwater yield is small and generally sufficient only for stock and domestic purposes (USAF 1997e). Groundwater in the Hennessey Shale is typically shallow and unconfined, where precipitation is the primary source of recharge to the water-bearing zone. Additionally, groundwater storage in the Hennessey Shale can fluctuate significantly due to seasonal fluctuations and periods of above-average rainfall (USAF 1997e). Movement of groundwater is regionally toward the southeast, generally following surface topography. Additionally, groundwater has been reported to flow to the southeast on the base (Benson 2001).

Shallow groundwater in the MFH area is most likely present at depths of less than 5 feet below ground surface (bgs), similar to depth to groundwater measurements obtained for other portions of Altus AFB (USAF 1998c). Although shallow groundwater quality at the base has been impacted (see Section 3.1.6.3), no impacts to groundwater quality have been detected in samples collected from three background monitoring wells installed in the MFH area and analyzed for VOCs, semi-volatile organic compounds, and metals. Groundwater samples from monitoring wells in the MFH area have not been analyzed for pesticides or polychlorinated biphenyls (PCBs).

3.1.9.3 Floodplains

EO 11988, *Floodplain Management*, directs federal agencies to provide leadership and take action to reduce the risk of flood loss; to minimize the impact of floods on human safety, health, and welfare; and to restore, preserve, and enhance the natural and beneficial values served by floodplains. The Executive Order states that an agency shall avoid undertaking or providing assistance for new construction located in floodplains and that if the head of the agency finds no practicable alternative to such construction, the proposed action must include all practicable measures to minimize harm to floodplains that may result from such use.

The National Flood Insurance Program (NFIP), administered by the Federal Emergency Management Agency, was created in 1968 to provide flood insurance to people who live in areas with the greatest risk of flooding, called special flood hazard areas (SFHAs). Generally, the SFHAs are those portions of participating communities within the 100-year floodplain. The 100-year floods are hydrological events of a magnitude expected to be equaled or exceeded once, on the average, during any 100-year period or commonly have a 1 percent chance of being equaled or exceeded during any year. Although the recurrence interval represents the long-term, average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The 100-year floodplain includes land that during such an event would be flooded. The NFIP is effective only for participating communities. The City of Altus is a participant, but Jackson County is not. Figure 3-3 shows the boundaries of the 100-year floodplain on Altus AFB (Bellon 2003; Sirmons 2003).

The boundaries of the 100-year and 500-year floodplains in the MFH areas, as shown in the 1980 Flood Insurance Rate Map (FIRM), have been affected by the construction activities in the area in recent years. The 1980 FIRM predates the construction of the Great Plains housing area. A retention basin was constructed at the south end of the Great Plains housing area to deter flooding, and the area where the housing units were constructed was elevated (Bellon 2001). Additionally, the City of Altus has constructed retention basins northwest of Altus AFB to alleviate flooding problems in the western portion of the base (Bellon 2001; Benson 2001). Based on the updated floodplain map (Figure 3-2; Sirmons 2003), a 100-year floodplain is associated with the unnamed tributary of Stinking Creek that transects the MFH areas. As shown on Figure 3-2, nine of the current MFH units are located within this floodplain.

Based on interviews conducted for the 2002 EBS, flooding in the housing area, particularly Capehart housing, has been observed. However, none of these observations include flooding into the actual housing units, with the exception of one occasion where floodwaters slightly entered a patio door (Stevenson 2001). All observations of flooding have been related to roads being under water and elevated water levels in the unnamed tributaries of Stinking Creek. Additionally, information obtained from the interviews conducted for the EBS indicates that flooding does not appear to have occurred since the retention basins discussed above were constructed.

3.1.10 Biological Resources

In addition to vegetation and wildlife, this section addresses resources for which there are specific legal protections in laws other than NEPA, including threatened and endangered species and wetlands.

3.1.10.1 Vegetation

Vegetation and wildlife in the general vicinity of Altus AFB were previously described by the Air Force and the Oklahoma Biological Survey (USAF 1997d; USAF 1997a). The following section are a synopsis of those descriptions.

The area surrounding Altus AFB is located within the mixed-grass prairie of the Kansan biotic province. Grasses and shrubs cover the majority of the uncultivated and undeveloped land.

Very few native species of trees exist in the area (trees generally only occur naturally here along streams or irrigated areas), and attempts to establish trees on base have been difficult because of extreme temperatures, lack of moisture, and clay soils with high salt content (USAF 1998b). Native grasses consist primarily of little bluestem, sand bluestem, and switchgrass. Yucca, mesquite, sagebrush, and other xerophytic shrubs are scattered among the native grasses. Much of the native vegetation in the general vicinity of Altus AFB has been replaced by introduced species. Most vegetated areas on and adjacent to the base (including all MFH) are actively landscaped or maintained (mowed). In addition, much of the mixed prairie in the vicinity of Altus AFB has been converted to short-grass pasture for livestock grazing. Wheat, cotton, sorghum, and alfalfa are the major crops grown in the area's cultivated fields (USAF 1994b). A complete list of plant species and plant communities found in the vicinity of Altus AFB is included in the Oklahoma Biological Survey's endangered species survey for Altus (USAF 1997d).

3.1.10.2 Wildlife

Five small mammal (rodent) species are known to be found on Altus AFB. They are, in order of abundance, hispid cotton rat, white-footed mouse, house mouse, deer mouse, and fulvous harvest mouse. Many other wildlife species exist in the less developed areas adjacent to Altus AFB. Some of the native mammals include fox squirrel, 13-lined ground squirrel, cottontail and jackrabbit, opossum, beaver, several species of mice, mule deer, coyote, and nine-banded armadillo. A total of 68 species of birds have been recorded on and adjacent to Altus AFB. The most common bird species on Altus AFB is the great-tailed grackle, with mourning doves the second most abundant. Other species observed frequently include cliff swallows, house sparrows, and western meadowlarks (USAF 1997d). A complete bird list is included in the Oklahoma Biological Survey's endangered species survey for Altus AFB (USAF 1997d).

Altus AFB is located in an ecosystem that was originally grasslands. Characteristic bird species of the grasslands include raptors such as northern harrier, red-tailed hawk, and Swainson's hawk (summer only); northern bobwhite; wild turkey; assorted dove species, including mourning dove and rock dove; roadrunner; screech owl; assorted flycatcher species such as eastern kingbird, western kingbird, and scissor-tailed flycatcher; northern mockingbird; and grasshopper sparrow. Bird species associated with a municipal habitat include rock dove, house sparrow, and European starling (USAF 1997d).

Populations of the above-mentioned species fluctuate with the season. With the exception of the raptors, the remaining more common species are relatively small in size and typically fly near the ground surface. Populations of raptors overall tend to increase during the late fall and winter. This area of Oklahoma is not within a primary raptor migration route but is within the wintering range of many raptors. Although herons and egrets may occur, these species typically do not occur in great concentrations and only at specialized habitat near water. Available maps indicate that suitable habitat is limited for these species.

There are several aquatic habitats in the Altus AFB area, including Stinking Creek, tributaries to Stinking Creek, irrigation canals, and upland drainage ditches. On the basis of the state of Oklahoma water classification system, Stinking Creek is considered a primary warm-water

fishery. However, because of the small surface area of the creek near the base and the effects of agricultural disturbances, no significant game-fish populations are present (USAF 1990).

3.1.10.3 Wetlands

Four federal agencies are responsible for identifying and regulating wetlands: the United States Army Corps of Engineers (USACE), the USEPA, the United States Fish and Wildlife Service (USFWS), and the Natural Resource Conservation Service (NRCS). The USACE and USEPA are primarily responsible for making jurisdictional determinations and regulating wetlands under Section 404 of the CWA. The USACE also makes jurisdictional determinations under Section 10 of the Rivers and Harbors Act of 1899. The NRCS has developed procedures for identifying wetlands for compliance with the Flood Security Act of 1985, and the USFWS has developed a classification system for identifying wetlands. The protection of wetlands is also mandated under Executive Order 11990.

The results of a 1994 USACE wetlands survey on Altus AFB indicated that four main areas within the base boundaries are jurisdictional wetlands. Several streambed and bank systems, which are jurisdictional as “other waters of the United States,” are also located on base (USFWS 1995).

Four areas were identified on base that have small, isolated wetland islands. In these areas, the exposed bed supported wetland indicator plants, while the presence of hydric soils varied throughout the system. Within Altus AFB, these wetlands areas were observed within channelized portions of Stinking Creek and several of its unnamed tributaries. However, none of these wetland areas are in the MFH areas (USAF 2002e).

A formal survey of land outside the boundaries has not been performed. However, based on information provided on the National Wetlands Inventory map, several wetland areas are mapped downstream of existing base housing. One of these areas is adjacent to the base, just south of the main gate. Several areas are also located adjacent to the southwest base boundary. The area just south of the main gate does not meet the qualifications of a jurisdictional wetland, as no hydric soils were identified (USFWS 1995).

3.1.10.4 Threatened and Endangered Species

The ESA of 1973, along with subsequent amendments, requires that actions of Federal agencies avoid jeopardizing the continued existence of federally listed or proposed threatened or endangered species or destroying or adversely modifying designated or proposed critical habitats.

Based on U.S. Fish and Wildlife Service data, endangered, threatened or candidate species do exist in Jackson County. The two federally listed endangered species known to exist in Jackson County are the interior least tern (*Stern antillarum athalassos*) and the whooping crane (*Grus americana*); however, there are no records of either of these species occurring near or on the base. The interior least tern is known to nest in Oklahoma during summer months, using sandbars along major rivers and around reservoirs. The whooping crane is known to migrate through the State during spring and fall, using prairie wetland areas and major rivers as stopover

sites (USAF 1994a). Only one other southwestern Oklahoma species is listed as threatened: the bald eagle. bald eagles have been recorded in this part of the State during the winter, although not in Jackson County or Washita County. No areas on Altus AFB are likely to attract this species. The 1997 Oklahoma Biological Survey found it highly improbable that federally listed species would be drawn to Altus AFB (USAF 1997d) given the extent and type of habitats present there. In addition, there are no known rare species or communities, refuges, management areas, nature preserves, or registry natural areas within one mile of the base.

(no document text this page)

CHAPTER 4

ENVIRONMENTAL CONSEQUENCES

This chapter describes the potential environmental impacts that are likely to occur as a result of the Proposed Action or Alternative 1. The No Action Alternative provides a baseline against which the impacts of the Proposed Action and Alternative 1 can be compared. A discussion of mitigation measures is included, as necessary. Any resultant irreversible or irretrievable commitments are noted. Criteria used to evaluate potential impacts are discussed at the beginning of each section. Where appropriate, the cumulative effects of the proposed action (when combined with other actions) are also evaluated.

4.1 DESCRIPTION OF THE EFFECTS OF ALL ALTERNATIVES ON THE AFFECTED ENVIRONMENT

4.1.1 Noise

The following factors were considered in evaluating potential noise impacts: (1) the degree to which noise levels generated by the construction and renovation activities were higher than the ambient noise levels; (2) the degree to which there is annoyance and/or interference with activity; and (3) the proximity of noise-sensitive receptors to the noise source. A noise-sensitive receptor is commonly defined as the occupants of any facility where a state of quietness is a basis for use, such as a residence, hospital, or church. Livestock, poultry, and some protected species of wildlife are also considered noise-sensitive receptors.

Noise naturally dissipates by atmospheric attenuation as it travels through the air. Some other factors that can affect the amount of attenuation are ground surface, foliage, topography, and humidity. Assuming that noise from the construction equipment radiates equally in all directions, the sound intensity would diminish inversely as the square of the distance from the source. Therefore; in a free field (no reflections of sound), the sound pressure level decreases 6 dB with each doubling of the distance from the source. Under most conditions, reflected sound will reduce the attenuation owing to distance. Therefore, doubling the distance may only result in decrease of 4 to 5 dB (AIHA 1986). Table 4-1 shows the anticipated noise levels at a distance of 50 feet for miscellaneous heavy equipment.

Table 4-1 Heavy Equipment Noise Levels at 50 Feet

Equipment Type ^a	Number Used ^a	Generated Noise Levels L _p (dBA) ^b
Bulldozer	1	88
Backhoe (rubber tire)	1	80
Front Loader (rubber tire)	1	80
Dump Truck	1	75
Concrete Truck	1	75
Concrete Finisher	1	80
Crane	1	75
Flat-bed truck (18 wheel)	1	75
Scraper	1	89
Trenching Machine	1	85

dBA= A-weighted Decibel

L_p=sound pressure level

a Estimated

b Source: CERL 1978

4.1.1.1 Proposed Action

Noise levels would temporarily increase in the MFH area due to construction/renovation of the housing units. Demolition, construction, and/or renovation activities would occur, in some cases, adjacent to occupied housing units. MFH units adjacent to ongoing demolition/construction would temporarily experience outside noise levels similar to those noted in Table 4-1 (75-89 dBA). It is important to note that sound levels within the housing units would be lower because of sound transmission loss through building walls and windows. Noise reduction within dwellings generally ranges from 18 to 27 dB depending on the type of walls and windows (USDOT 1992). Therefore, noise in MFH units adjacent to demolition/construction activities would be in the range of 57-71 dBA. All MFH would be renovated again in year 25 of the program. Noise levels for these primarily cosmetic renovations would be expected to be less than those during initial demolition and reconstruction, since they would not involve the use of heavy equipment.

Demolition and construction activities would be expected to occur between 7:00 a.m. and 5:00 p.m. Heavy equipment would only be used during demolition of each housing unit. As such, exposure to the noise associated with this equipment would be short term. Because the land use would not change, no long-term impacts to noise would occur.

4.1.1.2 Alternative 1

Noise impacts from this alternative would be the same as those described for the proposed action.

4.1.1.3 No Action Alternative

Under the No Action Alternative, there would be no change in the baseline conditions described in Section 3.1.1.

4.1.1.4 Mitigative Actions

Noise levels would be temporarily increased from the construction of the MFH on Altus AFB; however, mitigation measures would not be required for the proposed action.

Although mitigation is not required, possible measures that would reduce impacts from this project include the following:

- Noise-generating heavy equipment at the project site should be equipped with the manufacturer's standard noise control devices (i.e., mufflers, baffling, and/or engine enclosures). All equipment should be properly maintained to assure that no additional noise from worn or improperly maintained equipment parts is generated.
- Occupational exposure to the noise from heavy equipment could be reduced by requiring workers to wear appropriate hearing protection.
- Hearing protective devices such as ear plugs or ear muffs should be worn at all locations where workers may be exposed to high noise levels.

4.1.2 Land Use

The following factors were considered in evaluating potential land use: (1) the degree to which the location of facilities would adversely affect existing sensitive land uses; (2) the degree to which construction and/or operation of facilities would interfere with the activities or functions of adjacent existing or proposed land uses; and (3) the degree to which any physical changes in land use would affect surrounding uses and compatibility with land use plans.

4.1.2.1 Proposed Action

There would be no changes in land use resulting from the proposed action. The area would continue to be used for MFH. Therefore, there would be no impacts to land use.

4.1.2.2 Alternative 1

Impacts for this alternative would be the same as those described for the proposed action.

4.1.2.3 No Action Alternative

Under the No Action Alternative, there would be no change in the baseline conditions described in Section 3.1.2.

4.1.2.4 Mitigative Actions

Impacts to land use would not be expected from the proposed activities. Therefore, no mitigative actions would be required.

4.1.3 Air Quality

The following factors were considered in evaluating air quality: (1) the short- and long-term air emissions generated from renovation, construction, and demolition activities; (2) the type of emissions generated; and (3) the potential for emissions to exceed NAAQSs or State Implementation Plan limits.

4.1.3.1 Proposed Action

The proposed action would result in short-term emissions during renovation, construction, and demolition of the existing and new homes and associated infrastructure, principally from site clearing/preparation activities and the use of construction equipment and related vehicles. There would be no or a negligible increase in long-term emissions as it is assumed that personal operated vehicle (POV) use would remain the same and all boiler and generators associated with the housing would be comparable to those already in use.

It has been estimated that construction (2,700 square feet [ft²]) of each new home site would take approximately 90 days, renovation (2,700 ft²) and demolition (1,683 ft²) of each existing home site would take approximately 30 days, and the total actual working days spent on infrastructure improvements (1 mile of 25 ft wide asphalt road; 5,000 ft² of half gravel and half concrete playground, quarter mile of 10 ft wide concrete jogging track, and 1 mile of concrete drainage improvements) would be approximately 365 days spread equally over the span of the project.

The quantity of uncontrolled fugitive dust emissions from a construction site is proportional to the area of land being worked on and the level of construction activity. The USEPA has estimated that uncontrolled fugitive dust emissions from ground disturbing activities would be emitted at a rate of 80 lbs of total suspended particulate (TSP) per acre per day of disturbance (USEPA 1995). In a USEPA study of air sampling data at a distance of 50 meters downwind from construction activities, PM₁₀ emissions from various open dust sources were determined based on the ratio of PM₁₀ to TSP sampling data. The average PM₁₀ to TSP ratios for top soil removal, aggregate hauling, and cut and fill operations are reported as 0.27, 0.23, and 0.22, respectively (USEPA 1988). Using 0.24 as the average ratio for purposes of analysis, the emission factor for PM₁₀ dust emissions becomes 19.2 pounds per acre per day of disturbance. The emissions presented in Table 4-2 include the estimated annual PM₁₀ emissions associated with the uncontrolled fugitive dust emissions from the renovation, construction, and demolitions sites. Emissions from infrastructure improvements are also included. These emissions would produce slightly elevated short-term PM₁₀ ambient air concentrations. The USEPA estimates that the effects of fugitive dust from construction activities would be reduced significantly with an effective watering program. Watering the disturbed area of the construction site twice per day with approximately 3,500 gallons per acre per day would reduce TSP emissions as much as 50 percent (USEPA 1995). The effects from fugitive dust would last only as long as the duration of construction activity, fall off rapidly with distance from the construction site, and would not result in long-term impacts.

Specific information describing the types of construction equipment required for a task, the hours the equipment is operated, and the operating conditions vary widely from project to project. For purposes of analysis, these parameters were estimated using established cost estimating methodologies for construction and experience with similar types of construction projects

(Means 1996). Combustive emissions from construction equipment exhausts were estimated by using USEPA approved emissions factors for heavy-duty diesel-powered construction equipment (USEPA 2000) along with the emission factors for the estimated types and numbers of equipment expected to be used during construction (Latimer 2000). These emissions are included in Table 4-2. As with fugitive dust emissions, construction emissions would produce slightly elevated air pollutant concentrations. However, the effects from construction activities would last only as long as the duration of construction activity, fall off rapidly with distance from the construction site, and would not result in long-term impacts.

Review of emissions from the proposed action in Table 4-2 indicates that the greatest percentage impact to the regional emissions in a given year during the project would be PM₁₀ (8.59 tpy increase) at 2.03 percent from renovation, construction, and demolition operations during the initial phase of the project. The emissions would be temporary and would be eliminated after the activity is completed. All emissions would fall well below the 10 percent level that would be considered regionally significant by the USEPA if the region were nonattainment for any of the criteria pollutants as stated in 40 CFR 51, Subpart W, Section 852.

The short-term emissions from the alternative action are not in danger of exceeding NAAQS or limits that would be set in a specific State Implementation Plan (SIP). The emission of minor amounts of air pollution would be unavoidable; however, the individual impacts during renovation, construction, and demolition would be small when compared to the 2002 AQCR 189 emissions.

4.1.3.2 Alternative 1

Emissions for the alternative action would occur as a result of similar renovation, construction, and demolition and operational activities as the proposed action. Similarly, these emissions would be minimal and are summarized in Table 4-2.

Review of emissions from the alternative action in Table 4-2 indicates that the greatest percentage impact to the regional emissions in a given year during the project would be PM₁₀ (17.12 tpy) at 4.04 percent from renovation, construction, and demolition operations during the initial phase of the project. The emissions would be temporary and would be eliminated after the activity is completed. All emissions will fall well below the 10 percent level that would be considered regionally significant by the USEPA if the region were nonattainment for any of the criteria pollutants as stated in 40 CFR 51, Subpart W, Section 852.

The short-term emissions from the alternative action are not in danger of exceeding NAAQS or limits that would be set in a specific SIP. The emission of minor amounts of air pollution would be unavoidable; however, the individual impacts during renovation, construction, and demolition would be small when compared to the 2002 AQCR 189 emissions.

Table 4-2 Expected Emissions per Construction Year

Criteria Air Pollutant	CO	VOC	NO _x	SO _x	PM _{10/2.5}
Proposed Action (tpy)	6.13	2.01	14.06	1.50	8.59
Percent of Regional Emissions	0.09	0.06	0.09	0.21	2.03
Alternative Action (tpy)	14.11	3.37	32.49	3.46	17.12
Percent of Regional Emissions	0.21	0.10	0.21	0.49	4.04
No Action Alternative (tpy)	0.00	0.00	0.00	0.00	0.00
Percent of Regional Emissions	0.00	0.00	0.00	0.00	0.00
Future Renovations (tpy) ^a	2.60	0.45	5.88	0.63	2.55
2002 AQCR 189 Emissions (tpy) ^b	6855.41	3241.89	15677.02	702.03	423.33

AQCR=Air Quality Control Region

CO=carbon monoxide

NO_x=nitrogen oxides

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

PM₁₀=particulate matter equal or less than 10 micrometers in diameter

SO_x=sulfur oxides

tpy - tons per year

VOC=volatile organic compound

^a Applicable to the Proposed Action and Alternative 1

^b As reported in the 2002 ODEQ Source Emissions Database (Moffitt, 2004)

4.1.3.3 No Action Alternative

Under the No Action Alternative, there would be no change in the baseline conditions described in Section 3.1.3.

4.1.3.4 Mitigative Actions

Minor impacts to regional air quality would be expected from the proposed activities; however, no mitigative actions would be required.

4.1.4 Socioeconomic Resources

The DoD standard construction model of the USACE Economic Impact Forecast System (EIFS) was used to forecast the effects of the proposed action. The construction model predicts the economic impacts of the expenditures and employment from construction activities. Using a technique termed the rational threshold value (RTV), the EIFS estimates are compared to the historic trends for each of four economic indicators (business volume [using non-farm income], personal income, employment, and population). The RTV model analyzes annual changes since 1969 and establishes importance criteria based on historic deviations in the value of these four socioeconomic indicators. The EIFS calculates both positive and negative RTVs. This assessment assumes impacts associated with the proposed action, alternative action, and no-action alternative would occur within Jackson County.

In addition there are other actions proposed during the same time period as the proposed action that would be expected to have potential social and economic effects. Due to the nature of the proposed action, and the number of other actions anticipated to contribute to potential cumulative social and economic effects, an approach known as "bracketing" was used to determine whether social and economic effects could be expected from the proposed action, and whether cumulative social and economic effects could be expected from the proposed action in combination with the other actions.

Bracketing involves determining the time period in which the highest level of effects would be anticipated, and evaluating the effects during that time period based on the EIFS RTV model. For construction actions such as the proposed action, the time period in which the greatest potential effects would occur is defined as the fiscal year in which the greatest amount of construction-related investment would be made. The evaluations provided in this section report the greatest level of anticipated change from baseline conditions that could be expected from the proposed action, both individually and in combination with the other actions.

4.1.4.1 Proposed Action

Expenditures for the proposed action are expected to be incurred primarily in two phases, during the first five years of the project and again 25 years later for a period of six years. Expenditures during the first phase are likely to be significantly higher than the second phase as the first phase includes demolition, construction, and renovation while the second phase would be limited to renovations only. As mentioned previously, the peak year's expenditures will be used to determine the maximum socioeconomic impact of the proposed action.

The US Air Force has not yet entered into a contract with a private developer to undertake the proposed action. Therefore, construction and renovation expenditures have not yet been finalized. However, for purposes of this EA, the estimated cost of the first phase of the proposed action was the basis for assessing socioeconomic impacts. To minimize impacts to military families currently residing on base, the renovation and demolition/construction activities would be selectively phased. Therefore, for purposes of forecasting, total expenditures for the first phase were levelized over the five-year period to determine the maximum annual expenditures of the proposed action. Table 4-3 identifies the project area RTVs for four socioeconomic indicators.

Table 4-3 Comparison of Threshold RTVs to Forecasted Impacts of Proposed Action

Socioeconomic Indicator	RTVs	Impact of Proposed Action	Impact Value Within RTVs?
Sales	-11.18% to 12.02%	1.12%	Yes
Income	- 8.08% to 13.24%	0.24%	Yes
Employment	- 3.19% to 5.48%	0.23%	Yes
Population	- 2.37% to 3.97%	0.0%	Yes

RTV= rational threshold value

As illustrated in the table, for all four socioeconomic indicators, the impact of the proposed action is within the RTVs. Management of MFH would be transferred to a private developer; however, it is assumed that the MFH contractor would require similar staffing levels to manage MFH, resulting in no net loss of jobs.

Housing. As stated previously, the US Air Force has not yet entered into a contract with a private developer to undertake the proposed action. Therefore, it is difficult to determine whether military families would be relocated off base during the first phase of the proposed action or on-base surplus housing would be used to provide temporary housing. To ensure that the impacts of the proposed action are adequately addressed in light of this uncertainty, a maximum impact scenario was developed to assess the impact on housing availability in the local community.

Under a maximum impact scenario, the maximum number of families that would be relocated to off-base housing at any point in time during the project is 239. This estimate is based on the number of surplus housing units currently available on the base. The local available housing stock could easily accommodate the potential additional demand for housing that would occur as a result of relocation. According to U.S. Census data, there were approximately 1,787 vacant housing units in Jackson County in 2000. This number represents 14.4 percent of the total number of housing units available in Jackson County in 2000. If 239 families were to relocate to off-base housing as a result of the proposed action, the number of vacant housing units would decline to 1,548, or 12.5 percent of the total housing units in Jackson County. This decrease would only be temporary as the military families would move back to on-base housing when the new or renovated housing becomes available. Based on the 2 percentage point decrease in vacant housing units and the temporary nature of the decrease, the proposed action would have minimal impact on the availability of housing in the local community.

Education. As the proposed action would not result in an increase in the local population, the only potential impact on local schools would be the transfer of students from one school location to another as a result of housing relocation during construction activities. As stated previously, there is some uncertainty regarding whether any families would be relocated as a result of the proposed action. However, under the maximum impact scenario, a maximum of 239 families may be relocated to off-base housing. The analysis of the proposed action on local education resources is based on this maximum impact scenario.

Based on the number of hardship requests Altus housing officials receive requesting permission to retain military family housing in order to avoid having to transfer dependent children to other schools, it is unlikely that relocated families would enroll their children in alternate schools, particularly given that any transfer would be temporary.

4.1.4.2 Alternative 1

Alternative 1 is essentially the same as the Proposed Action except that instead of completing whole house renovations on 401 homes, these homes would be demolished and rebuilt. The total number of units remaining under Alternative 1 (726) would be the same as under the proposed

action; therefore, the number of homes to be renovated in phase 2 of the project is exactly the same as the proposed action.

Based on per unit construction, renovation, and demolition costs used to evaluate the impact of the Proposed Action, phase 1 of Alternative 1 is not expected to exceed \$75 million over a five-year period. Assuming levelized expenditures, an estimate of \$15 million in total annual expenditures was used to forecast socioeconomic impacts for Alternative 1. Table 4-4 compares the RTVs for Jackson County to the forecast estimates for Alternative 1.

Table 4-4 Comparison of Threshold RTVs to Forecasted Impacts of Alternative 1

Socioeconomic Indicator	RTVs	Impact of Alternative 1	Impact Value Within RTVs?
Sales	-11.18% to 12.02%	1.87%	Yes
Income	- 8.08% to 13.24%	0.41%	Yes
Employment	- 3.19% to 5.48%	0.39%	Yes
Population	- 2.37% to 3.97%	0.0%	Yes

RTV= rational threshold value

Housing. The number of surplus housing units currently available for temporarily relocating families is the same as the proposed action. Therefore, as was the case with the proposed action, a maximum of 239 families could be potentially relocated to off-base housing under Alternative 1.

Education. As was the case with housing, the impact of Alternative 1 on local education resources is the same as the proposed action. Given the temporary nature of any relocation that may be required and the desire expressed by military families in the past to continue educating their children at schools available to them when residing in on-base housing, the likelihood of transfers between schools is minimal.

4.1.4.3 No Action Alternative

Under the No Action Alternative, there would be no change in the baseline conditions described in Section 3.1.4. Altus AFB would retain all 965 MFH units. Because of limited military funding , there would be no whole house renovations or periodic capital repair and improvements. As such, MFH housing at Altus AFB would continue to deteriorate.

4.1.4.4 Mitigative Actions

Since neither the Proposed Action nor Alternative 1 is expected to have an adverse impact on socioeconomic resources, housing, or education, no mitigative actions are needed.

4.1.5 Cultural Resources

Potential impacts were assessed by (1) identifying types and possible locations of construction activities that could directly or indirectly affect cultural resources and (2) identifying whether cultural resources may be affected. Impacts to cultural and/or historic resources may occur if project activities resulted in:

- destruction or alteration of all or a contributing part of any NRHP eligible cultural or historic site without prior consultation with the SHPO;
- isolation of an eligible cultural resource from its surrounding environment;
- introduction of visual, audible, or atmospheric elements that are out of character with a NRHP eligible site or would alter its setting;
- neglect and subsequent deterioration of a NRHP eligible site; and
- disturbance of important sites of religious or cultural significance to Native Americans.

4.1.5.1 Historic Resources

4.1.5.1.1 Proposed Action

No historic buildings, structures, or objects are located in the proposed project areas at Altus AFB. Therefore, no impacts to historical buildings, structures, or objects are expected.

4.1.5.1.2 Alternative 1

Impacts for this alternative would be the same as those described for the proposed action.

4.1.5.1.3 No Action Alternative

Under the No Action Alternative, there would be no change in the baseline conditions described in Section 3.1.5.2.

4.1.5.1.4 Mitigative Actions

Impacts to historic resources would not be expected from the proposed activities. Therefore, no mitigative actions would be required.

4.1.5.2 Archaeological Resources

4.1.5.2.1 Proposed Action

Since there are no known archaeological sites located in the proposed project areas, no effects to known archaeological sites are expected. In accordance with the NHPA, if during the course of program activities, cultural/historic materials (particularly human remains) are unexpectedly discovered, work in the immediate vicinity of the cultural materials would be suspended and the Oklahoma SHPO consulted through the Altus AFB Environmental Flight. Subsequent actions would follow guidance provided in 36 CFR 800 and NAGPRA.

4.1.5.2.2 Alternative 1

Impacts for this alternative would be the same as those described for the proposed action.

4.1.5.2.3 No Action Alternative

Under the No Action Alternative, there would be no change in the baseline conditions described in Section 3.1.5.3.

4.1.5.2.4 Mitigative Actions

Impacts to archaeological resources would not be expected from the proposed activities. Therefore, no mitigative actions would be required.

4.1.6 Hazardous Materials and Wastes

The degree to which proposed construction, renovation, and demolition activities could affect the existing environmental and management practices was considered in evaluating potential impacts to hazardous materials and wastes, including ERP sites. Impacts could result if non-hazardous/regulated and hazardous substances were collected, stored and/or disposed of improperly.

4.1.6.1 Hazardous Materials

4.1.6.1.1 Proposed Action

The use of hazardous materials during implementation of the proposed action is expected to be limited to fuels, oils and lubricants associated with the construction equipment. If fuels are stored on site to refuel the equipment, proper containment and management procedures would be followed in compliance with standard best management practices. These hazardous materials would be managed by the contractor. Additionally, there would be no increased use of hazardous materials as a result of this project.

Asbestos. There are multiple ACMs present in the Capehart and Bicentennial housing areas, but not in the Great Plains area. The guidelines present in the Altus AFB Asbestos Management Plan would be followed in order to remove all ACM from the affected units prior to beginning demolition activities. No ACM would be used in the construction of the new housing units.

Lead-Based Paint. There are several interior and exterior trim locations in the Capehart housing area that has been found to have LBP. The procedures outlined in the LBP Management Plan would be followed to properly manage these areas of the housing units during demolition activities. No LBP would be used in the construction of the new housing units.

Radon. Based on EPAs established radon zones and a 1990 basewide radon survey, there is a very low potential for accumulation of radon gas within the present or future housing units above the guidance level of 4.0 pCi/L.

Pesticides. Base records indicate the historical application of several pesticides that are no longer approved for use. Although these pesticides were used in accordance with manufacturers

guidance and directions, the potential exists for residual concentrations in the soil underlying MFH at the base that exceed the current action levels established by USEPA. Some surface water samples collected during the EBS indicated no contribution of pesticides to the surface water originating from the housing areas. Prior to demolition of the houses and removal of the concrete slab foundations, a limited number of random samples would be collected to assess the presence or absence of pesticides in the soil underlying the housing units, and to properly categorize the soil for hazardous constituents per applicable State and federal regulations for disposal off site.

4.1.6.1.2 Alternative 1

The impacts for this alternative would be similar to those described for the proposed action in section 4.1.6.1.1, except that more housing units would be demolished, generating additional ACM, LBP, and possibly pesticide impacted soils for disposal.

4.1.6.1.3 No Action Alternative

Under the No Action Alternative, there would be no change in the baseline conditions described in Section 3.1.6.1.

4.1.6.1.4 Mitigative Actions

Impacts with regard to hazardous materials would not be expected from the proposed activities. Therefore, no mitigative actions would be required.

4.1.6.2 Hazardous Waste

4.1.6.2.1 Proposed Action

Hazardous wastes are not expected to be generated as a result of the construction of the MFH buildings at Altus AFB. The asbestos and LBP containing materials generated during the demolition activities would be managed in accordance with established base management plans. As mentioned above under hazardous materials, a limited number of soil samples would be collected and analyzed to assess the presence or absence of pesticides so that any excess soil may be disposed per applicable State and federal regulations.

4.1.6.2.2 Alternative 1

The impacts for this alternative would be similar to those described for the proposed action in section 4.1.6.2.1, except that more housing units would be demolished, generating additional ACM, LBP, and possibly pesticide impacted soils for disposal.

4.1.6.2.3 No Action Alternative

Under the No Action Alternative, there would be no change in the baseline conditions described in Section 3.1.6.2.

4.1.6.2.4 Mitigative Actions

Impacts with regard to hazardous materials or wastes would not be expected from the proposed activities. Therefore, no mitigative actions would be required.

4.1.6.3 Environmental Restoration Program

4.1.6.3.1 Proposed Action

As shown in Tables 3-5 and 3-6, there are five ERP sites and eight other compliance sites located within one-half mile of the housing areas. There are no ERP or compliance sites located within the MFH areas. None of the other ERP or compliance sites would affect or be affected by the proposed action. The ERP at Altus AFB is conducted in accordance with applicable Air Force and other federal and state regulations.

4.1.6.3.2 Alternative 1

Impacts for this alternative would be the same as those described for the proposed action in section 4.1.6.3.1.

4.1.6.3.3 No Action Alternative

Under the No Action Alternative, there would be no change in the baseline conditions described in Section 3.1.6.3.

4.1.6.3.4 Mitigative Actions

Impacts with regard to the ERP or other compliance sites would not be expected from the proposed activities. Therefore, no mitigative actions would be required.

4.1.7 Infrastructure and Utilities

The following factors were considered in evaluating potential impacts to infrastructure and utilities: (1) the degree to which a utility service would have to alter operating practices and personnel requirements, (2) the degree to which the change in demands from implementation of the proposed action and alternatives would impact the utility system's capacity, (3) the degree to which a transportation system would have to alter operating practices and personnel requirements to support the action, (4) the degree to which the increased demands from the proposed program would reduce the reliability of transportation systems, and (5) the degree to which the proposed action or alternatives change surface water runoff and erosion characteristics.

4.1.7.1 Sanitary Sewer

4.1.7.1.1 Proposed Action

The existing 965 MFH units currently produce an estimated 143,827,894 gallons of wastewater per year. Due to the 239 unit decrease in the number of housing units associated with the proposed action, a reduction in wastewater generation on Altus AFB would be expected. Overall

domestic wastewater generation in the community would not change because the number of personnel (and dependents) assigned to Altus AFB would remain the same.

The proposed action requires the replacement of existing sewer lines. Existing service laterals are PVC, however the main lines are clay and are in poor condition. Replacement would involve excavation of approximately 60 linear feet of service lateral between each manhole, providing a total of 4,950 liner feet of excavation within the MFH areas (Howard 2004). Excavated material would be used to backfill the trench after installation of the new laterals.

4.1.7.1.2 Alternative 1

Impacts for this alternative would be the same as those described for the proposed action.

4.1.7.1.3 No-Action Alternative

Under the No-Action Alternative, there would be no change in the baseline conditions described in Section 3.1.7.1.

4.1.7.1.4 Mitigative Actions

Mitigation measures to protect health and welfare would not be required for the proposed action. There would be no impacts to wastewater treatment and capabilities.

4.1.7.2 Potable Water

4.1.7.2.1 Proposed Action

The existing 965 MFH units use an estimated 158,399,218 gallons of potable water per year. Similar to domestic wastewater generation, the reduction in the number of housing units would result in a similar reduction in potable water consumption on Altus AFB. Overall domestic potable water consumption in the community would not change because the number of personnel (and dependents) assigned to Altus AFB would remain the same.

4.1.7.2.2 Alternative 1

Impacts for this alternative would be the same as those described for the proposed action.

4.1.7.2.3 No Action Alternative

Under the No Action Alternative, there would be no change in the baseline conditions described in Section 3.1.7.2.

4.1.7.2.4 Mitigative Actions

No adverse impacts to potable water would be anticipated for the proposed action. Therefore, no mitigative actions would be required.

4.1.7.3 Solid Waste

The following factors were considered in evaluating potential impacts to solid waste management: the degree to which proposed construction, changes in operations, and the potential for generating additional waste could affect the existing solid waste management program and capacity of the area landfills. The solid waste generated during construction of the project would consist of building materials such as solid pieces of concrete, metals, and lumber. Calculations to determine solid waste impacts are included in Appendix E and discussed below for each alternative.

4.1.7.3.1 Proposed Action

The proposed action includes whole-house renovation for 401 units, selective renovation for 183 units, demolition of 381 units, and new construction of 142 units. All of these activities would generate construction debris, the generation of which would be spread out over five years. Table 4-5 summarizes the potential increases in solid waste generation from the proposed action during the first five years of the project.

Table 4-5 Solid Waste Generation from Renovation, Construction, or Demolition Activity

Description of Action	Number of Units Affected	Total Area Affected by Action (sf) ⁽¹⁾	Estimated Volume of Debris Generated ⁽²⁾ (lbs/sf)	Estimated Solid Waste Generated from Action (Tons)
Whole House Renovation	401	697,740	24.05	8,390
Partial Renovation	183	147,987 ⁽³⁾	24.05	1,780
Demolish ⁽⁴⁾	381	542,334	111	30,099
New Construction	142	264,300	4.38	579
sf=square feet lbs/sf= pounds per square foot			Total Solid Waste (Tons)	44,103

(1) Total Area Affected = Average Square Footage of Unit Areas x Number of Units Affected.

(2) USEPA 1998.

(3) Area affected for partial renovation is assumed to be half the total area of the unit.

(4) Demolition debris includes concrete slabs from all affected units.

Based on the estimated volumes indicated in Table 4-5, a maximum volume of approximately 40,848 tons of construction debris would be generated over a 5-year period. This amounts to approximately 8,170 tpy, increasing the total expected solid waste disposal from Altus AFB for the first five years of the project to 10,360 tons per year, a substantial increase over the current Altus AFB contribution (2,190 tons per year).

The City of Altus landfill currently receives approximately 36,504 tpy (Coombs 2004a). The increase in solid waste disposal from the proposed action would be short term (five years) and would represent a 22 percent increase in solid waste disposal for this time period. The City of

Altus landfill currently has a life expectancy of 20 years, however approximately 400 adjacent acres of city-owned land is available for landfill use if necessary (Combs 2004b). Therefore, there is sufficient capacity to handle the short-term increase in solid waste.

There would be a slight decrease in solid waste production on Altus AFB from residents, as the number of housing units will decrease. Similar to domestic wastewater generation and potable water consumption, overall solid waste generation in the community would not change because the number of personnel (and dependents) assigned to Altus AFB would remain the same.

Whole-house renovations of all MFH units would occur in year 25 of the project, and would be completed within 6 years. This would produce approximately 15,433 tons of solid waste over the 6-year period.

4.1.7.3.2 Alternative 1

This alternative would generate demolition debris quantities of approximately 60,650 tons and construction debris quantities of approximately 2,027 tons over a 5-year period. This amounts to approximately 12,535 tpy, increasing the total expected solid waste disposal from Altus AFB for the first five years of the project to 14,725 tons per year, a substantial increase over the current Altus AFB contribution (2,190 tons per year).

The City of Altus landfill currently receives approximately 36,504 tpy (Coombs 2004a). The increase in solid waste disposal from the proposed action would be short term (five years) and would represent a 34 percent increase in solid waste disposal for this time period. The City of Altus landfill currently has a life expectancy of 20 years, however approximately 400 adjacent acres of city-owned land is available for landfill use if necessary (Combs 2004b). Therefore, there is sufficient capacity to handle the short-term increase in solid waste.

Due to the net decrease in housing units, residential solid waste production on Altus AFB would decrease. Solid waste generation would remain the same overall because the number of personnel (and dependents) assigned to Altus AFB would remain the same.

Whole-house renovations of the 726 units would occur again later in the program, generating approximately 14,692 tons of solid waste.

4.1.7.3.3 No Action Alternative

Under the No Action Alternative, there would be no change in the baseline conditions described in Section 3.1.7.3.

4.1.7.3.4 Mitigative Actions

No adverse impacts are expected as a result of implementing the Proposed Action or Alternative 1, therefore, no mitigation measures are required.

4.1.7.4 Drainage

4.1.7.4.1 Proposed Action

The proposed action includes some infrastructure improvements, including street drainage repairs across the MFH areas. These improvements would require minor re-grading of existing drainage ways and swales, installation of drainpipes beneath driveways and sidewalks, and replacement of driveway aprons. These improvements would require excavation and disturbance of areas currently stabilized with grass or pavement. Short-term increases in soil erosion and sediment loadings in storm water runoff would be expected, however, construction activities would be located in such a manner as to help avoid disturbance to streams, wildlife, wetlands and their associated riparian habitats. They would also accommodate the natural drainage patterns and anticipated runoff volumes at the site. A construction storm water permit would be obtained from the ODEQ before any construction activities began. Preparation and implementation of a SWPPP would be required to address surface water quality impacts from drainage system improvements. This SWPPP would include the following sections:

- Part IV.D.2.a.(1) – Sediment must be retained on site to the greatest extent practicable using structural Best Management Practices (e.g. silt fencing, erosion control fabric)
- Part IV.D.2.a.(2) – Vegetated buffer zones should be maintained along all perennial to ephemeral drainages
- Part IV.D.2.a.(3) – Structural Best Management Practices must be used to divert uphill storm water away from construction areas.
- Part IV.D.2.b. – Velocity dissipation devices should be used at all discharge locations

4.1.7.4.2 Alternative 1

Drainage impacts for this alternative would be the same as those described for the proposed action. Drainage improvements required under the proposed action would also be accomplished under this alternative.

4.1.7.4.3 No-Action Alternative

Under the No-Action Alternative, there would be no change in the baseline conditions described in Section 3.1.7.4.

4.1.7.4.4 Mitigative Actions

Preparation and implementation of a SWPPP would include measures such as using silt fences or hay bales to minimize sediment loading of runoff. These measures would be temporary, utilized only during periods of construction or demolition.

4.1.7.5 Transportation

4.1.7.5.1 Proposed Action

There would be a short-term increase in traffic counts resulting from the construction/renovation activities. A wide variety of tradespersons would enter the MFH areas on a daily basis to accomplish the renovation, demolition, and other aspects of the proposed action. Increased traffic counts would be expected in the early morning hours as workers arrive at the job site and in the early evening as workers depart for the day. This would typically coincide with the normal commuting patterns of base occupants who work similar hours.

Increased traffic congestion during peak traffic hours could be expected. Increases in traffic counts resulting from construction/demolition/renovation activities would be short-term in nature. Because the number of MFH units would decrease, the number of families living in the housing area also would decrease. Therefore, there would be a long-term decrease in traffic counts on Altus AFB as a result of the proposed action.

Transportation of heavy equipment, materials, and roll-off dumpsters to and from the MFH area would add additional short-term traffic. The heavy loads that would be expected from this type of traffic could adversely affect road surface conditions if the roadway section is not adequate to support continued heavy equipment traffic for an extended period. Repair of small roadway sections may be required following completion of the construction, demolition and renovation projects.

The demolition and construction activities would tend to have a greater effect on transportation systems than would the renovation activities, as demolition and construction would require: (1) more transportation of demolition debris, (2) increased delivery of construction materials, (3) increased use of heavy equipment, and (4) increases in the number of tradespersons working at the site.

4.1.7.5.2 Alternative 1

Impacts from implementation of Alternative 1 would be similar to those from the proposed action, however, there would be a greater occurrence of traffic congestion associated with the increase in construction related vehicles needed for the increase of demolition and construction activities. An increase in construction and demolition activities would also increase the chance of adversely affecting road surface conditions due to the increased number of heavy loads containing construction materials and demolition debris.

4.1.7.5.3 No Action Alternative

Under the No Action Alternative, there would be no change in the baseline conditions described in Section 3.1.7.5.

4.1.7.5.4 Mitigative Actions

Because implementation of the proposed action would not cause negative long-term impacts to transportation infrastructure at Altus AFB, no mitigative measures would be required.

4.1.7.6 Electricity/Natural Gas

4.1.7.6.1 Proposed Action

Implementation of the proposed action would decrease overall electrical and natural gas consumption on Altus AFB because the proposed action involves a decrease in the number of housing units. Electricity/natural gas consumption would remain the same overall because the number of personnel (and dependents) assigned to Altus AFB would remain the same.

4.1.7.6.2 Alternative 1

Impacts for this alternative would be the same as those described for the proposed action.

4.1.7.6.3 No Action Alternative

Under the No Action Alternative, there would be no change in the baseline conditions described in Section 3.1.7.6.

4.1.7.6.4 Mitigative Actions

Implementation of the proposed action would not increase overall energy demands; therefore, no mitigative actions would be required.

4.1.8 Earth Resources

The following factors were considered in evaluating potential impacts to earth resources: (1) the degree to which the proposed or alternative actions could potentially disrupt the ground surface and destroy the soil profile through excavation and removal of rock and soil in the construction of facilities and (2) the degree to which the proposed or alternative actions could potentially increase erosion caused by the disturbance of the ground surface during the construction of facilities.

4.1.8.1 Proposed Action

Under the proposed action, the geology and topography of the area would not change; however, the soil would be disturbed during demolition and reconstruction of the housing units. The area around the housing units would be de-vegetated beginning with the demolition of the structures and would not be re-vegetated until construction is complete. During the de-vegetated time, soil erosion would be rapid and severe, if left unprotected. During construction, silt fences and erosion control features would be used to limit or eliminate soil erosion. The erosion control features would include staked hay bails, silt fences, and/or berms of porous materials. Areas disturbed would be re-vegetated as soon as possible to avoid additional erosion of the soil. All work would follow the SWPPP prepared specifically for the site.

There would be little effect on the soil profile in the area of the housing units during the construction. The soil in this area has been disturbed from past activities.

4.1.8.2 Alternative 1

The impacts for this alternative would be the same as those described for the proposed action except that demolition and reconstruction of all housing units would create greater soil disturbance. As with the proposed action there would be little effect on the soil profile in the area. Erosion control measures would be implemented as described under the proposed action.

4.1.8.3 No-Action Alternative

Under the No-Action Alternative, there would be no change in the baseline conditions described in Section 3.1.8.

4.1.8.4 Mitigative Actions

The area around the housing units would be de-vegetated beginning with the demolition of the structures and would not be re-vegetated until construction is complete. As mentioned above under the proposed action, silt fences and erosion control features would be used to limit or eliminate soil erosion during construction activities. The erosion control features would include staked hay bails, silt fences, and/or berms of porous materials. Areas disturbed would be re-vegetated as soon as possible to avoid additional erosion of the soil. All work would follow the SWPPP prepared specifically for the site.

4.1.9 Water Resources

Impacts to surface water and groundwater resulting from the proposed or alternative actions may occur if project activities resulted in:

- Surface water quality declining such that the existing surface water quality standards would be violated,
- An increase in water usage from the underlying aquifer so that the usage had an impact on the aquifer.
- Construction activities directly or indirectly supporting development in the floodplain and/or resulting in long or short term adverse impacts associated with occupancy and modification of floodplains.

4.1.9.1 Surface Water

4.1.9.1.1 Proposed Action

As discussed in section 4.1.8, there would be potential for increased sediment loading of surface water during the initial demolition and construction activities. This potential is short-term and is manageable through implementation of a SWPPP. Following completion of the project and re-vegetation of the land surface, impacts to surface water would not be different from the baseline conditions described in section 3.1.9.1. Implementation of the proposed action would not have long-term adverse impacts on surface water quality or quantity on Altus AFB or downstream surface water bodies.

4.1.9.1.2 Alternative 1

There would be a greater disturbance of the land surface due to a larger number of houses planned for demolition. The result would be an increased potential for sediment loading of the surface water downstream of the housing areas. Similar to the proposed action, this increased potential is short-term and manageable through implementation of a SWPPP. Long-term conditions of surface water would be unchanged from the baseline conditions described in Section 3.1.9.1 following re-vegetation of the land surface when the construction activities are completed. Implementation of this alternative would not have long-term adverse impacts on surface water quality or quantity on Altus AFB or downstream surface water bodies.

4.1.9.1.3 No Action Alternative

Under the No Action Alternative, there would be no change in the baseline conditions described in Section 3.1.9.1.

4.1.9.1.4 Mitigative Actions

In order to minimize the potential for increased sediment loading of downstream surface water bodies, a SWPPP should be implemented as discussed in section 4.1.8.4. No other mitigative actions would be required due to absence of long-term adverse impacts to surface water quality or quantity.

4.1.9.2 Groundwater

4.1.9.2.1 Proposed Action

Implementation of the proposed action would not impact the quality or quantity of groundwater at Altus AFB or the surrounding area. Excavation for new home construction is not expected to exceed 5 feet bgs; however excavation for tornado shelter construction would likely exceed 5 feet bgs. As a result, groundwater could be encountered. If groundwater is encountered, the tornado shelters would be sealed to prevent groundwater infiltration, and care would be taken during construction activities to ensure that groundwater resources are protected from contamination. Likewise, in the event groundwater is encountered during new home construction, care would be taken during construction activities to ensure that groundwater resources are protected from contamination.

4.1.9.2.2 Alternative 1

Impacts for this alternative would be the same as those described for the proposed action.

4.1.9.2.3 No Action Alternative

Under the No Action Alternative, there would be no change in the baseline conditions described in Section 3.1.9.2.

4.1.9.2.4 Mitigative Actions

There are no adverse impacts to groundwater resources anticipated to result from the proposed action or alternatives, therefore no mitigative actions are required. As mentioned above, if groundwater is encountered during construction activities, care would be taken during construction activities to ensure that groundwater resources are protected from contamination.

4.1.9.3 Floodplains

4.1.9.3.1 Proposed Action

Nine MFH units are currently located within the 100-year floodplain (Figure 3-3). All of these units would be demolished as part of the proposed action and would not be rebuilt within the 100-year floodplain. Repair of utility lines would occur as part of the proposed action, including those that transect the 100-year floodplain in the MFH areas; however, the existing elevations and floodplain environment would be preserved. The configuration of the roadways within the 100-year floodplain would not be modified, further preserving the existing floodplain environment within the MFH areas. No impacts to the floodplain are expected except those associated with restoration of floodplain values caused by the removal of MFH structures from the floodplain.

No new construction subject to EO 11988 would occur; as such, a Finding of No Practicable Alternative under the EO 11988 is not required (Voorhees 2003; USAF 1999b).

4.1.9.3.2 Alternative 1

Impacts for this alternative would be the same as those described for the proposed action.

4.1.9.3.3 No Action Alternative

Under the No Action Alternative, there would be no change in the baseline conditions described in Section 3.1.9.3. The nine units currently in the floodplain would remain and would be at risk during future flood events.

4.1.9.3.4 Mitigative Actions

No mitigative actions would be required. No structures would be built within the 100-year floodplain, repair of utility lines would maintain existing floodplain values, and roads within the floodplain would not be modified.

4.1.10 Biological Resources

Potential impacts to biological resources were determined by analyzing the proposed and alternative actions within the context of existing conditions for regional biota and ecosystems. The following factors were considered in evaluating potential impacts to biological resources: (1) if the proposed or alternative actions would affect a threatened or endangered species, (2) substantially diminish habitat for a plant or animal species, (3) interfere substantially with wildlife movement or reproductive behavior, and/or (4) result in a substantial infusion of exotic plant or animal species.

4.1.10.1 Proposed Action

Vegetation and Wildlife. Impacts to local fish and wildlife populations can occur from sediment erosion and runoff resulting from construction activities (see Section 4.1.7.4). Vegetation that would be adversely affected from the proposed action are areas of extant, highly modified, and previously disturbed grass areas of minimal and non-unique habitat value. Only minimal vegetation such as Bermuda, St. Augustine, or native grass, ornamental shrubs, or small ornamental trees would be removed for the construction/demolition activities associated with the proposed action. Areas would be revegetated to native grasses and forbs, where feasible, upon completion of project activities.

Threatened and Endangered Species. Although U.S. Fish and Wildlife Service data indicates that endangered, threatened, or candidate species do exist in Jackson County, the results of an endangered species survey conducted on base between 1993 and 1995 indicate that no federally listed, state listed, or other species of concern were found on base. The 1997 Oklahoma Biological Survey found it highly improbable that federally listed species would be attracted to Altus AFB (USAF 1997d) given the extent and type of habitats present there. No large habitat areas, such as wildlife refuges, management areas, or nature preserves are located near the base that would sustain or attract species of concern. Also, the Department of Wildlife Conservation has indicated that due to the proximity to an urban area and the high utilization of the proposed location, this action should not have an impact on endangered or threatened wildlife species or local fish and wildlife resources (Department of Wildlife Conservation 2004). No federal- or state-listed threatened or endangered plant species are known to occur in southwestern Oklahoma. Therefore, no impacts are anticipated (USAF 1997d).

Wetlands. As indicated by the 1995 USACE wetlands survey, no jurisdictional wetlands are located on or in the vicinity of the MFH, however, according to a letter received from the USACE, the unnamed tributaries to Stinking Creek, including the one running through the housing area, are regulated waterways (USACE 2004). Implementation of the proposed action would not be expected to result in deposition of dredged or fill material into these waterways, however, if this were to occur, a USACE permit would be obtained. No impacts to wetlands or regulated waterways are expected to occur.

4.1.10.2 Alternative 1

Impacts for this alternative would be the same as those described for the proposed action.

4.1.10.3 No-Action Alternative

Under the No-Action Alternative, there would be no change in the baseline conditions described in Section 3.1.10.

4.1.10.4 Mitigative Actions

Best management practices during construction and repair activities would minimize impacts on vegetation. Mixed grasses would be restored by reseeding with native grasses. Mitigation measures for other biological resources would not be anticipated.

4.1.11 Cumulative Effects

A cumulative impact, as defined by the CEQ (40 CFR 1508.7), is the “impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of which agency (federal or non-federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.”

As described in Section 2.6, other proposed projects have been announced at Altus AFB and surrounding areas. These actions are not directly related to the proposed or alternative actions evaluated in this EA. This EA addresses the environmental impacts of these other actions only in the context of potential cumulative impacts, if any. Actions considered for cumulative effects are listed below:

- Construction of a new golf course maintenance facility with accompanying restrooms and covered rest area for use by golfers.
- Construction of a new C-17 cargo containment training facility adjacent to the existing facility.
- Construction of a new civil engineer complex.
- Utilities privatization.
- Airfield Repairs, Improvements, and Adjustments to Aircrew Training.
- Change in C-17 and C-5 training.
- Replacement of 77 dilapidated fire hydrants. This action is awaiting funding (Howard 2004).
- Construction of a new Department of Human Services building, which is currently under construction.
- The Jackson County Memorial Hospital is adding 42,000 square feet to an existing building for more bed space.
- Residential developers are adding to existing subdivisions six houses at a time.
- Final work, such as paving parking lots, is being completed on the children’s playground, Imagination Station.
- Luscombe Aircraft Corporation on the north edge of Altus, is planning a new facility to house part of their production process (Urbanski 2003). This facility will be in the air park industrial area adjacent to the Altus Municipal Airport.

Noise. Noise impacts associated with the proposed and alternative action at Altus AFB are short-term in nature and, therefore would not accumulate over time or contribute to cumulative noise effects. Operating procedures, which may further lessen noise impacts, are detailed in Section 4.1.1.4.

Land Use. The proposed and alternative actions would not change land use patterns on Altus AFB, and would, therefore, not contribute to cumulative effects to land use.

Air Quality. Implementation of MFH privatization at Altus AFB would result in short-term emissions during renovation, construction, and demolition of the existing and new homes and associated infrastructure, principally from site clearing/preparation activities and the use of construction equipment and related vehicles. There would be no or a negligible increase in long-term emissions as it is assumed that POV use would remain the same and all boiler and generators associated with the housing would be comparable to those already in use.

Air emissions for other actions announced on and off Altus AFB also are primarily short-term in nature, and associated with construction activities. Long-term increases in emissions from other actions announced on and off Altus AFB would occur from increased generator and/or boiler emissions associated with operation of new facilities (golf course maintenance facility, C-17 cargo containment training facility, and civil engineer complex on Altus AFB; Department of Human Services Building, Jackson County Memorial Hospital addition, and new production facility at Luscombe Aircraft Corporation in the surrounding area). Considering the relatively small size of other proposed projects announced at Altus AFB and surrounding areas, no cumulative effects are expected.

Socioeconomic Resources. Several other projects are likely to be ongoing during the proposed or alternative actions that would increase expenditures in the local area. Therefore, an assessment of the cumulative impact of the proposed and alternative actions on local socioeconomic factors must be considered. To assess the cumulative impact of the Proposed Action or Alternative 1 on the socioeconomics of the local community, an alternative expenditure estimate was developed. Since cost and timing data were unavailable for the other projects that may be ongoing in the area (see Section 2.6), a maximum impact scenario was developed using the higher value of either the Proposed Action or Alternative 1. Assuming that Alternative 1 costs approximately \$15 million per year, a forecast was developed based on four times this amount, or \$60 million per year. Results of the forecast for this annual expenditure total compared to the RTV for the area are provided in Table 4-6.

Table 4-6 Comparison of Threshold RTVs to Forecasted Cumulative Impacts

Socioeconomic Indicator	RTVs	Maximum Impact Cumulative Impact	Impact Value Within RTVs?
Sales	-11.18% to 12.02%	7.48%	Yes
Income	- 8.08% to 13.24%	1.62%	Yes
Employment	- 3.19% to 5.48%	1.55%	Yes
Population	- 2.37% to 3.97%	0.0%	Yes

RTV= rational threshold value

As was the case for the individual project analyses, the cumulative analysis indicates a positive, impact.

Housing. Based on the types of other projects proposed to be conducted at Altus AFB and the surrounding community, increases in population or decreases in the number of housing units available as a result of these other projects are expected to be minimal. In addition, some of the projects in the surrounding area would add to the number of available housing units, thereby resulting in a reduced cumulative impact on the local housing market relative to the individual Proposed Action or Alternative 1.

Education. As was the case with housing, the nature of other projects proposed to be conducted in the area is not likely to result in changes to the education services provided in the local community. Although a few houses are being added to existing subdivisions, no new subdivisions are currently planned. Substantial changes to school enrollment as a result of the proposed or alternative actions and other projects in the area is not likely.

Cultural Resources. The proposed and alternative actions would not affect cultural resources in or around Altus AFB, and would, therefore, not contribute to cumulative effects to cultural resources.

Hazardous Materials and Wastes. The proposed action and alternative actions would require the management of ACM and LBP during demolition of existing MFH units. Management of these waste streams would occur under existing Altus AFB management programs and would not result in adverse effects. The potential for the presence and management of pesticide-impacted soils beneath existing MFH units would also not result in adverse effects. Therefore, the proposed and alternative actions would not contribute to cumulative effects to hazardous materials and wastes in or around Altus AFB.

Infrastructure and Utilities. The proposed and alternative actions would change overall wastewater generation, potable water usage, or electricity/natural gas consumption and, therefore, would therefore not contribute to cumulative effects to these resources.

Increased solid waste loading resulting from the proposed and alternative action would contribute to the cumulative increase in solid waste generation from demolition of seven wooden, three metal and two concrete facilities totaling 60,429 square feet and construction of a facility totaling 102,806 square feet at Altus AFB (approximately 4,883 tons of solid waste generated) (USEPA 1998). This slight increase is small in comparison with the MFH privatization solid waste generation and should be acceptable by the City of Altus Landfill.

Short-term increases in soil erosion and sediment loadings in storm water runoff resulting from proposed and alternative action drainage improvements would contribute slightly to cumulative effects of other proposed actions at Altus AFB and surrounding areas.

Increased vehicular traffic resulting from the proposed and alternative action, along with increased traffic from other proposed construction and demolition activities occurring on Altus AFB and surrounding areas would contribute to increased traffic counts. Traffic carrying heavy loads also has the potential to cause damage to roadways not designed to support continued heavy equipment traffic for an extended period.

Earth Resources. The proposed and alternative actions would not affect earth resources in or around Altus AFB, and would; therefore, not contribute to cumulative effects to earth resources.

Water Resources. The proposed action and alternative actions would not affect water resources in or around Altus AFB, and would, therefore, not contribute to cumulative effects to water resources.

Biological Resources. Because there would be no adverse effects to vegetation, wildlife, or wetlands; implementation of the proposed action would not contribute to cumulative effects to these resources.

Analysis of the past, present, and reasonably foreseeable future actions in the Region of Influence demonstrate minimal cumulative impact upon the environment. There are no adverse impacts from this specific proposed action upon endangered species or cultural resources, and therefore no impact upon cumulative impacts in those categories. Minor impacts upon noise, air, and soil, when added to the other proposed projects in the Region of Influence, are all still temporary in nature, and the cumulative impacts are insignificant. Impacts upon the floodplain are permanent and beneficial from a cumulative perspective since they lead to restoration of floodplain values in the Region of Influence.

(no document text this page)

CHAPTER 5 LIST OF PREPARERS

Name/Organization	Degree	Resource Area	Years of Experience
Paige Rhodes/URS	BS, Biology; MS, Environmental Science	Project Manager, Biological Resources, Cultural Resources, Land Use	14
Travis Bunger/URS	BS Environmental Science; MS, Environmental Science	Hazardous Materials and Waste, Water Resources, Infrastructure and Utilities	9
Tamara Carroll/URS	BS, Bioenvironmental Science	Noise, Infrastructure and Utilities	2
Amanda Corson/URS	BA, Economics; MBA	Socioeconomic Resources, Environmental Justice	13
Jason Sheeley/URS	BS, Geography, Natural Resources, and Environmental Science; MA, Geography	Socioeconomic Resources, Environmental Justice	7
Shannon Hoover/URS	BS, Geology	Hazardous Materials and Waste	14
Rajiv Patel P.E./URS	BS, Chemical Engineering	Air Quality	4
Phil Ponebshek/URS	BS, Chemical Engineering; MS, Environmental Engineering	Independent Technical Review QA/QC	16

(no document text this page)

CHAPTER 6 LIST OF PERSONS AND AGENCIES CONSULTED

This chapter lists the individuals consulted during the preparation of this EA.

FEDERAL AGENCIES

Randolph Air Force Base, Texas, Headquarters Air Education and Training Command

Voorhees, Ron (HQ AETC/CEVN)

Altus Air Force Base, Oklahoma

Bellon, James (Chief, Natural and Cultural Resources)

Benson, James (Restoration Program Manager)

Bookout, George (Chief, Facility Maintenance)

Briseno, Lillian (Real Property Officer)

Brooks, James (Entymology Technician)

Campbell, Samuel (NCOIC, Pesticides Management)

Donahue, Dan (Environmental Protection Specialist)

Fields, Charles (Former Deputy Base Civil Engineer)

Guinan, Richard (Base Historian)

Hasty, Denise (Chief, Privatization)

Howard, Bron (97 CES/CEOE)

Lazenby, Bill (Environmental Specialist)

Morrison, Aleta (Housing Manager)

Peterson, Bert (Project Manager, KIRA)

Sirmons, Jimmy (97 CES/CEV)

Staton, Dan (Chief, Environmental Flight)

Tinsley, Melanie (Base Community Planner)

Tummings, Errol (Infrastructure Manager)

CITY OF ALTUS AGENCIES

City of Altus Chamber of Commerce

Urbanski, Holly (President)

City of Altus Department of Sanitation

Combs, Kenny (Department Head)

City of Altus Government

Burleson, Barbara (City Planner)

Gramling, T. L. (Mayor)

City of Altus Public Works

Stevenson, Robert (Former Chief of Operations)

JACKSON COUNTY, OKLAHOMA

Jackson County Commissioners

Jackson County School Districts

Allen, Roger (Olustee School Superintendent)

Bilbrey, Kay (Olustee School Superintendent's Office)

Edwards, Michelle (Eldorado School District Superintendent's Office)

Houska, Cheyenne (Duke School District)

Hunter, Keolle (Altus School District Superintendent's Office)

Montgomery, Gary (Superintendent of Navajo Public Schools)

Peretto, Darlene (Duke School District)

Shatswell, Vicky (Altus School District Superintendent's Office)

Shaw, Fran (Blair School District Superintendent's Office)

VonTunglen, Sue (Blair School Elementary Principal)

OTHER AGENCIES AND INDIVIDUALS

Department of the Army Corps of Engineers, Environmental and Regulatory Division

Hogue, Larry (Chief, Tulsa District Planning)

Federal Emergency Management Agency, Region IV

Castleman, Ron (Regional Director)

Oklahoma Archaeological Survey

Brooks, Robert (State Archaeologist)

Oklahoma Department of Civil Emergency Management

Ashwood, Albert (Director)

Oklahoma Department of Environmental Quality

Duncan, Judy (Director, Customer Services Division)

Oklahoma Department of Wildlife Conservation

Suttles, Ron (Coordinator, Natural Resources Section)

Oklahoma State Historic Preservation Office

Heisch, Melvena (State Historic Preservation Officer)

United States Bureau of Indian Affairs, Eastern Oklahoma Regional Office

Hanna, Jeannette (Regional Director)

United States Fish and Wildlife Service, Ecological Services Office

Brabander, Jerry (Field Supervisor)

(no document text this page)

CHAPTER 7 REFERENCES

- AIHA 1986. American Industrial Hygiene Association, *Noise and Hearing Conservation Manual*, Fourth Edition, 1986.
- Allen 2004. Telephone conversation from Tamara Carroll, URS, to Roger Allen, Superintendent, Olustee School. February 4.
- Altus COC 2004. Altus Major Employers. City of Altus Chamber of Commerce. Available at <http://altuschamber.com/altus.html>
- ANSI 1983. American National Standards Institute, *American National Standard Specification for Sound Level Meters*, April 1983.
- BEA 2001a. United States Department of Commerce, Bureau of Economic Analysis. Oklahoma Per Capita Personal Income, 2000-2001. Available at <http://www.bea.doc.gov/bea/regional/reis/drill.cfm?table=CA1-3&lc=30&years=2001,2000&format=htm&areatype=40000&sort=0>
- BEA 2001b. United States Department of Commerce, Bureau of Economic Analysis. Oklahoma Personal Income, 2000-2001. Available at <http://www.bea.doc.gov/bea/regional/reis/drill.cfm?table=CA1-3&lc=10&years=2001,2000&format=htm&areatype=40000&sort=0>
- BEA 2001c. United States Department of Commerce, Bureau of Economic Analysis. Oklahoma BEARFACTS, 1991-2001. Jackson, Oklahoma. Available at <http://www.bea.doc.gov/bea/regional/bearfacts/action.cfm?fips=40065&areatype=40065&yearin=2001>
- BEA 2001d. United States Department of Commerce, Bureau of Economic Analysis. Personal income by major source and earnings by industry. Jackson, Oklahoma, 2001. Available at <http://www.bea.doc.gov/bea/regional/reis/action.cfm?catable=CA05N&areatype=40000&years=2001&fips=40065&format=htm>
- Bellon 2001. Personal interview with James Bellon, Chief, Natural and Cultural Resources and EIAP Manager, 97 CES/CEV, Altus AFB, for Military Family Housing Environmental Baseline Survey. October 26.
- Bellon 2003. E-mail correspondence from James Bellon, Chief, Natural and Cultural Resources and EIAP Manager, 97 CES/CEV, Altus AFB to Paige Rhodes, URS Project Manager concerning use of the July 2002 floodplain as provided by Altus AFB. March 14.
- Benson 2001. Personal interview with Mr. James Benson, 97 CES/CEV, Altus AFB, for Military Family Housing Environmental Baseline Survey. October 24.

- Bilbrey 2004. Telephone conversation from Tamara Carroll, URS, to Kay Bilbrey, Secretary, Olustee School. January 7.
- Burleson 2003. Telephone conversation from Tamara Carroll, URS, to Barbara Burleson, City Planner, City of Altus Government. January 15, 2003.
- CERL 1978. United States Department of the Army, Construction Engineering Research Laboratory, *MicroBNOISE, A User's Manual, Technical Report, N-86/12*, June 1978.
- Combs 2004a. Telephone conversation from Tamara Carroll, URS, to Kenny Combs, Department Head, Department of Sanitation, City of Altus, Oklahoma. March 3.
- Combs 2004b. Telephone conversation from Tamara Carroll, URS, to Kenny Combs, Department Head, Department of Sanitation, City of Altus, Oklahoma. February 2.
- De Vore 1995. Steven L. De Vore, United States Department of the Interior, National Park Services, Interagency Archeological Services. *Cultural Resources Assessment- Altus Air Force Base, Jackson County, Oklahoma*.
- Edwards 2004. Telephone conversation from Tamara Carroll, URS, to Michelle Edwards, Secretary, Eldorado School District. January 7 and February 4.
- Houska 2004. Telephone conversation from Tamara Carroll, URS, to Cheyenne Houska, Secretary, Duke School District, January 7.
- Howard 2004. Telephone conversation from Tamara Carroll, URS, to Bron Howard, 97 CES/CEOE, Altus AFB. February 4.
- Hunter 2004. Telephone conversation from Tamara Carroll, URS, to Keolle Hunter, Insurance Clerk, Altus School District. January 7.
- Latimer 2000. E-mail transmission from David Latimer, Parsons Engineering Science. Inc., to Rajiv Patel, URS, containing emission factors for estimating construction emissions. May 20.
- Means 1996. *1996 Means Building Construction Cost Data*, 54th Annual Edition, RS. Means Company, Incorporated, Kingston, Massachusetts.
- Moffitt 2004. Morris Moffitt, Oklahoma Department of Environmental Quality, 2002 ODEQ Source Emissions Database, January 2004.
- Montgomery 2004. Telephone conversation from Tamara Carroll, URS, to Gary Montgomery, Superintendent of Navajo Public Schools. January 7.
- OESC 2003a. Oklahoma Economic Security Commission. Oklahoma Labor Force Statistics, October 2003 Preliminary Data. Available at <http://www.oesc.state.ok.us/lmi/LAUS/2003/lfs-1003.htm>
- OESC 2003b. Oklahoma Economic Security Commission. Oklahoma Labor Force Statistics, November 2003 Preliminary Data. Available at <http://www.oesc.state.ok.us/lmi/LAUS/2003/lfs-1103.htm>
-

- Oklahoma Department of Wildlife Conservation 2004. Letter from the Department of Wildlife Conservation, regarding the presence of threatened or endangered species within the project area. March 9, 2004.
- OSD 1997. Office of the Secretary of Defense. *Memorandum for Secretaries of the Military Departments, chairman of the Joint Chiefs of staff, Under Secretaries of Defense, General Counsel, Commanders of the Combatant Commands, Directors of Defense Agencies; Subject: Defense Planning Guidance, FY 1999-2003*; 2 July 1997.
- Peretto 2004. Telephone conversation from Tamara Carroll, URS, to Darlene Peretto, Secretary, Duke School District. February 4.
- Shatswell 2004. Telephone conversation from Tamara Carroll, URS, to Vicki Shatswell, Secretary, Altus School District. January 7.
- Shaw 2004. Telephone conversation from Tamara Carroll, URS, to Fran Shaw, Secretary, Blair School District. January 7 and February 4.
- SHPO 2000. Oklahoma State Historic Preservation Office. *Oklahoma's National Register Handbook*. Oklahoma State Historic Society, Oklahoma City, OK.
- Sirmons 2003. E-mail correspondence from Jimmy Sirmons, 97 CES/CEV, Altus AFB to Paige Rhodes, URS Project Manager containing the July 2002 floodplain layer for use in the Environmental Assessment. March 10.
- Stevenson 2001. Telephone interview conducted by Shannon Hoover, URS with Robert Stevenson, former 97 CES/CEOD, Altus AFB, current Director Public Works, City of Altus for Military Family Housing Environmental Baseline Survey. November 28.
- Urbanski 2003. Telephone conversation from Tamara Carroll, URS, to Holly Urbanski, President, City of Altus Chamber of Commerce. January 15.
- USACE 2004. Letter from the Department of the Army, Corps of Engineers, Tulsa District regarding the presence of regulated waterways within the MFH area. February 20, 2004.
- USAF 1990. U.S. Air Force, *Final Environmental Assessment of the Beddown of C-17A Aircraft at Altus Air Force Base, Altus Oklahoma*. Altus AFB, Oklahoma. Military Airlift Command, 1990.
- USAF 1992. United States Air Force, *Installation Restoration Program (IRP) Remedial Investigation Phase I, Final Technical Report (May 1988 to June 1991), Altus Air Force Base, Oklahoma, January 1992*.
- USAF 1994a. Environmental Impact Statement, United States Air Force Air Education and Training Command, KC-135 Combat Crew Training School Relocation. Altus AFB, Oklahoma: Air Education and Training Command, 1994.
- USAF 1994b. United States Air Force. *Air Installation Compatible Use Zone Study, Altus Air Force Base*. Altus AFB, Oklahoma: Air Education and Training Command, 1994.

- USAF 1994c. United States Air Force, Altus AFB Spill Prevention and Response Plan, February 1994.
- USAF 1997a. General Plan, Altus Air Force Base, Oklahoma, prepared by Black & Veatch for U.S. Air Force Education and Training Command.
- USAF 1997d. *Endangered Species Survey of Altus Air Force Base, Oklahoma*. Oklahoma Biological Survey, 1997.
- USAF 1997e. United States Air Force, Environmental Baseline Survey, Land Acquisition and Construction Projects, Land Fee Purchase, Altus Air Force Base, Oklahoma, May 1997.
- USAF 1998a. *Integrated Natural Resources Management Plan for Altus Air Force Base, Oklahoma, 1997-2001*, prepared by Oklahoma Biological Survey under Contract #F3461296W0186.
- USAF 1998b. Environmental Assessment, Proposed Acquisition of Real Estate Interests. Altus AFB, Oklahoma: Air Education and Training Command.
- USAF 1998c. United States Air Force, Revised Description of Current Conditions, RCRA Facility Investigation, Altus Air Force Base, Oklahoma, May 1998.
- USAF 1999a. *Altus AFB Economic Impact Report*.
- USAF 1999b. Memorandum for AIG 10904. Clarification of Environmental Impact Analysis Process (EIAP) Policy for Actions in Floodplains and Wetlands. Signed by Colonel Patrick T. Fink. April 30.
- USAF 1999c. Air Force Family Housing Master Plan. August 1999.
- USAF, 2000. United States Air Force, Altus Air Force Base, Family Housing Brochure, February 2000.
- USAF 2001. United States Air Force, Installation Restoration Program, Management Action Plan, Altus Air Force Base, Altus, Oklahoma, August 2001.
- USAF 2002a. Rules of Engagement for Proposed New Military Family Housing Standards, provided by facsimile from 97 CES/CECC on 22 April 2002.
- USAF 2002b. *Proposed Airfield Repairs, Improvements, and Adjustments to Aircrew Training for Altus AFB, OK*, prepared by Versar for U.S. Air Force Air Education and Training Command, 2002.
- USAF 2002c. Altus AFB Statistics. Prepared by 97 CPTF/FMA. Data as of End of Year Fiscal Year 2002.
- USAF 2002d. Altus Air Force Base Cold War-Era Buildings and Structures Inventory and Assessment. Air Education and Training Command. December 2002.

- USAF 2002e. *Environmental Baseline Survey for Military Family Housing at Altus Air Force Base, Oklahoma*, prepared by URS Group, Inc. for U.S. Air Force Air Education and Training Command, July 2002.
- USAF 2002f. United States Air Force, *2002 Turn Around Document for Altus Air Force Base, Oklahoma*, January 2004.
- USAF 2003a. Environmental Assessment, Altus AFB Military Family Housing Privatization, Preliminary Questions. March 12, 2003.
- USAF 2003b. *Management Action Plan, Altus Air Force Base, Oklahoma*, prepared by URS Group, Inc. for U.S. Air Force Air Education and Training Command, September 2003.
- USAF 2004a. FY2003 Main Base and Family Housing Input Data Report. Prepared by 97 CES/CEV, Altus AFB. January 29, 2004.
- USAF 2004b. Refuse Tonnages for FY00-FY05. Prepared by Altus AFB.
- USCB 1990a. U.S. Census Bureau. General Population and Housing Characteristics. Jackson County, Oklahoma. July 1, 1990. Available at http://factfinder.census.gov/servlet/QTTable?ds_name=D&geo_id=05000US40065&q_r_name=DEC_1990_STF1_DP1&lang=en
- USCB 1990b. U.S. Census Bureau. General Population and Housing Characteristics. Altus City, Oklahoma. July 1, 1990. Available at http://factfinder.census.gov/servlet/QTTable?ds_name=D&geo_id=16000US400060&q_r_name=DEC_1990_STF1_DP1&lang=en
- USCB 2000a. U.S. Census Bureau. Census of Population, Public Law 94-171 Redistricting Data File: July 1, 2000. Available at <http://quickfacts.census.gov/qfd/states/40000.html>
- USCB 2000b. U.S. Census Bureau. General Housing Characteristics: Jackson County, Oklahoma. July 1, 2000. Available at http://factfinder.census.gov/servlet/QTTable?ds_name=D&geo_id=05000US40065&q_r_name=DEC_2000_SF1_U_QTH1&lang=en
- USCB 2000c. U.S. Census Bureau. Profile of General Demographic Characteristics: 2000. Altus City, Oklahoma. July 1, 2000. Available at http://factfinder.census.gov/servlet/QTTable?ds_name=D&geo_id=16000US4001700&q_r_name=DEC_2000_SF4_U_DP1&lang=en
- USCB 2000d. U.S. Census Bureau. Profile of General Demographic Characteristics: 2000. Jackson County, Oklahoma. July 1, 2000. Available at http://factfinder.census.gov/servlet/QTTable?ds_name=D&geo_id=05000US40065&q_r_name=DEC_2000_SF4_U_DP1&lang=en
- USCB 2000e. U.S. Census Bureau. Profile of Selected Housing Characteristics: 2000. Jackson County, Oklahoma. July 1, 2000. Available at

- http://factfinder.census.gov/servlet/QTTable?geo_id=05000US40065&ds_name=DEC_2000_SF3_U&qr_name=DEC_2000_SF3_U_DP4&lang=en&sse=on
- USCB 2001. U.S. Census Bureau. Overview and Race and Hispanic Origin 2000, C2KBR/01-1. March 2001.
- USCB 2003a. U.S. Census Bureau. Oklahoma County Population Estimates and Population Change: July 1, 2001 to July 1, 2002. Table CO-EST2002-02-40: April 17, 2003. Available at <http://eire.census.gov/popest/data/counties/tables/CO-EST2002/CO-EST2002-02-40.php>
- USCB 2003b. U.S. Census Bureau. State and County Quick Facts. Jackson County, Oklahoma. 1990-2001. Available at <http://quickfacts.census.gov/qfd/states/40/40065.html>
- USDA 1961. Soil Survey Jackson County, Oklahoma. United States Department of Agriculture, Soil Conservation Service, Series 1958, No. 4. Prepared in cooperation with Oklahoma Agricultural Experiment Station.
- USDA 1983. United States Department of Agriculture, Soil Survey, Jackson County, Oklahoma, Soil Survey Series 1958, No. 4, reissued March 1983.
- UAFWS 1995. United States Fish and Wildlife Service, National Wetlands Inventory. *Mapping Report for United States Air Force Altus Air Force Base*.
- USDOT 1992. United States Department of Transportation, Federal Aviation Administration, *Guidelines for Sound Insulation of Residences Exposed to Aircraft Operations*, 1992.
- USEPA 1988. *Gap Filling PM₁₀ Emission Factors for Selected Open Area Dust Sources*, United States Environmental Protection Agency, EPA-450/4-88-003. Research Triangle Park, February 1988.
- USEPA 1995. *Compilation of Air Pollutant Factors, Volume 1: Stationary Point and Area Sources (AP-42)*, 5th edition, United States Environmental Protection Agency, Ann Arbor, January 1995.
- USEPA 1998. *Characterization of Building-Related Construction and Demolition Debris in the United States*, prepared by Franklin Associates for the United States Environmental Protection Agency, Municipal and Industrial Solid Waste Division. June 1998.
- USEPA 2000. *Compilation of Air Pollutant Factors, Volume II: Mobile Sources (AP-42)*, 5th edition, United States Environmental Protection Agency, November 2000.
- USEPA 2001. United States Environmental Protection Agency, *Emission Factor and Inventory Group*. Available at <http://www.epa.gov/ttn/chief>
- VonTunglen 2004. Telephone conversation from Tamara Carroll, URS, to Sue VonTunglen, Elementary Principal, Blair School District. February 6.
- Voorhees 2003. E-mail correspondence from Ron Voorhees, Environmental Planning Branch, HQ AETC/CEVN to James Bellon, Chief, Natural and Cultural Resources and EIAP

Manager, 97 CES/CEV, Altus AFB; and Paige Rhodes, URS Project Manager concerning the applicability of Executive Order 11988 to Military Family Housing Privatization at Altus AFB. March 14.

(no document text this page)