FINAL
ENVIRONMENTAL ASSESSMENT
FOR THE
MILITARY HOUSING
PRIVATIZATION INITIATIVE (MHPI)
TINKER AIR FORCE BASE, OKLAHOMA

OCTOBER 2007

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14. ABSTRACT

This EA addresses the potential environmental consequences to the human and natural environment associated with the implementation of the MHPI at Tinker AFB, OK. Currently Tinker AFB has 694 housing units distributed throughout five parcels of land, resulting in a surplus of 34 units. The Proposed Action would involve the leasing of all housing areas, potentially including an additional parcel not currently utilized for housing, to a private developer for up to 50 years. The Air Force would also convey all 694 existing military family housing (MFH) units to the developer who would implement a combination of demolition, renovation, and/or construction of housing units to meet the end-state requirement of 660 MFH units. Once privatization is implemented, the developer would own, operate, and manage all MFH housing units on the installation while leasing the land underlying the housing communities (approximately 224 acres) for a period of 50 years. While the exact distribution of demolition, renovation, and construction through the housing areas is not known, the Air Force does know the final number of units as well as the potential parcel location. Alternative 1, a minimum development scenario, involves the demolition of 432 units, renovation of 262 units, and construction of 398 new units. Alternative 2, a maximum development scenario, involves the demolition of all 694 units and construction of 660 new units. Under the No Action Alternative, the Air Force would not implement the MHPI at Tinker and would continue to manage and maintain military family housing in accordance with existing Air Force policy. The Air Force would eventually demolish 34 surplus units (most likely the oldest and least adequate units) to reach the minimum requirement of 660 units. All demolition and construction activities would occur on Tinker property. Resources and issues addressed in the EA include transportation, noise, hazardous materials and waste, air quality, safety, utilities, solid waste physical and biological resources, land use, socioeconomics, and cumulative impacts.

15. SUBJECT TERMS

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Standard Form 298 (Rev. 8-98)
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FINDING OF NO PRACTICABLE ALTERNATIVE/ FINDING OF NO SIGNIFICANT IMPACT AND MILITARY HOUSING PRIVATIZATION INITIATIVE (MHPI) TINKER AIR FORCE BASE, OKLAHOMA

Pursuant to the Council on Environmental Quality regulations for implementing the procedural provisions of the National Environmental Policy Act (40 Code of Federal Regulations [CFR] 1500-1508), Department of Defense Directive 6050.1 and Air Force Regulation 32 CFR Part 989, the 72nd Civil Engineer Group, Environmental Management Division has prepared an Environmental Assessment (EA) of the potential effects associated with the implementation of the Military Housing Privatization Initiative (MHPI) at Tinker Air Force Base (AFB).

PURPOSE AND NEED

The purpose of the Proposed Action is to provide access to safe, quality, well maintained housing in a community where Air Force members and their families will choose to live. A Housing Requirements and Market Analysis (HRMA) conducted in 2006 identified the need to upgrade the housing on Tinker AFB. (EA Section 1.1, 1.2, 1.3, page 1-1 to 1-3)

DESCRIPTION OF THE PROPOSED ACTION

The Proposed Action is for the Air Force to implement the MHPI program at Tinker AFB, Oklahoma. Existing housing units do not meet current Air Force housing standards. Currently Tinker AFB has 694 housing units distributed throughout five parcels of land, resulting in a surplus of 34 units. The Proposed Action and alternatives would involve the leasing of all housing areas, potentially including an additional parcel not currently utilized for housing, to a private developer for up to 50 years. The Air Force would also convey all 694 existing military family housing (MFH) units to the developer, and depending on the alternative selected, the developer would implement a combination of demolition, renovation, and/or construction of housing units to meet the end-state requirements of 660 MFH units. Once privatization is implemented, the developer would own, operate, and manage all MFH housing units on the installation while leasing the land underlying the housing communities (approximately 224 acres) for a period of 50 years. While the exact distribution of demolition, renovation, and construction through the housing areas is not known, the Air Force does know the final number of units as well as the potential parcel location. The alternatives for implementing the Proposed Action are associated with potential combinations of demolition, renovation, and new construction distributed throughout the MFH areas. Common to all alternatives is the need for the developer to provide a Housing Maintenance Facility (which may be accommodated by the existing housing maintenance facility or construction of a new facility). Also included and common to all alternatives are desired community features such as a sound protection buffer along Sooner Road, lighted tennis and basketball courts, and an outdoor fitness area. (EA Section 2.1 and 2.2, pages 2-1 to 2-7)

DESCRIPTION OF THE NO ACTION ALTERNATIVE

Under the No Action Alternative, the Air Force would not implement the MFH privatization program at Tinker AFB and would manage and maintain existing housing in accordance with

existing Air Force policy. Given that Tinker AFB currently has a surplus of 34 housing units, it is reasonable to assume that in the near future Tinker AFB would demolish the surplus units that are in disrepair, are the oldest, and/or do not meet current standards to reach the minimum requirement of 660 units. (EA Section 2.5.1, page 2-8 to 2-9)

ALTERNATIVES CONSIDERED BUT ELIMINATED

Siting the housing areas outside of the existing MFH footprint was considered but eliminated from further consideration due to the constraints associated with the project. (EA Section 2.4, page 2-8)

ALTERNATIVE 1: MINIMUM DEVELOPMENT SCENARIO (AIR FORCE PREFERRED ALTERNATIVE)

Under Alternative 1, the developer would potentially construct up to 398 new housing units, renovate up to 262 housing units, and demolish up to 432 housing units. (EA Section 2.5.2, pages 2-9 to 2-10)

ALTERNATIVE 2: MAXIMUM DEVELOPMENT SCENARIO

Alternative 2 is similar to Alternative 1 with regard to location. However, Alternative 2 differs in that all existing 694 housing units would be demolished and 660 new units would be constructed. (EA Section 2.5.3, pages 2-10 to 2-13)

ANTICIPATED ENVIRONMENTAL EFFECTS

Based on analyses presented in the EA, no adverse or significant impacts were identified to the following resources under any of the alternatives: transportation (EA Section 3.1, page 3-1); hazardous materials and waste/Installation Restoration Program sites (EA Section 3.3, page 3-12); air quality (EA Section 3.4, page 3-24); safety (EA Section 3.5, page 3-29); utilities (EA Section 3.6, page 3-32); solid waste (EA Section 3.7, page 3-36); land use (EA Section 3.10, page 3-63); socioeconomics (EA Section 3.11, page 3-67); and cumulative impacts (EA Section 4.0, page 4-1). The following summarizes impacts that, while not significant, have the potential to be adverse and would require Best Management Practices or mitigations to minimize the extent of impact:

Noise: Demolition or construction of units under any of the alternatives within close proximity to the Tinker Elementary School could be a source of annoyance and could interrupt daily learning activities. As a result, demolition planning should take into consideration unit proximity to the school, and activities for these units should either be avoided or scheduled to minimize interruption of the school day (e.g., during school vacations). While school activities could be affected, special safety or health risks to children from project noise under any of the alternatives are not anticipated. (EA Section 3.2, page 3-4)

Physical Resources: Under Alternatives 1 and 2, demolition and construction activities are likely to occur within the floodplains located within the MFH areas. Housing units currently within floodplain areas could be demolished or remodeled, but construction of new habitable structures (i.e., housing units) would not be permitted; however, floodplain areas could be developed for recreational purposes (i.e., parks, natural areas, walking trails, etc.) as long as

development does not negatively impact floodplain areas. As a result, while there would be initial disturbance of floodplain areas, some of the lost floodplain functions and values could be restored over the long term as structures are removed from floodplain areas. (EA Section 3.8, page 3-42)

Biological Resources: Alternatives 1 and 2 would result in the loss of Texas horned lizard habitat and may directly impact the species (which is not listed as federally threatened or endangered). Per the state of Oklahoma, it is unlawful to intentionally kill or to keep horned lizards in possession, but it does not extend protection to the horned lizard's habitat. Based on correspondence with the state, since the Air Force is not purposefully attempting to kill or take horned lizards, there are no restrictions on the construction. However, the state has requested two voluntary measures, when practical, to avoid killing the species:

- When feasible, the government should conduct a search for horned lizards immediately prior to any earth-moving work in suitable habitat areas. If any lizards are found, the state requests that the lizards be chased out of the immediate construction area or temporarily captured and moved by qualified biologists at least 100 yards but no more than 300 yards from the construction area.

- When feasible, holes and trenches should be filled as soon as possible after their use because open holes or trenches can trap horned lizards that may fall into them. Trenches and holes should be visually checked at least every other day to look for any trapped horned lizards, which should be captured and relocated away from the construction area. If possible, holes and trenches should be covered temporarily when not in use if they are going to be left unfilled for a period of more than a week. (EA Section 3.9, page 3-60)

CUMULATIVE IMPACTS

The cumulative effects of the Proposed Action when added to other past, present, and reasonably foreseeable future actions were evaluated and found to be insignificant. Future actions involving development south and west of the Base have been identified as potentially producing cumulative environmental effects in the immediate vicinity of the Proposed Action area. This development would increase the area of impermeable land surface and temporarily increase air emissions and solid waste generation. Incremental impacts associated with storm water runoff would occur but would not be considered significant. (EA Section 4.1, 4.2, 4.3, pages 4-1 to 4-3)

PUBLIC NOTICE

The Air Force made the Draft Final Environmental Assessment available for public review and comment from 17 August through 17 September 2007. The Air Force placed advertisements in the Oklahoman and the Tinker Take Off, local and installation newspapers respectively, on 17 August 2007 informing the public of the public review period and the location of the document for review: the Tinker Information Repository at the Midwest City Library located at Reno and Midwest Blvd. No comments regarding the proposed project or the Environmental Assessment were submitted to the Air Force by any members of the public.

FINDING OF NO PRACTICABLE ALTERNATIVE (FONPA)

Taking the above information into consideration, pursuant to Executive Order (EO) 11988, Floodplain Management EO 11990, Protection of Wetlands, and the authority delegated by Secretary of the Air Force Order 791.1, I find there is no practicable alternative to the actions proposed in the floodplain and the proposed action includes all practicable measures to minimize harm to the environment. This finding fulfills both the requirements of the referenced EOs and the Air Force Environmental Impact Analysis Process requirement (32 CFR 989.14) for a Finding of No Practicable Alternative.

FINDING OF NO SIGNIFICANT IMPACT (FONSI)

Based upon my review of the facts and the environmental analysis contained in the EA, which is hereby incorporated by reference, I conclude that the Proposed Action to implement MHPI will not have a significant impact on the human or natural environment under any of the alternatives. Therefore, an environmental impact statement is not required. This analysis fulfills the requirements of the NEPA, the President's Council on Environmental Quality, and 32 CFR Part 989.

s imothy K Bridges

TIMOTHY K. BRIDGES, SES
Director of Communications,
Installations and Mission Support

26 Oct 07

Date

COVER SHEET
FINAL ENVIRONMENTAL ASSESSMENT
MILITARY HOUSING PRIVATIZATION INITIATIVE
TINKER AFB, OK

a. *Responsible Agency:* Department of the Air Force, Air Force Materiel Command, 72 Air Base Wing, Tinker Air Force Base (AFB), Oklahoma (OK).

b. *Cooperating Agencies*: None

c. *Proposals and Actions*: This Environmental Assessment (EA) has been prepared in accordance with the National Environmental Policy Act to analyze the potential environmental consequences of the proposed MILITARY HOUSING PRIVATIZATION INITIATIVE (MHPI) AT TINKER AIR FORCE BASE, OK. Tinker AFB is located in Oklahoma County in the city limits of Oklahoma City, Oklahoma. After considering several factors including the potential environmental consequences associated with the Proposed Action, the U.S. Air Force will decide whether go forward with the Proposed Action through implementation of Alternative 1 or Alternative 2, or not implement the Proposed Action through selection of the No Action Alternative.

d. *Inquiries*: Any inquiries regarding this document or proposal should be directed to Ms. Cynthia Garrett, 72 ABW/CEVOE, 7701 Arnold Drive, Tinker AFB, OK 73145-9100 (405-734-2097).

e. *Designation*: Final Environmental Assessment

f. *Abstract*: This EA addresses the potential environmental consequences to the human and natural environment associated with the implementation of the MHPI at Tinker AFB, OK. Currently Tinker AFB has 694 housing units distributed throughout five parcels of land, resulting in a surplus of 34 units. The Proposed Action would involve the leasing of all housing areas, potentially including an additional parcel not currently utilized for housing, to a private developer for up to 50 years. The Air Force would also convey all 694 existing military family housing (MFH) units to the developer who would implement a combination of demolition, renovation, and/or construction of housing units to meet the end-state requirement of 660 MFH units. Once privatization is implemented, the developer would own, operate, and manage all MFH housing units on the installation while leasing the land underlying the housing communities (approximately 224 acres) for a period of 50 years. While the exact distribution of demolition, renovation, and construction through the housing areas is not known, the Air Force does know the final number of units as well as the potential parcel location. Alternative 1, a minimum development scenario, involves the demolition of 432 units, renovation of 262 units, and construction of 398 new units. Alternative 2, a maximum development scenario, involves the demolition of all 694 units and construction of 660 new units. Under the No Action Alternative, the Air Force would not implement the MHPI at Tinker and would continue to manage and maintain military family housing in accordance with existing Air Force policy. The Air Force would eventually demolish 34 surplus units (most likely the oldest and least adequate units) to reach the minimum requirement of 660 units. All demolition and construction activities would occur on Tinker property. Resources and issues addressed in the EA include transportation, noise, hazardous materials and waste, air quality, safety, utilities, solid waste, physical and biological resources, land use, socioeconomics, and cumulative impacts.

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FINAL

ENVIRONMENTAL ASSESSMENT

FOR THE

MILITARY HOUSING PRIVATIZATION INITIATIVE (MHPI)

TINKER AIR FORCE BASE, OKLAHOMA

Prepared for:

72 ABW/CEVOE

7701 Arnold St., Suite 204

Tinker AFB, OK 73145

Prepared by:

OCTOBER 2007

Contract No.: F41624-03-D-8614
Task Order: 0072

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TABLE OF CONTENTS

Page

LIST OF TABLES

Page

LIST OF FIGURES

Page

ACRONYMS, ABBREVIATIONS, AND SYMBOLS

µg/m^3	Micrograms per Cubic Meter
1,2-DCA	1,2-dichloroethane
72 ABW	72nd Air Base Wing
72 ABW/CE	72nd Air Base Wing/Civil Engineering
72 ABW/CECR	72nd Air Base Wing/Restoration Section
72 ABW/CEV	72nd Air Base Wing/Environmental Management Division
72 ABW/CEVOE	72nd Air Base Wing/Environmental Analysis Section
ACAM	Air Conformity Applicability Model
ACM	Asbestos-Containing Materials
AFB	Air Force Base
AFCEE	Air Force Center for Engineering and the Environment
AFI	Air Force Instruction
AFMC	Air Force Materiel Command
AFOSH	Air Force Occupational Safety and Health
AFPD	Air Force Policy Directive
AICUZ	Air Installation Compatible Use Zone
ARPA	Archaeological Resources Protection Act
BMP	Best Management Practices
C&D	Construction and Demolition
CAH	Chlorinated Aliphatic Hydrocarbon
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
cis-1,2-DCE	cis-1,2-dichloroethene
CO	Carbon Monoxide
CPSC	Consumer Product Safety Commission
CY	Calendar Year
dB	Decibel
dBA	A-weighted Decibels
DoD	Department of Defense
EA	Environmental Assessment
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EO	Executive Order
EPA	U.S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
FEMA	Federal Emergency Management Agency
FICON	Federal Interagency Committee on Noise
FONPA	Finding of No Practicable Alternative
FONSI	Finding of No Significant Impact
GSF	Gross Square Footage
HMMS	Hazardous Materials Management System
HQ AFCEE/HDP	Headquarters AFCEE/Housing Privatization
HRMA	Housing Requirements and Market Analysis
HUD	U.S. Department of Housing and Urban Development
HWBZ	Hennessey Water-Bearing Zone
Hz	Hertz

IICEP	Interagency and Intergovernmental Coordination for Environmental Planning
INRMP	Integrated Natural Resources Management Plan
IRP	Installation Restoration Program
lbs	Pounds
L_{dn}	Day-Night Average Sound Levels
$L_{eq(8)}$	Day-Night Average Sound Level (averaged over an eight-hour period)
LOS	Level of Service
LSZ	Lower Saturated Zone
LTM	Long-term Monitoring
MFH	Military Family Housing
MGD	Millions of Gallons per Day
MHPI	Military Housing Privatization Initiative
MNA	Monitored Natural Attenuation
MSA	Metropolitan Statistical Area
MSW	Municipal Solid Waste
NAAQS	National Ambient Air Quality Standards
NEI	National Emissions Inventory
NEPA	National Environmental Policy Act
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NO_x	Nitrogen Oxides
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NSR	New Source Review
NWI	National Wetland Inventory
OAC	Oklahoma Administrative Code
ODEQ	Oklahoma Department of Environmental Quality
OG&E	Oklahoma Gas and Electric
OPDES	Oklahoma Pollution Discharge Elimination System
OSH Act	Occupational Safety and Health Act
OSHA	Occupational Safety and Health Administration
Pb	Lead
PM	Particulate Matter
PM_{10}	Particulate Matter with a Diameter less than or equal to 10 Microns (coarse)
$PM_{2.5}$	Particulate Matter with a Diameter less than or equal to 2.5 Microns (fine)
POL	Petroleum, Oils, and Lubricants
POTW	Publicly Owned Treatment Works
ppb	Parts per Billion
ppm	Parts per Million
PSD	Prevention of Significant Deterioration
RCNM	Roadway Construction Noise Model
RCRA	Resource Conservation and Recovery Act
ROI	Region of Influence
SO_2	Sulfur Dioxide
SOP	Standard Operating Procedure
SWPPP	Storm Water Pollution Prevention Plan
TAFB	Tinker AFB

TCE	Trichloroethene
TSCA	Toxic Substances Control Act
U.S.	United States
USACE	U.S. Army Corps of Engineers
USAF	U.S. Air Force
USC	U.S. Code
USFWS	U.S. Fish and Wildlife Service
USZ	Upper Saturated Zone
VOC	Volatile Organic Compounds

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1. PURPOSE AND NEED

1.1 INTRODUCTION

The United States Air Force (Air Force), Air Force Materiel Command (AFMC), proposes to privatize its military family housing (MFH) at Tinker Air Force Base (AFB), Oklahoma. The *National Defense Authorization Act of 1996* gives the Department of Defense (DoD) the authority to engage private sector businesses through a process of housing privatization wherein private sector housing developers would renovate or demolish existing housing units, build new units, and provide the infrastructure needed to support such developments. Government officials have determined that privatization is the best solution for leveraging resources to meet these goals in a timely manner. Additional information and details regarding the housing privatization initiative can be found on the DoD housing privatization website at http://www.acq.osd.mil/housing. Privatization of military housing units would essentially be an investment for the private developer, since the developer would own the units, lease the land from the Air Force, and collect rent from service members while providing maintenance and management.

1.2 LOCATION OF THE PROPOSED ACTION

Tinker AFB is located in Oklahoma County in the city limits of Oklahoma City, Oklahoma. The Base covers more than 5,000 acres and is adjacent to Midwest City to the north and Del City to the west. Oklahoma City is served by Interstate Highways 35, 40, 44, and 240. Specific to the proposed project, the Air Force proposes to implement MFH privatization through selection of one of several alternatives specifically discussed in Chapter 2 of this document. Figure 1-1 at the end of this subsection shows the location of Tinker AFB and the surrounding area, while Figure 1-2 shows the location of the MFH project area.

1.3 PURPOSE AND NEED FOR THE ACTION

The purpose of the Proposed Action is to provide access to safe, quality, well-maintained housing in a community where Air Force members and their families will choose to live. Determining the specific need for required housing at Tinker AFB involved estimating the number of appropriate private sector housing units available to military families within 20 miles, or a 60-minute commute.

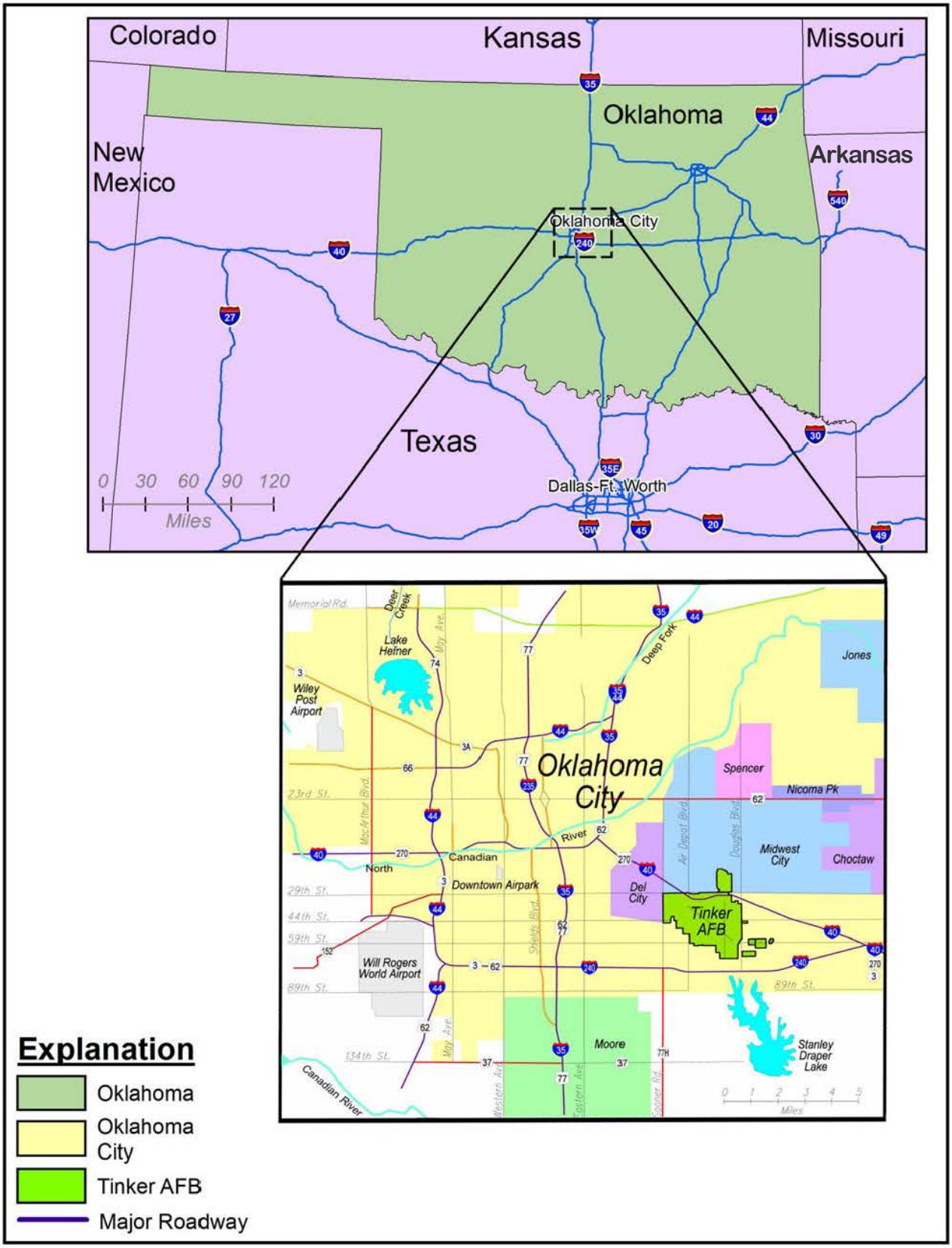

Figure 1-1. Location of Tinker AFB, Oklahoma

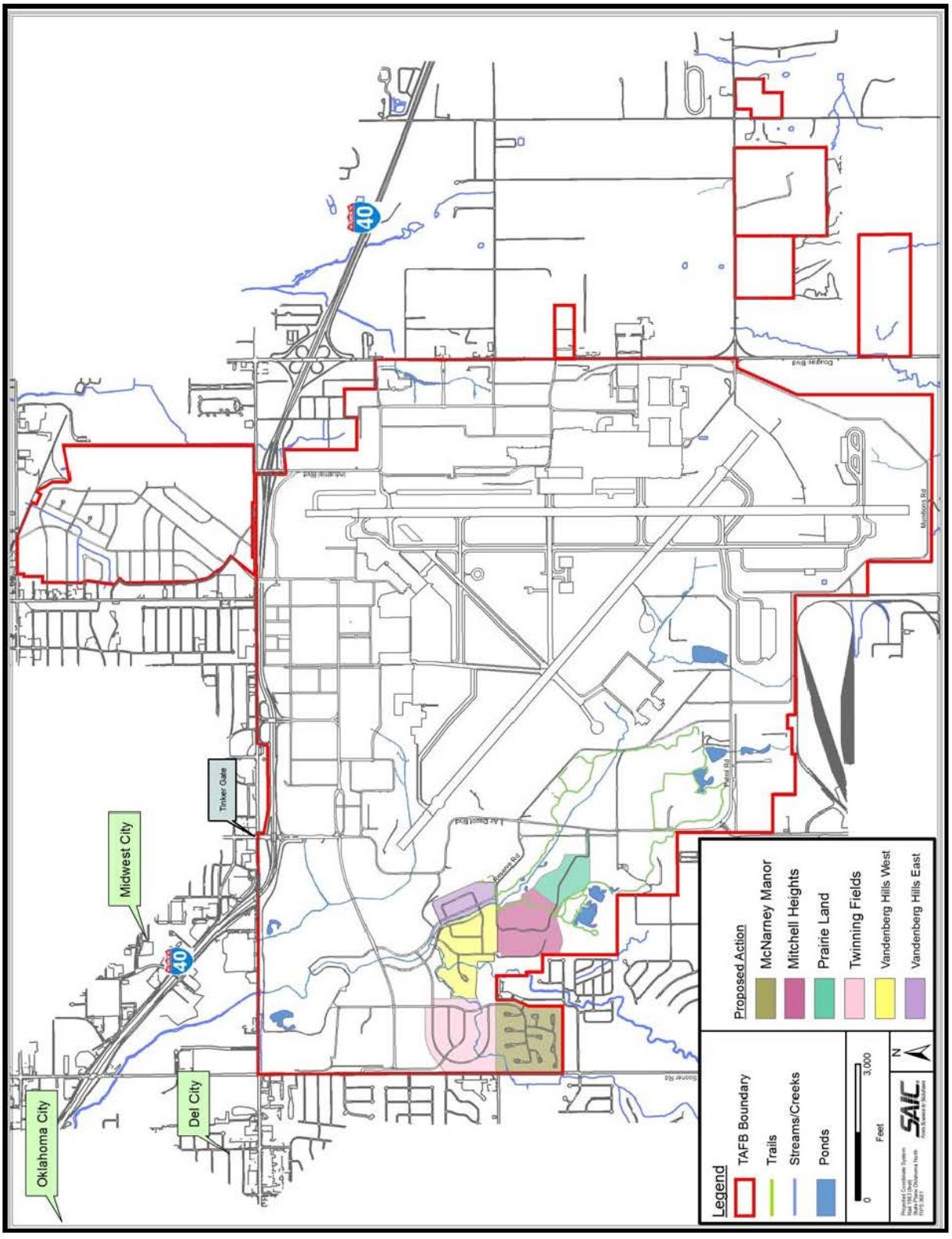

Figure 1-2. Location of Tinker Military Family Housing

In 2006, the Air Force conducted a Housing Requirements and Market Analysis (HRMA) for Tinker AFB to identify the housing units available to military members in the private community (U.S. Air Force, 2007). The total MFH requirement for Tinker AFB factored in shortfalls in the available private sector housing to determine the number of units (660 units) that the Air Force needs to provide at Tinker AFB for its personnel by calendar year (CY) 2011. Currently Tinker AFB has 694 housing units distributed throughout 5 parcels of land (Figure 1-2), resulting in a surplus of 34 units. The Proposed Action and alternatives would involve the leasing of all housing areas, potentially including an additional parcel not currently utilized for housing (identified as the "Prairie Land" parcel), to a private developer for up to 50 years, for a total of approximately 224 acres. The Air Force would also convey the 694 existing MFH units to the developer, and depending on the alternative selected, the developer would implement a combination of demolition, renovation, and/or construction of housing units to meet the end-state requirement of 660 MFH units. Once privatization is implemented, the developer would own, operate, and manage all MFH housing units on the installation while leasing the land underlying the housing communities for a period of 50 years. Further details on the Proposed Action and alternatives are provided in Chapter 2.

1.4 SCOPE OF THE ENVIRONMENTAL REVIEW

This EA identifies, describes, and evaluates the potential environmental impacts that may result from the implementation of MFH privatization under the Proposed Action and the alternatives, as well as the No Action Alternative. As appropriate, the affected environment and environmental consequences of the Proposed Action and alternatives may be described in terms of site-specific descriptions or regional overview. Finally, the EA identifies measures that would prevent or minimize environmental impacts.

Federal agencies are required to consider the environmental consequences of proposed actions in the decision-making process under NEPA. The Council on Environmental Quality (CEQ) was established under NEPA to implement and oversee federal policy in this process. In 1978, the CEQ issued regulations implementing the NEPA process under 40 Code of Federal Regulations (CFR) Parts 1500-1508. The CEQ regulations require that the federal agency considering an action evaluate or assess the potential consequences of the action or alternatives to the action, which may result in

the need for an environmental assessment or environmental impact statement. Under 40 CFR:

- An EA must briefly provide sufficient evidence and analysis to determine whether a FONSI or EIS should be prepared.
- An EA must facilitate the preparation of an EIS if required.

The activities that are addressed within this document constitute a federal action and, therefore, must be assessed in accordance with NEPA. To comply with NEPA, as well as other pertinent environmental requirements, the decision-making process for the Proposed Action will include the development of an EA to address the environmental issues related to the proposed activities. The Air Force Environmental Impact Analysis Process (EIAP) is accomplished through adherence to the procedures set forth in CEQ regulations and 32 CFR Part 989 (*Air Force Environmental Impact Analysis Process (EIAP)*).

The following environmental features were identified for analysis in this EA: air quality, solid waste, installation restoration program (IRP) sites, hazardous materials, utility infrastructure, safety, water resources, biological resources, soils, noise, socioeconomics (including protection of children), transportation, and land use.

1.4.1 Issues Not Carried Forward for Detailed Analyses

Issues with minimal or no impacts were identified through a preliminary screening process. The following describes the issues that were not carried forward for a detailed analysis and the rationale associated with their elimination.

- *Environmental Justice*: Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations*, requires federal agencies to identify community issues of concern during the National Environmental Policy Act (NEPA) process, particularly those issues relating to decisions that may have an impact on low-income or minority populations. The activities associated with the Proposed Action would not affect any low-income or minority populations. Therefore, the Air Force does not anticipate impacts associated with environmental justice from implementation of the Proposed Action under any of the alternatives.
- *Cultural Resources*: Based on survey information in the installation's Integrated Cultural Resources Management Plan (ICRMP) (U.S. Air Force, 2005), none of the existing buildings/features greater than 50 years in age are historic properties

and there are no archaeological sites or Native American cultural resources within the vicinity of the proposed alternative locations as determined under Section 106 of the National Historic Preservation Act and the Archaeological Resources Protection Act (ARPA). Thus, there would be no impacts to cultural resources from implementation of the Proposed Action under any of the alternatives. Should an unanticipated discovery of cultural resources occur (when ground-disturbing activities uncover a new site in an area that has already been adequately surveyed), all work in the area must be suspended and the installation Cultural Resource Manager must be immediately notified. The Cultural Resource Manager would then follow investigation and notification procedures as outlined in Section E.3 of the Tinker ICRMP (U.S. Air Force, 2005) in order to meet Section 106 NHPA compliance. Further, the Tinker ICRMP may need to be modified over the life of the project to account for the sequential and long-term impacts/activities related to lease holder(s) and subsurface activities; in particular, to identify requirements in instances where the lease holder reveals newly discovered potential historic properties under NHPA, or resources under ARPA. See Appendix A for State Historic Preservation Office correspondence.

1.5 APPLICABLE REGULATORY REQUIREMENTS

1.5.1 Environmental Coordination and Public Review

EO 12372, *Intergovernmental Review of Federal Programs*, requires intergovernmental notifications prior to making any detailed statement of environmental impacts. Through the process of Interagency and Intergovernmental Coordination for Environmental Planning (IICEP), the proponent must notify concerned federal, state, and local agencies and allow them sufficient time to evaluate the potential environmental impacts of a proposed action. Comments from these agencies are subsequently incorporated into the EIAP.

NEPA also requires that the government provide the public with an opportunity to review and provide input on the proposal and the potential environmental consequences prior to the government decision regarding the Proposed Action and Alternatives. The Air Force made the Draft Final Environmental Assessment available for public review and comment from 17 August through 17 September 2007. The Air Force placed advertisements in the Oklahoman and the Tinker Take Off, local and installation newspapers, respectively, on 17 August 2007 informing the public of the

public review period and the location of the document for review: the Tinker Information Repository at the Midwest City Library located at Reno and Midwest Boulevard. No comments regarding the proposed project or the Environmental Assessment were submitted to the Air Force by any members of the public. Copies of the public advertisements are located in Appendix A of this document.

1.5.2 Environmental Permitting/Coordination Requirements

Should the Air Force choose to implement the Proposed Action, the following are required to be implemented.

- Construction activity that disturbs an area of more than 1 acre must comply with the Stormwater General Permit for Construction Activities according to the rules established under the Oklahoma Pollution Discharge Elimination System (OPDES) under Oklahoma Administrative Code (OAC) 252:605. The stormwater program at Tinker AFB is covered under a general permit known as a "common plan of development." All construction activities are covered under this one permit due to ongoing construction at the installation.
- A Finding of No Practicable Alternative (FONPA) in accordance with 32 CFR 989.14 is required if project activities occur in floodplain areas.

1.6 ORGANIZATION OF THE DOCUMENT

This EA follows the requirements established by CEQ regulations (40 CFR, Parts 1500-1508). This document consists of the following chapters.

1. Purpose and Need
2. Description of Proposed Action and Alternatives
3. Affected Environment and Environmental Consequences
4. Cumulative Impacts
5. List of Preparers
6. Persons and Agencies Contacted
7. References

Appendix A – Public Involvement

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2. DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

2.1 INTRODUCTION

This chapter describes the process by which the Air Force formulated alternatives for implementation of the Proposed Action, the alternatives the Air Force considered but did not carry forward, the No Action Alternative. A summary of potential environmental impacts of the Proposed Action and alternatives is provided at the end of this chapter.

2.2 PROPOSED ACTION

The Proposed Action is not a separate alternative to be selected, but consists of activities associated with the overall proposal for the Air Force to implement the Military Housing Privatization Initiative (MHPI) program at Tinker AFB, Oklahoma. These activities would be common across all alternatives with the exception of the No Action Alternative, in which case the Air Force would not implement the MHPI at Tinker AFB. The Tinker AFB HRMA determined that the installation requires 660 MFH units by CY 2011 (U.S. Air Force, 2007). The HRMA inventoried existing MFH units at Tinker AFB to be 694 with a surplus of 34 units over the CY 2011 housing requirement. Through a combination of demolition, new construction, and/or renovation, a developer would reach the end-state requirement of 660 MFH units. The exact distribution of demolition, renovation, and construction throughout the housing areas would be detailed in developer proposals and is not known at this time. The alternatives for implementation of the Proposed Action are associated with potential combinations of demolition, renovation, and new construction distributed throughout the MFH areas and are detailed later in this chapter.

The following activities would be common to all alternatives with the exception of the No Action Alternative:

- Initially the Air Force would convey 694 existing government-owned housing units and associated infrastructure (e.g., roads) and utilities distributed among five different housing communities on the Base to a private real estate development and property management company.

- The Air Force would lease all housing areas (Figure 1-2), excluding existing easements, to the developer:
    - The Air Force would provide a short-term lease of 20 acres (in Vandenberg Hills East) to the developer for demolition purposes only, with the lease concluding at the end of the transition period. The lease would extend for a period of eight years. However, if the developer proposes an acceptable use for all or a portion of this location, the lease of this parcel may be extended.
    - At transaction closing the Government would lease to the developer up to 203 acres of improved land (Twining Fields, Vandenberg Hills West, McNarney Manor, and Mitchell Heights) and 21 acres of unimproved land (Prairie Land).
        - This lease also includes four playgrounds, two school bus stop shelters and Building 45306 (a self-help lawn maintenance storage building).
    - Three branches of Crutcho Creek have associated 100-year floodplains. The Eastern Branch and Main Crutcho Creek meet in Vandenberg Hills where the majority of floodplains are located. The Western Branch passes through the southern half of Twining Fields and is surrounded by a limited floodplain on each side of the creek. At Tinker AFB, floodplains would be managed consistent with the installation Draft Integrated Natural Resources Management Plan (INRMP). Currently 211 units are located within the floodplains. While the developer would be allowed to demolish or renovate these units, the developer would not be allowed to construct any new housing units or habitable structures within the floodplain. The developer would be allowed to develop the floodplain areas for recreational purposes (i.e., parks, natural areas, walking trails, etc.) provided the functionality and utility of the floodplain areas are not negatively affected. These areas could possibly be converted back to a natural riparian zone and/or storm water detention area. If a suitable use for the floodplain areas is not identified by the developer, then the floodplains would be returned to the government if not utilized.
        - Renovation and demolition of existing housing units, and new development located in a designated floodplain must comply with all applicable local, state, and federal floodplain regulations and EOs.

- Depending on alternative selection and developer proposals, the developer would:
  - Demolish a minimum of 432 existing units or up to all 694 units.
  - Renovate a maximum of 262 units or none at all (depending on how many are demolished).
  - Construct a minimum of 398 or maximum of 660 new units, depending on how many are demolished and/or renovated.

Table 2-1 provides a summary of activities associated with the Proposed Action.

Table 2-1. Tinker AFB MFH Proposed Action Details

Existing Housing Area	Estimated Size of Leased Area (Acres)	Length of Lease (Years)	Number of Units that Would Be Conveyed	Year Built	Units to Be Demolished	Units to Be Renovated	Units to Be Constructed	Total End-State Unit Requirement
Twining Fields (Parcel 11)	55	50	124	1959	432-694	0-262	398-660	**660**
Vandenberg Hills West (Parcel 12)	48	50	66	1959				
Vandenberg Hills East (Parcel 13)	20	8*	42	1959				
McNarney Manor (Parcel 14)	50	50	262	1970-1971				
Mitchell Heights (Parcel 15)	30	50	200	1982-1986				
Prairie Land (Parcel 16)	21	50 (Optional)	0	N/A	N/A			
Total	**224**	**N/A**	**694**	**N/A**	**N/A**	**N/A**	**N/A**	

*If the developer proposes an acceptable use for all or a portion of Parcel 13, the lease may be extended.

Through the combination of demolition, renovation, and/or new construction the developer would need to meet the end-state requirement of 660 housing units that meet the following demographic requirements (Table 2-2).

According to the Housing Privatization Request for Proposal, the developer is responsible for providing a development plan that meets the unit demographics identified in Table 2-2 through a combination of demolition, renovation, and new construction. Consequently, the developer would identify specific units for demolition

and renovation and would provide exact square footage and locations of new units, desired features, and driveways and/or roadways to be constructed or demolished with the developer's proposal.

Table 2-2. Proposed Action MFH Unit Demographics

Pay Grade	Units per Bedroom Count		
	2 Bedrooms (Modified)	3 Bedrooms	4 Bedrooms
O–7 to O–10 (General Officer)	0	0	3
O–6 (Senior Officer)			9
O–5		9	3
O–4		16	4
O–3	24	12	5
O–2	8	2	1
O–1	4	1	1
E–9		2	2
E–8	0	13	2
E–7		44	9
E–6	41	32	15
E–5	85	27	75
E–4	70	68	26
E–3	21	15	4
E–2	4	1	0
E–1	2	0	
TOTAL	**259**	**242**	**159**

For the EA, the most reasonably foreseeable development scenario for each alternative, based on existing housing area logistics and design/layout, is utilized for impact analysis. Because demolition, renovation, and construction activities could occur anywhere within the housing areas, the impacts analyses are based on the average square footage of units by bedroom count and other surfaces to be demolished and constructed, as opposed to utilizing the entire housing area as the demolition or construction footprint. The following housing demographic assumptions are used for calculating the potential demolition, renovation, and construction aspects of the Proposed Action and each alternative:

- Approximate unit distribution on Tinker AFB (694 units):
  - 2-Bedroom: 242 (35%)
  - 3-Bedroom: 303 (44%)
  - 4-Bedroom: 149 (21%)

The average size of 2-, 3-, and 4-bedroom units based on existing housing inventory (gross square feet):

- 2-Bedroom: 1,160 square feet
- 3-Bedroom: 1,382 square feet
- 4-Bedroom: 1,656 square feet

Renovation – Because the bedroom count and paygrade associated with units that would be renovated are unknown at this time, the alternatives are based on the average "maximum allowable renovation gross square footage" across paygrades for each bedroom count from the *Air Force Family Housing Guide for Planning, Programming, Design, and Construction* (U.S. Air Force, 2004):

- 2-Bedroom (Modified): 1,575 square feet
- 3-Bedroom: 1,836 square feet
- 4-Bedroom: 2,452 square feet

Construction – Because the bedroom count and paygrade associated with units that would be constructed are unknown at this time, the alternatives are based on the average "maximum allowable construction gross square footage" across paygrades for each bedroom count (U.S. Air Force, 2004):

- 2-Bedroom (Modified): 1,775 square feet
- 3-Bedroom: 2,036 square feet
- 4-Bedroom: 2,880 square feet

The Air Force also made assumptions for the square footage of the impervious surfaces associated with the units that would be demolished and newly constructed. The average impervious surface area associated with each unit (includes driveways, patios, sidewalks, etc.) would be approximately 1,275 square feet.

The floodplain areas identified previously would experience renovation and/or demolition activities and may be utilized by the developer for development of recreational areas; no new housing unit or habitable structures would be built. Two sources for the 100-year floodplain exist for Tinker AFB: the U.S. Army Corps of Engineers (USACE) and the Federal Emergency Management Agency (FEMA). The analysis in this EA is based on the USACE floodplain, which is more conservative. The following provides details associated with the floodplains located within the housing areas (Table 2-3).

Table 2-3. USACE and FEMA Floodplain Acreages Associated With the Housing Areas

Housing Area	USACE	FEMA
Twining Fields	~16 acres	~14 acres
Vandenberg Hills West	~32 acres	~28 acres
Vandenberg Hills East	~10 acres	~9 acres
McNarney Manor	~15 acres	~14 acres
Mitchell Heights	0 acres	< 0.25 acres
Prairie Land	0 acres	0 acres

Since the total area of floodplain is approximately 73 acres, there would remain approximately 152 acres available to the developer for new construction. It is assumed that approximately 80 percent of the remaining housing area would be available to build units, with 10 percent used for roads and 10 percent reserved for open space and recreation and support facilities that may be constructed by the developer. On the 122 acres therefore available for units, it is also assumed that half the units constructed would be duplex (at a maximum rate of 6 units per acre) and half would be single-family (at a maximum rate of 4 units per acre).

Assumptions associated with recreation and support facilities include:

- Sound protection buffer along Sooner Road
- Lighted tennis and basketball courts
    - Standard tennis courts are approximately 7,200 square feet in size; the Air Force assumes two tennis courts per parcel equaling approximately 72,000 square feet total for five developed parcels.
    - Regulation basketball courts are sized at approximately 4,700 square feet; the Air Force assumes one court per parcel totaling approximately 23,500 for five developed parcels.
- Outdoor fitness area (e.g., a par course)
    - Par course size varies, but an estimated size would be approximately 1,200 square feet. The Air Force assumes one per developed parcel, which equates to 6,000 square feet total for five developed parcels. However, such outdoor fitness centers are typically constructed using permeable surfaces such as wood chips, gravel, etc. and are not considered impervious surfaces when evaluating impacts.

- Housing Maintenance Facility
    - Facility #8100 is owned by the existing housing maintenance contractor (KIRA, Inc.) and is currently used as the housing maintenance facility. This facility may be left in place or removed at the option of KIRA, Inc. upon implementation of MFH privatization. For purposes of the EA the Air Force assumes that Facility #8100 would be removed and the private developer would construct a 4,000-square-foot housing maintenance/management facility.

At completion of the project, the developer would own and operate all housing units and associated infrastructure on behalf of Tinker AFB's military families. All privatized units would be either newly constructed or renovated and located only on Tinker AFB.

The alternatives associated with MFH privatization at Tinker AFB are associated with the number of units that would be demolished, renovated, and constructed in order to meet the 660-unit housing requirement, based on the parameters for housing distribution, renovation, and construction described previously. The details of each alternative are discussed in the associated section of this chapter.

2.3 FORMULATION OF ALTERNATIVES FOR IMPLEMENTING THE PROPOSED ACTION

The privatization initiative required Tinker AFB to assess the status of its current housing inventory and identify actions that would allow for the provision of adequate housing based on the HRMA housing requirement of 660 units (U.S. Air Force, 2007). During this process, alternatives were identified that could potentially meet the need for providing Tinker AFB families with adequate housing. Criteria for development of alternatives associated with the Tinker MHPI were identified and are described below.

- All MFH units must remain within the Tinker AFB boundary and near existing housing areas due to funding issues. Placing housing off-base or further from existing housing infrastructure would substantially increase the cost, which would have a negative impact on the project's feasibility.
- All MFH must meet current Air Force housing standards.
- The total number of MFH units on Tinker AFB must be 660 to meet the minimum HRMA housing requirement.

2.4 ALTERNATIVES CONSIDERED BUT ELIMINATED

Siting the housing areas outside of the existing MFH footprint or not or immediately adjacent to the existing housing areas was considered but eliminated from further consideration due to the constraints of the applied selection criteria. Given the requirements of the criteria for alternative development, the alternatives carried forward represent a range of reasonable alternatives for implementation of the Proposed Action.

2.5 ALTERNATIVES CARRIED FORWARD FOR ANALYSIS

Based on facility and location requirements identified previously, the Air Force has identified the following alternatives for implementing the Proposed Action. Figure 2-2 shows the locations of each alternative.

2.5.1 No Action Alternative

Under the No Action Alternative, the Air Force would not implement the MFH privatization program at Tinker AFB and would manage and maintain existing housing in accordance with existing Air Force policy, and would renovate or demolish surplus housing through the Military Construction process. Based on the HRMA, Tinker AFB has a requirement to supply 660 housing units by CY 2011. Given that Tinker AFB currently has 694 available units, there is a surplus of 34 housing units. If the Air Force were to select the No Action Alternative under this proposal, it is reasonable to assume that in the near future Tinker AFB would demolish surplus units to reach the minimum HRMA requirement of 660 units. The No Action Alternative is then based on the parameters identified in Section 2.2 and the following assumptions:

- It is reasonable to assume that the Air Force would demolish those units that are in disrepair, are the oldest, and/or do not meet current standards.
- The potential distribution of the 34 surplus units that would be demolished given current distribution of bedroom size at Tinker AFB would be:
    - 2-Bedroom: 12 units
    - 3-Bedroom: 15 units
    - 4-Bedroom: 7 units

- The average size of 2-, 3-, and 4-bedroom units based on existing housing inventory (U.S. Air Force, 2007a) is utilized for analysis purposes:
  - 2-Bedroom: 1,160 square feet
  - 3-Bedroom: 1,382 square feet
  - 4-Bedroom: 1,656 square feet
- The Air Force assumes that the impervious surface area associated with each unit (includes driveways, patios, sidewalks, etc.) is 1,275 square feet per unit.

The total estimated square footage of impervious surface area that may be demolished under the No Action Alternative is shown in Table 2-4.

Table 2-4. Tinker MFH No Action Alternative Demolition Activities

Bedroom Count	Number of Units Potentially Demolished	Average Unit Square Footage	Additional Surface Square Footage / Unit	Estimated Total Square Footage to be Demolished
2-Bedroom	12	1,160	1,275	29,220
3-Bedroom	15	1,382		39,855
4-Bedroom	7	1,656		20,517
Total	**34**	**N/A**	**N/A**	**89,592**

2.5.2 Alternative 1: Minimum Development Scenario (Air Force Preferred Alternative)

In addition to the activities identified as components of the Proposed Action, under Alternative 1, the Air Force's preferred alternative, Tinker AFB would meet the minimum housing requirement of 660 units through the following actions:

- The developer would demolish up to 432 housing units. Based on existing housing unit distribution by bedroom count and paygrade, the Air Force assumes that demolition would occur as follows:
  - 2-Bedroom: 151 units
  - 3-Bedroom: 190 units
  - 4-Bedroom: 91 units
- The developer would renovate up to 262 housing units. Based on the remaining units after demolition and on existing housing unit distribution by bedroom count and paygrade, the Air Force assumes that renovation would occur as follows:

- 2-Bedroom (Modified): 91 units
- 3-Bedroom: 113 units
- 4-Bedroom: 58 units

- The developer would construct up to 398 new housing units. Based on the number of units required by bedroom count as described previously, the remaining units after renovation, and on existing housing unit distribution by bedroom count and paygrade, the Air Force assumes that new construction would occur as follows:
  - 2-Bedroom (Modified): 259 units required - 91 units remaining after 151 units demolished = 168 units newly constructed
  - 3-Bedroom: 242 units required - 113 units remaining after 190 units demolished = 129 units newly constructed
  - 4-Bedroom: 159 units required - 58 units remaining after 91 units demolished = 101 units newly constructed
- Approximately 1,275 square feet of additional impervious surface would be required per unit.
- All other desired features would be developed as described under the Proposed Action.

The following table (Table 2-5) provides a summary of Alternative 1 activities, while Figure 2-1 provides a graphical representation.

Table 2-6 provides an estimated timeline scenario under Alternative 1. The timeline scenario is based on the assumption that all activities would be completed within eight years of project initiation, with 30 percent of activities completed within the first year and 10 percent per year thereafter.

2.5.3 Alternative 2: Maximum Development Scenario

In addition to the activities identified as components of the Proposed Action, under Alternative 2, Tinker AFB would meet the minimum housing requirement of 660 units through the following actions.

Table 2-5. Alternative 1 MFH Project Activities

Description	Approximate Size (Square Feet)		Est. # Units	Estimated Total Square Footage	Location
	Housing Unit	Additional Surface			
Housing Units					
Demolition					Location to be determined by developer proposal.
2-Bedroom	1,160*	1,275	151	367,685	
3-Bedroom	1,382*		190	504,830	
4-Bedroom	1,656*		91	266,721	
Total	**N/A**		**432**	**1,139,236**	
Renovation					
2-Bedroom (Modified)	1,575*	1,275	91	259,350	
3-Bedroom	1,836*		113	351,543	
4-Bedroom	2,452*		58	216,166	
Total	**N/A**		**262**	**827,059**	
Construction					
2-Bedroom (Modified)	1,775*	1,275	168	512,400	
3-Bedroom	2,036*		129	427,119	
4-Bedroom	2,880*		101	419,655	
Total	**N/A**		**398**	**1,359,174**	
Recreation and Support Facilities					
Housing Maintenance Office	4,000		1	4,000	Location to be determined by developer proposal.
Tennis Court	7,200		10	72,000	
Outdoor Fitness Area	1,200		5	6,000	
Basketball Court	4,700		5	23,500	
Total	**N/A**		**N/A**	**125,134**	

*Exact distribution of units to be demolished and renovated is unknown at this time; therefore, potential renovation and construction square footage is based on the average maximum allowable gross square footage for unit size per bedroom count across paygrades; U.S. Air Force, 2004.

Table 2-6. Projected Timeline Scenario for Alternative 1

Activity	Estimated Total Gross Square Footage/Project Year*								Total
	1	2	3	4	5	6	7	8	
Demolition	341,768	113,924	113,924	113,924	113,924	113,924	113,924	113,924	**1,139,236**
Renovation	248,117	82,706	82,706	82,706	82,706	82,706	82,706	82,706	**827,059**
Construction	445,298	148,430	148,430	148,430	148,430	148,430	148,430	148,430	**1,484,308**

* Includes housing units, impervious surface area, and recreation and support facilities.

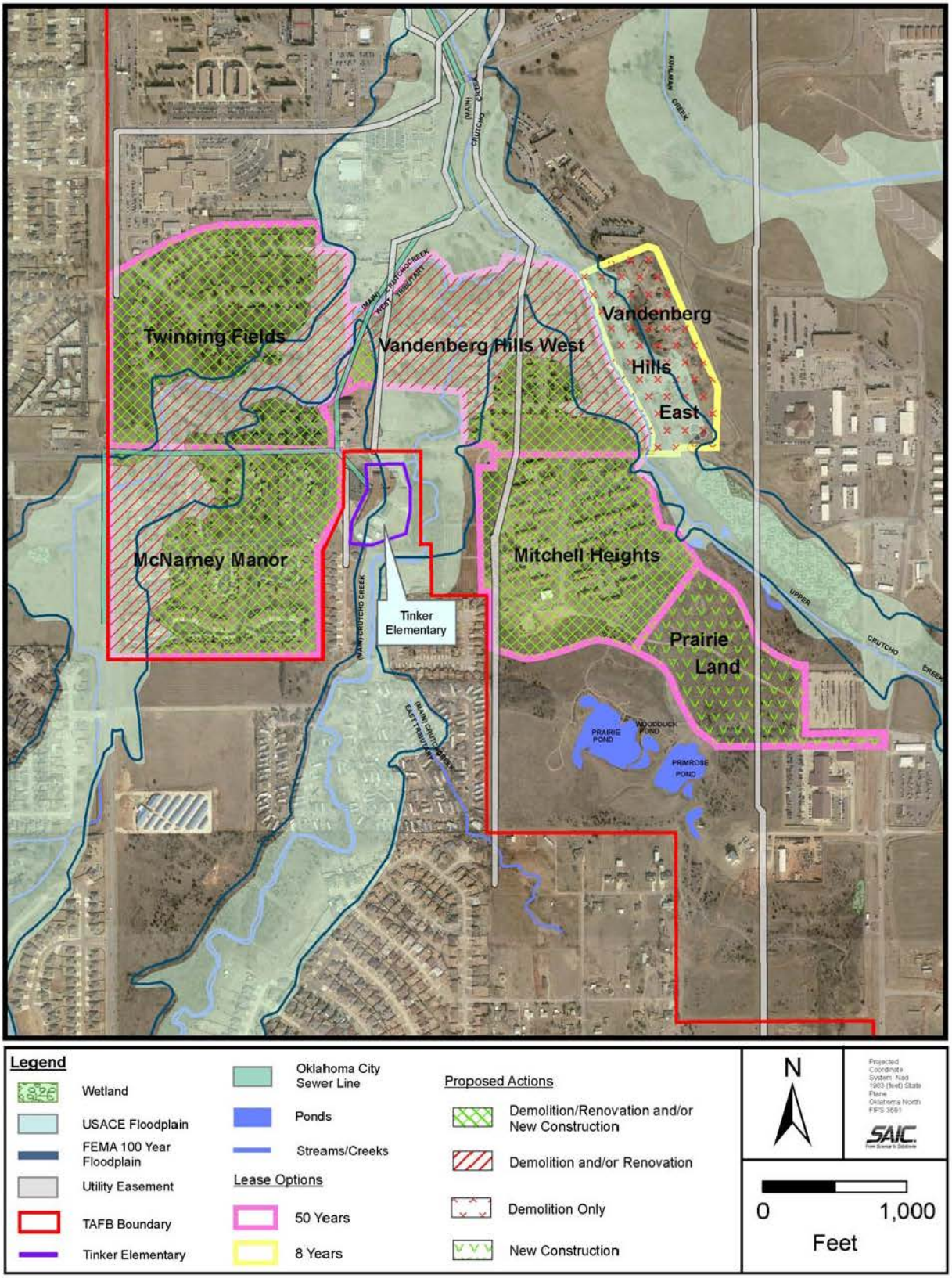

Figure 2-1. Proposed Project Activities at MFH Areas under Alternative 1

- The developer would demolish all 694 existing housing units. Based on existing housing unit distribution by bedroom count and paygrade, the Air Force assumes that demolition would occur as follows:
  - 2-Bedroom: 242 units
  - 3-Bedroom: 303 units
  - 4-Bedroom: 149 units
  - Total gross square footage of existing housing based on current housing inventory (U.S. Air Force, 2007a) is approximately 944,425.
- The developer would construct 660 new housing units. The Air Force assumes that new construction would occur as follows based on demographic requirements and maximum gross square footage allowances (Table 2-8) by bedroom count and paygrade (U.S. Air Force, 2004).
- Approximately 1,275 square feet of additional impervious surface would be required per unit.
- All other desired features would be developed as described under the Proposed Action.

Table 2-7 provides an estimated timeline scenario under Alternative 2. The timeline scenario is based on the assumption that all activities would be completed within eight years of project initiation, with 30 percent of activities completed within the first year and 10 percent per year thereafter.

Table 2-9 provides a summary of Alternative 2 activities, while Figure 2-2 provides a graphical representation.

2.6 COMPARISON OF ENVIRONMENTAL IMPACTS OF THE ALTERNATIVES

Table 2-10 on the following pages provides a comparison of environmental impacts associated with the Proposed Action and No Action alternatives.

Table 2-7. Projected Timeline Scenario for Alternative 2

Activity	Estimated Total Gross Square Footage/Project Year*								Total
	1	2	3	4	5	6	7	8	
Demolition	548,779	182,928	182,928	182,928	182,928	182,928	182,928	182,928	**1,829,275**
Construction	669,718	223,238	223,238	223,238	223,238	223,238	223,238	223,238	**2,232,384**

* Includes housing units, impervious surface area, and recreation and support facilities.

Table 2-8. Demographic Requirements and Maximum Gross Square Footage Allowances by Bedroom Count and Paygrade for Alternative 2

Pay Grade	Unit Requirement and Max Gross Square Footage (GSF) per Bedroom Count					
	2 Bedrooms (Mod)		3 Bedrooms		4 Bedrooms	
	Count	Max GSF	Count	Max GSF	Count	Max GSF
O–7 to O–10	0		0		3	4,060
O–6					9	2,920
O–5			9	2,300	3	2,700
O–4			16		4	
O–3	24	1,920	12	2,050	5	2,500
O–2	8		2		1	
O–1	4		1		1	
E–9	0		2	2,300	2	2,700
E–8			13	2,050	2	2,500
E–7			44		9	
E–6	41	1,630	32	1,760	15	2,200
E–5	85		27		75	
E–4	70		68		26	
E–3	21		15		4	
E–2	4		1		0	
E–1	2		0			
TOTAL	**259**	**N/A**	**242**	**N/A**	**159**	**N/A**

Table 2-9. Alternative 2 MFH Project Activities

Description	Approximate Size (Square Feet)		Est. # Units	Estimated Total Square Footage	Location
	Housing Unit	Additional Surface			
Housing Units					
Demolition					Location to be determined by developer proposal.
2-Bedroom	944,425	1,275	242	**1,829,275**	
3-Bedroom			303		
4-Bedroom			149		
Total	**N/A**		**694**		
Construction					
2-Bedroom (Modified)	432,610	1,275	259	762,835	
3-Bedroom	461,380		242	769,930	
4-Bedroom	371,760		159	574,485	
Total	**N/A**		**660**	**2,107,250**	
Recreation and Support Facilities					
Housing Maintenance Office	4,000		1	4,000	Location to be determined by developer proposal.
Tennis Court	7,200		10	72,000	
Outdoor Fitness Area	1,200		5	6,000	
Basketball Court	4,700		5	23,500	
Total	**N/A**		**N/A**	**125,134**	

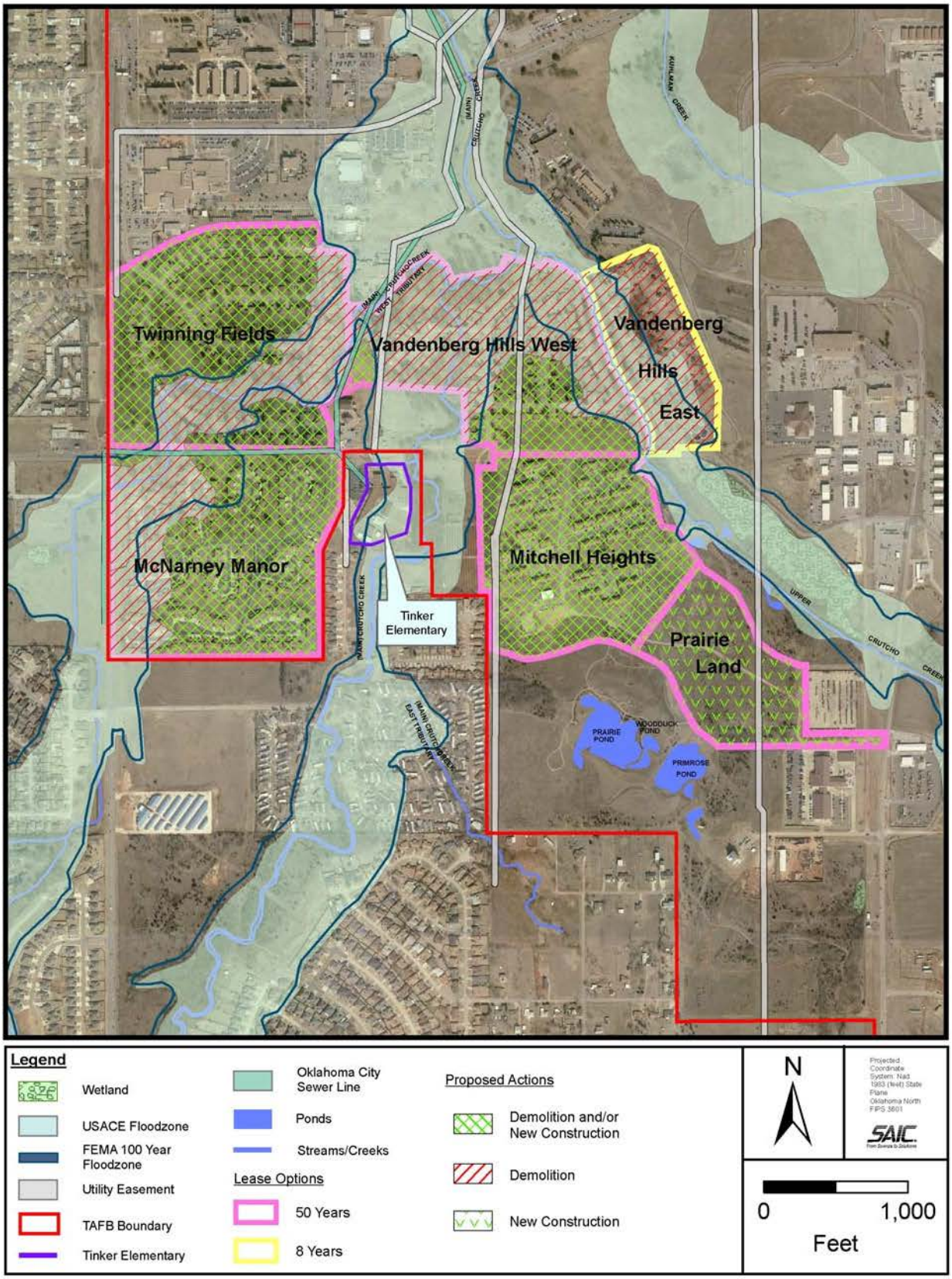

Figure 2-2. Proposed Project Activities at MFH Areas under Alternative 2

Table 2-10. Alternative Impact Summary and Comparison

Resource / Issue Area	Alternatives		
	No Action	**Alternative 1: Minimum Development Scenario**	**Alternative 2: Maximum Development Scenario**
Transportation	The Air Force expects increases in traffic associated with project activities to be minor and intermittent. Entrance gate service or level of service (LOS) of local roadways within or outside the MFH area would not be significantly impacted when compared to the existing traffic environment of Tinker AFB.	Under Alternative 1 there would be more traffic activity than with the No Action Alternative due to the increase in construction and demolition (C&D) activity (i.e., more dump trucks, more supply deliveries, and more workers requiring daily transport). However, entrance gate service and local roadway LOS would not be significantly impacted.	C&D activities would result in slightly more impact than the No Action Alternative and Alternative 1. Alternative 2 would not significantly impact entrance gate service or LOS of local roadways either within or outside the MFH area.
Noise	Noise levels would temporarily increase during demolition activity. The noise could result in increased annoyance for receptors within 400 feet of any demolition activity. Tinker Elementary School is located less than 500 feet from the nearest MFH unit. As a result, demolition of units within close proximity to the school could be a source of annoyance and could interrupt daily learning activities. Demolition planning should take into consideration unit proximity to the school, and activities for these units should either be avoided or scheduled to minimize interruption of the school day (e.g., during school vacations). No adverse impacts are expected provided demolition activities consider proximity to the school and are conducted during normal business hours and on the weekday.	C&D activities, especially during the first year, would result in more potential for public annoyance particularly for receptors within 400 feet of the project site (noise levels greater than 70 decibels (dB)). Potential issues associated with proximity to the elementary school are similar to the No Action Alternative. No adverse impacts are expected from the implementation of Alternative 1 provided activities consider proximity to the school and are completed during business hours of the work week. Following completion of the project, noise levels would return to baseline levels. No adverse impacts are expected.	Noise levels from C&D activities would be similar to those for Alternative 1. However, because this alternative requires the removal and rebuilding of more units, the potential to annoy larger numbers of residents could be greater. Potential issues associated with proximity to the elementary school are similar to the other alternatives. Completing demolition and construction activities during normal business hours of the work week and considering proximity to the school would minimize the number of those receptors annoyed. No adverse impacts are expected.

Table 2-10. Alternative Impact Summary and Comparison (continued)

Resource / Issue Area	Alternatives		
	No Action	**Alternative 1: Minimum Development Scenario**	**Alternative 2: Maximum Development Scenario**
Hazardous Materials and Waste / Installation Restoration Program (IRP)	Demolition of older housing units could result in the production of minor amounts of lead-based paint or asbestos-containing material (ACM) wastes. Standard operating procedures (SOPs) and management procedures would be utilized to minimize impacts, and no adverse impacts would be expected. Soil disturbance would not be expected to impact existing IRP sites.	Impacts would be similar to those described under the No Action Alternative, although more project activities would result in a greater potential for impacts. However, the same SOPs and management procedures utilized to minimize impacts as described under the No Action Alternative would apply, and no adverse impacts would be expected.	Alternative 2 has similar site conditions to Alternative 1 except that activities would be limited to demolition and construction (no renovation). Therefore, there are no potential impacts for Alternative 2 not already described under Alternative 1.
Air Quality	Temporary increases in air emissions would occur during the duration of demolition activities. However, standard fugitive dust controls would be implemented as part of this alternative and the Air Force has not identified any adverse impacts.	While emissions would be greater than the No Action Alternative, pollutant emissions would not exceed threshold criteria utilized for analysis. As a result, this alternative would not create a significant impact to air quality.	Air emissions would be greater than all other alternatives. However, emissions would not exceed significance criteria and long-term adverse effects are not expected. Most of the emissions would occur from construction activities and would result in temporary and short-term increases in the region. Therefore, significant impacts to air quality are not expected.
Safety	As part of normal operating procedures, all activities and workers would comply with Occupational Safety and Health Administration (OSHA) requirements. Workers would be required to conduct demolition activities in a manner that would not pose any risks to personnel at or near the action sites, and all materials and equipment would be used in accordance with industry and regulatory standards. Adverse impacts to personnel and the public, including children, are not expected.	Impacts would be similar to those of the No Action Alternative, although the overall scope of activities would be larger and include new construction. All activities and workers at the construction and demolition sites would be required to implement the same standards as described under the No Action Alternative. The Air Force does not anticipate any adverse safety impacts from Alternative 1.	Impacts related to the safety and protection of children under the Alternative 2 would be similar to those of Alternative 1. The Air Force does not anticipate any adverse safety impacts from Alternative 2.

Table 2-10. Alternative Impact Summary and Comparison (continued)

Resource / Issue Area	Alternatives		
	No Action	**Alternative 1: Minimum Development Scenario**	**Alternative 2: Maximum Development Scenario**
Utility Infrastructure	There would be a decrease in potable water, electricity, and natural gas use and sanitary wastewater generation on the installation associated with the overall reduction of housing units. However, this would be offset by the relocation of associated families into the local community. No adverse impacts to the utility infrastructure are anticipated with the implementation of the No Action Alternative.	New housing units would require minor construction to provide connections to the existing utility infrastructure. The reduction in the overall number of housing units would result in a slight decrease in potable water, electricity, and natural gas use and sanitary wastewater generation on the installation. However, this would be offset by the relocation of associated families into the local community.	Impacts would be similar to Alternative 1.
Solid Waste	C&D debris generated is estimated to represent approximately 1.25% of the annual average amount of waste disposed of at the Southeastern Oklahoma City Landfill. This would be a one-time event concluding when the project has been completed, and the Air Force does not consider impacts associated with solid waste to be adverse.	C&D debris generated during the first year of the project is estimated to represent approximately 5.8% of the annual average amount of waste disposed of at the Southeastern Oklahoma City Landfill. C&D debris generated during years two through eight is estimated to represent approximately 1.9% of the annual average amount of waste disposed of at the Southeastern Oklahoma City Landfill.	C&D debris generated during the first year of the project is estimated to represent approximately 8% of the annual average amount of waste disposed of at the Southeastern Oklahoma City Landfill. C&D debris generated during years two through eight is estimated to represent approximately 2.7% of the annual average amount of waste disposed of at the Southeastern Oklahoma City Landfill.
Soils	Project activities would disturb soils during final grading and landscaping activities. However, given the gentle slopes in the potentially affected areas and permitting requirements including best management practices (BMPs) and appropriate stormwater pollution prevention controls, adverse impacts from runoff and erosion would not be expected.	Soil would be disturbed during C&D activities, including excavations for new utility connections. The extent of the soil disturbance would be greater than under the No Action Alternative. However, the same permitting requirements, BMPs, and stormwater pollution prevention controls would be implemented. No significant adverse impacts are anticipated.	Soil disturbance would be slightly greater than under Alternative 1 but would be similar. No significant adverse impacts are anticipated.

Table 2-10. Alternative Impact Summary and Comparison (continued)

Resource / Issue Area	Alternatives		
	No Action	**Alternative 1: Minimum Development Scenario**	**Alternative 2: Maximum Development Scenario**
Water Resources	Demolition would not have any direct adverse impact on any surface waters or ground water and would result in an overall decrease in the amount of impervious surface, thus decreasing the overall amount of stormwater. Permitting requirements including BMPs and appropriate stormwater pollution prevention controls would offset potential indirect impacts from runoff. No adverse impacts to water resources are expected.	New construction could slightly increase the amount of impervious surface throughout the housing areas. Issues associated with water resources are the same as those described for the No Action Alternative. Although the potential for impacts is slightly higher relative to more development, the same BMPs and permitting requirements would apply. As a result, impacts to water resources under Alternative 1 are expected to be minimal.	Potential impacts are the same as those described for the No Action Alternative and Alternative 1. Although the potential for impacts is higher relative to more development under this Alternative, the same BMPs and permitting requirements would apply as those described previously. As a result, impacts to water resources under Alternative 2 are expected to be minimal.
Wetlands & Floodplains	Wetlands would not be adversely affected by demolition activities. Demolition activities may occur in floodplain areas. Removal of housing units within the floodplain may serve to restore, to a certain degree, previously lost floodplain functions and values. A flood event could cause property damage to the housing units remaining in the floodplain and disrupt Tinker's military operations. A FONPA is required for project activities in the floodplain.	Although wetlands would not be directly impacted, C&D activities could indirectly impact them due to runoff and erosion. However, BMPs and appropriate stormwater pollution prevention controls would minimize the potential for adverse impacts. The developer would be restricted from new unit construction within the floodplain, but could utilize it for recreational purposes. Removal of housing units and recreational utilization of floodplain areas previously developed for housing would have an overall beneficial impact to floodplain resources. A FONPA is required for project activities in the floodplain.	Under Alternative 2, there would be better opportunities to restore or enhance floodplain functions and values within the affected area, since all housing structures in floodplains would be removed and no new units would constructed within the floodplain. The increased demolition activity within or near the floodplains increases the possibility for indirect sedimentation and stormwater impacts. This risk can be controlled with standard BMPs and stormwater pollution prevention practices. A FONPA is required for project activities in the floodplain.

Table 2-10. Alternative Impact Summary and Comparison (continued)

Resource / Issue Area	Alternatives		
	No Action	**Alternative 1: Minimum Development Scenario**	**Alternative 2: Maximum Development Scenario**
Biological Resources	Under the No Action Alternative there would be no significant impacts to any sensitive species, habitats, other flora and fauna, or invasive species.	Alternative 1 would not be expected to have any adverse effects on sensitive plants since none have been documented in the MFH area. Potential construction of new housing in the Prairie Land area would result in the loss of as much as 25 acres of habitat for the Texas horned lizard. State of Oklahoma law makes it unlawful to intentionally kill horned lizards. Since the Air Force is not purposefully attempting to kill or take horned lizards, the state has not identified any restrictions on the construction. However, the state has identified two optional measures to minimize impacts to the species from project activities. The opportunity to restore wetland and floodplain habitat could have generally beneficial effects on plants and animals. Soil disturbance would create conditions that are conducive to the spread of invasive plants. Replanting disturbed areas with native plants or noninvasive plants and using similar native or noninvasive plants for landscaping around new housing units could avoid or minimize the spread of invasive species on disturbed areas.	Impacts under Alternative 2 would be similar to those described for Alternative 1.

Table 2-10. Alternative Impact Summary and Comparison (continued)

Resource / Issue Area	Alternatives		
	No Action	**Alternative 1: Minimum Development Scenario**	**Alternative 2: Maximum Development Scenario**
Land Use	Land use in the MFH areas would not change and there would be no impacts associated with land use beyond the scope of normal conditions and influences at these locations.	If new housing is constructed in the Prairie Land area, there would be a change in the existing open space land use to accompanied housing, but the change would not be incompatible with the other existing land uses in the surrounding area. If existing houses located within floodplain areas are demolished, the land use would change from accompanied housing to either open space or outdoor recreation. No significant adverse impacts would occur.	The impacts related to land use under Alternative 2 would be similar to those of Alternative 1.
Socio-economics	The No Action Alternative would not have any significant socioeconomic impact.	Alternative 1 would have positive impacts on employment and income in the region of influence (ROI). However, given the size of the Oklahoma City labor supply and the relatively small size of the project, the impacts would not be significant. Sufficient housing is available in the community for military families that are temporarily displaced from housing units that are renovated or demolished.	Socioeconomic impacts for Alternative 2 would be similar to those of Alternative 1.

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3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 TRANSPORTATION

3.1.1 Definition of the Resource

Transportation refers to the movement of vehicles on roadway networks. Transportation systems in the vicinity of Tinker AFB include roads, airports, and railroads. These transportation networks provide accessibility between the local community and the installation and among the various land use areas on the Base. For transportation resources, the region of influence (ROI) for the Proposed Action alternatives includes roadway networks on and in the vicinity of Tinker AFB, with particular emphasis on the roadways within the MFH area. Air and rail transportation would not be impacted by the Proposed Action and are not discussed further.

3.1.2 Existing Conditions

The local and regional transportation networks that surround and provide access to Tinker AFB include Interstate Highways 40 and 240 and three local arterial roads: Sooner Road, Southeast 29th Street, and Douglas Boulevard (U.S. Air Force, 2005a). Interstate Highway 40 provides access to Tinker AFB via Air Depot Boulevard. The Tinker Gate and Interstate 240 provide access to the Base via Sooner Road, Air Depot Boulevard, and Douglas Boulevard.

The current transportation network at Tinker AFB consists of a series of arterial, collector, and local roadway networks. The arterial network is a system of two- to four-lane roads that support the majority of the traffic circulation onto and around the Base. The major arterial roads are Air Depot Boulevard, East Drive, Arnold Road, and Patrol Road. The collector network is primarily a two-lane network that provides access to mission facilities and support facilities as well as access to the arterial road network. The major collectors for Tinker AFB are McNarney Avenue, Reserve Road, and Mitchell Avenue (U.S. Air Force, 2005a).

The perimeter of Tinker AFB is secured by 11 entry control points that are either manned by security forces personnel or controlled by effective force protection measures. Tinker Gate (Gate #1) and Lancer Gate (Gate #20) do not close, providing uninterrupted Base access. A heavy entry control point located at Gott Gate (Gate #34)

provides a single access point for delivery vehicles and heavy equipment entering the installation (U.S. Air Force, 2005a). The MFH housing area consists of a local roadway network.

3.1.3 Environmental Consequences

Impact to the level of service (LOS) on installation roadways is the primary transportation-related issue. Criteria for evaluating impacts to transportation service are related to the potential for disruption and/or permanent degradation of the transportation system and LOS.

3.1.3.1 No Action Alternative

A temporary and intermittent traffic influx would be associated with construction and demolition (C&D) activities during work hours. Standard practice indicates that most C&D equipment would be staged on site and would use immediate roadways to move from site to site. As a result, the majority of any traffic increases would result from dump trucks intermittently hauling C&D debris, occasional supply deliveries, and daily construction worker transport. The number and timing of dump truck trips and supply deliveries is difficult to estimate given the many variables involved. However, dump truck capacity can range from 10 to 40 tons, and based on solid waste analyses conducted later in this chapter it is assumed that, using a 10-ton dump truck capacity, the No Action Alternative would only require one dump truck, which would likely be utilized during normal business hours.

Based on socioeconomic analysis conducted later in this document there would not be a significant number of workers involved in the C&D activities, and it is likely that most would car pool to avoid gate access delays/issues. As a result, the Air Force expects increases in traffic associated with project activities to be minor and intermittent. Such increases would not significantly impact the entrance gate service or LOS of local roadways either within or outside the MFH area when compared to the existing traffic environment of Tinker AFB. Under the No Action Alternative, there would be a reduction in the number of MFH units, thus resulting in a slight benefit as a decreased unit density would result in a decreased car traffic density on residential streets. However, this would be offset by the relocation of previously on-base residents to off–base housing, which would increase daily traffic at the Base access gates. However, a potential permanent increase of 34 cars (34 unit reduction overall) even at

one gate on a daily basis is not expected to significantly impact the gate capacity, even when considered along with the temporary and intermittent C&D traffic increases.

3.1.3.2 Alternative 1: Minimum Development Scenario (Air Force Preferred Alternative)

As with the No Action Alternative there would be a temporary and intermittent traffic influx associated with C&D activities during work hours. Under Alternative 1 more traffic activity would occur than with the No Action Alternative due to the increase in C&D activity; there would be more dump trucks hauling C&D debris, more supply deliveries, and more workers requiring daily transport. Based on the timeline scenario in Section 2.4.2, the first year of the project would experience the most C&D activity, thus resulting in the most traffic activity during the length of the project; after that, the activity would taper down to a third of that of the first year for the rest of the project.

Using the same methodology for estimating dump truck trips as with the No Action Alternative, with an average over the course of a year, the Air Force estimates that during normal business hours approximately two dump trucks would be needed during the first project year and one for the remaining project years. It is unknown at this time how many units the developer would be working at any given time; however, based on analysis in Section 3.11 and assuming construction, renovation and demolition of four housing units at any given time, the estimated maximum daily labor requirement would be approximately 28 workers. Assuming a car pool of two workers per vehicle, it is estimated that there would be an average of 14 worker trips daily. The Air Force does not anticipate that intermittent dump truck activity, supply deliveries, and worker transport resulting from Alternative 1 would significantly impact the entrance gate service or LOS of local roadways either within or outside the MFH area when compared to the existing traffic environment of Tinker AFB. Once the project is completed, the impact to local roadways would be the same as that of the No Action Alternative given the same reduction in units and increased installation access gate traffic associated with families requiring off-base housing. The local road system must be developed to meet all local requirements and standards, including obtaining the best possible alignment, grade, sight distance, and drainage for new roads relative to the new development and associated terrain.

3.1.3.3 Alternative 2: Maximum Development Scenario

Using the same methodologies for estimating dump truck trips and worker trips as with the other alternatives, with an average over the course of a year, the Air Force estimates that during normal business hours approximately three dump trucks would be needed during the first project year, one for the remaining project years, and an average of 10 worker trips daily using the assumptions for Alternative 1. While these activities would result in slightly more of an impact than the No Action Alternative and Alternative 1, the Air Force does not anticipate that Alternative 2 would significantly impact the entrance gate service or LOS of local roadways either within or outside the MFH area when compared to the existing traffic environment of Tinker AFB. Once the project is completed, the impact to local roadways would be the same as that of the No Action Alternative and Alternative 1 given the same reduction in units and increased installation access gate traffic associated with families requiring off-base housing. As with Alternative 1, the local road system must be developed to meet all local requirements and standards, including obtaining the best possible alignment, grade, sight distance, and drainage for new roads relative to the new development and associated terrain.

3.2 NOISE

This section discusses noise sources and ambient noise levels within the alternative areas. In the project region, ambient noise (the surrounding background noise) currently exists as a result of transportation-related and other human activities. Many types of civil and military aircraft operate throughout the region and make use of the military training airspace overlying the area. Vehicles on roads are other sources of noise.

3.2.1 Definition of the Resource

Noise is considered to be unwanted sound that interferes with normal activities or otherwise diminishes the quality of the environment. It may be intermittent or continuous, steady or impulsive. It may be stationary or transient. Stationary sources are normally related to specific land uses, e.g., housing tracts or industrial plants. Transient noise sources move through the environment, either along relatively established paths (e.g., highways, railroads, and aircraft flight tracks around airports), or randomly. The physical characteristics of noise, or sound, include its intensity,

frequency, and duration. Sound intensity varies widely (from a soft whisper to a jet engine), and the unit used to measure the intensity of sound is the decibel (dB). There is wide diversity in responses to noise that not only vary according to the type of noise and the characteristics of the sound source, but also according to the sensitivity and expectations of the receptor, the time of day, and the distance between the noise source (e.g., an aircraft) and the receptor (e.g., a person or animal). Table 3-1 summarizes some typical noise sources with the corresponding noise measurement and a general human response to the sound level.

Table 3-1. Sound Levels of Typical Noise Sources

dB	Human Response	Noise Sources
120	Uncomfortably Loud	Military jet aircraft takeoff from aircraft carrier with afterburner at 50 feet – 130 dB
110		Turbo-fan aircraft at takeoff power at 200 feet – 118 dB
100	Very Loud	Boeing 707 aircraft at 6,080 feet before landing – 106 dB Jet flyover at 1,000 feet – 103 dB Bell J-2A helicopter at 100 feet
90		Boeing 737 aircraft at 6,080 feet before landing – 97 dB Motorcycle at 25 feet
80		Propeller plane flyover at 1,000 feet – 88 dB Diesel train 45 mph at 100 feet – 83 dB
70	Moderately Loud	Passenger car 65 mph at 25 feet – 77 dB
60		Air conditioning unit at 100 feet Normal speech
50	Quiet	Large transformer at 100 feet
40		Lowest limit of ambient sound
10		Just audible
0		Threshold of hearing

The frequency of sound is measured in cycles per second, or hertz (Hz). This measurement reflects the number of times per second the air vibrates. Low frequency sounds are heard as rumbles or roars, and high frequency sounds are heard as screeches. Sound measurement is further refined through the use of "A-weighting." The normal human ear can detect sounds that range in frequency from about 20 Hz to 20,000 Hz (FICON, 1992). However, all sounds throughout this range are not heard equally well; the human ear is most sensitive to frequencies in the 1,000 to 4,000 Hz range. Sounds measured within these frequencies are termed "A-weighted," and are shown in terms of A-weighted decibels (dBA).

The duration of a noise event and the number of times noise events occur are also important considerations in assessing noise impacts. Duration is characterized by the time period of the sound pattern. Continuous sounds are those produced for relatively long periods, while intermittent sounds are those that are produced for short periods such as aircraft takeoffs and landings.

Ambient background noise is not considered in the noise calculations. There are two reasons for this. First, ambient background noise, even in wilderness areas, varies widely depending on location and other conditions. Therefore, assigning a value to background noise would be arbitrary. Second, and probably more importantly, it is reasonable to assume that ambient background noise in the project's ROI would have little or no effect on the calculated Day-Night Average Sound Levels (L_{dn}). In calculating noise levels, louder sounds dominate the calculations. Overall aircraft and other transportation-related noise would be expected to be the dominant noise sources characterizing the acoustic conditions in the region.

Although ambient noise is not measured or included in noise calculations, it is an important factor in determining impacts. For example, a new airfield near an industrial area would have little impact on the noise environment. In comparison, a new airfield built near a residential area would have significant impacts on the noise environment. Therefore, ambient noise is discussed for each site and is considered in impact determination. Public annoyance is the most common impact associated with exposure to elevated noise levels. Generally, EPA and Air Force studies predict that noise from a given sound source that raises the average noise level 5 dB above ambient is intrusive and would likely generate widespread complaints. Impacts are therefore described in terms of increases in noise levels and the potential for annoyance to receptors (i.e., local residents, personnel, etc.) based on potential increases above ambient noise levels.

Noise Metric

Based on numerous sociological surveys and recommendations of federal interagency councils, the most common benchmark referred to is a L_{dn} of 65 dBA. This annual average threshold is often used to determine residential land use compatibility around airports, highways, or other transportation corridors. Two other average noise levels are also useful:

- A L_{dn} of 55 dBA was identified by the EPA as a level "requisite to protect the public health and welfare with an adequate margin of safety" (EPA, 1974). Noise may be heard, but there is no risk to public health or welfare.

- A L_{dn} of 75 dBA is a threshold above which effects other than annoyance may occur. It is 10 to 15 dBA below levels at which hearing damage is a known risk (Occupational Safety and Health Administration (OSHA), 1983). However, 75 dBA is also a level above which some adverse health effects cannot be categorically discounted.

Public annoyance is the most common impact associated with exposure to elevated noise levels. When subjected to L_{dn} of 65 dBA, approximately 12 percent of persons so exposed will be "highly annoyed" by the noise. At levels below 55 dBA, the percentage of annoyance is correspondingly lower (less than 3 percent). The percentage of people annoyed by noise never drops to zero (some people are always annoyed), but at levels below 55 dBA the noise is reduced enough to be essentially negligible (Finegold et al., 1994).

The L_{dn} sums individual noise events and averages the resulting level over a specified length of time, usually a 24-hour period. Thus, L_{dn} is a composite metric representing the maximum noise levels, the duration of the events, and the number of events that occur. However, this metric also considers the time of day during which noise events occur. This metric adds 10 dB to those events that occur between 10:00 p.m. and 7:00 a.m. to account for the increased intrusiveness of noise events that occur at night when ambient noise levels are normally lower than during the daytime.

3.2.2 Existing Conditions

Tinker AFB is an active military installation that includes aircraft, vehicle transportation, and various outdoor human activities (i.e., lawn mowing). The primary noises for each of the alternatives is residual aircraft noise (less than L_{dn} of 65), natural sounds (i.e., wind, birds), and some vehicle noise from traffic on nearby access roads. Noise contours produced by aircraft operations do not extend to the proposed sites (Figure 3-1). As demolition, renovation, and construction is occurring, residents in nearby housing would be subject to elevated noise levels from these activities.

3.2.3 Environmental Consequences

This section focuses on the effects of noise from demolition and construction activities of the MFH on the ambient sound environment. Discussion is based on information provided in the description of the Proposed Action and alternatives.

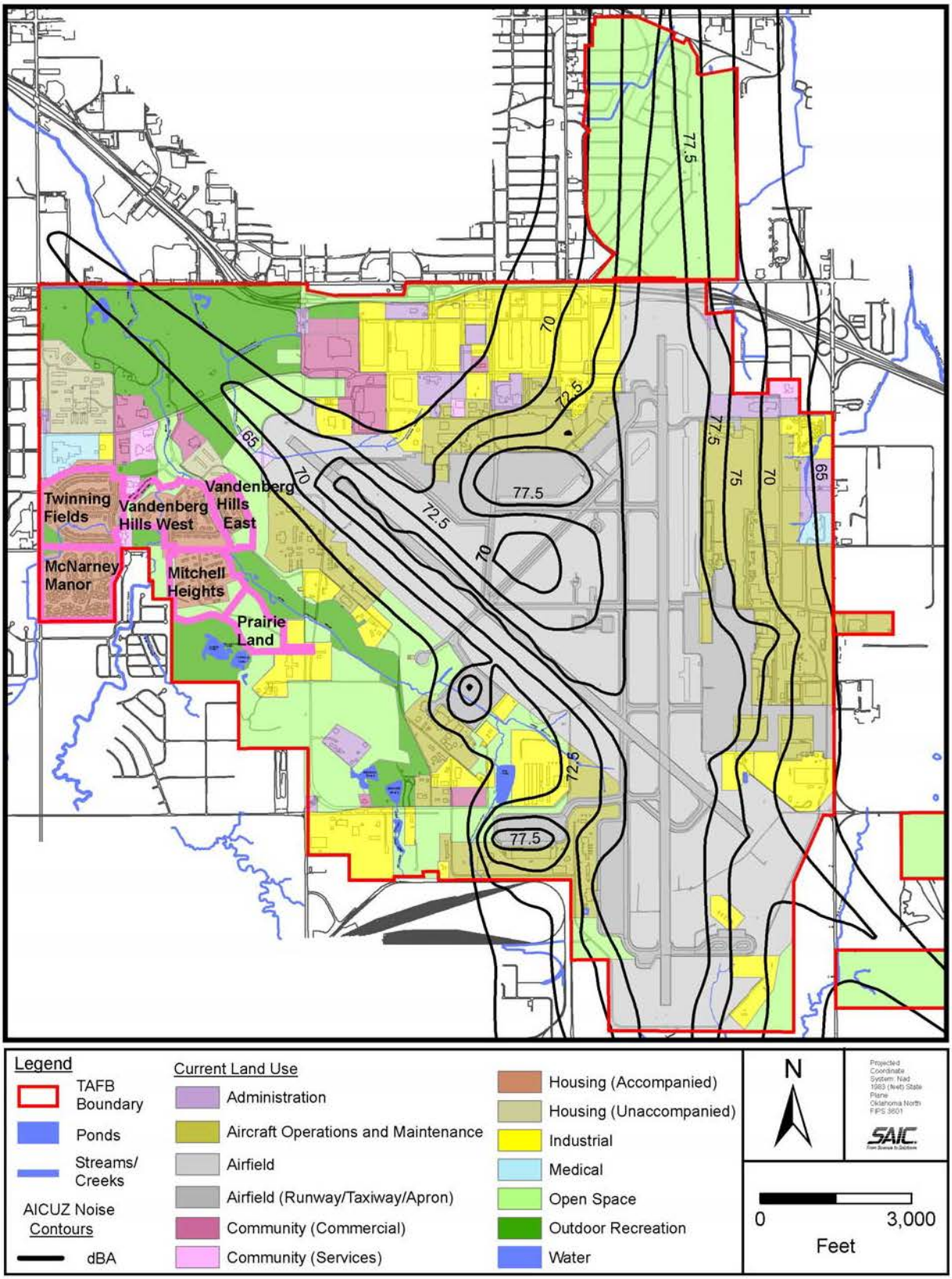

Figure 3-1. Aircraft Noise Contours and Land Use

Construction noise was evaluated for the proposed building projects. The Roadway Construction Noise Model (RCNM) was used to determine potential noise generated by construction equipment that would be utilized during the projects. This model is the Federal Highway Administration's national model for the prediction of construction noise (U.S. Department of Transportation, 2006). Types of machinery commonly used in grading and construction projects were analyzed at various distances from the construction site to evaluate potential noise impacts. Table 3-2 summarizes sound levels from typical equipment used on construction sites.

Construction noise was evaluated for one construction site and may be applied to each of the sites individually for potential negative effects to sensitive receptors in the vicinity of the construction site. Noise levels were evaluated for receptors at 100-foot increments.

Table 3-2. Typical Equipment Sound Levels

Equipment	Sound Level (in dBA) Under Indicated Operational Mode		
	Idle Power	Full Power	Moving Under Load
Dozer	63	74	81
Dump Truck	70	71	74
Excavator	62	66	72
Forklift	63	69	91
Front-end loader	60	62	68
Grader	63	68	78
Sweeper	64	76	85
Tractor-trailer	67	78	77

3.2.3.1 No Action Alternative

Under the No Action Alternative, elevated noise levels would occur from demolition activities. The noise analysis was completed for the demolition of one house and the corresponding noise levels were calculated at 100-foot increments from the site (Table 3-3). Typical demolition machinery was used in the analysis, such as a bull dozer, front end loader, dump truck, and grader.

Receptors would experience noise levels of 63.7 dBA over an eight-hour period at 500 feet from the demolition site. Receptors within 400 feet or closer to the demolition site would experience sound levels greater than 65 dBA, which has a higher tendency to cause annoyance to receptors. These noise levels would cause a temporary increase in the sound environment during demolition activity and, following completion sound levels, would return to previous baseline levels.

Table 3-3. Sound Levels at Various Receptor Distances from Demolition Activity

Distance to Receptor (ft)	Sound Level ($L_{eq(8)}$)
100	77.7
200	71.7
300	68.2
400	65.7
500	63.7

$L_{eq(8)}$ = Day-Night Average Sound Levels averaged over an 8-hour period.

Tinker Elementary School is located in the central portion of the Tinker AFB MFH area and less than 500 feet from the nearest MFH unit. As a result, demolition of units within close proximity to the school could be a source of annoyance and could interrupt daily learning activities. As a result, demolition planning should take into consideration unit proximity to the school, and activities for these units should either be avoided or scheduled to minimize interruption of the school day (e.g., during school vacations).

Completing demolition activities during normal working hours of the work week would further decrease the potential for annoyance to any residents within 400 feet of the site. No adverse impacts are expected from the No Action Alternative provided demolition activities account for proximity to the elementary school and are conducted during normal business hours and on the weekday.

3.2.3.2 Alternative 1: Minimum Development Scenario (Air Force Preferred Alternative)

Renovations would consist primarily of interior upgrades and have little effect on ambient noise levels. During the first year of the project, there is more potential for public annoyance from project activities, particularly for receptors within 500 feet of the project site. It was assumed that more machinery would be used in the same area during the first year of the project, thus increasing the sound levels generated. Receptors 500 feet from the project site would experience noise levels of 68.5 dBA and 68.7 dBA from demolition and construction activities, respectively. During the following years, receptors at distances greater than 400 feet would experience a slight increase in the sound environment during construction and demolition activities. Potential for noise impacts associated with the elementary school would be similar to the No Action Alternative. To minimize public annoyance project activities should account for unit proximity to the elementary school and be completed during business hours of the work week.

Table 3-4 summarizes the noise levels expected from both demolition and construction activities. It is assumed that 30 percent of the project would be completed in the first year and 10 percent per year would be completed each year thereafter. Thus, it was assumed that more demolition and construction machinery would be utilized during the first year. It was also assumed that demolition and construction activities would not occur simultaneously at a site.

Table 3-4. Sound Levels from Demolition and Construction Activities for Alternatives 1 and 2

Distance to Receptor (ft)	Sound Level ($L_{eq(8)}$) Year 1	Sound Level ($L_{eq(8)}$) Years 2-8
Demolition		
100	82.5	77.7
200	76.4	71.7
300	72.9	68.2
400	70.4	65.7
500	68.5	63.7
Construction		
100	82.7	77.9
200	76.7	71.9
300	73.1	68.4
400	70.6	65.9
500	68.7	63.9

Note: The noise levels are for the equipment working at a single site (i.e., one bulldozer, one front end loader, etc.).

During the first year of the project, there is more potential for public annoyance from project activities, particularly for receptors within 500 feet of the project site. It was assumed that more machinery would be used in the same area during the first year of the project, thus increasing the sound levels generated. Receptors 500 feet from the project site would experience noise levels of 68.5 dBA and 68.7 dBA from demolition and construction activities, respectively. During the following years, receptors at distances greater than 400 feet would experience a slight increase in the sound environment during construction and demolition activities. Potential for noise impacts associated with the elementary school would be similar to the No Action Alternative. To minimize public annoyance project activities should account for unit proximity to the elementary school and be completed during business hours of the work week.

3.2.3.3 Alternative 2: Maximum Development Scenario

Alternative 2 would require the demolition of all 694 existing housing units and the construction of 660 new housing units. The sound levels from demolition and

construction activities for each site are summarized in Table 3-4. Receptors would experience increased noise levels within 500 feet of the project site during the first year of the project. During the following years, the levels would be greater than 65 dBA at 400 feet of the site. This alternative would require the removal and rebuilding of more structures, resulting in an increased potential to annoy larger numbers of residents depending on the developer's use of the land and development plan. Potential for noise impacts associated with the elementary school would be similar to the No Action Alternative. To minimize public annoyance, project activities should account for unit proximity to the elementary school, and demolition and construction activities should be conducted during normal business hours of the work week. Following the completion of the project, the noise levels would return to baseline levels. No adverse impacts are expected with the implementation of Alternative 2 provided activities are completed during business hours of the work week.

3.3 HAZARDOUS MATERIALS AND WASTE/IRP

3.3.1 Definition of the Resource

Hazardous materials listed under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Emergency Planning and Community Right-to-Know Act (EPCRA) are defined as any substances that, due to quantity, concentration, or physical, chemical, or infectious characteristics, may present substantial danger to public health, welfare, or the environment. Examples of hazardous materials include petroleum products/fuels and paint-related products.

Hazardous wastes listed under the Resource Conservation and Recovery Act (RCRA) are defined as any solid, liquid, or contained gaseous or semisolid waste, or any combination of wastes that pose a substantive present or potential hazard to human health or the environment. In addition, hazardous wastes must meet either a hazardous characteristic of ignitability, corrosivity, toxicity, or reactivity under 40 CFR 261 or be listed as a waste under 40 CFR 261.

The affected resources also include the potential presence in structures of *asbestos* or *lead-based paint*, since *asbestos* and *lead-based paint* are specific types of hazardous materials. Asbestos is a naturally occurring mineral that is a very effective heat and sound insulator. Consequently, it has been used in many buildings as a fire and noise retardant. However, asbestos has been linked to several diseases, including lung cancer, and has not been used in construction materials since 1987. Friable (brittle)

asbestos becomes hazardous when fibers become airborne and are inhaled. Asbestos is regulated by the EPA with the authority promulgated under the Occupational Safety and Health (OSH) Act, 29 USC 669 et seq. Emissions of asbestos fibers to ambient air and potential issues associated with exposure to asbestos from renovations and demolitions are regulated under Section 112 of the Clean Air Act (the National Emissions Standards for Hazardous Air Pollutants (NESHAP)). The State of Oklahoma has adopted the NESHAP regulations (OAC 252:100, 41-15) for asbestos control in Oklahoma.

Lead was used as an additive and pigment in paints for many years and has been associated with central nervous system disorders, particularly among children and other sensitive populations. Exposure to lead is usually through inhalation during renovations and demolition activities or through ingestion of paint chips or lead-contaminated drinking water. The use of lead-based paint declined after 1978 when the Consumer Product Safety Commission (CPSC) lowered the allowable lead content in paint to 0.06 percent by weight (trace amount). The DoD implemented a ban of lead-based paint use in 1978.

Lead contamination is regulated by the Toxic Substances Control Act (TSCA), Titles I and IV, and OSH Act. Additionally, the Lead-Based Paint Poisoning Prevention Act (42 USC 4821 et seq.), as amended by the Residential Lead-Based Paint Hazard Reduction Act of 1992 (Public Law 102-550, also known as Title X), requires that lead-based paint hazards in some federal structures be identified and eliminated. Oklahoma Rule OAC 252:110 governs accreditation requirements and work practice standards for lead paint abatement activities.

The affected resources may also include Air Force *Installation Restoration Program (IRP)* sites. The IRP is used by the Air Force to identify, characterize, clean up, and restore sites contaminated with toxic and hazardous substances, low-level radioactive materials, petroleum, oils, lubricants, or other pollutants and contaminants. The IRP has established a process to evaluate past disposal sites, control the migration of contaminants, identify potential hazards to human health and the environment, and remediate the sites.

An IRP site is an area of contamination that poses a potential threat to human health or the environment based on reliable information. An IRP site, once designated, will typically be listed as a further action site or solid waste management unit in regulatory agreements. A solid waste management unit is any discernible unit at which solid wastes have been placed at any time, irrespective of whether the unit was

intended for the management of solid or hazardous waste. Such units include any area where solid wastes have been routinely and systematically released.

Analysis Methodology

The analyses focused on how and to what degree the alternatives affect hazardous materials usage and management and hazardous waste generation and management. Potential impacts related to hazardous materials (including asbestos and lead) and hazardous wastes/IRP were analyzed based on the following criteria:

1. Exposure to hazardous materials that could pose unique or unusual health or safety risks over those posed by products currently used at the installation. Also, generation of hazardous wastes types or quantities that could not be accommodated by the current management system, as could result from the generation of waste classified as acute, which are very toxic and can be fatal to humans in small amounts, or generation of waste in such quantities that it would affect the current hazardous waste generator classification of the installation.

   The analysis methodology utilized was to identify activities associated with the Proposed Action and, using process knowledge or other available data, predict the type of hazardous materials that would likely be used and the quantity of hazardous waste that would be generated from these activities. These data were compared to current usage, generation rates, waste types, and Base capability to manage these materials.

2. Potential for adverse impacts to an existing IRP site, as could be caused by disturbing the ground in a site identified as having contaminated soil, or by causing damage to existing site remediation infrastructures (e.g., sampling wells) from proposed activities. The analysis methodology utilized was to identify existing IRP sites and compare the location of these sites with the location of proposed activities. Where overlaps occurred, IRP site-specific conditions, such as existence of land use controls, were analyzed against proposed activities to assess potential impacts.

3.3.2 Existing Conditions

Hazardous Materials and Hazardous Wastes – A variety of products containing hazardous materials are used by Tinker AFB as part of day-to-day operations. Hazardous material usage is tracked by means of a computerized Hazardous Materials Management System (HMMS). The current hazardous material management program

is focused on minimizing hazardous material use/quantities while still supporting Air Force missions. This is achieved through pollution prevention alternatives that involve inventory reduction, product substitution, elimination, recycling, and reuse (U.S. Air Force, 2005b).

Housing areas contain no industrial facilities; however, residents may purchase cleaning supplies and other chemicals for personal use that contain constituents that are classified as hazardous materials. These products are typical of those found in a household and include gasoline, motor oils, paints and thinners, small volumes of pesticides, cleaning solvents, and janitorial supplies. The use of these chemicals is not tracked by the installation, and the stored quantity of these materials is unknown.

Small quantities of hazardous materials including pesticides, petroleum, oils, and lubricants (POLs), paints and paint-related products, are also stored at the KIRA, Inc. housing maintenance facility in the Mitchell Heights housing area. Pesticides are managed according to the installation's Pesticide Management Plan (U.S. Air Force, 2003).

Routine household hazardous wastes are generated in MFH areas including batteries, fluorescent bulbs, pesticides, and paint-related products. Used oil or other automotive fluids may also be generated as part of "do-it-yourself" vehicle maintenance activities. A family housing brochure provided to all incoming residents contains guidance on proper disposal of household hazardous waste. The Base also hosts an annual household hazardous waste turn-in day for housing residents.

At the KIRA, Inc. housing maintenance facility, fluorescent light tubes are collected from MFH for disposal. Any hazardous wastes that are generated are handled in accordance to the installation's Hazardous Waste Management Plan (U.S. Air Force, 2003).

IRP Sites – Tinker AFB has a total of 40 IRP sites, such as landfills, underground storage tanks, waste pits, fire training areas, and spill sites. Four current or former IRP sites are located within the boundary of MFH areas, including the undeveloped Prairie Land area: Multiple Creeks Site OT020, Crutcho Creek Site OT009, CG037, and CG038.

Multiple Creeks Site OT020 includes Soldier Creek, Kuhlman Creek, Crutcho Creek, and Elm Creek. This site was closed in 1991 and is no longer an IRP site. Crutcho Creek IRP Site OT009 is scheduled for project closure in 2008 and is currently under a long-term monitoring program for surface water, shallow sediment (0–1 foot), and deep sediment (1–3 feet). This monitoring is part of a program to ensure that no

long-term risks to human health or the environment developed at the sites due to former accidental spills or from leachate from adjacent IRP sites (U.S. Air Force, 2003).

The boundary of CG037 includes the northeast corner of Vandenberg Hills and Mitchell Heights, as delineated in the Tinker AFB IRP Management Action Plan (U.S. Air Force, 2004a). The boundary of CG038 covers most of the property associated with Prairie Land. CG037 and CG038 consist of underground contaminant plumes of volatile organic compounds (VOC) stemming from various former sources on the installation. Note: The actual groundwater contaminant plume associated with these two IRP sites is a limited area when compared to the total area delineated for these sites in the Management Action Plan (see discussion below). The primary organic contaminant in groundwater is the chlorinated hydrocarbon compound trichloroethene (TCE); secondary organic contaminants include cis-1,2-dichloroethene (cis-1,2-DCE), 1,2-dichloroethane (1,2-DCA), and vinyl chloride.

The contaminant plumes for CG037 and CG038 are contained primarily within the Upper Saturated Zone (USZ) and, to a lesser extent, the overlying Hennessey Water-Bearing Zone (HWBZ) and underlying Lower Saturated Zone (LSZ) (U.S. Air Force, 2003).

Figure 3-2 shows the location of all four IRP sites, while Figure 3-3 and Figure 3-4 depict the extent and concentrations associated with TCE contaminant plumes in the USZ and LSZ at CG037 and CG038, respectively.

A long-term monitoring (LTM) program has been recommended for Site CG037 to ensure the effectiveness of the recommended remedy (natural attenuation) and to provide assurance that the monitored natural attenuation (MNA) component of the remedy is protective. At the conclusion of the first five-year LTM period (2003-2008), the results of the LTM program will be evaluated in a comprehensive MNA progress review to: (1) evaluate the ability of MNA to prevent unacceptable migration of chlorinated aliphatic hydrocarbon (CAH) contaminants, such as TCE, cis-1,2-DCE, and 1,2-DCA, toward Base production wells, (2) re-examine the rates of chlorinated solvent degradation for the site and determine how MNA is impacting the rate of CAH destruction, and 3) evaluate the success of the pilot testing. The recommended locations, frequencies and analytical protocol for the LTM program may be changed following the five-year evaluation, as well as in the more distant future based on LTM results. Additional monitoring wells may be required depending on monitoring results (U.S. Air Force, 2003).

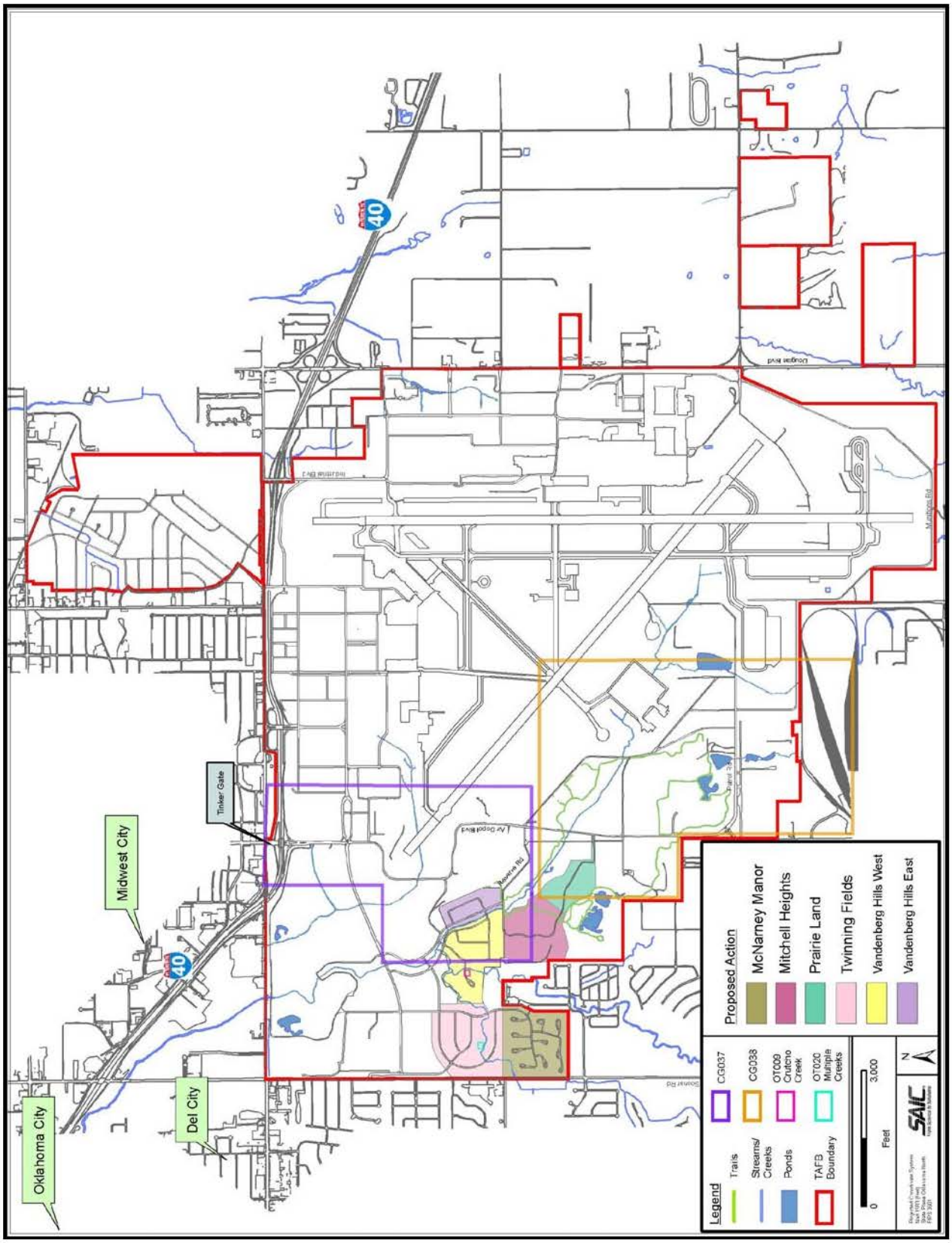

Figure 3-2. Location of IRP Sites in Relation to Housing Areas

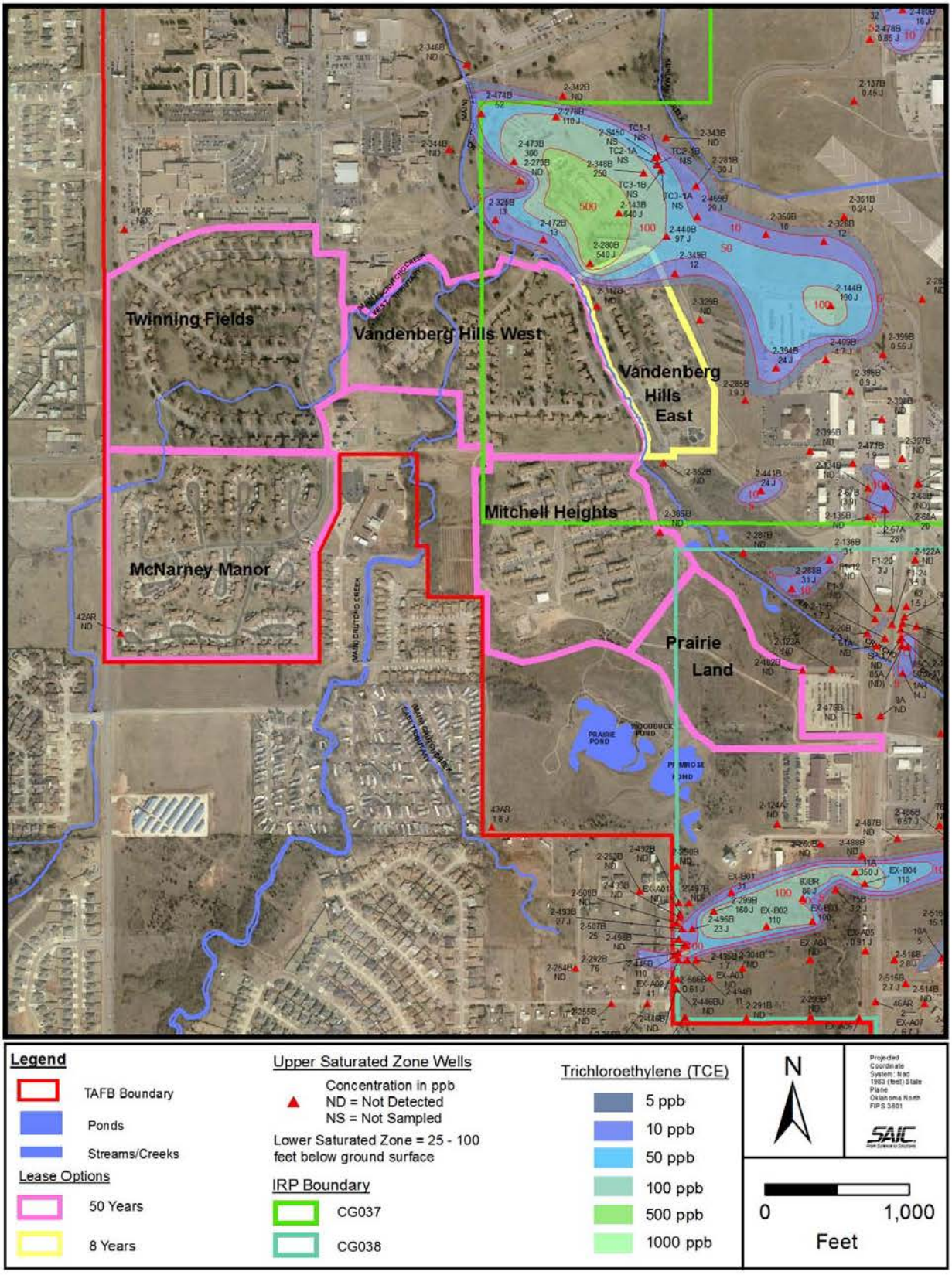

Figure 3-3. TCE Plume Concentrations in USZ

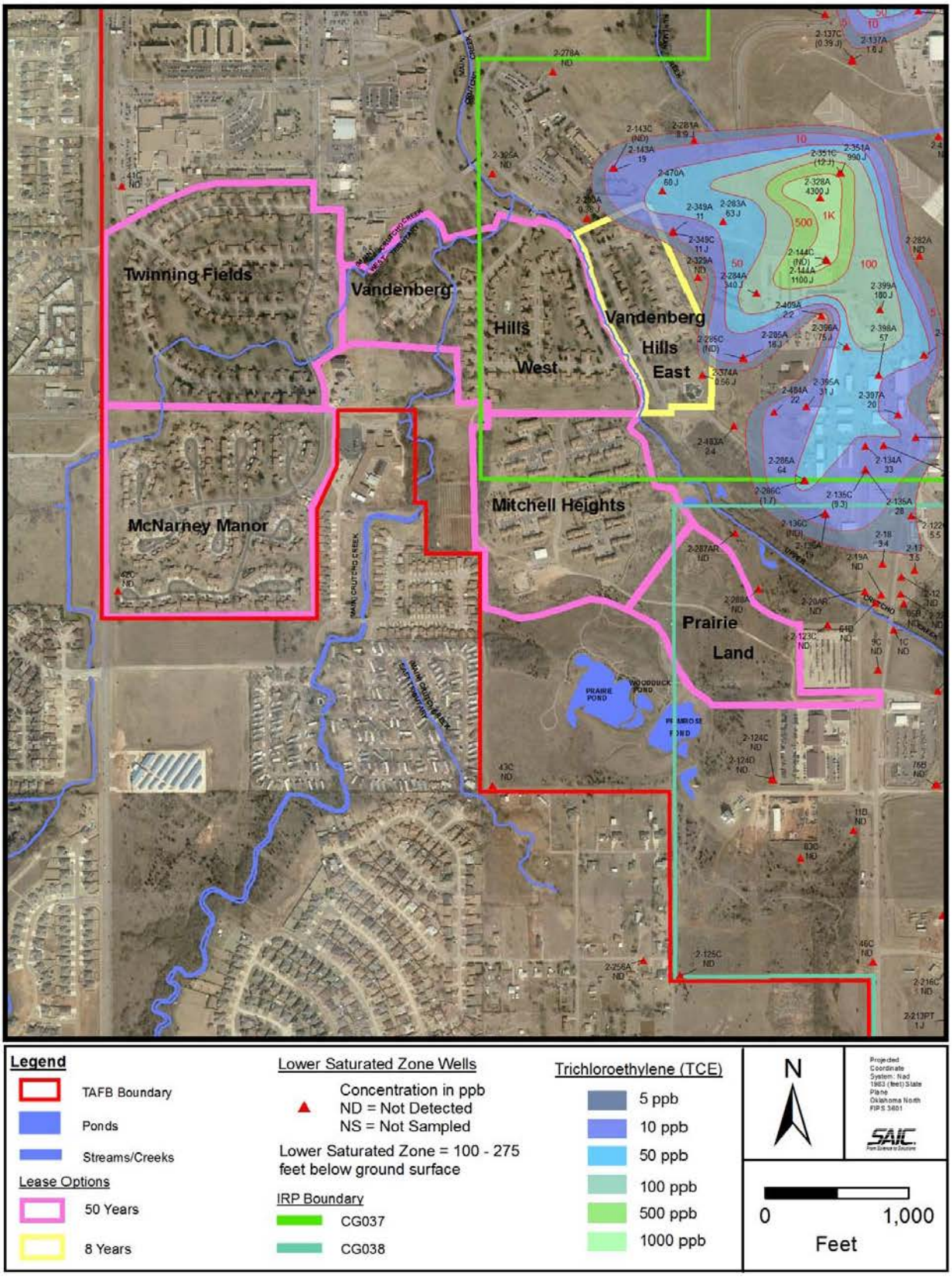

Figure 3-4. TCE Plume Concentrations in LSZ

CG038 is currently undergoing groundwater pumping and treatment. The following additional remedial methods will likely be added soon: installation of a permeable reactive barrier, increased pumping and treatment, in-situ treatment, and LTM (U.S. Air Force, 2003).

Asbestos-Containing Materials (ACM) – Instead of conducting a comprehensive ACM survey, Tinker AFB has relied on an approach of surveying areas where renovations or demolitions are planned. All MFH units were built in an era when the use of ACM was common, and ACM abatement activities have been conducted in these areas. During renovation activities in the Twining Fields neighborhood in November 2003, a contractor discovered asbestos encapsulated by dry board in the washer and dryer area of the housing unit. Additionally, ACM tested positive from glue in the flooring of the units (U.S. Air Force, 2003; U.S. Air Force, 2007b).

Tinker AFB maintains a computerized database system to support the management of ACM. The database supports activities that include asbestos physical survey data (e.g., building number, survey date, inspector, location/functional space, material type/description, and laboratory analysis results). The database provides environmental staff with on-demand data for managing ACM (U.S. Air Force, 2007b).

The Base manages asbestos in-place where possible, removing it only when there is a threat to human health or the environment or when it is in the way of construction or demolition. Removal and disposal of asbestos is carried out in strict compliance with all applicable federal, state, and local laws, rules, regulations, and standards. Although considered a solid waste, C&D debris must be characterized in accordance with RCRA characterization requirements to determine whether to dispose of it as solid waste or hazardous waste.

Lead-Based Paint – Older structures on the Base that have multiple layers of older paint are potential sources of lead. MFH areas at Tinker AFB built prior to 1978 include the Twining Fields, Vandenberg Hills, and McNarney Manor neighborhoods. The MFH Office issues a packet containing a lead-based paint memorandum, lead-based paint hazards disclosure information, and an EPA and U.S. CPSC document entitled "Protect Your Family From Lead in Your Home" to all MFH occupants in the 5000 series units (Twining Fields and Vandenberg Hills). The memorandum states that lead-based paint has been found on carport partitions and metal posts; storage room doors and door frames; carport and porch ceilings; window frames and sills; rain gutter downspouts; and gas regulator lines in backyard areas. Corrective actions to remediate the lead-based paint from the porch ceilings included encapsulation with plywood,

caulking, and painting. Additionally, lead-based paint was removed from the window frames and sills. No lead-based paint was found in units at McNarney Manor and Mitchell Heights (U.S. Air Force, 2003).

As with ACM, Tinker AFB manages lead-based paint in-place where possible, removing it only when there is a threat to human health or the environment. Removal and disposal of lead-based paint is carried out in strict compliance with all applicable federal, state, and local laws, rules, regulations, and standards.

3.3.3 Environmental Consequences

3.3.3.1 No Action Alternative

Hazardous Materials and Hazardous Wastes – Demolition of up to 34 housing units would involve the removal of the existing structure, to include the foundation and other impervious areas (driveways, patios, sidewalks, etc.) and the leveling of the soil. Equipment associated with demolition activities would require the use of hazardous substances such as petroleum, oil, and lubricants. These materials are currently used in day-to-day operations at Tinker AFB and would pose no unique chemical hazards to project personnel.

Use of these substances for fueling and equipment maintenance would create a potential for minor spills and releases. As part of standard operating procedure (SOP) to minimize potential spills, a spill control plan would be developed and implemented, personnel would be trained on rapid response in the event of a fuel spill or a hazardous material release, and appropriate spill response equipment would be located on site.

Demolition of housing units would not be expected to generate RCRA hazardous wastes; however, demolition of older units could result in the production of minor amounts of lead-based paint or ACM wastes (see following sections). All waste resulting from demolition activities would be managed appropriately. Wastes that cannot be recycled would be disposed of in a manner approved by the EPA at licensed facilities.

No adverse impacts would be expected from hazardous materials usage or hazardous waste disposal under the No Action Alternative.

IRP Sites – As Figure 3-3 indicates, the TCE contaminant plume for IRP Site CG037 in the USZ, which extends from approximately 70 to 110 feet below land surface in the southwestern portion of the installation, is confined to the uppermost northern portion of Vandenberg Hills East. The highest TCE concentration underlying housing

in this area is approximately 100 parts per billion (ppb). The CG037 contaminant plumes in the LSZ, which underlies the USZ-LSZ aquitard, extend slightly into the northeast and east portions of Vandenberg Hills East (Figure 3-4). The highest TCE concentration in these areas is approximately 10 ppb. The TCE contaminant plume associated with CG038 does not extend below any of the housing areas in either the USZ or LSZ.

Multiple Creeks Site has been closed as an IRP site (i.e., no further action is required) and any impacts associated with Crutcho Creek IRP Site OT009 would be limited to the water quality in the creek itself. There are approximately eight IRP groundwater monitoring wells in or adjacent to four of the housing areas: Vandenberg Hills East, Mitchell Heights, McNarney Manor, and Prairie Land (see Figure 3-5).

Existing conditions at IRP sites would have no adverse impacts on residents or construction workers. As is currently the case, housing residents would not be exposed to contaminated groundwater. Impacts to construction workers would be avoided because soil disturbance associated with demolition activities would be limited to the land surface (and near surface) and extend only to the immediate footprints of existing housing units, avoiding any exposure to contaminated groundwater. Construction activities would also avoid disturbing existing groundwater monitoring wells when possible. Construction activities on or near an existing well would require prior coordination with Environmental Management Division (72 ABW/CEV) personnel. Therefore, impacts to existing IRP sites would not be expected under this Alternative.

ACM – Asbestos debris may be generated as a result of the demolition of housing units. The specific units that would be demolished as part of this alternative have not been identified at this time. However, debris generated as a result of any demolition activities would be characterized for the presence of asbestos to determine whether to dispose of it as solid waste or hazardous waste. Proper disposal of asbestos wastes would be conducted as directed by NESHAP (40 CFR 61.40–157). Contractor personnel would have to be trained and certified. Also, the contractor would need to submit an asbestos work/disposal plan for any demolition. Transport and disposal documentation records, including signed manifests, would also be required. Implementation of these management requirements would mitigate any adverse impacts resulting from ACM.

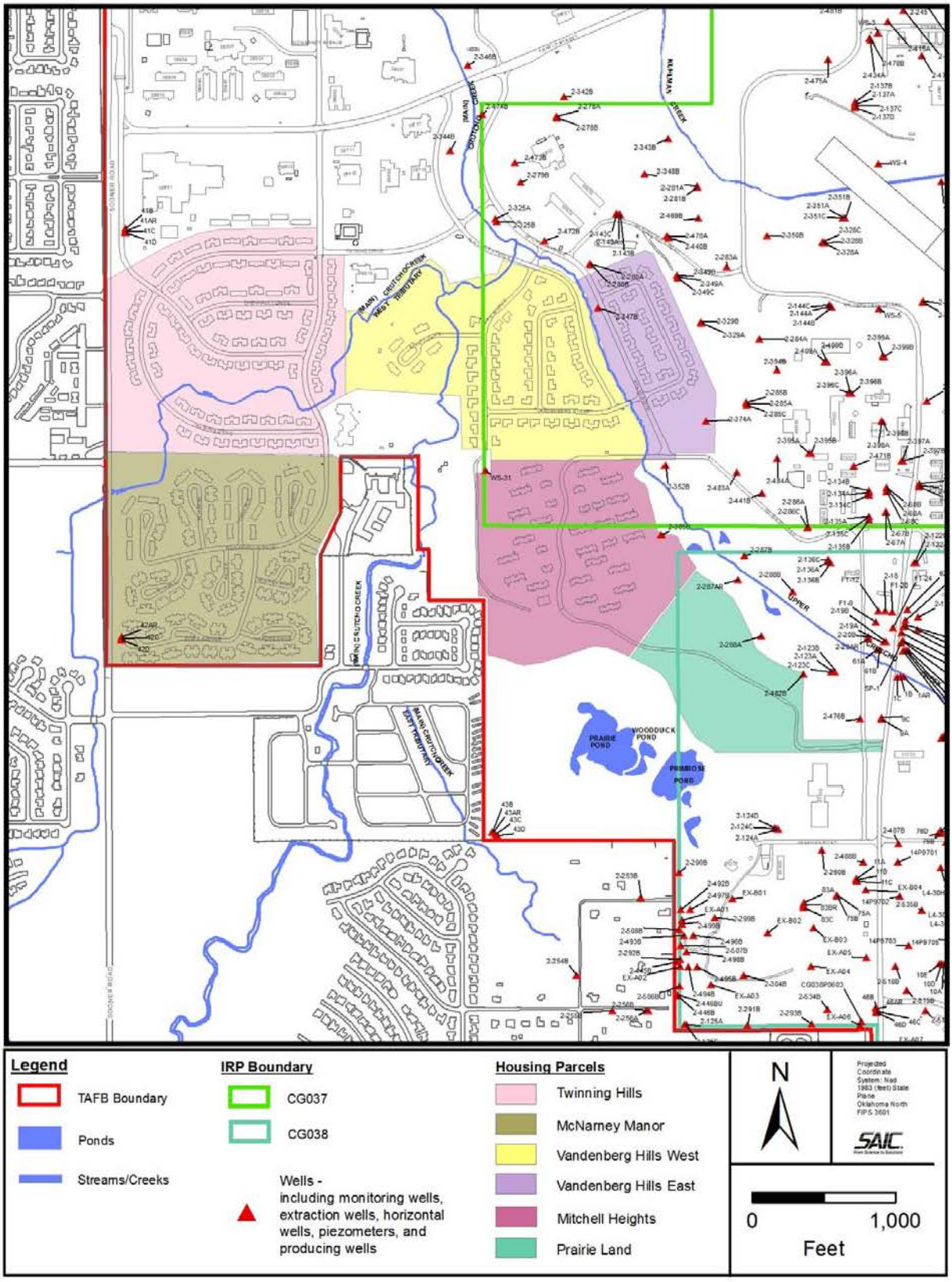

Figure 3-5. Location of Groundwater Monitoring Wells

Lead-Based Paint – Lead-based paint debris may be generated as a result of the demolition of housing units. Materials containing lead-based paint have been found in the Twining Fields and Vandenberg Hills areas. The specific units that would be demolished as part of this alternative have not been identified at this time. However, demolition of structures known to contain lead-based paint would be conducted in accordance with applicable regulations.

Proper disposal of lead-containing wastes would also be conducted in accordance with state and federal regulations, including TSCA and OSH Act. Further, these wastes would be accompanied by a waste manifest and disposed of at a state-approved facility. The appropriate management of lead-based paint is not expected to create adverse impacts.

3.3.3.2 Alternative 1: Minimum Development Scenario (Air Force Preferred Alternative)

Impacts associated with hazardous materials and waste, IRP sites, ACM, and lead-based paint would be similar to those described under the No Action Alternative, although more demolition, construction, and renovation activities would result in more use of hazardous materials, hazardous waste generation, potential to impact to IRP sites, and generation of ACM and lead-based paint debris. However, the same SOPs and management procedures utilized to minimize impacts as described under the No Action Alternative would apply, and no adverse impacts would be expected with regard to hazardous materials and waste, IRP sites, ACM, and lead-based paint resulting from Alternative 1.

3.3.3.3 Alternative 2: Maximum Development Scenario

Alternative 2 has similar site conditions to Alternative 1 with regard to hazardous materials and hazardous wastes/IRP sites, with the exception that activities under this alternative would be limited to demolition and construction (no renovation). Therefore, there are no potential impacts to hazardous materials or hazardous waste/IRP sites for Alternative 2 not already described under Alternative 1.

3.4 AIR QUALITY

3.4.1 Definition of the Resource

Air quality includes sources of air emissions, pollutant types, emission rates and release parameters, proximity to other emissions sources, and local conditions. Air

quality is determined by the type and amount of pollutants emitted into the atmosphere, the size and topography of the air basin, and the prevailing meteorological conditions. The levels of pollutants are generally expressed on a concentration basis in units of parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$). For this air quality analysis, the ROI used centers on the county (Oklahoma County) in which the construction and demolition actions occur.

The baseline standards for criteria pollutant concentrations are the National Ambient Air Quality Standards (NAAQS) and state air quality standards. These standards represent the maximum allowable atmospheric concentration that may occur and still protect public health and welfare.

Based on measured ambient air pollutant concentrations, the EPA designates areas of the United States as either meeting the NAAQS or not. Those areas demonstrating compliance with the NAAQS are considered "attainment" areas, while those that are not are known as "non-attainment." Those areas that cannot be classified on the basis of available information for a particular pollutant are "unclassifiable" and are treated as attainment until proven otherwise.

For the analysis of the alternatives, a threshold on an individual pollutant-by-pollutant basis was established. The criteria pollutants that were analyzed included: carbon monoxide (CO), nitrogen oxides (NO_x), particulate matter (PM) for both coarse (PM_{10}) and fine ($PM_{2.5}$) particles, sulfur dioxide (SO_2), VOC, and lead (Pb). The air quality analysis focused on construction and demolition activities.

In order to evaluate air emissions and their impact on the overall ROI, the emissions associated with the project activities were compared to the total emissions on a pollutant-by-pollutant basis for the ROI's 2002 NEI data. County emissions were obtained from the EPA 2002 National Emissions Inventory (NEI) (EPA, 2002). These data include emissions data from point sources, area sources, and mobile sources. *Point sources* are stationary sources that can be identified by name and location. *Area sources* are point sources whose emissions are too small to track individually, such as a home or small office building, or a diffuse stationary source, such as wildfires or agricultural tilling. *Mobile sources* are any kind of vehicle or equipment with a gasoline or diesel engine, such as an airplane or a ship. On-road and non-road are two types of mobile sources. On-road consists of vehicles such as cars, light trucks, heavy trucks, buses, engines, and motorcycles. Non-road sources are aircraft, locomotives, diesel and gasoline boats and ships, personal watercraft, lawn and garden equipment, agricultural and construction equipment, and recreational vehicles (EPA, 2006).

Potential significant impacts to air quality are identified as the total emissions of any pollutant that equals 250 tons per year or more emissions for that specific pollutant and does not exceed 10 percent of the total ROI's emissions for each pollutant as compared to the ROI's 2002 NEI data (Shipley Associates, 1995). The 250 tons per year criteria approach is used in the New Source Review (NSR) standards as an indicator for impact analysis for listed new major stationary sources (i.e., chemical process plant) in attainment areas for Prevention of Significant Deterioration (PSD), while the 10 percent criteria approach is used in the USEPA General Conformity Rule as an indicator for impact analysis for nonattainment and maintenance areas. Although Oklahoma County, Oklahoma, is attainment, the General Conformity Rule's impact analysis was utilized to provide a consistent approach to evaluating the impact of construction emissions.

To provide a conservative evaluation, the impacts screening in this analysis, used a more restrictive criteria than required in the General Conformity Rule. Rather than comparing emissions from construction activities to regional inventories (as required in the General Conformity Rule), emissions were compared to the individual counties potentially impacted, which comprise a smaller area.

The Air Conformity Applicability Model (ACAM) version 4.3.0, developed for the Headquarters (HQ) Air Force Center for Engineering and the Environment (AFCEE) and used by the Air Force for conformity evaluations, was utilized to provide a level of consistency with respect to emissions factors and calculations. The ACAM calculates air emissions from proposed federal actions in areas designated as non-attainment and/or maintenance for each specific criteria and precursor pollutant as defined in the NAAQS. ACAM was utilized to provide emissions for construction, demolition, grading, and paving activities by providing user inputs for each.

Tinker AFB operates under the constraints of a Title V permit; however, emissions associated with the construction and demolition activities will not affect the permitting status of the base. In addition, it should be noted that emissions that result solely from construction and demolition activities are not use in determining NSR/PSD applicability. Tinker AFB is currently in attainment status.

3.4.2 Existing Conditions

An air emissions inventory qualitatively and quantitatively describes the amount of emissions from a facility or within an area. Emissions inventories are designed to locate pollution sources, define the type and size of sources, characterize emissions

from each source, and estimate total mass emissions generated over a period of time, normally a year. These annual rates are typically represented in tons per year. Inventory data establishes relative contributions to air pollution concerns by classifying sources and determining the adequacy as well as the necessity of air regulations. Accurate inventories are imperative for the development of appropriate air quality regulatory policy.

For comparison purposes, Table 3-5 presents the EPA 2002 NEI data for Oklahoma County. The county data includes emissions data from point sources, area sources, and mobile sources, which have been previously described.

Table 3-5. Baseline Emissions Inventory for Oklahoma County

Source Type	Emissions (tons/year)					
	CO	NO_x	$PM_{2.5}$	PM_{10}	SO_2	VOC
Area Source	2,825	2,371	6,172	48,861	204	12,694
Non-Road	60,012	4,695	345	379	397	3,522
On-Road	207,192	22,547	408	572	974	16,068
Point Source	1,657	3,547	476	821	256	1,656
Total	**271,686**	**33,160**	**7,401**	**50,633**	**1,831**	**33,940**

Source: EPA, 2002

3.4.3 Environmental Consequences

3.4.3.1 No Action Alternative

As indicated in Section 2.5.1, it is reasonable to assume that the Air Force would demolish those units that are in disrepair, are the oldest, and/or do not meet current standards, which would be approximately 34 surplus units or 89,592 total square feet.

Demolition of structures involves two primary sources of emissions: destruction of the building and site removal of debris. Analysis developed individual emissions estimates from mechanical dismemberment, debris loading, and on-site truck traffic to remove debris. The individual calculations for these three events were added together to develop a recommended PM_{10} emissions factor based on the square footage of the demolished area. Based on 89,592 total square footage demolished (shown in Table 2-4 in Chapter 2), the PM_{10} emissions would be approximately 0.5 ton.

3.4.3.2 Alternative 1: Minimum Development Scenario (Air Force Preferred Alternative)

CO constitutes the majority of the criteria pollutant emissions from construction activities and the project overall. However, construction operations include more than just actual construction of the residential structures. It incorporates grading operations,

construction worker trips, stationary equipment (e.g., generators and saws), mobile equipment, residential architectural coatings, and acres paved. Approximately 90 percent of the total PM_{10} emissions for the project would be associated with grading activities during the early stages of each construction phase. PM_{10} and CO are the two primary pollutants of concern, constituting 76 percent of overall project emissions. A majority of the CO emissions would be associated with stationary equipment (e.g., saws and generators). Table 3-6 provides a detailed breakdown of the likely project emissions by year.

Table 3-6. Estimated Annual Project Emissions for Alternative 1 (Tons)

Year	CO	NO_x	SO_2	VOC	PM_{10}
1	2.11	7.93	0.80	0.84	239.55
2	130.98	37.61	4.33	11.56	2.98
3	130.98	37.45	4.33	11.31	2.98
4	130.98	37.45	4.33	11.31	2.98
5	130.98	37.45	4.33	11.31	2.98
6	130.98	37.45	4.33	11.31	2.98
7	130.98	37.45	4.33	11.31	2.98
8	62.80	17.96	2.07	5.40	1.43
Totals	**850.79**	**250.75**	**28.85**	**74.35**	**258.86**
Oklahoma County	271,686.00	33,160.00	1,831.00	33,940.00	58,034.00
Percentage of County Emissions	0.31%	0.76%	1.58%	0.22%	0.45%

As indicated in the table, the individual pollutant emissions from the project would not exceed 250 tons per year during any year of the project. The highest pollutant percentage is SO_2, which is approximately 1.58 percent of Oklahoma County's total SO_2 emissions based on the EPA 2002 NEI. Based on the criterion established, this alternative does not create a significant impact to air quality.

3.4.3.3 Alternative 2: Maximum Development Scenario

Similar to Alternative 1, CO would constitute the majority of the criteria pollutant emissions from construction activities and the project overall under Alternative 2. Approximately 92 percent of the total PM_{10} emissions for the project would be associated with grading activities during the early stages of each construction phase. PM_{10} and CO are the two primary pollutants of concern, constituting 77 percent of overall project emissions. A majority of the CO emissions would be associated with stationary equipment (e.g., saws and generators). Table 3-7 provides a detailed breakdown of the likely project emissions by year.

Table 3-7. Estimated Annual Project Emissions for Alternative 2 (Tons)

Year	CO	NO_x	SO_2	VOC	PM_{10}
1	5.42	20.40	2.07	2.17	609.94
2	259.43	75.06	8.66	22.77	5.95
3	259.43	74.77	8.66	22.19	5.95
4	259.43	74.77	8.66	22.19	5.95
5	259.43	74.77	8.66	22.19	5.95
6	259.43	74.77	8.66	22.19	5.95
7	259.43	74.77	8.66	22.19	5.95
8	124.39	35.85	4.15	10.65	2.85
Totals	**1,686.39**	**505.16**	**58.18**	**146.54**	**648.49**
Oklahoma County	271,686.00	33,160.00	1,831.00	33,940.00	58,034.00
Percentage of County Emissions	**0.62%**	**1.52%**	**3.18%**	**0.43%**	**1.12%**

With the exception of CO and PM_{10}, the individual pollutant emissions from the project would not exceed 250 tons per year during any year of the project and both do not exceed 10% of the ROI. Once construction activities associated with grading are complete, PM_{10} emission levels would fall below the 250 tons per year threshold. CO emissions would also drop once construction activities have decreased. Long-term adverse effects to regional air quality are not expected. Most of the emissions would occur from construction activities and would result in temporary and short-term increases in the region. Based on the criterion established, this alternative does not create a significant impact to air quality.

3.5 SAFETY

3.5.1 Definition of the Resource

This section addresses ground safety associated with the Proposed Action and alternative activities. Within the context of this EA, safety relates to issues associated with human activities and operation and maintenance activities that support the MFH privatization program. Specific issues include construction site safety. This section also addresses protection of children, as required by EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks (Protection of Children)*. EO 13045 was issued to identify and address issues that affect the protection of children. All federal agencies, the EO declares, must assign a high priority to addressing health and safety risks to children. The EO states that "…'environmental health risks and safety risks' mean risks to health or to safety that are attributable to products or substances that the child is likely to come in contact with or ingest (such as the air we breathe, the food we eat, the

water we drink or use for recreation, the soil we live on, and the products we use or are exposed to)."

3.5.2 Existing Conditions

Day-to-day construction operations and maintenance activities conducted at Tinker AFB are performed in accordance with applicable Air Force safety regulations, published Air Force Technical Orders, and standards prescribed by Air Force Occupational Safety and Health (AFOSH) requirements. Construction and demolition activities on the installation are required to have appropriate job site safety plans, which explain how job safety will be assured throughout the life of the project. Construction and demolition workers are also required to follow applicable OSHA requirements.

Children are more sensitive to some environmental effects than the adult population, such as airborne exposure to particulates from construction, safety issues with regard to equipment and the potential for trips, falls, and traps within structures being demolished, and noise. According to statistics from the 2000 census, approximately 1,163 children under age 18 live on the installation. Approximately 37 percent of the child population (430 children) is five years old or younger (U.S. Census Bureau, 2007). Consideration should also be given to the location of Tinker Elementary School; the school is located in the central portion of the Tinker AFB MFH area and less than 500 feet from the nearest MFH unit (Figure 2-1 in Chapter 2). The elementary school is composed of grade levels from pre-kindergarten through sixth grade with a total student population of 454 and total teacher population of 25 reported in 2005. Approximately 9 percent of the child population (40 children) is five years old (Oklahoma Schools, 2007).

3.5.3 Environmental Consequences

Impacts are assessed according to the potential to increase or decrease safety risks to installation and contractor personnel and the general public. The alternatives were considered to determine if additional or unique safety risks would be associated with their undertaking. If an activity indicated a major variance from existing conditions, it would be considered a safety impact. Analysis also focused on the exposure of children to the anticipated associated environmental effects.

The impacts would be associated with the potential for site-demolition and construction activities to pose risks to workers, installation personnel, or the general public. Additionally, heavy-equipment traffic would increase on roads in the family

housing areas during demolition and construction periods. This is potentially incompatible where pedestrian movement is commonplace and where children may be walking or playing especially during peak usage periods associated with the elementary school schedule.

Safety concerns associated with the demolition and construction activities may pose special risks to children. While demolition and construction activities would not use explosive or unique hazardous materials, other unique risks to children exist. For example, the project areas may be attractive to children for play, and children could find access to these sites. Additionally, children possess different physiologic and behavioral characteristics than adults that make them more vulnerable to environmental effects. The risks that could potentially be associated with the alternatives are exposure to asbestos and lead-based paint and safety concerns associated with noise from construction and demolition activities, since children are more sensitive to noise than adults.

3.5.3.1 No Action Alternative

Under the No Action Alternative, Tinker AFB would implement activities that would involve demolition activities of 34 housing units (Section 2.5.1). All activities and workers at construction sites would comply with OSHA standards and requirements. Workers would be required to conduct demolition activities in a manner that would not pose any risks to personnel at or near the action sites. All materials and equipment would be used in accordance with industry and regulatory standards. All demolition areas would be fenced to preclude public access. Given these measures, risks to personnel and the public, including children, would be minimized.

Hazardous materials including asbestos and lead-based paint would be removed from the action area. Children, as well as the community as a whole, would benefit from the elimination of potential exposure. The proper planning and implementation of responsible handling and disposal techniques would offset the potential impacts to any age group.

Noise associated with demolition activities would be intermittent and short in duration and would not contribute in any appreciable manner to the existing noise environment (Section 3.2). However, demolition of units within close proximity to the school could be a source of annoyance and could interrupt daily learning activities. As a result, demolition planning should take into consideration unit proximity to the school, and activities for these units should either be avoided or scheduled to minimize

interruption of the school day (e.g., during school vacations). While school activities could be affected, special safety or health risks to children from demolition noise under the No Action Alternative are not anticipated.

3.5.3.2 Alternative 1: Minimum Development Scenario (Air Force Preferred Alternative)

The impacts related to safety and protection of children under Alternative 1 would be similar to those of the No Action Alternative, although the overall scope of activities would be larger, and new units and recreational areas would be constructed. All activities and worker at the construction and demolition sites would be required to implement the same standards as described under the No Action Alternative. Again, demolition or construction of units within close proximity to the school could be a source of annoyance and could interrupt daily learning activities. As a result, demolition and construction planning should take into consideration unit proximity to the school, and activities for these units should either be avoided or scheduled to minimize interruption of the school day (e.g., during school vacations). The Air Force does not anticipate any adverse safety impacts from Alternative 1.

3.5.3.3 Alternative 2: Maximum Development Scenario

The impacts related to safety and protection of children under the Alternative 2 would be similar to those of Alternative 1. All activities and worker at the construction and demolition sites would be required to implement the same standards as described under the No Action Alternative. The Air Force does not anticipate any adverse safety impacts from Alternative 2.

3.6 UTILITY INFRASTRUCTURE

This section discusses utilities serving the existing and proposed project area, which include water supply, electricity, and natural gas. Additionally, this section identifies utility providers and the major attributes of utility systems in these areas such as existing capacity and existing demand. Utility locations with respect to the Proposed Action are shown on Figure 3-6.

3.6.1 Definition of the Resource

Within the context of this document, utilities refer to distribution and/or treatment systems and use of potable water, wastewater, stormwater, electricity, and natural gas.

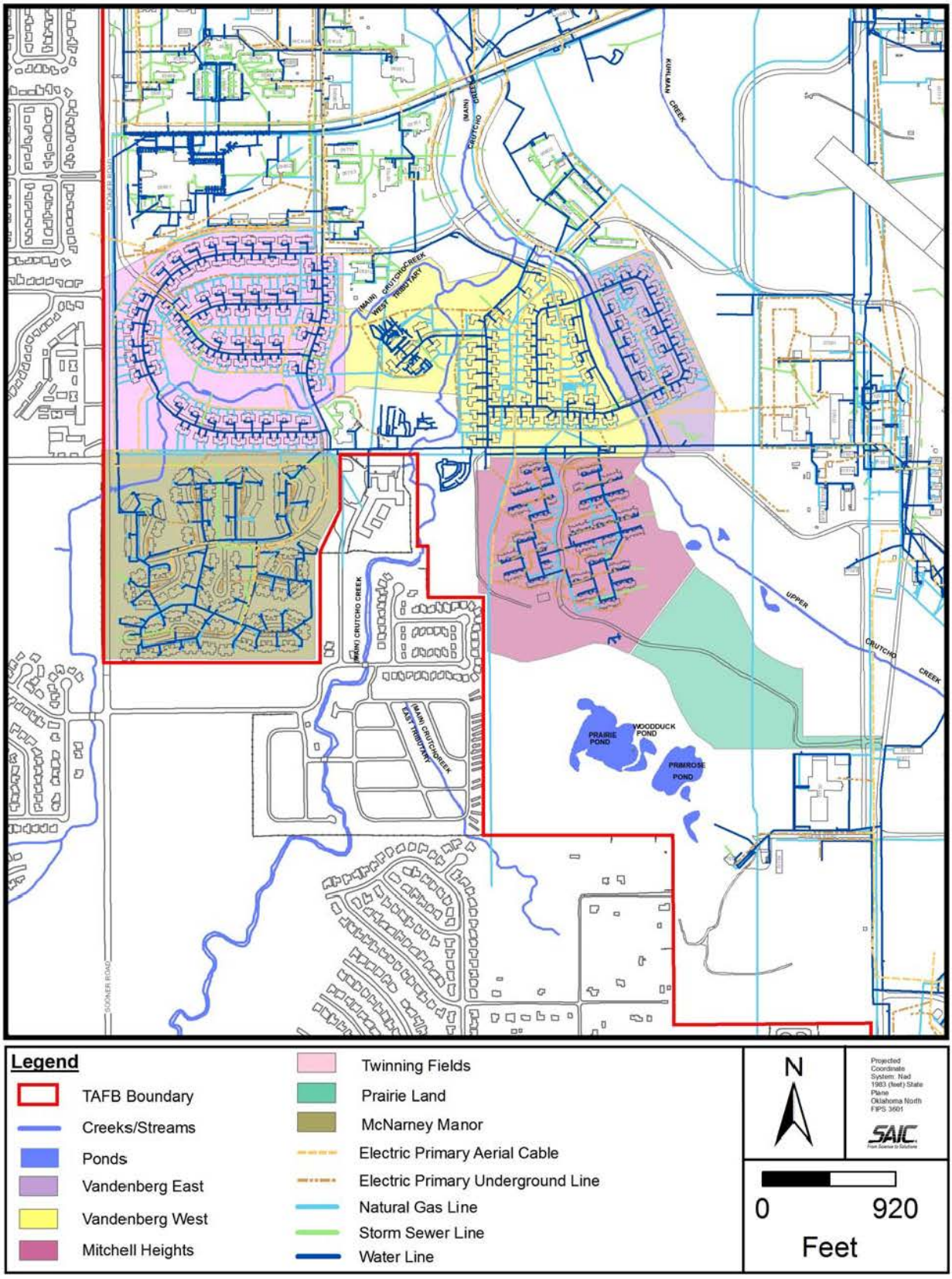

Figure 3-6. Utilities

3.6.2 Existing Conditions

Potable Water

Potable water used on Tinker AFB is obtained primarily from deep groundwater wells drawing from the producing zone, but the Base also has two tie-ins to the Oklahoma City water supply as a backup. The groundwater wells on Tinker AFB obtain water from the Garber-Wellington Aquifer (Creed, 2006). The water system serves 3,320 residential and 18,742 transient (employees that do not reside on Tinker AFB) people annually and is utilized during periods of peak demand (ODEQ, 2006). Environmental Management, Bioenvironmental Engineering Services, and Civil Engineering work together to manage the Base drinking water program (72 ABW/CEV, 2006). The water lines are owned and maintained by Tinker AFB.

Wastewater Treatment

Oklahoma City Publicly Owned Treatment Works (POTW) provides wastewater treatment and disposal for the Tinker AFB MFH units. Wastewater generated from bathrooms, showers, drinking fountains, etc. is collected via pipeline and conveyed to an Oklahoma City sewer line that goes to the North Canadian Plant Oklahoma City POTW (Rowden, 2007). The Oklahoma City POTW has an average daily flow rate of 45 millions of gallons per day (MGD) and a maximum daily permitted flow rate of 80 MGD (Davis, 2006).

Storm Water

Surface runoff is drained through a series of underground stormwater lines, culverts, and drainage ditches into Crutcho Creek (Rowden, 2007). The lines within the housing area are owned by the Air Force and maintained by Tinker AFB. The Air Force also maintains multiple storm drains and associated inlets and manholes.

Electricity

Tinker AFB utilizes electricity from the local power company, Oklahoma Gas and Electric (OG&E). Electricity is supplied to the Base via four lines, which are not being fully utilized. Electricity is mainly supplied to the MFH areas via overhead lines by nearby Substation 4, which is also operating below capacity (Rowden, 2007). Substation 4 is located in the north central part of the Base at the corner of Arnold Street and D Avenue.

Natural Gas

Natural gas is used primarily for facility heating on Tinker AFB and is supplied to the MFH area through natural gas lines that run along Arnold Street and Sooner Road (Figure 3-6).

3.6.3 Environmental Consequences

It is expected that the implementation of the Proposed Action and alternative activities would utilize approximately the same utility resources as the current MFH units. Therefore, the analysis focuses on assessing the ability of existing utility capacity to accommodate the minimal changes; identifying potential impacts related to connecting to existing utilities; and identifying and coordinating procedural requirements associated with establishing new utility infrastructure.

3.6.3.1 No Action Alternative

Under the No Action Alternative, there would be a decrease in the amount of utility infrastructure needed at the MFH area associated with a net reduction of 34 housing units. Potable water use, sanitary wastewater generation, and natural gas use would also decrease.

Demolition activities require the contractor go through the dig permit process that would require coordination with all utility providers to ensure that the contractor turns off all potentially affected utilities prior to removal activities. Coordination with utility providers is necessary to identify the exact location of utility lines prior to ground-disturbing activities associated with removal/demolition activities. Minor disruption of the utility infrastructure may also occur to the remaining housing units during demolition activities. However, these impacts are considered to be short-term. No adverse impacts to the utility infrastructure are anticipated with the implementation of the No Action Alternative.

3.6.3.2 Alternative 1: Minimum Development Scenario (Air Force Preferred Alternative)

Under Alternative 1, new recreational facilities could be constructed including the addition of 10 new tennis courts, five basketball courts, and five par courses. New utility infrastructure associated with these facilities would likely include water supply and electricity. Any new utility infrastructure associated with the construction of the new recreational facilities would have to be tied into the existing lines. Additionally, if

new MFH units are constructed in the currently undeveloped parcel (Prairie Land), the associated new utility infrastructure would have to be tied into the existing lines.

As with the No Action Alternative, demolition would occur, but on a larger scale (432 units would be demolished). In addition, renovation of existing units (up to 262) and construction of new units (up to 398) would occur. Demolition and construction activities would require the contractor go through the same dig permit process as described under the No Action Alternative.

Minor disruption of the utility infrastructure may also occur to the remaining housing units during demolition/construction activities. However, these impacts are considered to be short-term. It is estimated that 30 percent of the activities would be accomplished during the first year with the remaining activities to be accomplished in 10 percent increments over the remaining seven years. Impacts to the utility infrastructure and utility usage are anticipated to be minimal with the implementation of Alternative 1, with overall decreases in utility use on the installation associated with overall decreases in the number of housing units at the end state of the project.

3.6.3.3 Alternative 2: Maximum Development Scenario

Alternative 2 involves the same net decrease in the amount of utility infrastructure and the same demolition and construction parameters as Alternative 1 except that all current housing units would be demolished and a total of 660 new units would be constructed. With this exception, impacts to the utility infrastructure would be the same as described under Alternative 1. The project schedule would be the same as that described for Alternative 1. Consequently, impacts to the utility infrastructure and usage are anticipated to be minimal with the implementation of Alternative 2.

3.7 SOLID WASTE

3.7.1 Definition of the Resource

The Solid Waste Disposal Act (42 USC 3251 et seq.) established guidelines for solid waste collection, transport, separation, recovery, and disposal systems. RCRA (42 USC 6901 et seq.) amended this Act by shifting the emphasis from disposal to recycling and reuse of recoverable materials. The state of Oklahoma also has developed and implemented solid waste management statutes and regulations pertaining to solid waste facilities, state resource recovery and management programs, certification of resource recovery equipment, used oil and domestic sludge classification, utilization,

and disposal criteria. The ODEQ develops and adopts rules that govern proper management of solid waste in the state. Most of the responsibility for solid waste management under the law rests with local governments. In general, counties operate the solid waste disposal facilities that serve cities and towns within their jurisdictions. This project is subject to federal, state, local, and Air Force regulations because the Proposed Action will occur on Air Force property. If there are conflicting regulations or procedures and protocols, the most stringent should be applied.

Oklahoma regulates the operation of a variety of solid waste facilities. The facilities that require a permit under the Oklahoma statutes and rules include municipal solid waste and C&D landfills, composting, biomedical waste processing, and tire processing facilities, as well as transfer stations.

The regulatory framework consists of the requirements of the Oklahoma Solid Waste Management Act and the Oklahoma Solid Waste Management Regulations. Air Force regulatory requirements and management of solid waste are established by Air Force Policy Directive (AFPD) 32-70, *Environmental Quality*. AFPD 32-70 requires compliance with applicable federal, state, and local environmental laws and standards. For solid waste, AFPD 32-70 is implemented by Air Force Instruction (AFI) 32-7042. AFI 32-7042 requires that each installation have a solid waste management program that includes a solid waste management plan that addresses handling, storage, collection, disposal, and reporting of solid waste. AFI 32-7080 contains the solid waste requirement for preventing pollution through source reduction, resource recovery, and recycling. Solid waste management programs are managed by the 72 ABW/CEV on Tinker AFB. The project assumes that the developer(s) would be required (by lease agreement) to dispose of all C&D waste at existing state-approved commercial landfills over the project life-cycle including the construction and demolition phase(s).

3.7.2 Existing Conditions

Solid waste generated within the Oklahoma City area, including waste from Tinker AFB, is disposed of in landfills located in Oklahoma County. These landfills are operated and maintained by Oklahoma County or are privately operated. All landfills are permitted by the ODEQ. Because the project would occur in Oklahoma County, debris generated from construction, renovation, and demolition activities would be taken to an Oklahoma County landfill. Because the project involves the construction, renovation, or demolition of existing housing units at Tinker AFB, it is anticipated that the wastes generated from these activities would consist of C&D wastes. A portion of

these wastes may also contain hazardous materials such as asbestos as discussed in Section 3.3. Asbestos-containing building materials that may be encountered during implementation of this project include floor and ceiling tiles and shingles. Asbestos materials are regulated for disposal under the Oklahoma regulations in solid waste landfills that are specifically permitted to accept asbestos for disposal. The landfills within Oklahoma County include provisions for disposal of asbestos within their permits.

Within Oklahoma County, there are four municipal solid waste (MSW) landfills and one C&D landfill that serve Oklahoma City and surrounding areas (ODEQ, 2007). C&D waste is defined as asbestos-free waste, wood waste, yard waste, and residential lead-based paint waste generated during C&D projects (OAC 252:515, Section -1-2). Tinker AFB utilizes the Southeastern Oklahoma City Landfill, which is classified as a MSW landfill that also accepts C&D wastes (Kline, 2006). The Southeastern Oklahoma City Landfill is located approximately 4 miles southeast of Tinker AFB. It is a privately owned and operated landfill consisting of 163 acres and has a life expectancy of approximately 17 years (Bebick, 2006). The average annual amounts of waste taken to landfills in Oklahoma County from 2000 to 2006 are listed in Table 3-8.

Table 3-8. Construction and Demolition Debris Generated in Oklahoma County

Calendar Year	Southeast Oklahoma City Landfill (tons)
2000	446,960.18
2001	413,944.49
2002	404,434.93
2003	406,865.12
2004	383,864.57
2005	383,504.32
2006	444,450.62
Annual Average	**412,003.46**

3.7.3 Environmental Consequences

This section discusses potential impacts from solid waste generation, which includes C&D debris from demolition, renovation and construction activities associated with the evaluated alternatives. The wastes generated in this project are expected to consist of materials associated with housing structures (i.e., wood, plasterboard, roofing materials, etc.) as well as earth and concrete. Analysis focuses on assessing the ability of existing landfill capacity to accommodate the increased C&D waste from this project.

3.7.3.1 No Action Alternative

The C&D wastes generated from demolition activities as described in Section 2.5.1 was estimated using information provided in "*Characterization of Building-Related Construction and Demolition Debris in the United States*" (EPA, 1998) that includes solid waste generation rates for construction and demolition of residential and non-residential structures. Based upon the information provided in the EPA guidance, the average C&D generation rate for demolition of residential structures is 115 pounds (lbs) per square foot.

Using the generation rate of 115 lbs per square foot (EPA, 1998) and an estimated square footage of 89,592 requiring demolition, a total of 10,303,080 lbs or 5,152 tons of debris would be expected to be generated during demolition activities. The disposal of this material would result in an approximate 1.25 percent increase in the amount of C&D waste to the Southeastern Oklahoma City Landfill. This percent increase is based on a comparison to the annual average amount of waste taken to the landfill as shown in Table 3-8. As stated in Section 3.7.2, the Southeastern Oklahoma City Landfill has a life expectancy of approximately 17 years and has on average taken in 412,003.46 tons per year. Based upon this life expectancy, and average disposal rate, the quantity of waste generated from this alternative would result in shortening the life expectancy of the landfill by approximately 11 weeks based upon the annual average disposal rate. This impact does not consider any recycling of wastes generated from construction or demolition in order to establish the worst case conditions in evaluating the impact to landfill capacity.

3.7.3.2 Alternative 1: Minimum Development Scenario (Air Force Preferred Alternative)

Based upon EPA guidance (EPA, 1998), generation rates for activities described in Section 2.5.2 include:

- Demolition of residential structures – 115 lbs per square foot.
- Renovation of residential structures – 24.05 lbs per square foot.
- Construction of residential structures – 4.38 lbs per square foot.
- Construction of non-residential structures – 3.89 lbs per square foot.

Based upon the construction, renovation, and demolition activities required for the implementation of Alternative 1, a total of 78,671 tons of C&D debris would be generated from all activities over the life of the project. These wastes are not anticipated

to be generated within a single year, as outlined in the projected timeline scenario provided in Section 2.5.2 and Table 2-6 (Projected Timeline Scenario for Alternative 1). The construction, renovation and demolition activities associated with this alternative are expected to occur over an eight-year period. The largest quantity of waste would be generated during the first year.

For estimating purposes it was estimated that one-half of the required recreational and support square footage would be constructed in the first year of the project. Using the generation rates associated with demolition, renovation, and construction, it is estimated that 47,880,317 lbs or 23,940.16 tons of C&D wastes would be generated during the first year of implementation. The disposal of this material would result in an approximate 5.8 percent increase in the annual amount of C&D waste disposed at the Southeastern Oklahoma City Landfill. This impact would occur in the first year of implementation due to wastes generated from project activities. This percent increase is based on a comparison to the annual average amount of waste taken to the landfill as shown in Table 3-8.

The square footage specified for construction during the second through the eighth year includes one-half of the non-residential support and recreation structures. Based upon the annual demolition, renovation, and construction activities designated for those years, approximately 15,736,082 lbs or 7,868 tons of C&D waste would be generated, with disposal of the generated C&D wastes resulting in an approximate 1.9 percent increase in the annual amount of C&D waste disposed at the Southeastern Oklahoma City Landfill. This increase is based on a comparison to the annual average amount of waste accepted at the landfill.

As stated in Section 3.7.2, the Southeastern Oklahoma City Landfill has a life expectancy of approximately 17 years and has on average taken in 412,003.46 tons per year. The total quantity of waste generated from this alternative for the eight years of construction is approximately 79, 016.16 tons. Based upon this life expectancy, and average disposal rate, the quantity of waste generated from this alternative would result in the disposal of shortening the life expectancy of the landfill by about 10 weeks based upon the annual average disposal rate. This impact does not consider any recycling of wastes generated from construction or demolition in order to establish the worst case conditions in evaluating the impact to landfill capacity.

3.7.3.3 Alternative 2: Maximum Development Scenario

Solid waste generation rates associated with the activities described in Section 2.5.3 are the same as those presented for Alternative 1, resulting in a total of 110,036 tons of C&D debris generated from all activities over the life of the project. These wastes are not anticipated to be generated within a single year, as outlined in the projected timeline scenario provided in Section 2.5.3 and Table 2-7 (Projected Timeline Scenario for Alternative 2). The construction, renovation, and demolition activities associated with this alternative are expected to occur over an eight-year period. The largest quantity of waste would be generated during the first year.

For estimating purposes, it was estimated that one-half of the required recreational and support square footage would be constructed in the first year of the project. Using the generation rates associated with demolition and construction, it is estimated that 66,012,292 lbs or 33,006.15 tons of C&D wastes would be generated during the first year of implementation. The disposal of this material would result in an approximate 8.01 percent increase in the annual amount of C&D waste disposed at the Southeastern Oklahoma City Landfill. This increase would occur during the first year of construction due to wastes generated from project activities. This percent increase is based on a comparison to the annual average amount of waste taken to the landfill as shown in Table 3-8.

The square footage specified for construction during the second through the eighth year includes one-half of the non-residential support and recreation structures or 8,940 square feet of non-residential construction per year. Based upon the annual demolition and construction activities designated in those years, approximately 22,016,332 lbs or 11,008 tons of C&D waste would be generated, with the disposal of the generated C&D wastes resulting in an approximate 2.67 percent increase in the annual amount of C&D waste disposed at the Southeastern Oklahoma City Landfill. This increase is based on a comparison to the annual average amount of waste accepted at the landfill.

As stated in Section 3.7.2, the Southeastern Oklahoma City Landfill has a life expectancy of approximately 17 years and has on average taken in 412,003.46 tons per year. The total quantity of waste generated from this alternative for the 8 years of construction is approximately 110,062.15 tons. Based upon this life expectancy and average disposal rate, the quantity of waste generated from this alternative would result in the disposal shortening the life expectancy of the landfill by approximately 14 weeks based upon the annual average disposal rate. This impact does not consider

any recycling of wastes generated from construction or demolition in order to establish the worst case conditions in evaluating the impact to landfill capacity.

3.8 PHYSICAL RESOURCES

3.8.1 Definition of the Resource

This section describes the qualitative and quantitative characteristics of physical resources within the study area, which include soils, surface water, groundwater, wetlands, and floodplains. The ROI for soils includes the area immediately underlying the proposed construction and demolition sites. The ROI for surface waters includes the proposed construction and demolition sites and those areas down-slope that could receive runoff as a result of the Proposed Action and alternatives. The ROI for groundwater includes the aquifers beneath the project sites, including the Garber-Wellington aquifer, which provides potable water for the Base.

Soils

Soils play a critical role in both the natural and human environment and may have scientific, historical, economic, and recreational value. Soils are unconsolidated mineral and organic matter formed from the underlying bedrock or other parent material through the combined effects of physical, chemical, and biological processes. Soil characteristics differ due to variable formation factors including local geology, parent material, topography, climate, vegetation cover, and usage. Soil depth, drainage, texture, strength, shrink-swell potential, and erodibility all determine the suitability of the ground to support man-made structures and facilities.

Surface Water

Surface waters include streams, rivers, bays, ponds, and lakes. These waters are important to the ecological, recreational, economic, and human health of an area, which can be damaged when water resources are degraded. Stormwater flows, which usually increase in volume and velocity with increases in impervious surfaces such as rooftops and paved areas, have the potential to impact surface water hydrology. This stormwater runoff can also carry sediment, nutrients, debris, and many other pollutants into nearby water bodies. The state of Oklahoma has developed and retains primacy for surface water quality standards for all waters of the state in accordance with the provisions of the Clean Water Act. The ODEQ Water Quality Division is responsible for protecting Oklahoma's surface waters. It regulates municipal and industrial

wastewater discharges, nonpoint source pollution, stormwater discharges, erosion, and sedimentation through National Pollutant Discharge Elimination System (NPDES) permitting.

Ground Water

Groundwater consists of water resources located below the surface, and is generally discussed in terms of its distance from the ground surface, water quality, aquifer or well capacity, recharge rate, and geologic composition. Groundwater is important as a water source for potable water, irrigation, and industrial purposes. As discussed previously, there would be an overall decrease in the number of units on Tinker AFB; however, these families would live in the local community. Thus, the overall draw from local aquifers would be relatively the same. Additionally, construction and demolition activities would disturb the ground surface and would not reach deep enough to impact ground water quality. As a result, the Air Force does not expect adverse impacts to groundwater under any of the alternatives. As a result, groundwater is not discussed further in this document.

Wetlands

Wetlands are areas of transition between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water (Mitsch, 2000). Abiotic and biotic environmental factors such as morphology, hydrology, water chemistry, soil characteristics, and vegetation contribute to the diversity of wetland community types. The term *wetlands* describe marshes, swamps, bogs, and similar areas. Local hydrology and soil saturation largely affects soil formation and development, as well as the plant and animal communities found in wetland areas (EPA, 1995). Wetlands are often categorized by water patterns (the frequency or duration of flooding) and location in relation to upland areas and water bodies. Wetland hydrology is considered one of the most important factors in establishing and maintaining wetland processes and is critical to the groundwater recharge, floodwater storage, nutrient cycling, and wildlife habitat functions of wetland systems.

Section 404 of the Clean Water Act established a program to regulate the discharge of dredged and fill material into waters of the United States (U.S.), including wetlands. Activities in waters of the U.S. that are regulated under this program include fills for development, water resource projects (such as dams and levees), infrastructure development (such as highways and airports), and conversion of wetlands to uplands for farming and forestry. The USACE is the lead agency in protecting wetland

resources. This agency maintains jurisdiction over federal wetlands (33 CFR 328.3) under Section 404 of the Clean Water Act (30 CFR 320-330) and Section 10 of the Rivers and Harbors Act (30 CFR 329). The EPA assists the USACE (in an administrative capacity) in the protection of wetlands (40 CFR 225.1 to 233.71). Furthermore EO 11990, *Protection of Wetlands*, requires federal agencies, including the Air Force, to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands. In addition, the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) provide support with important advisory roles.

Floodplains

Floodplains are defined by EO 11988, *Floodplain Management*, as "the lowland and relatively flat areas adjoining inland and coastal waters including flood-prone areas of offshore islands, including at a minimum, the area subject to a one percent or greater chance of flooding in any given year" (that area inundated by a 100-year flood). Floodplains and riparian habitat are biologically unique and highly diverse ecosystems, providing a rich diversity of aquatic and terrestrial species. Floodplain vegetation promotes bank stability and provides a shading effect to moderate water temperatures. Vegetation and soils act as water filters, intercepting surface water runoff before it reaches lakes, streams, or rivers and stores floodwaters during flood events. This filtration process aids in the removal of excess nutrients, pollutants, and sediments from the water and helps reduce the need for costly cleanups and sediment removal. Floodplains also reduce downstream flooding by increasing upstream storage in wetlands, sloughs, back channels, side channels, and former channels.

3.8.2 Existing Conditions

Soils

All of the soil map units described have minor soils that are encompassed within the map unit that may have different properties and limitations, but can only be delineated using a detailed on-site survey. The properties and limitations of the soil type that comprises most of each soil map unit are presented in this section to provide an indication of the conditions and limitations found in the ROI.

There are 14 soil map units in the ROI, most of which are deep and all of which are well drained. Just over half (52 percent) of the soils within the ROI were formed on floodplains in alluvial material deposited by stream flows during flooding. The remainder were weathered in place from sedimentary rock, primarily shale or

sandstone (Natural Resources Conservation Service (NRCS), 2006). None of the soils are hydric, which is one of the required properties of wetlands. All of the soils are very susceptible to water erosion, especially if the surface is disturbed and the vegetation is damaged or removed.

Almost all (99 percent) of the soils in the ROI are not prime farmland. Prime farmland is land that has the best combination of physical and chemical characteristics for producing crops. It is designated independently of current land use, but it cannot include areas of urban land. The Federal Farmland Protection Policy (7 USC Chapter 73) requires that impacts to prime farmland soils be considered, although the Act cannot prohibit uses of these soils.

Soil properties influence the limitations for use, which may affect structure design, construction methods, and site maintenance.

Table 3-9 provides a summary of the limitations within each housing area for uses important to construction of housing. For this table, the soil map units shown in Figure 3-7 were grouped according to their limitations and presented as a percentage of each housing area.

The limitations on the construction of dwellings are primarily due to soils with high shrink-swell potential that expands and contracts, which can cause structures to crack, in addition to some areas that are relatively shallow to soft bedrock and brief flooding. Limitations on the construction and maintenance of local streets are due primarily to low soil strength, high shrink-swell potential, and brief flooding. Limitations for the establishment of lawns and landscaping are due to droughty conditions, primarily on the soils identified as Urban Land, and areas of brief flooding.

Limitations on shallow excavations that are used for installing utilities and footers for buildings include soils that tend to cave in when excavated, some constricting layers such as dense soil layers and soft bedrock, and brief flooding. The areas of brief and frequent flooding occur along Crutcho Creek on Ashton silt loam, within all housing areas except Prairie Land. Rare and very brief flooding occurs on Lawrie loam and Lawrie-Urban land complex soil map units within Mitchell Heights, Twining Fields, Vandenberg Hills East, and Vandenberg Hills West.

Table 3-9. Soil Limitations for Development by Housing Area

Development Uses by Housing Area	Rating Class and Percent of Housing Area			
	Not Limited	Somewhat Limited	Very Limited	Not Rated[1]
McNarney Manor				
Dwellings with Basements	0%	0%	9%	91%
Local Streets	0%	0%	9%	91%
Lawns and Landscaping	5%	0%	4%	91%
Shallow Excavations	0%	9%	0%	91%
Mitchell Heights				
Dwellings with Basements	2%	0%	98%	0%
Local Streets	0%	3%	97%	0%
Lawns and Landscaping	99%	0%	1%	0%
Shallow Excavations	0%	100%	0%	0%
Prairie Land				
Dwellings with Basements	0%	0%	100%	0%
Local Streets	0%	0%	100%	0%
Lawns and Landscaping	100%	0%	0%	0%
Shallow Excavations	0%	100%	0%	0%
Twining Fields				
Dwellings with Basements	29%	0%	57%	14%
Local Streets	0%	36%	50%	14%
Lawns and Landscaping	73%	0%	13%	14%
Shallow Excavations	0%	86%	0%	14%
Vandenberg Hills East				
Dwellings with Basements	51%	0%	49%	0%
Local Streets	0%	90%	10%	0%
Lawns and Landscaping	92%	0%	8%	0%
Shallow Excavations	0%	100%	0%	0%
Vandenberg Hills West				
Dwellings with Basements	24%	9%	67%	0%
Local Streets	0%	56%	44%	0%
Lawns and Landscaping	74%	0%	26%	0%
Shallow Excavations	0%	100%	0%	0%

Note: [1] Not Rated pertains primarily to soil map units containing Urban Land, which is so disturbed due to previous construction activities that the characteristics are variable and do not relate to the properties of the original soil types. To determine the limitations on Urban Land, an onsite evaluation is required.
Source: NRCS, 2006.

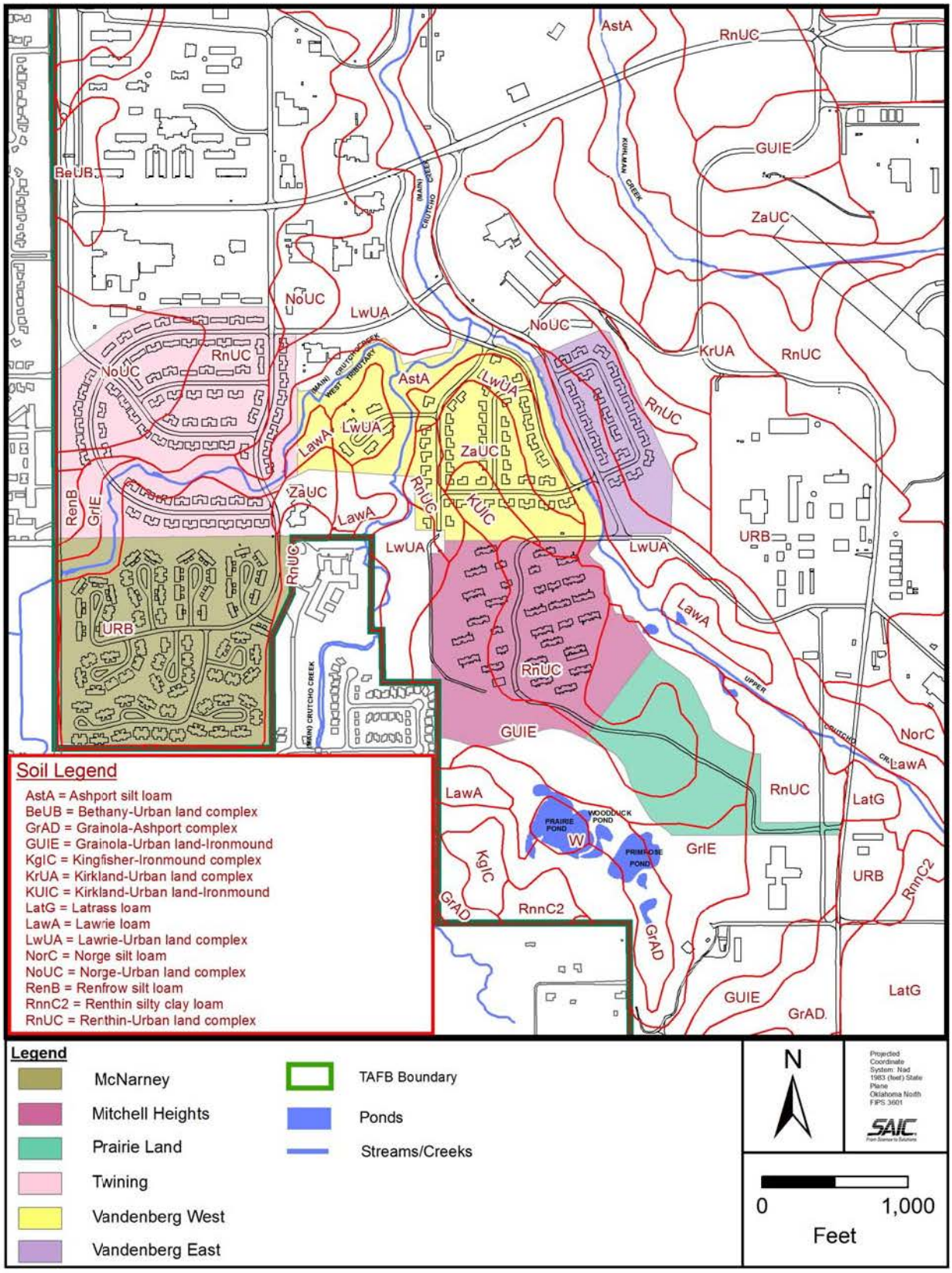

Figure 3-7. Soil Map Units in the ROI

Surface Water

All activities associated with the proposed MFH privatization program lie within the Crutcho Creek watershed. The Western Branch of Crutcho Creek flows through the McNarney Manor and Twining Fields housing area and joins Main Crutcho Creek, which flows through the Vandenberg Hills West housing area. Upper Crutcho Creek flows north between the Vandenberg Hills East and the Vandenberg Hills West housing area. Crutcho Creek is joined by two tributaries as it flows northward to the North Canadian River. The North Canadian River combines with the Arkansas River, Mississippi River, and finally discharges into the Gulf of Mexico. Kuhlman Creek joins Crutcho Creek just north of the Tinker AFB boundary, whereas Soldier Creek joins Crutcho Creek several miles north of the Base.

Surface water runoff, channeled through ditches and diversion structures, is the principal source of water to on-site streams. Numerous unnamed ephemeral streams drain other portions of the Base. No significant point source industrial discharges currently are made to any waterway on Tinker AFB. There are a total of 16 small man-made retention ponds and two detention basins on Tinker AFB (TAFB, 2007) including Beaver Pond, Beaver Marsh Filter, Redbud Pond, Fire Pond, Prairie Pond, Primrose Pond, Woodduck Pond, Reserve 1 North, Reserve 1 Southeast, Reserve 1 Southwest, Reserve 3 North, Reserve 3 South, GWTP Pond, Golf Course East Pond, Golf Course Central Pond, and Golf Course West Pond. The Reserve 1 ponds, Reserve 3 ponds, Prairie Pond, Woodduck Pond, and Primrose Pond are nearest to the Mitchell Heights and Prairie Land areas.

Figure 3-8 shows hydrological features associated with the proposed project areas.

Environmental Management manages the National Pollutant Discharge Elimination System (NPDES) permit for Tinker. This permit, issued by ODEQ, sets limits for discharging effluent from the Industrial Wastewater Treatment Plant (IWTP) and for 13 outfalls located on the base creek system. Environmental Management personnel perform weekly monitoring of these permitted outfalls, and submit monthly reports to the ODEQ.

In April 1995, the effluent from the IWTP was tied into the Oklahoma City Regional Treatment System, which eliminated the discharge of effluent into Soldier Creek. Now, the IWTP provides pretreatment for base industrial wastewater prior to discharge into the OKC system and is regulated by a City of Oklahoma City Industrial User Permit.

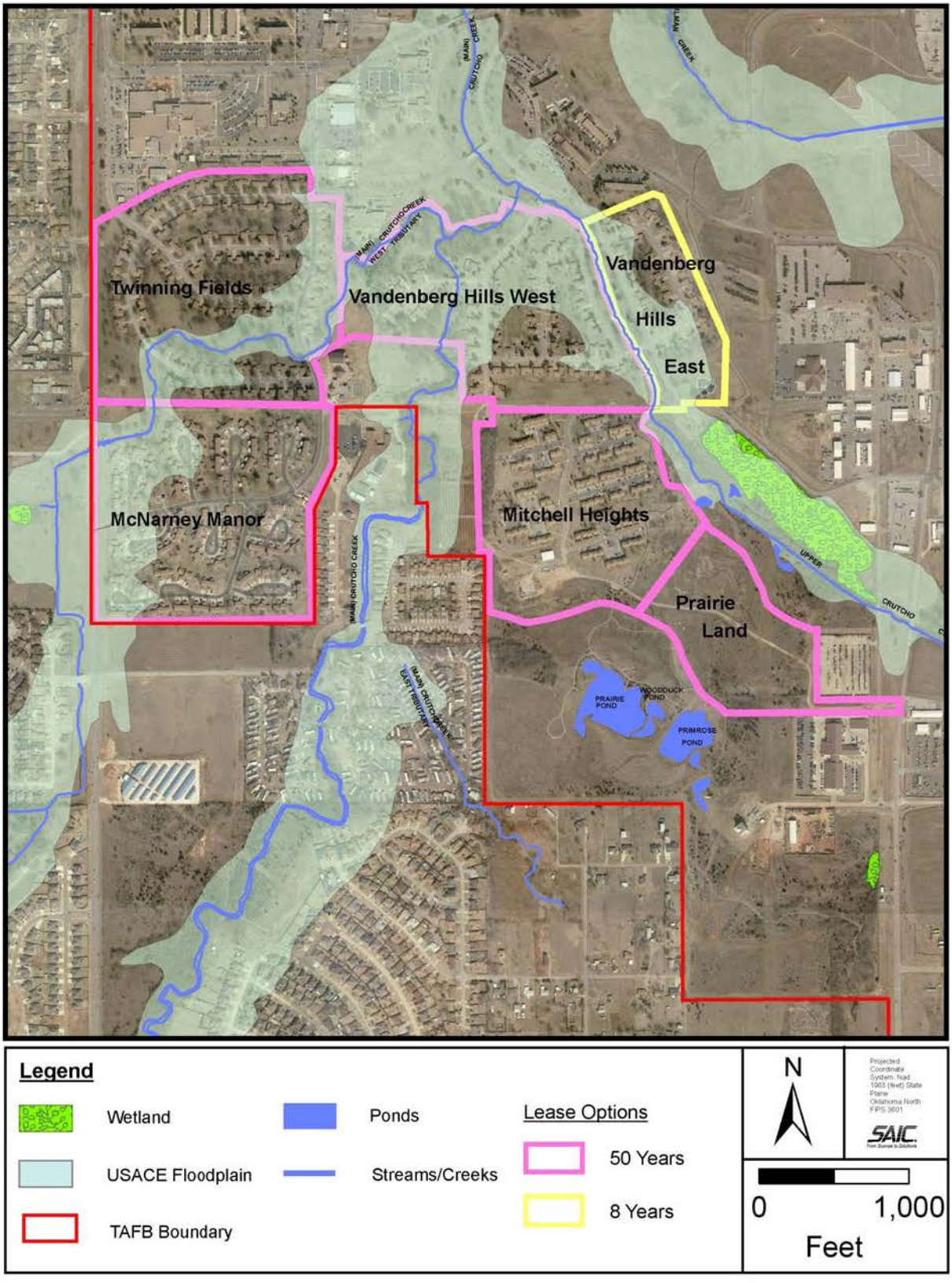

Figure 3-8. Hydrologic Features in the ROI

Wetlands

There are approximately 1.86 acres of National Wetland Inventory (NWI) wetlands in the proposed MFH area (Table 3-10). These wetlands are largely associated with the riparian zone around the Main Crutcho Creek and the Eastern and Western Branches (see Figure 2-1). NWI wetlands are based largely on periodic interpretation of aerial photography. This method of identifying wetlands is used by the U.S. Fish and Wildlife Service and the Natural Resources Conservation Service. The current total NWI acreage on Tinker AFB is estimated at 38 acres (TAFB, 2007).

Jurisdictional wetlands are wetlands that are regulated by the U.S. Army Corps of Engineers under Section 404 of the Clean Water Act. To be considered as jurisdictional, a wetland must exhibit all three characteristics of wetlands: hydrology, wetland vegetation (hydrophytes), and hydric soils. The total on-base jurisdictional wetland acreage is approximately 6 acres. There are no jurisdictional wetlands within the proposed MFH area.

Human activities have affected each of the wetlands at Tinker AFB. As a result, most NWI wetland areas are fairly small (less than 3 acres) and rated as moderate or impaired condition (Science Applications International Corporation, 2003).

Many of the wetlands were impacted in the past by grading, dredging, and/or construction of dikes and weirs (TAFB, 2007). Other activities have negatively affected the wetlands through habitat alteration. These activities are predominantly associated with the airfield, road crossings, residential and industrial areas, and the golf course. Common habitat alterations include channelization, placement of riprap and tiles, removal of riparian buffer vegetation, and the construction of ditches, stormwater outfalls, and roads. These activities potentially lead to increased sedimentation, woody debris removal, nutrient enrichment, and inputs of toxic pollutants. Few areas have recovered from these disturbances, and many of the wetlands will not completely recover because of human activities, particularly where the riparian vegetation is maintained as mowed grass (i.e., the golf course, roads, industrial, and residential areas).

Table 3-10. MFH Areas and Associated Floodplains and Wetlands

Housing Area	Number of Housing Units in Floodplain	Acres of Floodplain Within Housing Areas	Acres of NWI Wetlands in Housing Areas
Twining Fields	48	16	0.16
Vandenberg Hills East	12	10	0.33
Vandenberg Hills West	61	32	0.00
McNarney Manor	90	15	0.10
Mitchell Heights	0	0	0.12
Prairie Land	0	0	1.15
Totals	**211**	**73**	**1.86**

Floodplains

The 100-year floodplain boundary for Tinker AFB was updated by the USACE in 2002 (USACE, 2002). This survey covered the entire Base land area. Most of the floodplain has been significantly altered and degraded (TAFB, 2007). The majority of the floodplain is classified as improved grounds (i.e., housing, facilities, roads, ramps, or highly maintained areas such as lawns, athletic fields, and the golf course, where personnel perform intensive maintenance). Much of the floodplain is therefore in an impaired condition.

Floodplains and wetlands provide many beneficial functions and values. Functions currently provided by floodplains and wetlands include:

- Protection of streambanks from erosion.
- Attenuation of flood peaks.
- Fish and wildlife habitat.
- Flora and fauna migration corridors.
- Nutrient filtering.
- Water quality maintenance by acting as sediment repositories.
- Groundwater recharge.

Human-derived values from Tinker AFB's floodplain include:

- Recreational sites/opportunities (e.g., Greenway system, golf course).
- Natural beauty.
- Flood storage (reduce flood-related damage).
- Filtering nonpoint source pollutant (e.g., sediment, pesticides, fertilizers), which improves water quality and ensures compliance with NPDES permit limits and ensures continuance of the Base mission.

Three branches of Crutcho Creek have associated 100-year floodplains (see Figure 2-1). The Eastern Branch and Main Crutcho Creek meet in Vandenberg Hills where the majority of floodplains are located. The Western Branch passes through the southern half of Twining Fields and is surrounded by a limited floodplain on each side of the creek. Currently, there are 211 housing units located within a total of 73 acres of mapped floodplains (Table 3-10).

3.8.3 Environmental Consequences

Impacts to soils consider the potential for soil erosion and soil limitations for the proposed use. Analysis of impacts to soil resources resulting from proposed construction and demolition activities examines the suitability of locations for proposed activities and whether earth disturbance would expose accelerated erosion. Generally, impacts can be avoided or minimized if proper construction techniques, erosion control measures, and structural engineering designs are incorporated into project development.

Construction activity that disturbs an area of more than 1 acre must comply with the Stormwater General Permit for Construction Activities according to the rules established under the OPDES under OAC 252:605. Compliance with the permit is intended to improve or maintain water quality by minimizing pollutants in stormwater runoff that is discharged into the drainage system, in this case Crutcho Creek. The permit guidelines include issuance of a Notice of Intent, development and implementation of a site-specific Storm Water Pollution Prevention Plan (SWPPP) that includes erosion and sediment control measures, and implementation and maintenance of best management practices (BMP) to minimize offsite erosion and sediment yield during and after construction. Annual monitoring and assessment of potential stormwater pollution sources is required under the Stormwater General Permit. Under each alternative, more than 1 acre of disturbance would occur and a permit would be required.

The alternatives include demolition, renovation, and construction activities in the same areas. The demolition, renovation, and construction activities would not directly affect Upper Crutcho Creek or Main Crutcho Creek and its tributaries. Indirect impacts could result from uncontrolled sedimentation and stormwater runoff; however, use of BMPs (see Section 3.8.3.4) and stormwater pollution prevention controls would prevent silt and sediment from leaving the construction site and entering the stream.

3.8.3.1 No Action Alternative

Soils

Under the No Action Alternative, no new facilities would be constructed, but demolition of 34 excess housing units would occur. The total area of surface disturbance would be approximately 2 acres. The demolition could occur within any of the housing areas except Prairie Land. Assuming that the areas where demolition would occur

would be graded and landscaped, the most successful landscaping is likely to occur within those areas with the fewest soil limitations for lawns and landscaping, including Mitchell Heights, Twining Fields, Vandenberg Hills East, and Vandenberg Hills West. Rapid and successful stabilization of disturbed areas using vegetation would minimize the potential for accelerated soil erosion of these highly erodible soils.

BMPs implemented as part of the SWPPP during and after demolition would minimize soil erosion and offsite sedimentation in drainages. Well maintained silt fences, detention basins, daily site inspections, and other BMPs may be used to limit or eliminate soil movement, stabilize runoff, and control sedimentation. Following earthmoving, disturbed areas would be established with appropriate vegetation or other groundcover and managed to minimize erosion.

Given the gentle slopes in the area and the required employment of engineering practices and BMPs through OPDES permitting and SWPPP development that would minimize potential erosion, impacts to soils are expected to be minimal.

Surface Water and Ground Water

The potential for impacts to water resources is minimal under the No Action Alternative, as there would be demolition of only 34 units to reach the minimum HRMA requirement of 660 units. No renovations or new unit construction would occur under the No Action Alternative. The demolition would result in an overall decrease of approximately 10 percent in the amount of impervious surface present in the housing areas, thus decreasing the overall amount of stormwater associated with the housing areas. The Air Force would implement BMPs for erosion control during demolition activities as part of permitting requirements. No adverse impacts to water resources are expected under this Alternative.

Wetlands

Under the No Action Alternative, 1.86 acres of NWI wetlands within the MFH area would be expected to continue functioning at moderate to impaired levels. These wetlands would continue to receive storm flow and sediment from upstream sources outside the Base. It is not expected that these wetlands would be adversely affected by demolition activities.

Floodplains

Under the No Action Alternative, demolition activities may occur in floodplain areas. In compliance with EO 11988 and 32 CFR 989.14, a FONPA would be required for activities that disturb floodplain areas. Removal of housing units within the

floodplain would serve to restore, to a certain degree, previously lost floodplain functions and values in those areas. For those units remaining in the floodplain, a 100-year flood event could cause property damage to military housing in floodplains and disrupt Tinker AFB's military operations.

3.8.3.2 Alternative 1: Minimum Development Scenario (Air Force Preferred Alternative)

Soils

The earthmoving associated with construction and demolition would be the primary activities that would affect soils under Alternative 1. Renovation of housing would have little to no effect on soils and is not considered further in this section. Construction and demolition would disturb up to a total of 59 acres, and between 4.5 and 13.5 acres per year over eight years.

The least is known about the soil suitability in the McNarney Manor housing area due to the extensive Urban Land classification that would require on-site evaluations to determine soil characteristics and limitations for development. As shown in Table 3-9, Vandenberg Hills East has the fewest limitations for construction of dwellings, streets, lawns and landscaping, and shallow excavations. Housing areas other than Vandenberg Hills East are well-suited to single uses including the following:

- All of the housing areas are somewhat limited to very limited for construction and maintenance of local streets, with the most limited occurring within Mitchell Heights and Prairie Land.
- Mitchell Heights, Twining Fields, and Vandenberg Hills West are well-suited to lawns and landscaping, with Vandenberg Hills West having the highest proportion (26 percent) of soils that are very limited.
- All of the housing areas are somewhat limited for shallow excavations.

The soils limitations can be overcome, but may require more expensive and extensive planning and design to ensure successful construction and maintenance. Rapid and successful stabilization of disturbed areas using vegetation would minimize the potential for accelerated soil erosion of these highly erodible soils.

BMPs implemented as part of the SWPPP during and after construction and demolition would minimize soil erosion and offsite sedimentation in drainages. Well maintained silt fences, detention basins, daily site inspections, and other BMPs may be used to limit or eliminate soil movement, stabilize runoff, and control sedimentation.

Following earthmoving, disturbed areas would be established with appropriate vegetation or other groundcover and managed to minimize erosion.

Given the gentle slopes in the area and the required employment of engineering practices and BMPs through OPDES permitting and SWPPP development, soil erosion and offsite sedimentation is expected to be minimal. Natural soil horizons would be disturbed permanently where excavation occurs for structures and utilities, but the soils are not considered to be prime farmland, and the overall impacts to soils would not be significant.

Surface Water

Under Alternative 1, there would be an approximate 20-percent increase in the amount of impervious surface throughout the housing areas. The issues associated with water resources under Alternative 1 are the same as those described previously under the No Action Alternative. Although the potential for impacts is slightly higher relative to more development under this Alternative, the same BMPs (especially the use of appropriately designed detention basins) and permitting requirements would apply as those described previously. As a result, impacts to water resources under Alternative 1 are expected to be minimal.

Wetlands

Under Alternative 1, there may be some opportunities to restore or enhance wetland functions and condition. The extent to which any restoration of wetland functions and condition could occur would ultimately depend on how many structures are removed from floodplain areas. Under Alternative 1, a minimum of 12 and a maximum of 211 housing units could be demolished and removed from the floodplain. Since wetlands and floodplains share many of the same functions, the more housing units removed from the floodplain, the better the potential for restoring floodplain functions and values to impaired floodplains.

Although housing demolition and/or renovation would not directly impact any wetlands, it should be noted that any construction activities that disturb soil can lead to indirect negative effects on wetlands due to sedimentation and stormwater pollution. The use of standard BMPs and stormwater pollution prevention practices should avoid or minimize this risk. Any opportunities to restore wetland functions and condition would have beneficial impacts on wetlands at Tinker AFB.

Floodplains

Under Alternative 1, housing units currently within floodplain areas could be demolished or remodeled, but no new habitable structures (i.e., housing units) would be permitted to be constructed; however, floodplain areas could be developed for recreational purposes (i.e., parks, natural areas, walking trails, etc.) as long as development does not negatively impact floodplain areas. As a result, some of the lost floodplain functions and values could be restored as structures are removed from floodplain areas. The degree to which floodplain functions could be restored depends on the number of housing units that are removed from flood-prone areas and the subsequent land use. The housing contractor would determine how many housing units would be removed from floodplain areas. The more housing units removed from the floodplain, the better the potential for restoring floodplain functions and values. It should be noted that any construction activities associated with housing demolition and/or renovation that disturb soil can lead to negative effects on floodplains due to sedimentation and stormwater pollution. The use of standard BMPs and stormwater pollution prevention practices should minimize this risk.

The Tinker AFB Draft INRMP (TAFB, 2007) states that restoring lost or degraded floodplain functions would result in improved pollution control/environmental compliance, disaster preparedness, good neighbor/community partner, ecosystem management, holistic planning, cost savings, enhanced natural aesthetics, and warfighter health and wellness. Any opportunities to restore floodplain functions and values would have beneficial impacts on floodplains at Tinker AFB, even if restored areas are retained for recreational use by the housing contractor. Benefits would be surest at Vandenberg Hills East where all affected structures are scheduled for demolition.

Demolition activities as well as recreational development within the floodplain would require a FONPA as described in EO 11988 and 32 CFR 989.14. Because the existing units within the floodplain are substandard, there is no practicable alternative other than to conduct either demolition or renovation activities within the floodplain. Removal of housing units and recreational utilization of floodplain areas previously developed for housing would have an overall beneficial impact to floodplain resources.

3.8.3.3 Alternative 2: Maximum Development Scenario

Soils

The soil limitations for development are described under Alternative 1. With more housing to be constructed and demolished, it is likely that more extensive use of less suitable soils would be necessary to accommodate the larger acreage to be developed. The soils limitations can be overcome, but may require more expensive and extensive planning and design to ensure successful construction and maintenance. Rapid and successful stabilization of disturbed areas using vegetation would minimize the potential for accelerated soil erosion of these highly erodible soils.

As described for Alternative 1, the gentle slopes in the area and the required employment of engineering practices and BMPs through OPDES permitting and SWPPP development would minimize soil erosion and offsite sedimentation. Natural soil horizons would be disturbed permanently where excavation occurs for structures and utilities, but the soils are not considered to be prime farmland, and the overall impacts to soils would not be significant.

Surface Water

The issues associated with water resources under Alternative 2 are the same as those described previously under the No Action Alternative and Alternative 1. Although the potential for impacts is higher relative to more development under this Alternative, the same BMPs and permitting requirements would apply as those described previously. As a result, impacts to water resources under Alternative 2 are expected to be minimal.

Wetlands

Under Alternative 2, there would be better opportunities to restore or enhance wetland functions and condition within the affected area, since all structures in floodplains would be removed. The increased demolition activity within or near the floodplains would also increase the potential for indirect sedimentation and stormwater impacts to wetlands. This risk can be controlled with standard BMPs and stormwater pollution prevention practices.

Floodplains

As with Alternative 1, housing units currently within floodplain areas could be demolished or remodeled, but no new habitable structures (i.e., housing units) would be permitted to be constructed; however, floodplain areas could be developed for

recreational purposes (i.e., parks, natural areas, walking trails, etc.) as long as development does not negatively impact floodplain areas. Under Alternative 2, there would be better opportunities to restore or enhance floodplain functions and values within the affected area, since all housing structures in floodplains would be removed. The increased demolition activity within or near the floodplains increases the possibility for indirect sedimentation and stormwater impacts. This risk can be controlled with standard BMPs and stormwater pollution prevention practices. FONPA requirements would also apply to this alternative for the same reasons as Alternative 1.

3.9 BIOLOGICAL RESOURCES

3.9.1 Definition of the Resource

Biological resources include the native and introduced terrestrial and aquatic flora (plants) and fauna (animals) found on and around the Proposed Action areas at Tinker AFB.

Sensitive Species/Habitat

Sensitive species are those species protected under federal or state law, to include migratory birds, which are protected under the Migratory Bird Treaty Act (16 USC 703–712; 1997-Supp), and threatened and endangered species (protected under the Endangered Species Act). An *endangered* species is one that is in danger of extinction throughout all or a significant portion of its range. A *threatened* species is any species that is *likely* to become endangered within the foreseeable future throughout all or a significant portion of its range. Certain federal activities may require a Section 7 consultation with the USFWS depending upon the time of action, place of action or types of activities. Avoidance of impacts to the species by changing the time of action, place of action or types of activities in locations of federally listed species can be cost- and time-effective if a consultation is avoided.

AFI 32-7064, *Integrated Natural Resources Management,* calls for the protection and conservation of state-listed species when not in direct conflict with the military mission. Although the Air Force is not legally required to consult for state-listed species, Tinker AFB does give consideration to state-listed species. The conservation of state-listed species and other rare but unlisted species is encouraged and in some cases is critical to ensuring continued mission flexibility. The 72 ABW/CEVOE at Tinker AFB protects many state-listed species through habitat management.

Sensitive Habitat

Sensitive habitats include areas that the federal government, state government, or the DoD have designated as worthy of special protection due to certain characteristics such as high species diversity, rare plant or animals, or other unique features. Although Tinker AFB is located in an area of extensive industrial and residential development, there are some sensitive habitats present. Sensitive habitats at Tinker AFB include wetlands, floodplains, the tall grass prairie in the Reserve areas, and the bottomland forest in the Greenway.

Flora/Fauna

The flora of Tinker AFB is typical of that found in other heavily developed areas of Oklahoma. Native prairies, woodlands, and forests have been affected by urbanization and development. Ecological influences that controlled and maintained these habitats (e.g., native mammal grazing, fire) have been largely eliminated from the ecosystems. In many cases exotic, invasive plants have been introduced into the environment. All this has contributed to an environment today that is very different from what was here historically (TAFB, 2007). These changes in habitat have had similar influences on the animals that now live at Tinker AFB.

Invasive Species

Invasive species are defined as indigenous and non-indigenous plants that have a propensity to invade and/or take over areas of native vegetation. These plants tend to have high reproductive rates, rapid establishment and dispersal, and are very adaptable. If not controlled, invasive plants can cause negative economic, ecological, military operational, and human health impacts. EO 13112 states that no federal agency shall authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive pest plants in the United States or elsewhere.

3.9.2 Existing Conditions

Although most of Tinker AFB has been affected by industrial and residential development, the existing habitat supports a diverse flora and fauna, including some sensitive species. Some sensitive habitats are also present.

Sensitive Species

No plants on Tinker AFB are classified as state or federal species of concern or proposed/listed as threatened or endangered. However, rare species do occur on the Base. The Tinker AFB Draft INRMP (TAFB, 2007) documents the occurrence of two rare

plants at the Base, Oklahoma penstemon (*Penstemon oklahomensis*) and powdery thalia (*Thalia dealbata*). No Oklahoma penstemon colonies exist anywhere close to the MFH area and powdery thalia most likely exists at the installation due to accidental introduction (TAFB, 2007).

While no threatened or endangered state or federal species have been observed on Tinker AFB, there are five sensitive animal species that do occur on the Base (TAFB, 2007). Only one species, the Texas horned lizard (*Phrynosoma cornutum*), has been documented in the Prairie Land portion of the MFH area. Detailed descriptions of sensitive plants and animals at the installation are found in the Tinker AFB Draft INRMP (TAFB, 2007).

Sensitive Habitats

Sensitive habitats at Tinker AFB include wetlands, floodplains, the tallgrass prairie in the Reserve areas, and the bottomland forest in the Greenway. Within the housing areas there are 1.86 acres of wetlands and 66 acres of floodplain habitat. Wetlands and floodplains were described previously in Section 3.8. The Prairie Land includes about 25 acres that consists largely of tallgrass prairie that is in a degraded state (TAFB, 2007).

Flora/Fauna

Various vegetation surveys have been conducted at Tinker AFB since the early 1990s (TAFB, 2007). These surveys include a basewide flora inventory completed in 1993, a native tall grass prairie assessment conducted in 1995, and basewide vegetation classification in 2005 (TAFB, 2007). These surveys documented the occurrence of a number of native and exotic plants and at least 31 different plant communities.

Tinker AFB has an active urban forestry program. Urban forest is defined as primarily street and park trees that are located on improved and semi-improved grounds (i.e., grounds that are mowed). Tree care policy and guidance on base property is detailed in the Tinker AFB Urban Forestry Ordinance (TAFB, 2007). The base has been divided into 25 urban forest management units, and each unit is represented by a member of the Urban Forestry Working Group which oversees tree management. The status and trend of Tinker AFB's urban forest is stable. Many trees have been removed in recent years, but many have been exotics and many native trees have been planted with the long-term aim of offsetting negative impacts of tree removal (TAFB, 2007).

TAFB is classified as a Category 1 installation (i.e., the base has suitable habitat for conserving and managing fish and wildlife, per AFI 32-7064). The occurrence of over

230 native and exotic vertebrate species has been documented on Base property (TAFB, 2007). This includes resident and migratory populations and is composed of 26 mammal, 149 bird, 24 reptile, 10 amphibian, and 26 fish species.

Invasive Species

No comprehensive invasive species survey has been conducted on Tinker AFB. However, a native tallgrass prairie assessment in 1995 identified 31 non-native plant species in grassland areas on the Base (TAFB, 2007). Of these 31 species, six were considered invasive. Numerous additional invasive plant species have since been identified on Base property; however, their densities, distribution, and trends are unknown.

3.9.3 Environmental Consequences

3.9.3.1 No Action Alternative

Sensitive Species

Under the No Action Alternative, sensitive species of plants and animals would be expected to follow trends as described in the Tinker AFB Draft INRMP (TAFB, 2007). The trend for powdery thalia is stable, but it is vulnerable because of its restricted distribution. The status and trend of the Oklahoma penstemon on Tinker AFB currently is not known. No trend data exists for the sensitive animal species at Tinker AFB except for the Texas horned lizard, which indicates that the lizard population is stable. The No Action Alternative would not be expected to have any effect on the powdery thalia or Oklahoma penstemon since none are found in the MFH area. Populations of Texas horned lizards living in the Prairie Land area would continue to have access to 25 acres of available suitable habitat in the area.

Sensitive Habitats

Under the No Action Alternative, approximately 25 acres of sensitive tallgrass prairie habitat in the Prairie Land area would not be disturbed. Also, if any surplus housing units were demolished in the floodplain, that area could be available for restoration or enhancement.

Flora/Fauna

Under the No Action Alternative, populations of plants and animals at Tinker AFB would continue to follow trends as described in the Tinker AFB Draft INRMP (TAFB, 2007). The status and trend of Tinker AFB's urban forest is stable. Trend data for

mammal populations is limited, but appear to be stable overall. No trend data exists for birds, reptiles, and amphibians. The trend for fish populations is improving based on efforts to improve stream environments and water quality. The trend of Tinker's sport fish is upward based on the results of increased management, such as the trophy bass pond and sport fish stockings.

Invasive Species

Under the No Action Alternative, populations of exotic, invasive plants at Tinker AFB would continue to follow trends as described in the Tinker AFB Draft INRMP (TAFB, 2007). The trend of base native vegetation communities as related to invasive species is stable to downward. Invasive species are present and spreading in native systems. However, areas dominated by exotic invasive plants are being converted to native vegetation.

3.9.3.2 Alternative 1: Minimum Development Scenario (Air Force Preferred Alternative)

Sensitive Species

In general Alternative 1 would not be expected to have any adverse effects on sensitive plants since none have been documented in the MFH area. Potential construction of new housing in the Prairie Land would result in the loss of as much as 25 acres of habitat for the Texas horned lizard.

The state of Oklahoma has promulgated a year-round closed season on the Texas horned lizard (Howery, 2007). This closed season makes it unlawful to intentionally kill or to keep horned lizards in possession, but it does not extend protection to the horned lizard's habitat. Even though there are data to demonstrate that horned lizards are present on or in the vicinity of the Prairie Land area, the Air Force is not purposefully attempting to kill or take horned lizards; therefore, there are no restrictions on the construction (Howery, 2007).

The state has requested two voluntary measures, when practical, to avoid killing Texas horned lizards (Howery, 2007):

- When feasible, conduct a search for horned lizards immediately prior to any earth-moving work in suitable habitat areas. Only the actual area that will be disturbed by heavy equipment needs to be searched, and the search can be a simple visual check of the area for lizards. If any lizards are found, the state requests that the lizards be chased out of the immediate construction area or

temporarily captured and moved at least 100 yards but no more than 300 yards from the construction area.

- When feasible, holes and trenches should be filled as soon as possible after their use because open holes or trenches can trap horned lizards that may fall into them. Trenches and holes should be visually checked at least every other day to look for any trapped horned lizards, which should be captured and relocated away from the construction area. If possible, holes and trenches should be covered temporarily when not in use if they are going to be left unfilled for a period of more than a week.

Sensitive Habitats

Under Alternative 1, as much as 1.86 acres of wetlands and 66 acres of floodplains would potentially be affected by the demolition and/or renovation of as many as 211 housing units. Effects on wetland and floodplains are discussed in Section 3.8. Construction of new housing in the Prairie Land could impact up to 25 acres of degraded tallgrass prairie.

Other sensitive species present at Tinker AFB could also benefit from wetland and floodplain habitat restoration and/or enhancement by managing fauna habitat, foraging areas, waterways, corridors, and edges that would increase the native wildlife species richness and diversity, encouraging an environment that is more diverse and able to support a greater population of wildlife.

Demolition and construction activities have the potential to impact large mature trees that are part of the Tinker AFB urban forest. The potential developer(s) should consult the Tinker AFB Urban Forestry Ordinance and Urban Forestry Working Group to ensure that existing mature trees are protected to the extent practicable. Additionally, in accordance with Executive Order 13148, *Greening the Government through Leadership in Environmental Management*, where cost effective and to the maximum extent practicable, all trees used for landscaping on TAFB should be native (varieties/subspecies and cultivars of native species are acceptable) to the local region (TAFB, 2007).

Flora/Fauna

The opportunity to restore wetland and floodplain habitat as discussed in Section 3.8 could have generally beneficial effects on plants and animals at Tinker AFB. Restoration and/or enhancement of these resources could provide improved habitat for plants and animals. Restoration and enhancement could include expansion of the urban forest and Greenway network at the installation.

Invasive Species

Demolition and construction activities would require disturbance to soil and vegetation. This disturbance would create conditions that are conducive to the spread of many invasive plants. Since many invasive plants are already established at areas of Tinker AFB, there are ready sources of seed nearby. Mitigations to avoid or minimize the spread of invasive species on disturbed areas could include replanting disturbed areas with native plants or noninvasive plants and using similar native or noninvasive plants to landscape around new housing units.

3.9.3.3 Alternative 2: Maximum Development Scenario

Impacts under Alternative 2 would be expected to be similar to those described under Alternative 1. However, since the area of disturbance would be much greater under Alternative 2, there would be increased opportunity for the spread of invasive plants. Mitigations described under the discussion of Alternative 1 should help minimize this risk.

3.10 LAND USE

3.10.1 Definition of the Resource

Land use generally refers to human modification of land, often for residential or economic purposes. It also refers to the use of land for preservation or protection of natural resources such as wildlife habitat, vegetation, or unique features. Human land uses include residential, commercial, industrial, agricultural, and recreational. Unique natural features are often designated as national or state parks, forests, wilderness areas, or wildlife refuges. Attributes of land use include general land use and ownership, land management plans, and special use areas. Land ownership is a categorization of land according to type of owner. The major land ownership categories include federal, state, Native American, and private. Federal lands are further described by the managing agency, which may include the USFWS, U.S. Forest Service, Bureau of Land Management, or the DoD. Land uses are frequently regulated by management plans, policies, ordinances, and regulations that determine the types of activities that are allowed or that protect specially designated or environmentally sensitive uses. Special-use land management areas (e.g., wilderness areas) are identified by federal and state agencies as being worthy of more rigorous management.

Noise is another factor in determining appropriate land uses since elevated sound levels are incompatible with residential areas; noise was described previously in Section 3.2. Residential areas are typically inconsistent with noise levels above an L_{dn} of 65. Table 3-11 summarizes incompatible land uses for residential areas.

Table 3-11. Residential Land Use Compatibility Chart

Ldn Noise Contours (dBA)				CLEAR ZONE	APZ I	APZ II
65-69	70-74	75-79	80+			
No*	No*	No	No	No	No	No

* Unless sound attenuation materials are installed.

3.10.2 Existing Conditions

On-Base Land Use

Eleven land use categories (based on the function of the activity within the category) have been established for land management at the Base within the Tinker AFB General Plan. The major land uses on Tinker AFB include airfield and aircraft operations and maintenance, industrial, and open space. All MFH areas fall within the *Housing – Accompanied* category. Additional information on the land use classifications for the Base can be found in the Tinker AFB General Plan (U.S. Air Force, 2005a).

On the Base, Twining Fields and McNarney Manor are bordered on the west by the Base boundary and South Sooner Road. Twining Fields is bordered on the north by the Base medical area and a small industrial use area and on the east by community (service) areas and open space associated with the West Crutcho Creek Tributary floodplain. McNarney Manor is bordered on the south by off-base open space and single family residential space, with the Tinker Elementary School located off-base bordering the east side. Vandenberg Hills West and Mitchell Heights are predominately surrounded by open space and outdoor recreation areas. Vandenberg Hills East is bordered by unaccompanied housing to the north, open space and outdoor recreation areas to the east and south, and the Crutcho Creek floodplain to the west. The existing land use for the Prairie Land area is open space that adjoins the outdoor recreation area surrounding Prairie Pond, Wood Duck Pond, and Primrose Pond to the southwest and the Crutcho Creek floodplain to the northeast. Prairie Land is bordered on the southeast by an area of industrial land use. The existing land use for the MFH area is shown on Figure 3-1.

The Air Installation Compatible Use Zones (AICUZ) program, which delineates noise contours, also promotes compatible development around Air Force installations.

An AICUZ study provides installation commanders and local governments with recommendations for land use restrictions. Figure 3-1 also depicts noise contours and accident potential zones for the installation based on the most recent AICUZ study data (U.S. Air Force, 2006). The designated clear zones at Tinker AFB are located at either end of the runway, and the accident potential zones extend beyond the clear zone from the runway end. All of the existing MFH areas that are part of the Proposed Action are located outside of the 65 dBA noise contour, and no portion of the housing areas are located within the clear zone or accident potential zones.

Off-Base Land Use

The off-base land use located nearest the existing MFH area is a mix of single- and multi-family residential, commercial/mixed use, office center institutional, industrial, and open space. These areas are located west of South Sooner Road and to the south McNarney Manor. The multi-family residential, commercial/mixed use, and office land use is concentrated around the intersection of South Sooner Road and S.E. 44th Street. Tinker Elementary School is located within the area of institutional land use. The open space will likely become new single-family residential (U.S. Air Force, 2005a).

Planners at Tinker AFB work with residents and community planners of Oklahoma City, Del City, Midwest City, and Oklahoma County through the Association of Central Oklahoma Governments to ensure that the surrounding off-base development is compatible with the Tinker AFB mission and operations.

3.10.3 Environmental Consequences

Land use impacts can result if an action displaces an existing use or reduces the suitability of an area for its current, designated, or formally planned use. In addition, a proposed activity may be incompatible with local plans and regulations that provide for orderly development to protect the general welfare of the public or may conflict with management objectives of a federal or state agency for an affected area. Compatible land use development would need to comply with federal and state environmental laws and regulations.

3.10.3.1 No Action Alternative

No adverse impacts to land use are anticipated under the No Action Alternative. It is assumed that under this alternative Tinker AFB would demolish surplus units to reach the minimum HRMA requirement of 660 units. All activities would occur within

existing housing areas. If surplus units were demolished and Tinker AFB chose to demolish units located within the Crutcho Creek floodplain, this would be a positive compatible impact for the affected open space land use and would enhance the character and function of the floodplain.

3.10.3.2 Alternative 1: Minimum Development Scenario (Air Force Preferred Alternative)

All activities would occur within the existing housing areas except for the Prairie Land area. Demolition in Vandenberg Hills East and demolition, renovation, and/or new construction in Twining Fields, McNarney Manor, Vandenberg Hills West, and Mitchell Heights would not result in any adverse impacts. If new housing is constructed in the Prairie Land area, there would be a change in the existing open space land use to accompanied housing, but the change would not be incompatible with the other existing land uses in the surrounding area. If existing houses located within the floodplain including the Vandenberg Hills East housing area are demolished, then the land use would change from accompanied housing to either open space or outdoor recreation. This would depend on whether the contractor only demolishes the houses and the area is returned to the Air Force (i.e., open space) or if the developer identifies a compatible use for the floodplain (e.g., park). If the floodplain area is returned, the Air Force could choose to manage the open space area for conservation or preservation or for outdoor recreation (e.g., expansion of the multi-use trail). Portions of the housing floodplain have been identified as wildlife corridor gaps (i.e., a highly maintained and urbanized area between two natural areas). As a result, an additional option is to convert these areas back to a natural riparian zone and/or storm water detention area. If converted to a natural area, these areas would be classified as "Natural Buffer to Be Preserved" in the base Area Development Plans and would be managed under the Tinker AFB Draft INRMP. This would be a beneficial impact, which would enhance the character and function of the floodplain.

3.10.3.3 Alternative 2: Maximum Development Scenario

The impacts related to land use under Alternative 2 would be similar to those of Alternative 1. Demolition and construction within the affected housing areas would not result in any adverse impacts since the land use would remain the same. Demolition of housing units within Vandenberg Hills East and other floodplain areas would change the existing land use to open space, outdoor recreation, or natural area depending on Air Force and contractor decisions. New housing constructed in the Prairie Land area

would change the existing open space land use to accompanied housing, but the change would not be incompatible with the other existing land uses in the surrounding.

3.11 SOCIOECONOMICS

3.11.1 Definition of the Resource

Socioeconomic resources are defined as the basic attributes associated with human activities. Indicators such as population, characteristics of race, ethnicity, and age distribution and economic factors including employment, income, and poverty status are applied to measure the socioeconomic impacts of the alternatives under consideration. These actions may impact other socioeconomic factors such as housing availability and public services. Because this action does not involve an increase in population, analysis is limited to economic, employment, and housing impacts associated with the Proposed Action.

Tinker AFB, located in the Oklahoma City, Oklahoma, metropolitan area, is bordered by Oklahoma City, Del City, and Midwest City. The ROI for assessing socioeconomics for Tinker AFB is the Oklahoma City Metropolitan Statistical Area (MSA). The Oklahoma City MSA comprises the following counties: Canadian County, Cleveland County, Grady County, Lincoln County, Logan County, McClain County, and Oklahoma County.

To comply with NEPA, the planning and decision making process for actions proposed by federal agencies requires a study of relevant environmental statutes and regulations, including EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, and EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*. EO 12898 defines environmental justice by identifying and addressing activities, policies, and programs of federal agencies that may have a disproportionately high and adverse effect on the environment or human health of minorities or low-income populations. Protection of children is discussed previously in Section 3.5, Safety.

3.11.2 Existing Conditions

Income

Median family income in the Oklahoma City MSA was $53,900 in 2006 (U.S. Department of Housing and Urban Development (HUD), 2006). The median income for

the state of Oklahoma is $48,800, while the medium income for the nation is $59,600. Regional median family income has been growing at an average of 3 percent annually since 2000, exceeding the 2.7 percent rate of inflation for the same time period, indicating a growth in real income as well (U.S. Bureau of Labor Statistics, 2007).

Employment

The Oklahoma City economy was built on the foundation of the oil and natural gas industry. Historically, a healthy and profitable oil and gas industry has meant economic growth for the Oklahoma City region. From 2006 to 2007, employment in the oil and gas sector has grown almost 20 percent, generating additional growth throughout the regional economy. In 2004, total non-farm employment accounted for 706,908 jobs.

Total employment in the Oklahoma City MSA increased by 0.9 percent annually between 2003 and 2007 (U.S. Department of Labor, 2007). The largest employment sectors in the ROI in 2004 were state and local government, retail trade and health care and social assistance. The construction sector employed 38,501 people or 5.4 percent of the workforce in 2004 (Table 3-12) (U.S. Department of Commerce, 2007). Between 2002 and 2007, the fastest growing industries in the ROI were the natural resources and mining sector, which grew by more than 70 percent, and the construction sector, which grew by just over 20 percent. The state of Oklahoma is the largest single employer in the ROI, followed by Tinker AFB and the U.S. Postal Service. The largest entirely private employer is the Hertz Reservation Center (Table 3-13) (Greater Oklahoma City Chamber of Commerce, 2007).

Housing

There were over 465,500 single-family homes, multi-family units and mobile homes in the Oklahoma City MSA in 2000 (U.S. Census, 2007a). Factoring in housing market growth, the ROI contained an estimated 313,100 owner-occupied units and 168,600 rental units in 2006. About 8.9 percent of area rental units are vacant.

Consistently low interest rates have made homeownership more affordable. Home ownership has increased in the ROI, following with national trends. The 2000 U.S. Census indicates that 64.7 percent of the housing units in the Oklahoma City MSA are owner occupied. This is up only slightly since the 1990 Census. For the entire United States, owner occupied units were 66.2 percent of the housing stock in 2000, up from 64.2 percent in 1990. The current availability of relatively low mortgage rates indicates a continuation of this trend.

Table 3-12. Employment By Industry, 2004

Oklahoma City MSA	2004	Percent of Total
Total Non-Farm Employment	**706,908**	
Private Sector Employment	584,045	
Natural Resources and Mining	20,800	2.9%
Construction	38,501	5.4%
Manufacturing	40,515	5.7%
Wholesale Trade	24,311	3.4%
Retail Trade	77,975	11.0%
Finance and Insurance	32,524	4.6%
Real Estate, Rental and Leasing	27,353	3.9%
Administrative and Waste Services	51,852	7.3%
Health Care and Social Assistance	67,615	9.6%
Accommodation and Food Services	51,227	7.2%
Other Services	42,207	6.0%
Government and Military	122,863	17.4%

Source: U.S. Department of Commerce, 2007

Table 3-13. Major Area Employers

Employer	Sector	Employees
State of Oklahoma	Government	38,000
Tinker Air Force Base	Military	24,000
U.S. Postal Service	Government	8,706
INTEGRIS Health	Health Care	6,200
Oklahoma City Public Schools	Education	5,900
FAA Aeronautical Center	Aerospace Training	5,600
City of Oklahoma City	Government	4,320
OU Health Sciences Center	Education	4,200
Hertz Reservation Center	Auto Rental	3,400
OU Medical Center	Health Care	3,250
AT&T	Telecommunications	3,193
OG&E Energy	Electric Utility	2,973

Source: Greater Oklahoma City Chamber of Commerce, 2007

A majority of the homes are single family units. There has been steady growth in the single-family housing market in the Oklahoma City MSA over the past decade, a trend that is in line with national housing market activity. According to the 2000 U.S. Census, 72.8 percent of housing in the Oklahoma City MSA was singe-family structures compared to 71.3 percent in 1990.

Consistent with the growth in the ROI housing market, there has been an increase in the number of single-family building permits issued each year since 2000,

peaking in 2005 with 9,230 units and then declining in 2006 to 7,400 units (HUD, 2007). Single-family permits in 2005 were almost double the number of permits in 2000 (Table 3-14). The number of multi-family building permits is more cyclical. Based on housing permits data, the housing growth rate for the ROI is 1.6 percent annually.

Table 3-14. Building Permits

Oklahoma City MSA	2000	2001	2002	2003	2004	2005
Total Units	5,401	5,957	6,207	8,172	9,327	9,230
Single-Family	4,162	4,732	5,794	6,933	7,749	8,251
Multi-Family	1,239	1,225	413	1,239	1,578	979

Source: HUD, 2007

The cost of housing in the Oklahoma City area has continued to increase with the increase in demand. Average home sales prices increased by 35.2 percent from 2002 to 2006, to almost $146,000 (Oklahoma Association of Realtors, 2007). Sales volume has remained strong, with total sales of nearly 20,000 houses in 2005 and 2006. The number of sales for the first two months of 2007 indicates that a noticeable decline in volume should not be expected at this time.

3.11.3 Environmental Consequences

To assess the potential socioeconomic impacts of the alternatives, potential employment associated with development activities, as well as the adequacy of the local area to provide housing for new construction workers were evaluated.

3.11.3.1 No Action Alternative

Under the No Action Alternative, the Air Force would not implement the MFH privatization program at Tinker AFB and would continue to manage and maintain existing housing in accordance with Air Force policy. The current surplus of 34 housing units would likely be demolished within a short time. It is estimated that this activity would require approximately three weeks for a single four-person crew. The No Action Alternative would have a negligible socioeconomic impact.

3.11.3.2 Alternative 1: Minimum Development Scenario (Air Force Preferred Alternative)

Demolition, renovation and construction activities under Alternative 1 would have positive impacts on employment and income in the ROI. The maximum impact would occur in the initial year when 30 percent of the total activities are to be completed. In the Oklahoma City MSA, housing construction increased to

9,230 residential units in 2005 and then declined to about 7,400 residential units in 2006. Renovations and new construction during the initial year under Alternative 1, at a maximum, would comprise about 1.31 percent of the peak construction that occurred in 2005. There should be ample capacity in the construction industry to meet these requirements. Given the size of the Oklahoma City labor supply and the relatively small size of the Tinker AFB MFH privatization project, there should not be any significant impact on employment and earnings.

Labor requirements are assumed to be six to seven persons for the new construction per housing units and renovation. Labor requirements for demolitions are assumed to be four persons per housing unit. It is unknown at this time how many units the developer would be working at any given time; however, based on the existing labor pool, it is assumed that there would be sufficient laborers to accommodate the project.

The alternative could impact Tinker AFB military families by dislocating a number of families from MFH during the construction, renovation, and demolition activities. The ROI contained an estimated 168,600 rental units in 2006, of which approximately 10,700 are suitable and vacant. Given that a maximum of 198 units could be unavailable at any one time, there is sufficient housing available in the community into which military families could transition during the construction process, and no significant impact is anticipated.

3.11.3.3 Alternative 2: Maximum Development Scenario

Alternative 2 would have some positive impact on area employment and income similar to Alternative 1. New construction during the initial year under Alternative 2, at a maximum, would comprise about 2.1 percent of the peak construction that occurred in 2005. The size of the Oklahoma City labor supply and the relatively small size of the project should not result in any significant impact on employment and earnings. The maximum daily labor requirement for demolition and construction activities during the initial year would be similar to Alternative 1. Alternative 2 could impact Tinker AFB military families by dislocating a number of families from MFH during the demolition and construction activity. There is sufficient housing available in the community into which military families could transition during the project. There should be no significant impact from the relocation of the military families as the housing is demolished and replaced with new construction.

4. CUMULATIVE IMPACTS

According to CEQ regulations, a cumulative effects analysis should consider the potential environmental impacts resulting from "the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions" (40 CFR 1508.7).

Cumulative effects may occur when there is a relationship between a proposed action or alternative and other actions expected to occur in a similar location or during a similar time period. This relationship may or may not be obvious. The effects may then be incremental (increasing) in nature and result in cumulative impacts. Actions overlapping with, or in close proximity to, the Proposed Action or alternatives can reasonably be expected to have more potential for cumulative effects on "shared resources" than actions that may be geographically separated. Similarly, actions that coincide temporally will tend to offer a higher potential for cumulative effects.

In this EA, the Air Force has made an effort to identify actions on or near the installation that are under consideration and in the planning stage at this time. These actions are included in the cumulative analysis to the extent that details regarding such actions exist and the actions have a potential to interact with the Proposed Action. Although the level of detail available for those future actions varies, this approach provides the decision maker with the most current information to evaluate the consequences of the Proposed Action. The environmental analysis addresses cumulative impacts to assess the incremental contribution of the action to impacts on affected resources from all factors.

4.1 RELEVANT PAST AND PRESENT ACTIONS

Existing Base development and operations represent relevant past and present actions that are associated with the impacts of the Proposed Action. In addition, nearby land development and infrastructure improvements such as roads, pipelines, and power transmission lines, also have potential impacts on the project. Past and present actions in and around the action areas associated with these activities may have cumulative effects on the local environment.

4.2 RELEVANT REASONABLY FORESEEABLE ACTIONS

Of significance within the context of a cumulative impact analysis associated with C&D activities, are the installation's growth management policy and plans for future development, as encapsulated in the Base General Plan, as well as potential off-base changes in land use.

According to the Tinker AFB General Plan, there are 54 construction projects and 85 demolition projects planned for the short-term and outlying years (U.S. Air Force, 2005a); this does not include proposed housing privatization initiatives. Tinker AFB has recently completed the Maintenance Repair Overhaul project, a large facility southeast of the Base.

Over the past several years, there has been a large increase in urban-suburban development to the west of Tinker AFB, primarily in areas outside Gott Gate. Based on review of the *Oklahoma City Southeast Sector Plan* (City of Oklahoma, 2007), the 2030 land use plan for the area, shows that land east of the Base is proposed for industrial development and environmental conservation. The land south of the Base is proposed for industrial development, and the land west of the Base is proposed for urban growth.

4.3 ANALYSIS OF CUMULATIVE IMPACTS

Given the scope of the Proposed Action and other similar past, present, and reasonably foreseeable future actions within the ROI, potential cumulative impacts may occur in the areas of air quality, solid waste, land use, and stormwater. The project would generate air pollution emissions during construction activities and would, therefore, incrementally contribute to air emissions if other construction projects are initiated within the same timeframe. This increase would relate to regional air quality goals and attainment standards, but the contribution from the project would be negligible. Air emissions associated with the project represent only a small percentage of Oklahoma County's annual emissions. Project emissions would not contribute to other county emissions in any appreciable manner and would be temporary; therefore, the Air Force does not anticipate any long-term cumulative impacts to air quality from the Proposed Action when considered with other similar past, present, or reasonably foreseeable actions.

Incremental impacts associated with solid waste generated from the Proposed Action as well as any other C&D projects would incrementally affect local landfill capacity regardless of timing, in that the additive amount of solid waste would serve to

decrease existing landfill capacity. However, the amount of solid waste that would be generated from the Proposed Action would be minor compared to typical solid waste generation within the local area, and thus, from an incremental standpoint, would contribute only in a minor way to a decrease in landfill capacity. Recycling and reuse, as well as distribution among several different landfills, would serve to minimize the impacts, and as part of local planning efforts, landfills are planned and developed as existing landfills near their capacity. Consequently, the Air Force does not expect any adverse, long-term impacts associated with solid waste from the Proposed Action when considered with other similar past, present, or reasonably foreseeable actions.

Incremental impacts associated with land use and water quality are related to the increasing development of previously undeveloped land area on the installation. Over time, continued development of open spaces reduces the amount of area that could be utilized for recreational purposes, perpetuates an urban atmosphere, and increases stormwater runoff through the addition of impervious surfaces, thus resulting in ever increasing impacts to water quality. As part of the MHPI at Tinker AFB, a currently undeveloped parcel (Prairie Land) would be utilized for housing. This would not be a compatible use for that particular area and would result in the loss of this area for recreational purposes. However, this loss may be somewhat offset from a cumulative land use perspective in that the Vandenberg Hills East area would either not be utilized by the MHPI and left as open space, or would be developed as a recreational area. However, there would still be the loss of a previously undeveloped area.

Continued development on the installation will result in incremental impacts associated with stormwater runoff. When evaluating the cumulative nature of stormwater impacts, it is important to recognize the locations and net footprint change of C&D projects. Most proposed projects at Tinker AFB occur in already developed areas of the installation and involve a minimal net change in impervious surface areas. With respect to the Proposed Action, the net increase in impervious surface is relatively small and would not be expected to result in a considerable increase in stormwater runoff on the installation. Thus, the implementation of the Proposed Action and resulting incremental stormwater impacts when taken in the context of other similar projects would not be considered significant. Of more concern would be the proposed development of open spaces outside the installation, as proposed by the local community. While these developments may result in significant increases in stormwater runoff over the long term, the incremental contribution of the Proposed Action would be considered minor in context.

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APPENDIX A
PUBLIC INVOLVEMENT

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The Air Force made the Draft Final Environmental Assessment available for public review and comment from 17 August through 17 September 2007. The Air Force placed advertisements in the Oklahoman and the Tinker Take Off, local and installation newspapers, respectively, on 17 August 2007 informing the public of the public review period and the location of the document for review: the Tinker Information Repository at the Midwest City Library located at Reno and Midwest Boulevard. No comments regarding the proposed project or the Environmental Assessment were submitted to the Air Force by any members of the public. The following is a certification of publication in the Oklahoman. A copy of the advertisement as it appeared in the Tinker Take Off is provided; a similar advertisement was published in the Oklahoman.

STATE OF OKLAHOMA, } SS.
COUNTY OF OKLAHOMA }

Affidavit of Publication

Gina Calame, of lawful age, being first duly sworn, upon oath deposes and says that he is the A.E. of The Oklahoma Publishing Company, a corporation, which is the publisher of the The Oklahoman which is a daily newspaper of general circulation in the State of Oklahoma, and which is a daily newspaper published in Oklahoma County and having paid general circulation therein; that said newspaper has been continuously and uninterruptedly published in said county and state for a period of more than one hundred and four consecutive weeks next prior to the first publication of the notice attached hereto, and that said notice was published in the following issues of said newspaper, namely:

Th. 8/16 thru 5

DIANNAH FEATHERSTON NOTARY # 01004284 EXP. 4/01/09 PUBLIC STATE OF OKLAHOMA

Subscribed and sworn to before me this 20th day of August, 2007

Diannah Featherston
Notary Public

Gina Calame

My commission expires April 1, 2009

TAKE NOTE

United Way seeks Day of Caring volunteers

Teams of volunteers are needed to complete 100 projects during United Way's annual Days of Caring Oct. 12 and 13. Teams of all skills and sizes are requested to work on projects at local non-profits including painting, landscaping, filing, decorating, and interacting with clients.

Volunteer teams from private corporations, government agencies, faith-based organizations and schools may sign up to participate at http://dayofcaring.unitedwayokc.org. On the Web site, volunteers will find more information about the program, an opportunity to register a team and view a list of available projects. Volunteers may also request free T-shirts thanks to sponsorship by Deaconess Hospital.

Volunteer teams should register by today.

Projects are available in Oklahoma, Canadian and Logan Counties.

For more information, contact Rachel Klein at 236-8441 ext. 234 or rklein@unitedwayokc.org or visit http://dayofcaring.unitedwayokc.org.

Tuskegee Airmen Chapter to meet

The Charles B. Hall Chapter of the Tuskegee Airmen Incorporated will hold its monthly meeting from 5:30 p.m. to 6:30 p.m. Tuesday in the Tinker Terrace Room at Rose State College in Midwest City. For more information, contact Gus Mays at 733-2793 or sugsyam@aol.com.

AFCEA to hold Info Tech Expo

The Oklahoma City Chapter of the Armed Forces Communications and Electronics Association will hold an Info Tech Expo from 10 a.m. to 2 p.m. Wednesday and Thursday at the Tinker Club. The theme of the expo is "Command and Control: The Heart of America."

There is no cost to attend and all Tinker personnel are invited. Attendees can view and demo some of the latest IT products and services on the market today.

To pre-register visit www.fedpage.com and click on the "Events and Attendee Registration" tab in the left corner. Pre-registration is not required, but appreciated.

For more information, e-mail Dennis O'Neill at dennis@fbcinc.com.

Air Force Security Police Association

The Oklahoma Heartland Chapter of the Air Force Security Police Association will hold its monthly meeting at 9:30 a.m. Aug. 25 at the Tinker Club.

For more information, contact Pete Piazza at 921-8900 or wpiazza@aol.com.

Federally Employed Women

The Tinker Chapter of the Federally Employed Women will have its annual business meeting from 11:30 a.m. to 12:30 p.m. Aug. 27 at the Tinker Club. Everyone can attend and learn more about the organization. Tickets are on sale for a buffet lunch. Call Marilyn Porter at 734-1565 or Linda Bowers at 734-3364 for more information.

Park University enrollment

Park University offers four different majors in either the computer science or management areas. Enrollment is currently in progress for the Fall I Term, which begins Monday. To enroll or for

See **Take Note** *page 17.*

NOTICE OF AVAILABITY
DRAFT FINAL ENVIRONMENTAL ASSESSMENT
DRAFT FINDING OF NO SIGNIFICANT IMPACT
DRAFT FINDING OF NO PRACTICABLE ALTERNATIVE
FOR THE MILITARY HOUSING PRIVATIZATION INITIATIVE
AT
TINKER AIR FORCE BASE, OK

An Environmental Assessment (EA) has been prepared to analyze proposed military housing privatization at Tinker AFB, OK. The EA, prepared in accordance with the National Environmental Policy Act (NEPA), Council on Environmental Quality regulations, and Air Force instructions implementing NEPA, evaluates potential impacts of the proposed and alternative actions, including the No Action Alternative, on the environment. Based on the EA, the Air Force has prepared a proposed Finding of No Significant Impact (FONSI) and, due to potential unavoidable impacts to floodplains, a Finding of No Practicable Alternative (FONPA).

Copies of the EA and proposed FONSI/FONPA are available at the Tinker Information Repository located in the Midwest City Public Library, Reno at Midwest Boulevard.

For more information or to submit written comments please contact Brion Ockenfels with

Tinker AFB's Public Affairs Office:

72 Air Base Wing Public Affairs Office

7460 Arnold Avenue, Ste 127

Tinker AFB, OK 73145

(405) 739-2027/26

PRIVACY ADVISORY NOTICE

Your comments on this Draft Final EA are requested. Letters or other written comments provided may be published in the Final EA. As required by law, comments will be addressed in the Final EA and made available to the public. Any personal information provided will be kept confidential. Private addresses will be compiled to develop a mailing list for those requesting copies of the Final EA. However, only the names of the individuals making comments and their specific comments will be disclosed. Personal home addresses and phone numbers will not be published in the Final EA.

OKLAHOMA HISTORIC PRESERVATION CORRESPONDENCE

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DEPARTMENT OF THE AIR FORCE
72 AIR BASE WING (AFMC)
TINKER AIR FORCE BASE, OKLAHOMA

MEMORANDUM FOR STATE HISTORIC PRESERVATION OFFICE
ATTN: MR. JIM GABBERT
2401 NORTH LAIRD AVENUE
OKLAHOMA CITY OK 73105

MAY 11 2007

FROM: 72 ABW/CEVOE
7701 Arnold Street Room 109
Tinker AFB, OK 73145-9100

SUBJECT: Concurrence with the Program Comment for Capehart and Wherry Era Housing and Associated Structures and Landscape Features (1949 – 1962)

1. Tinker AFB is requesting a concurrence of the Program Comment for Capehart and Wherry Era Housing and Associated Structures and Landscape Features (1949 – 1962) with the Department of the Air Force (dated 18 Nov 2004). A program comment had been previously established with the Army (dated 31 May 2002). A study was conducted on the Cold War Era Capehart and Wherry houses. The study determined that five bases represented the best integrity of all the Capehart and Wherry houses. Therefore all of the other Capehart and Wherry houses were determined be ineligible. Under the program comments Tinker AFB is asking for concurrence that the 156 Capehart and Wherry houses on base are not eligible for the National Register of Historic Places. I have included a list of all the Capehart and Wherry houses on Tinker AFB.

2. For additional information, our point of contact is Mr. Tim Taylor at 739-7062.

TIM TAYLOR, CRPM
Environmental Engineering Operations Section
Environmental Management Division

Attachment:
List of Tinker Capehart and Wherry Houses

Tinker CapehartWherry Housing List

5001	FAM HSG,	2,754	SF	1959	DIL
5004	FAM HSG,	2,754	SF	1959	DIL
5005	FAM HSG,	2,968	SF	1959	DIL
5008	FAM HSG,	3,196	SF	1959	DIL
5009	FAM HSG,	2,754	SF	1959	DIL
5012	FAM HSG,	2,754	SF	1959	DIL
5013	FAM HSG,	3,082	SF	1959	DIL
5016	FAM HSG,	2,968	SF	1959	DIL
5017	FAM HSG,	2,754	SF	1959	DIL
5020	FAM HSG,	2,754	SF	1959	DIL
5021	FAM HSG,	3,196	SF	1959	DIL
5024	FAM HSG,	2,968	SF	1959	DIL
5025	FAM HSG,	2,754	SF	1959	DIL
5028	FAM HSG,	2,754	SF	1959	DIL
5029	FAM HSG,	3,082	SF	1959	DIL
5032	FAM HSG,	2,968	SF	1959	DIL
5033	FAM HSG,	2,754	SF	1959	DIL
5035	FAM HSG,	2,968	SF	1959	DIL
5037	FAM HSG,	3,082	SF	1959	DIL
5039	FAM HSG,	3,196	SF	1959	DIL
5042	FAM HSG,	2,968	SF	1959	DIL
5043	FAM HSG,	2,968	SF	1959	DIL
5046	FAM HSG,	2,968	SF	1959	DIL
5047	FAM HSG,	3,082	SF	1959	DIL
5050	FAM HSG,	2,968	SF	1959	DIL
5051	FAM HSG,	2,968	SF	1959	DIL
5053	FAM HSG,	3,082	SF	1959	DIL
5056	FAM HSG,	3,196	SF	1959	DIL
5057	FAM HSG,	2,968	SF	1959	DIL
5060	FAM HSG,	3,196	SF	1959	DIL
5061	FAM HSG,	3,082	SF	1959	DIL
5064	FAM HSG,	3,082	SF	1959	DIL
5065	FAM HSG,	3,082	SF	1959	DIL
5068	FAM HSG,	3,196	SF	1959	DIL
5069	FAM HSG,	2,968	SF	1959	DIL
5072	FAM HSG,	3,196	SF	1959	DIL
5073	FAM HSG,	3,082	SF	1959	DIL
5076	FAM HSG,	3,196	SF	1959	DIL
5077	FAM HSG,	3,196	SF	1959	DIL
5080	FAM HSG,	3,082	SF	1959	DIL
5081	FAM HSG,	3,196	SF	1959	DIL
5084	FAM HSG,	3,082	SF	1959	DIL
5086	FAM HSG,	3,082	SF	1959	DIL
5087	FAM HSG,	3,082	SF	1959	DIL
5090	FAM HSG,	3,082	SF	1959	DIL
5092	FAM HSG,	2,968	SF	1959	DIL
5093	FAM HSG,	2,968	SF	1959	DIL
5096	FAM HSG,	3,082	SF	1959	DIL
5097	FAM HSG,	3,082	SF	1959	DIL
5100	FAM HSG,	2,968	SF	1959	DIL
5102	FAM HSG,	3,082	SF	1959	DIL
5103	FAM HSG,	2,754	SF	1959	DIL

Tinker CapehartWherry Housing List

5106	FAM HSG,	3,082	SF	1959	DIL
5107	FAM HSG,	3,196	SF	1959	DIL
5110	FAM HSG,	3,082	SF	1959	DIL
5111	FAM HSG,	2,968	SF	1959	DIL
5114	FAM HSG,	2,968	SF	1959	DIL
5115	FAM HSG,	2,754	SF	1959	DIL
5118	FAM HSG,	3,082	SF	1959	DIL
5119	FAM HSG,	3,196	SF	1959	DIL
5122	FAM HSG,	3,082	SF	1959	DIL
5123	FAM HSG,	2,754	SF	1959	DIL
5126	FAM HSG,	3,196	SF	1959	DIL
5127	FAM HSG,	3,082	SF	1959	DIL
5129	FAM HSG,	2,968	SF	1959	DIL
5132	FAM HSG,	2,968	SF	1959	DIL
5134	FAM HSG,	3,082	SF	1959	DIL
5135	FAM HSG,	2,754	SF	1959	DIL
5138	FAM HSG,	3,082	SF	1959	DIL
5140	FAM HSG,	3,082	SF	1959	DIL
5142	FAM HSG,	3,196	SF	1959	DIL
5143	FAM HSG,	3,082	SF	1959	DIL
5146	FAM HSG,	3,082	SF	1959	DIL
5148	FAM HSG,	2,968	SF	1959	DIL
5149	FAM HSG,	3,082	SF	1959	DIL
5152	FAM HSG,	3,196	SF	1959	DIL
5153	FAM HSG,	3,196	SF	1959	DIL
5156	FAM HSG,	3,196	SF	1959	DIL
5157	FAM HSG,	3,082	SF	1959	DIL
5160	FAM HSG,	2,968	SF	1959	DIL
5301	FAM HSG,	1,735	SF	1959	DIL
5302	FAM HSG,	1,798	SF	1959	DIL
5303	FAM HSG,	1,798	SF	1959	DIL
5304	FAM HSG,	2,251	SF	1959	DIL
5305	FAM HSG,	1,798	SF	1959	DIL
5306	FAM HSG,	2,886	SF	1959	DIL
5307	FAM HSG,	3,408	SF	1959	DIL
5308	FAM HSG,	2,886	SF	1959	DIL
5309	FAM HSG,	2,886	SF	1959	DIL
5310	FAM HSG,	2,886	SF	1959	DIL
5311	FAM HSG,	1,798	SF	1959	DIL
5312	FAM HSG,	2,251	SF	1959	DIL
5313	FAM HSG,	1,735	SF	1959	DIL
5314	FAM HSG,	2,203	SF	1959	DIL
5315	FAM HSG,	1,798	SF	1959	DIL
5316	FAM HSG,	2,203	SF	1959	DIL
5317	FAM HSG,	1,798	SF	1959	DIL
5318	FAM HSG,	2,251	SF	1959	DIL
5319	FAM HSG,	1,798	SF	1959	DIL
5320	FAM HSG,	2,251	SF	1959	DIL
5321	FAM HSG,	1,735	SF	1959	DIL
5322	FAM HSG,	1,735	SF	1959	DIL
5323	FAM HSG,	1,735	SF	1959	DIL
5324	FAM HSG,	1,735	SF	1959	DIL

Tinker CapehartWherry Housing List

5325	FAM HSG,	1,798	SF	1959	DIL
5326	FAM HSG,	1,735	SF	1959	DIL
5327	FAM HSG,	1,798	SF	1959	DIL
5328	FAM HSG,	1,798	SF	1959	DIL
5329	FAM HSG,	1,798	SF	1959	DIL
5330	FAM HSG,	1,798	SF	1959	DIL
5332	FAM HSG,	3,304	SF	1959	DIL
5333	FAM HSG,	3,304	SF	1959	DIL
5336	FAM HSG,	3,410	SF	1959	DIL
5337	FAM HSG,	3,410	SF	1959	DIL
5340	FAM HSG,	3,410	SF	1959	DIL
5342	FAM HSG,	3,410	SF	1959	DIL
5343	FAM HSG,	3,304	SF	1959	DIL
5345	FAM HSG,	3,410	SF	1959	DIL
5347	FAM HSG,	3,304	SF	1959	DIL
5349	FAM HSG,	3,304	SF	1959	DIL
5351	FAM HSG,	1,735	SF	1959	DIL
5352	FAM HSG,	1,735	SF	1959	DIL
5353	FAM HSG,	1,735	SF	1959	DIL
5354	FAM HSG,	1,735	SF	1959	DIL
5355	FAM HSG,	1,735	SF	1959	DIL
5356	FAM HSG,	1,735	SF	1959	DIL
5357	FAM HSG,	1,735	SF	1959	DIL
5358	FAM HSG,	1,798	SF	1959	DIL
5359	FAM HSG,	1,735	SF	1959	DIL
5361	FAM HSG,	1,735	SF	1959	DIL
5362	FAM HSG,	1,798	SF	1959	DIL
5363	FAM HSG,	1,735	SF	1959	DIL
5364	FAM HSG,	1,735	SF	1959	DIL
5365	FAM HSG,	1,735	SF	1959	DIL
5366	FAM HSG,	1,735	SF	1959	DIL
5368	FAM HSG,	3,304	SF	1959	DIL
5370	FAM HSG,	3,304	SF	1959	DIL
5372	FAM HSG,	3,304	SF	1959	DIL
5374	FAM HSG,	3,304	SF	1959	DIL
5376	FAM HSG,	3,304	SF	1959	DIL
5378	FAM HSG,	3,304	SF	1959	DIL
5379	FAM HSG,	3,304	SF	1959	DIL
5382	FAM HSG,	3,304	SF	1959	DIL
5384	FAM HSG,	3,304	SF	1959	DIL
5386	FAM HSG,	3,410	SF	1959	DIL
5387	FAM HSG,	3,410	SF	1959	DIL
5390	FAM HSG,	3,304	SF	1959	DIL
5391	FAM HSG,	3,304	SF	1959	DIL
5394	FAM HSG,	3,410	SF	1959	DIL
5395	FAM HSG,	3,304	SF	1959	DIL
5398	FAM HSG,	3,410	SF	1959	DIL
5400	FAM HSG,	3,304	SF	1959	DIL
5401	FAM HSG,	3,304	SF	1959	DIL
5403	FAM HSG,	3,304	SF	1959	DIL
5406	FAM HSG,	3,410	SF	1959	DIL
5407	FAM HSG,	3,410	SF	1959	DIL

Oklahoma Historical Society *Founded May 27, 1893*
State Historic Preservation Office
Oklahoma History Center • 2401 North Laird Ave. • Oklahoma City, OK 73105-7914
(405) 521-6249 • Fax (405) 522-0816 • www.okhistory.org/shpo/shpom.htm

May 15, 2007

Mr. Tim Taylor, CRPM
TAFB Environmental Engineering Section
72 ABW/CEVOE
7701 Arnold Street, Room #109
Tinker AFB, OK 73145

RE: File #1488-07; Tinker AFB Program Comment for Capehart and Wherry Era Housing

Dear Mr. Taylor:

We have received and reviewed the documentation on the referenced project. We concur with your opinion that the Capehart and Wherry Era base housing at Tinker Air Force Base (TAFB) are not eligible for the National Register of Historic Places, based on the findings of the Program Comment issued by the Department of the Air Force in 2004. A similar finding for the Department of the Army in 2002 is the basis for the Air Force study. A site visit by SHPO staff in 2002 noted the integrity and condition of the 156 Capehart and Wherry houses at TAFB, and based on the Army study, determined that there was no significance to the collection of resources

We appreciate the opportunity to comment on this project and look forward to working with you in the future.

Should further correspondence pertaining to this project be necessary, the above underlined file number must be referenced. If you have any questions, please contact Mr. Jim Gabbert, Architectural Historian, at 405/522-4478.

Sincerely,

Melvena Heisch
Deputy State Historic
Preservation Officer

MH:pm

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