U.S. Air Force
Environmental Assessment
Repair by Replacement JP-8 Fuel Transfer Line
Tinker Air Force Base, Oklahoma

United States Air Force
Air Force Materiel Command

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14. ABSTRACT

The Air Force proposes to remove and replace approximately 11,000 linear feet of existing underground fiberglass jet fuel transfer line with new piping suitable for jet fuel. The diameter of the new pipeline would be six inches (same as the existing jet fuel transfer line). The replacement fuel transfer line would be an in-kind replacement and located primarily within the same alignment on either side of Runway 12/30. The purpose of the action is to replace the existing fiberglass jet fuel transfer line and avoid failure of the pipeline. The replacement pipeline is needed to continue providing fuel to operating tanks that service aircraft under the responsibility of the Air Force and other agencies. The Proposed Action to replace the jet fuel transfer line at Tinker AFB is being evaluated in this EA. Environmental resources evaluated in this impact analysis are: biological resources; cultural resources; geologic resources and soils; hazardous materials and wastes; and water resources (floodplains and wetlands).

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FINDING OF NO SIGNIFICANT IMPACT AND FINDING OF NO PRACTICABLE ALTERNATIVE REPAIR BY REPLACEMENT OF JP-8 FUEL TRANSFER LINE TINKER AIR FORCE BASE, OKLAHOMA

Pursuant to the Council on Environmental Quality regulations for implementing the procedural provisions of the National Environmental Policy Act (NEPA), Title 40 of the Code of Federal Regulations (CFR) §§1500 – 1508; Air Force Environmental Impact Analysis Process (EIAP) regulations, 32 CFR §989, and Department of Defense Directive 6050.1, the Air Force has prepared an environmental assessment (EA) to evaluate the potential environmental impacts on the natural and human environment associated with replacing the jet fuel transfer line at Tinker Air Force Base (AFB), Oklahoma.

Purpose and Need for the Proposed Action (EA §1.2)

The purpose of this action is to avoid failure of the existing fiberglass jet fuel transfer pipeline, which is needed to continue providing fuel to operating tanks that service aircraft under the responsibility of the Air Force and other agencies at Tinker AFB.

Description of Proposed Action and Alternatives

The 72 ABW is proposing to remove and replace 11,000 linear feet of the underground fiberglass jet fuel transfer line with piping suitable for jet fuel. The diameter of the new pipeline would be 6 inches (same as the existing jet fuel transfer line). Replacement of the jet fuel transfer line would conform to Unified Facilities Criteria (UFC) 3-460-3 and MIL-HDBK-1022A for federal petroleum systems. The replacement fuel transfer line would be an in-kind replacement and located primarily within the same alignment on either side of Runway 12/30. The Proposed Action would result in:

- Trenching of approximately 11,000 linear feet to include pavement removal. Boring under Runway 12/30, three taxiways and existing road surfaces would be required.
- Construction within the 100-year floodplain associated with East Crutcho Creek (to replace the pipeline that is buried beneath this creek).

Construction of the project would require approximately 12 months. Airfield operations, including ongoing aircraft fueling and defueling on the apron, would continue during the construction period.

Preferred Alternative (EA §2.10)

Based on the analyses conducted for this EA, the Air Force has identified the Proposed Action (replacement of the jet fuel transfer line as described in §2.3 of the EA) as the Agency Preferred Alternative.

No Action Alternative (EA §2.5)

Under the No Action Alternative, aircraft fueling operations would continue using the existing fiberglass jet fuel transfer line until failure. Failure of the 6-inch diameter pressurized underground fuel line would create unacceptable environmental consequences. In the event of line failure, there would be no way to supply five hydrant operating tanks. Refueling trucks would be the only way to service aircraft supported by these systems. The current refueling fleet is sized for the existing fuel hydrant utilization and is not sufficient to meet the demands of the Tinker AFB aircraft flying mission. Additional refueler trucks would be required and would result in increased air pollutant

emissions and risk of environmental spills from fuel handling. Line failure could result in delays in maintenance and operational schedules, which could result in fewer aircraft available for sortie generation and hinder mission capability and readiness. Continued use of the existing underground jet fuel transfer line would result in the continued labor-intensive, trial-and-error efforts to find and repair future leaks in the line. There is no practicable method to continuously monitor for leaks in single-walled fiberglass piping.

Environmental Consequences

Biological Resources (EA §3.1.4)

Construction associated with removal of the existing jet fuel transfer line and installation of a replacement line would result in approximately 1.5 acres of grassy/grassland and open woodland vegetation disturb on Tinker AFB. This corridor would be re-landscaped or re-vegetated upon completion of construction. An isolated 5-acre area of prairie vegetation adjacent to the southern segment of the replacement jet fuel transfer line corridor would be avoided. No impacts to common species of wildlife would result from construction activities. There are no federal or state listed threatened or endangered species of plants or wildlife. To prevent potential impacts to species of concern or sensitive species, no mature trees would be removed in the open wooded area adjacent to Tower Road along the southeastern segment of the jet fuel transfer line.

Cultural Resources (EA §3.2.4)

Although no known historic properties are within or immediately adjacent to the project area, construction has the potential to encounter an unanticipated discovery of subsurface archaeological material due to the need for ground disturbance (i.e., excavation and trenching). To avoid impacts to archaeological resources, the Air Force would ensure any archaeological deposits discovered during construction activities would be managed in accordance with the compliance procedures in the Tinker AFB Integrated Cultural Resources Management Plan (ICRMP). A concurrence letter from the State Historic Preservation Officer was received 21 Nov 11 (EA Appendix A). The Air Force also consulted with Native American tribes and groups in the area. No issues or concerns with cultural resources have been identified to date.

Geologic Resources and Soils (EA §3.3.4)

Construction of the replacement jet fuel transfer line would occur within an area where the physiographic features and geologic resources have been previously disturbed. Alteration of ground surface would consist of pavement removal and trenching to install a replacement jet fuel pipeline. The replacement pipeline would be designed and constructed in accordance with engineering standards applicable to soil characteristics at the project site. Construction would not require any permanent removal of topsoil or use of extensive fill. Earthwork would be planned and conducted in such a manner as to minimize the duration of exposure of unprotected soils. Best management practices such as single point construction entries would minimize erosion during demolition and construction. Grass and other landscaping would be reestablished in the disturbed areas immediately after construction is completed, thereby, reducing the potential for erosion. No permanent alteration of surface features would occur. Impacts to geologic resources and soils would not be significant.

Hazardous Materials and Wastes (EA §3.4.4)

Because soil and groundwater contamination from past fuel releases is present in the project area, any contaminated soil from trenching or excavation would be tested prior to disposal. Ongoing

cleanup and investigation at nearby contaminated sites would continue during replacement of the jet fuel transfer line.

Operation of the replacement jet fuel transfer line would not result in the generation or disposal of hazardous materials/wastes. The likelihood of jet fuel leaks from an obsolete pipeline would be reduced when the replacement pipeline is operational. Ongoing remediation and investigation at nearby contaminated sites would not be impeded during operation of the replacement jet fuel transfer line. Therefore, there would be no adverse impacts to hazardous materials/wastes or contaminated sites during operation of the Proposed Action.

Water Resources (EA §3.5.4)

The Proposed Action would be constructed to avoid permanent disturbance to East Crutcho Creek. Best Management Practices for erosion control would be followed in accordance with construction permit conditions and the Storm Water Pollution Prevention Plan (SWPPP). No change to groundwater recharge would occur as a result of the Proposed Action.

Wetlands. There are no wetlands in the immediate area of the Proposed Action that would be affected by construction or operations. The proposed replacement of the jet fuel transfer line would not involve any disturbance or removal of any wetlands. Although no jurisdictional wetlands would be crossed, work within the watershed of the Fire Pond jurisdictional wetland would be required. Implementation of the SWPPP would ensure secondary impacts from construction activities would not impact the wetland area.

Floodplains. Removal of the existing jet fuel transfer line and the installation of replacement pipeline would occur within approximately 9,025 square feet of the mapped floodplain associated with East Crutcho Creek, an intermittent ephemeral stream. The proposed in-kind replacement of this pipeline should not result in any change in the elevation, function, or capacity of the existing floodplain since activities would only involve short-term construction. Following installation, the piping would be buried and the ground surface would be returned to its current condition (i.e., elevation, topography, ground cover). The Proposed Action would have temporary negligible impacts on the East Crutcho Creek floodplain; no permanent impacts would occur.

Overall, the Proposed Action would not result in impacts to water resources.

Cumulative Impacts (EA §§3.1.5, 3.2.5, 3.3.5, 3.4.5, and 3.5.5

The cumulative impacts of implementing the Proposed Action along with other past, present, and future projects identified in §2.5 of the EA were assessed.

- The proposed replacement of the buried jet fuel pipeline would not contribute to loss of biological habitat on Tinker AFB.
- No historic buildings would be affected by the Proposed Action and the probability is low for inadvertent discoveries of archaeological resources.
- The in-kind replacement of the buried jet fuel pipeline would not result in any adverse impacts to geologic resources or soils. No permanent removal of topsoil, alteration of topography, or increases in erosion would result.
- The likelihood of jet fuel leaks from an aging pipeline would be avoided.
- The Proposed Action would not result in any disturbance to surface water, groundwater, and wetlands or permanent alteration of floodplains.

Therefore, the Proposed Action would not contribute to cumulative impacts on biological resources, cultural resources, geologic resources and soils, hazardous materials and wastes, or water resources (surface water, groundwater, wetlands, or floodplains).

Public Notice

A Notice of Availability for public review of the Draft EA was published in *The Daily Oklahoman* and *Tinker Take Off* on 10 November 2011. The document was transmitted to 27 government agencies and was also available for review at the Midwest City Public Library. The public review lasted for 30 days. No comments were received by the Air Force.

FINDING OF NO PRACTICABLE ALTERNATIVE

Taking the above information into consideration, pursuant to Executive Order 11988 (*Floodplain Management*) and the authority delegated by Secretary of the Air Force Order 791.1, I find that there is no practicable alternative to conducting the Proposed Action within 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 Executive Order and the Air Force EIAP regulation, 32 CFR §989.14, for a Finding of No Practicable Alternative.

FINDING OF NO SIGNIFICANT IMPACT

Based upon my review of the facts and analyses contained in the attached EA and as summarized above, I find the Proposed Action to replace the JP-8 fuel transfer line at Tinker AFB will not have a significant impact on the natural or human environment; therefore, an environmental impact statement is not required. This analysis fulfills the requirements of NEPA, the President's Council on Environmental Quality 40 CFR §§1500-1508, and the Air Force EIAP regulations 32 CFR §989.

PAUL A. PARKER, SES
Command Civil Engineer
Communications, Installations
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22 Dec 2011
Date

U.S. AIR FORCE
ENVIRONMENTAL ASSESSMENT

REPAIR BY REPLACEMENT OF JP-8 FUEL TRANSFER LINE
TINKER AIR FORCE BASE, OKLAHOMA

United States Air Force
Air Force Materiel Command

Tinker Air Force Base, Oklahoma

December 2011

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ENVIRONMENTAL ASSESSMENT
REPAIR BY REPLACEMENT JP-8 FUEL TRANSFER LINE
AT TINKER AIR FORCE BASE, OKLAHOMA

Responsible Agency: Department of the Air Force, 72nd Air Base Wing (72 ABW), Civil Engineering Flight, Tinker Air Force Base (AFB), Oklahoma

Proposed Action: Repair by Replacement JP-8 Fuel Transfer Line at Tinker AFB, Oklahoma

Written comments and inquiries regarding this document should be directed to: Mr. Brion Ockenfels, 72 ABW/PA, 7460 Arnold Avenue (Bldg 460), Suite 127, Tinker AFB, Oklahoma 74135 Phone: (405) 739-2027. Email: brion.ockenfels@tinker.af.mil

Abstract: The Air Force proposes to remove and replace approximately 11,000 linear feet of existing underground fiberglass jet fuel transfer line with new piping suitable for jet fuel. The diameter of the new pipeline would be six inches (same as the existing jet fuel transfer line). The replacement fuel transfer line would be an in-kind replacement and located primarily within the same alignment on either side of Runway 12/30. The purpose of the action is to replace the existing fiberglass jet fuel transfer line and avoid failure of the pipeline. The replacement pipeline is needed to continue providing fuel to operating tanks that service aircraft under the responsibility of the Air Force and other agencies.

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ACRONYMS AND ABBREVIATIONS

ABW	Air Base Wing
ACOG	Association of Central Oklahoma Governments
ACW	Air Control Wing
AFB	Air Force Base
AFCEE	Air Force Center for Engineering and the Environment
AFGLSC	Air Force Global Logistics Support Center
AFI	Air Force Instruction
AFMC	Air Force Materiel Command
AP	accumulation point
APE	area of potential effect
APZ	Accident Potential Zone
ARW	Air Refueling Wing
AST	aboveground storage tank
ATFP	anti-terrorism/force protection
AWACS	Airborne Warning and Control System
BBL	barrel
BMP	best management practice
B.S.	Bachelor of Science
CCG	Combat Communications Wing
CEAN	Civil Engineering - Natural Infrastructure Management
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFC	chlorofluorocarbon
CFR	Code of Federal Regulations
CG	contaminated groundwater
CRP	Compliance Restoration Program
CSCW-1	Command Strategic Communications Wing One
CZ	Clear Zone
DEQ	Department of Environmental Quality
DISA	Defense Information Systems Agency
DoD	Department of Defense
EA	environmental assessment
ECAMP	Environmental Compliance Assessment and Management Program
EIAP	environmental impact analysis process
EIG	Engineering Installation Group
EIS	environmental impact statement
E.O.	Executive Order
EPA	Environmental Protection Agency
ERP	Environmental Restoration Program
ESQD	Explosive Safety Quantity Distance
FONPA	finding of no practicable alternative
FONSI	finding of no significant impact

FRG	Foundation Repair Guide
GHG	greenhouse gases
GIS	Geographic Information System
GISP	Geographic Information System Professional
GWMU	groundwater management unit
HCFC	hydrochlorofluorocarbon
HFC	hydrofluorocarbon
HQ AFCEE	Headquarters, Air Force Center for Engineering and the Environment
HMMP	Hazardous Materials Management Plan
HMMS	Hazardous Materials Management System
ICA	Intergovernmental Coordination Act
ICE	internal combustion engine
ICRMP	Integrated Cultural Resources Management Plan
IICEP	Interagency and Intergovernmental Coordination for Environmental Planning
IRP	Installation Restoration Program
JP-8	Jet Propellant 8
JP-5	Jet Propellant 5
kPa	kilo Pascal
kW	kiloWatt
LBP	lead-based paint
LRS/LGRFO	Logistics Readiness Squadron/Fuels Management
MAC	Military Airlift Command
M.A.G.	Master of Applied Geography
MIL-HDBK	military handbook
MM	Modified Mercalli
MMRP	Military Munitions Response Program
MMRP	Military Munitions Response Program
M.S.	Master of Science
MSL	mean sea level
NATO	North Atlantic Treaty Organization
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
OAS	Oklahoma Archaeological Survey
OC-ALC	Oklahoma City-Air Logistics Center
OC-ALC/GK	Oklahoma City-Air Logistics Center/Aerospace Sustainment Directorate
ODWC	Oklahoma Department of Wildlife Conservation
OK	Oklahoma
OT	other
P2	pollution prevention
PCB	polychlorinated biphenyl
PFC	perfluorocarbon
P.L.	Public Law
psi	pounds per square inch

QAE	Quality Assurance Officer
RCRA	Resource Conservation and Recovery Act
ROI	region of influence
RW	radioactive
SCMG	Supply Chain Management Wing
SES	Senior Executive Service
SF_6	sulfur hexafluoride
SHPO	State Historic Preservation Office
SRM	Sustainment, Repair and Modernization
ST	storage tank
SWPPP	Storm Water Pollution Prevention Plan
TACX	Tinker Aerospace Complex
TCE	trichloroethene
TSDF	treatment, storage and disposal facility
USAF	United States Air Force
UFC	Unified Facilities Criteria
USC	United States Code
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UST	underground storage tank
VOC	volatile organic compounds

CHAPTER 1
OVERVIEW

The United States Air Force (USAF), Air Force Materiel Command (AFMC), 72nd Airbase Wing (72 ABW) at Tinker Air Force Base (AFB), Oklahoma (the Responsible Agency for this environmental assessment and the proponent for this action) proposes to replace the jet fuel transfer line that supports 552nd Air Control Wing (552 ACW) E-3, 507th Air Refueling Wing (507 ARW) KC-135, United States Navy Command Strategic Communications Wing One (CSCW-1) E-6B and other aircraft serviced at Tinker AFB, Oklahoma.

1.1 INTRODUCTION

Tinker AFB currently utilizes a jet fuel transfer line that supports multiple aircraft assigned to the 552 ACW, 507 ARW, the Navy CSCW-1, and other units. Due to substantial increases in home station aircraft and associated programmed training, the need for a reliable jet fuel transfer line is critical to mission performance and readiness.

The Base Fuels Management Office at Tinker AFB currently has one underground, fiberglass jet fuel transfer line that connects to two principal hydrant fuel service facilities. This six-inch diameter fiberglass line was installed in 1985 and had a design life of 20 years. Jet fuel is transferred from the bulk fuel storage tanks at the north side of Tinker AFB to five hydrant operating tanks at two locations on the south side of the base. These operating tanks serve hydrant systems on the aircraft parking aprons used by 552 ACW, 507 ARW, and U.S. Navy CSCW-1.

1.2 PURPOSE AND NEED

The purpose of the action is to replace the existing fiberglass JP-8 fuel transfer line which has exceeded its expected useful life. Due to having exceeded its useful life, failure of this JP-8 fuel transfer line could occur at anytime. The existing line does not have a leak detection system. Any further leaks could discharge jet fuel into two creeks on Tinker AFB. A jet fuel release into Kuhlman Creek or East Crutcho Creek would be an unpermitted discharge that could result in an enforcement action from the Oklahoma Department of Environmental Quality (DEQ).

The replacement jet fuel transfer line is needed to continue providing fuel to five hydrant operating tanks that service aircraft under the responsibility of the 507 ARW, the 552 ACW, U.S. Navy CSCW-1 and other units. Failure to provide fuel to these aircraft would impact the ability to provide Command and Control (C2) Battle Management to theater commanders with airborne command and control capability and critical operational support for various combat theaters.

The Tinker AFB General Plan (2005) indicated that although the liquid fuels system is adequate to meet current and future mission requirements, a number of components should be improved. The General Plan included a recommendation to replace the main fuel line from the Northside Industrial District to the South Forty District.

1.3 LOCATION, HISTORY AND CURRENT MISSION

1.3.1 Location

Tinker AFB is a major U.S. Air Force base, with Navy and other Department of Defense missions, located in the southeast Oklahoma City area, directly south of the suburb of Midwest

City, Oklahoma (Figure 1-1). The main portion of Tinker AFB is located within the incorporated city limits of Oklahoma City, Oklahoma. Centered ten miles southeast of downtown, Tinker AFB is generally bordered to the north by Interstate 40 and 29th Street, to the east by Douglas Boulevard, to the south along 74th Street, and to the west by Sooner Road. Incorporated areas immediately surrounding the Base include Midwest City to the north and Del City to the northwest (Figure 1-2).

Figure 1-1. Location of Tinker Air Force Base, Oklahoma

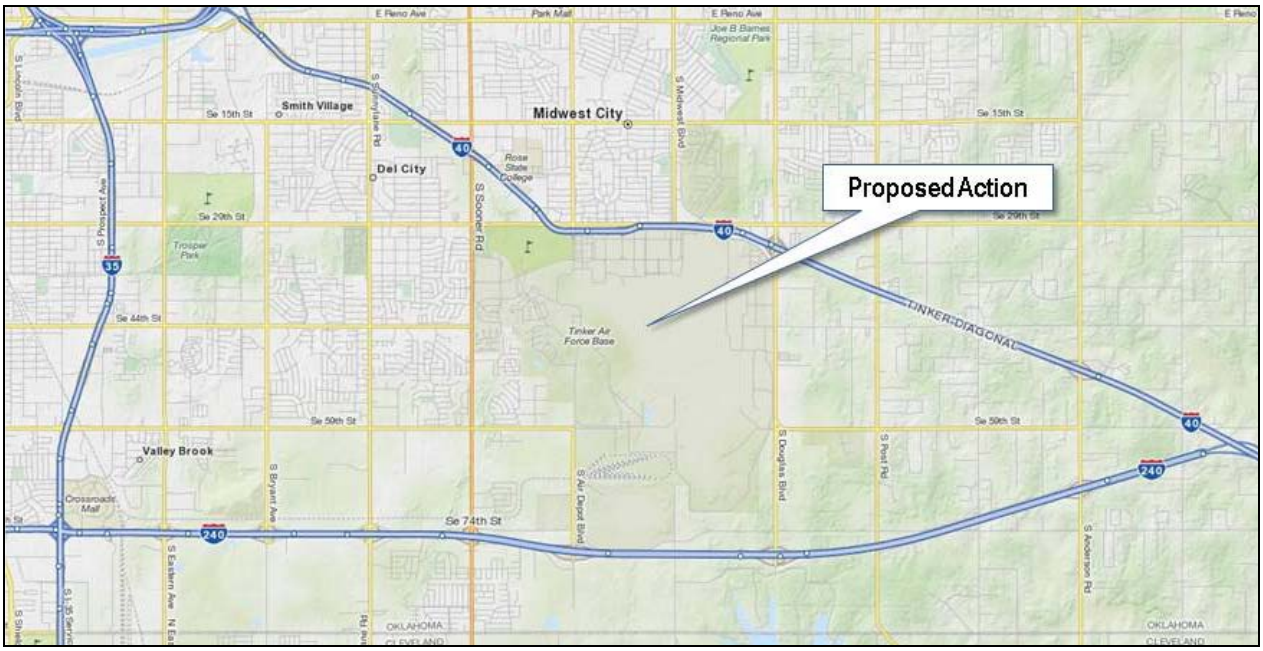

Figure 1-2. Location of Proposed Replacement of Jet Fuel Transfer Line at Tinker AFB

Tinker AFB occupies 5,033 acres and is divided into seven districts:

- The Northside Industrial District is where the majority of administrative, command and control, 552 ACW and personnel services are located.
- The Eastside Depot Maintenance District encompasses the majority of the activities associated with the Oklahoma City - Air Logistics Center (OC-ALC).
- The 38th Engineering Installation Group (EIG) District is a satellite location east of the Base boundary.
- The Southeastside Munitions District is located in the isolated southeast corner of the Base for the storing of munitions.
- The South Forty District, which includes the 3rd Combat Communications Group (CCG), the 507th Air Refueling Wing (507 ARW), and the U.S. Navy Command Strategic Communications Wing One (CSCW-1), is located in the southwestern portion of the Base.
- The West Community District has housing and most community facilities.
- The Airfield District located in the center of the Base is comprised of runways, taxiways and areas that support aircraft operations and maintenance.

1.3.2 History of Tinker AFB

As the United States was preparing for World War II in the early 1940s, the military needed aircraft manufacturers to build massive quantities of aircraft and subsequently, to establish air bases and depots to support these aircraft. On May 21, 1941, with the support of the city government and local organizations, the Army selected 960 acres just east of Oklahoma City to establish a depot. The Oklahoma City Air Depot began operations in downtown Oklahoma City in January 1942. The airfield was ready for beneficial occupancy on March 1, 1942, and was named Tinker Field in late 1942. After the war, all facilities came under control of the military. In January 1948, the installation became Tinker Air Force Base (USAF, 2011b). The Douglas Cargo Airplane Plant manufactured C-47s at Tinker AFB for the Army during World War II. After the end of WWII, the plant was closed and converted into new types of repair and test facilities, including facilities for testing and over-hauling jet engines by the base. During the Cold War, Tinker AFB became the logistics center for several of the key functions of the nation's new aircraft, missiles, and communications equipment, including the logistics functions of the B-52 bomber (USAF, 2011b).

A major repair site during the Korean War, the base was also the headquarters of the Combat Control Center during the Cuban Missile Crisis. During the Vietnam War, the base's size and responsibilities for aircraft and vehicle repair were again expanded. Tinker AFB was the only overhaul depot for the J-57 engine, and it provided overhaul and repair services for the F-101 engine, the AGM-86A missile, and other military offensive aircraft. In the early 1990s, the base provided front-line support to the forces engaged in Operation Desert Shield and Desert Storm. Today, Tinker AFB continues to provide aircraft maintenance and repair as well as logistical support (USAF, 2011b).

1.3.3 Mission

Tinker AFB is an AFMC installation. With 464 buildings, the installation functions as a major aircraft maintenance and repair depot. The largest organization on the Base is OC-ALC which is the largest of three depot repair centers in AFMC. OC-ALC provides depot maintenance,

management expertise as well as installation, services and information support for weapon systems, various commands, numerous Air Force bases and foreign nations. The host organization for Tinker AFB is OC-ALC, whose mission is to provide aircraft modifications, repairs and program management on a variety of bombers, refuelers and reconnaissance aircraft.

OC-ALC is the worldwide manager for a wide range of aircraft engines, missiles and commodity items. The center manages an inventory of aircraft, which include the B-1 Lancer, B-2 Spirit, B-52 Stratofortress, C/KC-135 Stratotanker, E-3 Sentry and contractor logistics support aircraft; as well as a substantial jet engine inventory ranging from the older Pratt and Whitney TF33 to the newer, state-of-the-art engines such as the GE F118. The center performs depot maintenance and overhaul and repair on numerous jet engines. More than 17,763 military, civilian and contract employees work at OC-ALC. OC-ALC is comprised of three wings that collaborate to ensure the overall success of the center:

- The 72 ABW provides base installation and support services for the OC-ALC and 45 associate units assigned to six major commands, including 552 ACW (the largest flying wing in Air Combat Command), the U.S. Navy CSCW-1 and several defense agencies. More than 1,600 personnel and 1,343 contractors work within the 72 ABW.
- The 76th Maintenance Wing is the largest wing at OC-ALC with more than 8,400 military and civilian personnel. The 76th Maintenance Wing performs programmed depot maintenance on the C/KC-135, B-1B, B-52 and E-3 aircraft, expanded phase maintenance on Navy E-6 aircraft, and maintenance, repair and overhaul of F100, F101, F108, F110, F118, F119 and TF33 engines for the Air Force, Air Force Reserve, Air National Guard, Navy and foreign military sales. Additionally, the wing is responsible for the maintenance, repair and overhaul of a myriad of Air Force and Navy airborne accessory components, and the development and sustainment of a diverse portfolio of operational flight programs.
- The Oklahoma Air Logistics Center Aerospace Sustainment Directorate (OC-ALC/GK) organizes, directs and controls total life-cycle management of 94 B-52, 585 C/KC-135, 69 B-1 and 416 contractor logistics (including tanker, trainer, telemetry, airlift, command and control and U.S. Presidential aircraft) aircraft. This Directorate is also responsible for all modifications and sustainment, including management and engineering of systems upgrades, acquisition of new systems, fleet support logistics, software maintenance, and programmed depot maintenance and supporting USAF, Reserve and Guard, sister service and forces from numerous foreign military services. OC-ALC/GK manages the readiness of B-2 and E-3 aircraft, 1,382 Air Traffic Control and Landing Systems, and worldwide High Frequency Global Communications Network.

Tinker AFB is also home to eight major Department of Defense, Air Force and Navy activities with critical national defense missions:

- The 448th Supply Chain Management Wing is comprised of five Supply Chain Management Groups (SCMG): 448th SCMG Contracting Group; 638th SCMG Planning & Execution Group (Robins AFB, Georgia); 748th SCMG, Planning & Execution Group (Hill AFB, Utah); 848th SCMG Planning and Execution Group; and 948th SCMG Materiel Group. All are part of the Air Force Global Logistics Support Center (AFGLSC) headquartered at Scott AFB, Illinois.

- The 552nd Air Control Wing flies the E-3 Sentry aircraft and is part of the Air Force's Air Combat Command mobile strike force.
- The U.S. Navy Strategic Communications Wing One provides a vital, secure communications link to the submerged fleet of ballistic missile submarines. OC-ALC airframe artisans perform depot work on the Navy's E-6 Mercury airplanes while sailors perform field-level work.
- The 507 ARW, an Air Force Reserve flying unit, supports U.S. military and North Atlantic Treaty Organization (NATO) aircraft with aerial refueling and Airborne Warning and Control System missions worldwide. OC-ALC is the primary source of depot maintenance for the wing's KC-135R aircraft and engines.
- The 3rd Combat Communications Group provides deployable communications, computer systems, navigational aids and air traffic control services anywhere in the world.
- The 38th Cyberspace Engineering Group has worldwide responsibility for engineering and installation of all communications and electronic facilities for the Air Force.
- The Defense Distribution Depot Oklahoma provides the receipt, storage, issue, inspection and shipment of material in support of OC-ALC and other Tinker-based organizations.
- The Defense Information Security Agency Defense Enterprise Computing Center, Oklahoma City, is the local organization of the Defense Information Systems Agency (DISA). DISA operates computer systems for the base and serves 172 other bases in all 50 states and 92 foreign countries (USAF, 2011a).

The 72 ABW, 552nd Air Control Wing, U.S. Navy CSCW-1, and 507 ARW are assigned responsibility for the E-3 Sentry, the E-6B Mercury, and the KC-135. These organizations are capable of supporting and executing their global mission from Tinker AFB. OC-ALC is responsible for depot level maintenance of the B-1B Lancer, the E-3 Sentry, B-52, C/KC-135, the E-6B Mercury, and 25 other Contractor Logistics Support aircraft. The center also oversees 23,000 aircraft engines, and a multitude of missile systems for the Department of Defense..

1.3.4 Tinker AFB Jet Fuel Transfer Line

The existing jet fuel transfer line that supports 552 ACW, 507 ARW, and U.S. Navy CSCW-1 aircraft is located from the fuels area at Facility 273 (JP-8 Tank) north of Runway 12/30 to Facility 995 (Pump House) south of the runway. This pipeline extends beneath Taxiway Mike, is parallel to Runway 12/30 on the north side, goes under the runway, under Taxiway Hotel, continues parallel to Runway 12/30 on the south side, proceeds north of the control tower (Facility 935), turns south, crosses Crutcho Creek, runs east of Landfill Five, goes under Taxiway Echo, and ends at Facility 995 (Figure 1-3).

1.4 SUMMARY OF ENVIRONMENTAL STUDY REQUIREMENTS

The National Environmental Policy Act (NEPA) of 1969, as amended, requires federal agencies to consider environmental consequences prior to undertaking federal actions that may affect the environment. The President's Council on Environmental Quality (CEQ) issued regulations to implement NEPA. The Air Force Environmental Impact Analysis Process (EIAP) is accomplished through adherence to the procedures set forth in CEQ regulations (40 Code of Federal Regulations [CFR] 1500-1508) and 32 CFR 989, *Air Force Environmental Impact Analysis Process*. These federal regulations establish both the administrative process and substantive scope of the environmental impact evaluation designed to ensure that deciding

authorities have a proper understanding of the potential environmental consequences of a contemplated course of action. The CEQ regulations require that an environmental assessment (EA):

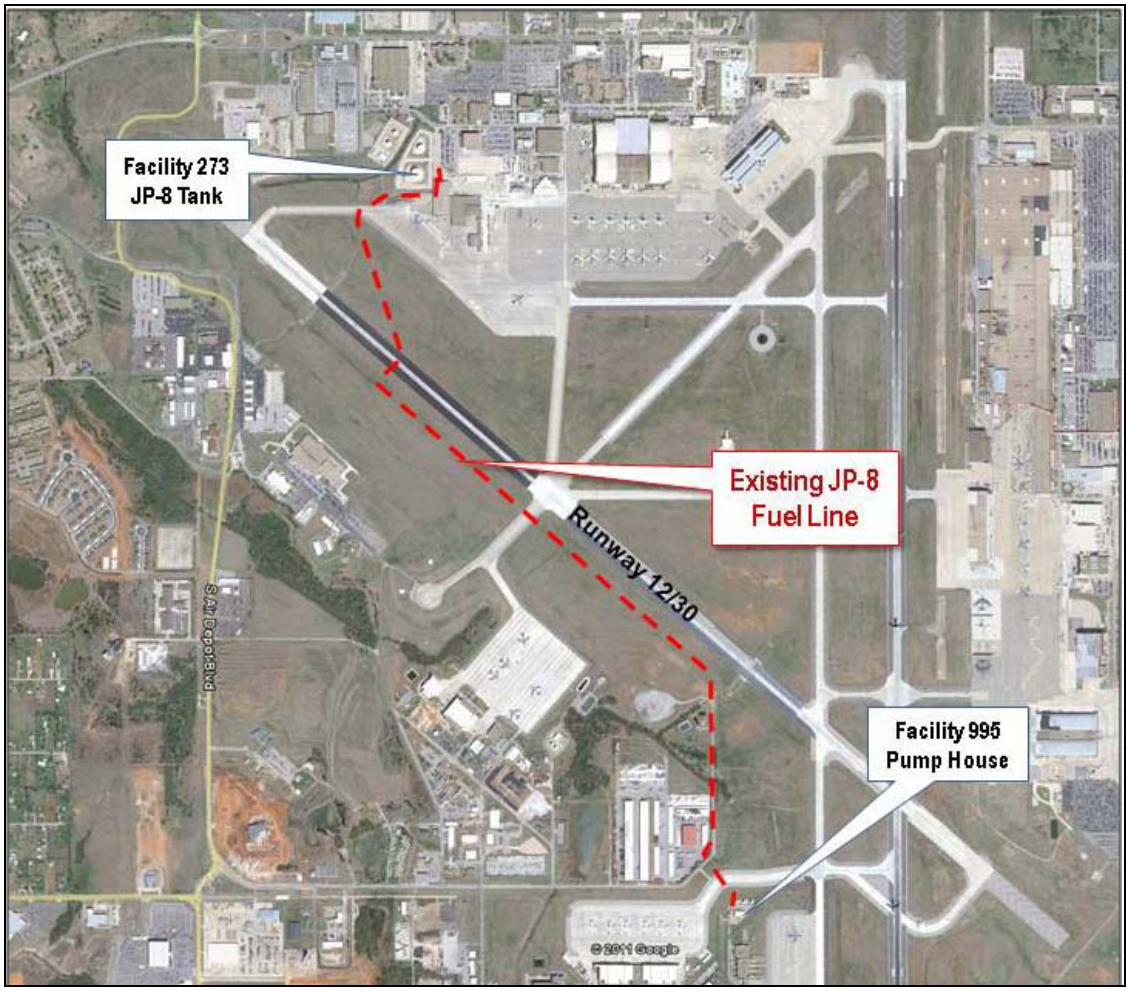

Figure 1-3. Existing JP-8 Fuel Transfer Line on Tinker AFB

- Briefly provide sufficient evidence and analysis to determine whether an environmental impact statement (EIS) or finding of no significant impact (FONSI) should be prepared;
- Aid in an agency's compliance with NEPA when no EIS is required; or,
- Facilitate preparation of an EIS, when required.

1.4.1 Scope of the Environmental Assessment

This EA identifies, describes, and evaluates the potential environmental impacts that may result from the Proposed Action and the No Action Alternative. The EA also explains the alternatives formulation and consideration process in which other alternatives were considered but eliminated from consideration. As appropriate, the affected environment and environmental consequences of the Proposed Action is described in terms of site-specific descriptions or a regional overview. Finally, the EA identifies measures that would prevent or minimize environmental impacts, if required.

1.4.2 Resource Areas Addressed in Detail

The intent of this EA is to meet NEPA requirements established in 32 CFR 989 (EIAP). The following resource areas are discussed in detail in the EA:

- Biological Resources;
- Cultural Resources;
- Geologic Resources and Soils;
- Hazardous Materials and Wastes; and
- Water Resources (including surface and ground water, and floodplains).

1.4.3 Resource Areas Eliminated from Further Study

Resource areas that have been eliminated from further detailed study in this document and the rationale for eliminating them are presented in the following paragraphs:

- **Air Quality and Greenhouse Gases.** With the exception of air pollutant emissions generated during construction, the proposed replacement and operation of the buried pipeline would not add a new emissions source to existing sources at Tinker AFB. Temporary construction-related air emissions would be generated from trenching for the placement of the new pipeline and removal of the old fiberglass pipeline over a period of approximately 12 months. Emissions would be limited to dust generated from an area of about 1.5 acres and combustion emissions generated from a backhoe or a trenching machine. These air pollutant emissions would not cause or contribute to a violation of any national, state, or local ambient air quality standard, nor would they expose sensitive receptors to substantially increased pollutant concentrations. The impact of the project's contribution to greenhouse gases from temporary construction emissions would be negligible.
- **Airspace Operations.** This action does not involve any change to the level of aircraft operations at Tinker AFB.
- **Noise.** With the exception of temporary construction-related noise that would be localized at the airfield, this action does not involve any change to the level of aircraft operations at Tinker AFB. For this reason, the Proposed Action would not result in any impacts to the noise environment at Tinker AFB or the surrounding community.
- **Land Use**. The Proposed Action would not result in any change to existing or planned land use at Tinker AFB.
- **Visual Resources**. This action does not involve any permanent, physical modifications to the aircraft operations and maintenance area. Replacement of the underground jet fuel transfer line would not result in any permanent alteration of the visual appearance of the airfield on Tinker AFB.
- **Safety**. Human health and safety are defined as the conditions, risks, and preventative measures associated with a facility and its ability to potentially affect the health and safety of facility personnel or the general public.. The proposed replacement of the jet fuel transfer line would be an on-Base function with minimal impacts to the general public. While unmarked surface safety zones are present in the project area, construction would not occur within the limits of the Clear Zone (CZ) or Accident Potential Zone (APZ) for the runways. Although a portion of the alignment would be near an Explosive

Safety Quantity Distance (ESQD) arc associated with munitions storage, pipeline replacement construction would not occur in the same area where munitions are stored. Operation of the replacement pipeline would not be affected by the storage of munitions because it is a buried pipeline. The Air Force follows stringent safety procedures for the transport and storage of munitions to preclude or minimize hazards to personnel and structures. Construction personnel would be required to abide by these safety procedures. The Proposed Action would be an in-kind replacement of an existing buried fuel pipeline and would not pose any new safety risks.

- **Sustainability**. On October 5, 2009, President Barack Obama issued Executive Order (E.O.) 13514, *Federal Leadership in Environmental, Energy, and Economic Performance,* to expand upon energy reduction and environmental performance requirements of E.O. 13423 *Strengthening Federal Environmental, Energy, and Transportation Management*, which was signed on January 24, 2007. E.O. 13514 establishes federal energy requirements in the areas of: accountability and transparency; strategic sustainability performance planning; greenhouse gas (GHG) management; sustainable buildings and communities; water efficiency; electronic products and services; fleet and transportation management; and pollution prevention and waste reduction. The Proposed Action to replace the existing jet fuel transfer line would not change energy requirements on Tinker AFB. This action would have no effect on mandated energy reduction goals at Tinker AFB as defined by E.O. 13514. As sustainability represents the reconciliation of social, environmental and economic demands, the Proposed Action could result in a cost savings from elimination of the costs associated with cleanup of fuel leaks associated with the existing jet fuel line.
- **Solid Waste.** The Proposed Action would result in generation of construction and demolition (C&D) waste which is generally separated from other solid waste to facilitate disposal. C&D waste includes solid wastes resulting from the construction and the demolition of pavements (concrete and asphalt). Solid waste generated on Tinker AFB is disposed of at an off-base landfill. The nearest landfill to Tinker AFB is the Southeast Oklahoma City Landfill approximately 8 miles west of Tinker AFB. The SE Oklahoma City landfill processed 535,809 tons of solid waste in 2010, has an expected lifespan of 12 years (Sanders, 2011), and is permitted to accept C&D waste. C&D debris generated on Tinker AFB is processed separately from other solid waste generated at the base. The construction contractor would be required to comply with the Integrated Solid Waste Management Plan that establishes procedures for managing solid waste on Tinker AFB and requires the on-base recycling and reuse of C&D wastes, when applicable. Tinker AFB operates a Defense Reutilization and Marketing Office to accept materials for reuse, transfer, donation, or sale, as well as accepting recyclable materials such as scrap metal and automotive and aircraft tires (USAF, 2005). The Proposed Action would not result in generation of solid waste or C&D waste that would exceed the capacity of the off-base landfill.
- **Socioeconomic Resources**. The Proposed Action would result in a temporary increase in local employment through construction jobs and local spending for construction materials; this impact would be beneficial but minor in comparison to the regional economy. The Proposed Action would not result in any appreciable impacts to population, employment, income, or economic activity at Tinker AFB or in the local area or region.

- **Infrastructure and Utilities**. The Proposed Action would not result in any change to communications, electricity, natural gas, potable water, or wastewater treatment.
- **Public Services.** This action does not involve any change to the level of aircraft operations or any substantial change in personnel requirements at Tinker AFB. For this reason, there would be no change in the need for police or fire protection, medical services or other public services.
- **Environmental Justice and Protection of Children.** In 1994, President William J. Clinton issued Executive Order (E.O.) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, in response to growing concern that minority and low-income populations bear adverse health and environmental effects disproportionately. E.O. 12898 encourages federal facilities to achieve "environmental justice" by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations. Accompanying E.O. 12898 was a Presidential transmittal memorandum, which referenced existing federal statutes and regulations to be used in conjunction with E.O. 12898. One of the items in this memorandum was the use of the policies and procedures of NEPA, specifically that, "Each federal agency shall analyze the environmental effects, including human health, economic, and social effects of federal actions, including effects on minority communities and low-income communities, when such analysis is required by the NEPA 42 USC Section 4321, et seq." In 1997, E.O. 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, was issued by President William J. Clinton. This order requires a similar analysis for children, where federal agencies must identify and assess environmental health risks and safety risks that may disproportionately affect children. Environmental health risks or safety risks refer to 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 air, food, drinking water, recreational water, and soil).

  Oklahoma County exhibits a higher minority population (48.7 percent) than the state of Oklahoma (32.0 percent). The county is composed of a higher percentage of persons under 18 years of age (26.2 percent) than the state (24.9 percent). The county is characterized by the same percent of low-income persons (16.2) as the state. Although Oklahoma County has a disproportionately higher percentage of minorities and children, the area that would be affected by the Proposed Action is limited to on-Base property. Based on the analyses conducted for this EA, the Proposed Action does not result in significant or adverse effects at any location for the following resources: biological resources; cultural resources; geological resources and soils; hazardous materials and wastes; and water resources. Since the Proposed Action would not have any adverse effect, no disproportionately high or adverse impacts upon minority and low-income populations would be anticipated. Therefore, impacts on environmental justice would not occur. Likewise, the Proposed Action would not cause environmental health or safety risks that may disproportionately affect children.

1.4.4 Required Permits and Consultations

The following federal, state, or local permits, licenses, and consultation requirements are required before implementation of the Proposed Action:

- The Air Force would provide notification of construction to the Federal Aviation Administration (FAA) on Form 7460-1, Notice of Proposed Construction or Alteration, in accordance with 14 CFR 77.9, *Safe, Efficient Use, and Preservation of the Navigable Airspace.*
- Clean Water Act[1] Section 404 Permit (under Nationwide Permit 12 for utility line activities) from the U.S. Army Corps of Engineers for work in waters of the U.S. to include a Notice of Intent, Storm Water Pollution Prevention Plan, and water quality certification per Section 401 of the Clean Water Act. Storm Water General Permit for Construction Activities from the Oklahoma Department of Environmental Quality (DEQ) (General Permit OKR10 for Storm Water Discharges from Construction Activities Within the state of Oklahoma and Oklahoma DEQ General Permit Number OKR05 for Storm Water Discharges from Industrial Facilities Under the Multi-Sector Industrial General Permit within the state of Oklahoma).
- National Historic Preservation Act (NHPA) consultation with the Oklahoma State Historic Preservation Officer (SHPO) and the Oklahoma Archaeological Survey (OAS) on a determination of No Effect. The Proposed Action would not result in the removal or disturbance of any National Register of Historic Places (NRHP)-eligible buildings or structures nor would any ground disturbing activities result in any effects on the historic district on Tinker AFB.
- Floodplain Development Permit from the Federal Emergency Management Agency for work in the 100-year floodplain.

Section 10 of the Rivers and Harbors Act approved March 3, 1899 (33 U.S.C. 403) prohibits the unauthorized obstruction or alteration of any navigable water of the United States. The construction of any structure in or over any navigable water of the United States, the excavating from or depositing of material in such waters, or the accomplishment of any other work affecting the course, location, condition, or capacity of such waters is unlawful unless the work has been recommended by the Chief of Engineers and authorized by the Secretary of the Army. The instrument of authorization is designated a permit. The Proposed Action would not require a Section 10 Permit from the U.S. Army Corps of Engineers.

[1] Regulates water quality by establishing standards and facilitating permit programs.

CHAPTER 2
ALTERNATIVES INCLUDING THE PROPOSED ACTION

This chapter describes the elements associated with development of alternatives that were considered by the Air Force. The specifics of the proposal for meeting the project's purpose and need are discussed for each alternative. The methodology used to identify alternatives and the alternatives considered but not carried forward for analysis are provided in Subchapter 2.1. This chapter also describes the No Action Alternative in accordance with Council of Environmental Quality (CEQ) regulations (40 CFR 1502.14(d). Elements of the Proposed Action are described in Subchapter 2.3.

2.1 INTRODUCTION

Tinker AFB has a requirement for a reliable jet fuel transfer line to ensure mission performance and readiness. To support multiple aircraft assigned to the 552 ACW, 507 ARW, and U.S. Navy CSCW-1, the Base currently utilizes a fiberglass jet fuel transfer line that was installed in 1985 and had a design life of 20 years. Implementation of the Proposed Action is needed to provide a reliable fuel system to support 552 ACW E-3 and other depot aircraft.

2.2 ALTERNATIVES SELECTION STANDARDS

Alternatives for transfer of jet fuel must meet the following selection standards:

- **Mission Readiness.** The transfer of jet fuel for aircraft based at Tinker AFB must be functionally reliable to support mission capability and meet aircraft turnaround times for training and combat sortie generation rates. If these fueling rates are not met, aircraft sortie generation capacity will rapidly degrade eventually causing a mission failure to meet a global tasking. The jet fuel transfer line must have minimal risk of disruption over the long-term operation of the airfield.
- **Compatibility with Airfield Operations.** The transfer of jet fuel at Tinker AFB must not interfere with operations on the active runways and taxiways.

2.2.1 Alternatives Considered

Personnel from the 72 ABW reviewed a range of alternatives to efficiently transfer jet fuel to all fueling points in support of aircraft assigned to Tinker AFB. As a result of the process and in addition to the No Action Alternative, 72 ABW personnel identified three alternatives to satisfy the need identified in Subchapter 1.2:

- **Increase Number of Refueling Trucks.** Instead of using the existing fuel transfer line, additional refueling trucks would be used to transfer fuel to various parts of the airfield to support aircraft assigned to Tinker AFB. This alternative would result in additional vehicles and increased airfield security requirements on the flightline. Because of the additional labor needed and time required for refueler trucks to transfer fuel to various locations, this alternative would increase turnaround time for fuel transfer and not meet mission readiness requirements or critical sortie generation rates. An increase in the potential for fuel spills and emissions of air pollutants from trucks would also result. Increased vehicular traffic across the flightline would interfere with airfield operations. Hazards associated with the handling of combustible materials would also increase as would the amount of wear and tear on Base roads. This alternative does not provide a

realistic solution to the need for efficient fuel transfer and is not considered as a viable alternative.

- **Construct New Jet Fuel Transfer Line.** The Air Force considered abandoning the existing jet fuel transfer line and replacing it with a new jet fuel transfer line to ensure mission readiness. Although this alternative would meet both selection standards, the construction of a new jet fuel transfer line without removal of the existing line was eliminated from consideration because it is a Base Civil Engineering requirement to remove all abandoned lines so as not to be an impediment to future construction.
- **Replace Jet Fuel Transfer Line.** The Air Force considered an in-kind replacement of the existing jet fuel transfer line with a new jet fuel transfer line to ensure mission readiness. The new jet fuel transfer line would be located in the same general location as the existing transfer line. This alternative would meet both selection standards.

Construction methods (i.e., jack and bore under the floodplain) and the specific alignment for the replacement jet fuel line (i.e., avoidance of the floodplain) would be determined during the design process and were not evaluated as alternatives in this environmental assessment.

Table 2-1 summarizes the evaluation of the alternatives selection process. "Yes" indicates the alternative would meet the standard or that the alternative would represent an acceptable solution. An alternative must meet each of the selection standards to be considered viable.

Table 2-1. Application of Selection Standards to Alternatives Considered

Selection Standard	Alternative		
	Increase Number of Refueler Trucks	New Jet Fuel Transfer Line	Replace Jet Fuel Transfer Line
Mission Readiness	No	Yes	Yes
Compatibility with Airfield Operations	No	Yes	Yes
Eliminated from Further Consideration	Yes	Yes[1]	No

Note. 1. Although this alternative meets both selection standards, it was eliminated from consideration because it is a Base Civil Engineering requirement to remove all abandoned lines so as not to be an impediment to future construction.

2.2.2 Alternatives Eliminated from Further Consideration

As shown in Table 2-1, only the proposed replacement of the existing jet fuel transfer line would meet all three selection standards. The alternative of increasing the number of refueler trucks could enable the Air Force to meet its mission readiness fuel transfer requirements but would have operational disadvantages. Based on the summary in Table 2-1, the proposed replacement of the jet fuel transfer line was identified as the alternative best suited to meet the need identified in Subchapter 1.1. Therefore, the alternative of fuel transfer using additional refueler trucks has been eliminated from further review.

2.3 DESCRIPTION OF THE PROPOSED ACTION

The Air Force proposes to remove and replace approximately 11,000 linear feet of existing underground fiberglass jet fuel transfer line with a new pipeline suitable for jet fuel. The pipeline would be constructed of material(s) compatible with jet fuel; the specific material to be determined during the design process. The diameter of the new pipeline would be six inches (same as the existing jet fuel transfer line). Replacement of the jet fuel transfer line would conform to Unified Facilities Criteria (UFC) 3-460-3 and MIL-HDBK-1022A for federal petroleum systems.

The replacement fuel transfer line would be an in-kind replacement and located primarily within the same alignment on either side of Runway 12/30. Figure 2-1 depicts a preliminary conceptual design for the proposed alignment of the replacement jet fuel transfer line.

Figure 2-1. Site Layout for Replacement of Jet Fuel Transfer Line

As shown on Figure 2-1, the Proposed Action would result in:

- Trenching of approximately 11,000 linear feet to include pavement removal. Boring under Runway 12/30, three taxiways and existing road surfaces would be required.
- Construction within the 100-year floodplain associated with East Crutcho Creek; the existing jet fuel pipeline is buried beneath East Crutcho Creek. Although no jurisdictional wetlands would be crossed, work within the watershed of the Fire Pond jurisdictional wetland would be required.

To maintain continuous and ongoing aircraft operations and fuel transfer, the construction of the replacement line would occur before demolition and removal of the existing jet fuel transfer line. The project would be phased to keep the existing line in working order until the replacement line is installed and ready for use. Airfield operations, including ongoing aircraft fueling and defueling on the apron, would continue during the construction period. A construction period of approximately 12 months would be required.

Replacement of the jet fuel transfer line would be conducted in close cooperation with 72 ABW/CEPR and AFCEE to ensure efficiencies can be achieved in conjunction with ongoing investigative and remedial actions in the project area. The proposed pipeline replacement may encounter contaminated soil associated with Installation Restoration Program (IRP) sites. In the event contaminated soil or groundwater is encountered, proper testing and disposal of removed contaminated material would be required. The Proposed Action would not include remediation of contaminated soil or groundwater that may be encountered during trenching or excavation. A separate Sustainment, Repair and Modernization (SRM) project would fund containment, removal, and remediation efforts for this project. The depth of the proposed replacement jet fuel transfer line would be designed to avoid any shallow contaminated groundwater.

The proposed construction would meet Anti-Terrorism/Force Protection (AFTP) criteria, as coordinated with 72 ABW/XP-AT.

All contract specifications for construction projects on Tinker Air Force Base include a section on environmental requirements. Section 00 72 00 (*Environmental Requirements for Construction Contracts*) would specify environmental protection and compliance requirements before and during construction for management of storm water (including erosion control), wastewater, hazardous materials, hazardous wastes, natural resources, cultural resources, air emissions, occupational health and safety, and compliance with applicable Executive Orders and federal, state, Air Force, and Tinker AFB regulations.

2.4 NO ACTION ALTERNATIVE

The Air Force is required by regulation to consider the No Action Alternative. Under the No Action Alternative, aircraft fueling operations would continue using the existing fiberglass jet fuel transfer line until failure. Failure of the 6-inch diameter pressurized underground fuel line would create unacceptable environmental consequences. In the event of line failure, there would be no way to supply five hydrant operating tanks. R-11 refueling trucks would be the only way to service aircraft supported by these systems. The current R-11 refueling fleet is sized for the existing fuel hydrant utilization and is not sufficient to meet the demands of the Tinker AFB aircraft flying mission. Additional refueler trucks would be required and would result in increased air pollutant emissions and risk of environmental spills from fuel handling. Line failure could result in delays in maintenance and operational schedules which could result in

fewer aircraft available for sortie generation and hinder mission capability and readiness. Continued use of the existing underground jet fuel transfer line would result in the continued labor-intensive trial-and-error efforts to find and repair future leaks in the line. There is no practicable method to continuously monitor for leaks in single-walled fiberglass piping

2.5 REASONABLY FORESEEABLE CONCURRENT ACTIONS

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

The complete EIAP of the No Action Alternative and the Proposed Action must consider cumulative impacts due to other actions. Implementation of the Proposed Action and associated potential environmental impacts would occur concurrently with other projects and developments proposed on Tinker AFB in the vicinity of the proposed jet fuel transfer line that would be replaced. In addition to the Proposed Action, there are 24 known projects occurring or planned on Tinker AFB within the next three years:

Projects Currently Under Construction:

- Depot Maintenance, Reengineering, and Transformation of Three-Bay Multi-Aircraft Hangar Construction
- Medical Clinic Construction
- 507th Base Realignment and Closure Action
- Air Depot Road/Tinker Gate Realignment
- Child Development Center Construction

Projects Planned for Construction:

- Harry Twaddle Facility Acquisition
- Demolition of Bldg 3108
- KC-46A Maintenance Beddown
- Air Traffic Controller Tower Construction
- Physical Fitness Center Construction
- Consolidated Security Forces, South Forty Development Construction
- Military Family Housing Privatization
- Vance Gate Relocation
- Airborne Warning and Control System Maintenance Group Complex at Building 230 Repair and Renovation
- Maintenance, Repair, and Overhaul Technology Center Acquisition
- Large Engine Test Cell Construction
- Chemical Cleaning Line in Building 3001 Renovation
- T9 Test Cell at Tinker Aerospace Complex (TACX) Construction
- Midwest Boulevard Gate Construction
- Fee/Title Acquisition for TACX

- Retrofit Boilers and Install Landfill Gas Generation Serving TACX Facility
- Steam Decentralization Project
- Add to and Alter Type III Hydrant Fueling System
- Construct Vehicle Fueling Station (southwest of airfield)

Future construction projects listed above and their associated cumulative impacts are further evaluated for each environmental resource area in Chapter 3 of this EA.

2.6 SUMMARY OF POTENTIAL ENVIRONMENTAL IMPACTS

Potential environmental impacts are evaluated in Chapter 3 of this EA. Table 2-2 summarizes potential impacts for resource areas evaluated for the Proposed Action and the No Action Alternative.

Table 2-2. Summary of Environmental Impacts for Proposed Replacement of Jet Fuel Transfer Line at Tinker AFB, Oklahoma

Biological Resources
Proposed Action ▪ Construction associated with installation of the replacement jet fuel transfer line would result in disturbance to 1.5 acres of grassy/grassland (1.4 acres) and open woodland vegetation (0.1 acre) on Tinker AFB. This corridor would be revegetated upon completion of construction activities. ▪ No impacts to common species of wildlife would result from construction. ▪ No impacts to federal or state listed threatened or endangered species of plants or wildlife in the project area would occur. ▪ No tree removal would occur in the open wooded area along Tower Road.
No Action Alternative ▪ There would be no change to existing biological resources.
Cultural Resources
Proposed Action ▪ There are no known archaeological sites within or immediately adjacent to the project site. ▪ There are no National Register of Historic Places (NRHP)-listed resources within the Area of Potential Effect (APE) for the Proposed Action. ▪ No impacts to Native American interests would result from the Proposed Action.
No Action Alternative ▪ There would be no change to existing cultural resources.
Geologic Resources and Soils
Proposed Action ▪ Construction would occur within an area where the physiographic features and geologic resources have been previously disturbed. ▪ Construction would not require permanent removal of topsoil or the use of extensive fill. No permanent alteration of surface features would occur.
No Action Alternative ▪ There would be no changes to existing surface features or geologic resources.

Table 2-2. Summary of Environmental Impacts for Proposed Replacement of Jet Fuel Transfer Line at Tinker AFB, Oklahoma (Cont'd)

Hazardous Materials and Wastes (Cont'd)
Proposed Action ▪ Because soil and groundwater contamination from past fuel releases is present in the project area, any contaminated soil from trenching or excavation would be tested prior to disposal. ▪ Operations of the replacement jet fuel transfer line would not result in the generation or disposal of hazardous materials or wastes. ▪ The likelihood of spills from the replacement jet fuel transfer line would be reduced when the replacement pipeline is operational. ▪ Ongoing remediation and investigation at nearby contaminated sites would not be impeded during the use and operation of the replacement jet fuel transfer line. ▪ There would be no adverse impacts on or from hazardous materials or wastes or contaminated sites during operation of the replacement jet fuel transfer line.
No Action Alternative ▪ The potential for leaks from the existing jet fuel transfer line would continue.
Water Resources
Proposed Action ▪ The Proposed Action would be constructed to avoid disturbance to East Crutcho Creek. Best Management Practices for erosion control would be followed in accordance with construction permit conditions and the Storm Water Pollution Prevention Plan (SWPPP). ▪ No change to the amount of infiltration areas or changes to groundwater recharge would occur. ▪ There are no wetlands in the area of the Proposed Action that would be affected by construction or operation of the replacement jet fuel transfer line. ▪ The Proposed Action would not result in any change in the elevation, function, or capacity of the existing floodplain associated with East Crutcho Creek. The Proposed Action would have temporary negligible impacts on the East Crutcho Creek floodplain; no permanent impacts would occur.
No Action Alternative ▪ There would be no changes to East Crutcho Creek, groundwater resources, wetlands or the floodplain associated with East Crutcho Creek.

2.7 MITIGATION MEASURES

No mitigation measures would be required.

2.8 BEST MANAGEMENT PRACTICES

Although no mitigation measures are required, Best Management Practices (BMP) would be identified in required plans, permits and approvals to be obtained for the project as discussed in Subchapter 1.4.5. Environmental protection and compliance requirements before and during construction would also be included with contract specifications Section 00 72 00 (*Environmental Requirements for Construction Contracts*), as described in Subchapter 2.3. A summary of BMPs for the Proposed Action is provided in Table 2-3.

Table 2-3. Summary of Best Management Practices for Proposed Replacement of Jet Fuel Transfer Line at Tinker AFB, Oklahoma

Biological Resources
▪ Final design of the replacement jet fuel pipeline alignment would be coordinated with 72 ABW/CEAN. ▪ Avoid removal of any mature trees within the East Crutcho Creek floodplain. ▪ Any removal of mature trees would be replaced in-kind in coordination with 72 ABW/CEAN. ▪ In the event that mature trees in the East Crutcho Creek floodplain require removal during the breeding season for migratory birds (February 1- September 1), the Air Force would ensure that a nesting bird survey is conducted by a qualified biologist at least 30 days prior to construction. ▪ The construction contractor would notify 72 ABW/CEAN in the event that Texas horned lizard or burrowing owl nests are found in the construction area. ▪ The Construction Project Quality Assurance Evaluator (QAE) would identify the proposed limits of construction along the final alignment to avoid unnecessary removal of mature trees or vegetation. ▪ The Project QAE would ensure that any equipment storage areas and construction laydown areas are sited in previously disturbed areas within the established construction work limits. ▪ Any topsoil removed from the pipeline corridor would be placed in the immediate area, replaced onto the same area, and used for re-compaction purposes. ▪ All disturbed areas (i.e., where existing vegetation requires removal for trenching) would be re-landscaped. Grass and other landscaping would be reestablished in the disturbed areas immediately after construction is completed, (i.e., within one month and before the rainy season). ▪ Revegetation would include warm season native plant species, as appropriate, whenever possible. Revegetation of airfield surfaces would use plant species that do not attract wildlife. Avoid the use of annual rye grasses and other cool season species for temporary cover. Ensure that appropriate timing of seeding and mulching are planned.
Cultural Resources
▪ To avoid impacts to archaeological resources, the Air Force would ensure that any archaeological deposits discovered during construction activities would be managed in accordance with the compliance procedures described in Section E.13 of the Tinker AFB ICRMP (*Unexpected Discoveries of Archaeological Materials During Construction Projects*) and the provisions of applicable law(s) such as NHPA Section 106 (36 CFR 800.13). The procedural requirement for protection of cultural resources following an unanticipated discovery would be included in project planning requirements. ▪ Native American tribes would be consulted for any post-review discoveries of historic properties, certain or potential materials subject to the Native American Graves Protection and Repatriation Act (NAGPRA), and other Native American cultural resources of interest. Consultation with Native American tribes, if necessary, would be conducted in accordance with procedures outlined in the ICRMP.
Geologic Resources and Soils
▪ The replacement pipeline would be designed and constructed in accordance with engineering standards applicable to soil characteristics at the project site. ▪ Silt fences, compost berms, filter socks or other similar measures would be installed, as appropriate, for managing soil erosion.
Hazardous Materials and Wastes
▪ Regulated waste would be contained and disposed in accordance with all applicable standards by a licensed contractor.

Table 2-3. Summary of Best Management Practices for Proposed Replacement of Jet Fuel Transfer Line at Tinker AFB, Oklahoma (Cont'd)

Water Resources
▪ Obtain Storm Water General Permit for Construction Activities (Permit No. OKR10) from Oklahoma DEQ. ▪ Minimize the total amount of ground disturbance and preserve vegetative cover to the amount practicable. ▪ Install silt fence, compost berms, or filter socks or other similar measures for managing storm water runoff. ▪ Limit construction staging areas to previously disturbed areas. ▪ Service and refuel equipment away from East Crutcho Creek. ▪ Ensure all chemicals and petroleum products are stored and contained away from water sources.

2.9 IDENTIFICATION OF THE AGENCY PREFERRED ALTERNATIVE

Based on the analyses conducted for this EA, the Air Force has identified the Proposed Action, as described in Subchapter 2.3, as the Agency Preferred Alternative.

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CHAPTER 3
AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the existing environmental resources that could be affected by or could affect the No Action Alternative and Proposed Action. Only those specific resources relevant to potential impacts are described in detail. The baseline represents the current condition for the respective resource or conditions that may exist due to the No Action Alternative. This chapter also evaluates the potential environmental consequences resulting from implementation of the Proposed Action and the No Action Alternative.

Implementation of the Proposed Action and associated potential environmental impacts would occur concurrently with other projects and developments proposed on Tinker AFB in the vicinity of the proposed jet fuel transfer line that would be replaced. As discussed in Subchapter 2.5, there are probable future projects which could occur over the next three years, some of which could overlap with construction associated with the Proposed Action. Cumulative impacts of the Proposed Action are discussed within each environmental resource category.

3.1 BIOLOGICAL RESOURCES

3.1.1 Definition of Resource

Biological resources encompass living species and vegetation communities crucial to the functions of biological systems, of special public importance, or that are protected under federal or local law or statute. For the purposes of this document, biological resources are divided into three categories: *vegetation communities*; *wildlife*; and *threatened, endangered and candidate species*. Animal and plant species include those species listed under the federal Endangered Species Act (ESA), candidates for ESA listing, and those listed as threatened or endangered by state of Oklahoma law.

3.1.2 Existing Conditions

The landscape of Oklahoma County is characterized by level to gently rolling hills, broad flat plains, and bottomlands intersected by small to medium sized watercourses. The county is part of the Cross Timbers Vegetation Area of the Midwest and the Central Oklahoma/Texas Plains or Central Great Plains (USDA, 2003).

3.1.2.1 Vegetation

Five general vegetation types (including 31 vegetation communities within those vegetation types) are found at Tinker AFB, according to the Tinker AFB *Integrated Natural Resources Management Plan* (INRMP) (USAF, 2007):

- **Prairie.** Characteristic of a native midgrass prairie (approximately 1,200 acres of prairie vegetation is found on Tinker AFB).
- **Herbaceous.** Areas dominated by forbs, with low levels of grasses present. Wetland and marsh areas are also included, which are areas dominated by mesophytes (plants growing under medium moisture conditions) and/or hydrophytes (plants growing under high moisture conditions) and located in areas temporarily or permanently inundated by water.

- **Grass/Grassland.** Dominated by turf grass, associated forbs, and ornamental herbaceous and woody plants.
- **Shrubland.** Close or open growth of native shrub species with mixed native and/or exotic species of grasses and forbs.
- **Forest/Woodland.** Close stand (forest) or open growth (woodland) in a natural area. May include successional stages of native and/or exotic trees configured in close or open stands, primarily in previously disturbed areas.

Areas on base that have been converted to urban and industrial use are characterized by a plant community consisting primarily of turf grasses and ornamental trees and shrubs. The predominant turf grass on Tinker AFB is Bermuda grass (*Cynodon dactylon*). Native buffalo grass (*Bouteloua dactyloides*) is often found mixed with Bermuda grass. More rural areas are typically a mixture of exotic and native plants. Trees and shrubs are composed of native and exotic plants and contrary to pre-settlement plant distribution, many woody plants are found on upland as well as bottomland sites (USAF, 2007).

The proposed corridor for replacement of the jet fuel transfer line is characterized primarily as semi-improved grounds. As shown on Figure 3-1, two vegetation communities are found within or immediately adjacent to the proposed corridor:

- **Grass/Grassland**. The corridor for the proposed alignment is predominantly planted turf grasses and is classified as grass/grassland. Areas adjacent to runway clear zones and taxiways, these grounds are infrequently mowed to maintain grass height at typically between 7 to 14 inches (USAF, 2007).
- **Woodland.** Scattered mature trees within a band of floodplain mixed forest (FJ) occur in open stands. Approximately 518 linear feet of the proposed alignment would cross through open stand, wooded areas associated with East Crutcho Creek on either side of Tower Road.

3.1.2.2 Wildlife

Tinker AFB is classified as a Category 1 installation, as defined in AFI 32-7064, *Integrated Natural Resource Management,* indicating that suitable habitat for conserving and managing fish and wildlife exists on the base (USAF, 2007).

The available habitat includes movement corridors (e.g., riparian zones along creeks) and pockets of undeveloped acreage surrounded by urbanized land (USAF, 2007). A total of 244 vertebrate species occur on the base, consisting of 26 reptiles, 11 amphibians, 24 mammals, 157 birds, and 26 fish. Common mammalian species found on Tinker AFB include fox squirrel (*Sciurus niger*), eastern cottontail (*Sylvilagus floridanus*), opossum (*Didelphis virginianus*), raccoon (*Procyon lotor*), and various rodent species (e.g., *Peromycscus* sp., *Neotoma* sp., *Sigmodon* sp.). Less common mammalian species found in unimproved portions of the base include beaver (*Castor canadensis*), coyote (*Canis latrans*), bobcat (*Felis rufus*), muskrat (*Ondatra zibethicus*), white-tailed deer (*Odocoileus virginianus*) and others (USAF, 2007).

Resident bird species include mourning dove (*Zenaida macroura*), barn swallow (*Hirundo rustica*), red-winged blackbird (*Agelaius phoeniceus*), meadowlark (*Sturnella* spp.), scissor-tailed flycatcher (*Tyrannus forficatus*), great-horned owl (*Bubo virginianus*), and bobwhite quail (*Colinus virginianus*).

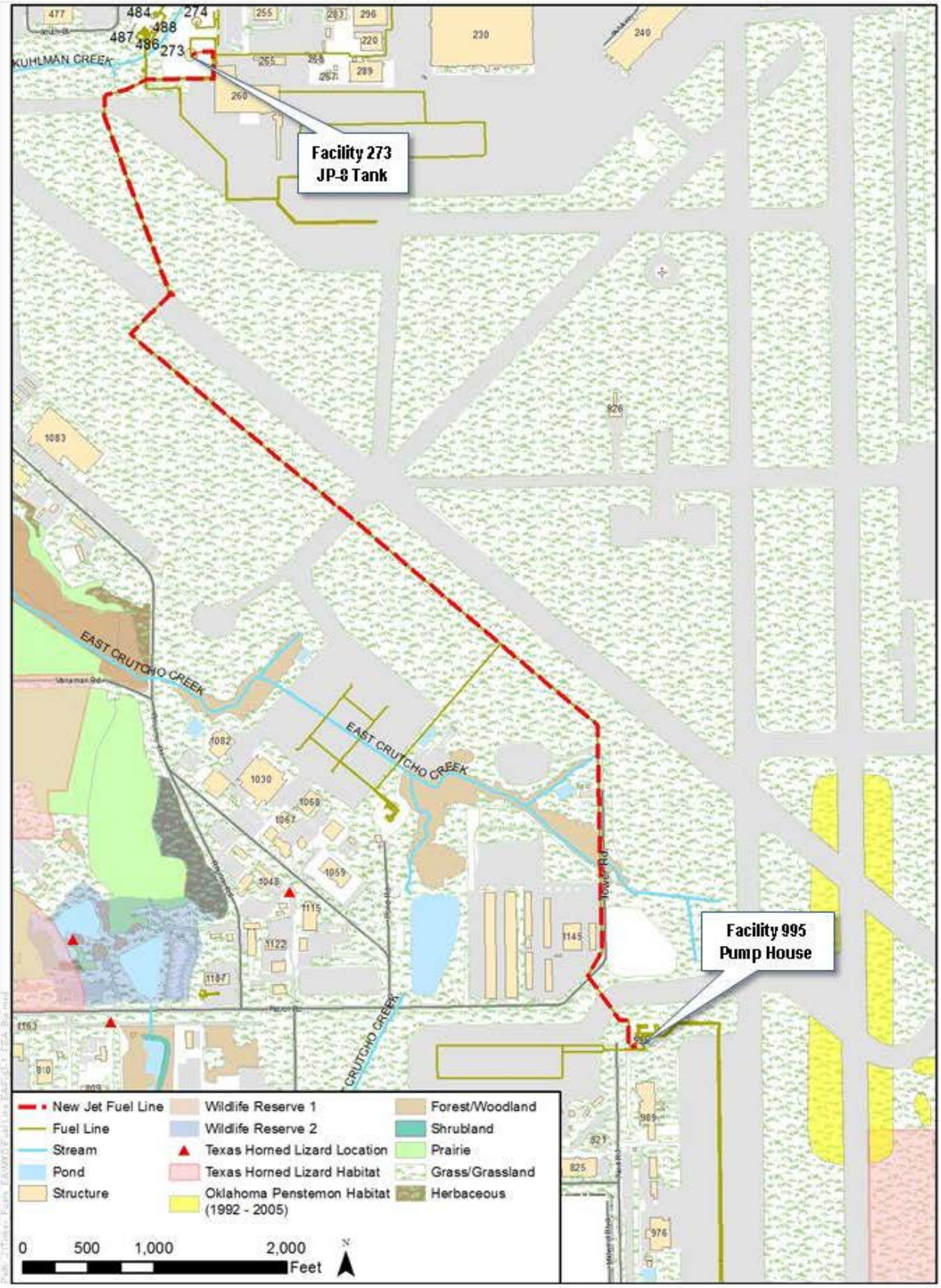

Figure 3-1. Biological Resources in Proposed Action Area on Tinker AFB

Several reptile and amphibian species are commonly found at Tinker AFB. These include the Texas red-eared slider (*Trachemys [Pseudemys] scripta*), three-toed box turtle (*Terrapene carolina*), and plain-bellied water snake (*Nerodia erythrogaster*). Other reptiles observed on base include the racerunner (*Cnemidophorus sexlineatus*) and the Texas horned lizard (*Phrynosoma cornutum*) (see Subchapter 3.1.2.3 for additional discussion of Texas horned lizard).

Seven species of fish occur in ponds on the base while 19 species of fish occur in those portions of Crutcho, Kuhlman, and Soldier creeks that are on Tinker AFB. Several ponds on base are managed for largemouth bass (*Micropterus salmoides*) and bluegill (*Lepomis macrochirus*). Some ponds have been stocked with fish, including channel catfish (*Ictalurus punctatus*). Other fish found in the base's ponds include red-ear sunfish (*Lepomis microlophus*), green sunfish (*Lepomis cyanellus*), warmouth (*Leopomis gulosus*), and white crappie (*Pomoxis annularis*). During winter, ponds are stocked with rainbow trout (*Oncorhynchus mykiss*) (USAF, 2011c).

The existing jet fuel line is buried beneath grassy turf areas along the runway and taxiways. These semi-improved grounds are managed as part of the airfield and not considered optimal wildlife habitat; typical grassland species such as cottontail, fox squirrel, raccoon, red-winged blackbird, mourning dove, and meadowlark may occur in the area.

The southeastern reach of the proposed alignment may offer a higher diversity of wildlife species that utilize mixed native/non-native semi-improved prairie vegetation. This area has also been subject to disturbance.

3.1.2.3 Threatened and Endangered Species

Flora

There are no federal or state listed threatened or endangered plant species found on Tinker AFB. No flora on Tinker AFB is classified as state or federal species of concern or proposed for listing as threatened or endangered (USAF, 2007).

One rare plant is found on Tinker AFB. Oklahoma penstemon is found only in Oklahoma, where in many places it is very abundant. It is found in prairies, oak savannas, abandoned fields, and along roadsides. Oklahoma penstemon colonies mapped on Tinker AFB through 2005 were found in fragmented, remnant native prairie communities, primarily in the southeastern portion of the base that includes the airfield southeast of Runway 12/30 (USAF, 2007). Due to conflicts with airfield operations, penstemon populations within the airfield fence boundary southeast of Runway 12/30 are no longer maintained as no-mow zones in the spring months (USAF, 2007).

Fauna

Three species that may potentially occur in Oklahoma County are listed by U.S. Fish and Wildlife Service (Table 3-1). None of these species are listed by the Oklahoma Department of Wildlife Conservation.

The endangered whooping crane (*Grus americana*) and the threatened Arkansas River Shiner (*Notropis girardi*) have not been documented, and are not expected to occur, on Tinker AFB. The threatened piping plover (*Charadrius melodus*) has been documented on Tinker AFB as a result of bird aircraft strikes. No preferred habitat for piping plover is known to exist on the base.

Table 3-1. Federal and State Listed Wildlife Species for Oklahoma County, Oklahoma

	Common Name	Scientific Name	State Status	Federal Status
Birds				
1	Whooping Crane	*Grus americana*	(none)	Endangered
2	Piping plover	*Charadrius melodus*	(none)	Threatened
Fish				
3	Arkansas River shiner	*Notropis girardi*	(none)	Threatened

Source: USFWS, 2011A

Several species designated as state species of special concern by the Oklahoma Department of Wildlife Conservation or sensitive species by the Oklahoma Natural Heritage Inventory occur on the base. Table 3-2 lists all special status species documented as occurring on base.

Table 3-2. Special Status Wildlife Species Occurring on Tinker AFB

Common Name	Scientific Name	State Rank
American White Pelican	*Pelecanus erythrorhynchos*	S3N
Barn Owl	*Tyto alba*	SS2
Burrowing Owl	*Athene cunicularia*	SS2
Loggerhead Shrike (migrant subspecies)	*Lanis ludovicianus migrans*	SS2
Swainson's Hawk	*Buteo swainsoni*	SS2
Texas Horned Lizard	*Phrynosoma cornutum*	CS, SS2

Source: USAF, 2007

SS2 = Species of special concern. These species have been identified by technical experts as possibly threatened of extirpation but for which additional information is needed.

CS = Statewide closed season (state ranking).It is unlawful at any time to possess or to kill individuals of this species or to remove any individuals of these species from their natural habitats.

S3 = Rare and local (restricted range) in Oklahoma (though it may be abundant at some of its locations).

N = Nonbreeding in Oklahoma.

The six special status wildlife species on Table 3-2 have been recorded on Tinker AFB. The USFWS defines species of concern for the future wellbeing of the species, but the species does not receive any protection under the Endangered Species Act. AFI 32-7064 states that species of concern should be considered in future planning and facility siting as well as provided protection wherever possible. Each of the state special status species identified at Tinker AFB are described as follows:

American white pelican. Large flocks of the American white pelican are often sighted during spring and fall migration. The species has also been observed south of the base over Draper Lake (USAF, 2007).

Barn owl. The barn owl is found throughout most of the United States and is a rare resident of most of Oklahoma. It usually occupies relatively open areas, such as prairies, meadows, and marshes. The barn owl nests and roosts in buildings, cliffs, and trees. The diet of the owl consists primarily of rodents, small birds, and occasionally insects. Barn owls have been observed in the northeastern portions of Tinker AFB (USAF, 2011c).

Burrowing owl. A ground dwelling and nesting species, the burrowing owls inhabit grasslands and are frequently associated with prairie dog colonies. This species has been observed in winter months on the airfield and in the western portion of the base, southeast of the military family housing area between East Crutcho Creek and the base boundary (USAF, 2007). The species is

believed to be a winter visitor to Tinker AFB; no nests have been documented on the base (USAF, 2011c)

Loggerhead shrike. This species has been observed base-wide (USAF, 2007). Suitable habitat for this species includes grassland with scattered trees and shrubs for foraging, nesting and perching. Loggerhead shrikes prefer open habitat characterized by grasses and forbs of low stature interspersed with bare ground and shrubs or low trees. Scattered shrubs or trees, particularly thick or thorny species, serve as nesting substrates and hunting perches (Dechant *et al*., 2002). Due to taxonomic uncertainty concerning this species, it is not known whether the loggerhead shrikes observed on base were the migrant subspecies (USAF, 2007).

Swainson's hawk. Swainson's hawk occurs throughout Tinker AFB on relatively open lands and has historically nested along Kuhlman Creek (USAF, 2007). While there are no known nesting sites for Swainson's hawk reported along the alignment of the proposed jet fuel line replacement, this species can nest in a variety of tree species (USFWS, 2011b). This species may forage over the area and may hunt from perches such as power poles.

Texas horned lizard. Texas horned lizards range from the south-central United States to northern Mexico. They occur in open areas with sparse to slightly more dense plant cover with corridors of sparse vegetation, in arid and semiarid habitats that range from the south-central United States to northern Mexico, throughout much of Texas, Oklahoma, Kansas and New Mexico. This species is listed as threatened (federal Category 2) in Texas (Texas Parks & Wildlife, 2010). The species has been documented in sparsely vegetated grassland areas primarily in the southwestern corner of Tinker AFB with isolated observations in the southeastern and northern areas of the base (USAF, 2007). The species could possibly, but not likely, occur in the area of the proposed jet fuel line replacement.

All DoD installations are required to perform a threatened and endangered species survey prior to any activities that disturb habitat that potentially supports such species. However, there are no threatened or endangered species known to occur in the immediate vicinity of the proposed replacement jet fuel pipeline corridor. Although none of the six state special status wildlife species listed on Table 3-2 have been reported, or would be expected to occur, within the proposed corridor for replacement of the jet fuel line, four of these species have a low likelihood of occurring because of availability of suitable habitat, the presence of the open wooded area, and the water source at East Crutcho Creek. These wildlife species are burrowing owl, Swainson's hawk, loggerhead shrike and Texas horned lizard.

3.1.2.4 Species Protected Under the Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) of 1918 (50 CFR 10.13) implemented the 1916 convention between the United States and Great Britain for the protection of birds migrating between the U.S. and Canada. Similar conventions between the United States and Mexico, Japan and the Union of Soviet Socialists Republics further expanded the scope of international protection of migratory birds. Each new treaty has been incorporated into the MBTA as an amendment and the provisions of the new treaty are implemented domestically. These four treaties and their enabling legislation, the MBTA, establish federal responsibilities for the protection of nearly all species of birds, their eggs and nests.

The MBTA made it illegal for people to "take" migratory birds, their eggs, feathers or nests. Take is defined in the MBTA to include by any means or in any manner, any attempt at hunting,

pursuing, wounding, killing, possessing or transporting any migratory bird, nest, egg, or part thereof. The Bald and Golden Eagle Protection Act affords additional protection to all bald and golden eagles. In total, 836 bird species are protected by the MBTA, 58 of which are currently legally hunted as game birds that are subject to migratory game bird regulations issued by the USFWS. A migratory bird is any species or family of birds that live, reproduce or migrate within or across international borders at some point during their annual life cycle. The recognized breeding season for most species of birds is from February 1 to September 1.

3.1.3 Approach to Analysis

An impact to biological resources would be considered significant if the action would likely adversely affect a threatened or endangered species, substantially diminish habitat for a plant or animal species, substantially diminish a regionally or locally important plant or animal species, interfere substantially with wildlife movement or reproductive behavior that would reduce the population and/or result in a substantial infusion of exotic plants or animal species. Impacts would be considered significant if any native migratory birds or their active nests were to be harmed, particularly during the breeding bird season (for all migratory nongame native bird species protected by international treaty under the federal Migratory Bird Treaty Act of 1918).

3.1.4 Proposed Action

Vegetation

The Proposed Action would require removal of approximately 1.5 acres of vegetation or ornamental landscaping primarily in semi-improved grounds in order to remove the existing jet fuel pipeline. Impacts from removal of the total 1.5 acres of vegetation are depicted on Figure 3-2 and are described as follows:

- **Grassland.** Approximately 1.4 acres of non-native grassland and mowed turf would be removed adjacent to runways and taxiways from Facility 273 (tank) to the area south of Runway 12/30. As the alignment veers south, it would continue in grasslands and cross approximately 518 ft of open wooded area associated with the southern reach of East Crutcho Creek and approximately 400 ft of prairie to the east of the alignment.
- **Woodland.** Approximately 3,108 square feet of open woodland vegetation (based on a 6-ft wide trench) would be disturbed. This area consists primarily of scattered vegetation along both sides of Tower Road for a distance of approximately 518 linear feet (north and south of East Crutcho Creek). Vegetation in this corridor is concentrated closest to East Crutcho Creek and includes cottonwood (*Populus deltoides)*, sugarberry (*Celtis laevigata*), red mulberry (*Morus rubra*) and American elm (*Ulmus americana*). Although removal of approximately 0.1 acre of this woodland vegetation would be required for removal of the existing buried fuel line and placement of the new pipeline, construction would not be expected to require the removal of mature trees.

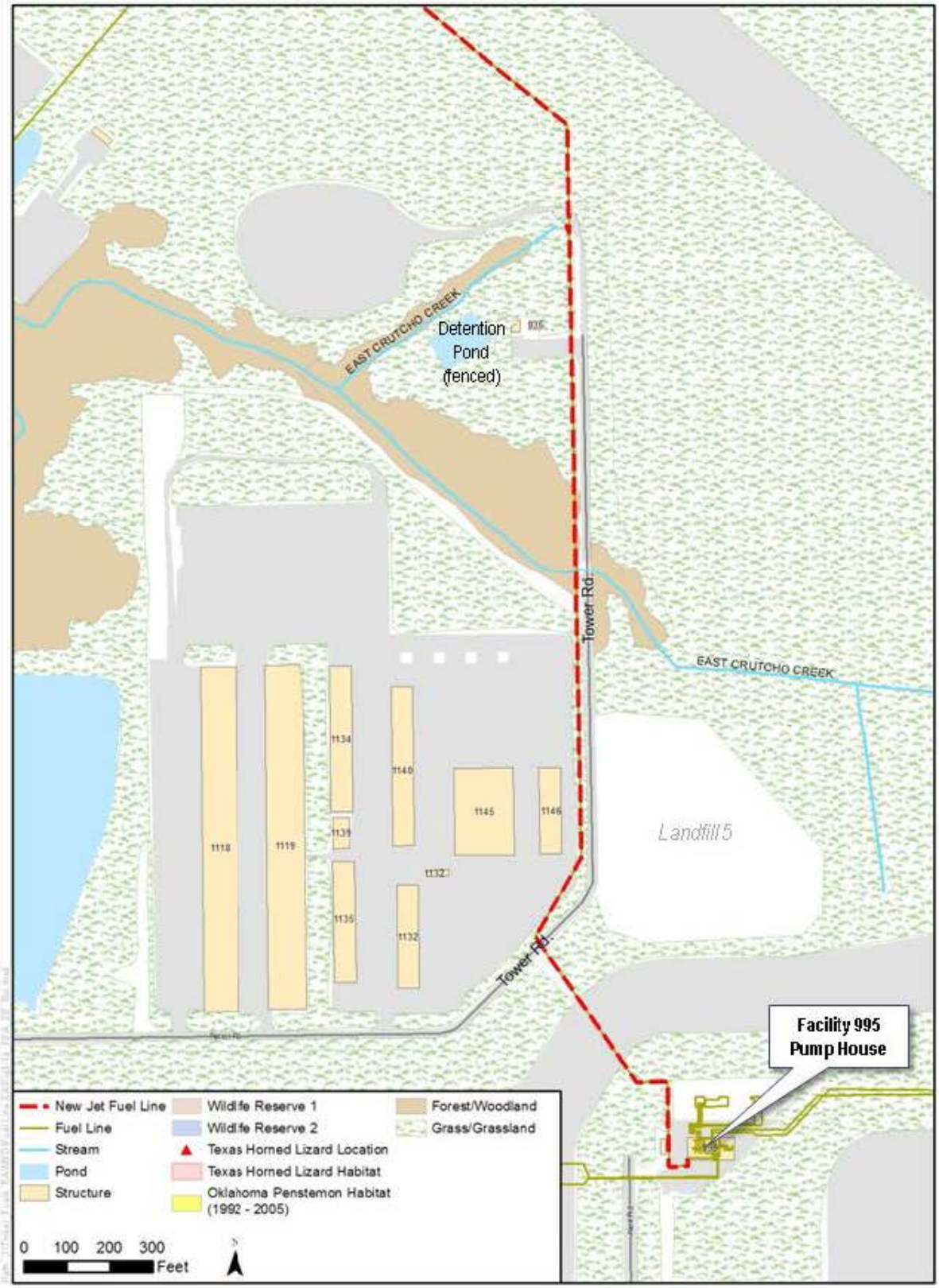

Figure 3-2. Biological Resources in the Vicinity of the Southeastern Segment of the Proposed Jet Fuel Transfer Line on Tinker AFB

Wildlife

The proposed replacement of the existing jet fuel transfer line would result in disturbance to approximately 1.5 acres of marginal grassland habitat for wildlife. The areas to be disturbed would be revegetated upon completion of construction. Although a variety of common birds and small mammals may utilize the area for foraging, the removal of vegetation along a 6 ft corridor would not be expected to result in any detrimental effects on wildlife movement or reproductive behavior. Disturbance to 1.5 acres of habitat would not substantially diminish habitat for plant or animal species because this acreage does not contain high quality habitat. The area within the proposed alignment has not been designated for wildlife conservation. With incorporation of best management practices (see Subchapter 3.1.8), impacts to wildlife would not be significant.

Threatened and Endangered Species

The Proposed Action would not result in loss of habitat for any federal or state listed threatened or endangered species. The Proposed Action would not result in loss of habitat for piping plover (*Charadrius melodus*) because no habitat is known to exist on the base.

Although none of the six state special status species listed on Table 3-2 have been reported, or would be expected to occur, within the proposed corridor for replacement of the jet fuel line, four of these species have a low likelihood of occurring because of availability of suitable habitat, the presence of the open wooded area, and the water source at East Crutcho Creek:

- **Burrowing owl.** The ground dwelling and nesting burrowing owl has been observed in winter months on the airfield is believed to be a winter visitor to Tinker AFB. The species nests in grasslands although no nests have been documented on the base (USAF, 2011c). With incorporation of best management practices, this species or its habitat is not likely to be adversely affected by the proposed replacement of the buried jet fuel transfer line.
- **Loggerhead shrike.** This species has been observed base-wide. Due to taxonomic uncertainty concerning this species, it is not known whether the loggerhead shrikes observed on base were the migrant subspecies (USAF, 2007). With incorporation of best management practices, this species or its habitat is not likely to be adversely affected by the proposed replacement of the buried jet fuel transfer line.
- **Swainson's hawk.** Swainson's hawk may forage over the area and can nest in a variety of tree species. With incorporation of best management practices, this species or its habitat is not likely to be adversely affected by the proposed replacement of the buried jet fuel transfer line.
- **Texas horned lizard.** Texas horned lizards have been documented in sparsely vegetated grassland on Tinker AFB although not within the proposed alignment for the proposed fuel line. With incorporation of best management practices, this species or its habitat is not likely to be adversely affected by the proposed replacement of the buried jet fuel transfer line.

With incorporation of best management practices (see Subchapter 3.1.8), impacts to the above four species of concern would not be expected. The Proposed Action would not be expected to significantly diminish any regionally or locally important plant or animal species or result in any impacts to species of concern or sensitive species.

Impacts to Migratory Birds

The proposed replacement of the buried jet fuel transfer line would occur on previously disturbed ground with limited nesting habitat for native birds. Although the potential exists for limited effects on native wildlife that may forage over the site, the Proposed Action would not interfere substantially with movement of wildlife because of the limited extent of disturbance in the proposed area of construction.

Removal of mature trees that may provide bird nesting sites would be considered an adverse impact. Removal of trees that takes place outside of the breeding season for migratory birds (February 1- September 1) would avoid impacts to migratory nesting birds. To avoid impacts to migratory birds that may be nesting on the site (including disturbances which would cause abandonment of active nests containing eggs and/or young), the Air Force would avoid removal of mature trees in the open woodland area associated with East Crutcho Creek.

3.1.5 Cumulative Impacts

The Proposed Action would result in disturbance to 1.5 acres of vegetation as a result of removal of the existing jet fuel transfer line and replacement with a new pipeline. The disturbed area would be re-landscaped upon completion of construction. No net loss of biological habitat would result from the Proposed Action. Although construction of other reasonably foreseeable projects on Tinker AFB would occur at the same time, the Proposed Action would be an in-kind replacement of an existing underground fuel pipeline with no loss of biological habitat. There would be no impacts to biological resources during routine operation of the buried jet fuel transfer line. For this reason, the Proposed Action would not contribute to cumulative impacts on biological resources.

3.1.6 No Action Alternative

If the No Action Alternative were selected, Tinker AFB would not implement the Proposed Action. Under the No Action Alternative, there would be no change to existing biological resources above the alignment of the existing jet fuel transfer line at Tinker AFB. The No Action Alternative would not require any construction or removal of vegetation; therefore, this condition does not result in direct or indirect impacts to vegetation or wildlife that may be present within the alignment. Current operation of the jet fuel line does not result in any impacts to threatened or endangered species of wildlife of plants. The No Action Alternative does not involve any disturbance or removal of any native vegetation, ornamental landscaping, or other habitat that would serve as nesting habitat for migratory birds.

3.1.7 Mitigation Measures

No mitigation measures would be required to avoid or reduce effects to biological resources.

3.1.8 Best Management Practices

Best management practices would be implemented during construction as required in Contract Specification Section 00 72 00 to prevent or minimize adverse impacts to biological resources. The following best management practices would be included as part of project planning:

- Final design of the replacement jet fuel pipeline alignment would be coordinated with 72 ABW/CEAN.
- Avoid removal of any mature trees within the East Crutcho Creek floodplain.

- Any removal of mature trees would be replaced in-kind in coordination with 72 ABW/CEAN.
- In the event that mature trees in the East Crutcho Creek floodplain require removal during the breeding bird season (February 1- September 1), the Air Force would ensure that a nesting bird survey is conducted by a qualified biologist at least 30 days prior to construction.
- The construction contractor would notify the 72 ABW/CEVOE in the event that Texas horned lizard or burrowing owl nests are found in the construction area.
- The Construction Project Quality Assurance Evaluator (QAE) would identify the proposed limits of construction along the final alignment to avoid unnecessary removal of mature trees or vegetation.
- The Project QAE would ensure that any equipment storage areas and construction laydown areas are sited in previously disturbed areas within the established construction work limits.
- Any topsoil removed from the pipeline corridor would be placed in the immediate area, replaced onto the same area, and used for re-compaction purposes.
- All disturbed areas (i.e., where existing vegetation requires removal for trenching) would be re-landscaped. Grass and other landscaping would be reestablished in the disturbed areas immediately after construction is completed, (i.e., within one month and before the rainy season).
- Revegetation would include warm season native plant species, as appropriate, whenever possible. Revegetation of airfield surfaces would use plant species that do not attract wildlife. Avoid the use of annual rye grasses and other cool season species for temporary cover. Ensure that appropriate timing of seeding and mulching are planned.

3.2 CULTURAL RESOURCES

3.2.1 Definition of Resource

Cultural resources include prehistoric and historic archaeological sites, buildings, structures, districts, artifacts, objects, or any other physical evidence of human activity considered important to a culture, subculture, or community for scientific, traditional, or religious purposes. Pursuant to Section 106 of the National Historic Preservation Act of 1966 (NHPA), as amended, and its implementing regulations at 36 CFR 800, federal agencies must take into consideration the potential effect of an undertaking on "historic properties," which refers to cultural resources listed in, or eligible for inclusion in, the National Register of Historic Places (NRHP). Sites not yet evaluated are considered potentially eligible for inclusion in the NRHP and as such, are afforded the same regulatory consideration as nominated or previously found eligible properties.

Numerous laws and regulations require federal agencies consider the effects of a Proposed Action on cultural resources. Cultural resources on Air Force installations are managed in accordance with Air Force Instruction (AFI) 32-7065, *Cultural Resources Management*; Executive Order (E.O.) 11593 of 1971; the National Historic Preservation Act of 1966, as amended (16 USC 470), and its implementing regulations (36 CFR 800); the Archeological and Historic Preservation Act of 1974 (P.L. 93-291); the Archaeological Resources Protection Act of 1979 (P.L. 96-95); the American Indian Religious Freedom Act of 1978 (P.L. 95-341); and the Native American Graves Protection and Repatriation Act of 1990 (P.L. 101-601). Only those

potential historic properties that may be eligible under cultural resource legislation are subject to protection or consideration by a federal agency. Eligibility is determined by application of the NRHP criteria

NHPA regulations describe the procedures for identifying and evaluating historic properties, assessing the effects of federal actions on historic properties, and consulting to avoid, reduce, or minimize adverse effects. These procedures are commonly referred to as the Section 106 process. As part of the Section 106 process, agencies are required to consult with the State Historic Preservation Officer (SHPO).

Consultation with federally recognized tribes for proposed activities that could significantly affect tribal resources or interests is required by DoD Instruction 4710.02 (14 September 2006), within which the DoD Annotated Policy on American Indians and Alaska Natives (27 October 1999) is a component, and EO 13175, *Consultation and Coordination with Indian Tribal Governments*. Resources of interest to federally-recognized tribes in this region include historic properties including archeological sites that have cultural or religious significance, sacred sites as defined under Executive Order 13007 (*Indian Sacred Sites*), traditional and materials protected under the Native American Graves Protection and Repatriation Act (NAGPRA).

Traditional cultural properties, protected under NHPA, are related to precontact (prior to European contact) and post-contact periods are associated with beliefs and cultural practices of a living culture, subculture, or community. These beliefs and practices are rooted in the group's history and are important in maintaining the cultural identity of the group.

3.2.2 Existing Conditions

The Air Force has implemented an Integrated Cultural Resources Management Plan (ICRMP) for Tinker AFB (USAF, 2011b) which fulfills its legal requirements for integrating historic preservation and cultural resource management into the overall planning and development of projects on the installation. The ICRMP provides the historic and prehistoric framework of Tinker AFB and the surrounding area and is considered to be a complete inventory of cultural resources on Tinker AFB. The ICRMP fulfills Air Force requirements under AFI 32-7065 (*Cultural Resources Management*, 1 June 2004), and is a broad-based plan of action that identifies the base's significant cultural resources. The ICRMP provides specific guidance for managing and considering cultural resources on Tinker AFB.

3.2.2.1 Area of Potential Effect

For this analysis, the Area of Potential Effect (APE), as defined by the NHPA, includes all area on the ground that would be used for removal of the existing, and installation of a replacement, jet fuel line (as shown on Figure 2-1). The APE consists of an approximately 6 ft wide corridor that would extend for 11,000 linear feet from Facility 273 to Facility 995 (Figure 3-3). The APE encompasses the alignment of the existing buried jet fuel pipeline and the new alignment (to be approximately the same alignment). Identification of cultural resources potentially impacted by the Proposed Action was accomplished by reviewing information in the Tinker AFB ICRMP. Information compiled in this plan reflects resource inventories derived from past archaeological and historic building surveys of the entire land area of Tinker AFB.

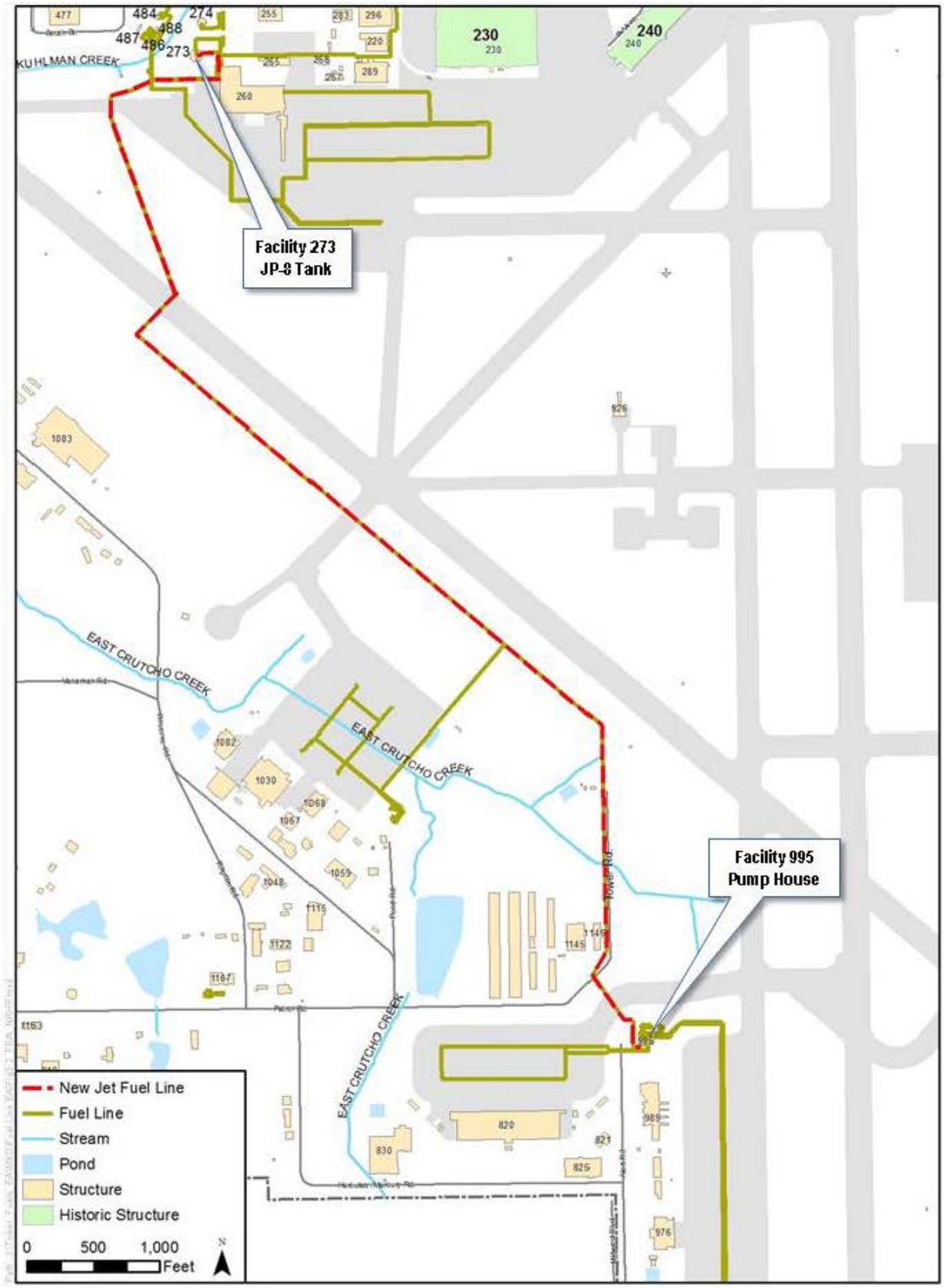

Figure 3-3. Historic Buildings Near the Proposed Action Site on Tinker AFB

3.2.2.2 Archaeological Resources

Archaeological resources are prehistoric or historic places where human activity has measurably altered the earth or left deposits of physical remains. Archaeological resources may include some surface deposits and below ground (subsurface) deposits. Examples of prehistoric archaeological resources include village sites, campsites, lithic scatters, burials, hearths (or hearth features), processing sites, caves and rock shelters, and petroglyph and pictograph sites. Examples of historic archaeological resources include homesteads, mines, townsites, roads and trails, privies, and trash deposits.

The entire land area of Tinker AFB has been surveyed for archeological resources. Four archaeological sites have been identified at Tinker AFB (USAF, 2011b). As shown on Table 3-3, three sites have been determined to be eligible for listing in the NRHP, and one site has been determined to be ineligible. None of these known archaeological sites are located within the APE for the Proposed Action.

Table 3-3. Archaeological Sites at Tinker AFB

Site No.	Site Description	NRHP Status
34OK-146	Historic trash scatter	Ineligible
34OK-157	Historic building complex	Eligible
34OK-166	Prehistoric open habitation without mounds	Eligible
34OK-167	Prehistoric open habitation without mounds	Eligible

Source: USAF, 2011b

3.2.2.3 Historic Buildings

Two types of historic property have been identified at Tinker AFB: facilities associated with aircraft construction and modification, 1942-1946; and facilities associated with the Cuban Missile Crisis, 1962. There are no buildings or structures on Tinker AFB that are eligible for listing on the NRHP due to their association with Cold War activities (USAF, 2011b). As shown in Table 3-4, Tinker AFB has six buildings individually eligible for listing in the NRHP.

Table 3-4. Historic Buildings at Tinker AFB

Building No.	Construction Date	Description	NRHP Eligibility
1	1942	Depot Supply	Individually Eligible
208	1942	Steam Plant	Individually Eligible
230	1942	Airplane Repair Building	Individually Eligible
240	1942	Flight Test Hangar / Base Operations	Individually Eligible
3001	1943	Douglas Assembly Building	Individually Eligible; Eligible as Contributing Property*
3105	1943	Paint Building	Eligible as Contributing Property*
3113	1943	Woodworking Building	Eligible as Contributing Property*
3202	1943	Fire Pump Station	Eligible as Contributing Property*
3203	1943	Fire Protection Water Storage Tank	Eligible as Contributing Property*
3204	1943	Switch Gear House	Eligible as Contributing Property*
3303	1943	Pump House	Eligible as Contributing Property*
4029	1951	Combat Control Center	Individually Eligible

Source: USAF, 2011b. *Contributing property to the Douglas Cargo Aircraft Manufacturing Historic District. The buildings and structures in the Douglas Cargo Aircraft Manufacturing Historic District are historically significant for their role in the Douglas Cargo Aircraft Plant's World War II efforts to produce C-47 transport aircraft for the Army.

The APE for the Proposed Action includes the alignment of the existing and proposed jet fuel line beginning at Facility 273 (JP-8 tank) and ending at Facility 995 (pump house). Table 3-5 provides a summary of buildings and tanks within or adjacent to the APE.

Table 3-5. Facilities Within or Near the APE for the Proposed Action

Building No.	Construction Date	Description	NRHP Eligibility
260	1959	Air Freight Terminal	Surveyed; Not Eligible
273	(unknown)	JP-8 Fuel Tank	Not suveyed because of age
1146	1990	Warehouse Supply Equipment Depot	Not suveyed because of age
995	1984	Pump House	Not suveyed because of age

Note: Only the existing JP-8 fuel tank (Tank 273) is within the APE; other structures are adjacent to or outside the limits of the APE.

Source: Taylor, 2011

Figure 3-3 depicts the location of buildings that are NRHP-eligible in relation to the area of potential effect for the Proposed Action. As shown on this figure, there are no NRHP-eligible buildings within or immediately adjacent to the APE for the Proposed Action.

3.2.2.4 Native American Interests

Native American resources can include, but are not limited to, archaeological sites, burial sites, ceremonial areas, caves, mountains, water sources, trails, plant habitat or gathering areas, or any other natural area important to a culture for religious or heritage reasons. NRHP-eligible traditional sites are subject to the same regulations, and afforded the same protection, as other types of historic properties. The Region of Influence (ROI) for Native American traditional resources consists of those areas associated with project activities in the vicinity of Tinker AFB.

Five federally recognized Native American groups are located in the vicinity of the Proposed Action:

- Seminole Nation
- Muscogee (Creek) Nation
- Caddo Nation of Oklahoma
- Osage Nation
- Wichita and Affiliated Tribes

3.2.3 Approach to Analysis

An undertaking is considered to have an effect on a historic property when the undertaking may alter characteristics of the property that may qualify the property for inclusion in the NRHP. An effect is considered adverse when it diminishes the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Adverse effects on historic properties would include, but would not be limited to:

- physical destruction, damage, or alteration of all or part of the property;
- isolation of the property from or alteration of the character of the property’s setting when that character contributes to the property's qualification for the National Register;
- introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting;

- neglect of a property resulting in its deterioration or destruction; and
- transfer, lease, or sale of the property (36 CFR 800.9[b]).

Any ground-disturbing action in the area of an NRHP-eligible or potentially eligible archaeological site, or modification to such a site, can affect the integrity of that cultural resource, resulting in alteration or destruction of those characteristics or qualities which make it significant and potentially eligible for inclusion in the NRHP. While archaeological sites, historic buildings or historic structures can be destroyed as a result of a single construction project, more often it is the cumulative effect of recurrent disturbing actions that diminish the integrity of the cultural resource and its significant characteristics. Activities with potential to adversely affect cultural resources would be associated primarily with discovery of subsurface resources as a result of ground disturbing activities.

Cultural resources are subject to review under both federal and state laws and regulations. Section 106 of the NHPA of 1966 empowers the Advisory Council on Historic Preservation to comment on federally initiated, licensed, or permitted projects affecting cultural sites listed or eligible for inclusion on the NRHP. Only cultural resources determined to be significant (i.e., eligible for the NRHP) are protected under the NHPA.

3.2.4 Proposed Action

Archaeological Resources

Since there are no known archaeological sites near the construction area associated with the Proposed Action, there would be no effect on known archaeological resources. Although no archaeological resources have been identified within or immediately adjacent to the project area and the project area is not located in an area of potential concern for archaeological resources, proposed construction has a potential to encounter an unanticipated discovery of subsurface archaeological material due to the need for ground disturbance (i.e., excavation and trenching). Excavation may extend up to 8 ft below existing ground surface for removal of the existing fuel line and placement of the new jet fuel pipeline.

An unanticipated discovery is defined as one found during a construction project in an area that has already been adequately surveyed or deemed not to require a survey (with SHPO concurrence), and the site in question was not found during that survey. Unanticipated discoveries include the finding of archaeological materials, historic artifacts, or human remains, found when ground-disturbing activities uncover a new site in an area that has already been adequately surveyed.

The likelihood of discovering significant cultural resources such as archeological deposits during implementation of the Proposed Action would be low since nearly all areas proposed for ground-disturbing activities have been previously disturbed for facilities and infrastructure development. To avoid impacts to archaeological resources, the Air Force would ensure that any archaeological deposits discovered during construction activities would be managed in accordance with the compliance procedures described in Section E.13 of the Tinker AFB ICRMP (*Unexpected Discoveries of Archaeological Materials During Construction Projects*) and the provisions of applicable law(s) such as NHPA Section 106 (36 CFR 800.13). The procedural requirement for protection of cultural resources following an unanticipated discovery would be included in project planning requirements.

The Air Force sent a request to the Oklahoma Archaeological Survey for a review of prehistoric resources. No sites are listed as occurring within the area of the Proposed Action, and no archaeological materials are likely to be encountered (Appendix A).

Historic Buildings

No NRHP-listed resources are located within the APE for the Proposed Action as shown on Figure 3-3. The Proposed Action includes temporary trenching and installation of replacement buried pipeline in the vicinity of Buildings 260 and 1146; neither of these buildings is eligible for listing on the NRHP. The Proposed Action would not result in the removal or disturbance of any NRHP-eligible buildings or structures nor would any ground disturbing activities result in any effects on the historic district on Tinker AFB.

The Air Force sent a request to the Oklahoma Archaeological Survey for a review of prehistoric resources (Appendix A). The Oklahoma Historical Society (State Historic Preservation Office) has found that there are no historic properties affected by the Proposed Action (Appendix A).

Native American Interests

Federally recognized Native American tribes and groups identified at the time of preparation of this document are identified in Subchapter 3.2.2.6. The Air Force consulted with each of these Native American tribes and groups (see Appendix B) to ensure that any sites of traditional cultural value are identified and adequately considered under the Proposed Action. No issues or concerns from Native American tribes or groups have been identified at this time.

Native American tribes would be consulted for any post-review discoveries of historic properties, certain or potential materials subject to the Native American Graves Protection and Repatriation Act (NAGPRA), and other Native American cultural resources of interest. Consultation with Native American tribes, if necessary, would be conducted in accordance with procedures outlined in the ICRMP.

For these reasons, the Proposed Action would not result in impacts to Native American interests in the area.

3.2.5 Cumulative Impacts

Cumulative effects on cultural resources would not be expected within the project APE because no historic properties are known in the APE, and the probability is low for inadvertent discoveries of such resources. While cumulative effects analysis considers potential impacts further removed in time, and place, there are no such impacts reasonably predictable for known or expected historic properties outside the APE.

3.2.6 No Action Alternative

Implementation of the No Action Alternative would have no impact on cultural resources because no construction would occur. Archaeological and historic structures in the area of the Proposed Action would not change from current conditions.

The potential for adverse effects to Native American resources in the area would continue to be minimized through the Base's ongoing consultation with Native American groups in the Tinker AFB area. For these reasons, the No Action Alternative would not result in impacts to Native American interests in the area.

3.2.7 Mitigation Measures

No mitigation measures would be necessary to avoid or reduce effects to cultural resources.

3.2.8 Best Management Practices

The following best management practices would be incorporated into project planning documents:

- To avoid impacts to archaeological resources, the Air Force would ensure that any archaeological deposits discovered during construction activities would be managed in accordance with the compliance procedures described in Section E.13 of the Tinker AFB ICRMP (*Unexpected Discoveries of Archaeological Materials During Construction Projects*) and the provisions of applicable law(s) such as NHPA Section 106 (36 CFR 800.13). The procedural requirement for protection of cultural resources following an unanticipated discovery would be included in project planning requirements.
- Native American tribes would be consulted for any post-review discoveries of historic properties, certain or potential materials subject to the Native American Graves Protection and Repatriation Act (NAGPRA), and other Native American cultural resources of interest. Consultation with Native American tribes, if necessary, would be conducted in accordance with procedures outlined in the ICRMP.

3.3 GEOLOGIC RESOURCES AND SOILS

3.3.1 Definition of Resource

This section addresses terrestrial earth resources: physiography and geology, soils, and geologic hazards (e.g., earthquakes, liquefaction, landslides and expansive soils). Geologic resources can have economic, scientific, and recreational value, and some can pose hazards to human activities in the affected area.

3.3.2 Existing Conditions

3.3.2.1 Physiography and Geology

Tinker AFB is located in the Central Redbed Plains section of the Central Lowland Physiographic Province which is characterized by level to gently rolling hills, broad flat plains, and bottomlands bisected by small- to medium-sized water courses. Tinker AFB is situated on a broad, relatively high area of uplands that forms a watershed divide.

Oklahoma County elevations range from approximately 850 feet above mean sea level (MSL) in the southeastern part to approximately 1300 feet MSL in the northwestern part. The elevation of Tinker AFB ranges from approximately 1200 feet MSL (Crutcho Creek, northwestern portion of base) to 1310 feet MSL (southeast portion of the base). The airfield elevation is approximately 1291 feet MSL (USAF, 2007).

The surficial geology of Tinker AFB is comprised primarily of sandstone and mudstone (commonly described as shale). Sandstone is orange-red to reddish-brown, fine-grained and poorly cemented. The grains are subangular to sub-rounded and composed of quartz. Mudstone is typically reddish-brown and silty (USAF, 2007).

3.3.2.2 Soils

The soils on Tinker AFB have been altered during industrialization; soil borrowed from on-base areas was used for buildup of facility foundations, leveling portions of the airfield, and the capping of landfills. This has resulted in permanent removal of topsoil and subsoil in some areas (USAF, 2007). Soil compaction is commonplace as the result of off-road training exercises, military construction projects, past aircraft parking, and related activities. Other places have been subjected to extensive filling (USAF, 2005).

The general soil association in the area of the Proposed Action is Kirkland-Urban Land-Renthin, characterized by areas of very deep and deep well drained, clayey soils in areas of urban land or upon prairie uplands. The soil classification for the area of the Proposed Action is Kirkland-Urban land complex (KrUA) (USAF, 2007).

A soil survey by the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) in 1983 identified 89 acres of land that were classified as prime farmland[2]. Soil types were reclassified when the soil survey was updated in 1996. Today, approximately 300 acres of land which would have been designated prime farmland has been urbanized and therefore, no longer meets prime farmland criteria (USAF, 2007).

3.3.2.3 Geologic Hazards

Natural geologic hazards are events or processes that have caused, or may cause, hazardous conditions. Examples of natural geologic hazards in Oklahoma include earthquakes, liquefaction, landslides, and expansive soils (Luza and Johnson, 2008).

Earthquakes

Earthquakes frequently occur in three principal areas in Oklahoma: Canadian County; Love, Jefferson and Carter counties; and Garvin and nearby counties. The southeast part of Oklahoma is also an area of low-level earthquake activity. Earthquake activity in Oklahoma County has been recorded with an intensity of V to VI on the Modified Mercalli (MM) Scale; this corresponds to ground motion that is felt by nearly everyone and with some objects overturned or broken. Ground shaking from earthquakes associated with nearby and distant faults may occur during the lifetime of the project. Because earthquake-related hazards cannot be totally avoided, the project site could be subjected to mild to moderate seismic ground shaking.

Liquefaction

Liquefaction occurs when loose sand and silt that is saturated with water can behave like a liquid when shaken by an earthquake. For liquefaction to occur, there must be: (1) loose, granular sediment; (2) saturation of the sediment by ground water; and (3) strong shaking (USGS, 2008).

[2] Prime farmland is defined as land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is also available for these uses (the present land use could be cropland, pasture land, rangeland, forest land, or other land, but not urban built-up land or water). It has the soil quality, growing season, and moisture supply needed to economically produce sustained high yields of crops when treated and managed, including water management, according to acceptable farming methods. In general, prime farmland has an adequate and dependable moisture supply from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, acceptable salt and sodium content, and few or no rocks. It is permeable to water and air. Prime farmland is not excessively erodible or saturated with water for long periods of time, and either does not flood frequently or is protected from flooding (USAF, 2007).

At Tinker AFB, the near surface deposits are well consolidated mudstones and sandstones. For this reason the occurrence of liquefaction is highly unlikely.

Landslides

Most landslides in Oklahoma have occurred in the eastern one-third of the state due to wetter climate and steep slopes associated with mountainous terrain (Luza and Johnson, 2008). Tinker AFB is located in an area with a low potential for landslides.

Expansive Soils

Expansive soil, also called shrink-swell soil, is a very common cause of foundation problems. Depending upon moisture in the ground, shrink-swell soils would experience changes in volume of up to thirty percent or more. Foundation soils which are expansive can cause lifting of a building or other structure during periods of high moisture. Conversely during periods of falling soil moisture, expansive soil would collapse and can result in building settlement. Expansive soil would also exert pressure on the vertical face of a foundation, basement or retaining wall resulting in lateral movement. Shrink-swell soils which have expanded due to high ground moisture experience a loss of soil strength or "capacity" and the resulting instability can result in various forms of foundation problems and slope failure (FRG, 2010).

Clay-rich mudstones, or soils from the weathering of mudstones, may contain smectite clay minerals, such as montmorillonite, that swell up to 1.5 to 2.0 times their original dry volume after adding water. Over 75 percent of Oklahoma bedrock units are possible sources for expansive soils. Soil saturation from rainfall, lawn watering, or sewer leakage may cause major damage by soils expanding under sidewalks, highways, utility lines, and foundations. If construction takes place on wet expanded soils, then shrinkage may occur after drying, resulting in severe cracking in structures. Principal geologic units in Oklahoma having high shrink-swell potential include several Permian units in central Oklahoma (Luza and Johnson, 2008). Tinker AFB is considered to have a low-to-moderate abundance of expansive soils. Proper compaction of soil would reduce the risk of instability of soils.

3.3.3 Approach to Analysis

An impact to geological resources and soils would be considered significant if it resulted in substantial erosion or loss of soil, or if permanent alteration of ground surface features resulted from activities such as excavation, drilling, or digging.

3.3.4 Proposed Action

Construction activities associated with the replacement of the jet fuel transfer line at Tinker AFB would occur within an area where the physiographic features and geologic resources have been previously disturbed and modified by prior construction of the airfield and supporting facilities. Alteration of ground surface would consist of trenching to remove the existing jet fuel pipeline followed by installation of replacement piping. The proposed replacement of the jet fuel transfer line would not require any permanent removal of topsoil or the use of extensive fill. No soil-related issues or geologic constraints would be expected.

The proposed replacement jet fuel transfer line project would be designed and constructed to resist earthquake damage in accordance with applicable design standards and codes. Therefore, the potential impact from seismic ground shaking would not be significant.

The replacement jet fuel transfer line would be designed and constructed in accordance with engineering standards applicable to soil characteristics at the project site. Section 00 72 00 (*Environmental Requirements for Construction Contracts*) would specify environmental protection and compliance requirements before and during construction for management of natural resources in compliance with applicable Executive Orders and federal, state, Air Force, and Tinker AFB regulations.

Earthwork would be planned and conducted in such a manner as to minimize the duration of exposure of unprotected soils. Best management practices such as single point construction entries would minimize erosion during demolition and construction. Grass and other landscaping would be reestablished in the disturbed areas immediately after construction is completed, thereby reducing the potential for erosion. No permanent alteration of surface features would occur. Therefore, impacts to geologic resources and soils would not be significant.

3.3.5 Cumulative Impacts

Activities with potential to adversely affect geologic resources and soils would be associated with removal of topsoil, alteration of topography or increases in erosion. Although construction of other reasonably foreseeable projects on Tinker AFB would occur at the same time, the Proposed Action would be an in-kind replacement of an existing underground fuel pipeline with no permanent change in surface features. The Proposed Action would not result in any impacts to geologic resources. Best Management Practices for erosion control would be followed in accordance with construction permit conditions and the SWPPP. For this reason, the Proposed Action would not contribute to cumulative impacts on geologic resources and soils.

3.3.6 No Action Alternative

No ground disturbing activities would occur as a result of the No Action Alternative. Therefore, no impact to physiographic features and soils would be anticipated.

3.3.7 Mitigation Measures

No mitigation measures would be necessary to avoid or reduce impacts to geologic resources or soils.

3.3.8 Best Management Practices

Best Management Practices would be implemented to reduce potentially adverse impacts on geologic resources and soil, or from geologic hazards, as a result of the Proposed Action. The replacement pipeline would be designed and constructed in accordance with engineering standards applicable to soil characteristics at the project site. BMPs for erosion control would be followed in accordance with construction permit conditions and the SWPPP. Silt fences, compost berms, filter socks or other similar measures would be installed, as appropriate, for managing soil erosion.

3.4 HAZARDOUS MATERIALS AND WASTES

3.4.1 Definition of Resource

Hazardous materials are defined as substances with physical properties of ignitability, corrosivity, reactivity, or toxicity that may cause an increase in mortality, a serious irreversible or incapacitating but reversible illness or may pose a substantial threat to human health or the

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

Issues associated with hazardous materials and wastes typically focus on underground storage tanks (UST); aboveground storage tanks (AST); and the storage, transport, and use of pesticides, bulk fuel, petroleum, oils, and lubricants. When such resources are improperly used, they can threaten the health and well-being of wildlife, habitats, soil systems, water resources, and humans.

To protect habitats and humans from inadvertent and potentially harmful releases of hazardous substances, the DoD requires that all facilities develop and implement Hazardous Waste Management Plans or Spill Prevention and Response Plans. In addition, the DoD has developed the Environmental Restoration Program (ERP), intended to facilitate investigation and cleanup of contaminated sites at military installations. These plans and programs, in addition to established legislation [e.g., Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and Resource Conservation and Recovery Act (RCRA)] protect the ecosystems on which most living organisms depend.

Some building components may contain hazardous building materials such as asbestos or lead-based paint (LBP). These substances are hazardous to human health. Consequently, demolition or removal of such components may result in the generation of regulated waste. Regulated waste is transported off site by a licensed contractor for appropriate disposal.

3.4.2 Existing Conditions

3.4.2.1 Hazardous Materials

Hazardous materials are used in processes to perform the mission of Tinker AFB and are managed in accordance with Air Force Instruction (AFI) 32-7086, Hazardous Materials Management, Tinker AFB Supplement (17 December 2009). The Hazardous Materials Management Program (HMMP) manages the procurement and use of hazardous materials at the base. The HMMP functions through the Hazardous Materials Pharmacy, which consists of a decentralized Hazardous Materials Pharmacy Cell and a hazardous materials electronic tracking system, the Hazardous Materials Management System (HMMS). The HMMS is used to perform the following automated functions:

- Track training, exposure, inventory, and personal protective equipment
- Dispense hazardous materials according to units of use
- Serve as the central issue point for just-in-time control and issue
- Provide online Material Safety Data Sheets
- Maintain hazardous materials control by authorized user, zone, and task

The tracking system also compiles the data necessary to meet reporting requirements, assists in identifying processes for pollution prevention (P2) opportunities, and measures progress in minimizing hazardous materials usage at Tinker AFB.

Tinker AFB's OC-ALC Plan 19-2, Spill Prevention and Emergency Response Plan for Hazardous and Extremely Hazardous Material and Spill Prevention Control and Countermeasures Plan (Tinker AFB 2010), presents specific procedures for preparing for and

responding to inadvertent discharges of oil or releases of hazardous substances at the base, as well as notification and reporting requirements in the event of a release.

The jet fuel pipeline to be replaced under the Proposed Action is made of fiberglass and was installed in 1985. It is highly unlikely that this pipeline was painted with LBP.

Demolition wastes that may contain hazardous substances would be managed in accordance with Tinker AFB Instruction 32-7004.

3.4.2.2 Hazardous Wastes Generation and Accumulation

Tinker AFB is permitted as a large-quantity hazardous waste generator and holds a Part B permit for its treatment, storage and disposal facility (TSDF) located at B810. The permit was issued by the Oklahoma DEQ with an effective date of July 2001. The Oklahoma DEQ serves as the primary oversight agency for RCRA compliance in Oklahoma. The TSDF is operated by the Defense Logistics Agency Disposition Services and is limited to conforming storage (no treatment or disposal). B810 and B811 store hazardous waste for up to one year. Containers are then shipped off site for disposal.

Hazardous wastes at the base are managed in accordance with Tinker AFB Instruction 32-7004. The purpose of Tinker AFB Instruction 32-7004 is to ensure safe and effective collection, handling, and disposal of hazardous waste on the installation in accordance with applicable federal, state, DoD and USAF regulations.

The largest volume of hazardous waste at the base is generated by aircraft and jet engine maintenance and overhaul activities. These activities include the following:

- Preparation of aircraft skins and structural members
- Paint removal and application, degreasing, metal etching, and carbon removal from engines
- Abrasive blasting

Conducting these activities requires the use of large volumes of solvents and the generation of dust and liquid wastes. Other hazardous wastes contributing to this waste stream include petroleum products and waste, hydraulic fluid, antifreeze, and mercury-containing light bulbs and ballasts. Disposal of mercury-containing light bulbs must be conducted in accordance with the Universal Waste Rule (40 CFR 273); this rule specifies procedures for proper disposal and storage of used mercury-containing light bulbs and ballasts. The Hazardous Wastes Management program at Tinker AFB has prepared a plan for the replacement of such light bulbs and ballasts and should be contacted prior to renovation or demolition activities to ensure the proper handling, management and disposal of these materials.

Another large hazardous waste stream generated at Tinker AFB results from RCRA corrective actions on past contaminated sites and remediation of a National Priorities List site on the base. These wastes consist of solvent-, hydrocarbon-, and metal-contaminated soil and debris removed during remediation projects. Other hazardous waste at Tinker AFB is generated from remodeling or demolition of older buildings. Due to the age of certain buildings on base, there is a potential for building materials to contain hazardous substances such as asbestos and LBP. Operational activities including vehicle, building, and grounds maintenance, and wastewater treatment also generate hazardous waste.

Hazardous wastes are accumulated at the site of generation in initial accumulation points (IAPs) throughout the base. In some areas, collection points are used to accumulate wastes during work shifts; wastes are then transferred to an appropriate IAP at the end of the work shift. Waste staging areas are used for some locations where wastes from multiple IAPs are staged for pickup and transfer to one of two accumulation points (APs), located in B809 and B3125. Waste containers are tracked from the issue of an empty container through disposal of the container using the HMMS. B809 is the largest of the APs and processes the majority of containerized hazardous waste from the IAPs for transfer to B810. Serialized accumulation containers for non-bulk hazardous waste are issued to waste generators and picked up when full. Waste profiling is completed using either generator knowledge or laboratory analysis to identify and quantify the chemical constituents of the waste for proper treatment and disposal.

There are three areas on Tinker AFB where non-containerized waste is accumulated in APs. The industrial wastewater treatment plant accumulates dewatered hazardous waste sludge in a roll-off bin that is picked up directly by a contractor and taken to an appropriate TSDF. At the AP at B3125, drums are rinsed and crushed, aerosol cans are punctured and crushed, and blast media wastes are accumulated. The chemical cleaning line in B3001 includes hazardous waste tanks which are only used when there is a malfunction in the process line.

There are no hazardous waste storage areas within the area of the Proposed Action, although there are hazardous waste storage areas at nearby facilities at both ends of the existing fiberglass pipeline.

3.4.2.3 Fuel Storage

The fuels and materials stored and handled in bulk at the base include jet propellant 5 (JP-5), JP-8, and pulverized fuel 1 (PF-1; aviation fuels), JP-10 (missile fuel), motor gasoline (Mogas; automotive gasoline), diesel fuel, biodiesel fuel, No. 2 heating oil, PD-680 (solvent), and deicing fluid. Conoco supplies JP-8 fuel to Tinker AFB through a 6-inch-diameter supply line that enters the northern section of the base and continues to the main tank farm. Tanker trucks are used as a backup to deliver JP-8, which is dispensed to aircraft either from one of the 11 refueler vehicles (R-11s) or directly through hydrants located on the aprons.

Various fuels at the base are also stored in aboveground storage tanks (AST) and underground storage tanks (UST). Tinker AFB currently maintains 36 active USTs and 90 active ASTs.

Releases from ASTs and USTs (i.e., spills, overfill, and leaks) can cause fires or explosions that threaten human safety and can contaminate soil and groundwater that threaten human health. To protect groundwater and soil from contamination, the storage tank program at Tinker AFB implements the following:

- All ASTs must meet applicable requirements, including requirements for leak testing and preventing, responding to, reporting, and cleaning up spills.
- New USTs (including piping) must be designed and constructed to provide corrosion protection, release detection, spill and overfill prevention, proper installation, and secondary containment.
- All existing USTs (any regulated UST installed before 22 December 1988) must be upgraded to meet the standards for new USTs.

OC-ALC Plan 19-2 includes the Spill Prevention, Control and Countermeasures (SPCC) Plan required under Title 40, Code of Federal Regulations, Part 112 (Oil Pollution Prevention) for fuel storage facilities.

Abandoned and active USTs at Tinker AFB were investigated beginning in September 1985. Eighty-eight active tanks and 38 abandoned tanks were identified and located. Most of those tanks were found in the vicinity of B3001 and in the north-central portion of the base near B201, B210, and the B290 Fuel Farm. In coordination with the Oklahoma Corporation Commission (OCC), Tinker AFB began release investigations at 26 UST sites beginning on 31 July 1999. Tinker AFB has completed most of the investigations and has determined the nature and extent of contamination at each UST site; several of those sites are in active remediation. Currently, 15 of the sites have been closed or deactivated in accordance with OCC regulations that were in effect prior to 1 September 1996. The previous rules categorized UST sites for remediation based on generic contaminant levels in soils and groundwater. On 1 July 1996, the OCC issued new rules that classify sites for remediation based on risk to human health and the environment. The new process is referred to as the Oklahoma Risk-Based Corrective Action Program. Eleven sites are still open and are in remediation or have been recommended for case closure. In addition, two UST removals were performed in 1998, and tank closure reports were submitted to the OCC in December 1998 for each site. According to the Fiscal Year 2009 *Internal ECAMP Final Report*, Tinker AFB currently maintains 36 active USTs and 90 active ASTs (Tinker AFB 2009).

In coordination with the Oklahoma Corporation Commission (OCC), Tinker AFB began release investigations at 26 UST sites beginning on 31 July 1999. Tinker AFB has completed most of the investigations and has determined the nature and extent of contamination at each UST site; several of those sites are in active remediation. Currently, 15 of the sites have been closed or deactivated in accordance with OCC regulations that were in effect prior to 1 September 1996. The previous rules categorized UST sites for remediation based on generic contaminant levels in soils and groundwater. On 1 July 1996, the OCC issued new rules that classify sites for remediation based on risk to human health and the environment. The new process is referred to as the Oklahoma Risk-Based Corrective Action Program. Eleven sites are still open and are in remediation or have been recommended for case closure. In addition, two UST removals were performed in 1998, and tank closure reports were submitted to the OCC in December 1998 for each site.

There are no fuel storage tanks associated with the Proposed Action, although the fiberglass pipeline to be replaced transfers JP-8 from Tank 273 at the northern end to the pump house (Facility 995) south of Runway 12/30. Tank 273 is a 55,500-barrel AST. North of Tank 273 is Tank 274, a 25,000-barrel AST containing heating oil. There are two 10,000-barrel, JP-8 ASTs (Tank 483 and Tank 484) associated with the nearby Type III Phillips hydrant system. At Facility 995, there are three 2,500 barrel, JP-8 ASTs (Tanks 965, 998, and 999).

3.4.2.4 Groundwater Contamination

Tinker AFB has established a base-wide groundwater sampling program to obtain depth-to-water and depth-to-product measurements semiannually from approximately 1,300 monitoring wells, pumping wells, and piezometers (a small-diameter observation well used to measure groundwater pressure). Groundwater at Tinker AFB is evaluated and monitored in areas where solvents or other hazardous materials may have been disposed of and have impacted groundwater. Three consolidated groundwater management units (GWMU), identified as the

Northwest, East and Southwest GWMUs, are located within the boundaries of Tinker AFB. The purposes of the GWMUs are to define areas to facilitate investigation and monitoring of groundwater for contaminants, principally solvents, metals and fuel that may originate from a variety of localized sources. The sources include several Installation Restoration Program (IRP) sites and non-IRP sites at Tinker AFB. Remedial actions in place include pump-and-treat systems, monitored natural attenuation, and interim controls.

Soil vapor at Tinker AFB results from the evaporation of petroleum products, solvents, or other hazardous materials remaining in the unsaturated soils found below the ground surface (above groundwater level). Vapor intrusion assessments were recently performed to assess the potential for soil vapor intrusion of subsurface contaminants volatilized from soil and/or groundwater into overlying buildings at various areas across Tinker AFB. It was determined that the potential for soil vapor intrusion exists for several buildings at Tinker AFB. However, the assessment concluded that soil vapor intrusion is likely to be a rare occurrence at Tinker AFB because of the clay-rich soils underlying most of the buildings.

The Proposed Action area crosses all three GWMUs indicating that contaminated groundwater (including soil) may be encountered during construction. Soil vapor intrusion into buildings is not a concern for this project as the Proposed Action does not include any buildings.

A site characterization survey of the Proposed Action area in support of this project was recently conducted. Fuels and solvents are the two contaminants of concern at the project area. Fuel spills are known to have occurred along the pipeline in the 1990s and in June 2011. Solvent, primarily trichloroethene (TCE), is present in the shallow Upper Saturated Zone groundwater under the site. However, the Hennessy Water Bearing Zone is not known to be contaminated. Solvent sources are not related to the fuel transfer pipeline.

The pipeline route crosses through, or passes close to, three shallow Upper Saturated Zone groundwater contaminant plumes comprised principally of solvents (primarily TCE). The northernmost plume is associated with an old fire training area (IRP Site FT022) (see Figure 3-4). Shallow soil borings in this area have not encountered any significant contamination. The second plume is located south of the first plume along the pipeline route. The third plume is located south of the second plume and southwest of Landfill 5 (IRP Site LF015) (see Figure 3-5), straddling Tower Road. Design of the pipeline depth would have to take into consideration avoidance of the contaminated shallow groundwater.

3.4.2.5 Environmental Restoration Program

The DoD Environmental Restoration Program (ERP) was established in 1981 to investigate and remediate hazardous waste sites at DoD facilities. The USAF subsequently established its ERP to locate and investigate hazardous waste sites on its installations, termed Installation Restoration Program (IRP) sites. Fully restored and remediated IRP sites present few constraints to future on-base development; however, the implementation of land use controls may be required. Land use controls are physical, legal, or administrative mechanisms that restrict or limit access to contaminated property to promote beneficial land uses and to protect human health and the environment.

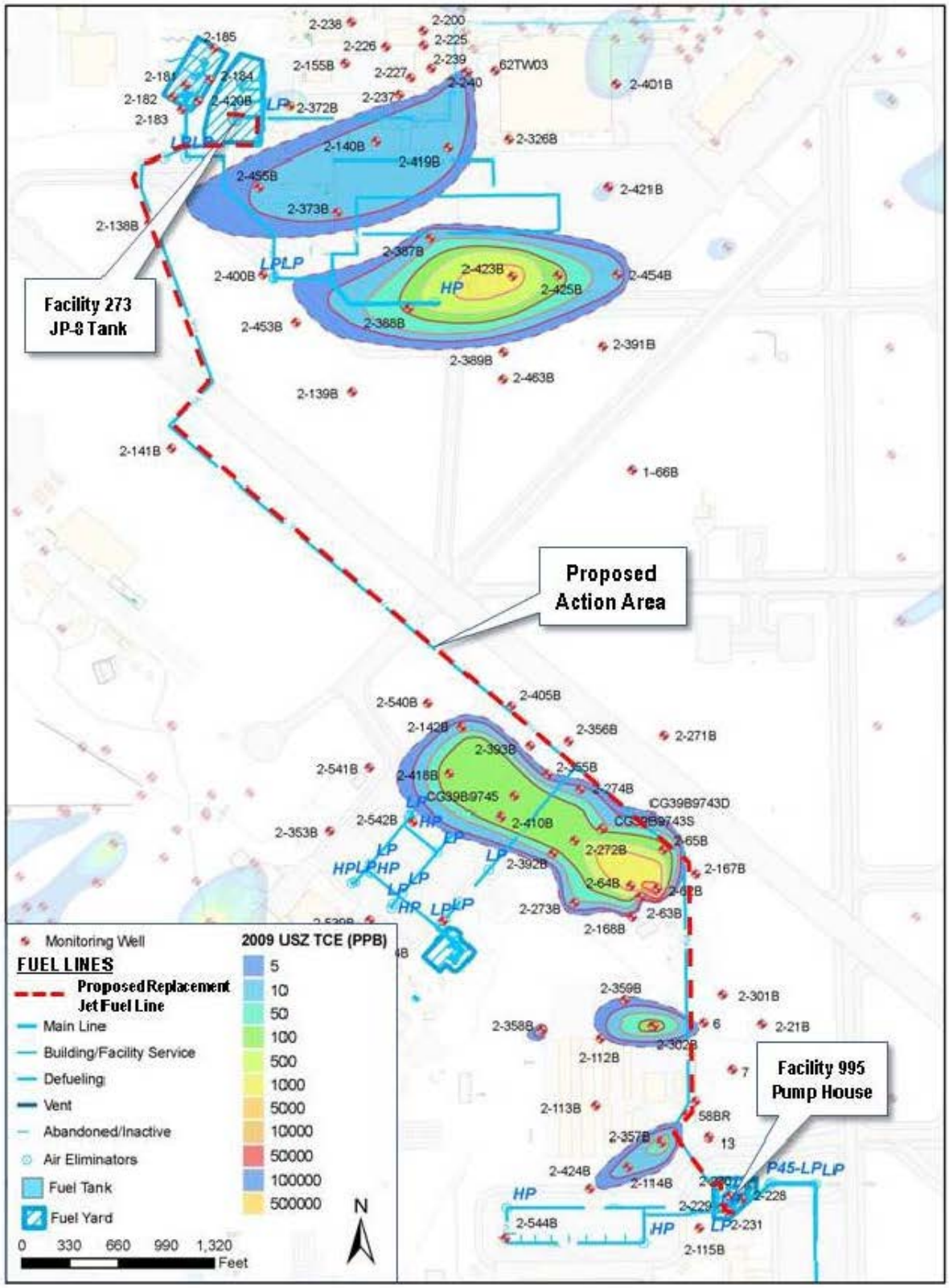

Figure 3-4. TCE Plumes and Monitoring Well Locations in the Proposed Action Area

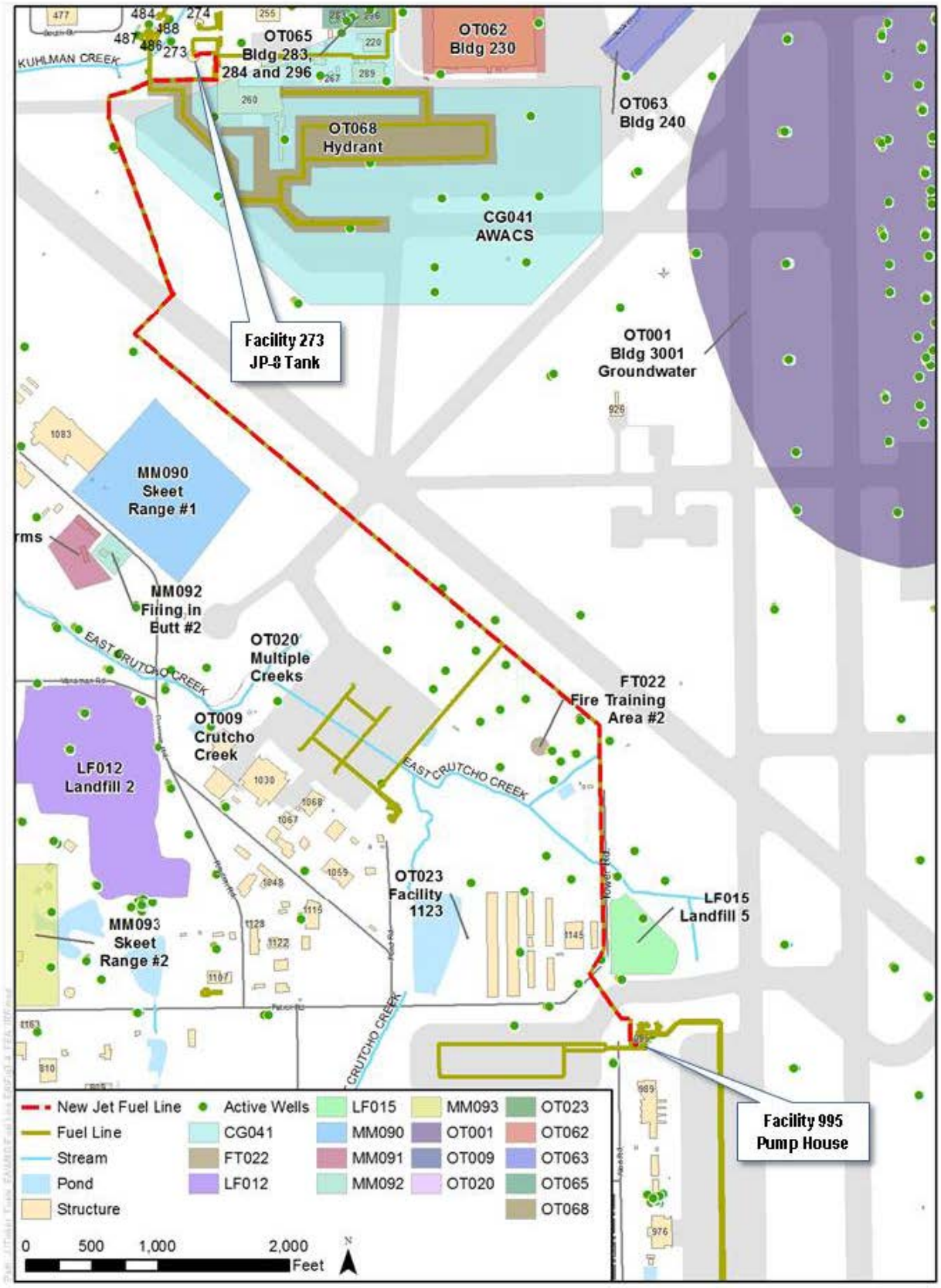

Figure 3-5. IRP Sites in the Proposed Action Area

A total of 40 IRP sites including National Priorities List sites (operable units), landfills, industrial waste pits, fire-training areas, radioactive waste disposal sites, disposal areas, and groundwater contamination sites have been identified on Tinker AFB. Of the 40 sites in the IRP, 24 have

reached site closeout with the regulating authority while the remaining 16 sites have a remedy in place. All of the IRP sites in the Proposed Action area are RCRA corrective action sites and regulated by the Oklahoma DEQ.

In addition to the IRP sites, 13 Air Force Compliance Restoration Program (CRP) sites are located on Tinker AFB. All of the CRP sites are RCRA corrective action sites that would require site investigations, studies, or other evaluation before further remedial action can be proposed and implemented. There are five active Military Munitions Response Program (MMRP) sites on Tinker AFB, but none are in the Proposed Action area.

There are eight existing IRP and two proposed CRP sites in the vicinity of the Proposed Action area (Figure 3-5). These are listed in Table 3-6.

Table 3-6. IRP Sites in the Proposed Action Area

Site Type	Status
Other (OT) 009 Crutcho and Elm Creeks	Site Closed – No Further Action
Other (OT) 010 Kuhlman Creek	Site Closed – No Further Action
Fire Training (FT) 022 Fire Training Area #2	Site Closed – No Further Action
Other (OT) 023 Facility 1123	Site Closed – No Further Action
Landfill (LF) 015 Landfill #5	Long Term Monitoring, Natural Attenuation
Contaminated Groundwater (CG) 037 Northwest Groundwater Management Unit	Long Term Monitoring, Natural Attenuation
Contaminated Groundwater (CG) 038 Southwest Groundwater Management Unit	Long Term Monitoring, Natural Attenuation
Contaminated Groundwater (CG) 039 East Groundwater Management Unit	Long Term Monitoring, Natural Attenuation
Contaminated Groundwater (CG) 041 AWACS Groundwater Management Unit	Proposed
Other (OT) 068 Hydrant	Proposed

3.4.3 Approach to Analysis

Numerous local, state, and federal laws regulate the storage, handling, disposal, and transportation of hazardous materials and wastes; the primary purpose of these laws is to protect public health and the environment. The significance of potential impacts associated with hazardous substances is based on their toxicity, ignitability, reactivity, and corrosivity. Impacts associated with hazardous materials and wastes would be significant if the storage, use, transportation, disposal of, or interaction with hazardous substances substantially increases the human health risk or environmental exposure.

3.4.4 Proposed Action

Construction-Related Impacts

Implementation of the Proposed Action includes the removal of the existing fiberglass pipeline and replacement with a carbon steel pipe. Contractors constructing the replacement fuel transfer line may bring hazardous materials on site. These may include lubricants, coatings, and solvents.

The project area is known to have soil and groundwater contamination from past fuel and solvent releases. Any contaminated soil from trenching or excavation would be tested prior to disposal. Ongoing cleanup and remedial investigations at contaminated sites within and near the project area would continue during construction of the Proposed Action. The Proposed Action would not include remediation of contaminated soil from the Proposed Action project area. A separate Sustainment, Repair and Modernization (SRM) project would be funded for containment, removal and remediation efforts for this project.

Regulated hazardous materials and hazardous waste such as those described above would be contained and disposed in accordance with all applicable standards by a licensed contractor. In addition, construction contractors would be required to comply with Section 00 72 00, *Environmental Requirements for Construction Contracts*. Compliance with applicable requirements would result in negligible impacts from exposure to hazardous substances during the replacement of the fiberglass fuel transfer line.

Operational Impacts

Operations associated with the Proposed Action would not result in the generation or disposal of hazardous materials or wastes in the Proposed Action project area. The likelihood of releases from the new fuel transfer line, relative to the old fiberglass pipeline, would be minimized. Ongoing cleanup and remedial investigations at contaminated sites would continue and not be impeded. Therefore, there would be no adverse impacts on or from hazardous materials or wastes during operation of the Proposed Action.

3.4.5 Cumulative Impacts

The Proposed Action would result in a decrease in the likelihood of jet fuel leaks from the buried pipeline. There would be no change to hazardous materials use or generation of hazardous wastes. For this reason, the Proposed Action would not contribute to cumulative impacts on hazardous materials and hazardous wastes.

3.4.6 No Action Alternative

If the No Action Alternative were selected, Tinker AFB would not implement the Proposed Action. Therefore, no impacts with regard to hazardous materials would occur and conditions would remain as described in Subchapter 3.4.2 (*Existing Conditions).*

3.4.7 Mitigation Measures

No mitigation measures would be necessary to reduce any adverse hazardous substances/waste impacts to below significant levels.

3.4.8 Best Management Practices

Best management practices would be implemented during construction as required in Contract Specification Section 00 72 00 to prevent or minimize potential impacts from hazardous substances and hazardous wastes. Regulated waste would be contained and disposed in accordance with all applicable standards by a licensed contractor.

3.5 WATER RESOURCES

3.5.1 Definition of Resource

Water resources include surface and groundwater resources (including the quality and availability of surface and groundwater), wetlands, and floodplains. Surface water resources comprise lakes, rivers, and streams and are important for a variety of reasons including economic, ecological, recreational, and human health. Groundwater comprises the subsurface hydrologic resources of the physical environment and is an essential resource in many areas; groundwater is commonly used for potable water consumption, agricultural irrigation, and industrial applications. Groundwater properties are often described in terms of depth to aquifer, aquifer or well capacity, water quality, and surrounding geologic composition (USAF, 2011c).

Wetlands are defined by the U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency in 33 CFR 328.3(b) as areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. As defined in 1984, wetlands generally include swamps, marshes, bogs, and similar areas. Wetlands provide a variety of functions, including groundwater recharge and discharge, flood flow attenuation, sediment stabilization, sediment and toxicant retention, nutrient removal and transformation, aquatic and terrestrial diversity and abundance, and uniqueness. Jurisdictional wetlands are those subject to regulatory authority under Section 404 of the Clean Water Act; Executive Order 11990, *Protection of Wetlands*, requires analyses of potential wetland impacts if they are related to proposed federal actions.

Other issues relevant to water resources include watershed areas affected by existing and potential runoff and hazards associated with 100-year floodplains. Most of the watersheds on Tinker AFB property have been developed into residential or industrial areas, airfield, and the golf course with only some small areas remaining undeveloped (USAF, 2007).

Floodplains are corridors of low, level ground on one or both sides of a stream channel and are subject to either periodic or infrequent inundation by floodwater. Inundation dangers associated with floodplains have prompted federal, state, and local legislation that limits development in these areas largely to recreation and preservation activities. Executive Order 11988, *Floodplain Management*, requires actions to minimize flood risks and impacts. Under this order, development alternatives must be considered and building requirements must be in accordance with specific federal, state, and local floodplain regulations. The DoD has implemented storm water requirements under Section 438 (42 USC §17094) of the EISA to maintain the hydrologic functions of a site and mitigate the adverse impacts of storm water runoff from DoD construction projects. Section 438 requires federal facility projects of more than 5,000 square feet to "maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of flow" (DoD, 2010).

Surface water features, including wetlands and floodplains, found on Tinker AFB are shown on Figure 3-6.

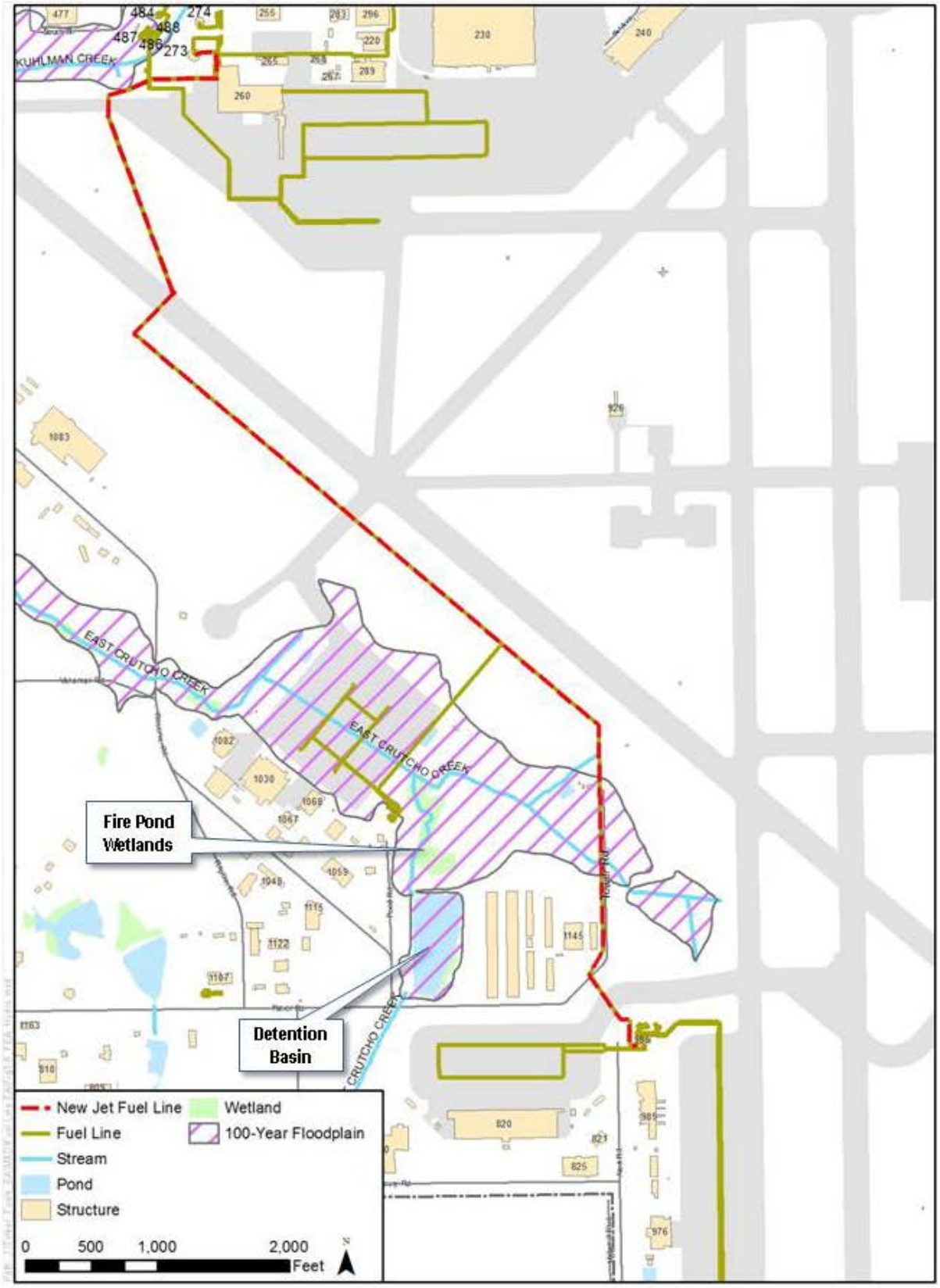

Figure 3-6. Surface Water Resources on Tinker AFB

3.5.2 Existing Conditions

Surface Water

Oklahoma County's landforms drain into the North Canadian River, which runs west to east through the county. The northern portion of the county drains into the Crutcho Creek drainage basin and into the North Canadian River, and the southern portion drains into the Elm Creek and Hog Creek drainage basins and into the South Canadian River; both rivers are headwaters for the Arkansas River. The entire county is part of the Arkansas River Basin.

Several drainage corridors traverse Oklahoma County close to Tinker AFB, including Brock Creek, East Elm Creek, Crutcho Creek, West Hog Creek, the East Fork and West Fork of Wildhorse Creek, Bluff Creek, Walnut Creek, and Soldier Creek. Surface waters on Tinker AFB occur in three primary drainage basins, one of which drains to the north (Crutcho Creek with Kuhlman and Soldier Creek tributaries) and two to the south (East Elm Creek and West Hog Creek). Most of Tinker AFB is drained by the Crutcho Creek drainage basin, which flows to the north into the North Canadian River. The Elm Creek and Hog Creek drainage basins flow to the south of the base into the Little River, which forms a confluence with the South Canadian River. Most base creek flows are the result of storm water runoff, although portions of the creeks are recharged from groundwater. Storm water runoff is collected by diversion structures and discharged into surface streams (USAF, 2007). No significant point-source industrial discharges currently are made into any waterway on Tinker AFB (USAF, 2007).

The primary portion of Crutcho Creek (Waterbody ID Nos. 520520000070_10 and 520520000090), which travels through the southern part of Tinker AFB, housing, the community area, and the golf course has been designated with the following beneficial uses (USAF, 2007):

- Habitat-limited Aquatic Community (i.e., water chemistry and habitat are not adequate to support a warm water aquatic community),
- Agriculture/Livestock and Irrigation,
- Industrial and Municipal Process and Cooling Water,
- Secondary Body Contact Recreation (i.e., activities where ingestion of water is not anticipated; for example, boating, fishing, and wading), and
- Aesthetics.

The 2007 Tinker AFB Storm Water Pollution Prevention Plan (SWPPP) complies with the conditions of the Multi-Section General Permit for Storm Water Discharges Associated with Industrial Activities (Permit Number GP-00-01). The SWPPP is a supporting plan in OC-ALC Plan 19-2. The SWPPP provides base-wide and facility-specific BMPs to reduce pollutants in storm water discharges from the base. BMPs for Tinker AFB include source controls, management practices, preventive maintenance, spill prevention and response, erosion and sediment controls, and the identification of storm water pollution prevention personnel.

As shown on Figure 3-6, there are two branches of East Crutcho Creek south of the airfield. The proposed alignment of the replacement jet fuel pipeline would cross only the southerly branch of East Crutcho Creek. This intermittent, ephemeral creek drains to the north. Stream flows are generated primarily by precipitation runoff.

Groundwater

The primary subsurface water zones identified at Tinker AFB include the Hennessey water-bearing zone, the upper saturated zone (formerly the "perched" zone), the lower saturated zone (formerly the "top of regional" and "regional" aquifers), and the producing zone. Tinker AFB is located in a recharge area for these water-bearing zones; groundwater is derived primarily from precipitation and from infiltration of surface streams (USAF, 2007).

Tinker AFB lies within the recharge area of the Garber-Wellington Aquifer. Regional groundwater flow under Tinker AFB ranges in direction from west/northwest to southwest, depending on location, and has a gradient between 10 to 30 feet per mile (USAF, 2007). The Hennessey water-bearing zone overlies this aquifer in the southwestern portion of the base, but it is not part of the Garber-Wellington Aquifer. Groundwater at Tinker AFB is found under either water table or confined conditions. The depth to water ranges from a few feet to about 70 feet depending on the local topography. Across Tinker AFB, water can sometimes be found in shallow, thin, discontinuous perched zones above the aquifer. However, on Tinker AFB contaminated groundwater plumes exist typically at a depth of 175 feet or shallower. These plumes do not pose health concerns at this time since the producing zone at Tinker AFB (i.e., depth at which water from supply wells is obtained) is 200 feet or deeper. Also, there appears to be an aquitard, or hydraulically confining lithologic layer, at approximately 200 feet, which hydraulically separates the producing zone from shallower groundwater in the aquifer at Tinker AFB (USAF, 2007). More than 1,300 monitoring wells, production wells, and piezometers have been installed in support of the Tinker AFB ERP monitoring (see Subchapter 3.4, *Hazardous Materials and Wastes*).

The approximate direction of groundwater flow in the Garber-Wellington Aquifer is west to northwest across the northern half of Tinker AFB. Shallow groundwater may discharge into surface streams or be recharged by streams. Most water from the Garber-Wellington Aquifer is of sufficient quality to be used for most industrial, agricultural or domestic purposes. However, contaminated groundwater plumes do exist typically at a depth of 175 feet or shallower. These plumes are primarily a result of aircraft maintenance and overhaul operations that occurred between the mid-1940s and mid-to-late1970s. These operations required the use of solvents and involved activities such as chrome plating which by various means led to contaminants entering the groundwater. Leaking fuel tanks and inappropriate waste disposal practices also contributed to the plumes (USAF, 2007). Additional information on groundwater contamination is provided in Subchapter 3.4.2.4.

Wetlands

In 1995, approximately 65 acres of wetlands were identified on Tinker AFB by USFWS using National Wetland Inventory (NWI) criteria; these wetlands included creeks, ponds, drainage swales, and other wet areas (USAF, 2007). Of the 65 acres, 7.9 acres were later classified by the U.S. Army Corps of Engineers as jurisdictional wetlands under the Clean Water Act. In 2002, the 65 acres of wetlands (73 wetland areas) were reassessed to track their status and trend. Based on the survey, only two wetlands (i.e., the Urban Greenway and Prairie Pond) were classified as high-quality wetlands. Thirty-four were classified as being of intermediate quality, and six were classified as low quality. This study also determined that 31 of the original 73 NWI wetland areas no longer existed or were actually drainage ditches or wet-weather conveyances that did not function as wetlands or aquatic habitat and therefore were not included in the survey. These

nonwetland areas covered approximately 27 acres and most were within the airfield or other highly industrialized areas of the base. Therefore, the current total NWI acreage on Tinker AFB is estimated at 38 acres. As of 2007, these had not been officially "delisted" as wetlands by the USFWS, which conducted the original study (USAF, 2007).

Based on data from the *Integrated Natural Resources Management Plan* (USAF, 2007) and geospatial data provided by Tinker AFB, there are no wetlands in the area of the Proposed Action. The Proposed Action is within the watershed of the Fire Pond jurisdictional wetland north of the detention basin (Figure 3-6). The area that would be subject to construction includes the existing alignment for the jet fuel transfer line.

Floodplains

The flood hazard areas of Oklahoma County are subject to periodic inundation that results in loss of life and property, health and safety hazards, disruption of commerce and governmental services, and extraordinary public expenditures for flood protection and relief, all of which adversely affect public health, safety, and general welfare. The bulk of 100-year and 500-year floodplains designated by the Federal Emergency Management Agency for Oklahoma County are along the North Canadian River and its major tributaries.

In October 2002, the U. S. Army Corps of Engineers, Southwestern Division-Tulsa District, completed a study for the Air Force to update the 100-year and 500-year floodplains at Tinker AFB. Crutcho Creek, its tributaries, and Kuhlman Creek are bounded by 100-year and 500-year floodplains. These floodplains affect approximately 121 acres of land on Tinker AFB. The bulk of these floodplains are located along Crutcho Creek.

In general, the function of 100-year floodplains on Tinker AFB is poor. However, conversion of some floodplains in improved and semi-improved grounds to natural areas in recent years has helped to develop the functions of these areas. Although no specific monitoring of floodplain functions has been accomplished in the past, projects are scheduled to provide the foundational data for measuring progress towards development of healthy floodplains on Tinker AFB (USAF, 2007).

The proposed alignment for replacement of the jet fuel transfer line would cross over approximately 9,025 sq ft of the mapped floodplain of East Crutcho Creek southeast of the runways (Figure 3-7). The size of the affected floodplain is based on a trench width of 6 feet. No other portions of the Proposed Action area are within mapped floodplains.

3.5.3 Approach to Analysis

Significance criteria for water resources impacts are based on water availability, quality, and use; existence of floodplains; and associated regulations. An impact on water resources would be significant if it would: (1) reduce water availability to or interfere with the supply of existing users; (2) create or contribute to overdraft of groundwater basins or exceed safe annual yield of water supply sources; (3) adversely affect water quality or endanger public health by creating or worsening adverse health hazard conditions; (4) threaten or damage unique hydrologic characteristics; or, (5) violate established laws or regulations that have been adopted to protect or manage water resources of an area including wetlands. Impacts of flood hazards on a project would be significant if such actions are proposed in areas with high probabilities of flooding.

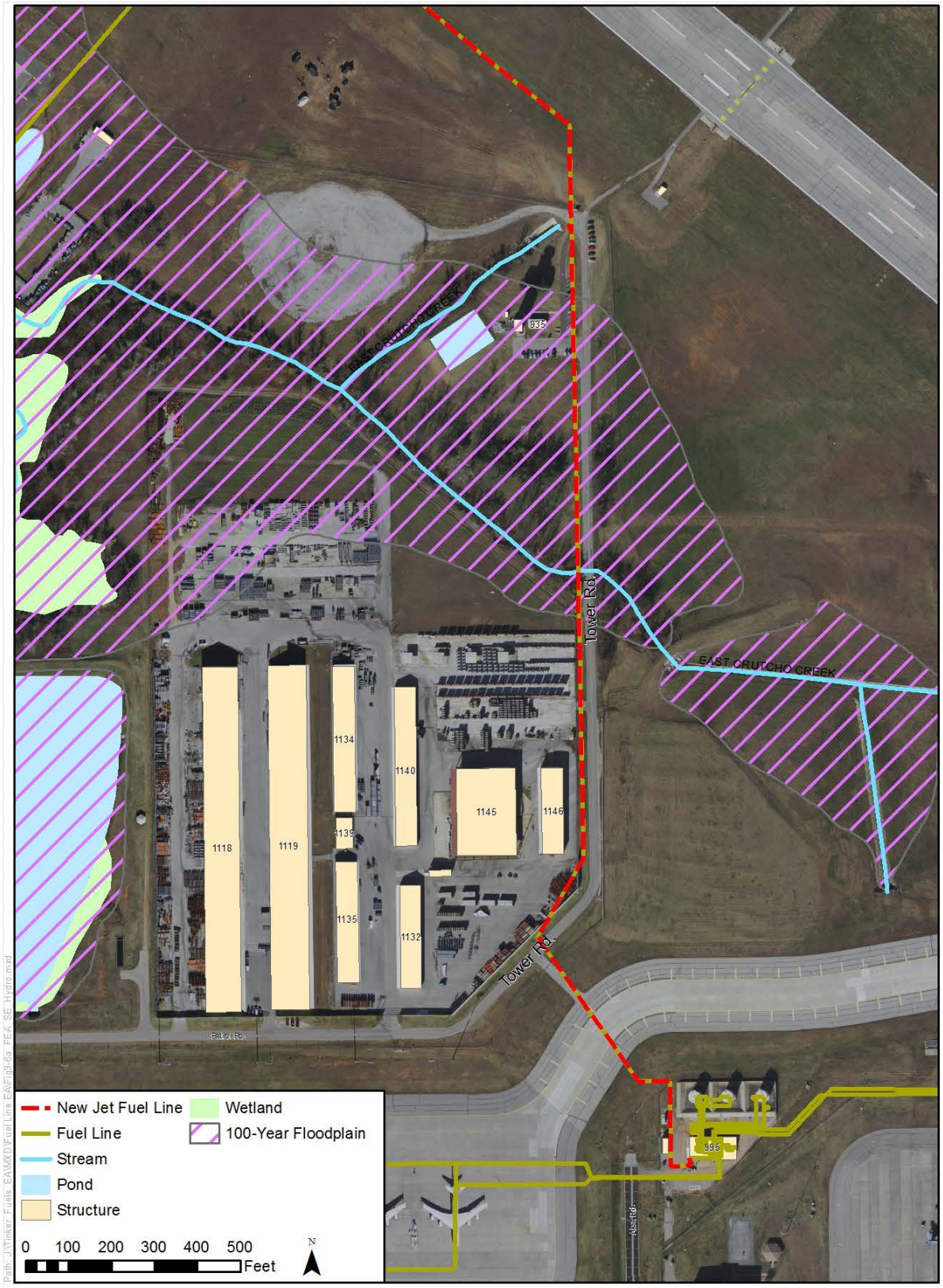

Figure 3-7. Floodplains in the Vicinity of the Southeastern Segment of the Proposed Jet Fuel Transfer Line on Tinker AFB

3.5.4 Proposed Action

Surface Water

Implementation of the Proposed Action would involve ground-disturbing activities that could increase the potential for soil erosion during construction. Due to the need to replace the jet fuel pipeline that crosses East Crutcho Creek, the potential for adverse impacts on surface water quality (e.g., silt-laden runoff discharge into the creek) could result.

Potential impacts to East Crutcho Creek from trenching for the replacement pipeline would be minimized through implementation of existing nonpoint pollution requirements and spill prevention and response procedures. A Storm Water General Permit for Construction Activities (Permit No. OKR10), issued by the Oklahoma DEQ, would be required. In addition, implementation of BMPs such as silt fencing and vegetation-based erosion control measures would minimize construction impacts. Long-term operations of the system would not affect surface water; therefore, under implementation of the Proposed Action, no long-term adverse impacts on surface water resources are anticipated.

Groundwater

It is unlikely that groundwater quality would be adversely affected by the Proposed Action, assuming required controls for the handling of hazardous materials and spill prevention and cleanup are implemented properly.

Implementation of the Proposed Action would result in no net change in impermeable surfaces from the replacement of the existing jet fuel transfer line. Further, the Proposed Action would not be a water user or wastewater generator. The footprint of the Proposed Action is negligible with regard to groundwater area below the region. Groundwater monitoring wells would not be affected. Therefore, implementation of the Proposed Action would result in negligible impacts on groundwater resources.

Wetlands

No wetlands exist at or immediately adjacent to the Proposed Action. The proposed replacement of the jet fuel transfer line would not involve any disturbance or removal of any wetlands. Although no jurisdictional wetlands would be crossed, work within the watershed of the Fire Pond jurisdictional wetland would be required (Figure 3-7). Therefore, construction of the Proposed Action would have no effect on wetland resources; no permanent impacts on wetlands would occur.

Floodplains

In accordance with Executive Order 11988, *Floodplain Management*, the Air Force has considered development alternatives that meet the need for this action. The Air Force would also incorporate construction requirements to minimize flood risks and impacts, including implementation of storm water requirements under Section 438 (42 USC §17094) of the EISA to maintain the hydrologic functions of a site and mitigate the adverse impacts of storm water runoff from DoD construction projects. Section 438 requires federal facility projects of more than 5,000 square feet to "maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of flow" (DoD, 2010).

The proposed replacement of the jet fuel transfer line would require construction over approximately 9,025 square feet of regulated floodplains based on a 6-ft wide trench. The Proposed Action would include trenching and associated pipeline replacement construction activities within the mapped floodplain of East Crutcho Creek (Figure 3-7). No other portions of the Proposed Action area are within floodplains.

The proposed replacement of the existing pipeline should not result in any change in the elevation, function, or capacity of the existing floodplain, since activities would only involve short-term construction and installation of underground jet fuel piping. Following installation, the piping would be buried and the ground surface would be returned to its current condition (e.g., elevation, topography, ground cover). Therefore, implementation of the Proposed Action would have temporary negligible impacts on the East Crutcho Creek floodplain in the southeastern portion of the base; no permanent impacts would occur.

3.5.5 Cumulative Impacts

Activities with potential to adversely affect water resources would be associated with disturbance to surface water, groundwater, and wetlands, or alteration of floodplains. Although construction of other reasonably foreseeable projects on Tinker AFB would occur at the same time, the Proposed Action would be constructed to avoid disturbance to Crutcho Creek. Best Management Practices for erosion control would be followed in accordance with construction permit conditions and the SWPPP. No change to groundwater recharge would occur as a result of the Proposed Action. There are no designated wetlands in the construction area of the Proposed Action. The proposed replacement of the jet fuel transfer line should not result in any change in the elevation, function, or capacity of the existing floodplain associated with Crutcho Creek, and the ground surface would be returned to its current condition after construction. For these reasons, the Proposed Action would not contribute to cumulative impacts on surface water, groundwater, wetlands or floodplains.

3.5.6 No Action Alternative

If the No Action Alternative were selected, proposed construction activities would not be implemented and water resources conditions would remain unchanged from their current status, as described in Subchapter 3.5.2.

3.5.7 Mitigation Measures

No mitigation measures would be necessary to avoid or reduce any adverse impacts to water resources (surface and groundwater, wetlands or floodplains).

3.5.8 Best Management Practices

Best Management Practices would be implemented in order to reduce potentially adverse impacts on water resources as a result of the Proposed Action. The SWPPP provides base-wide and facility-specific BMPs to reduce pollutants in storm water discharges from the base. The contractor would control storm water and wastewater during construction activities by implementing the following measures:

- Obtain Storm Water General Permit for Construction Activities – Permit No. OKR10 issued by Oklahoma DEQ.
- Minimize the total amount of ground disturbance and preserve vegetative cover to the amount practicable.

- Install silt fence, compost berms, or filter socks or other similar measures for managing storm water runoff.
- Limit construction staging areas to previously disturbed areas.
- Service and refuel equipment away from East Crutcho Creek.
- Ensure all chemicals and petroleum products are stored and contained away from water sources.

3.6 INDIRECT IMPACTS

While direct environmental effects, as evaluated in this EA, are caused by the action and occur at the same time and place, indirect effects are those effects caused by the action that occur at a later time or are farther removed in distance but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to the induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.

The Proposed Action would result in the in-kind replacement of an existing jet fuel line at Tinker AFB. No change to the mission, personnel or operations on Tinker AFB would otherwise occur. Indirect effects on land use, population density or growth rate, air quality and ecosystems would not be expected.

3.7 UNAVOIDABLE ADVERSE ENVIRONMENTAL IMPACTS

Unavoidable adverse impacts would result from implementation of the Proposed Action. None of these impacts would be considered significant.

3.7.1 Noise

The noise that would result from construction activities associated with the replacement jet fuel transfer line is an unavoidable condition. These activities may result in intermittent periods of increased noise levels. Sleep disturbance, hearing impairment, and structural damage would not be expected to occur as a result of construction noise associated by the Proposed Action because there are no residents in the affected area that would be subject to construction noise. Noise from construction may result in temporary periods of annoyance and speech interference for personnel in the immediate area only.

3.7.2 Air Quality

Generation of air pollutant emissions resulting from construction is an unavoidable condition. These activities may result in intermittent periods of increased air pollutant emissions that would be limited to the immediate work site. The Air Force would ensure that emissions are minimized by site watering and that all hazardous emissions are managed in accordance with applicable regulations. Air pollutant emissions generated by the Proposed Action during construction would not be considered a significant impact to air quality.

3.7.3 Energy

The energy associated with construction of the replacement jet fuel transfer line involve the use of petroleum-based products (such as gasoline or diesel fuel for construction equipment) and electricity, none of which are in short supply. The use of fossil fuels, a nonrenewable natural resource, for construction of the Proposed Action would be considered an unavoidable adverse impact. The Proposed Action would result in no change in the use of fossil fuels during the

operation of the pipeline. The use of nonrenewable resources is unavoidable, although not considered significant.

3.8 RELATIONSHIP BETWEEN THE SHORT-TERM USE OF THE ENVIRONMENT AND LONG-TERM PRODUCTIVITY

The Proposed Action would not result in an intensification of land use on Tinker AFB or in the Oklahoma City area and vicinity. Implementation of the Proposed Action or the No Action Alternative would not result in loss of open space. The site for replacement of the jet fuel transfer line has been designated for industrial use, and was not planned for long-term open space or other use. Therefore, it is not anticipated that the Proposed Action or the No Action Alternative would result in any cumulative land use or visual resources impacts. Long-term productivity of the area would not be affected by the Proposed Action.

3.9 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The irreversible environmental changes that would result from implementation of the Proposed Action involve the consumption of material resources, energy resources, and human resources. The use of these resources is considered to be permanent.

3.9.1 Energy Resources

Energy resources utilized for construction of the Proposed Action would be irretrievably lost. These include petroleum-based products (such as gasoline and diesel fuel), natural gas, and electricity. Natural gas and electricity would continue to be used by operational activities. Consumption of these energy resources would not place a significant demand on their availability in the region. Therefore, no significant impacts on energy resources would be expected.

3.9.2 Human Resources

The use of human resources for construction of the replacement jet fuel transfer line is considered an irretrievable loss, only in that it would preclude such personnel from engaging in other work activities. However, the use of human resources for the Proposed Action would result in improvements in fuel transfer system reliability on Tinker AFB, and is considered beneficial.

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CHAPTER 5
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Brown, James (72 ABW/CEAN)
Dalke, Bill (72 ABW/CEAO)
Feltman, Roger (72 ABW/CEAN)
Garrett, Cynthia (72 ABW/CEAN)
Harbough, Mark (72 ABW/CEPE)
Hedges, Richard (72 ABW/CEAN)
Jure, Raymond (72 MSG/LRDF)
Krupovage, John (72 ABW/CEAN)
McFarland, Lisa (OC-ALC/JAV)
Moody, Raymond (72 ABW/CEAN)
Radtke, Marybeth (552 ACW/CED)
Rucci, John (72 LRS)
Saunders, Frances (72 ABW/CEAN)
Taylor, Timothy (72 ABW/CEAN)
Weidler, Mike (TSS/JV CE)

The following persons were responsible for preparation of this EA:

Name	Degree(s)	Resource	Years of Experience
Parsons			
Crisologo, Rosemarie	B.S., Biological Sciences M.S., Environmental Engineering	NEPA Analysis; Biological Resources; Cultural Resources; Geologic Resources and Soils; Water Resources.	25
Gaddi, Elvira, P.E.	B.S., Chemical Engineering M.S., Chemical Engineering	Hazardous Wastes and Hazardous Materials.	29
Marfori, Liza	B.S., Chemical Engineering	Project Management	20
Osweiler, John	B.S., Geology	Technical Advisor	35
Saldana, Tim, GISP	B.S., Geographic Information Systems M.A.G., Geographic Information Systems	GIS Program Manager	19

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APPENDIX A

AGENCY CONSULTATIONS AND PUBLIC INVOLVEMENT

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AGENCY CONSULTATIONS AND PUBLIC INVOLVEMENT

A.1 AGENCY CONSULTATIONS

Air Force Instruction (AFI) 32-7060, *Interagency and Intergovernmental Coordination for Environmental Planning*, provides the procedures to comply with applicable federal, state, and local directives for Interagency and Intergovernmental Coordination for Environmental Planning (IICEP). The AFI implements the following:

- Air Force Planning Document 32-70, *Environmental Quality*;
- Department of Defense (DoD) Directive 4165.61, Intergovernmental coordination of DoD Federal Development Programs and Activities;
- Executive Order 12372, Intergovernmental Review of Federal Programs;
- Title IV of the Intergovernmental Coordination Act (ICA) of 1968; and
- Section 204 of the Demonstration Cities and Metropolitan Development Act of 1966.

Section 401(b) of the ICA states that, "All viewpoints-national, regional, state, and local…will be fully considered…when planning federal or federally assisted development programs and projects."

Air Force planners determined that for purposes of public participation under 36 CFR 800.2(d) and 800.8(a)(1), distribution of this EA for public comment offered the public a reasonable opportunity to engage the Air Force under provisions of NHPA Section 106.

A.2 NOTIFICATION OF AVAILABILITY OF THE DRAFT ENVIRONMENTAL ASSESSMENT

The *Air Force Environmental Impact Analysis Process* (32 CFR 989), 15 Jul 99, and amended 28 Mar 01, states that an environmental assessment and Finding of No Significant Impact/Finding of No Practicable Alternative should be made available to agencies and the public for comment. A notice announcing the 30-day public comment period and the availability of the Draft EA was published in the Daily Oklahoman and the Tinker Takeoff newspapers. A copy of these notices is included in this appendix.

A.3 DISTRIBUTION OF THE DRAFT ENVIRONMENTAL ASSESSMENT

The Draft EA was placed in the following library for public review:

Metropolitan Library System Midwest City
8143 E Reno Avenue
Oklahoma City, OK 73110-7589

The Draft EA was transmitted to the following 27 agencies and organizations:

1. Association of Central Oklahoma Governments
2. Oklahoma Archaeological Survey
3. Oklahoma Corporation Commission
4. City of Del City
5. Oklahoma County, District Two
6. Tinker AFB Community Advisory Board Members

7. City of Midwest City
8. Oklahoma Department of Environmental Quality, Customer Services Division
9. U.S. Army Corps of Engineers, Tulsa District, Planning and Environmental Division
10. City of Oklahoma City, Planning Department
11. Oklahoma Department of Transportation, Planning and Research Division
12. U.S. Army Corps of Engineers, Tulsa District, Regulatory Division
13. City of Oklahoma City, Ward Four
14. Oklahoma Department of Wildlife Conservation
15. U.S. Department of Agriculture, Natural Resources Conservation Service
16. Oklahoma DEQ Site Assessment Unit Community Action Board
17. Oklahoma Geologic Survey
18. U.S. Fish and Wildlife Services, Division of Ecological Services
19. EPA Region VI, Compliance Assurance Enforcement Division (6EN-XP)
20. Oklahoma Historical Society, Administration
21. USEPA-Region 6 (6SF-LP) #1200
22. Federal Emergency Management Agency
23. Oklahoma Water Resources Board, Planning and Management Division
24. Greater Oklahoma City Chamber of Commerce, Government Relations
25. Oklahoma State Historic Preservation Office
26. Oklahoma Wildlife Federation
27. Audubon Society of Central Oklahoma

A.4 COMMENTS RECEIVED ON THE DRAFT ENVIRONMENTAL ASSESSMENT

No comment letters were received on the Draft EA.

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

MEMORANDUM FOR OKLAHOMA ARCHEOLOGICAL SURVEY 17 October 2011
ATTN: MR. ROBERT L. BROOKS
111 EAST CHESAPEAKE
NORMAN, OK 73019

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

SUBJECT: Prehistoric Resources Review of Section 15 T11N R2W, Section 21 T11N R2W, and Section 22 T11NR2W

1. Tinker AFB is requesting a review of prehistoric resources for the Replacement of JP8 Fuel Transfer Line and the Replacement of Type II Hydrant Fuel System projects at Tinker AFB, Oklahoma. The land to be reviewed is the Section 15 T11N R2W, Section 21 T11N R2W, and Section 22 T11N R2W. According to the Oklahoma State Historic Preservation Office, a review focusing on prehistoric resources by the Oklahoma Archeological Survey is required as part of the Section 106 review process. The review will be incorporated into the Environmental Assessment for the aforementioned projects.

2. Enclosed is a USGS Topography Map indicating the area of concern. For additional information, our point of contact is Mr. Tim Taylor at 739-7062.

Trudi Logan

TRUDI LOGAN, Chief
Environmental Engineering Operations Section
Environmental Management Division

Attachment: USGS Topography Map

Area of Concern

T 11 N

Oklahoma Archeological Survey

THE UNVERSITY OF OKLAHOMA

November 18, 2011

Mr. Tim Taylor
Department of the Air Force
72 Air Base Wing
7535 5th Street
Tinker Air Force Base, Oklahoma 73145-9100

Re: Tinker Air Force base proposed Replacement of JP8 Fuel Transfer Line and the Replacement of Type II Hydrant Fuel System. Legal Description: Section 15 T11N R2W, Section 21 T11N R2W, and Section 22 T11N R2W, Oklahoma County, Oklahoma.

Dear Mr. Taylor:

The Community Assistance Program staff of the Oklahoma Archeological Survey has reviewed the above referenced projects in order to identify potential areas that may contain prehistoric or historic archaeological materials (historic properties). The location of your projects has been crosschecked with the state files containing approximately 18,000 archaeological sites that are currently recorded for the state of Oklahoma. No sites are listed as occurring within the areas of the projects, and based on the topographic and hydrologic setting; no archaeological materials are likely to be encountered Thus an archaeological field inspection is not considered necessary. However, should construction activities expose buried archaeological materials such as chipped stone tools, pottery, bone, historic crockery, glass, metal items or building materials, this agency should be contacted immediately at (405) 325-7211. A member of our staff will be sent to evaluate the significance of these remains.

This environmental review and evaluation is performed in order to locate, record, and preserve Oklahoma's prehistoric and historic cultural heritage in cooperation with the State Historic Preservation Office. Oklahoma. Historical Society. In addition to our review comments, under 36CFR Part 800.3 you are reminded of your responsibility to consult with the appropriate Native American tribe/groups to identify any concerns they may have pertaining to this undertaking and potential impacts to properties of traditional and/or ceremonial value. Thank you.

Sincerely,

Janna Gruber
Staff Archaeologist

Robert L. Brooks
State Archaeologist

:ls

Cc: SHPO

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

November 21, 2011

Ms. Trudi Logan
Chief, Environmental Engineering Operations Section
72 ABW/CEAN
7535 5th Street
Tinker AFB, OK 73145-9100

RE: File #1352-11; Tinker AFB Proposed Project for Replacement of JP-8 Fuel Transfer Line and Type II Hydrant Fuel System

Dear Ms. Logan

We have received and reviewed the documentation concerning the referenced project in Oklahoma County. Additionally, we have examined the information contained in the Oklahoma Landmarks Inventory (OLI) files and other materials on historic resources available in our office. We find that there are no historic properties affected by the referenced project.

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

If you have any questions, please contact Charles Wallis, RPA, Historical Archaeologist, at 405/521-6381.

Should further correspondence pertaining to this project be necessary, the above underlined file number must be referenced. Thank you.

Sincerely,

Melvena Heisch
Deputy State Historic
Preservation Officer

MH:bh

PAID ADVERTISEMENT

NOTICE OF AVAILABILITY

DRAFT ENVIRONMENTAL ASSESSMENTS FOR THE PROPOSED REPLACEMENT OF THE TYPE III HYDRANT FUEL SYSTEM AND THE JP-8 FUEL TRANSFER LINE AT TINKER AFB, OKLAHOMA

The 72d Air Base Wing (ABW) of the U.S. Air Force, under command of Headquarters Air Force Materiel Command, is proposing two replacement projects that would support 552nd Air Control Wing (ACW), 76th Aircraft Maintenance Wing, and transient aircraft serviced north of the taxiways at Tinker Air Force Base (AFB), and multiple units and aircraft south of the crosswind runway:

Replacement of the Type III Hydrant Fuel System. The proposed replacement of the functionally limited existing Type III hydrant fuel system is needed to provide a reliable Type III hydrant fuel system that would: (1) eliminate congestion during the fueling and defueling process at the existing hydrant fuel system; (2) comply with Air Force facility requirements that necessitate a hydrant fuel system for aircraft with a total tank capacity exceeding 76,000 liters (20,000 gallons); and, (3) reduce the amount of time needed for fueling and defueling of aircraft at Tinker AFB.

Replacement of the Fuel Transfer Line. Approximately 11,000 linear feet of existing underground fiberglass fuel transfer line would be removed and replaced with an interior coated carbon steel pipe suitable for fuel. The diameter of the new pipeline would be the same as the existing fuel transfer line. The purpose of the action is to avoid failure of the pipeline. The replacement pipeline is needed to continue providing fuel to operating tanks that service aircraft under the responsibility of the Air Force and other agencies at Tinker AFB.

As part of the Air Force Environmental Impact Analysis Process, the Air Force has prepared Draft Environmental Assessments (DEAs) for these actions. Resources evaluated in the impact analyses include: air quality; biological resources; cultural resources; geology and soils; hazardous materials and wastes; and, water resources (wetlands and floodplains). The Air Force is considering approval of Findings of No Significant Impact and Findings of No Practicable Alternative for these actions. The DEAs are available at: the Metropolitan Library System Midwest City, 8143 E. Reno Avenue, Oklahoma City, OK 73110-7589. Should you have any comments on the DEAs, written comments may be mailed to:

72d Air Base Wing Public Affairs Office, ATTN: Brion Ockenfels
7460 Arnold Ave., Suite 127, Tinker Air Force Base, Oklahoma 73145
E-mail: brion.ockenfels@tinker.af.mil

All written comment letters must be received by **December 10, 2011.**
Should you have any questions, please contact Mr. Ockenfels at (405) 739-2027.

OC-ALC Strategic Goal 4. Improve mission readiness and support

NOTICE OF AVAILABILITY
DRAFT ENVIRONMENTAL ASSESSMENTS FOR THE PROPOSED REPLACEMENT OF THE TYPE III HYDRANT FUEL SYSTEM AND THE JP-8 FUEL TRANSFER LINE AT TINKER AIR FORCE BASE, OKLAHOMA

The 72nd Air Base Wing (ABW) of the U.S. Air Force, under command of Headquarters Air Force Materiel Command, is proposing two replacement projects that would support 552nd Air Control Wing (ACW), 76th Aircraft Maintenance Wing, and transient aircraft serviced north of the taxiways at Tinker Air Force Base (AFB) and multiple units and aircraft south of the crosswind runway:

Replacement of the Type III Hydrant Fuel System. The proposed replacement of the functionally limited existing Type III hydrant fuel system is needed to provide a reliable Type III hydrant fuel system that would: (1) eliminate congestion during the fueling and defueling process at the existing hydrant fuel system; (2) comply with Air Force facility requirements that necessitate a hydrant fuel system for aircraft with a total tank capacity exceeding 76,000 liters (20,000 gallons); and, (3) reduce the amount of time needed for fueling and defueling of aircraft at Tinker AFB.

Replacement of the Fuel Transfer Line. Approximately 11,000 linear feet of existing underground fiberglass fuel transfer line would be removed and replaced with an interior coated carbon steel pipe suitable for fuel. The diameter of the new pipeline would be the same as the existing fuel transfer line. The purpose of the action is to avoid failure of the pipeline. The replacement pipeline is needed to continue providing fuel to operating tanks that service aircraft under the responsibility of the Air Force and other agencies at Tinker AFB. As part of the Air Force Environmental Impact Analysis Process, the Air Force has prepared Draft Environmental Assessments (DEAs) for these actions. Resources evaluated in the impact analyses include: air quality; biological resources; cultural resources; geology and soils; hazardous materials and wastes; and, water resources (wetlands and floodplains). The Air Force is considering approval of Findings of No Significant Impact and Findings of No Practicable Alternative for these actions. The DEAs are available at: the Metropolitan Library System Midwest City, 8143 E. Reno Avenue, Oklahoma City, OK 73110-7589. Should you have any comments on the DEAs, written comments may be mailed to:

72d Air Base Wing Public Affairs Office
ATTN: Brion Ockenfels
7460 Arnold Ave., Suite 127
Tinker Air Force Base, Oklahoma 73145
E-mail: brion.ockenfels@tinker.af.mil

All written comment letters must be received by December 10, 2011. Should you have any questions, please contact Mr. Ockenfels at (405) 739-2027.

APPENDIX B

NATIVE AMERICAN CONSULTATION

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

MEMORANDUM FOR ATTACHED DISTRIBUTION LIST 20 October 2011

FROM: 72 ABW/CE
7535 Fifth Street, Building 400
Tinker AFB, OK 73145

SUBJECT: Notification of Replacement of JP8 Fuel Transfer Line at Tinker Air Force Base

In accordance with the National Historic Preservation Act of 1966, as amended, the American Indian Religious Freedom Act, and the Native American Graves Protection and Repatriation Act of 1990, we are notifying you of a proposed construction project on Tinker AFB, Oklahoma.

The U.S. Air Force is preparing an Environmental Assessment (EA) for the proposed replacement of the JP8 fuel transfer pipeline that supports 552nd Air Control Wing (ACW) E-3, 507th Air Refueling Wing (ARW) KC-135, and United States Navy Command Strategic Communications Wing One (CSCW-1) E-6B aircraft serviced at Tinker AFB, Oklahoma (the Draft EA will be available later this year). The project would require construction to remove and replace approximately 11,000 linear feet of the existing 6-inch diameter underground fiberglass JP8 fuel transfer pipeline with a 6-inch interior coated carbon steel pipeline suitable for JP8 fuel. Replacement of the JP8 fuel transfer line with steel piping will conform to Uniform Facilities Criteria (UFC) 3-460-3 and MIL-HDBK-1022A for Federal petroleum systems. The replacement fuel transfer line would be an in-kind replacement and located primarily within the same alignment on either side of Runway 12/30 as shown on Figure 2.

To ensure that any areas of sacred or spiritual significance to Native American groups are considered, we would appreciate your help in identifying any interests or concerns regarding traditional resources or properties within the lands associated with proposed construction activities. If you have concerns with this proposed action, you may address any comments or questions to Ms. Cindy Garrett via email at Cynthia.Garrett@tinker.af.mil or by mailing your written response to: Cindy Garrett, USAF 72ABW/CEAN, 7535 Fifth Street, Suite 204, Tinker Air Force Base, OK 73145. She can be reached by phone at (405) 734-2097. Please provide any comments or information within 30 days from the date of the letter. Thank you for your interest in the project.

THOMAS M. GRIFFITH
Base Civil Engineer

Attachments: 1. Project Location
2. Distribution List

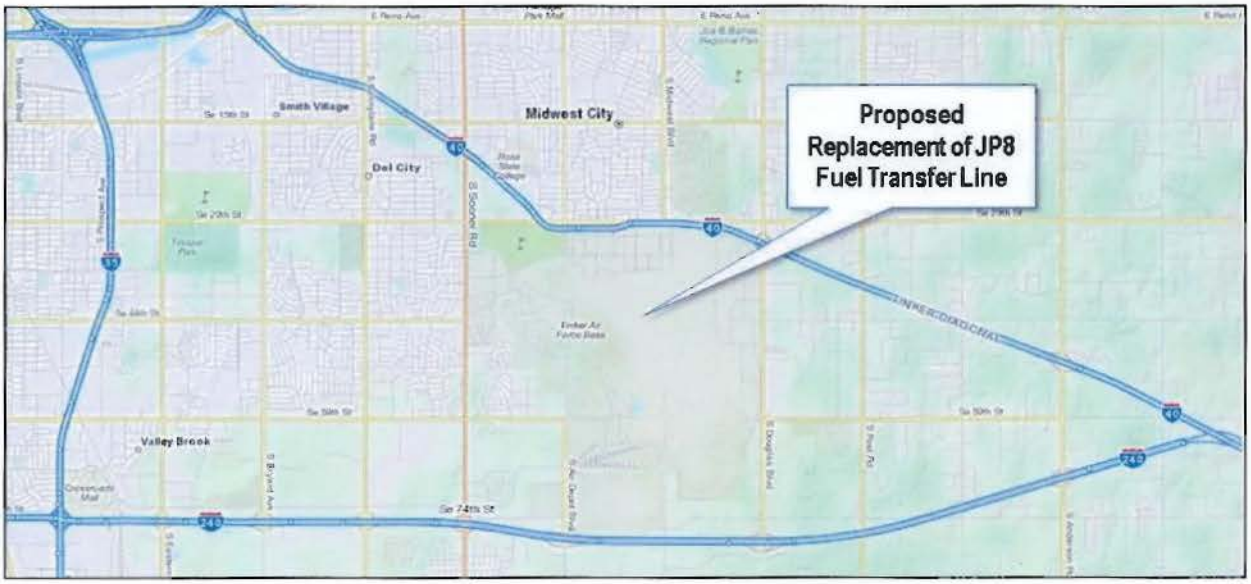

Figure 1. Location of Proposed Action at Tinker AFB

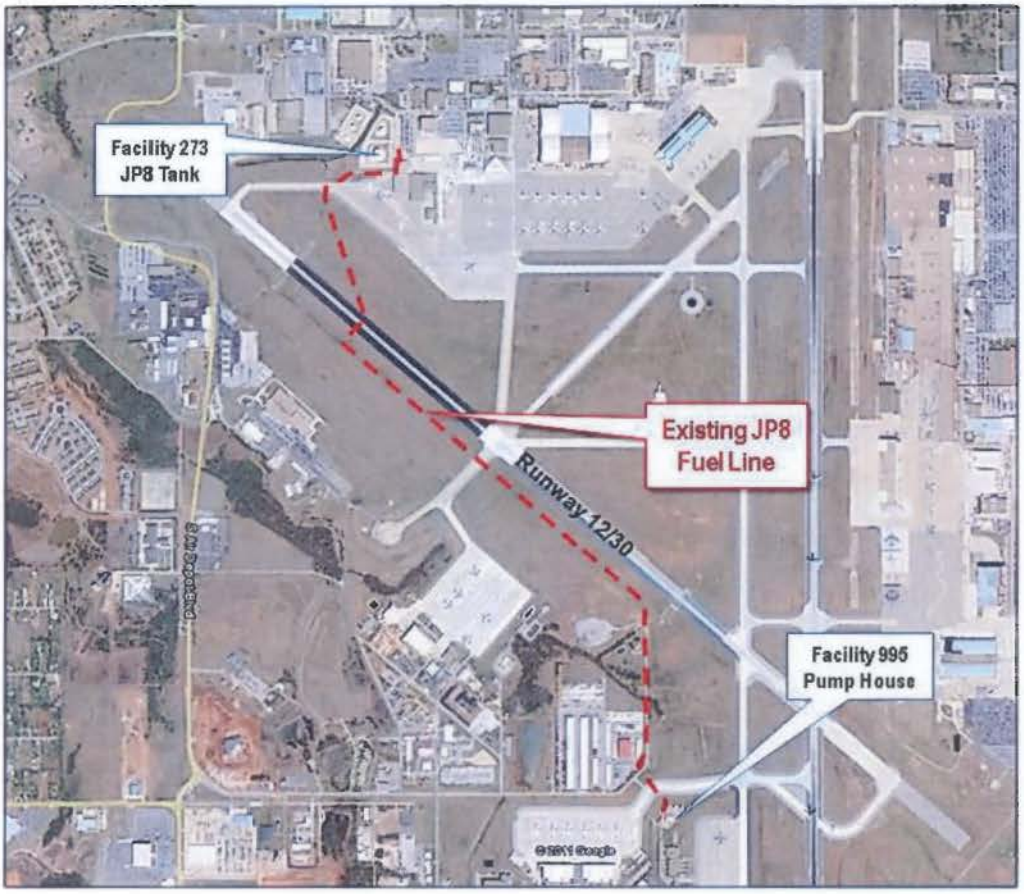

Figure 2. Proposed Replacement of JP8 Fuel Line at Tinker AFB, Oklahoma

Distribution List

Seminole Nation
Principal Chief Leonard Harjo
P.O. Box 1498
Wewoka, OK 74884
(405) 257-7200

Muscogee (Creek) Nation
Principal Chief A.D. Ellis
P.O. Box 580
Okmulgee, OK 74447
(918) 732-7731

Caddo Nation of Oklahoma
Caddo National Chairman,
Brenda Shemayme Edwards
P.O. Box 487
Binger, OK 73009
(405) 656-2344

Osage Nation
Principal Chief John Red Eagle
P.O. Box 779
Pawhuska, OK 74056
(918) 287-5555

Wichita and Affiliated Tribes
Stratford Williams, President
P.O. Box 729
Anadarko, OK 73005
(405) 247-2425