



FINAL | May 2024

Environmental Impact Statement Volume 1

B-21 Beddown Main Operating Base 2 (MOB 2) or Main Operating Base 3 (MOB 3) at Dyess AFB or Whiteman AFB



This page is intentionally blank.

PRIVACY ADVISORY

This Final Environmental Impact Statement (EIS) is provided in accordance with the National Environmental Policy Act, the President's Council on Environmental Quality NEPA Regulations (40 Code of Federal Regulations 1500–1508), and 32 Code of Federal Regulations 989, Environmental Impact Analysis Process.

The Environmental Impact Analysis Process provides an opportunity for public input on Air Force decision making, allows the public to offer inputs on alternative ways for the Air Force to accomplish what it is proposing, and solicits comments on the Air Force's analysis of environmental effects.

Public commenting allows the Air Force to make better informed decisions. Letters or other written or oral comments provided may be published in the EIS. As required by law, comments provided will be addressed in the EIS and made available to the public. Providing personal information is voluntary. Any personal information provided will be used only to identify a desire to make a statement during the public comment portion of any public meetings or hearings or to fulfill requests for copies of the EIS or associated documents. Private addresses were compiled to develop a mailing list for those requesting copies of the EIS. However, only the names of the individuals making comments and specific comments are disclosed. Personal home addresses and phone numbers are not published in the Final EIS. If you choose to not provide personal identifying information, your comments will be given the same weight and consideration as any other comments submitted.

Information regarding the EIS is available on the website at
www.B21EIS.com.

Please direct any requests for information or other inquiries to:
Dyess AFB Public Affairs, (325) 696-4820
7bw.pa.publicaffairs@us.af.mil
or
Whiteman AFB Public Affairs, (660) 687-5727
509bw.publicaffairs@us.af.mil

This page is intentionally blank.

COVER SHEET

a. Responsible Agency: Department of the Air Force (DAF)

b. Cooperating Agencies: None.

c. Proposals and Actions: This Environmental Impact Statement (EIS) describes the potential consequences to the human environment from the proposed implementation of the B-21 Main Operating Base (MOB) 2 beddown or MOB 3 beddown at Dyess Air Force Base (AFB) or Whiteman AFB, which would include B-21 Operational Squadrons, a Weapons Instructor Course, an Operational Test and Evaluation Squadron, and a Weapons Generation Facility.

d. Inquiries: Information regarding the EIS is available on the website at www.B21EIS.com. Questions can also be directed to: B-21 EIS Project Manager, AFCEC/CZN, 2261 Hughes Avenue, Suite 155, JBSA Lackland, TX 78236-9853.

e. Designation: Final EIS

f. Abstract: This EIS has been prepared in accordance with the National Environmental Policy Act to analyze the potential environmental consequences of the B-21 MOB 2 and MOB 3 beddown. The Department of Defense is developing a new bomber aircraft, the B-21 "Raider," which will eventually replace existing B-1 and B-2 bomber aircraft. The beddown of the B-21 will take place through a series of three MOBs, referred to as MOB 1, MOB 2, and MOB 3. The *B-21 Main Operating Base 1 (MOB 1) Beddown at Dyess AFB, Texas or Ellsworth AFB, South Dakota Environmental Impact Statement* and Record of Decision were completed on June 3, 2021. In this EIS, the DAF is evaluating the proposed MOB 2 and MOB 3 beddowns of the B-21.

The purpose of the Proposed Action is to implement the goals of the National Defense Strategy by modernizing the U.S. bomber fleet capabilities. The B-21 Raider is being developed to carry conventional payloads and to support the nuclear triad by providing a visible and flexible nuclear deterrent capability that will assure allies and partners through the United States' commitment to international treaties. The B-21 will operate under the direction of the DAF Global Strike Command. The B-21 will have both conventional and nuclear roles and will be capable of penetrating and surviving in advanced air defense environments. It is projected to enter service in the 2020s, and the DAF intends to have at least 100 B-21 aircraft built.

This EIS evaluates alternatives that would support deterrence capabilities by basing the B-21 at installations that can support DAF Global Strike Command's MOB 2 and MOB 3 missions and can support training of crewmembers and personnel in the operation and maintenance of the B-21 aircraft in an appropriate geographic location that can provide sufficient airfield, facilities, infrastructure, and airspace to support the B-21 training and operations. Three alternatives are included in the EIS, as discussed in Chapter 2 (Description of the Proposed Action and Alternatives), which include the following:

- Dyess AFB Alternative
- Whiteman AFB Alternative (Preferred Alternative), including two subalternatives: North WGF Site Subalternative (Preferred Subalternative) and South WGF Site Subalternative
- No Action Alternative

This EIS analyzes potential impacts associated with airspace, noise, air quality, land use, socioeconomics, environmental justice, biological resources, cultural resources, physical resources, hazardous materials and waste, health and safety, transportation, and utilities and infrastructure. The EIS also identifies potential mitigation measures and best management practices that the DAF could implement to minimize or offset potential adverse impacts.

g. Total Estimated Cost of EIS: \$3.5 million

This page is intentionally blank.

SUMMARY

S.1. INTRODUCTION

This Environmental Impact Statement (EIS) has been prepared in accordance with the National Environmental Policy Act (NEPA) to analyze the potential environmental consequences of the Department of the Air Force (DAF) proposal to beddown the B-21 Main Operating Base (MOB) 2 or MOB 3 at Dyess Air Force Base (AFB) or Whiteman AFB. The B-21 “Raider,” which is currently being developed by the Department of Defense, will eventually replace existing B-1 and B-2 aircraft.

The beddown of the B-21 will take place through a series of three MOBs, referred to as MOB 1, MOB 2, and MOB 3. The DAF Strategic Basing Process was used to identify Ellsworth AFB, Dyess AFB, and Whiteman AFB as candidates for MOBs. In June 2021, the DAF selected Ellsworth AFB as the MOB 1 location after completing the *B-21 Main Operating Base 1 (MOB 1) Beddown at Dyess AFB, Texas or Ellsworth AFB, South Dakota Environmental Impact Statement* (hereinafter referred to as the “MOB 1 EIS”) (DAF, 2021e). As discussed in Chapter 2 (Description of Proposed Action and Alternatives), the three alternatives considered in this EIS include the Dyess AFB Alternative, the Whiteman AFB Alternative, and the No Action Alternative.

If, following completion of this EIS, one of the two remaining candidate bases is selected for MOB 2, then the final remaining base would become the MOB 3 beddown location. Air operations and personnel numbers for the MOB 3 beddown are not anticipated to exceed those analyzed in this EIS and construction activities are anticipated to be the same for either MOB location. Therefore, the analysis presented in this EIS represents potential impacts associated with either the MOB 2 or MOB 3 beddown actions for either location.

S.2. PURPOSE OF AND NEED FOR THE PROPOSED ACTION (EIS CHAPTER 1)

The purpose of the Proposed Action is to implement the goals of the National Defense Strategy by modernizing the U.S. bomber fleet capabilities. The B-21 Raider is being developed to carry conventional payloads and to support the nuclear triad by providing a visible and flexible nuclear deterrent capability. The B-21, which is projected to enter service in the 2020s, will operate under the direction of the DAF Global Strike Command.

The need for the Proposed Action is to support deterrence capabilities by basing the B-21 at installations that can support the MOB 2 mission. The installation will support training of crewmembers and personnel in the operation and maintenance of the B-21 aircraft in an appropriate geographic location that can provide sufficient airfield, facilities, infrastructure, and airspace to support the B-21 training and operations.

S.3. OVERVIEW OF PROPOSED ACTION AND ALTERNATIVES (EIS CHAPTER 2)

S.3.1 Proposed Action (EIS Section 2.1)

Implementation of the Proposed Action would involve changes in personnel, airfield operations, airspace and range utilization, and facilities and infrastructure at the selected beddown location. In addition to other infrastructure changes required to support the MOB 2 operational functions, a Weapons Generation Facility (WGF) would also be constructed at each B-21 beddown location to provide a safe and secure location for the storage of nuclear munitions. Because mission transition would be gradual, a “snapshot” scenario was developed to represent conditions during the time period when operations and personnel associated with the current mission (i.e., B-1 at Dyess AFB and B-2 at Whiteman AFB) would overlap with incoming B-21 operations and personnel. The “end-state” reflects the point in time when all B-21s are in place and B-1 or B-2 aircraft have been removed. DAF planners evaluated operational readiness and leveraged existing facilities and infrastructure at each base individually, factoring base-specific site constraints, to minimize mission impact, maximize facility reuse, and minimize cost.

S.3.2 No Action Alternative (EIS Section 2.2)

Under the No Action Alternative, the DAF would not beddown the MOB 2 or MOB 3 missions at Dyess AFB or Whiteman AFB. There would be no changes to personnel, airfield operations, airspace and range utilization, facilities and infrastructure at either installation. The B-21 program is a major Department of Defense initiative to ensure that the U.S. nuclear triad is and remains effective. If the No Action Alternative was selected due to unforeseen issues, the DAF would reevaluate their B-21 phasing approach, using the Strategic Basing Process, and implement the basing at another, undetermined location.

S.3.3 Dyess AFB Alternative (EIS Section 2.3)

The Dyess AFB Alternative would establish MOB 2 at Dyess AFB. The B-21 mission would replace the B-1 mission currently being flown at the installation.

S.3.3.1 Personnel (EIS Section 2.3.2)

There would be an increase of 1,318 individuals at Dyess AFB from 11,862 to 13,180 after all B-21 mission individuals have arrived and all B-1 mission individuals have departed (i.e., the end-state). Under the snapshot scenario, the number of individuals would temporarily increase to 13,609 (i.e., 1,747 more individuals than the No Action Alternative).

S.3.3.2 Airfield Operations (EIS Section 2.3.3)

The number of airfield operations flown per year would decrease by 2,026 from 48,140 under the No Action Alternative to 46,114 at end-state. Under the snapshot scenario, the number of airfield operations would be 47,887 (i.e., 253 fewer airfield operations than the No Action Alternative).

S.3.3.3 Airspace and Range Utilization (EIS Section 2.3.4)

The number of airspace operations flown per year would be lower at end-state than under the No Action Alternative in training airspace units that would be used regularly by the MOB 2 mission at Dyess AFB. These training airspace units, which include Bronco (3 and 4), Brownwood, Lancer, Lancer Bridge, and Pecos MOAs, as well as the Air Traffic Control Assigned Airspaces (ATCAAs) overlying those MOAs and the Willie-Roscoe ATCAA are shown in EIS Figure 2.3-2. At end-state, the number of operations flown annually in these airspace units would decrease by between 41 and 2,220. Under the snapshot scenario, the number of operations conducted annually in individual airspace units would decrease by as many as 2,010 in all airspace units except the Pecos MOA, where the number would increase by only 2 operations.

S.3.3.4 Facilities and Infrastructure (EIS Section 2.3.5)

Construction of 27 new facilities or facility additions (4.2 million square feet), renovation or repair of 10 facilities (600,000 square feet), and demolition of 10 facilities (300,000 square feet) would be required to support the MOB 2 mission at Dyess AFB. The locations of these facilities are presented in the EIS as generalized construction footprint areas due to operational security concerns. EIS Figure 2.3-3 reflects two Courses of Action (COAs) DAF planners developed for the B-21 beddown at Dyess AFB relative to facility siting. The planned areas of construction depicted in EIS Figure 2.3-4 reflect a hybrid of those COAs and includes both the proposed facility sites as well as areas designated for construction support activities, such as a construction access road and fence, contractor lay down areas, and batch plant (if needed). One potential batch plant, which may or may not be required, might be located off-installation but would be temporary and would not require land acquisition.

S.3.3.5 Weapons Generation Facility (EIS Section 2.3.6)

Several potential WGF locations, which are shown in EIS Figure 2.3-5, were considered for the WGF at Dyess AFB, but only one location was found to be suitable and carried forward for analysis in this EIS. The other potential WGF locations were found to be unsuitable due to a variety of planning factors. In addition to the 50-acre area required for the WGF, a new road (136,097 square feet) would also be constructed, connecting the WGF to the airfield.

S.3.4 Whiteman AFB Alternative (Preferred Alternative) (EIS Section 2.4)

The Whiteman AFB Alternative would establish MOB 2 at Whiteman AFB. The B-21 mission would replace the B-2 mission currently being flown at the installation.

S.3.4.1 Personnel (EIS Section 2.4.2)

There would be an increase of 1,021 individuals at Whiteman AFB from 19,408 to 20,429 after all B-21 mission individuals have arrived and all B-2 mission individuals have departed (i.e., the end-state). Under the snapshot scenario, the number of individuals would temporarily increase to 20,888 (i.e., 1,480 more individuals than the No Action Alternative).

S.3.4.2 Airfield Operations (EIS Section 2.4.3)

The number of airfield operations flown per year would increase by 1,980 from 29,771 under the No Action Alternative to 31,751 at end-state. During the snapshot scenario, the number of airfield operations per year would increase by 2,952 compared to the No Action Alternative, temporarily reaching 32,723 operations.

S.3.4.3 Airspace and Range Utilization (EIS Section 2.4.4)

The number of airspace operations flown per year at end-state would be the same as under the No Action Alternative in training airspace units that would be used regularly by the MOB 2 mission at Whiteman AFB. These airspace units, which are shown in EIS Figure 2.4-2, include Smoky Hill Range (Smoky MOA, Bison MOA and R-3601A/B), Cannon MOA (A and B), and Ada MOA (East and West), including all associated ATCAAs, as well as the Ozark ATCAA (A, B, and C). During the snapshot scenario, the number of airspace operations in each airspace unit would remain the same or temporarily increase slightly by between 2 and 50 operations per year.

S.3.4.4 Facilities and Infrastructure (EIS Section 2.4.5)

Construction of 16 new facilities or facility additions (600,000 square feet), renovation or repair of 26 facilities (1.7 million square feet), and demolition of three facilities (85,000 square feet) would be required to support the MOB 2 mission at Whiteman AFB. The locations of these facilities, which are presented in the EIS as generalized areas due to operational security concerns, are shown in EIS Figure 2.4-3. A single COA was considered for siting of the facilities after several other COAs were rejected because they did not meet planning criteria.

S.3.4.5 Weapons Generation Facility (EIS Section 2.4.6)

Two WGF locations were found to be suitable (see EIS Figure 2.4-4), and both were carried forward for analysis in this EIS as subalternatives. Both subalternatives would require a 50-acre area for the WGF. The North WGF Site Subalternative (Preferred Subalternative) would require the construction of two access roads (177,196 square feet) and the relocation of the existing Explosive Ordnance Disposal (EOD) range, as shown in EIS Figure 2.4-5. Implementation of the South WGF Site Subalternative would also require the construction of up to three access roads (50,885 square feet), one of which would require construction over an Environmental Restoration Program site, as shown in EIS Figure 2.4-6.

S.3.5 Mitigation (EIS Section 2.5)

Resource-specific mitigation measures are described in detail in EIS Table 2.5-1 and are summarized below. The proposed mitigations avoid, minimize, rectify, reduce, eliminate, or compensate for impacts associated with the Proposed Action. The effects of the potential mitigations are considered in the assessment of environmental impacts (EIS Chapter 3). The mitigation measures may be implemented in conjunction with the final decision which will be identified in the Record of Decision.

- Noise – No mitigations would be necessary. If substantial changes to the proposed action or its impacts are recognized, the DAF would re-evaluate potential impacts and develop mitigation measures, as needed.

- Socioeconomics – The DAF would work with the local community to assist in any way practicable with planning for support of the increased population.
- Biological Resources – The DAF would avoid tree and shrub clearing during migratory bird nesting season at both installations. At Dyess AFB, the DAF would conduct site-specific surveys and identify areas of potential habitat for the Texas horned lizard. If Texas horned lizards are found, the DAF would initiate relocation. At Whiteman AFB, the DAF would avoid tree clearing during bat maternity and active season.
- Physical Resources – The DAF would implement erosion and sediment control measures; design site draining to manage increased runoff; incorporate stormwater management features; and use erosion controls and engineering planning to reduce impacts at stream crossings at both bases. At Whiteman AFB, the DAF would develop compensatory mitigation if construction in Long Branch Creek is required, and place facilities or structures such that spill control structures would be effective.
- Hazardous Materials and Hazardous and Solid Wastes – For both installations, the DAF would characterize and/or dispose of soils in accordance with DAF policy and guidance and would address any contaminated soils on site or by disposal in an approved landfill. At Whiteman AFB, under the North WGF Subalternative, the DAF would conduct clearance and any mitigative actions required at the existing EOD Range prior to range closure.
- Transportation – At both installations, the DAF would schedule commercial deliveries outside of peak traffic hours; require construction crews to use the commercial gate; and take measures to ensure that emergency response ability is maintained at all times. At Whiteman AFB, the DAF would identify other measures to decrease traffic impacts during relocation of the Arnold Gate.

Potential unavoidable impacts that cannot be mitigated include reduction of regional landfill capacity, generation of hazardous and nonhazardous wastes, and effects to individual biological species at each base.

S.4. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES (EIS CHAPTER 3)

Table S-1 presents a summary of potential environmental consequences for the MOB 2 or MOB 3 beddown by alternative and environmental resource area.

Table S-1. Summary of Environmental Consequences for the MOB 2 or MOB 3 Beddown by Alternative

Alternative	Environmental Consequences
Airspace Use and Management	
No Action Alternative	There would be no changes to operations or airspace use and, therefore, baseline operations would continue as summarized in EIS Table 2.3-2 and EIS Table 2.3-3 (Dyess AFB), and EIS Table 2.4-2 and EIS Table 2.4-3 (Whiteman AFB). Operations in the training airspace for Dyess and Whiteman AFBs include each base's aircraft, aircraft associated with other nearby installations, and transient aircraft. Airfield operations and airspace utilization at both bases would be comparable to current conditions; therefore, the No Action Alternative would not contribute to air traffic controller workload or congestion in the airspace areas.
Dyess AFB Alternative	Airfield operations at Dyess AFB would decrease by 4.2 percent from baseline levels. There would be no significant impacts because flight operations would decrease across all SUA, resulting in less congestion. In addition, the B-21 would tend to use a range of higher altitudes that are currently underutilized.
Whiteman AFB Alternative (Preferred Alternative)	Airfield operations at Whiteman AFB would increase by 6.65 percent from baseline levels. This minor level of increase would not likely impact airspace use, ATC, or scheduling, therefore no significant impacts are anticipated. The total number of annual flight operations at all the training airspace units would remain the same as baseline conditions and, therefore, impacts would be the same as those described for the No Action Alternative.
Noise	
No Action Alternative	<u>Construction</u> : Construction projects associated with the Proposed Action would not occur and would result in no additional noise impacts. Construction projects that are under way or programmed to occur would result in only temporary, minor noise increases. <u>Flight Training</u> : There would be no changes to operations at either installation and noise levels would remain at baseline levels. Aircraft noise levels under the Dyess AFB training airspace would range from less than 35 dBA L_{dnmr} to 51.9 dBA L_{dnmr} and noise levels under the Whiteman AFB training airspace would range from less than 35 dBA L_{dnmr} to 42.2 dBA L_{dnmr} . There would be no flight training noise impacts because all noise levels are below the 65 dBA DNL noise level at which all land uses are compatible.
Dyess AFB Alternative	<u>Construction</u> : Facilities and C&D activities would result in temporary, localized increases in noise levels, but the installation and surrounding area is exposed to similar noise under baseline conditions. C&D activities would occur during normal business hours. Impacts would not be significant. <u>Flight Training</u> : The acreage and number of residents exposed to off-installation noise levels exceeding 65 dBA DNL would decrease relative to the No Action Alternative. Noise levels beneath the training airspace would decrease or remain the same. Overall, noise impacts would be beneficial or remain the same, and would not be significant.
Whiteman AFB Alternative (Preferred Alternative)	<u>Construction</u> : Consequences would be the same as those described under the Dyess AFB Alternative. <u>Flight Training</u> : There would be an increase of 498 acres (18 percent) and 89 (37 percent) residents exposed to off-installation noise levels exceeding 65 dBA DNL relative to the No Action Alternative. Noise levels at points of interest would increase by 0 to 2 dBA DNL, but the highest SEL values typically experienced would not change, therefore impacts would not be significant. Noise levels beneath the training airspace would remain the same, and impacts would not change from the No Action Alternative.

Table S-1. Summary of Environmental Consequences for the MOB 2 or MOB 3 Beddown by Alternative

Alternative	Environmental Consequences
Air Quality	
No Action Alternative	Emissions associated with personnel, airfield operations, airspace and range utilization, and construction activities would not differ from baseline conditions at Dyess or Whiteman AFB. Emissions at both bases are minimal for all criteria pollutants. The activities have been ongoing for many years and have not adversely impacted air quality in the region.
Dyess AFB Alternative	Personnel additions, airfield and flight operations, and C&D activities would result in combined annual emissions of all criteria pollutants other than PM ₁₀ that are below indicator thresholds. PM ₁₀ emissions may be reduced by construction BMPs. Emissions from C&D activities would be minor and temporary. GHG emissions are estimated at 7,464 tons per year. There would be no significant impacts to regional air quality.
Whiteman AFB Alternative (Preferred Alternative)	Consequences would be the same as those described under the Dyess AFB Alternative, except for GHG emissions, which are estimated at 32,114 tons per year. Construction BMPs may mitigate some GHG emissions. There would be no significant impacts to regional air quality.
Land Use	
No Action Alternative	<p><u>Construction:</u> There would be no personnel changes or C&D or renovation activities associated with the B-21 beddown at either base. On-base development would continue to adhere to existing land use planning procedures and requirements. Baseline development and infrastructure projects would not change on-base or off-base land use.</p> <p><u>Flight Training:</u> There would be no change to existing noise zones or APZs resulting from airfield operations. Incompatible land use adjacent to each base would continue, but impacts would be less than significant due to the relatively small area affected. There would be no changes to land use under the training airspace. Aircraft operations would continue at current levels.</p>
Dyess AFB Alternative	<p><u>Construction:</u> All on-base development would be conducted in accordance with installation land use planning procedures and requirements. There would be no change to existing land use designations. Adjacent off-base development resulting from the B-21 beddown would likely occur with consideration of aircraft noise, APZs, height restrictions, and corresponding land use compatibility. No significant impacts are anticipated.</p> <p><u>Flight Training:</u> The on-base and off-base noise zones associated with airfield operations would decrease substantially relative to existing conditions, resulting in potentially beneficial impacts. All on-base land use would be compatible with expected noise levels. Noise levels under the training airspace would decrease or remain the same relative to existing conditions. Therefore, no significant impacts would occur.</p>
Whiteman AFB Alternative (Preferred Alternative)	<p><u>Construction:</u> Consequences would be the same as those described under the Dyess AFB Alternative.</p> <p><u>Flight Training:</u> There would be a relatively small increase in on-base and off-base area exposed to aircraft noise relative to existing conditions. On-base land use would remain compatible with expected noise levels. The area of off-base conditionally compatible land use would increase slightly, but there would be no change in the area of incompatible use and significant impacts are not anticipated. Noise levels under the training airspace would remain the same relative to existing conditions.</p>

Table S-1. Summary of Environmental Consequences for the MOB 2 or MOB 3 Beddown by Alternative

Alternative	Environmental Consequences
Socioeconomics	
No Action Alternative	<p><u>Construction</u>: There would be no personnel changes, C&D, or renovation activities at Dyess AFB or Whiteman AFB, and no corresponding change to the economy, employment, or income in the region. Baseline conditions for housing and schools would continue as summarized in EIS Table 3.6-7 and EIS Table 3.6-8 (Dyess AFB), and EIS Table 3.6-15 and EIS Table 3.6-16 (Whiteman AFB).</p> <p><u>Flight Training</u>: Aircraft operations would remain the same as baseline conditions and the number of off-base residents exposed to noise levels above 65 dBA DNL would therefore be unchanged. Noise levels under the training airspace associated with each base would be less than 55 dBA DNL, which the EPA considers to be the threshold at which potential effects to public health and welfare occur.</p>
Dyess AFB Alternative	<p><u>Construction</u>: C&D and renovation activities would result in positive direct, indirect, and induced economic impacts (primarily construction spending). However, construction-related impacts would only last for the duration of the activities and would not be significant.</p> <p><u>Flight Training</u>: The increase in military and civilian personnel and dependents associated with the B-21 beddown would have a positive, long-term economic impact in the ROI, including indirect and induced employment. Benefits would primarily occur in housing, education, and various public services. The number of off-base residents within noise levels of 65 dBA DNL or greater would decrease compared to the No Action Alternative. Noise levels under the training airspace would decrease or stay the same, remaining well below the EPA level of 55 dBA DNL.</p>
Whiteman AFB Alternative (Preferred Alternative)	<p><u>Construction</u>: Consequences would be the same as those described under the Dyess AFB Alternative.</p> <p><u>Flight Training</u>: The increase in military and civilian personnel and dependents associated with the B-21 beddown would have a positive, long-term economic impact in the ROI, including indirect and induced employment. Benefits would primarily occur in housing, education, and various public services. There would be a small increase in the number of off-base residents within noise levels of 65 dBA DNL or greater compared to the No Action Alternative; however, this increase would not result in significant impacts. Noise levels under the training airspace would stay the same, remaining well below the EPA level of 55 dBA DNL.</p>
Environmental Justice	
No Action Alternative	<p><u>Construction</u>: C&D and maintenance activities would continue as part of normal operations and development at each base. Construction noise would not affect environmental justice or sensitive populations because all activities would likely occur within installation boundaries and noise would be intermittent and temporary.</p> <p><u>Flight Training</u>: The number of off-base environmental justice and sensitive population residents exposed to aircraft noise levels above 65 dBA DNL would remain the same. The number of residents exposed is provided in EIS Table 3.7-3 and EIS Table 3.7-4 (Dyess AFB) and EIS Table 3.7-5 and EIS Table 3.7-6 (Whiteman AFB).</p>

Table S-1. Summary of Environmental Consequences for the MOB 2 or MOB 3 Beddown by Alternative

Alternative	Environmental Consequences
Dyess AFB Alternative	<p><u>Construction</u>: No significant impacts to environmental justice or sensitive populations would occur because all C&D and renovation activities would occur within installation boundaries and noise would be intermittent and temporary.</p> <p><u>Flight Training</u>: The number of residents exposed to aircraft noise levels greater than 65 dBA DNL, including minority, low-income, youth, and elderly residents, would decrease relative to the No Action Alternative (EIS Table 3.7-7 to EIS Table 3.7-10). Therefore, no significant impacts would occur because there would be positive impacts to environmental justice and sensitive populations.</p>
Whiteman AFB Alternative (Preferred Alternative)	<p><u>Construction</u>: Consequences would be the same as those described under the Dyess AFB Alternative.</p> <p><u>Flight Training</u>: The number of residents exposed to aircraft noise levels greater than 65 dBA DNL, including minority, low-income, youth, and elderly residents, would increase relative to the No Action Alternative (EIS Table 3.7-15 to EIS Table 3.7-18). Exposure would be associated with the 65–69 and 70–74 dBA DNL noise contours. Impacts to environmental justice and sensitive populations would not be significant because the increase in affected residents would be a low percentage of the existing population and no adverse health effects would occur to residents within newly exposed areas.</p>
Biological Resources	
No Action Alternative	<p><u>Facilities and Infrastructure</u>: There would be no C&D or renovation activities associated with the B-21 beddown. On-base biological resources would continue to be managed through the installations' INRMP and BASH program.</p> <p><u>Airfield Operations</u>: Baseline airfield operations would not result in significant impacts to biological resources because there would be no change in noise and on-base resources would continue to be managed through the installations' INRMP and BASH program.</p> <p><u>Airspace and Range Utilization</u>: Airspace use under current operational parameters would continue and would not result in changes in impacts to biological resources under the training airspace.</p>
Dyess AFB Alternative	<p><u>Facilities and Infrastructure</u>: C&D and renovation activities would occur primarily within previously developed, turf, or landscaped areas. Undeveloped lands would be impacted permanently, but the affected area is small compared to similar habitats available nearby. Construction noise would be localized and short term and would only occur during daylight hours. Construction areas are in a military industrial land use with frequent elevated noise levels. Impacts to wildlife from construction noise would be temporary. No federally listed species or federally designated critical habitat occur at Dyess AFB. Implementation of proposed mitigation measures for migratory birds and state-listed threatened Texas horned lizard would reduce the potential for adverse effects to these species. Therefore, no significant impacts are expected.</p> <p><u>Airfield Operations</u>: Airfield operations and associated noise would decrease from the No Action Alternative, reducing the potential for BASH incidents and adverse noise effects on wildlife, including special status species. Therefore, no significant impacts would occur. Adherence to the existing BASH program and Depredation Permit conditions would further minimize the risk of bird/wildlife</p>

Table S-1. Summary of Environmental Consequences for the MOB 2 or MOB 3 Beddown by Alternative

Alternative	Environmental Consequences
	<p>aircraft strikes to negligible levels. No federally listed species or designated critical habitat have been documented on the installation. As such, there would be no effect to ESA-listed species or critical habitat.</p> <p><u>Airspace and Range Utilization:</u> Aircraft operations would decrease from baseline conditions across all proposed training airspace units, potentially decreasing the potential for bird–aircraft strikes. Noise levels within and under the training airspace would remain the same or decrease relative to the No Action Alternative. As a result, there would be no significant impacts due to the reduced potential for adverse noise effects to noise sensitive wildlife, migratory birds (including BCC), and bald or golden eagles within the training airspace. There would be no effect on federally listed species or critical habitat under the training airspace.</p>
Whiteman AFB Alternative (Preferred Alternative)	<p><u>Facilities and Infrastructure:</u> C&D and renovation activities would occur within previously developed, turf, or landscaped areas, except for the WGF sites. Impacts to vegetation and wildlife may result from land clearing and construction in the proposed North and South WGF areas. Wildlife would be permanently displaced by new construction. While no federally listed species have been documented at Whiteman AFB, potential suitable habitat for four federally listed bat species is present within the North and South WGF areas. Mitigation measures would reduce the potential for impacts to these species. Wildlife may be temporarily disturbed from increased noise and human activity, but noise would be localized and short term, and would only occur during daylight hours. Construction areas are in a military industrial land use area with frequent elevated noise levels. There would be no effect on federal and state-listed species and no significant impacts to biological resources.</p> <p><u>Airfield Operations:</u> Airfield operations would increase from the No Action Alternative but this would not result in a noticeable increase in bird/wildlife aircraft strike encounters. Adherence to the existing BASH program and Depredation Permit conditions would minimize the risk of strikes to negligible levels. Aircraft noise levels would increase by 1 or 2 dBA DNL. Maximum noise levels would be 68 dBA DNL and the highest SEL values typically experienced would not change compared to the No Action Alternative. Impacts to wildlife in newly exposed areas would likely be short term and infrequent and would not significantly affect overall populations. There would be no effect on ESA-listed species or critical habitats.</p> <p><u>Airspace and Range Utilization:</u> Aircraft operations and associated noise levels within the training airspace would remain the same relative to the No Action Alternative. Therefore, impacts would be the same as those under existing conditions. Since there is no increased risk of aircraft strikes and noise levels would not change compared to baseline conditions, there would be no significant impacts to wildlife, special status species, migratory birds (including BCC), or bald or golden eagles. There would be no effect to ESA-listed species and critical habitat under the training airspace.</p>
Cultural Resources	
No Action Alternative	<p><u>Construction:</u> No historic properties would be affected, and the bases would continue to manage cultural resources in accordance with SOPs as stated in base-specific ICRMPs.</p> <p><u>Flight Training:</u> Aircraft operations in the training airspace would continue in accordance with existing procedures and activity levels. Since noise levels are below 65 dBA L_{dnmr} under existing conditions, impacts to cultural resources would not be anticipated.</p>
Dyess AFB Alternative	<p><u>Construction:</u> Construction would not adversely affect any historic properties at Dyess AFB. While new facilities and infrastructure may be within view of some historic properties, the effects would be minimal because the historic resources exist within an active</p>

Table S-1. Summary of Environmental Consequences for the MOB 2 or MOB 3 Beddown by Alternative

Alternative	Environmental Consequences
	<p>base composed of historic and non-historic facilities and impacts would not be significant. The Area of Potential Effects includes all disturbance limits of the B-21 MOB 2 beddown. The DAF completed NHPA Section 106 (54 United States Code 306108) consultation with the Texas SHPO and Texas Historical Commission who concurred with DAF's finding of No Adverse Effects to above-ground resources.</p> <p><u>Flight Training:</u> Noise levels received by historic properties due to airfield operations would be less than current levels. Noise in the training airspace would be the same or less than the No Action Alternative, and no adverse impacts would be expected. Since the B-21 is projected to fly higher than the B-1, the visibility of the aircraft from historic properties below training airspaces would decrease. As a result, there would be no significant impacts.</p>
Whiteman AFB Alternative (Preferred Alternative)	<p><u>Construction:</u> C&D and renovation activities would occur near historic properties, although none would be directly affected. No historic properties are located at the alternative WGF sites. While new facilities and infrastructure may be within view of some historic properties, the effects would be minimal because the historic resources exist within an active base composed of historic and non-historic facilities and impacts would not be significant. The Area of Potential Effects includes all disturbance limits of the B-21 MOB 2 beddown. The DAF completed NHPA Section 106 (54 United States Code 306108) consultation with the Missouri SHPO. Under Section 110 of the NHPA, Whiteman AFB would be required to minimize harm to Oscar-01 as an NHL, if future mission plans required alteration or destruction.</p> <p><u>Flight Training:</u> Consequences would be the same as those described under the No Action Alternative because noise levels would not change under the training airspace.</p>
Physical Resources	
No Action Alternative	<p><u>Construction:</u> C&D and maintenance would continue as part of baseline development and infrastructure projects. These activities may affect physical resources but the potential for impacts would be decreased by sediment and erosion control requirements in each base's SWPPP and SPCC Plan, and construction general permit requirements if construction involves areas greater than 1 acre. Erosion control measures would likely be implemented during off-base construction.</p> <p><u>Flight Training:</u> Normal airfield operations at each base may affect physical resources by inadvertent releases of hazardous chemicals and from leaking fuel storage tanks. However, measures contained in each base's SWPPP and SPCC Plan to protect soils and surface waters would be implemented, and impacts would not be significant.</p>
Dyess AFB Alternative	<p><u>Construction:</u> There would be low potential for soil erosion from land disturbance during construction due to flat topography. Erosion potential would be further reduced by controls implemented by the CES Environmental Group, including measures for a new crossing of North Diversion Ditch. Coverage under the TCEQ construction general permit (TXR150000) would be required for land disturbances greater than 1 acre. Adherence to provisions in the construction general permit will be required, including development of a site-specific SWPPP that describes BMPs for erosion and sediment control. The SWPPP will specify BMPs for discharges of stormwater from construction activities and construction support activities (e.g., borrow pits, staging areas, and material storage areas). The DAF will ensure that NPDES requirements are met during execution of construction projects and will coordinate with TCEQ as needed. If land disturbed by construction will be revegetated, the correct seed mix identified by the</p>

Table S-1. Summary of Environmental Consequences for the MOB 2 or MOB 3 Beddown by Alternative

Alternative	Environmental Consequences
	<p>local NRCS office will be used. Increased runoff associated with impervious surfaces would be managed through stormwater conveyances. Stormwater management controls would be implemented in accordance with requirements in Section 438 of the Energy Independence and Security Act.</p> <p>Because 100- and 500-year floodplains are present in some construction areas, facility siting would comply with floodplain management rules in EO 11988 and EO 13690. The affected floodplain areas consist of land that has been previously developed, and therefore redevelopment would not change hydrologic characteristics. Since Dyess AFB does not have land for establishing the B-21 facilities without working in the floodplain, a Finding of No Practicable Alternative would be included in the Record of Decision.</p> <p>Additional POL use and storage would be subject to requirements of the base SPCC Plan. BMPs and spill prevention practices in the Dyess AFB SWPPP and SPCC plan would prevent significant impacts on ground water.</p> <p>Increased personnel associated with the beddown would not adversely affect potable water supply on base or in the Abilene area, and would not overburden the base's stormwater system.</p> <p><u>Flight Training:</u> Water resources could potentially be impacted by inadvertent releases of hazardous chemicals during airfield operations and from leaking fuel storage tanks. The volume of fuels and hazardous chemicals used, and volume of hazardous waste generated, are not expected to change, therefore, no significant impacts are anticipated. The DAF would continue to implement hazardous material and hazardous waste management actions, and spill prevention and response plans described in the SWPPP and SPCC Plan.</p>
<p>Whiteman AFB Alternative (Preferred Alternative)</p>	<p><u>Construction:</u> There would be low to moderate potential for soil erosion from land disturbance in most areas due to flat topography, but there are small areas of steep topography with moderate to high erosion potential. Construction contractors would operate under an MDNR construction land-disturbance state operating permit for construction sites exceeding one acre. The main requirement of the MDNR land-disturbance permit is development of a site-specific SWPPP that describes BMPs to minimize soil erosion and prevent sediments and pollutants from leaving the site. The SWPPP will specify BMPs for discharges of stormwater from construction activities and construction support activities (e.g., borrow pits, staging areas, and material storage areas). The DAF will ensure that NPDES requirements are met during execution of construction projects and will coordinate with MDNR as needed. If land disturbed by construction will be revegetated, the correct seed mix identified by the local NRCS office will be used. Base personnel would monitor sites to ensure stormwater BMPs and permit requirements are implemented. Erosion controls would likely be required for the Long Branch Creek crossing.</p> <p>Increased runoff would be addressed through design of stormwater conveyances. Stormwater management controls would be implemented in accordance with requirements in Section 438 of the Energy Independence and Security Act.</p> <p>Some planned areas of construction and a roadway for the South WGF Site contain jurisdictional WOTUS. The DAF received an approved JD from the U.S. Army Corps of Engineers on November 2, 2023, verifying the jurisdictional status of WOTUS potentially impacted by B-21 beddown activities. Facilities could be designed to avoid impacts to jurisdictional WOTUS in some</p>

Table S-1. Summary of Environmental Consequences for the MOB 2 or MOB 3 Beddown by Alternative

Alternative	Environmental Consequences
	<p>cases. However, if jurisdictional WOTUS cannot be avoided, the DAF would apply for a CWA Section 404 permit with the U.S. Army Corps of Engineers.</p> <p>None of the construction areas occur in or near the floodplain except for a small area in the southeastern corner of the North WGF Site. To ensure compliance with EO 11988/EO 13690, the DAF would take all feasible measures to either avoid disturbing the zone or to limit development in the zone to structures that would cause minimal impacts. If this alternative is selected, the DAF would include a Finding of No Practicable Alternative in the Record of Decision.</p> <p>B-21 operations would not result in impacts to water quality if personnel adhere to requirements in the SWPPP, SPCC Plan, and Hazardous Material Management and Hazardous Waste Disposal Programs. The potential for impacts on surface waters resulting from adding a road crossing at Long Branch Creek near the South WGF Site would be minimized through site construction planning and engineering practices.</p> <p>Additional POL use and storage would be subject to the base SPCC Plan. BMPs and spill prevention practices in the Whiteman AFB SWPPP and SPCC plan would prevent significant impacts on ground water.</p> <p>Increased personnel associated with the B-21 beddown would not adversely affect potable water supply and would not overburden the base's stormwater system.</p> <p><i>Flight Training:</i> Consequences would be the same as those described under the Dyess AFB Alternative.</p>
Hazardous Materials and Hazardous and Solid Wastes	
No Action Alternative	Under the No Action Alternative, there would be no change in the storage or use of hazardous materials or the generation of solid or hazardous wastes. Ongoing activities related to the management of ERP sites would continue.
Dyess AFB Alternative	Hazardous Materials Management – No significant impacts related to hazardous materials or petroleum products would occur with implementation of established management procedures.
Whiteman AFB Alternative (Preferred Alternative)	<p>Toxic Substances and Hazardous Wastes – Management of ACM and LBP would be accomplished in accordance with all regulatory requirements. Hazardous and nonhazardous waste generated from aircraft maintenance would also be managed according to established procedures. No change to permits, hazardous waste generator status, or management procedures would be required and no adverse environmental impacts are anticipated.</p> <p>ERP Sites – Development on or near any ERP or PFAS sites would be coordinated with the state regulatory agency and other relevant stakeholders, as applicable. No significant impacts related to ERP issues are anticipated.</p> <p>Solid Waste – MSW and C&D debris would not result in significant impacts to landfill capacity. Implementation of appropriate waste recycling, diversion, and management measures would further minimize any potential impacts.</p>
Health and Safety	
No Action Alternative	<i>Construction:</i> Under the No Action Alternative, ground operations and construction activities would continue to be conducted using the same safety processes and procedures as under current conditions. All actions would be accomplished by technically

Table S-1. Summary of Environmental Consequences for the MOB 2 or MOB 3 Beddown by Alternative

Alternative	Environmental Consequences
	<p>qualified personnel and would be conducted in accordance with applicable DAF safety requirements, approved technical data, OSHA and AFOSH standards; consequently, no significant impacts would occur.</p> <p><i>Flight Training:</i> Under the No Action Alternative, the installations would continue current operations using existing aircraft. Established procedures would continue for flight safety, mishap prevention and response, and weapons safety.</p>
<p>Dyess AFB Alternative</p> <p>Whiteman AFB Alternative (Preferred Alternative)</p>	<p><i>Construction:</i></p> <p>Explosives Safety – Proposed structures within existing QD arcs would undergo an explosive safety review to ensure occupancy and land uses would be compatible. As required, the installation may implement compensatory measures. Additionally, the WGF would be purpose-built to ensure that nuclear material and conventional explosives would be stored separately. Building design and dedicated explosive safety and fire suppression systems, would eliminate any risk to the public and potential impacts would not be significant. Existing explosive safety plans would be updated accordingly. Explosives safety requirements of AFMAN 91-201 would be met.</p> <p>Construction Safety – Ground operations and construction activities would continue to be conducted using the same safety processes and procedures as under existing conditions. All actions would be accomplished by technically qualified personnel and would be conducted in accordance with applicable DAF safety requirements, approved technical data, and OSHA and AFOSH standards.</p> <p><i>Flight Training:</i></p> <p>Flight Safety – Because the B-21 would be a new aircraft, historical mishap rates are not available; however, current aircraft flight safety policies and procedures are designed to ensure the potential for aircraft mishaps is reduced to the lowest possible level. These safety policies and procedures would continue, and impacts would not be significant. Dyess AFB has been operating the B-1 aircraft for over 30 years, and there have been three Class A mishaps associated with Dyess AFB aircraft. There have been two flight-related Class A mishaps and one ground fire accident associated with B-2 bomber aircraft associated with Whiteman AFB. If a mishap were to occur, the DAF would implement established emergency response procedures.</p>
Transportation	
<p>No Action Alternative</p>	<p><i>Construction:</i> Baseline development and infrastructure projects could potentially cause reduced travel speeds, road-shoulder closures, and lane closures. However, the effects would be short-term and would affect relatively small portions of the base. There would be no long-term impacts to the on-base or off-base transportation system. Transportation projects not associated with the B-21 beddown or baseline development and infrastructure projects would continue with a project-specific environmental review. Traffic operations on and outside the bases would continue as under existing conditions.</p> <p>The on-base road system at Dyess AFB would continue to function adequately, with the exception of a few intersections. Traffic adjacent to the base would continue to function adequately at times, but substantial congestion would likely occur on some roads</p>

Table S-1. Summary of Environmental Consequences for the MOB 2 or MOB 3 Beddown by Alternative

Alternative	Environmental Consequences
	<p>during peak hours. The on-base road system at Whiteman AFB would continue to function adequately, with little traffic congestion. Traffic adjacent to the base would generally continue to function adequately, but congestion would likely occur at times.</p> <p>Although off-base transportation service levels would be low at some times and locations, activities at Dyess AFB and Whiteman AFB would have little effect on operations, and impacts would be less than significant.</p> <p><u>Flight Training:</u> Existing airfield operations would not affect transportation on Dyess AFB or Whiteman AFB, or at adjacent off-base areas. Airspace and range utilization would not affect traffic operations under the training airspace associated with either base.</p>
Dyess AFB Alternative	<p><u>Construction:</u> Increased personnel associated with the B-21 beddown would result in increased on-base and off-base traffic operations. Higher on-base traffic volume would likely increase traffic congestion and decrease road segment or intersection service levels and could cause some road segments to operate near capacity. Increased off-base vehicle operation would add to existing congestion, particularly during peak commute hours and in areas of concentrated operation. Additional personnel would potentially cause a significant increase in congestion and queuing near installation gates.</p> <p>C&D and renovation projects could potentially cause traffic congestion and reduced service levels, particularly during peak hours. Unaffected roads could potentially accommodate rerouted traffic, and LOS would not likely be affected substantially on most parts of the base. Delivery and removal of materials and debris, and base access by construction crews, would cause an increase in off-base traffic. However, the number of vehicles involved would be small, and activities could occur throughout the workday. Impacts would not be significant because they would be temporary and would cease with completion of the projects.</p> <p><u>Flight Training:</u> Airfield operations would not affect transportation on Dyess AFB or at adjacent off-base areas. Airspace and range utilization would not affect traffic operations under the training airspace.</p>
Whiteman AFB Alternative (Preferred Alternative)	<p><u>Construction:</u> Impacts would be similar to those discussed for Dyess AFB. Increased personnel would result in increased on-base and off-base traffic operations that could contribute to traffic congestion and decreased LOS, particularly during peak commute hours and in areas of concentrated operation. Additional personnel could potentially cause an increase in congestion and queuing near installation gates.</p> <p>C&D and renovation projects could cause traffic congestion and reduced LOS, particularly during peak hours. Commercial traffic associated with facility and infrastructure projects would also cause an increase in off-base traffic. However, the number of vehicles involved would be small, and activities could occur throughout the workday. No significant impacts are anticipated because effects would be temporary and would cease with completion of the projects.</p> <p><u>Flight Training:</u> Consequences would be the same as those described under the Dyess AFB Alternative.</p>
Utilities and Infrastructure	
No Action Alternative	<p>Utility usage would continue below permitted/allowed capacity limits at both Dyess AFB and Whiteman AFB. Electrical system repairs and upgrades to the Charlie substation at Dyess AFB would further increase capacity. Similarly, construction of the 10 MW combined heat and power plant at Whiteman AFB would provide additional capacity.</p>

Table S-1. Summary of Environmental Consequences for the MOB 2 or MOB 3 Beddown by Alternative

Alternative	Environmental Consequences
Dyess AFB Alternative Whiteman AFB Alternative (Preferred Alternative)	While utility usage under both the Dyess AFB Alternative and the Whiteman AFB Alternative are expected to slightly increase, these increases would not be significant because they would not exceed any permitted/allowed usage capacity limits and the remaining capacities are sufficient for future growth.

ACM = asbestos-containing materials; AFB = Air Force Base; AFOSH = Air Force Operational and Environmental Safety, Fire Protection, and Health; AFMAN = Air Force Manual; APZ = accident potential zone; APZ = accident potential zone; ATC = Air Traffic Control; BASH = Bird/Wildlife-Aircraft Strike Hazard; BCC = Birds of Conservation Concern; BMP = best management practice; C&D = construction and demolition; CES = Civil Engineering Squadron; CWA = Clean Water Act; DAF = Department of the Air Force; dBA = A-weighted decibels; DNL = day-night average sound level; EO = Executive Order; EPA = Environmental Protection Agency; ERP = Environmental Restoration Program; ESA = Endangered Species Act; GHG = greenhouse gas; ICRMP = Integrated Cultural Resources Management Plan; INRMP = Integrated Natural Resources Management Plan; JD = jurisdictional determination; LBP = lead-based paint; LOS = level of service; MDNR = Missouri Department of Natural Resources; MOA = Military Operating Area; MOB = Main Operating Base; MSW = municipal solid waste; MW = megawatt; NHL = National Historic Landmark; NHPA = National Historic Preservation Act; NPDES = National Pollutant Discharge Elimination System; NRCS = United States Department of Agriculture Natural Resource Conservation Service; OSHA = Occupational Safety and Health Administration; PFAS = per- and polyfluoroalkyl substances; PM₁₀ = particulate matter with a diameter of less than or equal to 10 microns; POL = petroleum, oil, and lubricant; QD = quantity-distance; ROI = region of influence; SEL = sound exposure level; SHPO = State Historic Preservation Officer; SPCC = Spill Prevention, Control, and Countermeasures; SUA = Special Use Airspace; SWPPP = Storm Water Pollution Prevention Plan; TCEQ = Texas Commission on Environmental Quality; WGF = Weapons Generation Facility; WOTUS = waters of the United States

Final

**Environmental Impact Statement for
B-21 Beddown Main Operating Base 2 (MOB 2) or
Main Operating Base 3 (MOB 3) at
Dyess AFB or Whiteman AFB**

TABLE OF CONTENTS

	<u>Page</u>
1. PURPOSE OF AND NEED FOR ACTION	1-1
1.1 Introduction	1-1
1.2 Background	1-1
1.3 Purpose of the Proposed Action.....	1-3
1.4 Need for the Proposed Action	1-3
2. DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES	2-1
2.1 Proposed Action	2-1
2.1.1 Personnel.....	2-1
2.1.2 Airfield Operations	2-2
2.1.3 Airspace and Range Utilization	2-2
2.1.4 Facilities and Infrastructure.....	2-3
2.1.5 Weapons Generation Facility.....	2-3
2.2 No Action Alternative	2-4
2.2.1 No Action Alternative at Dyess AFB	2-4
2.2.2 No Action Alternative at Whiteman AFB.....	2-6
2.3 Dyess AFB Alternative.....	2-7
2.3.1 Background.....	2-7
2.3.2 Personnel.....	2-8
2.3.3 Airfield Operations	2-10
2.3.4 Airspace and Range Utilization	2-10
2.3.5 Facilities and Infrastructure.....	2-12
2.3.6 Weapons Generation Facility.....	2-17
2.4 Whiteman AFB Alternative (Preferred Alternative).....	2-17
2.4.1 Background.....	2-17
2.4.2 Personnel.....	2-18
2.4.3 Airfield Operations	2-18
2.4.4 Airspace and Range Utilization	2-19
2.4.5 Facilities and Infrastructure.....	2-22
2.4.6 Weapons Generation Facility.....	2-25
2.5 Mitigation	2-29
2.5.1 Mitigation Measures.....	2-29
2.5.2 Proposed Resource-Specific Mitigations to Reduce the Potential for Environmental Impacts	2-30
2.5.3 Unavoidable Impacts	2-34
3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES	3-1
3.1 Introduction	3-1
3.2 Airspace.....	3-10
3.2.1 Airspace, Affected Environment	3-10
3.2.2 Airspace, Environmental Consequences.....	3-12
3.3 Noise.....	3-17

3.3.1	Noise, Affected Environment	3-17
3.3.2	Noise, Environmental Consequences	3-25
3.4	Air Quality	3-60
3.4.1	Air Quality, Affected Environment.....	3-60
3.4.2	Air Quality, Environmental Consequences	3-78
3.5	Land Use	3-94
3.5.1	Land Use, Affected Environment.....	3-94
3.5.2	Land Use, Environmental Consequences	3-108
3.6	Socioeconomics	3-139
3.6.1	Socioeconomics, Affected Environment	3-139
3.6.2	Socioeconomics, Environmental Consequences	3-142
3.7	Environmental Justice	3-162
3.7.1	Environmental Justice, Affected Environment	3-162
3.7.2	Environmental Justice, Environmental Consequences	3-169
3.8	Biological Resources	3-185
3.8.1	Biological Resources, Affected Environment.....	3-185
3.8.2	Biological Resources, Environmental Consequences	3-210
3.9	Cultural Resources	3-225
3.9.1	Cultural Resources, Affected Environment.....	3-225
3.9.2	Cultural Resources, Environmental Consequences	3-236
3.10	Physical Resources	3-242
3.10.1	Physical Resources, Affected Environment.....	3-242
3.10.2	Physical Resources, Environmental Consequences	3-262
3.11	Hazardous Materials and Hazardous and Solid Wastes	3-276
3.11.1	Hazardous Materials and Hazardous and Solid Wastes, Affected Environment	3-276
3.11.2	Hazardous Materials and Hazardous and Solid Wastes, Environmental Consequences	3-296
3.12	Health and Safety	3-308
3.12.1	Health and Safety, Affected Environment.....	3-308
3.12.2	Health and Safety, Environmental Consequences	3-315
3.13	Transportation	3-320
3.13.1	Transportation, Affected Environment	3-320
3.13.2	Transportation, Environmental Consequences	3-330
3.14	Utilities and Infrastructure	3-343
3.14.1	Utilities and Infrastructure, Affected Environment	3-343
3.14.2	Utilities and Infrastructure, Environmental Consequences.....	3-350
4.	SUBMITTED ALTERNATIVES, INFORMATION, AND ANALYSES.....	4-1
4.1	Introduction	4-1
4.2	Public Scoping Summary	4-1
4.2.1	Substantive Scoping Comments Summary	4-2
4.3	Draft EIS Review Period Summary	4-3
4.3.1	Substantive Draft EIS Comments Summary	4-4
5.	REFERENCES	5-1
6.	LIST OF PREPARERS AND CONTRIBUTORS	6-1

LIST OF APPENDICES

Appendix A, Public Involvement
 Appendix B, Air Quality Calculations
 Appendix C, Land Use
 Appendix D, Biological Resources Supporting Information
 Appendix E, Cultural Resources
 Appendix F, Physical Resources

EIS SUPPORTING INFORMATION (ON THE PROJECT WEBSITE)

The Noise Supporting Information document is provided on the project website: www.B21EIS.com (EIS Supporting Information).

LIST OF TABLES

Table 2.2-1.	No Action Alternative at Dyess AFB – Personnel.....	2-5
Table 2.2-2.	No Action Alternative at Dyess AFB – Annual Airfield Operations.....	2-5
Table 2.2-3.	No Action Alternative at Whiteman AFB – Personnel	2-6
Table 2.2-4.	No Action Alternative at Whiteman AFB – Annual Airfield Operations.....	2-6
Table 2.3-1.	Personnel Associated With the Incoming B-21 Mission, Snapshot Scenario, and End-State Personnel at Dyess AFB	2-8
Table 2.3-2.	Annual Airfield Operations at Dyess AFB With Snapshot Scenario.....	2-10
Table 2.3-3.	Airspace and Range Utilization Operations With Snapshot Scenario for Dyess AFB Alternative.....	2-10
Table 2.3-4.	Facilities and Infrastructure for the Dyess AFB Alternative	2-12
Table 2.4-1.	Personnel Associated With the Incoming B-21 Mission, Snapshot Scenario, and End-State Personnel at Whiteman AFB	2-18
Table 2.4-2.	Annual Airfield Operations at Whiteman AFB With Snapshot Scenario.....	2-19
Table 2.4-3.	Airspace and Range Utilization Operations With Snapshot Scenario for Whiteman AFB Alternative.....	2-19
Table 2.4-4.	Facilities and Infrastructure for the Whiteman AFB Alternative.....	2-24
Table 2.5-1.	Proposed Resource-Specific Mitigations to Reduce the Potential for Environmental Impacts	2-30
Table 3.1-1.	No Action Alternative Baseline Projects	3-2
Table 3.1-2.	Reasonably Foreseeable Future Actions and Environmental Trends.....	3-6
Table 3.1-3.	Snapshot Analysis – Affected Resources.....	3-10
Table 3.2-1.	Airspace and Range Utilization Operations for Dyess AFB Alternative	3-14
Table 3.3-1.	Relationship Between Annoyance and DNL	3-22
Table 3.3-2.	Estimated Average NIPTS and 10th Percentile NIPTS as a Function of $L_{eq(24hr)}^{(a)}$	3-24
Table 3.3-3.	Acreage and Population Affected by Elevated Noise Levels Under the No Action Alternative at Dyess AFB.....	3-25
Table 3.3-4.	DNL and SEL at Representative Points of Interest Under the No Action Alternative at Dyess AFB.....	3-27
Table 3.3-5.	Potential Classroom Disruption at Schools Near Dyess AFB Under the No Action Alternative.....	3-28
Table 3.3-6.	Estimated Population Exposed to Noise Levels That Could Result in Substantive NIPTS Under the No Action Alternative at Dyess AFB	3-29
Table 3.3-7.	Construction Noise Levels.....	3-31
Table 3.3-8.	Acreage and Population Affected by Elevated Noise Levels Under the No Action Alternative at Whiteman AFB	3-31
Table 3.3-9.	DNL and SEL at Representative Points of Interest Under the No Action Alternative at Whiteman AFB.....	3-32
Table 3.3-10.	Potential Classroom Disruption at Schools Near Whiteman AFB Under the No Action Alternative.....	3-34
Table 3.3-11.	Acreage and Population Affected by Elevated Noise Levels Under the Dyess AFB Alternative.....	3-37
Table 3.3-12.	DNL and SEL at Representative Points of Interest Under the Dyess AFB Alternative	3-39
Table 3.3-13.	Potential Classroom Disruption at Schools Near Dyess AFB Under the Dyess AFB Alternative.....	3-39
Table 3.3-14.	Dyess AFB Alternative Training Airspace Noise Levels (dBA L_{dnmr})	3-42

Table 3.3-15. Acreage and Population Affected by Elevated Noise Levels Under the Snapshot Scenario at Dyess AFB	3-44
Table 3.3-16. DNL and SEL at Representative Points of Interest Under the Snapshot Scenario at Dyess AFB.....	3-44
Table 3.3-17. Potential Classroom Disruption at Schools Near Dyess AFB Under the Snapshot Scenario.....	3-45
Table 3.3-18. Dyess AFB Snapshot Scenario Training Airspace Noise Levels (dBA L _{dnmr})	3-48
Table 3.3-19. Acreage and Population Affected by Elevated Noise Levels Under the Whiteman AFB Alternative.....	3-49
Table 3.3-20. DNL and SEL at Representative Points of Interest Under the Whiteman AFB Alternative.....	3-51
Table 3.3-21. Potential Classroom Disruption at Schools Near Whiteman AFB Under the Whiteman AFB Alternative.....	3-52
Table 3.3-22. Whiteman AFB Alternative Training Airspace Noise Levels (dBA L _{dnmr})	3-53
Table 3.3-23. Acreage and Population Affected by Elevated Noise Levels Under the Snapshot Scenario at Whiteman AFB	3-56
Table 3.3-24. DNL and SEL at Representative Points of Interest Under the Whiteman AFB Snapshot Alternative.....	3-56
Table 3.3-25. Potential Classroom Disruption at Schools Near Whiteman AFB Under the Snapshot Scenario.....	3-57
Table 3.3-26. Whiteman AFB Snapshot Scenario Training Airspace Noise Levels (dBA L _{dnmr})	3-59
Table 3.4-1. Maximum Allowable Pollutant Concentration Increases Under PSD Regulations.....	3-61
Table 3.4-2. National Emissions Inventory 2017 Criteria Pollutant Emissions Inventory for Taylor County, Texas.....	3-63
Table 3.4-3. National Emissions Inventory 2017 Greenhouse Gas Emissions Inventory for Taylor County, Texas.....	3-63
Table 3.4-4. National Emissions Inventory 2017 Criteria Pollutant and Greenhouse Gas Emissions Inventory for Lancer MOA.....	3-63
Table 3.4-5. National Emissions Inventory 2017 Criteria Pollutant and Greenhouse Gas Emissions Inventory for Lancer Bridge MOA	3-64
Table 3.4-6. National Emissions Inventory 2017 Criteria Pollutant and Greenhouse Gas Emissions Inventory for Brownwood MOA	3-64
Table 3.4-7. National Emissions Inventory 2017 Criteria Pollutant and Greenhouse Gas Emissions Inventory for Pecos MOA.....	3-65
Table 3.4-8. Baseline Criteria Pollutant and Greenhouse Gas Emissions Inventory for Bronco 3 MOA.....	3-66
Table 3.4-9. National Emissions Inventory 2017 Criteria Pollutant and Greenhouse Gas Emissions Inventory for Bronco 4 MOA.....	3-66
Table 3.4-10. National Emissions Inventory 2017 Criteria Pollutant and Greenhouse Gas Emissions Inventory for Willie-Roscoe ATCAA	3-67
Table 3.4-11. National Emissions Inventory 2017 Criteria Pollutant Emissions Inventory for Johnson County, Missouri	3-67
Table 3.4-12. National Emissions Inventory 2017 Greenhouse Gas Emissions Inventory for Johnson County, Missouri	3-67
Table 3.4-13. Nonattainment Areas for Whiteman AFB Airspace	3-68
Table 3.4-14. National Emissions Inventory 2017 Criteria Pollutant and Greenhouse Gas Emissions Inventory for Ada East/West MOA	3-69
Table 3.4-15. National Emissions Inventory 2017 Criteria Pollutant and Greenhouse Gas Emissions Inventory for Smoky Hill Range	3-69
Table 3.4-16. National Emissions Inventory 2017 Criteria Pollutant and Greenhouse Gas Emissions Inventory for Cannon MOA	3-70
Table 3.4-17. National Emissions Inventory 2017 Criteria Pollutant and Greenhouse Gas Emissions Inventory for Lindbergh MOA.....	3-71
Table 3.4-18. National Emissions Inventory 2017 Criteria Pollutant and Greenhouse Gas Emissions Inventory for Truman MOA.....	3-72

Table 3.4-19.	National Emissions Inventory 2017 Criteria Pollutant and Greenhouse Gas Emissions Inventory for Bison MOA	3-73
Table 3.4-20.	National Emissions Inventory 2017 Criteria Pollutant and Greenhouse Gas Emissions Inventory for Ozark ATCAA.....	3-73
Table 3.4-21.	Personnel Emissions With the Dyess AFB Alternative.....	3-81
Table 3.4-22.	Airfield Operations Emissions With the Dyess AFB Alternative	3-82
Table 3.4-23.	Lancer and Pecos MOA/MTR Air Operations Emissions With the Dyess AFB Alternative	3-82
Table 3.4-24.	Facilities and Infrastructure Emissions With the Dyess AFB Alternative	3-83
Table 3.4-25.	Weapons Generation Facility Construction Emissions With the Dyess AFB Alternative	3-84
Table 3.4-26.	Summary of Dyess AFB Alternative Emissions.....	3-84
Table 3.4-27.	Personnel Emissions for the Snapshot Scenario With the Dyess AFB Alternative	3-85
Table 3.4-28.	Airfield Operations Emissions for the Snapshot Scenario With the Dyess AFB Alternative	3-86
Table 3.4-29.	Lancer and Pecos MOA/MTR Air Operations Emissions for the Snapshot Scenario With the Dyess AFB Alternative	3-86
Table 3.4-30.	Summary of Dyess AFB Snapshot Scenario Emissions	3-87
Table 3.4-31.	Personnel Emissions With the Whiteman AFB Alternative	3-88
Table 3.4-32.	Airfield Operations Emissions With the Whiteman AFB Alternative	3-89
Table 3.4-33.	Facilities and Infrastructure Emissions With the Whiteman AFB Alternative	3-89
Table 3.4-34.	Weapons Generation Facility Subalternative Construction Emissions With the Whiteman AFB Alternative	3-90
Table 3.4-35.	Summary of Whiteman AFB Alternative Emissions ^(a)	3-91
Table 3.4-36.	Personnel Emissions for the Snapshot Scenario With the Whiteman AFB Alternative ...	3-91
Table 3.4-37.	Airfield Operations Emissions for the Snapshot Scenario With the Whiteman AFB Alternative	3-92
Table 3.4-38.	Summary of Whiteman AFB Snapshot Scenario Emissions	3-93
Table 3.5-1.	Off-Base Incompatible Land Use Area Identified in the 2015 Dyess AICUZ Study	3-99
Table 3.5-2.	Off-Base Incompatible Land Use Area Identified for Whiteman AFB.....	3-103
Table 3.5-3.	On-Base Area Exposed to Noise Zones on Dyess AFB, No Action Alternative.....	3-110
Table 3.5-4.	Off-Base Land Use Area Exposed to Noise Zones Near Dyess AFB, No Action Alternative	3-112
Table 3.5-5.	Off-Base Land Use Area Exposed to the Clear Zone and Accident Potential Zones at Dyess AFB, No Action Alternative	3-113
Table 3.5-6.	Notional Off-Base Incompatible Land Use Area Near Dyess AFB, No Action Alternative	3-114
Table 3.5-7.	Noise Levels Under Training Airspace for the No Action Alternative at Dyess AFB.....	3-116
Table 3.5-8.	On-Base Area Exposed to Noise Zones on Whiteman AFB, No Action Alternative	3-116
Table 3.5-9.	Off-Base Land Use Area Exposed to Noise Zones Near Whiteman AFB, No Action Alternative	3-120
Table 3.5-10.	Off-Base Land Use Area Exposed to the Clear Zone and Accident Potential Zones at Whiteman AFB, No Action Alternative.....	3-121
Table 3.5-11.	Notional Off-Base Incompatible Land Use Area Near Whiteman AFB, No Action Alternative	3-121
Table 3.5-12.	Noise Levels Under the Training Airspace for the No Action Alternative at Whiteman AFB	3-122
Figure 3.5-11.	On-Base Land Use and Noise Contours on Dyess AFB, Dyess AFB Alternative	
Table 3.5-13.	On-Base Area Exposed to Noise Zones at Dyess AFB – Dyess AFB Alternative	3-124
Table 3.5-14.	Comparison of Total On-Base Area Exposed to Noise Zones at Dyess AFB Under the No Action Alternative and the Dyess AFB Alternative.....	3-125
Table 3.5-15.	Off-Base Land Use Area Exposed to Noise Zones Under the Dyess AFB Alternative..	3-127
Table 3.5-16.	Notional Off-Base Incompatible Land Use Area With the Dyess AFB Alternative	3-127
Table 3.5-17.	Comparison of Total Off-Base Area Adjacent to Dyess AFB Exposed to Noise Zones Under the No Action Alternative and the Dyess AFB Alternative	3-128

Table 3.5-18.	Comparison of Total Off-Base Incompatible Land Use Area Under the No Action Alternative and Dyess AFB Alternative.....	3-128
Table 3.5-19.	Noise Levels Under the Training Airspace for the Dyess AFB Alternative.....	3-128
Table 3.5-20.	On-Base Area Exposed to Noise Zones at Whiteman AFB – Whiteman AFB Alternative.....	3-131
Table 3.5-21.	Comparison of Total On-Base Area Exposed to Noise Zones at Whiteman AFB Under the No Action Alternative and Whiteman AFB Alternative.....	3-133
Table 3.5-22.	Off-Base Land Use Area Exposed to Noise Zones Under the Whiteman AFB Alternative.....	3-135
Table 3.5-23.	Notional Off-Base Incompatible Land Use Area With the Whiteman AFB Alternative...	3-135
Table 3.5-24.	Comparison of Total Off-Base Area Adjacent to Whiteman AFB Exposed to Noise Zones Under the No Action Alternative and the Whiteman AFB Alternative.....	3-135
Table 3.5-25.	Comparison of Total Off-Base Incompatible Land Use Area Under the No Action Alternative and Whiteman AFB Alternative	3-136
Table 3.5-26.	Noise Levels Under the Training Airspace for the Whiteman AFB Alternative	3-136
Table 3.6-1.	Numbers Used to Determine the Indirect Jobs and Dollar Value of Air Force Personnel Associated With the B-21 MOB 2 Beddown.....	3-140
Table 3.6-2.	Population Estimates and Projections for Dyess AFB Region of Influence	3-143
Table 3.6-3.	Personnel Estimates at Dyess AFB.....	3-143
Table 3.6-4.	Economic Impact of Dyess AFB, Fiscal Year 2021	3-144
Table 3.6-5.	Total Full-Time and Part-Time Employment (Number of Jobs) by Industry in the Abilene Metropolitan Statistical Area, 2021	3-144
Table 3.6-6.	Selected Economic Characteristics, Dyess AFB Region of Influence.....	3-145
Table 3.6-7.	Selected Housing Characteristics, Dyess AFB Region of Influence	3-146
Table 3.6-8.	Schools, Dyess AFB Region of Influence, 2020.....	3-146
Table 3.6-9.	Estimated Public Service Professionals Per 1,000 Capita, Dyess AFB Region of Influence	3-147
Table 3.6-10.	Population Estimates and Projections for Whiteman AFB Region of Influence	3-148
Table 3.6-11.	Personnel Estimates at Whiteman AFB	3-148
Table 3.6-12.	Economic Impact of Whiteman AFB, Fiscal Year 2020.....	3-149
Table 3.6-13.	Total Full-Time and Part-Time Employment (Number of Jobs) by Industry in Johnson County and Pettis County, 2020.....	3-149
Table 3.6-14.	Selected Economic Characteristics, Whiteman AFB Region of Influence	3-150
Table 3.6-15.	Selected Housing Characteristics, Whiteman AFB Region of Influence	3-150
Table 3.6-16.	Schools, Whiteman AFB Region of Influence	3-151
Table 3.6-17.	Estimated Public Service Professionals per 1,000 Capita, Whiteman AFB Region of Influence	3-152
Table 3.6-18.	Personnel Estimates in the Region of Influence Under the Dyess AFB Alternative	3-153
Table 3.6-19.	Estimated Indirect Jobs and Value Associated With Active-Duty Military and Civilian Personnel in the Region of Influence Under the Dyess AFB Alternative	3-153
Table 3.6-20.	Estimated Housing Units Demanded in the Region of Influence Under the Dyess AFB Alternative.....	3-154
Table 3.6-21.	Total School Age Children Enrolling in the Region of Influence Under the Dyess AFB Alternative.....	3-155
Table 3.6-22.	Estimated Number of Public Service Professionals in the Region of Influence Associated With Personnel Under the Dyess AFB Alternative	3-155
Table 3.6-23.	Personnel Estimates in the Region of Influence Under the Whiteman AFB Alternative	3-158
Table 3.6-24.	Estimated Indirect Jobs and Value Associated With Active-Duty Military and Civilian Personnel in the Region of Influence Under the Whiteman AFB Alternative..	3-158
Table 3.6-25.	Estimated Housing Units Demanded in the Region of Influence Under the Whiteman AFB Alternative.....	3-159
Table 3.6-26.	Total School Age Children Enrolling in the Region of Influence Under the Whiteman AFB Alternative.....	3-160
Table 3.6-27.	Estimated Number of Public Service Professionals in the Region of Influence Associated With the Personnel Under the Whiteman AFB Alternative	3-160

Table 3.7-1.	Environmental Justice Communities and Sensitive Populations – Baseline Conditions (Dyess AFB)	3-167
Table 3.7-2.	Environmental Justice Communities and Sensitive Populations – Baseline Conditions (Whiteman AFB)	3-168
Table 3.7-3.	Number of Residents Exposed to Aircraft Noise in the Region of Influence Under Existing Conditions (No Action – Dyess AFB)	3-169
Table 3.7-4.	Number of Residents Exposed to Aircraft Noise in the Region of Influence Under Existing Conditions by Block Group (No Action – Dyess AFB)	3-170
Table 3.7-5.	Number of Residents Exposed to Aircraft Noise in the Region of Influence Under Existing Conditions (No Action – Whiteman AFB)	3-170
Table 3.7-6.	Number of Residents Exposed to Aircraft Noise in the Region of Influence Under Existing Conditions by Block Group (No Action – Whiteman AFB)	3-171
Table 3.7-7.	Environmental Justice Populations Exposed to Aircraft Noise Under the Dyess AFB Alternative	3-174
Table 3.7-8.	Environmental Justice Populations Exposed to Aircraft Noise by Block Group (Dyess AFB Alternative)	3-174
Table 3.7-9.	Sensitive Populations Exposed to Aircraft Noise in the Region of Influence (Dyess AFB Alternative)	3-175
Table 3.7-10.	Sensitive Populations Exposed to Aircraft Noise by Block Group (Dyess AFB Alternative)	3-175
Table 3.7-11.	Environmental Justice Populations Exposed to Aircraft Noise in the Region of Influence Under the Dyess AFB Snapshot Scenario	3-176
Table 3.7-12.	Environmental Justice Populations Exposed to Aircraft Noise by Block Group (Dyess AFB Alternative Snapshot)	3-176
Table 3.7-13.	Sensitive Populations Exposed to Aircraft Noise Under the Dyess AFB Alternative Snapshot	3-177
Table 3.7-14.	Sensitive Populations Exposed to Aircraft Noise by Block Group (Dyess AFB Alternative Snapshot)	3-177
Table 3.7-15.	Environmental Justice Populations Exposed to Aircraft Noise in the Region of Influence Under the Whiteman AFB Alternative	3-181
Table 3.7-16.	Environmental Justice Populations Exposed to Aircraft Noise by Block Group (Whiteman AFB Alternative)	3-181
Table 3.7-17.	Sensitive Populations Exposed to Aircraft Noise Under the Whiteman AFB Alternative	3-182
Table 3.7-18.	Sensitive Populations Exposed to Aircraft Noise by Block Group (Whiteman AFB Alternative)	3-182
Table 3.7-19.	Environmental Justice Populations Exposed to Aircraft Noise in the ROI Under the Whiteman AFB Alternative Snapshot	3-183
Table 3.7-20.	Environmental Justice Populations Exposed to Aircraft Noise by Block Group (Whiteman AFB Alternative Snapshot)	3-183
Table 3.7-21.	Sensitive Populations Exposed to Aircraft Noise Under the Whiteman AFB Alternative Snapshot	3-184
Table 3.7-22.	Sensitive Populations Exposed to Aircraft Noise by Block Group (Whiteman AFB Alternative Snapshot)	3-184
Table 3.8-1.	Federally Listed Species With Potential to Occur at Dyess AFB	3-188
Table 3.8-2.	Federally Listed Species Known to Occur or With Potential to Occur Under the Dyess AFB Alternative Airspace	3-193
Table 3.8-3.	Federally Listed Species With Potential to Occur at Whiteman AFB	3-200
Table 3.8-4.	Federally Listed Species Known to Occur or With Potential to Occur Under the Whiteman AFB Alternative Airspace	3-204
Table 3.9-1.	Noise Levels Under the Dyess AFB No Action Alternative Airspace	3-236
Table 3.9-2.	Noise Levels Under the Whiteman AFB No Action Alternative Airspace	3-237
Table 3.9-3.	Current and Projected Noise Levels at Historic Properties at Dyess AFB	3-238
Table 3.9-4.	Current and Projected Noise Levels at Historic Properties at Whiteman AFB	3-240
Table 3.10-1.	Soil Types in Planned Construction Areas and WGF Site, Dyess AFB	3-245

Table 3.10-2. Areal Extent and Erosion Factors for Soil Types at Planned Construction Areas, Dyess AFB	3-246
Table 3.10-3. Areal Extent and Erosion Factors for Soil Types at the WGF Site, Dyess AFB.....	3-246
Table 3.10-4. Soil Types in Planned Construction Areas and WGF Sites, Whiteman AFB	3-253
Table 3.10-5. Areal Extent and Erosion Factors for Soil Types at Planned Construction Areas, Whiteman AFB.....	3-254
Table 3.10-6. Areal Extent and Erosion Factors for Soil Types at the North WGF Site, Whiteman AFB	3-255
Table 3.10-7. Areal Extent and Erosion Factors for Soil Types at the South WGF Site, Whiteman AFB	3-255
Table 3.11-1. Dyess AFB ERP Sites With Established Land Use Controls	3-283
Table 3.11-2. Summary of PFAS Investigation Results ^(a) for Dyess AFB	3-286
Table 3.11-3. ERP Sites Undergoing Long-Term Monitoring or Other Remedial/Investigative Actions	3-291
Table 3.11-4. AFFF Areas and Selection Rationale for Site Inspections at Whiteman AFB	3-294
Table 3.11-5. Buildings Associated With the Dyess AFB Alternative Constructed Prior to 1980	3-298
Table 3.11-6. Buildings Associated With the Whiteman AFB Alternative Constructed Prior to 1980.....	3-298
Table 3.11-7. Affected ERP Sites at Dyess AFB	3-301
Table 3.11-8. Total Solid Waste Disposed of From the Dyess AFB Alternative.....	3-302
Table 3.11-9. Total Solid Waste Disposed of From the Whiteman AFB Alternative	3-306
Table 3.13-1. Level of Service Designations for Intersections	3-321
Table 3.13-2. Traffic Level of Service Standards in Texas.....	3-321
Table 3.13-3. Traffic Level of Service Standards in Missouri	3-321
Table 3.13-4. Inadequate Intersection Level of Service on Dyess AFB	3-323
Table 3.13-5. Approximate Average Daily Traffic Count Near Dyess AFB	3-326
Table 3.13-6. Approximate Average Daily Traffic Count Near Whiteman AFB	3-328
Table 3.13-7. Approximate Number of Work Commuters in Cities Near Whiteman AFB	3-328

LIST OF FIGURES

Figure 2.3-1. Dyess AFB Location	2-9
Figure 2.3-2. Dyess AFB Alternative Range and Airspace Boundaries.....	2-11
Figure 2.3-3. Dyess AFB Courses of Action Evaluated for MOB 2.....	2-14
Figure 2.3-4. Facilities and Infrastructure Planned Areas of Construction – Dyess AFB Alternative	2-15
Figure 2.3-5. WGF Planned Areas of Construction – Dyess AFB Alternative	2-16
Figure 2.4-1. Whiteman AFB Location	2-20
Figure 2.4-2. Whiteman AFB Alternative Range and Airspace Boundaries	2-21
Figure 2.4-3. Facilities and Infrastructure Planned Areas of Construction – Whiteman AFB Alternative	2-23
Figure 2.4-4. WGF Proposed Locations – Whiteman AFB Alternative	2-26
Figure 2.4-5. North WGF Site Planned Areas of Construction – Whiteman AFB.....	2-27
Figure 2.4-6. South WGF Site Planned Areas of Construction – Whiteman AFB	2-28
Figure 3.3-1. Noise Contours at Dyess AFB Under the No Action Alternative	3-26
Figure 3.3-2. L_{dnmr} Beneath Dyess AFB Training Airspace Under the No Action Alternative	3-30
Figure 3.3-3. Noise Contours at Whiteman AFB Under the No Action Alternative.....	3-33
Figure 3.3-4. L_{dnmr} Beneath Whiteman AFB Training Airspace Under the No Action Alternative.....	3-36
Figure 3.3-5. Noise Contours at Dyess AFB Under the Dyess AFB Alternative Compared With the No Action Alternative	3-38
Figure 3.3-6. L_{dnmr} Beneath Training Airspace Under the Dyess AFB Alternative.....	3-41
Figure 3.3-7. Noise Contours at Dyess AFB Under the Snapshot Scenario Compared With the No Action Alternative.....	3-43
Figure 3.3-8. L_{dnmr} Under the Dyess AFB Snapshot Scenario	3-47

Figure 3.3-9. Noise Contours at Whiteman AFB Under the Whiteman AFB Alternative Compared With the No Action Alternative	3-50
Figure 3.3-10. Noise Contours at Whiteman AFB Under the Snapshot Scenario Compared With the No Action Alternative	3-55
Figure 3.5-1. Land Use on Dyess AFB	3-96
Figure 3.5-2. Land Use Adjacent to Dyess AFB	3-98
Figure 3.5-3. Land Use on Whiteman AFB	3-100
Figure 3.5-4. Land Use Adjacent to Whiteman AFB	3-102
Figure 3.5-5. Land Use Associated With Dyess AFB Airspace	3-104
Figure 3.5-6. Land Use Associated With Whiteman AFB Airspace	3-106
Figure 3.5-7. On-Base Land Use and Noise Contours on Dyess AFB – No Action Alternative	3-109
Figure 3.5-8. Off-Base Land Use, Noise Contours, and Accident Potential Zones Adjacent to Dyess AFB – No Action Alternative	3-111
Figure 3.5-9. On-Base Land Use and Noise Contours on Whiteman AFB – No Action Alternative	3-117
Figure 3.5-10. Off-Base Land Use, Noise Contours, and Accident Potential Zones Adjacent to Whiteman AFB – No Action Alternative	3-119
Figure 3.5-11. On-Base Land Use and Noise Contours on Dyess AFB, Dyess AFB Alternative	3-124
Figure 3.5-12. Off-Base Land Use, Noise Contours, and Accident Potential Zones Adjacent to Dyess AFB – Dyess AFB Alternative	3-126
Figure 3.5-13. Land Use at the Facilities and Infrastructure Projects Locations for the Dyess AFB Alternative	3-130
Figure 3.5-14. On-Base Land Use and Noise Contours on Whiteman AFB – Whiteman AFB Alternative	3-132
Figure 3.5-15. Off-Base Land Use, Noise Contours, and Accident Potential Zones Adjacent to Whiteman AFB – Whiteman AFB Alternative	3-134
Figure 3.5-16. Land Use at the Facilities and Infrastructure Projects Locations for the Whiteman AFB Alternative	3-137
Figure 3.7-1. Dyess AFB Census Tracts and Block Groups Exposed to DNL of 65 dBA or Greater Under Baseline and Proposed Action	3-165
Figure 3.7-2. Whiteman AFB Census Tracts and Block Groups Exposed to DNL of 65 dBA or Greater Under Baseline and Proposed Action	3-166
Figure 3.7-3. Dyess AFB Census Tracts and Block Groups Exposed to DNL of 65 dBA or Greater Under Baseline and Snapshot	3-173
Figure 3.7-4. Whiteman AFB Census Tracts and Block Groups Exposed to DNL of 65 dBA or Greater Under Baseline and Snapshot	3-180
Figure 3.8-1. Bird Conservation Regions and Migratory Flyways	3-191
Figure 3.8-2. Critical Habitat Under Whiteman AFB Airspace	3-203
Figure 3.9-1. Location of Historic Properties at Dyess AFB	3-227
Figure 3.9-2. Location of Cultural Resources at Whiteman AFB	3-232
Figure 3.10-1. Topography, Dyess AFB	3-247
Figure 3.10-2. Soil Types, Planned Construction Areas and WGF Site, Dyess AFB	3-248
Figure 3.10-3. Streams, Lakes, Floodplains, and Wetlands – Dyess AFB	3-251
Figure 3.10-4. Active Water Supply Wells Near Dyess AFB	3-252
Figure 3.10-5. Topography, Whiteman AFB	3-256
Figure 3.10-6. Soil Types, Planned Construction Areas, WGF Sites and Potential Explosive Ordnance Disposal Range, Whiteman AFB	3-257
Figure 3.10-7. Streams, Lakes, Floodplains, and Wetlands – Whiteman AFB	3-258
Figure 3.10-8. Active Water Supply Wells Near Whiteman AFB	3-261
Figure 3.11-1. Hazardous Waste Sites at Dyess AFB	3-281
Figure 3.11-2. Environmental Restoration Program Sites at Dyess AFB	3-285
Figure 3.11-3. PFAS on Dyess AFB	3-288
Figure 3.11-4. Hazardous Waste Sites at Whiteman AFB	3-292
Figure 3.11-5. Environmental Restoration Program Sites at Whiteman AFB	3-293
Figure 3.12-1. Established Quantity-Distance Arcs at Dyess AFB	3-313
Figure 3.12-2. Established Quantity-Distance Arcs at Whiteman AFB	3-314
Figure 3.13-1. Road Network on Dyess AFB	3-324

Figure 3.13-2. Highway and Road Network Near Dyess AFB	3-325
Figure 3.13-3. Road Network on Whiteman AFB.....	3-327
Figure 3.13-4. Highway and Road Network Near Whiteman AFB.....	3-329
Figure 3.14-1. Dyess AFB Utilities	3-346
Figure 3.14-2. Whiteman AFB Utilities	3-348

ACRONYMS AND ABBREVIATIONS

°C	degrees Celsius
µg/L	micrograms per liter
1-135 ARB	1-135th Attack Reconnaissance Battalion
442 FW	442nd Fighter Wing
509 BW	509th Bomb Wing
509 CES/CEIE	509th Civil Engineer Squadron
7 BW	7th Bomb Wing
7 CES	7th Civil Engineering Squadron
ACAM	Air Conformity Applicability Model
ACM	asbestos-containing materials
AFB	Air Force Base
AFFF	aqueous film forming foam
AFGSC	Air Force Global Strike Command
AFI	Air Force Instruction
AFMAN	Air Force Manual
AFOSH	Air Force Occupational and Environmental Safety, Fire Protection, and Health
AFRC	Air Force Reserve Command
AGL	above ground level
AICUZ	Air Installation Compatible Use Zone
AISD	Abilene Independent School District
ANG	Air National Guard
ANSI	American National Standards Institute
APE	Area of Potential Effects
APZ	accident potential zone
ATC	Air Traffic Control
ATCAA	Air Traffic Control Assigned Airspace
ATEMS	Academy of Technology, Engineering, Mathematics and Science
BASH	Bird/Wildlife-Aircraft Strike Hazard
BCC	Birds of Conservation Concern
BCR	Bird Conservation Region
BG	Block Group
BGEPA	Bald and Golden Eagle Protection Act
BMP	best management practice
BOS	Base Operating Support
C&D	construction and demolition
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CES	Civil Engineering Squadron
CFR	Code of Federal Regulations
CISD	Consolidated Independent School District
CO ₂ e	carbon dioxide equivalent
COA	Course of Action
COC	Community of Comparison
CSR	Code of State Regulations

CT	Census Tract
CTE	Career and Technical Education
CWA	Clean Water Act
CY	calendar year
CZ	clear zone
D	Not shown to avoid disclosure of confidential information but included in total
DAF	Department of the Air Force
dB	decibels
dBA	A-weighted decibels
DNL	day-night average sound level
DoD	Department of Defense
DOT	Department of Transportation
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EO	Executive Order
EOD	Explosive Ordnance Disposal
EPA	U.S. Environmental Protection Agency
EPS	Environmental Protection Shelter
ERP	Environmental Restoration Program
ESA	Endangered Species Act
ESP	Explosive Site Plan
FAA	Federal Aviation Administration
FPPA	Farmland Protection Policy Act
FTE	full-time employee
FY	fiscal year
GHG	greenhouse gas
GIS	geographic information system
gpd	gallons per day
GWP	global warming potential
HA	Health Advisory
HAZMART	Hazardous Materials Pharmacy
I-20	U.S. Interstate 20
I-70	U.S. Interstate 70
I-90	U.S. Interstate 90
IAP	Initial Accumulation Point
ICEMAP	Installation Complex Encroachment Management Action Plan
ICRMP	Integrated Cultural Resources Management Plan
ID	identification code
IDP	Installation Development Plan
IFR	instrument flight rules
INRMP	Integrated Natural Resources Management Plan
IPaC	Information for Planning and Consultation
ISD	Independent School District
JD	jurisdictional determination
JLUS	Joint Land Use Study
kWh	kilowatt-hours
kV	kilovolt
L ₁₀	loudest 10 percent noise level
LBP	lead-based paint

L _{dn}	day-night average sound level (symbol)
L _{dnmr}	onset-rate adjusted monthly day-night average sound level
LEED®	Leadership in Energy and Environmental Design®
L _{eq}	equivalent sound level
L _{eq(24hr)}	24-hour equivalent sound level
L _{eq(8hr)}	8-hour equivalent sound level
L _{max}	maximum sound level
LOS	level of service
LUC	land use control
MBTA	Migratory Bird Treaty Act
MCF	thousands of cubic feet per day
MDC	Missouri Department of Conservation
MGD	million gallons per day
MOA	Military Operating Area
MOB	Main Operating Base
MRNMAP	Military Operations Area and Range NOISEMAP
MSA	Metropolitan Statistical Area
MSL	mean sea level
MSW	municipal solid waste
MTR	Military Training Route
mVA	megavolt amperes
MW	megawatt
N ₂ O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NEI	National Emissions Inventory
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NIPTS	Noise-Induced Permanent Threshold Shift
No.	Number
NOI	Notice of Intent
NO _x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRCS	U.S. Natural Resource Conservation Service
NRHP	National Register of Historic Places
NTTR	Nevada Test and Training Range
OSHA	Occupational Safety and Health Administration
OT&E	Operational Test and Evaluation
OWS	oil/water separator
PCL	Protective Concentration Level
PFAS	per- and polyfluoroalkyl substances
PFBS	perfluorobutanesulfonic acid
PFC	perfluorinated compound
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfonate
PFSA	perfluoroalkyl carboxylates, sulfonate
PHL	potential hearing loss
PM ₁₀	particulate matter with a diameter of less than or equal to 10 microns
PM _{2.5}	particulate matter with a diameter of less than or equal to 2.5 microns
POL	petroleum, oil, and lubricant

POV	privately owned vehicle
PR-	Powder River (Military Operating Area) (e.g., PR-1, PR-2, etc.)
PRC	People's Republic of China
PSD	Prevention of Significant Deterioration
QD	quantity-distance
RCRA	Resource Conservation and Recovery Act
RF	Radio Frequency
ROD	Record of Decision
ROI	region of influence
RRS	Risk Reduction Standard
RSL	Regional Screening Level
SAP	Satellite Accumulation Point
SC-GHG	social cost of GHG emissions
SEL	sound exposure level
SEL _{max}	maximum sound exposure level
SHPO	State Historic Preservation Officer
SO ₂	sulfur dioxide
SOP	Standard Operating Procedure
SO _x	sulfur oxides
SPCC	Spill Prevention, Control, and Countermeasures
SUA	Special Use Airspace
SWPPP	Storm Water Pollution Prevention Plan
TCEQ	Texas Commission on Environmental Quality
TCP	traditional cultural property
TPWD	Texas Parks and Wildlife Department
TRRP	Texas Risk Reduction Program
U.S.	United States
U.S.C.	United States Code
US-277	U.S. Highway 277
US-83/84	U.S. Highway 83/84
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
UTTR	Utah Test and Training Range
VFR	visual flight rules
WGF	Weapons Generation Facility
WIC	Weapons Instructor Course
WLT	Weapons Load Trainer
WOTUS	waters of the United States
WRSS	Weapons Release & Suspension Shop
WWTP	Waste Water Treatment Plant

1. PURPOSE OF AND NEED FOR ACTION

1.1 INTRODUCTION

The Department of Defense (DoD) is developing a new bomber aircraft, the B-21 “Raider,” which will eventually replace existing B-1 and B-2 bomber aircraft. The beddown of the B-21 will take place through a series of beddowns at three Main Operating Bases (MOBs), referred to as MOB 1, MOB 2, and MOB 3. The Department of the Air Force (DAF) previously identified Ellsworth Air Force Base (AFB), Dyess AFB, and Whiteman AFB as potential installations to beddown the B-21 Raider. The DAF chose Ellsworth AFB for MOB 1; therefore, this Environmental Impact Statement (EIS) evaluates potential environmental consequences associated with establishing MOB 2 at one of the remaining two alternative bases: Dyess AFB or Whiteman AFB.

The MOB 2 beddown would include B-21 Operations Squadrons, Weapons Instructor Course (WIC), and Operational Test and Evaluation (OT&E) Squadron, as well as a Weapons Generation Facility (WGF). Consequently, in this EIS, potential impacts of these four components (i.e., Operations Squadrons, WIC, OT&E, and WGF) are analyzed for both alternative locations, Dyess AFB and Whiteman AFB.

Since the B-21 basing action is a series of beddowns. If one of the candidate bases is selected for MOB 2, then the remaining base would subsequently become the MOB 3 beddown location. Air operations and personnel numbers for the MOB 3 beddown are not anticipated to exceed those analyzed in this EIS and construction activities are anticipated to be the same for either MOB location. Therefore, the analysis presented in this EIS represents potential impacts associated with the MOB 2 or MOB 3 beddown actions at either location.

The B-21 will operate under the direction of the Air Force Global Strike Command (AFGSC). The B-21 will have both conventional and nuclear roles and will be capable of penetrating and surviving in advanced air defense environments. It is projected to enter service in the 2020s, and the DAF intends to operate a minimum of 100 B-21 aircraft.

1.2 BACKGROUND

This EIS is being developed in compliance with the National Environmental Policy Act (NEPA) (42 United States Code [U.S.C.] 4321 et seq.), Council on Environmental Quality (CEQ) regulations [2022 promulgation], and the DAF’s Environmental Impact Analysis Process (32 Code of Federal Regulations [CFR] 989). These regulations require federal agencies to complete an EIS for any proposal that may significantly affect the quality of the human environment, outline the responsibilities of federal agencies, and provide specific procedures for preparing EISs to comply with NEPA. In addition, the DAF is evaluating how the proposed basing action might be affected by or impact other federal

and state regulatory and planning processes, such as the Clean Air Act, Clean Water Act (CWA), National Historic Preservation Act (NHPA), etc.

NEPA, and its implementing regulations, require the DAF to develop and identify reasonable alternatives to a proposed action. In determining the scope of alternatives to be considered, emphasis is placed on what is “reasonable.” Reasonable alternatives include those “that are practical or feasible from the technical and economic standpoint and using common sense, rather than simply desirable from the standpoint of the applicant” (CEQ, 1986).

The DAF’s Strategic Basing Process (Department of the Air Force Instruction [DAFI] 10-503, *Strategic Basing*) determined the candidate MOB locations for the B-21 basing action. The process began by identifying all the bases that could reasonably support the B-21 mission. The objectives for the B-21 basing strategy were to minimize mission impact, maximize facility reuse, and minimize cost. Therefore, the “enterprise of bases” that could support the B-21 mission was limited to current AFGSC bomber bases (Barksdale, Dyess, Ellsworth, Minot, and Whiteman AFBs). All non-bomber bases were eliminated due to their limited runway length, ramp and hangar deficiencies, and insufficient concrete strength for bomber operations, which make them incapable of supporting the B-21 mission.

The DAF determined that the B-52 fleet, with operations at both Barksdale and Minot AFBs, would continue to operate beyond 2050, leaving both bases with insufficient capacity for an additional B-21 mission. Additionally, the DAF believes that splitting up the B-52s to various other bomber bases to make room for an additional B-21 mission would incur excessive costs and cause operational risks and impacts, which goes against the strategy of using current infrastructure and minimizing impacts to current missions. Therefore, the DAF eliminated Barksdale and Minot AFBs as potential candidate bases to beddown the B-21.

The DAF then eliminated Whiteman AFB as a reasonable alternative for MOB 1 to ensure the United States’ nuclear capabilities remained uninterrupted. The DAF determined that the transfer of nuclear capabilities should occur after the initial beddown of MOB 1 and that the B-2 program would remain active at Whiteman AFB until the MOB 1 for the B-21 is established. As a result, the DAF evaluated Dyess AFB and Ellsworth AFB as reasonable alternatives for MOB 1.

The DAF prepared the *B-21 Main Operating Base 1 (MOB 1) Beddown at Dyess AFB, Texas or Ellsworth AFB, South Dakota Environmental Impact Statement* (hereinafter referred to as the “MOB 1 EIS”). On June 3, 2021, the DAF signed a Record of Decision (ROD) for the MOB 1 EIS and selected Ellsworth AFB as the MOB 1 location. The DAF decided to select the preferred alternative, Ellsworth AFB, as the MOB 1 location after consideration of relevant operational, environmental, economic, and technical factors discussed in the ROD; environmental consequences explained in the Final MOB 1 EIS; input from the public, regulatory and other agencies, and Native American tribes; and other relevant factors related to national defense, including current military operational needs and costs.

Since the DAF chose Ellsworth AFB for the MOB 1 beddown location, this EIS evaluates establishing MOB 2 at one of the remaining two alternative bases: Dyess AFB or Whiteman AFB.

In this EIS, the DAF has done its best to accurately predict potential impacts and anticipate future conditions even when data is unavailable. This NEPA analysis identifies environmental permits, proposed mitigation measures, and management actions to prevent or minimize environmental impacts, if needed. The ROD will then determine which mitigation measures will be implemented. A mitigation plan will then be developed in accordance with 32 CFR 989.22(d) for the mitigations selected in the ROD.

1.3 PURPOSE OF THE PROPOSED ACTION

As stated in the 2022 National Defense Strategy, which includes the 2022 Nuclear Posture Review and the 2022 Missile Defense Review, the global security environment and “threats to the homeland have fundamentally changed. The People’s Republic of China (PRC) and Russia now pose more dangerous challenges to safety and security at home, even as terrorists threats persist.” In particular, “the PRC has expanded and modernized nearly every aspect of the People’s Liberation Army (PLA), with a focus on off-setting U.S. military advantages” (DoD, 2022a). The threats we face as a nation are increasingly transregional, multi-domain, and multi-functional. These threats frequently do not comply with international rules of law. They include ever-expanding, rapidly developing technologies of nations such as the PRC as well as Russia and non-state actors.

Thus, the DAF must deter its adversaries, assure its allies, and be prepared to support operations that protect the homeland, respond to aggression with overlapping timelines, wage a global counter-terrorism campaign in cooperation with our allies and partners, and improve our ability to respond to emerging threats. Our adversaries must be aware that our weapons are reliable and will achieve the desired result regardless of enemy countermeasures.

Therefore, the purpose of the Proposed Action is to implement the goals of the National Defense Strategy by modernizing the U.S. bomber fleet capabilities. The B-21 Raider is being developed to carry conventional payloads and to support the nuclear triad by providing a visible and flexible nuclear deterrent capability that will assure allies and partners through the United States’ commitment to international treaties.

1.4 NEED FOR THE PROPOSED ACTION

The need for the Proposed Action stems from advancements in the technology that is available to potential adversaries of the United States. The United States must have advanced defense capabilities that discourage adversary nations from taking action and that can respond effectively to support national defense priorities if and when called upon to do so. The existing bomber fleet lacks the technology required to ensure U.S. global security and long-range strike missions into the future; therefore, a new, more

technologically capable system must be developed and fielded to support the nation's defense.

Therefore, the need for the Proposed Action is to support deterrence capabilities by basing the B-21 at installations that can support the AFGSC's MOB 2 mission. The B-21 will provide the only stealth bomber capability and capacity needed to deter, and if necessary, defeat our adversaries in an era of renewed great power competition. The installation will support training of crewmembers and personnel in the operation and maintenance of the B-21 aircraft in an appropriate geographic location that can provide sufficient airfield, facilities, infrastructure, and airspace to support the B-21 training and operations.

2. DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

2.1 PROPOSED ACTION

To meet the underlying purpose and need, the Proposed Action is for the DAF to implement the beddown of the B-21 MOB 2. The MOB 2 beddown would include establishing the B-21 Operations Squadrons, WIC, and OT&E, as well as constructing a WGF, developing new infrastructure, and increasing numbers of personnel to support and conduct B-21 aircraft operations. This EIS considers two alternative locations for the MOB 2 beddown of the B-21 (Dyess AFB and Whiteman AFB) and evaluates impacts where construction, training, and operational activities would occur. As previously described in Section 1.1 (Introduction), if a candidate base is selected as the MOB 2 location, then the remaining candidate base would subsequently become the MOB 3 beddown location. Air operations and personnel numbers for the MOB 3 beddown are not anticipated to exceed those analyzed in this EIS and construction activities are anticipated to be the same for either MOB location. Therefore, the analysis presented in this EIS sufficiently represents potential impacts associated with either the MOB 2 or MOB 3 beddown actions for either location.

The Proposed Action includes common elements that a B-21 MOB 2 would bring to, or require at, either candidate base to make them operationally ready. These elements are associated with personnel, airfield operations, airspace and range utilization, facilities and infrastructure, and the WGF.

Additionally, incorporating B-21 flight training into Global Strike Command's ongoing mission is a dynamic issue that is being addressed in this EIS. To help illustrate the gradual change from B-1 and B-2 to B-21 aircraft operations and personnel over time, an approximation, or "snapshot" scenario, was developed. This snapshot scenario considers the temporary timeframe when B-1 or B-2 operations and personnel would overlap with incoming B-21 operations and personnel. The "end-state" reflects the point in time when all B-21s are in place and all B-1s or B-2s have been removed.

2.1.1 Personnel

The B-21 MOB 2 mission would include Operational Squadrons, WIC, OT&E, and WGF components. The full B-21 mission personnel complement required to execute the proposed mission would include operational and instructor pilots, as well as maintenance personnel to support these components.

Based on manpower reports, the DAF estimates that the B-21 MOB 2 mission would require approximately 2,550 military personnel. Precise demographic data for the military personnel's dependents are not known. Therefore, to obtain the ratio of DAF active-duty members to family members for this EIS, the DAF reviewed the *2020 Demographics Profile of the Military Community* published by the DoD. According to that report, on average, there are 1.2 family members, or dependents, for each active-duty DAF

personnel (DoD, 2020). The DAF estimates total dependents associated with the B-21 MOB 2 beddown to be approximately 3,060. Additionally, the DAF assumed that 53.8 percent of personnel are married, based on marital status statistics for DAF active-duty members in that report (DoD, 2020). The number of children is then calculated by subtracting the number of spouses from the total number of dependents. The estimated maximum number of personnel associated with establishing the B-21 mission at the MOB 2 installation would be 5,610 total individuals.

The analysis of potential impacts from population changes at each MOB 2 candidate base must consider both the incoming B-21 mission and personnel as well as the retiring B-1 and B-2 missions and associated personnel at Dyess AFB and Whiteman AFB, respectively. These personnel changes are discussed in Sections 2.3.2 and 2.4.2 for Dyess AFB and Whiteman AFB, respectively, including a “snapshot” in time when some B-21 personnel have arrived while some B-1 or B-2 personnel remain. The number of personnel under the snapshot scenario equals the number of end-state personnel plus 10 percent of B-1 or B-2 personnel.

2.1.2 Airfield Operations

The annual estimated number of total B-21 aircraft operations is approximately 6,840 per year for all squadrons (Operations Squadrons, WIC, and OT&E), based on 95 sorties per month (see the Noise Supporting Information document on the project website located at www.B21EIS.com for explanation of operations versus sorties). Forty percent of all arrival and closed pattern operations and 5 percent of all departure operations would be conducted between 10:00 p.m. and 7:00 a.m. On average, approximately 3.12 sorties associated with the B-21 mission would be conducted per day at both Dyess AFB and Whiteman AFB. Airfield operations specific to each alternative are discussed in Sections 2.3.3 and 2.4.3 for Dyess AFB and Whiteman AFB, respectively, including a “snapshot” in time when B-1 or B-2 operations would overlap with incoming B-21 operations. The number of airfield operations under the snapshot scenario is equal to end-state operations plus 20 percent of B-1 or B-2 operations.

2.1.3 Airspace and Range Utilization

This EIS also addresses the B-21 training mission. Like other bombers, the B-21 can adequately train in Class A airspace using Federal Aviation Administration (FAA)-filed flight plans. However, training in Military Operating Areas (MOAs) and Air Traffic Control Assigned Airspaces (ATCAAs) provide additional flexibility and integration opportunities. Airspace and range training areas utilized under the Dyess AFB and Whiteman AFB Alternatives are described, respectively, in Sections 2.3.4 and 2.4.4. Other Class A airspace and Major Range and Test Facility Bases, such as the Utah Test and Training Range (UTTR) and the Nevada Test and Training Range (NTTR), would be used on an as-needed basis. There are no plans to modify any of the airspace as a result of the Proposed Action under either alternative.

2.1.4 Facilities and Infrastructure

As outlined in the MOB 1 EIS's Section 2.2.1 (Screening Criteria Process for MOB 1), the B-21 basing decision strategy was a deliberate process. Candidate bases, Dyess AFB and Whiteman AFB, currently host B-1 and B-2 missions, respectively, and the support they each provide for their respective missions is unique. DAF planners evaluated operational readiness and leveraged existing facilities and infrastructure at each base individually, factoring base-specific site constraints, to minimize mission impact, maximize facility reuse, and minimize cost. This selection process uses the strengths of each base to optimize the B-21 beddown strategy.

Given the different geographic locations of the candidate bases, physical conditions that would limit project-related site choices at Dyess AFB would not necessarily be the same at Whiteman AFB. At Dyess AFB, site constraints include floodplains and Environmental Restoration Program (ERP) sites. Planners at Whiteman AFB avoided ERP sites and wetland conditions to the extent practicable.

The DAF looked specifically at whether existing infrastructure would create unacceptable land use constraints for clear zones (CZs) and accident potential zones (APZs), APZ I and APZ II (Air Force Handbook 32-7084, *Air Installation Compatible Use Zones (AICUZ) Program Manager's Guide*). In addition to CZ considerations, explosives-safety arcs were utilized to help develop facility and infrastructure alternatives.

Therefore, the Proposed Action involves construction, renovation, and demolition projects to support the B-21 MOB 2 basing action at each alternative location. The proposed facilities and infrastructure projects required under each alternative are discussed in Sections 2.3.5 and 2.4.5 (Facilities and Infrastructure) for Dyess AFB and Whiteman AFB, respectively.

2.1.5 Weapons Generation Facility

The WGF is a unique facility that would be newly constructed at each B-21 beddown location. The WGF will provide a safe and secure location for the storage of DAF nuclear munitions. The WGF will require a construction footprint of approximately 50 acres, including areas for grading, drainage, and a contractor laydown area; however, the final WGF compound size will be approximately 20 acres. The WGF compound would be double fenced (approximately 7,100 linear feet), with approximately 8 acres of construction, consisting of 81,620 square feet of facilities and 274,814 square feet of parking/pavement areas. Roadway access to the proposed WGF sites is unique to each location and is described for the Dyess AFB and Whiteman AFB Alternatives, respectively, in Sections 2.3.6 and 2.4.6 (Weapons Generation Facility).

The DAF will implement construction and operations in a manner consistent with AFI 20-110, *Nuclear Weapons-Related Materiel Management*. Due to national security implications, the details regarding the infrastructure associated with the WGF are not releasable. It should be noted that the munitions storage areas for each of the

candidate bases have adequate capacity for conventional DAF assets. The WGF provides a consolidated facility within a single, controlled site that accommodates maintenance, storage, and support functions under one roof to provide enhanced operations and security measures for the entire mission. The configuration of the facility allows for efficient movements of all assets in various configurations, which improves both the safety and security associated with mission requirements.

2.2 NO ACTION ALTERNATIVE

The CEQ regulations (40 CFR 1502.14(c)) require the alternatives analysis in an EIS to “include the alternative of no action.” Analysis of this alternative provides a baseline against which decision makers can compare the magnitude of potential environmental effects resulting from the action alternatives. Under the No Action Alternative, the B-21 would not be based at either Dyess AFB or Whiteman AFB. However, the B-21 program is a major DoD initiative to ensure that the U.S. nuclear triad, consisting of land-, submarine-, and aircraft-launched nuclear weapons, is and remains effective. The B-21 program will be implemented whether or not the No Action Alternative is selected. If the No Action Alternative was selected due to unforeseen issues, the DAF would reevaluate their B-21 phasing approach, using the Strategic Basing Process, and implement the basing at another, undetermined location. Under the No Action Alternative, the B-1 mission would continue at Dyess AFB and the B-2 mission would continue at Whiteman AFB until the DAF conducted their re-evaluation of the B-21 phasing approach.

Under the No Action Alternative, each alternative installation would continue their individual missions at current levels, which are used as part of the baseline for the analysis. The following sections provide descriptions of the activities associated with the No Action Alternative, categorized by (1) personnel, (2) airfield operations, (3) airspace and range utilization, and (4) facilities.

2.2.1 No Action Alternative at Dyess AFB

Personnel

Table 2.2-1 lists the total number of active military, civilian, and contractor personnel and dependents associated with the No Action Alternative at Dyess AFB as 11,862 persons, which includes 6,470 dependents (Dyess AFB, 2020a). Since the actual numbers of children and spouses are provided only for active military personnel in the *Economic Impact Statement for Dyess AFB* (2020a), this EIS first assumes there are 1.2 dependents for each personnel, then extrapolates the number of spouses and children from the total number of dependents by assuming that 53.8 percent of the active military, civilian, and contractor personnel are married (Section 2.1.1, Personnel). The remaining number of total dependents are counted as children.

Personnel supporting current B-1 operations at Dyess AFB are also presented in Table 2.2-1. The ratios of spouses and children to active military and civilian personnel

were calculated and used to estimate the number of dependents specifically associated with B-1 mission personnel. Under the No Action Alternative, personnel associated with the B-1 mission would stay at Dyess AFB and these numbers are already incorporated in the total number of personnel.

Table 2.2-1. No Action Alternative at Dyess AFB – Personnel

Personnel ^(a)	Total Number of Individuals ^(b)	Number of B-1 Mission Individuals
Active Military	4,606	1,855
Civilian	736	46
Contractor	50 ^(c)	50
Spouses ^(d)	2,901	1,050
Children ^(d)	3,570	1,292
Total ^(e)	11,862	4,292

Key: AFB = Air Force Base

Notes:

a. Does not include retirees.

b. Source: (Dyess AFB, 2021a)

c. Based on number of contractors associated with B-1 mission.

d. Numbers of spouses and children were calculated assuming 1.2 dependents per military, civilian, and contractor personnel and that 53.8 percent of personnel are married with the remaining dependents being children.

e. Totals may not sum perfectly due to rounding in the underlying calculations.

Airfield Operations

Table 2.2-2 presents the number of air operations that would occur under the No Action Alternative at Dyess AFB.

Table 2.2-2. No Action Alternative at Dyess AFB – Annual Airfield Operations

Aircraft Type	Airfield Operations
B-1	8,866
C-130J	36,400
Transient Aircraft	2,874
Total	48,140

Key: AFB = Air Force Base

Note: Operation counts are based on pilot estimates for fiscal year 2021. Transient aircraft at Dyess AFB include A-10A, B-747-100, C-12, C130P, C-17, C-21A, F-15A, F-16A, F-18E/F, GASEPV, KC-10A, KC-135, T-1, T-38A, T-41, T-44, and UH-1N.

Airspace and Range Utilization

Airspace and range utilization for the No Action Alternative at Dyess AFB would continue to include the Powder River Training Complex, the NTTR, and the UTTR for supersonic training activities, as well as additional training in the airspace above the Brownwood MOA, Lancer MOA, and the Pecos MOA and their associated ATCAAs.

Facilities

No new construction would be associated with the No Action Alternative at Dyess AFB. However, there would be annually planned demolition, construction, and maintenance activities, which is reflected in the applicable reasonably foreseeable actions and environmental trends sections in Chapter 3 (Affected Environment and Environmental Consequences).

2.2.2 No Action Alternative at Whiteman AFB

Personnel

Table 2.2-3 lists the total number of active military, civilian, and contractor personnel and dependents associated with the No Action Alternative at Whiteman AFB as 19,408 persons, which includes 10,586 dependents. Since the actual numbers of children and spouses are not provided in the Economic Impact Report for Whiteman AFB (Whiteman AFB, 2021a), this EIS first assumes there are 1.2 dependents for each personnel (Section 2.1.1, Personnel) then extrapolates these numbers from the total number of dependents by assuming that 53.8 percent of the active military, civilian, and contractor personnel are married. The remaining number of total dependents are counted as children.

Personnel supporting current B-2 operations at Whiteman AFB are also presented in Table 2.2-3. The ratios of spouses and children to active military and civilian personnel were calculated and used to estimate the number of dependents specifically associated with B-2 mission personnel. Under the No Action Alternative, personnel associated with the B-2 mission would stay at Whiteman AFB and these numbers are already incorporated in the total number of personnel.

Table 2.2-3. No Action Alternative at Whiteman AFB – Personnel

Personnel	Total Number of Individuals ^(a)	Number of B-2 Mission Individuals
Active Military ^(b)	6,490	1,773
Civilian	2,098	79
Contractor	234 ^(c)	234
Spouses ^(d)	4,746	1,122
Children ^(d)	5,840	1,381
Total	19,408	4,589

Key: AFB = Air Force Base

Note:

a. Source: (Whiteman AFB, 2021a)

b. Includes Reserve/Air and Army National Guard.

c. Based on number of contractors associated with B-2 mission.

d. Numbers of spouses and children were calculated assuming 1.2 dependents per military, civilian, and contractor personnel and that 53.8 percent of personnel are married with the remaining dependents being children.

Airfield Operations

Table 2.2-4 presents the number of airfield operations that would occur under the No Action Alternative at Whiteman AFB.

Table 2.2-4. No Action Alternative at Whiteman AFB – Annual Airfield Operations

Aircraft Type	Airfield Operations
B-2	4,860
T-38	14,712
A-10	7,425

Table 2.2-4. No Action Alternative at Whiteman AFB – Annual Airfield Operations

Aircraft Type	Airfield Operations
H-60	1,404
Transient	1,370
Total	29,771

Key: AFB = Air Force Base

Note: Operation counts are based on projected fiscal year 2021 annual sorties. Transient aircraft at Whiteman AFB include F-16, GASEPV, C-21, F-18, DC-9, C-12, T-38, DC-10, C-130, C-17, KC-135, and H-64.

Airspace and Range Utilization

Airspace and range utilization for the No Action Alternative at Whiteman AFB would continue to include NTTR, Smoky Hill Range (Smoky MOA, Bison MOA and R-3601A/B), Ozark MOA, UTTR, Ada East/West, Lindbergh MOA and Truman MOA, including all associated ATCAAs.

Facilities

No new construction would be associated with the No Action Alternative at Whiteman AFB. However, there would be annually planned demolition, construction, and maintenance activities, which is reflected in the applicable reasonably foreseeable actions and environmental trends sections in Chapter 3 (Affected Environment and Environmental Consequences).

2.3 DYESS AFB ALTERNATIVE

2.3.1 Background

Dyess AFB is located in Taylor County in west central Texas within the incorporated limits of the city of Abilene (Figure 2.3-1). The installation encompasses approximately 5,424 acres of land and hosts three runways (Dyess AFB, 2017). Runway 16/34 is a north-south runway that is 13,500 feet long and 300 feet wide. Runways 163/343 and 164/344 (C-130 landing zones) located west of Runway 16/34 are 3,500 feet long and 60 feet wide.

At Dyess AFB, the 7th Bomb Wing (7 BW) of the AFGSC is the host unit and is responsible for providing combat-ready B-1 aircraft, crews, and associated combat support for global engagement taskings. The 7 BW is one of only two B-1 bomb wings assigned to the 8th Air Force under the AFGSC. The B-1 and the C-130J Super Hercules are the only aircraft stationed at Dyess AFB. The primary tenants at Dyess AFB include the 489th Bomb Group, the 317th Airlift Wing, the 436th Training Squadron, the 77th Weapons Squadron, the 337th Test and Evaluations Squadron, and the Armed Forces Reserves Center.

The Dyess AFB Alternative would establish MOB 2 at Dyess AFB, which includes personnel (Section 2.3.2), airfield operations (Section 2.3.3), airspace and range utilization (Section 2.3.4), plus the construction of the facilities, infrastructure, and the

WGF as described, respectively, in Section 2.3.5 (Facilities and Infrastructure) and Section 2.3.6 (Weapons Generation Facility) below.

2.3.2 Personnel

There are 4,292 individuals associated with the B-1 mission at Dyess AFB. The Dyess AFB Alternative incorporates the transition, or snapshot scenario, and eventual departure of B-1 personnel from Dyess AFB, which is referred to as the “end-state.” As shown in Table 2.3-1, under this alternative, there would be an end-state increase of approximately 1,318 individuals at Dyess AFB compared to the No Action Alternative.

Table 2.3-1. Personnel Associated With the Incoming B-21 Mission, Snapshot Scenario, and End-State Personnel at Dyess AFB

Personnel	No Action Alternative Individuals ^(a)	Departing B-1 Mission Individuals	B-21 Mission Individuals	Snapshot Analysis ^(d)			End-State Personnel ^(e)	End-State Change Over No Action
				10% Departing Individuals	B-21 + 10% Departing Individuals	Total Snapshot		
Active Military	4,606	1,855	2,550	186	2,736	5,487	5,301	695
Civilian ^(b)	736	46	NA	5	5	695	690	-46
Contractor	50	50	NA	5	5	5	0	-50
Spouses ^(c)	2,901	1,050	1,372	105	1,477	3,328	3,223	322
Children ^(c)	3,570	1,292	1,688	129	1,818	4,095	3,966	397
Total ^(f)	11,862	4,292	5,610	429	6,040	13,609	13,180	1,318 (11%)

Key: % = percent; + = plus; NA = not available

Notes:

a. Source: (Dyess AFB, 2021a)

b. Includes appropriated and non-appropriated fund civilians and private businesses.

c. Numbers of spouses and children were based on statistics in the 2020 Demographics Profile of the Military Community (DoD, 2020) that 53.8 percent of the Air Force is married and there are 1.2 dependents for each active-duty Air Force member. These demographics were extended to civilians and contractors. Therefore, the number of spouses was calculated by multiplying the total number of personnel (active military + civilian + contractor) by 53.8 percent. The number of children were calculated by multiplying the total number of personnel (active military + civilian + contractor) by 1.2 to determine the total number of dependents, then subtracting the number of spouses.

d. Snapshot analysis considers overlap between B-21 and B-1 transition at Dyess AFB. Assumes all B-21 personnel and 10 percent of B-1 personnel are present on the base at the same time along with temporary contractor support. Snapshot personnel number = Baseline population – B-1 personnel + B-21 personnel + 10 percent B-1 personnel + temporary contractor support.

e. End-state personnel was calculated by removing the personnel associated with the B-1 mission at Dyess AFB from the No Action Alternative baseline personnel numbers and then adding the personnel associated with the B-21 mission.

f. Totals may not sum perfectly due to rounding in the underlying calculations.

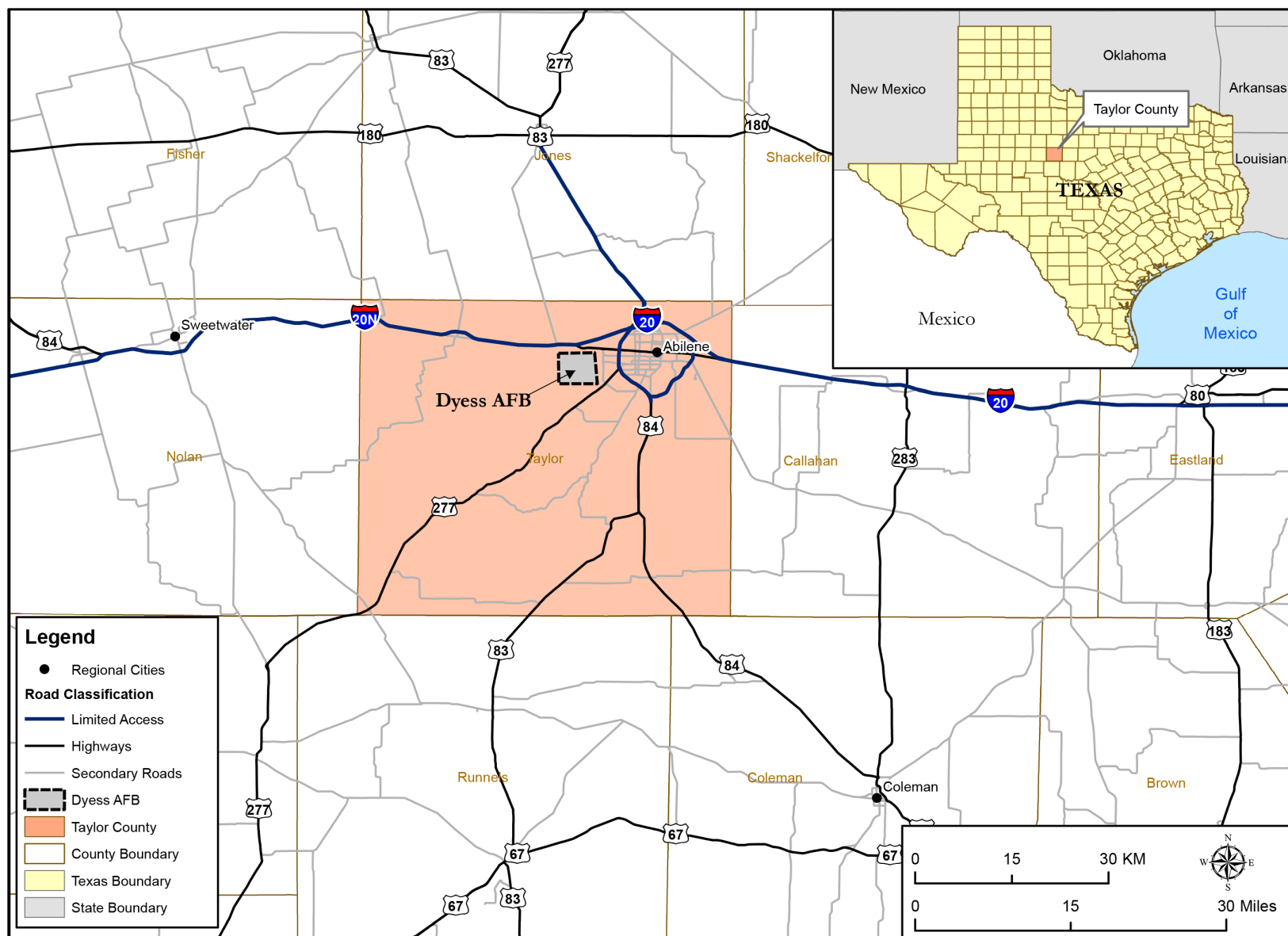


Figure 2.3-1. Dyess AFB Location

2.3.3 Airfield Operations

Table 2.3-2 provides the number of airfield operations that would occur at Dyess AFB under the Dyess AFB Alternative, as well as under the snapshot scenario. There would be a decrease of 2,026 and 253 airfield operations at the end-state and during the snapshot scenario, respectively, as compared to the No Action Alternative.

Table 2.3-2. Annual Airfield Operations at Dyess AFB With Snapshot Scenario

Location	No Action Alternative ^(a)	Proposed Action ^(b)	Proposed Action Change from No Action Alternative	Snapshot ^(c)	Snapshot Change from No Action Alternative
Dyess AFB Airfield	48,140	46,114	-2,026	47,887	-253

Notes:

- Current flight operations data provided and validated by Dyess AFB B-21 Site Activation Task Force (SATAF) personnel.
- The Proposed Action flight operations represent the end-state operations removing the B-1 operations and adding B-21 operations maintaining existing operations for other Primary Assigned Aircraft and transient aircraft.
- The snapshot flight operations represent a transitional condition in which approximately 20 percent of current B-1 operations would potentially occur simultaneous with proposed B-21 operations maintaining existing operations for other Primary Assigned Aircraft and transient aircraft.

2.3.4 Airspace and Range Utilization

For military aircraft flying out of Dyess AFB, the Lancer MOA, Lancer Bridge MOA, Bronco MOA (3 and 4), the Pecos MOA, and all associated ATCAAs, including the Willie-Roscoe ATCAA, are the most cost-effective and convenient training areas to use. Dyess AFB-based aircraft would also utilize the Brownwood MOA as supplemental training airspace. The range and airspace boundaries associated with the Dyess AFB Alternative are shown in Figure 2.3-2. Table 2.3-3 presents the number of airspace operations proposed for each airspace unit under the Dyess AFB Alternative, including the snapshot and changes from the No Action Alternative.

Table 2.3-3. Airspace and Range Utilization Operations With Snapshot Scenario for Dyess AFB Alternative

Airspace	No Action Alternative ^(a)	Proposed Action ^(b)	Proposed Action Change from No Action Alternative	Snapshot ^(c)	Snapshot Change from No Action Alternative
Bronco MOA	535	494	-41	504	-31
Willie-Roscoe ATCAA	689	231	-458	325	-364
Brownwood MOA	3,095	2,454	-641	2,461	-634
Lancer MOA	3,690	1,470	-2,220	1,680	-2,010
Lancer Bridge MOA	277	167	-110	219	-58
Pecos MOA	554	445	-109	556	2

Key: AFB = Air Force Base; ATCAA = Air Traffic Control Assigned Airspace; MOA = Military Operating Area

Notes:

- Current flight operations data provided and validated by Dyess AFB B-21 Site Activation Task Force personnel.
- The Proposed Action flight operations represent the end-state operations removing the B-1 operations and adding B-21 operations maintaining existing operations for other Primary Assigned Aircraft and transient aircraft.
- The snapshot flight operations represent a transitional condition in which approximately 20 percent of current B-1 operations would potentially occur simultaneous with proposed B-21 operations maintaining existing operations for other Primary Assigned Aircraft and transient aircraft.

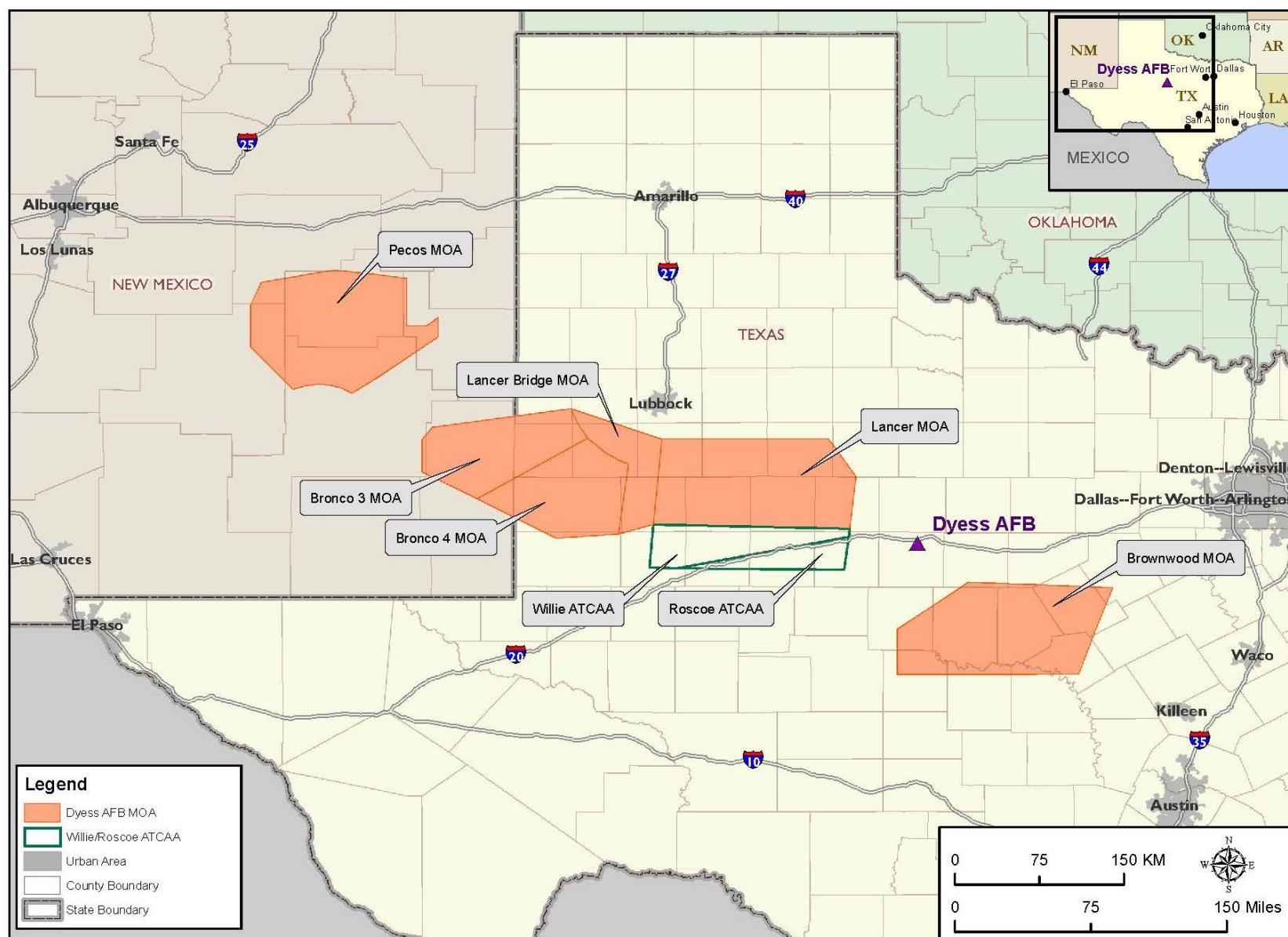


Figure 2.3-2. Dyess AFB Alternative Range and Airspace Boundaries

2.3.5 Facilities and Infrastructure

Using the planning processes described in Section 2.1.4 (Proposed Action, Facilities and Infrastructure), DAF planners at Dyess AFB developed two possible Courses of Action (COAs)¹ for the B-21 beddown at Dyess AFB, the North COA and the South COA. The general construction footprints for each of these COAs are shown in Figure 2.3-3.

There are some overlapping footprints in Figure 2.3-3 where proposed facility and infrastructure projects are the same for both COAs. Originally, the facilities and infrastructure projects included in the South COA would primarily occur along the southern end of the parking apron, whereas the North COA projects would be located primarily along the entire length of the parking apron. After reviewing each of the COAs, DAF planners chose to blend the two COAs and develop a hybrid COA that consolidates all facilities and infrastructure projects needed to support the B-21 beddown. This configuration provides an efficient solution for establishing the necessary infrastructure and facilities required to support MOB 2 operational functions.

The facilities and infrastructure projects associated with the hybrid COA are shown in Table 2.3-4 and would be constructed to establish the B-21 MOB 2 at Dyess AFB.

Table 2.3-4. Facilities and Infrastructure for the Dyess AFB Alternative

Facility	Size (Square Feet)	Building Type
Logistics Readiness Squadron Fuels Admin/Lab	7,089	New
Covered Refueler Parking and Apron Access	133,855	New
Low-Observable Hangar (2-Bay)	95,691	New
New Low-Observable Hangar Apron	16,829	New
Hangar Apron Maintenance	168,855	Repair (on Existing Pavement)
Simulator Facility	35,000	New
Radio Frequency/Measurements Hangar	57,532	New
Field Training Detachment	55,884	New
Mission Planning Facility	47,117	New
Fuel Cell/Wash Rack (2-Bay)	69,552	New
National Airborne Operations Center Support	5,625	New
Weapons Loader Training (2-Bay)	56,268	Renovation (Bldg. 4230)
Weapons Loader Training (2-Bay)	60,000	New
B-21 Aerospace Ground Equipment	32,297	New
Phase Dock/General Maintenance Hangar	128,492	Renovation (Bldg. 5020)
B-21 Armaments Storage – on Flightline	5,000	New
B-21 Armaments Storage – off Flightline	45,000	Renovation (Bldg. 9112)
B-21 Squad Operations/Aircraft Maintenance Unit	120,000	New
Alternate Fuel Cell	23,053	Renovation (Bldg. 4315)
B-21 Aircraft Parts Store	40,000	New (on Existing Pavement)
Environmental Shelters (28)	21,200 x 28 = 593,600	New (on Existing Pavement)
77th Weapons Squadron/337th Test and Evaluation Squadron	34,592	Renovation (Bldg. 6030)

¹ The phrase “Course of Action” (COA) is a term that is used by military planners and decision makers to refer to a broad potential solution to an identified problem (U.S. Army, 2015).

Table 2.3-4. Facilities and Infrastructure for the Dyess AFB Alternative

Facility	Size (Square Feet)	Building Type
Base Operations/Passenger Terminal	11,795	Renovation (Bldg. 5225)
Alert Facility	40,000	New (on Existing Pavement)
Alert Apron/Ramp and Road	1,224,036	New
Logistics Readiness Squadron Cargo Pad [Uncovered Open Storage]	63,000	New
Aerospace Ground Equipment Yard [Covered and Uncovered Storage]	60,000	New
Conventional Maintenance	18,200	New
B-21 Supply Warehouse Support	25,000	Renovation (Bldg. 7004)
Base Supply Store	10,000	Renovation (Bldg. 7008)
Fall Protection	23,288	Renovation (Bldg. 5105)
Bldg. 4101	3,000	Demolition and Relocation
Bldg. 4111	7,089	Demolition
Bldg. 4112	5,792	Demolition
Bldg. 4119	3,382	Demolition
Bldg. 4160	1,358	Demolition
Bldg. 4217	15,875	Demolition
Bldg. 4218	11,372	Demolition
Bldg. 4317	7,854	Demolition
Bldg. 9001	11,795	Demolition
Existing Pavement Demolition	250,000 ft ³	Demolition
New Pavement	1,364,708	New
Flightline Fence Demolition/Construction	7,160/ 8,400 linear ft	Demolition/New
BOS – Dorm (estimated 144-Person Occupancy)	83,757	New
BOS – Child Development Center	8,000	Addition (Bldg. 8150)
BOS – Youth Center	8,387	Addition (Bldg. 11902)
BOS – Fitness Center	33,500	Addition (Bldg. 7104)
BOS – Dining Facility	4,000	Addition (Bldg. 6132)

Key: Bldg. = Building; BOS = Base Operating Support; ft = feet; ft³ = cubic feet

Note:

a. The National Airborne Operations Center Support facility is not part of the B-21 program but is a connected action as a result of displacement due to the beddown of the B-21.

Due to operational security concerns, the specific locations of the facilities included in Table 2.3-4 cannot be illustrated. However, DAF planners evaluated land use limitations and identified the general planned area of construction, or construction footprint, shown in Figure 2.3-4. The resulting Dyess AFB COA shown in Figure 2.3-4 incorporates the footprints shown in Figure 2.3-3 plus other potential areas of construction identified in subsequent planning meetings, which also includes a construction access road and fence, contractor lay down areas, and batch plants (if needed). One potential batch plant might be located outside of the installation; however, this would be temporary and would not involve any land acquisition. Construction associated with each of these facilities and infrastructure projects would allow initial operational flying associated with the B-21 Operations Squadrons, WIC, and OT&E.



Figure 2.3-3. Dyess AFB Courses of Action Evaluated for MOB 2

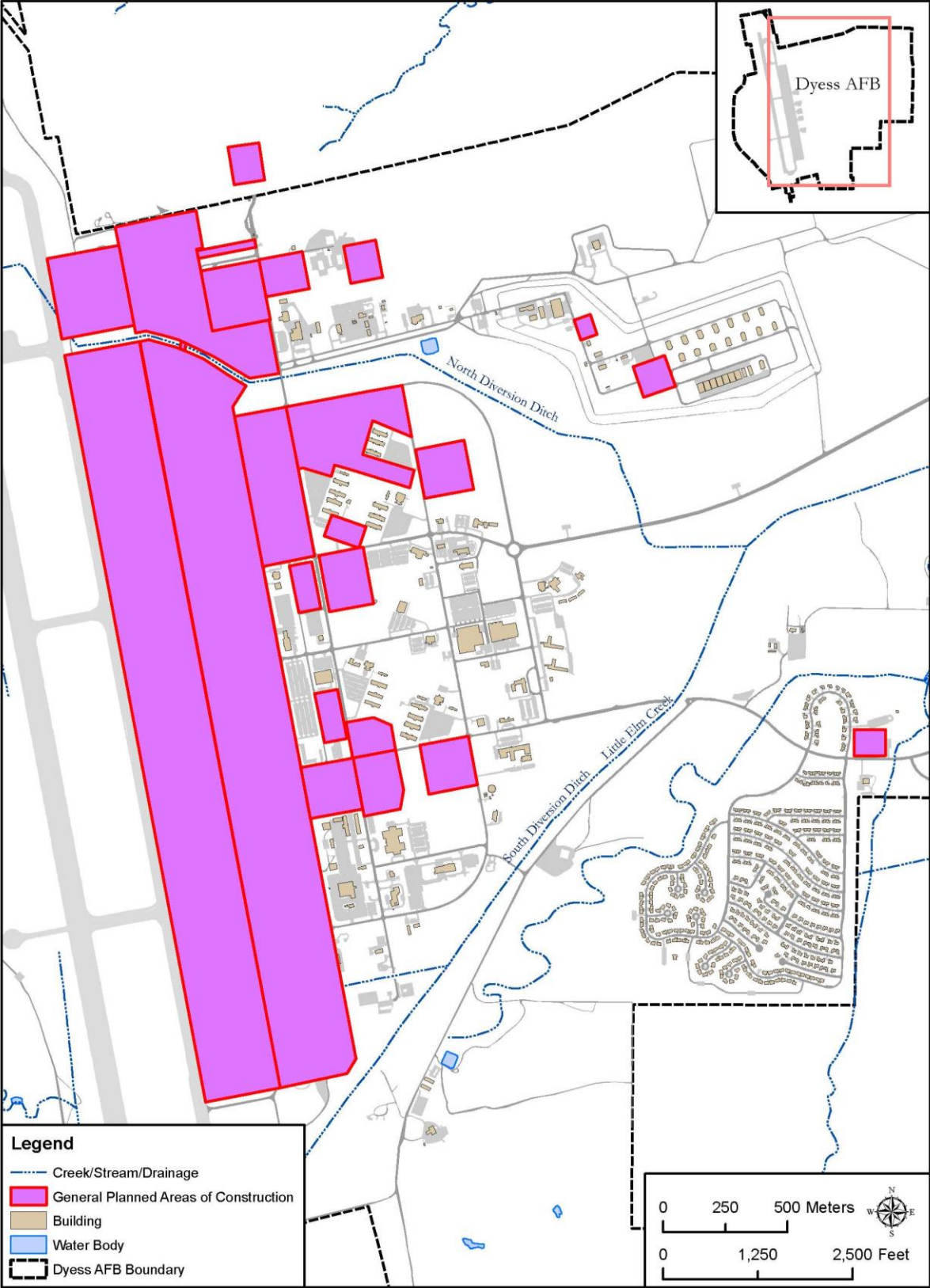


Figure 2.3-4. Facilities and Infrastructure Planned Areas of Construction – Dyess AFB Alternative

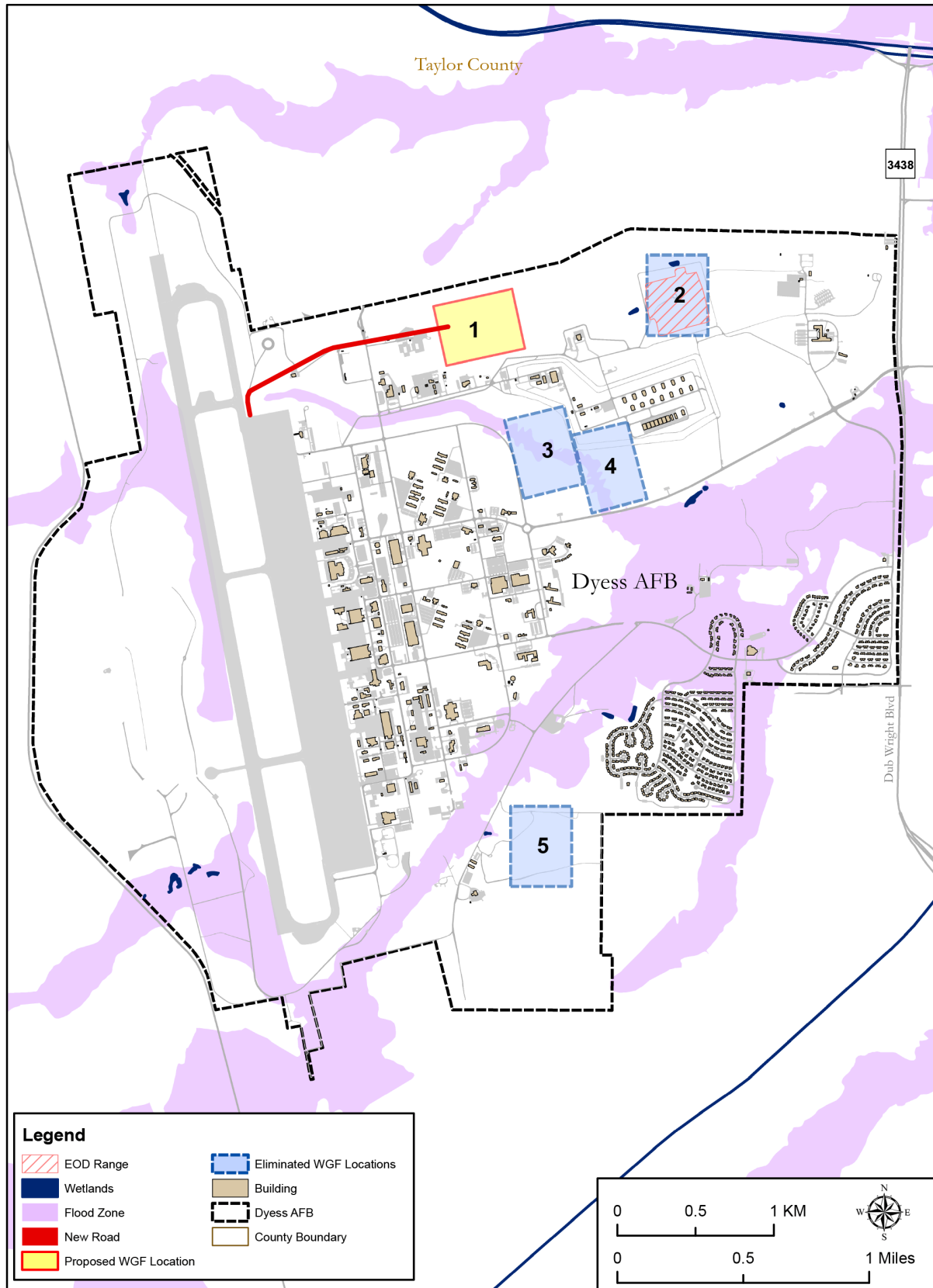


Figure 2.3-5. WGF Planned Areas of Construction – Dyess AFB Alternative

2.3.6 Weapons Generation Facility

In the MOB 1 EIS, DAF planners identified five locations at Dyess AFB as possible sites for the WGF (see the MOB 1 EIS's Figure 2.4-4). Four of those locations were eliminated due to the presence of one or more negative site evaluation criteria discussed in the MOB 1 EIS's Section 2.2.1 (Screening Criteria Process for MOB 1). As shown in Figure 2.3-5 on the previous page, Location 2 was eliminated because it occurs at an existing Explosive Ordnance Disposal (EOD) range where the presence of unexploded ordnance is possible, which would require closure studies and necessitate construction of a new range at an undisturbed site. Locations 3 and 4 were eliminated because flood zones run across both sites. Location 5 was eliminated based on a combination of operational readiness concerns, including nearness to the airfield. Location 1 satisfied all evaluation criteria and was carried forward for evaluation in the MOB 1 EIS. This location is also being carried forward in this EIS for MOB 2. In addition to the infrastructure for the WGF described in Section 2.1.5 (Weapons Generation Facility), a new road (136,097 square feet) would also be constructed, connecting the WGF to the airfield (Figure 2.3-5).

2.4 WHITEMAN AFB ALTERNATIVE (PREFERRED ALTERNATIVE)

2.4.1 Background

Whiteman AFB covers approximately 5,520 acres in Johnson County in west-central Missouri, approximately 2 miles south of the city of Knob Noster and 70 miles southeast of Kansas City, Missouri (Figure 2.4-1). Runway 01/19 is a north-south runway that is 12,400 feet long and 200 feet wide.

The 509th Bomb Wing (509 BW) of the AFGSC is the host unit at Whiteman AFB. As the host unit, the mission of the 509 BW is to develop and sustain the world's best stealth war fighting capability and develop and maintain the highest level of readiness to support worldwide contingency operation. The 509 BW flies the B-2 stealth bomber and T-38 Talon trainer at Whiteman AFB.

The primary tenants at Whiteman AFB include the Air Force Reserve Command 442nd Fighter Wing (442 FW), the 1-135th Attack Reconnaissance Battalion (1-135 ARB) of the Missouri Army National Guard, the 131st Bomb Wing of the Missouri Air National Guard, the 72nd Test and Evaluation Squadron, the 325th Weapons Squadron, the DAF Office of Special Investigations, and the 20th Attack Squadron Remote Split Operations. The 442 FW operates 24 A-10 Thunderbolt II aircraft and the 1-135 ARB flies UH-60L Blackhawk helicopters at Whiteman AFB.

The Whiteman AFB Alternative would establish MOB 2 at Whiteman AFB, which includes personnel (Section 2.4.2), airfield operations (Section 2.4.3), airspace and range utilization (Section 2.4.4), plus the construction of the facilities, infrastructure, and the WGF as described, respectively, in Section 2.4.5 (Facilities and Infrastructure) and Section 2.4.6 (Weapons Generation Facility) below. Two subalternatives are associated with the Whiteman AFB Alternative, as described in Section 2.4.6.1 (North WGF Site

Subalternative at Whiteman AFB) and Section 2.4.6.2 (South WGF Site Subalternative at Whiteman AFB).

2.4.2 Personnel

There are 4,589 individuals associated with the B-2 mission at Whiteman AFB. The Whiteman AFB Alternative incorporates the transition, or snapshot scenario, and eventual departure of B-2 personnel from Whiteman AFB, which is referred to as the “end-state.” As shown in Table 2.4-1, under this alternative, there would be an end-state increase of approximately 1,021 individuals at Whiteman AFB compared to the No Action Alternative.

Table 2.4-1. Personnel Associated With the Incoming B-21 Mission, Snapshot Scenario, and End-State Personnel at Whiteman AFB

Personnel	No Action Alternative Individuals ^(a)	Departing B-2 Mission Individuals	B-21 Mission Individuals	Snapshot Analysis ^(d)			End-State Personnel ^(e)	End-State Change Over No Action
				10% Departing Individuals	B-21 + 10% Departing Individuals	Total Snapshot		
Active Military	6,490	1,773	2,550	177	2,727	7,444	7,267	777
Civilian ^(b)	2,098	79	NA	8	8	2,027	2,019	-79
Contractor	234	234	NA	23	23	23	0	-234
Spouses ^(c)	4,746	1,122	1,372	112	1,484	5,108	4,996	250
Children ^(c)	5,840	1,381	1,688	138	1,826	6,285	6,147	307
Total ^(f)	19,408	4,589	5,610	459	6,068	20,888	20,429	1,021 (5%)

Key: % = percent; + = plus; NA = not available

Notes:

a. Source: (Whiteman AFB, 2021a)

b. Includes appropriated and non-appropriated fund civilians and private businesses.

c. Numbers of spouses and children were based on statistics in the 2020 Demographics Profile of the Military Community (DoD, 2020) that 53.8 percent of the Air Force is married and there are 1.2 dependents for each active-duty Air Force member. These demographics were extended to civilians and contractors. Therefore, the number of spouses was calculated by multiplying the total number of personnel (active military + civilian + contractor) by 53.8 percent. The number of children were calculated by multiplying the total number of personnel (active military + civilian + contractor) by 1.2 to determine the total number of dependents, then subtracting the number of spouses.

d. Snapshot analysis considers overlap between B-21 and B-2 transition at Whiteman AFB. Assumes all B-21 personnel and 10 percent of B-2 personnel are present on the base at the same time along with temporary contractor support. Snapshot personnel number = Baseline population – B-2 personnel + B-21 personnel + 10 percent B-2 personnel + temporary contractor support.

e. End-state personnel was calculated by removing the personnel associated with the B-2 mission at Whiteman AFB from the No Action Alternative baseline personnel numbers and then adding the personnel associated with the B-21 mission.

f. Totals may not sum perfectly due to rounding in the underlying calculations.

2.4.3 Airfield Operations

Table 2.4-2 provides the number of airfield operations that would occur at Whiteman AFB under the Whiteman AFB Alternative, as well as under the snapshot scenario. There would be an increase of 1,980 and 2,952 airfield operations at the end-state and during the snapshot scenario, respectively, as compared to the No Action Alternative.

Table 2.4-2. Annual Airfield Operations at Whiteman AFB With Snapshot Scenario

Location	No Action Alternative ^(a)	Proposed Action ^(b)	Proposed Action Change from No Action Alternative	Snapshot ^(c)	Snapshot Change from No Action Alternative
Whiteman AFB Airfield	29,771	31,751	1,980	32,723	2,952

Key: AFB = Air Force Base

Notes:

- a. Current flight operations data provided and validated by Whiteman AFB B-21 Site Activation Task Force personnel.
- b. The Proposed Action flight operations represent the end-state operations removing the B-2 operations and adding B-21 operations maintaining existing operations for other Primary Assigned Aircraft and transient aircraft.
- c. The snapshot flight operations represent a transitional condition in which approximately 20 percent of current B-2 operations would potentially occur simultaneous with proposed B-21 operations maintaining existing operations for other Primary Assigned Aircraft and transient aircraft.

2.4.4 Airspace and Range Utilization

For any military aircraft flying out of Whiteman AFB, the DAF would utilize the Smoky Hill Range (Smoky MOA, Bison MOA and R-3601A/B), Cannon MOA (A and B), and Ada MOA (East and West), including all associated ATCAAs, as well as the Ozark ATCAA (A, B, and C). Whiteman AFB-based aircraft would utilize Lindbergh MOA (A, B, and C) and Truman MOA (A, B, and C) as supplemental training airspaces. The range and airspace boundaries associated with the Whiteman AFB Alternative are shown in Figure 2.4-2. Table 2.4-3 presents the number of airspace operations proposed for each airspace unit under the Whiteman AFB Alternative, including the snapshot and changes from the No Action Alternative.

Table 2.4-3. Airspace and Range Utilization Operations With Snapshot Scenario for Whiteman AFB Alternative

Airspace	No Action Alternative ^(a)	Proposed Action ^(b)	Proposed Action Change from No Action Alternative	Snapshot ^(c)	Snapshot Change from No Action Alternative
Ozark A, B, C ATCAA	252	252	0	302	50
Smoky Hill Range	1,973	1,973	0	2,002	29
Ada East/West MOA	73	73	0	80	7
Cannon MOA A, B	1,377	1,377	0	1,377	0
Truman A, B, C MOA	18,925	18,925	0	18,927	2
Lindbergh A, B, C MOA	268	268	0	269	1

Key: AFB = Air Force Base; ATCAA = Air Traffic Control Assigned Airspace; MOA = Military Operating Area

Notes:

- a. Current flight operations data provided and validated by Whiteman AFB B-21 Site Activation Task Force personnel.
- b. The Proposed Action flight operations represent the end-state operations removing the B-2 operations and adding B-21 operations maintaining existing operations for other Primary Assigned Aircraft and transient aircraft.
- c. The snapshot flight operations represent a transitional condition in which approximately 20 percent of current B-2 operations would potentially occur simultaneous with proposed B-21 operations maintaining existing operations for other Primary Assigned Aircraft and transient aircraft.

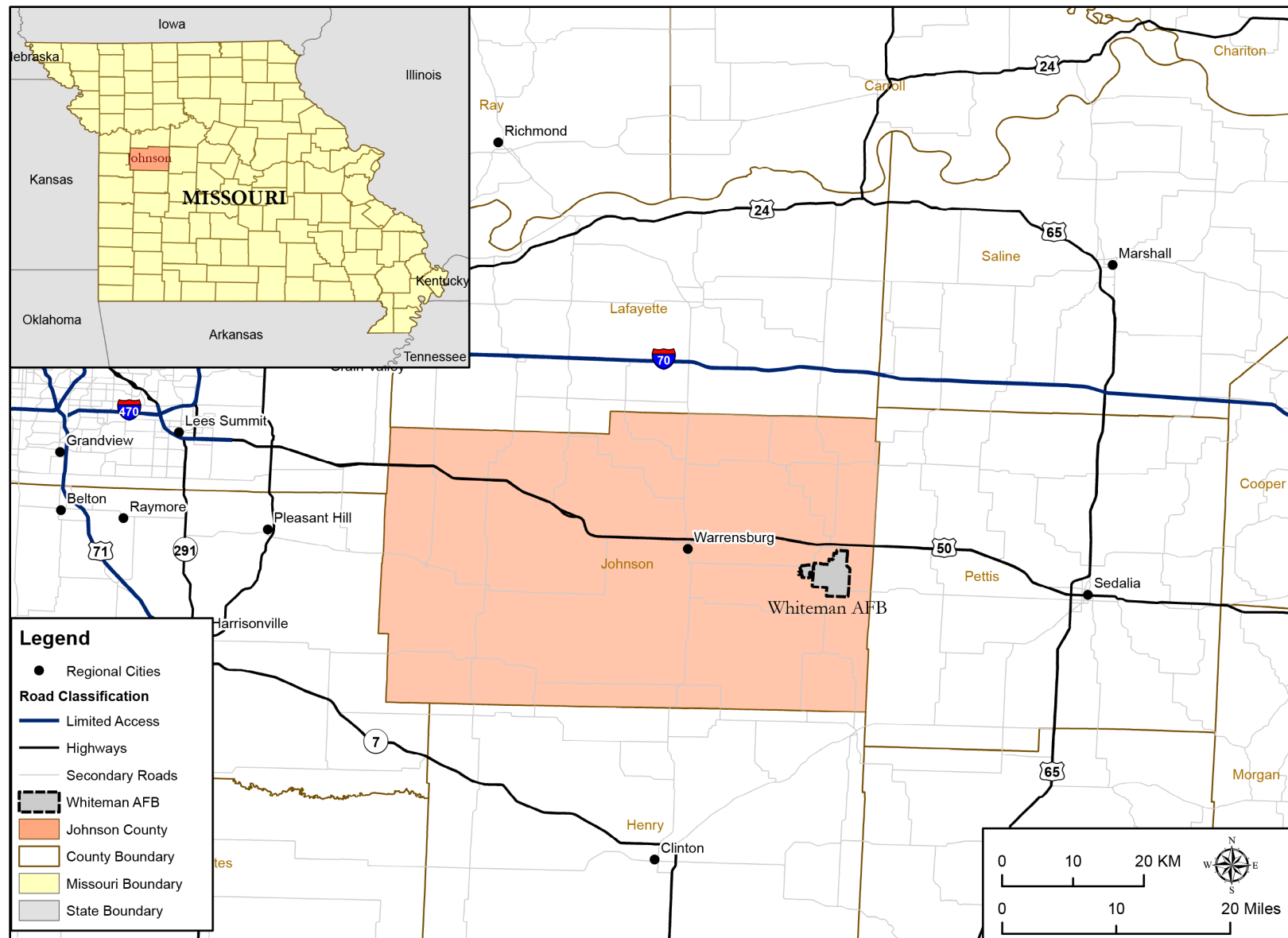


Figure 2.4-1. Whiteman AFB Location

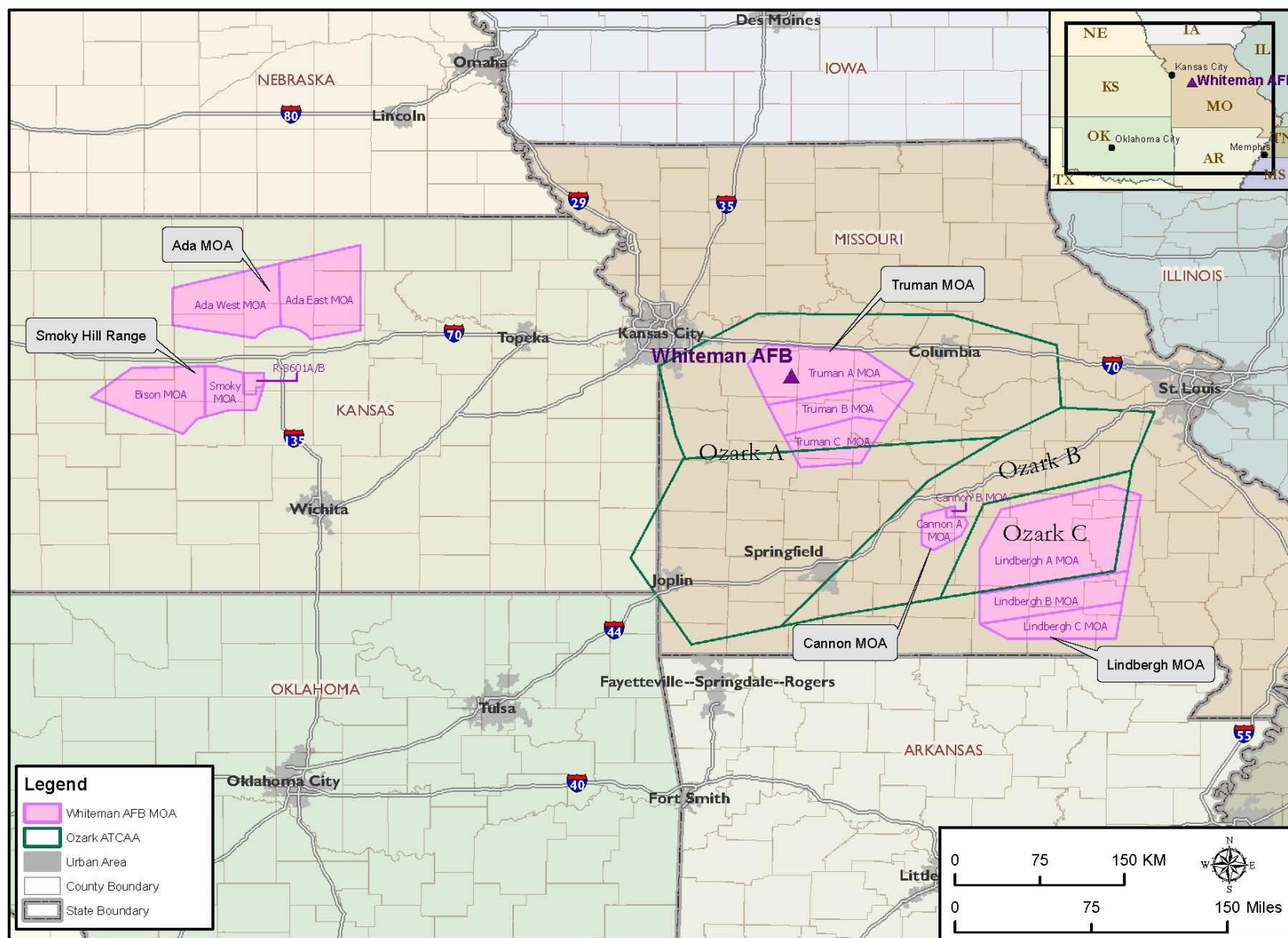


Figure 2.4-2. Whiteman AFB Alternative Range and Airspace Boundaries

2.4.5 Facilities and Infrastructure

Using the planning processes described in Section 2.1.4 (Proposed Action, Facilities and Infrastructure), DAF planners at Whiteman AFB considered alternative locations for several facilities associated with the B-21 beddown, including the Radio Frequency (RF) Hangar, Weapons Release & Suspension Shop (WRSS), Environmental Protection Shelters (EPSs), and Weapons Load Trainer (WLT). One alternative siting location for the RF, WRSS, and EPSs was the area south of Dock 14; however, this location was eliminated due to insufficient standoff distance from the taxiway to the RF Hangar, difficulty in achieving access to the WRSS at that location, and the high expense associated with the new pavement that would be required to establish the EPSs there.

Another possible siting location for the RF Hangar, WRSS, and EPSs was considered to the east of Docks 1 and 2; however, this area presented the same constraints as the area south of Dock 14, as well as detrimental impacts to generation capabilities in the docks. For the second WLT, alternative siting locations included Docks 13 or 14, Hangars 52 or 4, new construction near the Low-Observable Hangar, or new construction at the current fire station location. These locations were removed from consideration due to the resulting loss of B-2/B-21 maintenance and parking availability (Docks 13/14) and a capable/flexible aircraft maintenance hangar (Hangar 52); the advanced age and declining condition of Hangar 4; an infeasible distance between the two WLTs in the case of possible new construction near the Low-Observable Hangar; and an expected lack of new fire station military construction funding for new construction at the current fire station location. Other considerations included siting facilities on the north ramp, but this option was eliminated due to the costs required to replace apron pavements and extend utilities up to the site.

As a result of these constraints, only one COA was developed and carried forward for Whiteman AFB, as the airfield layout is ideal for B-21 and there is some space to allow for concurrent B-21 and B-2 operations. Although some unknowns are associated with the timing of renovation activities and the draw-up and draw-down of the B-21 and B-2 missions, impacts to either mission are not anticipated because there is enough capacity to run concurrent operations. The facilities and infrastructure projects associated with the Whiteman AFB COA would occur primarily along the north end of the main apron (Figure 2.4-3). Implementation of the Whiteman AFB COA would maximize the reuse of existing infrastructure; however, existing infrastructure would need renovation.

Due to the siting requirements of the facilities and infrastructure associated with the COA the A-10 engine wash will be relocated to the south end of the ramp in the vicinity of the T-38/A-10 shelters. The new A-10 engine wash area would consist of one designated parking spot with drain inlets able to flow to the existing sanitary sewer, when necessary, and may also serve as a deicing area. This is a connected action due to B-21 facility siting requirements.

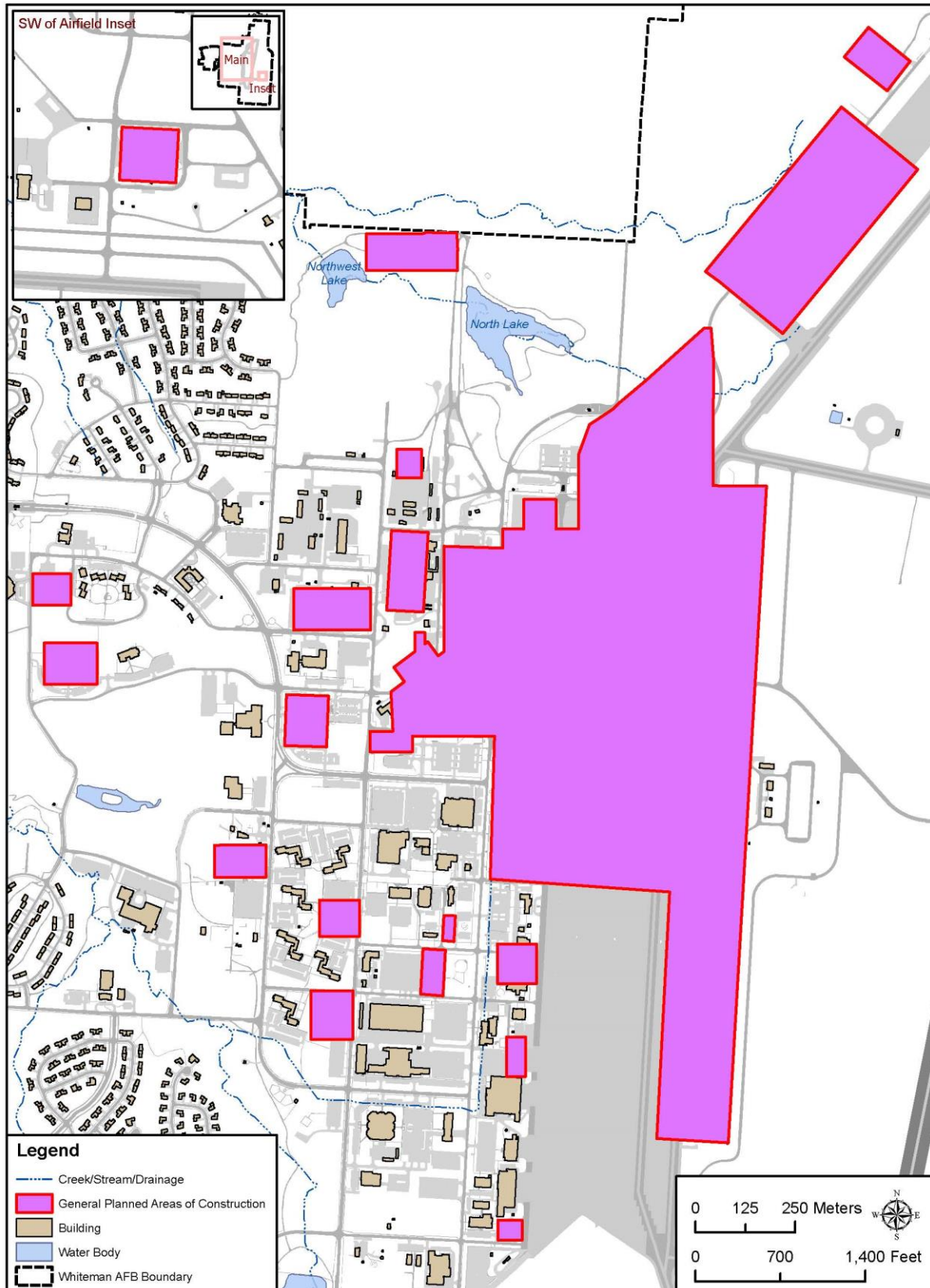


Figure 2.4-3. Facilities and Infrastructure Planned Areas of Construction – Whiteman AFB Alternative

The facilities and infrastructure projects associated with the Whiteman AFB COA listed in Table 2.4-4 would be implemented to establish the B-21 MOB 2 at Whiteman AFB. Like the Dyess AFB Alternative, due to operational security concerns, the exact locations of the facilities included in Table 2.4-4 cannot be illustrated. However, Figure 2.4-3 shows where DAF planners evaluated land use limitations and identified a general planned area of construction, or construction footprint, and includes contractor lay down areas and batch plants (if needed). Implementing the Whiteman AFB COA would allow initial operational flying associated with the B-21 Operations Squadrons, WIC, and OT&E.

Table 2.4-4. Facilities and Infrastructure for the Whiteman AFB Alternative

Facility	Size (square feet)	Building Type
Field Training Detachment	34,399/20,000	Renovation/Addition (Bldg. 152)
Field Training Detachment Parking Area	47,916	New
Radio Frequency Hangar	57,532	New
Armament Shop (WRSS)	7,500/17,000	Renovation/Addition (Bldg. 5208)
Weapons Load Trainer (2-Bay)	60,225	New
Hangar 4	29,225	Demolition
Cockpit Procedure Trainer	29,383 5,000	Demolition (Bldg. 706) New
Chadwell Cockpit Procedure Trainer	5,000	New
Special Access Program Space	38,209	Renovation (Bldg. 509)
Simulator Facility (Phase 1)	92,511	Renovation (Bldg. 153)
Simulator Facility (Phase 2)	92,511	Renovation (Bldg. 153)
Low-Observable Hangar (2-Bay)	81,776	Renovation (Bldgs. 5205/5206)
Low-Observable Equipment Facility	8,000	New
Snow Removal Areas	100,000	New
Base Supply Warehouse	106,588	Renovation (Bldg. 139)
Aircraft Maintenance Unit Composite Tool Kit	37,258	Renovation (Bldg. 14)
Phase Dock (2-Bay)	148,407	Renovation (Bldg. 9)
General Maintenance Hangars (14)	26,500 x 14 = 371,000	Renovation (Docks 1–14)
Aircraft Maintenance Units 1 & 2	40,617	Renovation (Bldg. 33)
Wash Rack Hangar	31,837	Renovation (Bldg. 27)
Aircraft Parts Store	16,965	Renovation (Bldg. 26)
Fuel Cell Hangar	30,474	Renovation (Bldg. 1)
Operations Overflow	33,147	Renovation (Bldg. 200)
Environmental Shelters (11)	21,400 x 11 = 235,400	New (on Existing Pavement)
Roads/Road Access	91,191	New
Bldg. 43	26,393	Demolition
Petroleum, Oil, and Lubricant Operations	4,183/1,687	Renovation/Addition (Bldg. 90)
Petroleum, Oil, and Lubricant Parking	4,500	Addition
Storage/Maintenance	24,742	Renovation (Hangar 52)
Hazardous Materials Pharmacy	8,683/4,000	Renovation/Addition (Bldg. 114)
Maintenance Facility	39,917	Renovation (Bldg. 7)
Propulsion Shop	24,084	Renovation (Bldg. 2)
Mobility Warehouse	23,732	Renovation (Bldg. 115)
Combined Operations Building	79,190	Renovation (Bldg. 38)
Low-Observable Supply Building	2,770	Renovation (Bldg. 5214)
Intermediate Maintenance Facility	68,941	Renovation (Bldg. 4055)
Aircrew Flight Equipment	5,203	Renovation (Bldg. 32)
Engine Test Cell	4,479	Renovation (Bldg. 5203)

Table 2.4-4. Facilities and Infrastructure for the Whiteman AFB Alternative

Facility	Size (square feet)	Building Type
BOS – Dorm (144-Person Occupancy; 3 Stories)	119,985	New
BOS – Child Development Center	8,000	Addition
BOS – Youth Center	8,387	Addition
BOS – Fitness Center	33,500	Addition
BOS – Dining Facility	4,000	Addition

Key: Bldg. = Building; BOS = Base Operating Support; WRSS = Weapons Release & Suspension Shop

2.4.6 Weapons Generation Facility

DAF planners identified five possible locations at Whiteman AFB for the WGF (see Figure 2.4-4). After applying the planning process (see Section 2.1.4, Proposed Action, Facilities and Infrastructure), DAF planners eliminated three locations. Location 1 was eliminated because of impacts to current missions, including limiting potential future capabilities of the 442 FW weapons storage area, security related issues, and weapons safety concerns. Location 4 was eliminated due to site constraints that would limit potential future capabilities of the weapons storage area, in addition to impacts to current missions. Location 5 was eliminated due to site constraints associated with airfield criteria and proximity to existing infrastructure. Additionally, Site 5 would interfere with navigational aids, create access issues for the existing docks, and would require access to the airfield to get to the WGF. Therefore, Locations 2 and 3 were selected as proposed locations because they satisfied the site evaluation criteria unique to the WGF. Location 2 is hereafter referred to as the North WGF Site and Location 3 is the South WGF Site.

2.4.6.1 North WGF Site Subalternative at Whiteman AFB (Preferred Subalternative)

The North WGF Site Subalternative would require the construction of two access roads (one for munitions transport and one for privately owned vehicles [POVs]), consisting of approximately 177,196 square feet, and the relocation of the existing EOD range. The construction footprint for the North WGF Site, associated roads, and relocation of facilities are identified in Figure 2.4-5. The North WGF Site (Figure 2.4-5) would be located to the east of the center of the runway, which would facilitate operational readiness requirements for the B-21 mission.

2.4.6.2 South WGF Site Subalternative at Whiteman AFB

The South WGF Site Subalternative consists of constructing the WGF at a location to the east of the south end of the runway (Figure 2.4-6). Implementation of the South WGF Site would also require the construction of up to three access roads (for munitions transport and for POVs), consisting of approximately 50,885 square feet of new roadway. One roadway would require construction over an existing ERP site. Like the North WGF Site, this location meets operational readiness requirements for the B-21 mission. The construction footprint for the South WGF Site and associated roads are identified in Figure 2.4-6.

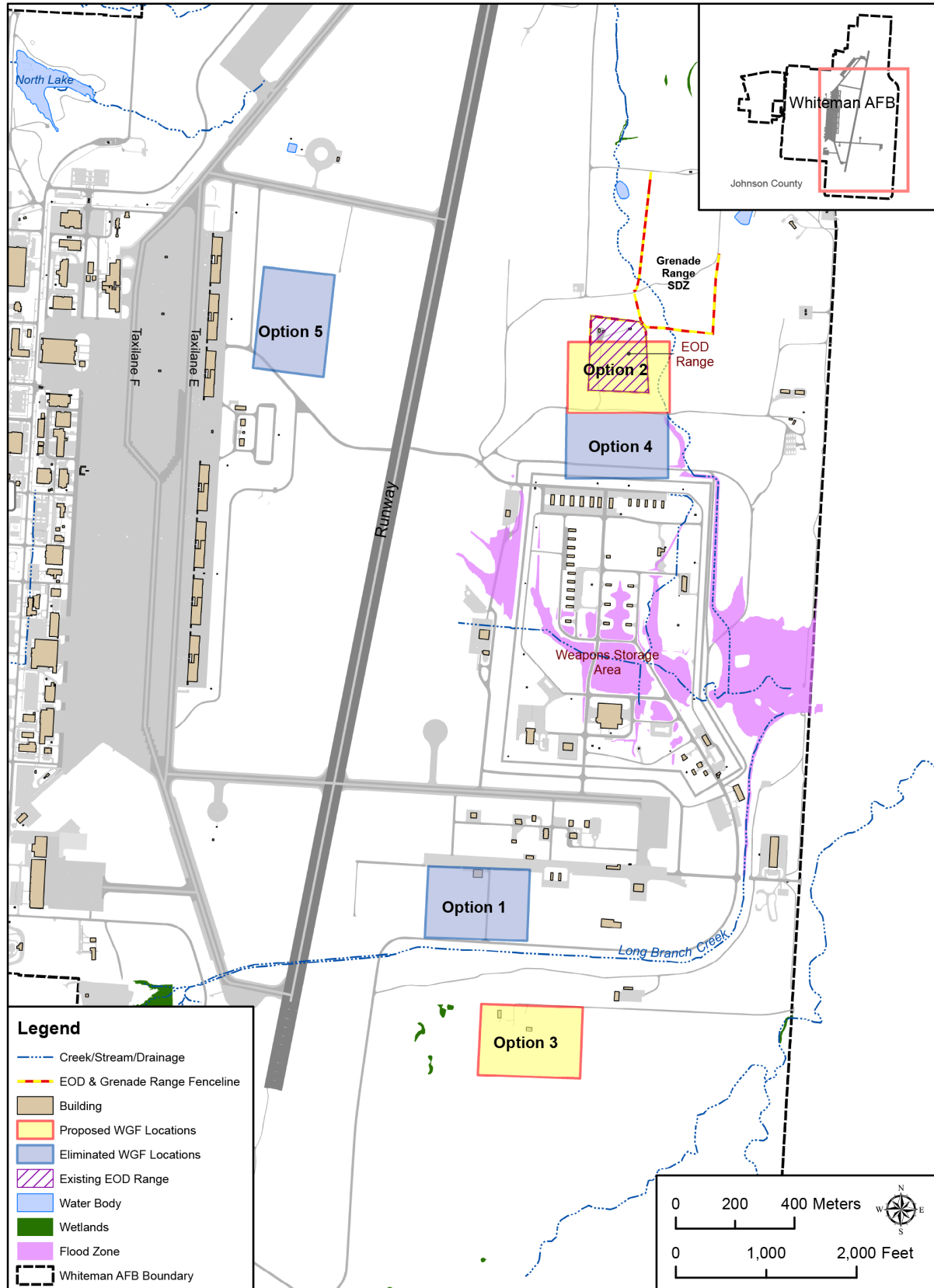


Figure 2.4-4. WGF Proposed Locations – Whiteman AFB Alternative

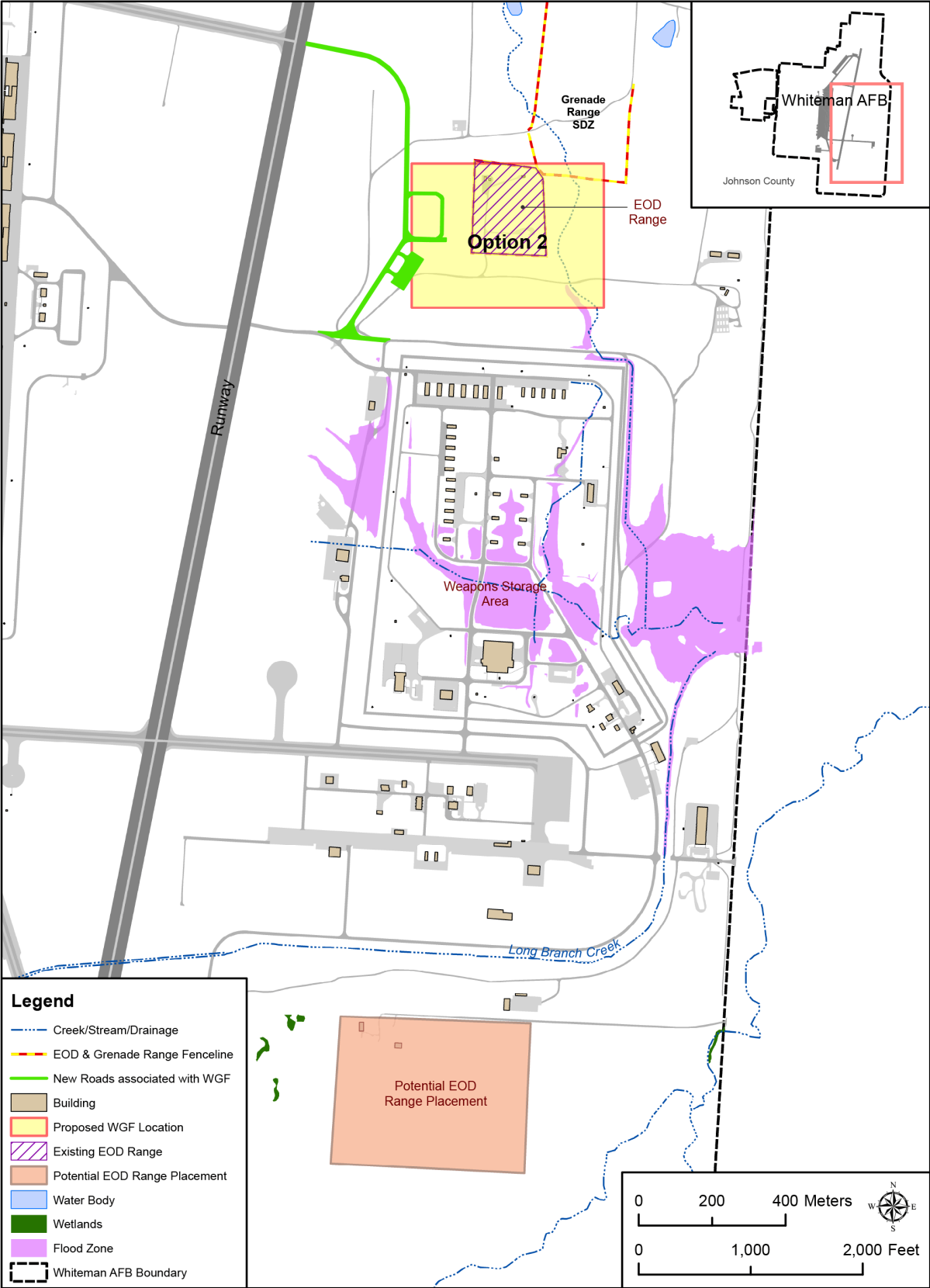


Figure 2.4-5. North WGF Site Planned Areas of Construction – Whiteman AFB

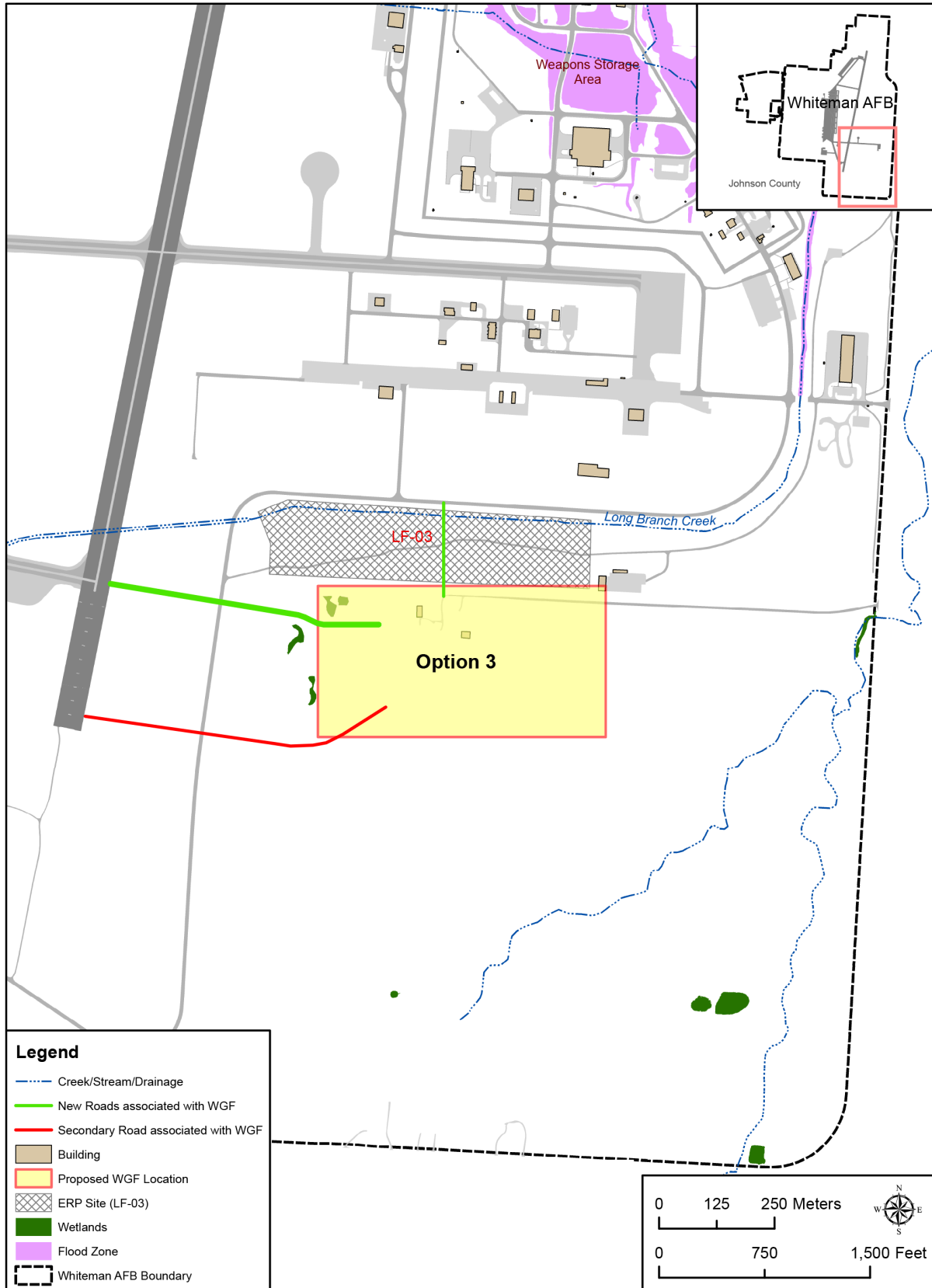


Figure 2.4-6. South WGF Site Planned Areas of Construction – Whiteman AFB

2.5 MITIGATION

Resource-specific mitigation measures have been proposed and may be implemented in conjunction with the final decision which will be identified in the ROD. Chapter 3 (Affected Environment and Environmental Consequences) includes and analyzes mitigation measures for impacts identified or required by regulation or agency guidance for each affected resource.

2.5.1 Mitigation Measures

The mitigations discussed in an EIS cover a range of issues. Generally, mitigations may be applied in the development of the Proposed Action or alternatives (i.e., mitigation by avoidance) or applied during the impact analysis. Mitigation measures may also be considered for impacts that, by themselves, would not be considered “adverse.” The Proposed Action is considered as a whole to address specific effects on the environment (regardless of the level of the impacts), and mitigations are developed where it is feasible to do so.

CEQ regulations (at 40 CFR 1508.1(s)) define mitigation in the following five ways:

1. **Avoiding** the impact altogether by not taking a certain action or parts of an action
2. **Minimizing** impacts by limiting the degree or magnitude of the action, and its implementation
3. **Rectifying** the impact by repairing, rehabilitating, or restoring the affected environment
4. **Reducing or eliminating** the impact over time by preservation and maintenance operations during the life of the action
5. **Compensating** for the impact by replacing or providing substitute resources or environments

The DAF is responsible for monitoring the predictions (e.g., impact, mitigations) made in its completed NEPA documentation (40 CFR 1505.3, 1505.2(a)(3)). If substantial changes are recognized that are relevant to environmental concerns or that bear on a proposed action or its impacts, the DAF would reevaluate for potential impacts related to those changes. A mitigation plan will be developed in accordance with 32 CFR 989.22(d) to address specific mitigations selected in the ROD.

NEPA imposes a continuing duty to supplement (40 CFR 1502.9(d)) existing NEPA documents when substantial changes are made that are relevant to environmental concerns or in response to the identification of “significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts” (40 CFR 1502.9(d)(1)(ii)).

2.5.2 Proposed Resource-Specific Mitigations to Reduce the Potential for Environmental Impacts

Table 2.5-1 identifies proposed measures to reduce the potential for environmental impacts. The table presents the measures by resource area and alternative.

Table 2.5-1. Proposed Resource-Specific Mitigations to Reduce the Potential for Environmental Impacts

Resource Area	Dyess AFB Alternative	Whiteman AFB Alternative
Noise	No mitigations would be necessary. <ul style="list-style-type: none"> However, the DAF is responsible for monitoring the predictions (e.g., impact, mitigations) made in its completed NEPA documentation (40 CFR 1505.3, 1505.2(a)(3)). <ul style="list-style-type: none"> If substantial changes are recognized that are relevant to environmental concerns or that bear on a proposed action or its impacts, the DAF would reevaluate for potential impacts related to those changes. This would include monitoring noise and public noise complaints and developing potential mitigation measures that could be implemented based on DAF monitoring. 	
Socioeconomics	To minimize additional pressure on socioeconomic resources (i.e., affordable housing, educational resources, and public services), the DAF would: <ul style="list-style-type: none"> Work with the local community to assist in any way practicable with the planning for the increased population and increased requirements for support. 	
Biological Resources	For migratory birds: <ul style="list-style-type: none"> Avoid tree and shrub removal during the migratory bird nesting season (March through August). Conduct site-specific surveys for the state-listed threatened Texas horned lizard prior to any proposed habitat disturbance activity. For Texas horned lizard: <ul style="list-style-type: none"> Prior to implementation of the Proposed Action, update the Dyess AFB Environmental Management System to identify areas of potential Texas horned lizard habitat. Coordinate species surveys to be conducted by a permitted biologist. If Texas horned lizards are found on any project site, the DAF would contact TPWD to develop relocation plans. 	For federally listed bat species: <ul style="list-style-type: none"> Avoid tree clearing during the bat maternity and active season (April 1 through October 31). For migratory birds: <ul style="list-style-type: none"> Avoid tree clearing during the migratory bird nesting season (March through August).
Physical Resources	Reduce construction-related impacts on soil and surface water quality through:	Reduce construction-related impacts on soil and surface water quality through:

Table 2.5-1. Proposed Resource-Specific Mitigations to Reduce the Potential for Environmental Impacts

Resource Area	Dyess AFB Alternative	Whiteman AFB Alternative
	<ul style="list-style-type: none"> • Obtaining coverage under the TCEQ construction general permit for construction projects greater than 1 acre and adhering to permit requirements including development of site-specific SWPPPs describing BMPs for erosion and sediment control during construction activities and construction support activities (e.g., borrow pits, staging areas, and material storage areas). • Implementing erosion and sediment control measures, such as minimization of earth-moving activities during wet weather/conditions, covering soil stockpiles, installation of silt fencing and sediment traps, and revegetation of disturbed areas with native plants (using the correct seed mix identified by the local NRCS office) as soon as possible to contain and prevent off-site migration of sediment or eroded soils from the project areas. • Ensuring that NPDES requirements are followed during construction projects and coordinating with TCEQ as needed. • Designing site drainage around the new facilities to manage the anticipated increased runoff from the increased impervious surface through properly sized stormwater conveyance structures. • Incorporating stormwater management features such as porous pavements and infiltration basins that treat, store, and infiltrate runoff on site before it can affect downstream water bodies. • Utilizing erosion controls and engineering planning to reduce the potential for the new road crossing of North Diversion Ditch to cause siltation, sedimentation, and hydrologic changes to the stream. 	<ul style="list-style-type: none"> • Obtaining an MDNR construction land disturbance permit for construction projects greater than 1 acre and adhering to permit requirements including development of site-specific SWPPPs describing BMPs for erosion and sediment control during construction activities and construction support activities (e.g., borrow pits, staging areas, and material storage areas). • Implementing erosion and sediment control measures, especially in areas with steep slopes such as in the vicinity of North Lake and Northwest Lake, including revegetation of disturbed areas with native plants using the correct seed mix identified by the local NRCS office. • Ensuring that NPDES requirements are followed during construction projects and coordinating with MDNR as needed. • Selecting facility locations within the North WGF Site to avoid direct impacts to the tributary of Long Branch Creek and avoid construction within the small freeboard floodplain area or designed to minimize impacts on the floodplain. • Designing the roadway to access the South WGF Site to avoid impacts to Long Branch Creek to the greatest extent possible. <ul style="list-style-type: none"> ○ If the roadway design requires construction within the stream, then USACE would likely require compensatory mitigation measures to be implemented. ○ The need for and nature of specific mitigation measures would be determined, in consultation with USACE, when road design specifications are developed. • Designing site drainage around the new facilities to manage the anticipated increased runoff from the increased impervious surface through properly sized stormwater conveyance structures. • Incorporating stormwater management features such as porous pavements and infiltration basins that treat,

Table 2.5-1. Proposed Resource-Specific Mitigations to Reduce the Potential for Environmental Impacts

Resource Area	Dyess AFB Alternative	Whiteman AFB Alternative
		<p>store, and infiltrate runoff on site before it can affect downstream water bodies.</p> <ul style="list-style-type: none"> Utilizing erosion controls and engineering planning to reduce the potential for the new road crossing of Long Branch Creek to cause siltation, sedimentation, and hydrologic changes to the stream. Placing facilities and structures where military operations would involve handling of hazardous chemicals or fueling operations where spill control structures serve as physical barriers that could prevent releases from flowing into streams.
Hazardous Materials and Hazardous and Solid Wastes	<p>There is a potential that construction sites could be impacted by PFOS/PFOA or other contaminants (e.g., fuels, solvents).</p> <ul style="list-style-type: none"> If construction would require soil removal/disposal, then characterization and disposal would be conducted in accordance with DAF policy and guidance. Contaminated soils may be addressed on site or disposed of in an appropriate landfill. 	<p>There is a potential that construction sites could be impacted by PFOS/PFOA or other contaminants (e.g., fuels, solvents).</p> <ul style="list-style-type: none"> If construction would require soil removal/disposal, then characterization and disposal would be conducted in accordance with DAF policy and guidance. Contaminated soils may be addressed on site or disposed of in an appropriate landfill. Closure of the existing EOD Range under the North WGF Alternative would require EOD clearance and potential mitigative actions such as hazardous material disposal or contaminated soil removal.
Transportation	<p>To reduce the effects of commercial traffic on transportation operations and LOS on and near the base during construction, demolition, and renovation activities consider:</p> <ul style="list-style-type: none"> Scheduling commercial deliveries outside peak traffic hours. Requiring all construction crews to use the commercial gate. <p>To eliminate the potential for construction, demolition, and renovation activities, as well as operation of new roadways, to negatively affect emergency services on the base:</p> <ul style="list-style-type: none"> Include measures during project planning to ensure proper emergency response ability is 	<p>To reduce the effects on LOS, both on-base and off-base, that could potentially result from relocation and construction activities:</p> <ul style="list-style-type: none"> Identify measures to decrease on-base and off-base traffic congestion and queuing during relocation of Arnold Gate and construction of associated components. <p>To reduce the effects of commercial traffic on transportation operations and LOS on and near the base during construction, demolition, and renovation activities consider:</p> <ul style="list-style-type: none"> Scheduling commercial deliveries outside peak traffic hours. Requiring all construction crews to use the commercial gate.

Table 2.5-1. Proposed Resource-Specific Mitigations to Reduce the Potential for Environmental Impacts

Resource Area	Dyess AFB Alternative	Whiteman AFB Alternative
	maintained during construction activities and after project completion.	<p>To eliminate the potential for construction, demolition, and renovation activities, as well as operation of new roadways, to negatively affect emergency services on the base:</p> <ul style="list-style-type: none"> • Include measures during project planning to ensure proper emergency response ability is maintained during construction activities and after project completion.

Key: AFB = Air Force Base; BMP = best management practice; CFR = Code of Federal Regulations; DAF = Department of the Air Force; EOD = Explosive Ordnance Disposal; LOS = level of service; MDNR = Missouri Department of Natural Resources; NEPA = National Environmental Policy; NPDES = National Pollutant Discharge Elimination System; NRCS = U.S. Department of Agriculture Natural Resource Conservation Service; PFOA = perfluorooctanoic acid; PFOS = perfluorooctane sulfonate; SWPPP = Storm Water Pollution Prevention Plan; TCEQ = Texas Commission on Environmental Quality; TPWD = Texas Parks and Wildlife Department; USACE = U.S. Army Corps of Engineers; WGF = Weapons Generation Facility

2.5.3 Unavoidable Impacts

Certain B-21 activities are projected to result in disturbance and/or noise within areas not previously or recently subject to these effects. However, some impacts that cannot be mitigated would occur. Some of these impacts could be considered adverse or annoying to potentially affected individuals.

Potential impacts that could occur and cannot be mitigated include the following:

- The existing capacity of regional landfills would be reduced due to the solid waste generated.
- Hazardous and nonhazardous waste would be generated as a result of maintenance functions associated with B-21 operations.
- Individual biological species would be affected by construction activities and daily B-21 operations.

3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 INTRODUCTION

For each environmental resource analyzed in this EIS, Chapter 3 defines the resource, describes the region of influence (ROI) potentially affected by the Proposed Action, explains the analysis methodology, and presents the environmental consequences of the No Action Alternative and each action alternative.

The “Analysis Methodology” section for each resource area describes the approach taken to evaluate impacts and any assumptions made in the analysis for that resource. The analysis methodology for each resource primarily addresses the context of the environmental resource and the intensity of any potential consequence to the resource resulting from the Proposed Action per the requirements of 40 CFR 1508.27. For some environmental resources that use modeling and other calculations for quantitative analyses (e.g., air quality), supplemental technical information, data, and other background information relevant to the analyses are provided in appendices to this EIS.

As noted in Section 2.2 (Description of Proposed Action and Alternatives, No Action Alternative), the current mission levels and activities at each base as proposed for the No Action Alternative would contribute to baseline conditions for each potentially affected resource, except for land use, which is discussed in Section 3.5.1.3 (Land Use, Affected Environment, Analysis Methodology). The baseline analysis under the No Action Alternative also includes evaluation of potential impacts associated with other development and infrastructure improvement projects that would occur either on or in the vicinity of Dyess AFB and Whiteman AFB, as well in the proposed training airspace (Table 3.1-1). Projects included in this table are actions that have already occurred within the last five years or are expected to occur up to one year after the ROD signature date for this EIS. This table also lists the resource areas that are potentially affected by each project and therefore are incorporated into the respective No Action Alternative baseline analyses. Resource areas that are not affected by any of the projects listed in the table include, airspace and environmental justice; therefore, their respective baseline analyses only consider the relevant aspects of the No Action Alternative related to personnel, airfield operations, airspace and range utilization, and facilities. Overall, this EIS presents the No Action Alternative analysis before the action alternatives’ analysis, which allows the reader and decision makers to easily compare the consequences from the baseline conditions with consequences of the action alternatives.

Table 3.1-1. No Action Alternative Baseline Projects

Project	Description	Resources Potentially Affected
Relevant Past and Present Actions		
Dyess AFB		
Dyess AFB Water Main Replacement (Dyess AFB, 2018a; Downing, 2020)	A major water main replacement project has been completed to replace the original 1957 asbestos-cement pipe. Dyess AFB's water mains were replaced by a three-phase effort. A water tower renovation project has also been recently accomplished. These efforts will improve water use on the base.	Biological Resources Health and Safety Land Use Noise Physical Resources Socioeconomics
Dyess AFB Electrical Distribution System Repair (Dyess AFB, 2020b; Ford et al., 2019)	There is a current project to repair the base electrical distribution system. Based on discussion with 7th CES personnel during the November 2019 site visit, plans include upgrading the Charlie substation to have a 4-MW capacity as part of the Energy Savings Performance Contract.	Biological Resources Health and Safety Land Use Noise Physical Resources Socioeconomics Transportation
Dyess AFB Dormitories (Downing, 2020)	The base has programmed a new dormitory (approximately 60,000 sf) for construction. Four more dormitories (approximately 113,000 sf) have been awarded and are under renovation. Several demolitions are planned (approximately 111,000 sf), with two buildings currently available to be demolished. Three buildings will be vacated with the Security Forces consolidation and one building with the Cyber Intel C2 facility project. This demolition will clear the area of administrative functions housed in former dining facilities associated with the dormitories, clearing the way for development of new dormitories should new missions require them.	Biological Resources Health and Safety Land Use Noise Physical Resources Socioeconomics Transportation
Wylie ISD Bond 2019 Program (Wylie ISD, 2019a; Wylie ISD, 2019b)	The purpose of the 2019 bond program is to accommodate the growing student population within the Wylie ISD. The bond proposal includes approximately \$211.9 million in renovations and additions to two high schools, three junior high schools, two intermediate schools, and seven elementary schools in the district. As of March 2020, structural foundation work had begun and continues at Wylie East High School, and work on additions and renovations to Bush Elementary, Cox Elementary, Watkins Elementary, and Harrison Intermediate are scheduled to begin once contract details have been completed.	Socioeconomics Transportation

Table 3.1-1. No Action Alternative Baseline Projects

Project	Description	Resources Potentially Affected
Dyess AFB Community Center Complex (Dyess AFB, 2018a; Downing, 2020)	Although most redevelopment of the family housing area has been completed, a new community center complex was recently completed by the private owner, Balfour Beatty Communities of Newtown Square, Pennsylvania. The existing community center building (including parking, green space, pavilions, tennis courts, etc.) encompasses 8 acres, with the facility itself being 5,830 sf in size. For the purpose of this analysis, it is assumed that the new proposed complex is to be approximately equivalent in size. The terms of the partnership are such that the private owner owns the houses outright (674 separate dwelling units at Dyess AFB) and leases the ground upon which the housing neighborhoods are situated. The land subject to the ground lease is described in Dyess AFB, Taylor County, Texas, ALTA/ACSM Land Title Survey, ACC III Housing Ground Survey. All the existing roads and streets within the housing area are maintained by the private owner (except for a section of Texas Street). The utilities (electrical, natural gas, wastewater, and water) are subject to maintenance based on the Points of Demarcation.	Biological Resources Health and Safety Land Use Noise Physical Resources Socioeconomics Transportation
Dyess AFB Security Forces Conversion	Renovation includes 25,981 sf to consolidate SFS administration, operations and armory. Demolition of five facilities will total 23,163 sf. This effort will provide space for an armory as required by UFC 4-215-01. Renovation details include replacement of lighting, plumbing piping, and the addition of restrooms. The existing fire alarm system will be removed in its entirety and replaced with a new fire alarm and mass notification system along with a new sprinkler system. Installation of an elevator and lobby addition will provide access to all three floors. A new parking lot will be provided to the south of the building outside the 82-foot standoff distance in accordance with AT/FP requirements of UFC-04-010-01 to accommodate 60 vehicles.	Biological Resources Health and Safety Land Use Noise Physical Resources Socioeconomics Transportation
Abilene ISD: ATEMS/CTE Center (Gersh, 2019; Abilene ISD News, 2019; Abilene ISD, 2022)	A new 124,000-sf facility, to be called “The LIFT,” was constructed to hold the ATEMS and CTE schools on Texas State Technical College Campus, off Loop 322, near Abilene Regional Airport. Construction took place during 2020–2021. This has been completed and was placed in service in the 2021–2022 school year.	Socioeconomics Transportation
Abilene ISD: New Dyess Elementary School (AISD, 2019; Jensen, 2019; McLean, 2020; Parkhill, 2021)	A new two-story elementary school (approximately 101,000 sf) was constructed on the existing Dyess Elementary School campus, which is located southeast of Dyess AFB, just outside the boundary. The current campus buildings, which total approximately 60,000 sf, were demolished.	Socioeconomics Transportation

Table 3.1-1. No Action Alternative Baseline Projects

Project	Description	Resources Potentially Affected
	Construction plans also included the relocation of a 16-inch water line in early 2020, with construction to follow. Anticipated completion date for construction was July 2021, with the new school scheduled to open in August 2021. This has been completed and was placed in service in the 2021–2022 school year.	
Air Force Reserve Command F-35A Operational Mission (DAF, 2020a)	The Air Force Reserve Command is proposing a beddown action that includes Joint Base Fort Worth. This action would include 24 F-35As with two backup inventory aircraft. The F-35A aircraft would replace the Air Force Reserve Command F-16 fighters and utilize Lancer and Brownwood MOAs for aircraft operations.	Airspace Biological Resources Health and Safety Noise
Whiteman AFB		
Whiteman AFB Modernization of LeMay Gate	Whiteman AFB is currently modernizing LeMay Gate, which includes relocating the entry gate farther south of Hwy 23, constructing a new POV check station, and connecting pavement areas. The project also includes demolition of the existing POV check station and entry gate.	Health and Safety Land Use Noise Physical Resources Socioeconomics Transportation
Whiteman AFB Maintenance Facility	A new maintenance facility is currently being constructed in the vicinity of the munitions storage area. The maintenance facility is approximately 17,000 sf.	Health and Safety Land Use Noise Physical Resources Socioeconomics Transportation
Whiteman AFB Combined Heat and Power Plant (Whiteman AFB, 2022a)	The 10 MW Combined Heat and Power Plant will encompass approximately 1.7 acres and will be located north of Steam Plant (Bldg 140) which is in close proximity to the existing main substation. The new plant will service the entire base.	Health and Safety Land Use Noise Physical Resources Socioeconomics Transportation
Whiteman AFB Airfield Pavement Repair (Whiteman AFB, 2022a)	Airfield pavement repair to B-2 hard stands 5 and 6 will encompass approximately 66,000 sf and is located west of Dock 5.	Health and Safety Land Use Noise Physical Resources Socioeconomics Transportation
Whiteman AFB Water Main Replacement (Whiteman AFB, 2022a)	The replacement of the cast iron water main includes approximately 9,000 linear feet of replacement and involves water mains crossing Arnold Ave into PL-2.	Health and Safety Land Use

Table 3.1-1. No Action Alternative Baseline Projects

Project	Description	Resources Potentially Affected
		Physical Resources Noise Socioeconomics Transportation
Whiteman AFB Vehicle Operations and Maintenance Facility (Whiteman AFB, 2022a)	The Consolidated Vehicle Ops and Maintenance Facility will encompass approximately 7.5 acres and is located north of Bldg 115 at the corner of Vandenburg and 2nd Street.	Health and Safety Land Use Noise Physical Resources Socioeconomics Transportation
Whiteman AFB Force Support Squadron Annex (Whiteman AFB, 2022a)	The Force Support Squadron Annex encompasses less than 1 acre and is located east of Main FSS Building (Bldg 3036).	Health and Safety Land Use Noise Physical Resources Socioeconomics Transportation
Whiteman AFB Flightline Fueling Facilities (Whiteman AFB, 2022a)	The construction of flightline fueling facilities will encompass approximately 0.7 acre and will be located south of Bldg 1139 and east of Bldg 1125.	Health and Safety Land Use Noise Physical Resources Socioeconomics
Whiteman AFB LO Chemical Storage Facility (Whiteman AFB, 2022a)	The construction of the LO Chemical Storage Facility will encompass approximately 0.5 acre and is located west of the LO Facility and south of Bldgs 5214 and 5215.	Health and Safety Land Use Noise Physical Resources Socioeconomics Transportation
Missouri DOT Spirit Blvd Turn Lane (Missouri DOT, 2022a)	The Missouri DOT is planning to construct a turn lane at the Whiteman AFB entrance at Spirit Boulevard to aid in safety and traffic flow. The proposed turn lane construction totals less than a quarter mile of roadway. The Missouri DOT expects an award date of 2023, and the construction is expected to begin in mid-2023 with an estimated duration of approximately one year.	Socioeconomics Transportation

Table 3.1-1. No Action Alternative Baseline Projects

Project	Description	Resources Potentially Affected
Missouri DOT Rte D Turn Lane (Missouri DOT, 2022a)	The Missouri DOT is planning to construct new turn lanes and shoulders at the intersection of Rte D south of the Whiteman AFB boundary to aid in safety and traffic flow. The proposed construction totals less than a quarter mile of roadway. The Missouri DOT expects an award date of 2023, and the construction is expected to begin in mid-2023 with an estimated duration of approximately one year.	Socioeconomics Transportation
Missouri DOT Drainage Repair (Missouri DOT, 2022a)	The Missouri DOT is planning to repair a drainage area on the westbound lane of NW US Hwy 50 approximately 0.7 mile east of Rte D and 1 mile west of Rte FF. The proposed construction totals approximately 0.10 mile of roadway on NW US Hwy 50. The Missouri DOT expects an award date of spring of 2022, and the construction is expected to begin in 2022.	Socioeconomics Transportation
Missouri DOT Bridge L0801 Reconstruction (Missouri DOT, 2022a)	The Missouri DOT is planning to rehab and reconstruct Bridge L0801 on NW US Hwy 50, located 1.2 miles east of Rte 23 and 0.5 mile west of Rte D. The proposed reconstruction totals approximately 0.08 mile. The Missouri DOT expects an award date of 2023, and the rehab and reconstruction is expected to begin in 2023.	Socioeconomics Transportation

Key: AFB = Air Force Base; ALTA/ACSM = American Land Title Association/American Congress of Surveying and Mapping; ATEMS/CTE = Academy of Technology, Engineering, Mathematics and Science/Career and Technical Education; AT/FP = antiterrorism/force protection; Bldg = Building; CES = Civil Engineering Squadron; DAF = Department of the Air Force; DOT = Department of Transportation; FSS = Force Support Squadron; Hwy = Highway; ISD = Independent School District; LO = Low-Observable; MOA = Military Operating Area; MSA = munitions storage area; MW = megawatt; NW = Northwest; Ops = Operations; POV = Privately Owned Vehicle; Rte = Route; sf = square feet; UFC = Unified Facilities Criteria

Each resource area also includes an analysis of reasonably foreseeable future actions and environmental trends as shown in Table 3.1-2. Projects included in this table are actions and trends that are expected to occur following one year after the ROD signature date for this EIS. This table also lists the resource areas that are potentially affected by each project and trend and therefore are incorporated into the respective environmental consequences analyses.

Table 3.1-2. Reasonably Foreseeable Future Actions and Environmental Trends

Project/Trend	Description	Resources Potentially Affected
Reasonably Foreseeable Future Actions		
Dyess AFB Alternative		
Dyess AFB Main Parking Apron Repair	Dyess AFB umbrella project to perform comprehensive repair of entire parking apron that is in a state of deterioration and at further risk due to new mission construction. There are four phases	Biological Resources Health and Safety Land Use Noise Physical Resources

Table 3.1-2. Reasonably Foreseeable Future Actions and Environmental Trends

Project/Trend	Description	Resources Potentially Affected
	proposed for this project. Total cost of all phases totals \$98 million.	Socioeconomics
Whiteman AFB Alternative		
Whiteman AFB Airfield Surface Drainage Corrections (Whiteman AFB, 2022a)	This project encompasses multiple areas in and around the existing airfield and includes re-grading of non-paved airfield surfaces to achieve proper stormwater runoff.	Biological Resources Health and Safety Land Use Noise Physical Resources Socioeconomics
Whiteman AFB Arnold Gate Relocation	The relocation of the Arnold Gate would include two new roads, a guardhouse, and relocation of the debarment parking lot and B-52 static display. Approximately 950 feet of fence line would be removed, and 390 feet of fence line would be constructed.	Biological Resources Health and Safety Land Use Noise Physical Resources Socioeconomics
Predictable Environmental Trends		
Climate change	<p>Dyess AFB – Climate Change</p> <p>Dyess AFB, Texas, is located within the Southern Great Plains regions of the United States, which encompasses Texas, Oklahoma, and Kansas. The U.S. Global Change Research Program estimates in the Fourth National Climate Assessment that annual average temperatures in the Southern Great Plains region will increase from 4.4 to 8.4 degrees Fahrenheit by the late 21st century compared to average conditions from 1976 to 2005. Predictions of long-term environmental impacts in the Southern Great Plains region that encompasses Texas include an increase in extreme high temperature events. By the late 21st century, if no reductions in emissions take place, the region is projected to experience an additional 30–60 days per year above 100°F than it does currently (U.S. Global Change Research Program, 2018).</p> <p>Climate conditions in the Southern Great Plains vary dramatically from the arid, high-elevation borders with the mountainous states of Colorado and New Mexico in the west, to the humid states of Missouri, Arkansas, and Louisiana in the Mississippi River valley in the east. Average annual precipitation ranges from less than 10 inches in the western reaches of the region to over 60 inches in the southeastern corner. Dyess is in the central portion of the region that experiences 20 to 30 inches of precipitation annually. Average annual precipitation projections suggest small changes in the region, with slightly wetter winters, particularly in the north of the region, and drier summers. However, the frequency and intensity of heavy</p>	Air Quality Biological Resources Noise

Table 3.1-2. Reasonably Foreseeable Future Actions and Environmental Trends

Project/Trend	Description	Resources Potentially Affected
	<p>precipitation is anticipated to continue to increase (U.S. Global Change Research Program, 2018).</p> <p><i>Whiteman AFB – Climate Change</i></p> <p>Whiteman AFB, Missouri is located in the Midwest region of the United States, which includes Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. The U.S. Global Change Research Program estimates in the Fourth National Climate Assessment that warm-season temperatures are projected to increase more in the Midwest than any other region of the United States. The frost-free season is projected to increase 10 days by early this century (2016–2045), 20 days by mid-century (2036–2065), and possibly a month by late century (2070–2099) compared to the period 1976–2005. Predictions of long-term environmental impacts in the Midwest region that encompasses Missouri includes an increase in extreme high-temperature events, an increase in humidity during the warm season, an increase in days with heavy precipitation and flooding, and an increase in ambient ozone concentrations advances (U.S. Global Change Research Program, 2018).</p> <p>Increases in humidity in spring through mid-century are expected to increase rainfall, which will increase the potential for soil erosion and further reduce planting-season workdays due to waterlogged soil. Current understanding of drought in the Midwest is that human activity has not been a major component in historical droughts, and it remains uncertain how droughts will behave in the future. However, projections show that Midwest surface soil moisture likely will transition from excessive levels in spring due to increased precipitation to insufficient levels in summer driven by higher temperatures, causing more moisture to be lost through evaporation.</p> <p>Increases in warm-season absolute humidity and precipitation have eroded soils, created favorable conditions for pests and pathogens, and degraded the quality of stored grain. Projected changes in precipitation, coupled with rising extreme temperatures before mid-century, will reduce Midwest agricultural productivity to levels of the 1980s without major technological advances (U.S. Global Change Research Program, 2018).</p>	
Population/demographic trends	<p>Aspect includes changes in population and demographics within the affected environment. Trends are detailed within Section 3.6</p>	Socioeconomics Environmental Justice

Table 3.1-2. Reasonably Foreseeable Future Actions and Environmental Trends

Project/Trend	Description	Resources Potentially Affected
	(Socioeconomics) and Section 3.7 (Environmental Justice and Children). These may be the direct result of other reasonably foreseeable future actions identified (such as roadway improvements and housing construction).	
Trends in property values	Aspect includes changes in property values within the affected environment. Trends are detailed in Section 3.6 (Socioeconomics).	Socioeconomics
Community development trends	Notwithstanding the reasonably foreseeable future actions identified above, this aspect accounts for the overall trend of community development as represented by a combination of identified projects and those that may occur in the future that are not captured in this document (e.g., projects that may arise over time).	Socioeconomics
Air emissions trends	Aspect includes changes in air emissions that could result in increase or reduction in criteria pollutant emissions within the affected environment. Trends are detailed in Section 3.4 (Air Quality).	Air Quality

Key: AFB = Air Force Base

Section 2.5.2 (Proposed Resource-Specific Mitigations to Reduce the Potential for Environmental Impacts) identifies potential mitigations that the proponent could implement to minimize or offset potential adverse impacts.

In the analysis of anticipated impacts, the DAF has done its best to accurately predict potential impacts and anticipate future conditions when data is unavailable and employ tools for the EIS analysis, including the “snapshot” scenario. As a new aircraft under development, B-21 data for noise, air quality, and safety analyses are currently incomplete or unavailable. The CEQ regulations implementing NEPA recognize that such a situation may occur. Agencies manage such situations in accordance with 40 CFR 1502.21, *Incomplete or Unavailable Information*. 40 CFR 1502.21 includes a provision for how to address incomplete or unavailable information within the context of how the DAF is handling incomplete/unavailable information for the B-21.

As indicated above, data for the B-21 aircraft that are necessary to model the aircraft’s noise, air quality, and safety impacts are currently unavailable. While the costs to obtain complete data for these purposes are not exorbitant, those data cannot be obtained at this time due to limitations on aircraft testing during its early developmental stage, the need for analyses during normal (versus developmental) flying conditions, and the time required to develop a flight safety record (40 CFR 1502.21I and 1502.21I(1)). The data and factors used in this analysis are presented in the body of this EIS for each alternative and further detailed in Appendix B (Air Quality Calculations) for air quality issues.

Some environmental resources would not be affected by overlapping B-1 or B-2 and B-21 operations. Only the resources that would be impacted by overlapping B-1 or B-2 and

B-21 operations present potential impacts for the “snapshot” scenario. Table 3.1-3 below indicates whether a given resource area section includes a “snapshot” analysis.

Table 3.1-3. Snapshot Analysis – Affected Resources

EIS Section	Resource Area	Snapshot Analysis Included	
		Personnel	Operations
Section 3.2	Airspace	No	Yes
Section 3.3	Noise	No	Yes
Section 3.4	Air Quality	Yes	Yes
Section 3.5	Land Use	No	No
Section 3.6	Socioeconomics	Yes	No
Section 3.7	Environmental Justice	No	Yes
Section 3.8	Biological Resources	No	No
Section 3.9	Cultural Resources	No	No
Section 3.10	Physical Resources	No	No
Section 3.11	Hazardous Materials and Hazardous and Solid Wastes	No	No
Section 3.12	Health and Safety	No	No
Section 3.13	Transportation	Yes	No
Section 3.14	Utilities and Infrastructure	Yes	No

3.2 AIRSPACE

3.2.1 Airspace, Affected Environment

3.2.1.1 Description of Resource

Special Use Airspace (SUA) are airspace units where military airborne activities must be confined because of their nature and/or where limitations may be imposed on aircraft operations that are not part of those activities. SUA have defined dimensions that are associated with an area on the surface of the earth. With the exception of Controlled Firing Areas, SUA are depicted on aeronautical charts. SUA include the following types of charted airspace: MOAs, Restricted Areas, Warning Areas, Alert Areas, Prohibited Areas, and National Security Areas. Controlled Firing Areas are uncharted. The MOAs are the primary type of SUA of concern in this document.

Two types of flight rules (visual flight rules [VFR] and instrument flight rules [IFR]) apply to airspace, providing a general means of managing its use. Both military and civil aviation abide by these rules to ensure safe operations. For example, private pilots flying between airports to survey oil fields or livestock typically operate under VFR. The VFR pilots fly using visual cues along their desired flight route, as long as appropriate visibility conditions exist, day or night. Pilots flying IFR undergo much more flight training, operate using instruments without the aid of ground-based visual cues, and may fly during periods of reduced visibility. All commercial and military pilots are IFR certified.

The FAA has designated MOAs as SUA. MOAs are airspaces established outside Class A airspace to separate or segregate certain nonhazardous military activities from IFR traffic and to identify for VFR traffic where these activities are conducted. MOAs provide military aircrew the opportunity to perform many different training activities within a large horizontal and vertical expanse of airspace. The ceiling of all MOAs can extend to no more than 17,999 feet mean sea level (MSL), while the floor can be established at any altitude. While any military or civilian pilot flying VFR can enter and fly through MOAs using see-and-avoid techniques, it is highly recommended that pilots contact the controlling agency prior to entering to determine if the MOA is active or not. When flying IFR, nonparticipating military (those not using the MOA for training) or civilian aircraft must obtain an Air Traffic Control (ATC) clearance to enter a MOA, if it is active.

ATCAAs are commonly assigned above MOAs and extend above 18,000 feet MSL. Once established, an ATCAA is activated for the time it is required in accordance with the controlling Letter of Agreement between the FAA and the DAF. ATCAAs are not depicted on aeronautical charts.

The DAF maintains a cooperative, working relationship with the FAA in all facets of aviation and aviation safety, from coordinating at the Headquarters FAA level through the Policy Board on Federal Aviation out of the Pentagon to regional representation at the DAF base level. Military representatives are also embedded with the Headquarters FAA to assist and advise on military aviation, airspace, and ATC matters. At the base level, the Airfield Operations Officer is the primary interface with local and regional FAA personnel and is responsible for coordinating any proposed actions or changes to the flight or ATC environment. Any proposed changes in procedures that would affect the flight environment are usually codified in a Letter of Agreement or Memorandum of Understanding between using agencies. Additionally, quarterly meetings are held on the base, where FAA personnel are invited to participate to discuss any proposed actions, policy, or procedural changes and mitigations/solutions. At some bases, an FAA liaison has an office on the base to assist and advise the military on FAA policy and procedures. Often, this individual may actually advise multiple bases in a region, if required.

3.2.1.2 Region of Influence

3.2.1.2.1 Dyess AFB

For military aircraft flying out of Dyess AFB, the Lancer, Lancer Bridge, Bronco, and Pecos MOAs and all associated ATCAAs, as well as the Willie-Roscoe ATCAA, are the most cost-effective and convenient training areas to use. Dyess AFB-based aircraft would utilize Brownwood MOA as supplemental training airspaces. Figure 2.3-2 shows the airspace that would be used by the B-21 if Dyess AFB is selected as the beddown location.

Numerous federal airways, jet routes, and civil aviation airports occur within the ROI. Ranchers, crop dusters, and other local VFR pilots may operate at lower altitudes equivalent to those of Military Training Routes (MTRs). FAA charts, publications, and procedures provide the means for VFR pilots to plan for and safely transit an MTR. Neither the FAA nor the state maintains records of the amount of VFR flight activity by

civil aviation in the area. It is known, however, that ranchers, cloud seeding pilots, and other local VFR pilots frequently fly in these areas. ATC procedures, charting of MTRs for pilot awareness, pilot compliance with FAA flight procedures, and required see-and-avoid techniques collectively make MTR use compatible with civil aviation activities.

Airfields ranging from regional county airports to small airstrips on ranches are located within the ROI.

3.2.1.2.2 Whiteman AFB

If Whiteman AFB is selected, the Air Force would utilize the Smoky Hill Range (Smoky MOA, Bison MOA and R-3601A/B) and Ada East/West, Lindbergh, Cannon and Truman MOAs, including all associated ATCAAs, as well as the Ozark ATCAA. Figure 2.4-2 shows the airspace associated with the MOAs/ATCAA that would be used by the B-21 if Whiteman AFB is selected as the location for the MOB 2 or MOB 3 beddown. Currently, B-2s operate within all airspace units associated with the existing complex.

3.2.1.3 Analysis Methodology

As previously mentioned in Section 2.1.3 (Description of Proposed Action and Alternatives, Proposed Action, Airspace and Range Utilization), none of the proposed alternatives would involve physical changes (external boundaries, dimensions, altitudes, etc.) to any airspace area currently proposed for use by the B-21.

Although additional airspace is not required, certain airspace may be utilized more extensively, while use of other airspace units may decrease. Therefore, the use of the current airspace would likely be adjusted. The result could potentially change noise levels, patterns, and dispersal due to changes in aircraft operations. See the noise analysis in Section 3.3 (Noise) for more details on potential noise impacts due to aircraft operation. Both civilian and military airfields share the regional airspace, both under and in the vicinity of the ROI airspace, and therefore, efficient management and safety are crucial. Mismanagement could result in the unavailability of the airspace, which could threaten military missions and impede civilian flight access to regional airports, potentially affecting recreational flight, agricultural operations, tourism, and other regional business.

3.2.2 Airspace, Environmental Consequences

3.2.2.1 No Action Alternative Consequences

3.2.2.1.1 No Action Alternative at Dyess AFB

Under the No Action Alternative, aircraft operations would be consistent with current activities. An estimated 45,266 B-1 and C-130 annual airfield operations would occur at Dyess AFB, including departures, arrivals, and VFR and IFR patterns, and additional transient operations raise the annual operations to 48,140 for modeling purposes (Table 2.2-2). The No Action Alternative at Dyess AFB would not contribute to air traffic

controller workload or congestion in the airspace areas. B-1s at Dyess AFB would continue to use the Lancer MOA as the primary location for training and would also continue to utilize Bronco, Brownwood, and Pecos MOAs and their associated ATCAAs as well as the Willie-Roscoe ATCAA for a portion of their operations. Under the baseline conditions, there are currently 3,095 annual operations including Dyess AFB aircraft in the Brownwood MOA, 3,690 total aircraft operations in the Lancer MOA, 689 in the Willie-Roscoe ATCAA, 554 in the Pecos MOA, 535 in the Bronco MOA, and 277 in the Lancer Bridge MOA (Table 2.3-3). These operations include Dyess AFB aircraft, as well as aircraft associated with other nearby installations (e.g., Sheppard AFB T-38s) and transient aircraft.

In addition, one project in Table 3.1-1, the Air Force Reserve Command F-35A Operational Mission, would contribute to the baseline. Current activities in the Dyess AFB training airspace under the No Action Alternative already accounts for the Air Force Reserve Command F-35A Operational Mission. The 24 F-35As with two backup inventory aircraft would use some of the same airspace units as the B-21, specifically the Lancer and Brownwood MOAs. Although additional airspace is not required, Lancer and Brownwood MOAs may be utilized more extensively. However, since the new F-35A aircraft would replace F-16s, the use of the airspace would not be likely to adversely impact airspace use, ATC, or scheduling in these MOAs.

3.2.2.1.2 No Action Alternative at Whiteman AFB

Under the No Action Alternative, aircraft operations would be consistent with current activities. An estimated 29,771 annual airfield operations would occur at Whiteman AFB, including departures, arrivals, and VFR and IFR patterns. B-2 operations account for 4,860 of these operations, or about 16 percent (Table 2.2-4). The remaining airfield operations are associated with T-38, A-10, H-60, and transient aircraft. The No Action Alternative at Whiteman AFB would not contribute to either air traffic controller workload or congestion in the airspace areas. B-2s at Whiteman AFB would continue to use the existing MOAs/ATCAAs as the primary location for training. Under the baseline No Action Alternative, there are currently 18,925 annual operations including Whiteman AFB aircraft in the Truman MOA, 1,973 annual operations in the Smoky Hill Range, 1,377 in the Cannon MOA, 2,168 in the Lindbergh MOA, 252 in the Ozark ATCAA, and 73 in the Ada East/West MOA (Table 2.4-3). Airspace utilization would be comparable to current conditions; therefore, there would be no increase in airspace utilization as a result of the No Action Alternative.

3.2.2.2 Dyess AFB Alternative

3.2.2.2.1 Airfield Operations

Existing airspace around the Dyess AFB airfield would not be modified under the Proposed Action. While there would be no airspace modifications, the way in which the airfield is utilized may change slightly with respect to flight profiles, patterns, etc. Under the Dyess AFB Alternative, the total number of airfield operations (takeoffs, landings, and closed patterns) would decrease from the No Action Alternative baseline by

2,026 operations annually, or 4.2 percent (Table 2.3-2). This decrease in operations is due to the drawdown of the B-1 operations, which would be replaced one-for-one by B-21 operations. This 4.2 percent decrease in total operations may have a beneficial effect but is not likely to impact airspace use, ATC, or scheduling at Dyess AFB.

3.2.2.2.2 Airspace and Range Utilization

Although airspace modifications are not required, each airspace unit would be utilized differently based on the proposed number of B-21 training operations. The following sections describes those changes for each of the airspace areas. See Table 3.2-1 for a comparison of the total flight operations in the SUA between the No Action Alternative, Proposed Action, and snapshot scenarios. Congestion and use would decrease under all airspace units as there would be a decrease in total operations. This may have a favorable effect but is not likely to impact airspace use, ATC, or scheduling.

Table 3.2-1. Airspace and Range Utilization Operations for Dyess AFB Alternative

Airspace	No Action Alternative ^(a)	Proposed Action ^(b)	Proposed Action Change from No Action Alternative	Percent Change ^(c)
Bronco MOA	535	494	-41	-8
Willie-Roscoe ATCAA	689	231	-458	-66
Brownwood MOA	3,095	2,454	-641	-21
Lancer MOA	3,690	1,470	-2,220	-60
Lancer Bridge MOA	277	167	-110	-40
Pecos MOA	554	445	-109	-20

Key: AFB = Air Force Base; ATCAA = Air Traffic Control Assigned Airspace; MOA = Military Operating Area

Notes:

- Current flight operations data provided and validated by Dyess AFB B-21 Site Activation Task Force personnel.
- The Proposed Action flight operations represent the end-state operations removing the B-1 operations and adding B-21 operations maintaining existing operations for other Primary Assigned Aircraft and transient aircraft.
- Percentages have been rounded.

3.2.2.2.3 Snapshot

Under the snapshot scenario at Dyess AFB, the total number of air operations (takeoffs, landings, and closed patterns) would decrease from the No Action Alternative baseline by 253 operations annually, or 0.53 percent (see Table 2.3-2). This decrease in total operations would result in positive impacts to airspace use, ATC, and scheduling at Dyess AFB.

Under the snapshot scenario for the Dyess AFB Alternative, annual operations at Willie-Roscoe ATCAA, Brownwood MOA, Lancer MOA and Lancer Bridge MOA and Bronco MOA would decrease by 364, 634, 2,010, 58, and 31 annual operations, respectively (52.83, 0.16, 12.22, 20.94, and 5.79 percent). Operations Pecos MOAs would increase by two annual operations, representing a 0.36 percent increase from the No Action Alternative baseline.

Operations increase of less than 1 percent in the Pecos MOAs would not contribute to increased airspace congestion and/or scheduling conflicts, because this level of increase is considered negligible and would be temporary under the snapshot scenario, until end-

state conditions are realized after the B-1s have phased out and the B-21 beddown has been completed. It is important to note that airspace usage and MOA distribution would continue to support the 9th Bomb Squadron. However, local training may also take place on an IFR track. Further, as the program develops, MOA usage and distribution may be adapted to better accommodate the B-21 training mission. For instance, the Lancer MOA, where operations would decrease by 12.22 percent, could be utilized more extensively to alleviate any strains in the Pecos MOA. Therefore, this level of change in total operations would not be likely to adversely impact airspace use, ATC, or scheduling at Dyess AFB alternative MOAs.

3.2.2.2.4 Reasonably Foreseeable Future Actions and Environmental Trends

There are no proposed physical changes (external boundaries, dimensions, altitudes, etc.) to any airspace currently utilized under the Dyess AFB Alternative or for any of the projects listed in Table 3.1-2. Therefore, no impacts resulting from reasonably foreseeable future actions or environmental trends to airspace use and management when combined with the Dyess AFB Alternative would be anticipated.

3.2.2.2.5 Proposed Resource-Specific Mitigations and Management Actions to Reduce the Potential for Environmental Impacts

No mitigations would be necessary to implement the Dyess AFB Alternative.

3.2.2.3 Whiteman AFB Alternative (Preferred Alternative)

3.2.2.3.1 Airfield Operations

Existing airspace around the Whiteman AFB airfield would not be modified under the Whiteman AFB Alternative. Additional airspace would not be required, but the way in which the airspace is used may change slightly with respect to flight profiles, patterns, etc. Under the Whiteman AFB Alternative, the total number of airfield operations (takeoffs, landings, and closed patterns) at Whiteman AFB would increase from the No Action Alternative baseline by 1,980 operations annually, or 6.65 percent (Table 2.4-2). This minor level of increase would not be likely to adversely impact airspace use, ATC, or scheduling at Whiteman AFB. Further, as the program develops, MOA usage and distribution may be adapted to better accommodate the B-21 training mission.

3.2.2.3.2 Airspace and Range Utilization

See Table 2.4-2 for a comparison of the total flight operations in the SUA between the No Action Alternative, Proposed Action, and snapshot scenarios. The total number of annual flight operations at all the training airspaces would remain the same as baseline conditions. B-21 operations would replace B-2 operations in a one-to-one ratio throughout all the SUA. Therefore, there would be no change in the number of air operations in any of the SUA and impacts would be the same as those described for the No Action Alternative.

Implementation of B-21 operations in Whiteman AFB airspace under the Whiteman AFB Alternative would not impact air traffic controller workload and would not contribute to

increased congestion for military and civilian aircraft across the region. However, existing policies and procedures would enable ATC and schedulers to continue to coordinate operations such that this change in total operations would not be likely to adversely impact airspace use, ATC, or scheduling at Whiteman AFB.

3.2.2.3.3 Snapshot

Under the snapshot scenario, the total number of annual airfield operations at Whiteman AFB would increase by 2,952 operations, or 9.91 percent from the No Action Alternative baseline (see Table 2.4-2). Additionally, annual operations in Ozark ATCAA, Smoky Hill Range, Ada East/West MOA, Truman MOA and Lindbergh would increase by 50, 29, 7, 2, and 1 operation, correspondingly, representing increases of 19.84, 1.47, 9.59, 0.011, and 0.37 percent, respectively. Operations in the Cannon MOA would remain at current levels.

Increases in airfield operations and operations in the training airspaces may impact air traffic controller workload and contribute to increased congestion for military and civilian aircraft, specifically for the Ozark ATCAA, as well as the Whiteman AFB airfield and the Ada East/West MOA to a lesser extent. However, existing policies and procedures would enable ATC and schedulers to continue to coordinate operations such that this change in total operations would not be likely to adversely impact airspace use, ATC, or scheduling at the Whiteman AFB SUA. Additionally, this would be a temporary situation only occurring during the transition period as the B-2s are being drawn down and the B-21 is bedded down.

3.2.2.3.4 Reasonably Foreseeable Future Actions and Environmental Trends

With the exception of the addition of the B-21 to Whiteman AFB and drawdown of the B-2, none of the reasonably foreseeable future actions or trends identified in Table 3.1-2 would affect airspace utilization. For the Whiteman AFB Alternative, there are no proposed physical changes (external boundaries, dimensions, altitudes, etc.) to any airspace currently utilized. Therefore, no additional impacts to airspace use and management would be anticipated from the Whiteman AFB Alternative as a result of reasonably foreseeable future actions.

3.2.2.3.5 Proposed Resource-Specific Mitigations and Management Actions to Reduce the Potential for Environmental Impacts

No mitigations would be necessary to implement the Whiteman AFB Alternative.

3.3 NOISE

3.3.1 Noise, Affected Environment

3.3.1.1 Description of Resource

Noise is defined as unwanted sound. Potential noise impacts are dependent on characteristics of the noise such as sound level, pitch, and duration. Noise impacts are also strongly influenced by characteristics of the noise receiver (i.e., persons, animals, or objects that hear or are affected by noise). This section focuses on potential impacts of noise on human experiences (e.g., noise-induced annoyance, speech interference, etc.). Additional discussion of specific noise effects on other affected resources can be found in Section 3.6 (Socioeconomics), Section 3.7 (Environmental Justice), Section 3.8 (Biological Resources), and Section 3.9 (Cultural Resources).

Several noise metrics are used in this EIS to describe aspects of noise that are relevant to estimating noise impacts, such as noise intensity and frequency-of-occurrence of noise events. A more thorough explanation of these metrics can be found in the Noise Supporting Information document on the project website located at www.B21EIS.com.

- A-weighted decibels (dBA) sound level measurements reflect the frequencies to which human hearing is most sensitive. All noise levels in this EIS can be assumed to be A-weighted.
- Day-night average sound level (DNL) represents aircraft noise level averaged over a 24-hour period with a 10-decibel (dB) adjustment to flights occurring between 10:00 p.m. and 7:00 a.m. to account for the added intrusiveness of noise during these hours.
- Sound exposure level (SEL) accounts for both the maximum sound level and the length of time a sound lasts. This single number represents all the acoustic energy of an event as if it occurred within a one-second period. This metric does not reflect the sound level heard at any particular time but is useful for comparing the amounts of sound energy generated by individual overflights by various aircraft types.
- Equivalent sound level (L_{eq}) represents aircraft noise level averaged logarithmically over a specified time period. This analysis uses the L_{eq} metric to describe sound levels during an eight-hour school day, denoted as $L_{eq(8hr)}$, and during a 24-hour period, denoted as $L_{eq(24hr)}$.
- Maximum sound level (L_{max}) is the highest sound level measured (using time integration of either 1/8 second or 1 second) during a noise event. L_{max} decreases as altitude or distance from the observer increases and varies according to the type of aircraft, engine power setting, and atmospheric conditions.

Onset-rate adjusted monthly day-night average sound level (L_{dnmr}) is the measure used for subsonic aircraft noise in military airspace (i.e., ranges, MTRs, or MOAs). The L_{dnmr} metric is similar to the DNL metric except that it adds a decibel adjustment of up to 11 dBA to overflight events, where appropriate, to account for potential startle effects associated with sudden onset aircraft noise. The L_{dnmr} metric is calculated for the busiest month in a year to account for the high degree of operations tempo variability in a typical military training airspace unit. In this analysis, training airspace usage tempos were described as approximately uniform among all months of the year, and the modeled month was equivalent to an average month for L_{dnmr} calculations.

3.3.1.2 Region of Influence

This section describes the acoustic environments in the components of the ROI. The ROI for noise includes the two alternative beddown installations, the areas surrounding the installation, and land areas under the airspace units where B-21 flight operations would occur.

Measured ambient sound levels are not available in the ROI, but the characteristics of the acoustic environments can be estimated based on general characteristics of the land. For example, ambient sound levels in small towns are typically near 55 dBA DNL, while farms and rural areas are typically at approximately 45 dBA DNL (EPA, 1974). In this document, ambient sound levels refer to sound levels when no aircraft operations are under way. All components of the ROI are currently used for military aircraft training. Aircraft noise levels in each portion of the ROI will be discussed further and quantified in Section 3.3.2.1 (Noise, Environmental Consequences, No Action Alternative Consequences).

3.3.1.2.1 Dyess AFB

Noise environments in the vicinity of Dyess AFB are dominated by aircraft noise. Other noise sources on the installation include ground vehicles, ongoing construction activities, and machinery. The area surrounding Dyess AFB is primarily rural/agricultural to the west, north, and south. As shown in Figure 2.3-1, there are a few small communities such as Tye, Merkel, Caps, and Buffalo Gap in those areas. The city of Abilene to the east of Dyess AFB is the largest community that could potentially experience noise impacts associated with the Proposed Action.

Lancer MOA

The Lancer MOA ROI includes portions of eight counties in west Texas (see Figure 2.3-2). The area beneath Lancer MOA is primarily rural/agricultural, but some small communities, such as Snyder, are situated beneath the airspace.

Lancer Bridge MOA

The Lancer Bridge MOA ROI is situated between Lancer MOA and Bronco MOA and includes portions of five counties in west Texas (see Figure 2.3-2). The area beneath

Lancer Bridge MOA is primarily agricultural but includes some developed areas such as the city of Brownfield in Terry County and the city of Lamesa in Dawson County.

Bronco MOA

The Bronco MOA ROI includes parts of five counties in Texas and two counties in New Mexico (see Figure 2.3-2). The area beneath the Bronco MOA is almost entirely open space with the exception of Denver City in Yoakum and Gaines Counties, Texas, Seminole, Texas in Gaines County, and Hobbs, New Mexico in Lea County. Several small communities such as Plains, Seagraves, Loop, and Ashmore are also located beneath the Bronco MOA.

Willie-Roscoe ATCAA

The Willie-Roscoe ATCAA ROI includes parts of eight counties in west Texas. The area beneath the Willie-Roscoe ATCAA is almost entirely open space with the exception of Big Spring in Howard County, Colorado City in Mitchell County, and Sweetwater in Nolan County (see Figure 2.3-2). There are also a handful of very small towns such as Ira, Westbrook, and Ackerly.

Brownwood MOA

The Brownwood MOA ROI includes all of Brown County and parts of seven other counties in midwest Texas (see Figure 2.3-2). The area beneath Brownwood MOA is primarily rural/agricultural. The city of Brownwood and several smaller communities, such as Coleman, Comanche, and Cross Plains, are situated beneath the airspace.

Pecos MOA

The Pecos MOA ROI includes parts of five counties in eastern New Mexico (see Figure 2.3-2). The area beneath the Pecos MOA is almost entirely open space with the exception of Fort Sumner in De Baca County. Fort Sumner is a small village consisting primarily of agricultural areas.

3.3.1.2.2 Whiteman AFB

Noise environments in the vicinity of Whiteman AFB are dominated by aircraft noise. Other noise sources on the installation include ground vehicles, ongoing construction activities, and machinery. The area surrounding Whiteman AFB is primarily rural/agricultural. The small community of Knob Noster is to the north of the installation as shown in Figure 2.4-1. The largest community near Whiteman AFB is Warrensburg approximately 7 miles to the west of the base.

Smoky Hill Range

Airspace units associated with Smoky Hill Range (i.e., R-3601A, Smoky MOA, and Bison MOA) include portions of seven counties in Kansas (see Figure 2.4-2). The area beneath airspace units associated with Smoky Hill Range is predominately rural/agricultural with

the exception of communities such as Ellsworth in Ellsworth County and Claflin, Ellinwood, and Hoisington, which are located in Barton County.

Cannon MOA

The Cannon MOA includes parts of four counties in Missouri (see Figure 2.4-2). The area beneath Cannon MOA is almost entirely rural/agricultural.

Ada MOA

The Ada MOA ROI includes parts of 10 counties in Kansas (see Figure 2.4-2). The area beneath the Ada MOA is almost entirely rural, agricultural, or forested with the exception of Beloit, Concordia, Minneapolis, and Clay Center in Mitchell, Cloud, Ottawa, and Clay Counties, respectively. Several small communities such as Glen Elder, Glasco, Delphos, Morganville, and Palmer are also located beneath the Ada MOA.

Ozark ATCAA

The Ozark ATCAA includes parts of 56 counties in Missouri, four in Kansas, and one in Oklahoma (see Figure 2.4-2). This includes much of southern Missouri, south of I-70. The area beneath the Ozark ATCAA is primarily forested/open space with the exception of Springfield, Joplin, Jefferson City, Rolla, and Lebanon in Greene, Jasper, Cole/Callaway, Phelps, and Laclede Counties, respectively. There are also several small towns and unincorporated communities throughout the area.

Lindbergh MOA

The Lindbergh MOA ROI includes all of Shannon County and parts of 11 other counties in south-central Missouri (see Figure 2.4-2). The area beneath the Lindbergh MOA is primarily rural/agricultural or forested. The small cities of Willow Springs, West Plains, and Ellington as well as several small towns such as Summersville, Van Buren, and Bunker are situated beneath the Lindbergh MOA.

Truman MOA

The Truman MOA ROI includes all of Benton and Pettis Counties and parts of 10 other counties in southeastern Missouri (see Figure 2.4-2). The area beneath the Truman MOA is primarily rural/agricultural or forested. The largest cities located under the Truman MOA are Warrensburg, Sedalia, and Whiteman AFB itself. There are also several other small cities, such as Windsor, Versailles, and Cole Camp located beneath Truman MOA airspace.

3.3.1.3 Analysis Methodology

3.3.1.3.1 Noise Level Calculation

AFI 32-1015, *Integrated Installation Planning*, provides the overall framework for computing noise levels associated with aircraft operations in the vicinity of military airfields and beneath military training airspace. Noise analysis in this EIS was conducted in accordance with standard DoD analytical procedures, where appropriate for each specific category of noise.

Aircraft Operations Near the Installations

Noise levels at and near the potential beddown installations were modeled using the program NOISEMAP, version 7.3. NOISEMAP uses detailed information on aircraft operations near the airfield in conjunction with measured reference noise levels for each aircraft in various flight configurations to calculate noise levels under each operational scenario. For this analysis, aircraft operational data for each operational scenario were collected from pilots, air traffic controllers, aircraft maintainers, and other relevant subject matter experts for input to NOISEMAP.

The B-21 is a new airframe and measured reference noise level data for this aircraft is not yet available. The B-21 is similar in several aspects to the B-2 aircraft and is expected to generate noise levels similar to those generated by the B-2. Therefore, measured B-2 aircraft noise levels were used as a surrogate for B-21 noise levels for the purposes of noise impacts assessment in this EIS.

Noise levels results are presented for several representative points of interest using a variety of noise metrics and as DNL contour maps. In accordance with current DoD policy, DNL was calculated for an average annual day (i.e., a day with 1/365th of total annual operations). The noise contours depicted in this document delineate areas affected by 65-70, 70-75, 75-80, and greater than 85 dBA DNL.

The number of off-installation residents exposed to each DNL interval were estimated based on Census data. Where census blocks were split by a noise contour line, population within the noise contour was assumed to be proportional to the percentage of the census block located within the noise contour interval. While this assumption is not always correct, the results would not be expected to be biased in favor of either more or less population being included in the estimate.

Aircraft Operations in Military Training Airspace

Noise levels beneath military training airspace units were modeled using the program Military Operations Area and Range NOISEMAP (MRNMAP), version 3. MRNMAP uses information on aircraft operations in training airspace combined with reference noise levels for each aircraft type to calculate noise levels beneath the training airspace. Information on aircraft operations under each operational scenario was gathered from pilots, range managers, and other subject matter experts for input to the model. The B-2

aircraft was used as the noise surrogate for B-21 aircraft for the purposes of this analysis. Calculated noise levels beneath each military training airspace unit are presented using the L_{dnmr} metric for each operational scenario.

Construction Noise

Construction noise was evaluated using the Federal Highway Administration Roadway Construction Noise Model, version 1.1 (FHWA, 2006). The Roadway Construction Noise Model has the capability to model types of construction equipment that would be expected to be the dominant construction-related noise sources associated with this aspect of the Proposed Action. All construction noise analyses assumed that a standard set of construction equipment would be used. Construction noise impacts are quantified using the metrics L_{max} and L_{10} as calculated based on distance from a construction site.

3.3.1.3.2 Potential Noise Impacts

Potential noise impacts are described below. More in-depth descriptions of potential noise impacts are provided in the Noise Supporting Information document on the project website located at www.B21EIS.com.

Annoyance

The primary effect of aircraft noise on exposed communities is one of annoyance, including activity interference, which includes speech interference and sleep disturbance. Noise annoyance is defined by the U.S. Environmental Protection Agency (EPA) as any negative, subjective reaction on the part of an individual or group (EPA, 1974). The best available method for predicting community annoyance response to aircraft noise is the updated Schultz curve (sometimes called the “Air Force curve”) (Table 3.3-1). Because of the increasing likelihood of noise disruptions at higher noise levels, not all land uses are considered compatible at noise levels exceeding 65 dBA DNL according to DoD land use guidance. The L_{dnmr} metric has been designed to predict the prevalence of annoyance in areas affected by military training airspace noise and has the same relationship to percentage of the population highly annoyed as DNL.

Table 3.3-1. Relationship Between Annoyance and DNL

Noise Exposure (DNL)	Percent of Population Highly Annoyed
<65	<12.29
65–70	12.29–22.10
70–75	22.10–36.47
75–80	36.47–53.74

Key: < = less than; DNL = day-night average sound level

Classroom Learning

Good acoustical qualities are essential in classrooms in which speech communication is an important part of the learning process. Excessive background noise interferes

with speech communication and thus presents an acoustical barrier to learning. The American National Standards Institute's (ANSI's) Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools provides "acoustical performance criteria, design requirements, and design guidelines for new school classrooms and other learning spaces" (ANSI, 2009). While this standard is not a requirement to be followed by school systems, it is applicable as a design guideline to new construction, as well as renovations of existing facilities, and is recommended to achieve a high degree of speech intelligibility in learning spaces. Because this ANSI standard was not finalized until 2009, it should not be expected that all schools constructed or renovated before that date would necessarily meet the recommended criteria.

The ANSI standard identifies an appropriate set of criteria for maximizing speech intelligibility in schools as an indoor L_{eq} of 40 dBA (for intermittent noise from transportation sources such as aircraft operations). To compare the outdoor noise levels to indoor recommended values, outdoor noise levels are adjusted to account for the noise level reduction provided by the structure. Typical noise level reduction values are 15 dBA with windows open and 25 dBA with windows closed, but vary by structure, climate, and noise sources.

Potential Hearing Loss

Risk of noise-related hearing loss has been extensively studied, with most studies conducted in workplace environments. Populations exposed to DNL greater than 80 dBA are at the greatest risk of potential hearing loss (PHL), and DoD policy calls for estimation of long-term Noise-Induced Permanent Threshold Shift (NIPTS) risk in such areas using a process defined in the EPA's *Guideline for Noise Impact Analysis* (Undersecretary of Defense for Acquisition Technology and Logistics, 2009). A permanent threshold shift is a change in the lowest sound level audible that does not disappear over time. Some hearing loss is normal as people age, and the NIPTS is specifically defined as the difference in threshold shifts between people exposed to noise and those who are not exposed. Numerically, the NIPTS is the change in threshold averaged over several frequencies that can be expected from exposure lasting 8 hours per day, 5 days per week starting at age 20 and continuing for 40 years. Because individual sensitivity to noise varies, NIPTS is estimated for a person with average sensitivity and for a person in the most sensitive 10 percent of the population.

Many people spend at least part of their day indoors, where aircraft noise levels are lower. A 2-year EPA-sponsored telephone survey of more than 9,000 persons found that the average American spends approximately 87 percent of their time indoors (Klepeis, et al., 2001). This percentage was found to be fairly constant across the 48 contiguous United States.

Table 3.3-2 shows the "average NIPTS" and the "10th percentile" NIPTS as a function of $L_{eq(24hr)}$ if the person is fully exposed to the noise level at his or her residence (i.e., outdoors 100 percent of the time) or if he or she is outdoors for the national average 13 percent of the day. It was assumed for the purposes of this study that residents would remain at their residences 24 hours per day, 365 days per year.

Table 3.3-2. Estimated Average NIPTS and 10th Percentile NIPTS as a Function of $L_{eq(24hr)}$ ^(a)

$L_{eq(24hr)}$ (dBA)	100 Percent of Time Outdoors		National Average Percentage of Time Outdoors	
	Average NIPTS (dBA) ^(b)	10th Percentile NIPTS (dBA) ^(b)	Average NIPTS (dBA) ^(b)	10th Percentile NIPTS (dBA) ^(b)
80–81	3	7	N/A ^(c)	N/A ^(c)
81–82	3.5	8	N/A ^(c)	N/A ^(c)
82–83	4	9	1	3.5
83–84	4.5	10	1	4
84–85	5.5	11	1.5	4.5
85–86	6	12	2	5.5
86–87	7	13.5	2.5	6.5
87–88	7.5	15	3	7
88–89	8.5	16.5	3.5	8
89–90	9.5	18	4	9

Key: dBA = A-weighted decibels; $L_{eq(24hr)}$ = 24-hour equivalent sound level; N/A = not applicable; NIPTS = Noise-Induced Permanent Threshold Shift

Notes:

a. Relationships between $L_{eq(24hr)}$ and NIPTS were derived from *Guidelines for Preparing Environmental Impact Statements on Noise* (CHABA, 1977)

b. NIPTS values rounded to the nearest 0.5 dBA.

c. Equivalent exposure noise level is less than 75 dBA DNL, below the threshold at which NIPTS has been demonstrated to occur.

To put these numbers in perspective, changes in hearing threshold of less than 5 dBA are generally not considered noticeable or significant. Furthermore, no known evidence suggests that a NIPTS of 5 dBA is perceptible or has any practical significance for the individual. Finally, the variability in audiometric testing is generally assumed to be ± 5 dBA (EPA, 1974).

The preponderance of available information on risk of hearing loss for the adult working population is from the workplace with continuous exposure throughout the day for many years. According to *Long Term Effects of Military Jet Aircraft Noise Exposure During Childhood on Hearing Threshold Levels*, military personnel who as children had lived in or near stations where jet operations were based had no significant differences in audiometric test results compared to a similar group who had no such exposure as children (Ludlow & Sixsmith, 1999). For the purposes of hearing loss analysis, it could be assumed that the limited data on hearing loss are applicable to the general population, including children, and provide a conservative estimate of hearing loss.

3.3.2 Noise, Environmental Consequences

3.3.2.1 No Action Alternative Consequences

3.3.2.1.1 No Action Alternative at Dyess AFB

Aircraft Noise Near the Installation

Aircraft operations in the installation vicinity and in training airspace would not change as a result of No Action Alternative projects, which are listed in Table 3.1-1. Therefore, aircraft noise levels would remain as they are under baseline conditions. Noise impacts described in this section quantify effects under both the No Action Alternative and baseline conditions.

Annoyance. Figure 3.3-1 shows noise contours under the No Action Alternative. Modeling indicates that 11,023 acres and an estimated 1,494 persons would continue to be exposed to off-installation noise levels exceeding 65 dBA DNL near Dyess AFB (Table 3.3-3). As described in Section 3.3.1.3.2 (Noise, Affected Environment, Analysis Methodology, Potential Noise Impacts), people exposed to elevated aircraft noise levels have an increased likelihood of becoming annoyed by the noise.

Table 3.3-3. Acreage and Population Affected by Elevated Noise Levels Under the No Action Alternative at Dyess AFB

Noise Level (dBA DNL)	Acres Off Installation	Off-Installation Population ^(a)
65–69	5,764	673
70–74	3,262	465
75–79	1,361	230
80–84	452	93
85–89	146	27
≥90	38	6
Total	11,023	1,494

Key = > = greater than; AFB = Air Force Base; dBA = A-weighted decibels; DNL = day-night average sound level

Note:

a. Population estimates were made based on 2015–2021 American Community Survey 5-Year Estimates data (U.S. Census Bureau, 2021a) assuming an even population distribution within each census subdivision. The actual number of persons currently residing in affected areas may differ from the listed estimates.

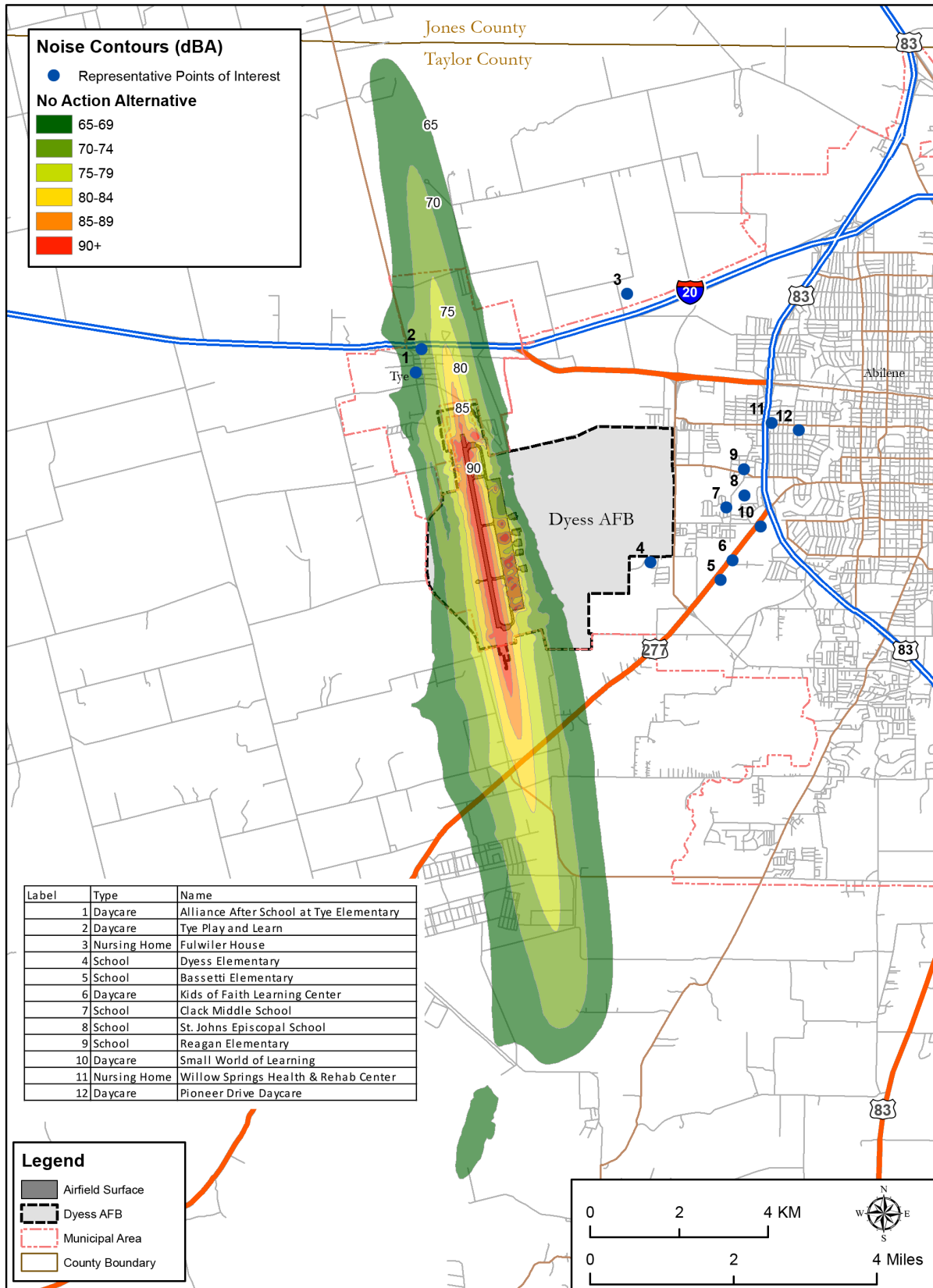


Figure 3.3-1. Noise Contours at Dyess AFB Under the No Action Alternative

Representative points of interest near Dyess AFB that were selected for additional noise analysis are also shown in Figure 3.3-1. Under the No Action Alternative, these locations would continue to experience DNL of up to 71 dBA and individual overflight noise levels would continue to be as high as 117 dBA SEL (Table 3.3-4). Because overflight noise levels vary depending on where and how the aircraft is flying, as well as ambient atmospheric conditions, any given location is exposed to a wide range of individual aircraft overflight noise levels. SEL values listed in Table 3.3-4 reflect the highest SEL values associated with standard flight procedures and typical atmospheric conditions as experienced at that location. The loudest and most frequent types of overflights, particularly types of flights conducted frequently during the late night (10:00 p.m. to 7:00 a.m.), play a dominant role in determining overall DNL noise levels and people's reactions to the noise environment.

Table 3.3-4. DNL and SEL at Representative Points of Interest Under the No Action Alternative at Dyess AFB

ID	General Description	Type	No Action Alternative	
			DNL (dBA)	Highest Typical SEL (dBA)
01	Alliance After School at Tye Elementary	Daycare	68	114
02	Tye Play and Learn	Daycare	71	117
03	Fulwiler House	Nursing Home	48	93
04	Dyess Elementary	School	54	98
05	Bassetti Elementary	School	47	89
06	Kids of Faith Learning Center	Daycare	45	88
07	Clack Middle School	School	44	87
08	St. John's Episcopal School	School	42	86
09	Reagan Elementary	School	42	86
10	Small World of Learning	Daycare	43	88
11	Willow Springs Health & Rehab Center	Nursing Home	46	95
12	Pioneer Drive Daycare	Daycare	45	95

Key: AFB= Air Force Base; dBA = A-weighted decibels; DNL = day-night average sound level; ID = identification code; SEL = sound exposure level
 Note: Points of Interest presented in this table are provided to help understand the noise environment. As such, this table may not include all noise-sensitive facilities (schools, churches, daycares, etc.) that are affected by noise contours.

Potential Classroom Disruption. Table 3.3-5 lists the outdoor and indoor estimated $L_{eq(8hr)}$ values during a typical school day (7:00 a.m. to 4:00 p.m., Monday through Friday) at schools near Dyess AFB under the No Action Alternative. Schools at which the indoor $L_{eq(8hr)}$ exceeds 40 dBA may not meet the 2009 ANSI guidance for at least a portion of one hour during a typical school day. The $L_{eq(8hr)}$ at Alliance After School at Tye Elementary (01) and Tye Play and Learn (02) exceeds this classroom noise level guideline. To further describe classroom noise levels, Table 3.3-5 also shows the number of events during an average school day hour with the potential to interfere with speech. For the purposes of this analysis, any noise event exceeding 50 dBA L_{max} was conservatively assumed to have the potential to interfere with speech at least momentarily. For example, an individual attending after-school daycare at Alliance After School at Tye Elementary (01) would continue to experience an average of four potential

speech interference events per hour with the windows open and one event per hour with windows closed under the No Action Alternative.

Table 3.3-5. Potential Classroom Disruption at Schools Near Dyess AFB Under the No Action Alternative

Point of Interest ^(a)		Outdoor $L_{eq(8hr)}$ (dBA)	Indoor ^(b)			
ID	Description		Windows Open ^(c)		Windows Closed ^(c)	
			$L_{eq(8hr)}$ (dBA)	Events per Hour ^(d)	$L_{eq(8hr)}$ (dBA)	Events per Hour ^(d)
01	Alliance After School at Tye Elementary	66	51	4	41	1
02	Tye Play and Learn	69	54	3	44	2
04	Dyess Elementary	52	<40	1	<40	0
05	Bassetti Elementary	45	<40	0	<40	0
06	Kids of Faith Learning Center	44	<40	0	<40	0
07	Clark Middle School	42	<40	0	<40	0
08	St. John's Episcopal School	41	<40	0	<40	0
09	Reagan Elementary	40	<40	0	<40	0
10	Small World of Learning	42	<40	0	<40	0
12	Pioneer Drive Daycare	44	<40	0	<40	0

Key: < = less than; AFB = Air Force Base; ANSI = American National Standards Institute; dBA = A-weighted decibels; ID = identification code; $L_{eq(8hr)}$ = 8-hour equivalent sound level

Notes:

- Daycares/schools presented in this table are provided to help understand the noise environment. As such, this table may not include all such facilities that are affected by elevated aircraft noise levels.
- Schools that meet the 2009 ANSI standard of less than 40 dBA L_{eq} are listed as having an L_{eq} of <40 dBA.
- Assumes 15 dBA and 25 dBA of Noise Level Reductions for windows open and closed, respectively. Events per hour are rounded values.
- For the purposes of this analysis, any noise event exceeding 50 dBA L_{max} was conservatively assumed to have the potential to interfere with speech at least momentarily.

Potential Hearing Loss. The risk of hearing loss was assessed using the methodology prescribed by DoD policy, which is described in Section 3.3.1.3.2 (Noise, Affected Environment, Analysis Methodology, Potential Noise Impacts) and in greater detail in the Noise Supporting Information document on the project website located at www.B21EIS.com. PHL risk is calculated based on the $L_{eq(24hr)}$ noise metric. An estimated 57 residents would continue to be exposed to outdoor noise levels exceeding 80 dBA $L_{eq(24hr)}$ under the No Action Alternative (Table 3.3-6). As noted in Section 3.3.1.3.1 (Noise, Affected Environment, Analysis Methodology, Noise Level Calculation), the numbers of residents within each noise contour interval were estimated assuming that population is distributed evenly within each Census subdivision. Because areas that are nearest to the Dyess AFB runway and exposed to the highest noise levels are more likely to be uninhabited than other areas, this method may overestimate numbers of residents exposed to levels exceeding 80 dBA $L_{eq(24hr)}$.

Table 3.3-6. Estimated Population Exposed to Noise Levels That Could Result in Substantive NIPTS Under the No Action Alternative at Dyess AFB

L_{eq}(24hr) (dBA)	Estimated Population
80–81	14
81–82	11
82–83	9
83–84	6
84–85	5
85–86	3
86–87	3
87–88	2
88–89	2
89–90	1
90–91	1
>91	0
Total	57

Key: > = greater than; dBA = A-weighted decibels; L_{eq}(24hr) = 24-hour equivalent sound level

Aircraft Noise Levels in Training Airspace

Aircraft noise levels beneath military training airspace units within the Dyess AFB ROI would range from less than 35 dBA L_{dnmr} to 51.9 dBA L_{dnmr} under the No Action Alternative (Figure 3.3-2). Noise levels are well below the 65 dBA noise level at which all land uses are considered compatible. The likelihood of annoyance is low at these noise levels.

Noise modeling was conducted to assess baseline impacts by combining operations for both the No Action Alternative at Dyess AFB and the AFRC F-35A basing at Naval Air Station Fort Worth (Table 3.1-1). The overlap of this action occurs at Brownwood MOA and Lancer MOA. Baseline noise levels under the training airspace already factors in this action, and noise levels range from less than 35 dBA L_{dnmr} to 51.9 dBA L_{dnmr}.

Construction Noise

Under the No Action Alternative, construction, demolition, or renovation projects associated with the Proposed Action would not occur, but other unrelated construction efforts, which are described in Table 3.1-1 would occur. For example, the project to repair the base electrical system, which is currently under way, would proceed to completion under the No Action Alternative. Projects that have been programmed to occur in the future, which include construction of new dormitories and renovations to better support installation Security Forces would also occur under the No Action Alternative. These projects would result in temporary, minor noise increases resulting from construction and demolition (C&D) activities.

Construction noise modeling reflects a set of common equipment types which include a backhoe, bulldozer, ground compactor, generators, pickup trucks, and pneumatic tools. Noise levels on a day in which all these equipment types are operating are listed in Table 3.3-7 at various receptor distances from the construction site. At distances greater than 600 feet from the construction site, the L_{max} would be 64 dBA or less. This sound level is comparable to the noise level generated by a vacuum cleaner at a distance of 10 feet.

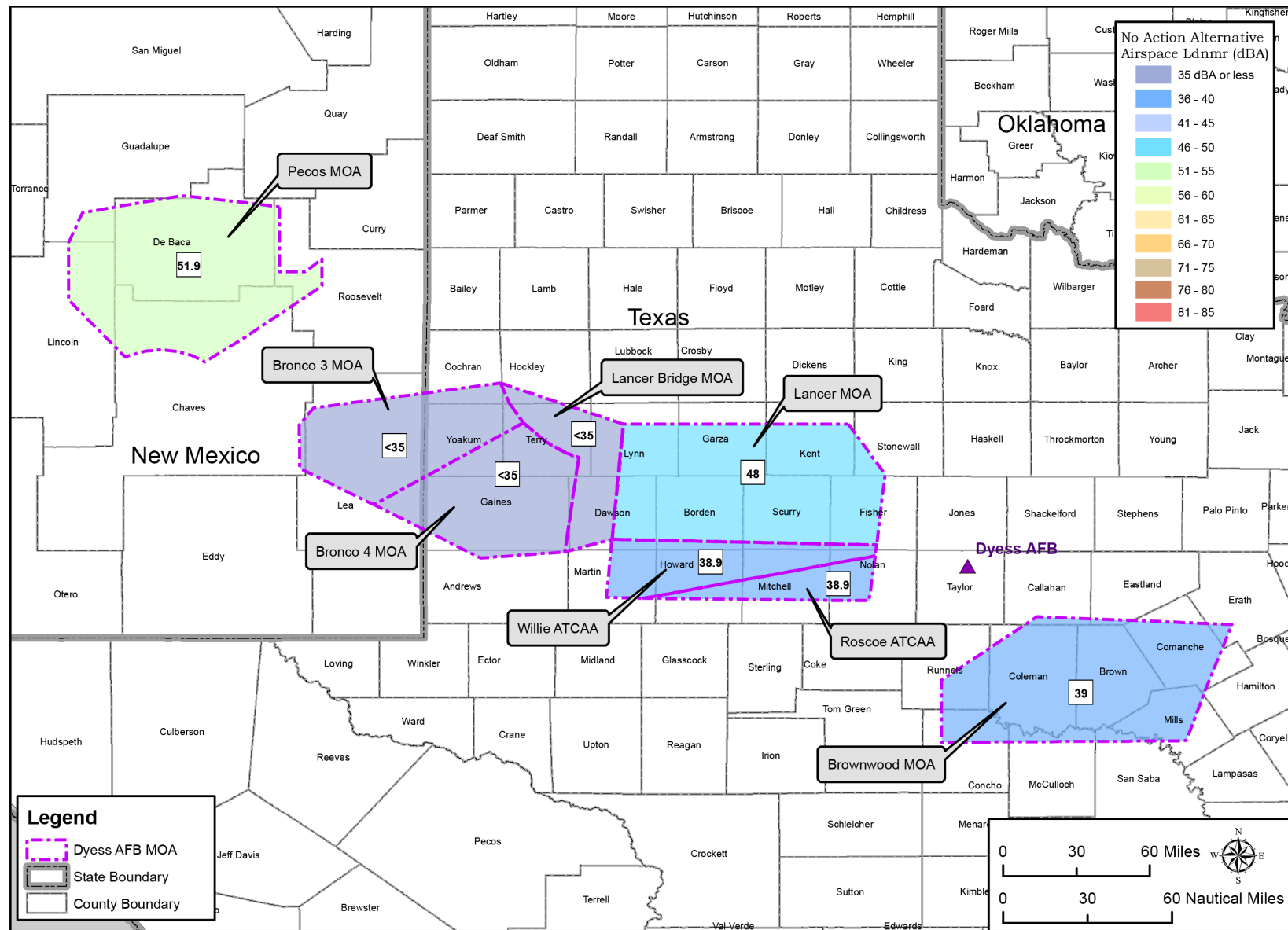


Figure 3.3-2. L_{dnmr} Beneath Dyess AFB Training Airspace Under the No Action Alternative

C&D activities under the No Action Alternative would result in temporary, localized increases in noise levels that could be disruptive and annoying. However, the installation and surrounding area is exposed to frequent loud aircraft operations noise and ground vehicle traffic noise under baseline conditions. Additionally, C&D activities would be conducted during normal business hours. In this context, the temporary and localized noise generated by C&D activities on the installation could be disruptive and potentially annoying, but noise impacts would not be significant.

Table 3.3-7. Construction Noise Levels

Distance to Receptor (feet)	L _{max} (dBA)
100	79
200	73
300	70
400	67
500	65
600	64

Key: dBA = A-weighted decibels; L_{max} = maximum sound level

3.3.2.1.2 No Action at Whiteman AFB

Aircraft Noise Near the Installation

Aircraft operations in the installation vicinity and in training airspace would not change as a result of No Action Alternative projects, which are listed in Table 3.1-1. Therefore, aircraft noise levels would remain as they are under baseline conditions. Noise impacts described in this section quantify effects under both the No Action Alternative and baseline conditions.

Annoyance. Figure 3.3-3 shows DNL noise contours at Whiteman AFB under the No Action Alternative. Modeling indicates that 1,106 acres and an estimated 240 residents would continue to be exposed to off-installation noise levels exceeding 65 dBA DNL (Table 3.3-8). As described in Section 3.3.1.3.2 (Noise, Affected Environment, Analysis Methodology, Potential Noise Impacts), people exposed to elevated aircraft noise levels have an increased likelihood of becoming annoyed by the noise.

Table 3.3-8. Acreage and Population Affected by Elevated Noise Levels Under the No Action Alternative at Whiteman AFB

Noise Level (dBA DNL)	Acres Off Installation	Off-Installation Population ^(a)
65–69	993	223
70–74	113	17
75–79	0	0
80–84	0	0
85–89	0	0
>90	0	0
Total	1,106	240

Key: > = greater than; AFB = Air Force Base; dBA = A-weighted decibels; DNL = day-night average sound level

Note:

a. Population estimates were made based on 2017–2021 American Community Survey 5-Year Estimates data (U.S. Census Bureau, 2021a) assuming an even population distribution within each census subdivision. The actual number of persons currently residing in affected areas may differ from the listed estimates.

Representative points of interest near Whiteman AFB that were selected for additional noise analysis are also shown in Figure 3.3-3. Under the No Action Alternative, these locations would continue to experience DNL of up to 67 dBA and individual overflight noise levels would continue to be as high as 112 dBA SEL (Table 3.3-9).

Because overflight noise levels vary depending on where and how the aircraft is flying, as well as ambient atmospheric conditions, any given location is exposed to a wide range of individual aircraft overflight noise levels. SEL values listed in Table 3.3-9 reflect the highest SEL values associated with standard flight procedures and typical atmospheric conditions as experienced at that location. The loudest and most frequent types of overflights, particularly types of flights conducted frequently during the late night (10:00 p.m. to 7:00 a.m.), play a dominant role in determining overall DNL noise levels and people's reactions to the noise environment.

Table 3.3-9. DNL and SEL at Representative Points of Interest Under the No Action Alternative at Whiteman AFB

ID	General Description	Type	No Action Alternative	
			DNL (dBA)	Highest Typical SEL (dBA)
01	Pleasant Grove Church	Church	53	96
02	Angel Haven Early Childhood Center	Youth Center	42	89
03	Knob Noster Campground	Campground	51	95
04	Mitch Franklin Park	Park	58	103
05	Calvary Baptist Church	Church	59	103
06	Knob Noster High School	School	55	100
07	Knob Noster Middle School	School	59	107
08	Knob Noster Elementary School	School	60	109
09	Whiteman Elementary School	School	51	96
10	Whiteman AFB Chapel	Church	52	97
11	Whiteman Youth Center	Youth Center	51	97
12	Whiteman AFB Sports Complex area	Park	55	101
13	Charity Christian Revival Center	Church	63	112
14	Show-Me Christian Youth Home	Youth Center	46	95
15	La Monte High School	School	39	85
16	La Monte Middle School	School	39	86
17	Ready Set Grow Daycare	Daycare	55	106
18	Today's Kidz Academy	Daycare	60	106
19	Mt Moriah Missionary Baptist Church	Church	59	108
20	Road Intersection	Road Intersection	67	111
21	Housing	Housing	57	103
22	Road Intersection	Road Intersection	32	85
23	Road Intersection	Road Intersection	52	100
24	Knob Noster Mobile Home & RV	Housing	66	109

Key: AFB = Air Force Base; dBA = A-weighted decibels; DNL = day-night average sound level; ID = identification code; SEL = sound exposure level

Note: Points of Interest presented in this table are provided to help understand the noise environment. As such, this table may not include all noise-sensitive facilities (schools, churches, daycares, etc.) that are affected by noise contours. Values in this table are rounded.

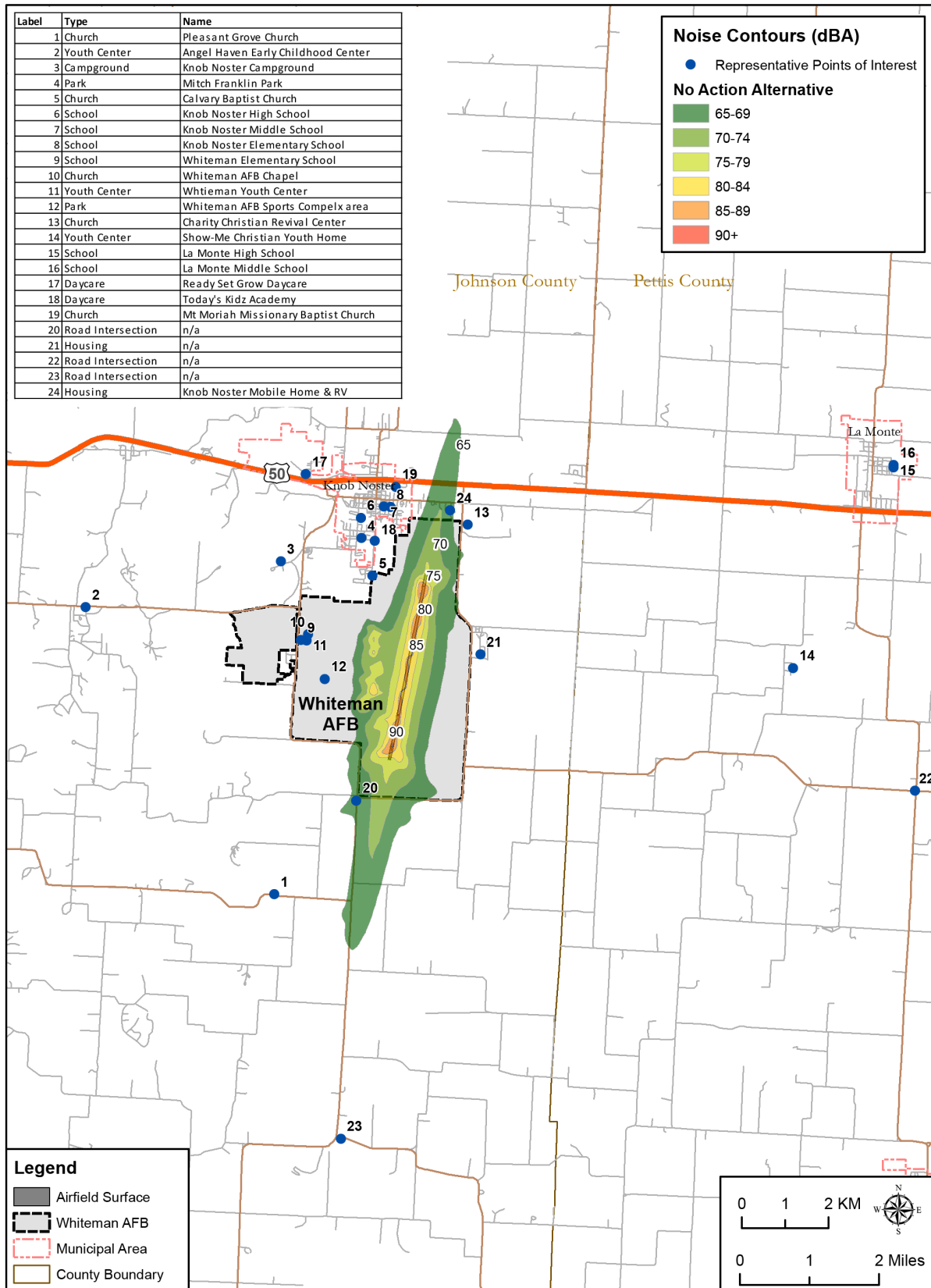


Figure 3.3-3. Noise Contours at Whiteman AFB Under the No Action Alternative

Potential Classroom Disruption. Table 3.3-10 lists the outdoor and indoor estimated $L_{eq(8hr)}$ values under the No Action Alternative during a typical school day (7:00 a.m. to 4:00 p.m., Monday through Friday) at schools near Whiteman AFB. Schools at which the maximum estimated indoor L_{eq} exceeds 40 dBA may not meet the 2009 ANSI guidance for at least a portion of one hour during a typical school day. The $L_{eq(8hr)}$ at four schools equal or exceed this classroom noise level guideline if the school's windows are open, but none of the schools studied would experience noise levels exceeding 40 dBA $L_{eq(8hr)}$ if windows are closed. To further describe classroom noise levels, Table 3.3-10 also shows the numbers of events during an average school day hour with the potential to interfere with speech. For the purposes of this analysis, any noise event exceeding 50 dBA L_{max} was conservatively assumed to have the potential to interfere with speech at least momentarily. For example, an individual attending Knob Noster High School (06) would typically experience two potential speech interference events per average hour with the windows open and one per hour with windows closed under the No Action Alternative.

Table 3.3-10. Potential Classroom Disruption at Schools Near Whiteman AFB Under the No Action Alternative

Point of Interest ^(a)		Outdoor $L_{eq(8hr)}$ (dBA) ^(c)	Indoor ^(b)			
			Windows Open		Windows Closed	
ID	Description		$L_{eq(8hr)}$ (dBA) ^(c)	Events per Hour ^(d)	$L_{eq(8hr)}$ (dBA) ^(c)	Events per Hour ^(d)
02	Angel Haven Early Childhood Center	<40	<40	0	<40	0
06	Knob Noster High School	55	40	2	<40	1
07	Knob Noster Middle School	56	41	2	<40	1
08	Knob Noster Elementary School	57	42	2	<40	1
09	Whiteman Elementary School	51	<40	1	<40	0
15	La Monte High School	<40	<40	0	<40	0
16	La Monte Middle School	<40	<40	0	<40	0
17	Ready Set Grow Daycare	50	<40	1	<40	0
18	Today's Kidz Academy	61	46	2	<40	1

Key: < = less than; AFB = Air Force Base; ANSI = American National Standards Institute; dBA = A-weighted decibels; ID = identification code; $L_{eq(8hr)}$ = 8-hour equivalent sound level

Notes:

- Daycares/schools presented in this table are provided to help understand the noise environment. As such, this table may not include all such facilities that are affected by noise contours.
- Indoor L_{eq} is assumed to be 25 dB less than outdoor L_{eq} due to the noise level reduction provided by the structure with windows closed. Actual outdoor-to-indoor noise level reduction varies from school to school and between locations within individual schools. Events per hour are rounded values.
- Schools that meet the 2009 ANSI standard of less than 40 dBA L_{eq} are listed as having an L_{eq} of <40 dB.
- For the purposes of this analysis, any noise event exceeding 50 dBA L_{max} was conservatively assumed to have the potential to interfere with speech at least momentarily.

Potential Hearing Loss. Under the No Action Alternative, no off-installation residents would be exposed to noise levels exceeding 80 dBA DNL (Table 3.3-8). PHL risk would continue to be minimal, and detailed PHL risk calculations are not warranted per DoD policy (Undersecretary of Defense for Acquisition Technology and Logistics, 2009).

Aircraft Noise Levels in Training Airspace

Aircraft noise levels beneath military training airspace units within the Whiteman AFB ROI would range from less than 35 dBA to 42.2 dBA L_{dnmr} under the No Action Alternative (Figure 3.3-4). Noise levels are well below the 65 dBA noise level at which all land uses are considered compatible. The likelihood of annoyance is low at these noise levels.

Construction Noise

Under the No Action Alternative, construction, demolition, or renovation projects associated with the Proposed Action would not occur, but other unrelated construction efforts, which are described in Table 3.1-1 would occur. For example, the project to modernize LeMay Gate, which is currently under way, would proceed to completion under the No Action Alternative. Projects that have been programmed to occur in the future, which include Whiteman AFB airfield pavement repair and replacement of the water main would also occur under the No Action Alternative. Projects would result in temporary, minor noise increases resulting from C&D activities.

Construction noise modeling reflects a set of common equipment types, which include a backhoe, bulldozer, ground compactor, generators, pickup trucks, and pneumatic tools. Noise levels on a day in which all these equipment types are operating are listed in Table 3.3-7 at various receptor distances from the construction site. At distances greater than 600 feet from the construction site, the L_{max} would be 64 dBA. This sound level is comparable to the noise level generated by a vacuum cleaner at a distance of 10 feet.

C&D activities under the No Action Alternative would result in temporary, localized increases in noise levels that could be disruptive and annoying. However, the installation and surrounding area is exposed to frequent loud aircraft operations noise and ground vehicle traffic noise under baseline conditions. Additionally, C&D activities would be conducted during normal business hours. In this context, the temporary and localized noise generated by C&D activities on the installation could be disruptive and potentially annoying, but noise impacts would not be significant.

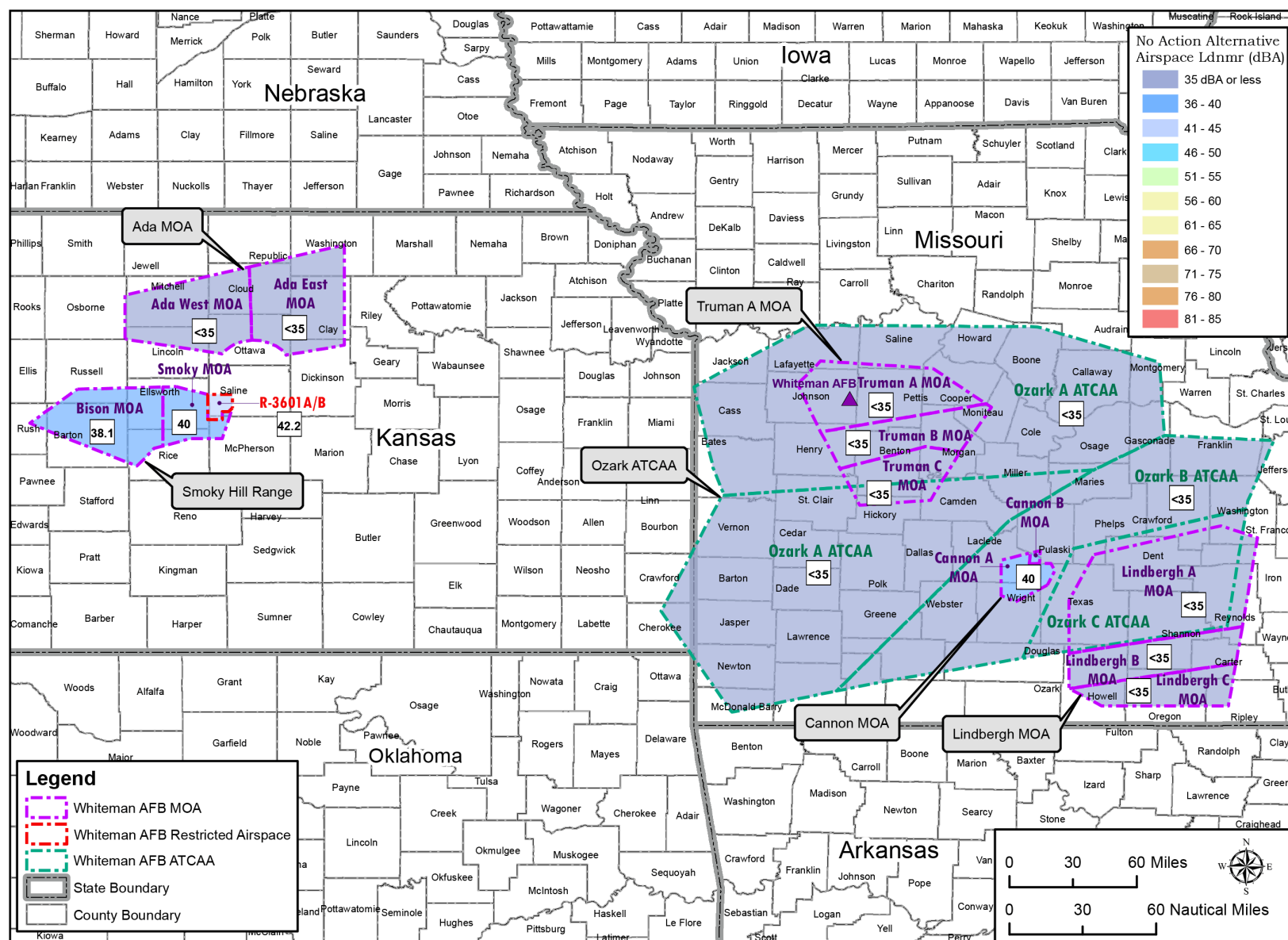


Figure 3.3-4. L_{dnmr} Beneath Whiteman AFB Training Airspace Under the No Action Alternative

3.3.2.2 Dyess AFB Alternative

3.3.2.2.1 Personnel

Additional personnel would not be likely to appreciably contribute to noise in the area. The area near Dyess AFB is characterized by aircraft noise and vehicular noise. Personnel would continue to commute on established roads, and the relatively minor increase in personnel and traffic overall would not be likely to impact noise adversely.

3.3.2.2.2 Airfield Operations

Annoyance. Figure 3.3-5 depicts noise contours in the vicinity of Dyess AFB under the Dyess AFB Alternative compared with the No Action Alternative. Under the Dyess AFB Alternative, 3,772 acres and an estimated 541 residents would be exposed to off-installation noise levels exceeding 65 dBA DNL near Dyess AFB (Table 3.3-11). This represents a decrease of 7,251 acres and 953 residents overall from the No Action Alternative. The change in noise level is attributable both to the net reduction in the number of annual flight operations under the Dyess AFB Alternative and to the fact that the B-21 is projected to be less loud than the B-1.

Under the Dyess Alternative, DNL at representative points of interest would decrease by as much as 12 dBA and the highest SEL values typically experienced would decrease by as much as 16 dBA (Table 3.3-12). DNL decreases would occur for the reasons mentioned previously. At Dyess AFB, the highest SEL values typically experienced are generated by based B-1 aircraft. The departure of B-1 aircraft under the Dyess AFB Alternative is the cause for the reductions in highest SEL values typically experienced at the representative points of interest.

Table 3.3-11. Acreage and Population Affected by Elevated Noise Levels Under the Dyess AFB Alternative

Noise Level (dBA DNL)	No Action Alternative Acres Off Installation	Dyess Alternative Acres Off Installation	Change from No Action Acres Off Installation	No Action Alternative Off-Installation Population ^(a)	Dyess Alternative Off-Installation Population ^(a)	Change from No Action Off-Installation Population
65–69	5,764	2,883	-2,881	673	375	-298
70–74	3,262	733	-2,529	465	139	-326
75–79	1,361	155	-1,206	230	27	-203
80–84	452	0	-452	93	0	-93
85–89	146	0	-146	27	0	-27
≥90	38	0	-38	6	0	-6
Total	11,023	3,772	-7,251	1,494	541	-953

Key = > = greater than; AFB = Air Force Base; dBA = A-weighted decibels; DNL = day-night average sound level

Note:

a. Population estimates were made based on 2015–2021 American Community Survey 5-Year Estimates data (U.S. Census Bureau, 2021a) assuming an even population distribution within each census subdivision. The actual number of persons currently residing in affected areas may differ from the listed estimates.

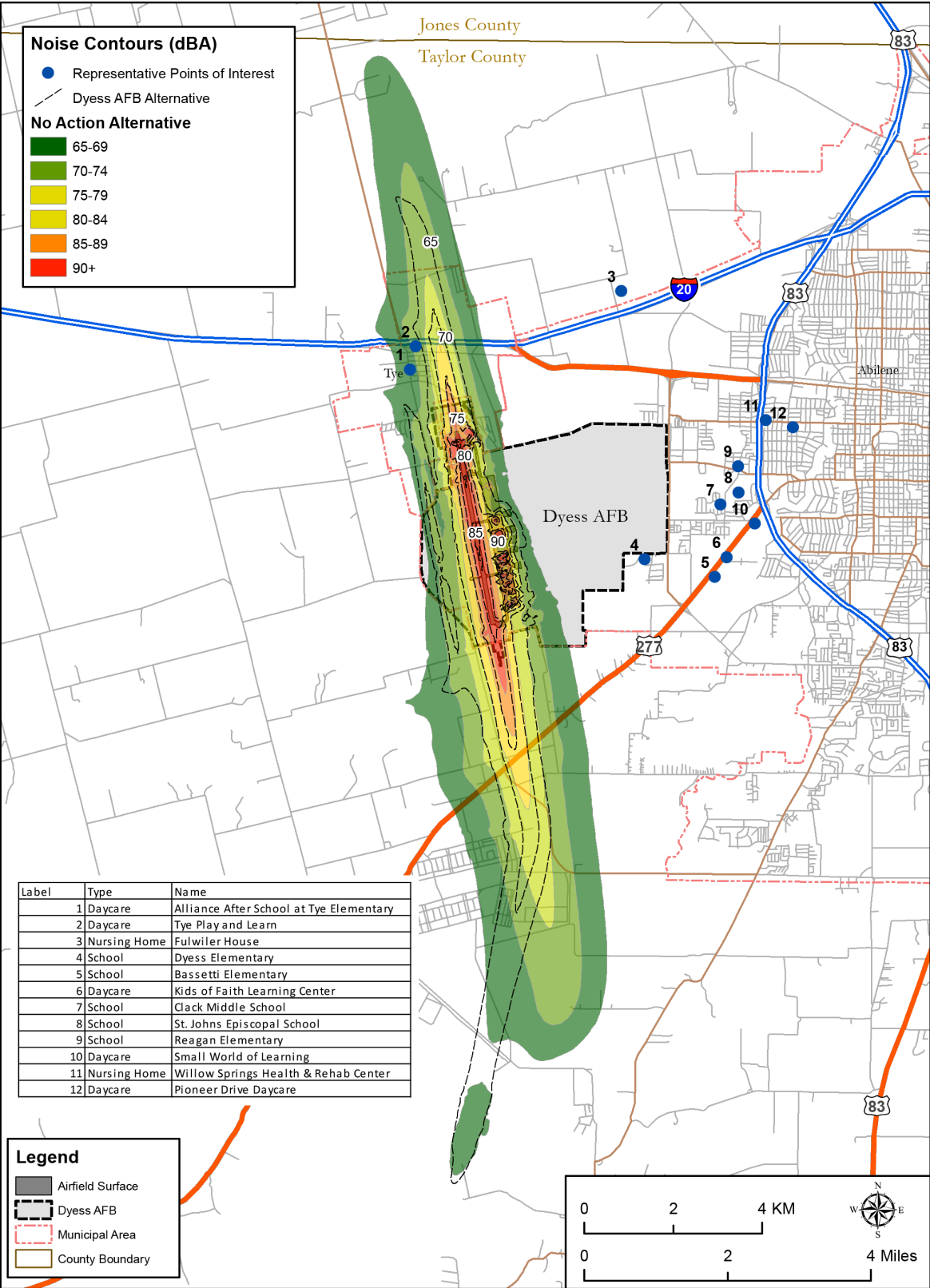


Figure 3.3-5. Noise Contours at Dyess AFB Under the Dyess AFB Alternative Compared With the No Action Alternative

Table 3.3-12. DNL and SEL at Representative Points of Interest Under the Dyess AFB Alternative

Point of Interest		DNL (dBA)			Highest Typical SEL (dBA)		
ID	Description	No Action	Dyess AFB Alternative	Change from No Action	No Action	Dyess AFB Alternative	Change from No Action
01	Alliance After School at Tye Elementary	68	61	-7	114	108	-6
02	Tye Play and Learn	71	63	-8	117	110	-7
03	Fulwiler House	48	39	-9	93	87	-6
04	Dyess Elementary	54	44	-10	98	87	-11
05	Bassetti Elementary	47	38	-9	89	82	-7
06	Kids of Faith Learning Center	45	37	-8	88	81	-7
07	Clark Middle School	44	36	-8	87	79	-8
08	St. John's Episcopal School	42	35	-7	86	82	-4
09	Reagan Elementary	42	35	-7	86	83	-3
10	Small World of Learning	43	34	-9	88	81	-7
11	Willow Springs Health & Rehab Center	46	34	-12	95	79	-16
12	Pioneer Drive Daycare	45	33	-12	95	80	-15

Key: - = minus; AFB = Air Force Base; dBA = A-weighted decibels; DNL = day-night average sound level; ID = identification code; SEL = sound exposure level

Note: Points of Interest presented in this table are provided to help understand the noise environment. As such, this table may not include all noise-sensitive facilities (schools, churches, daycares, etc.) that are affected by noise contours. Values in this table are rounded.

Potential Classroom Disruption. Under the Dyess Alternative, $L_{eq(8hr)}$ during a typical school day (7:00 a.m. to 4:00 p.m., Monday through Friday) would decrease by as much as 16 dBA (Table 3.3-13). The $L_{eq(8hr)}$ at Alliance After School at Tye Elementary (01) and Tye Play and Learn (02) would decrease to 41 and 43 dBA $L_{eq(8hr)}$, respectively, if windows are open but would be below 40 dBA $L_{eq(8hr)}$ if windows are closed. Classroom noise levels would be below the 40 dBA $L_{eq(8hr)}$ noise level classroom guideline at the other schools studied. The number of potential speech interference events per average hour at the schools studied would decrease by one or remain the same under the Dyess AFB Alternative. The potential for classroom disruption would be reduced under the Dyess AFB Alternative.

Table 3.3-13. Potential Classroom Disruption at Schools Near Dyess AFB Under the Dyess AFB Alternative

Point of Interest ^(a)		Dyess AFB Alternative ^(b)					Change from No Action				
		Outdoor Leq(8hr) (dBA)	Indoor ^(c)				Outdoor Leq(8hr) (dBA)	Indoor ^(c)			
			Windows Open		Windows Closed			Windows Open		Windows Closed	
			Leq(8hr) (dBA)	Events per Hour ^(d)	Leq(8hr) (dBA)	Events per Hour ^(d)		Leq(8hr) (dBA)	Events per Hour ^(d)	Leq(8hr) (dBA)	Events per Hour ^(d)
ID	Description										
01	Alliance After School at Tye Elementary	56	41	3	<40	0	-10	-10	-1	-10	-1
02	Tye Play and Learn	58	43	3	<40	2	-12	-12	0	-12	0
04	Dyess Elementary	41	<40	0	<40	0	-11	-11	-1	-11	0

Table 3.3-13. Potential Classroom Disruption at Schools Near Dyess AFB Under the Dyess AFB Alternative

Point of Interest ^(a)		Dyess AFB Alternative ^(b)					Change from No Action				
		Outdoor Leq(8hr) (dBA)	Indoor ^(c)				Outdoor Leq(8hr) (dBA)	Indoor ^(c)			
			Windows Open		Windows Closed			Windows Open		Windows Closed	
			Leq(8hr) (dBA)	Events per Hour ^(d)	Leq(8hr) (dBA)	Events per Hour ^(d)		Leq(8hr) (dBA)	Events per Hour ^(d)	Leq(8hr) (dBA)	Events per Hour ^(d)
ID	Description										
05	Bassetti Elementary	<40	<40	0	<40	0	-11	-11	0	-11	0
06	Kids of Faith Learning Center	<40	<40	0	<40	0	-10	-10	0	-10	0
07	Clark Middle School	<40	<40	0	<40	0	-9	-9	0	-9	0
08	St. John's Episcopal School	<40	<40	0	<40	0	-9	-9	0	-9	0
09	Reagan Elementary	<40	<40	0	<40	0	-8	-8	0	-8	0
10	Small World of Learning	<40	<40	0	<40	0	-10	-10	0	-10	0
12	Pioneer Drive Daycare	<40	<40	0	<40	0	-16	-16	0	-16	0

Key: < = less than; - = minus; AFB = Air Force Base; ANSI = American National Standards Institute; dBA = A-weighted decibels; ID = identification code; $L_{eq(8hr)}$ = 8-hour equivalent sound level

Notes:

- Daycares/schools presented in this table are provided to help understand the noise environment. As such, this table may not include all such facilities that are affected by noise contours.
- Schools that meet the 2009 ANSI standard of less than 40 dBA L_{eq} are listed as having an L_{eq} of <40 dBA. Events per hour are rounded values.
- Assumes 15 dBA and 25 dBA of noise level reductions for windows open and closed, respectively.
- For the purposes of this analysis, any noise event exceeding 50 dBA maximum sound level (L_{max}) was conservatively assumed to have the potential to interfere with speech at least momentarily.

Potential Hearing Loss. Under the Dyess Alternative, noise levels would decrease such that no off-installation residents would be exposed to noise levels at or exceeding 80 dBA DNL (see Table 3.3-11). It should be noted that this would result in a decrease of 57 residents being exposed to outdoor noise levels exceeding 80 dBA $L_{eq(24hr)}$ as compared to the No Action Alternative. The level of PHL risk is sufficiently low that detailed analysis is not warranted, as per DoD policy (Undersecretary of Defense for Acquisition Technology and Logistics, 2009).

3.3.2.2.3 Airspace and Range Utilization

Time-averaged noise levels (dBA L_{dnmr}) beneath training airspace would remain the same or decrease by as much as 15 dBA L_{dnmr} under the Dyess Alternative (Table 3.3-14 and Figure 3.3-6). Noise level decreases would result from the decreased number of operations proposed for the Dyess AFB Alternative and because the B-21 aircraft is projected to be less loud than the B-1. Noise impacts would be beneficial or non-existent.

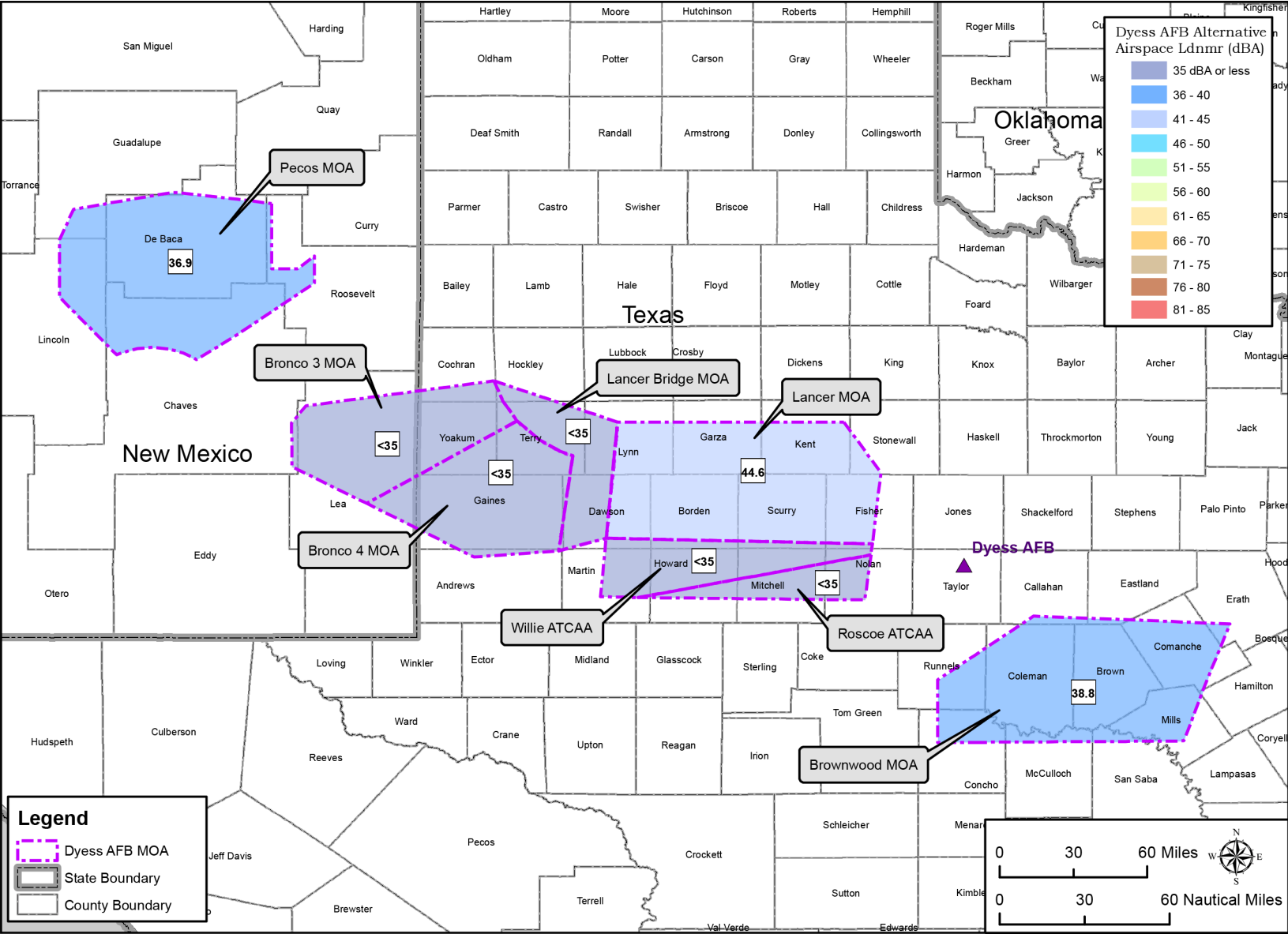


Figure 3.3-6. L_{dnmr} Beneath Training Airspace Under the Dyess AFB Alternative

Table 3.3-14. Dyess AFB Alternative Training Airspace Noise Levels (dBA L_{dnmr})

Airspace Name	No Action Alternative (dBA L _{dnmr})	Dyess Alternative (dBA L _{dnmr})	Change from No Action Alternative (dBA L _{dnmr})
Lancer MOA	48	44.6	-3.4
Willie-Roscoe ATCAA	38.9	<35	-3.9
Pecos MOA	51.9	36.9	-15.0
Lancer Bridge MOA	<35	<35	0
Brownwood MOA	39	38.8	-0.2
Bronco MOA	<35	<35	0

Key: < = less than; - = minus; AFB = Air Force Base; ATCAA = Air Traffic Control Assigned Airspaces; dBA = A-weighted decibels; dBA L_{dnmr} = onset-rate adjusted monthly day-night average sound level; MOA = Military Operating Area

3.3.2.2.4 Facilities and Infrastructure

Facilities and infrastructure C&D activities would result in temporary, localized increases in noise levels could be disruptive and potentially annoying. Construction noise levels would be similar to noise generated by construction projects that are ongoing currently or that would occur under the No Action Alternative on Dyess AFB (see Table 3.3-7). The installation and surrounding area are exposed to frequent, loud aircraft operations noise and ground vehicle traffic noise under baseline conditions. Additionally, C&D activities would be conducted during normal business hours. In this context, the temporary and localized noise generated by C&D activities on the installation could be disruptive and potentially annoying but would not be significant.

3.3.2.2.5 Weapons Generation Facility

WGF C&D activities would generate typical construction noise as shown in Table 3.3-7, which would decrease proportionally as the distance from the noise source to the receptor increases. Noise impacts would be temporary and minor and would not be significant.

3.3.2.2.6 Snapshot

Because the snapshot scenario reflects operational conditions at Dyess AFB that could exist for a relatively brief time period during which B-1 and B-21 missions could overlap, noise levels and potential noise impacts associated with the snapshot scenario would be temporary. Once the transition to the B-21 mission is complete, noise impacts would be as described for the Dyess AFB Alternative.

Airfield Operations

Annoyance. Noise contours in the vicinity of Dyess AFB under the Dyess AFB snapshot scenario are depicted in Figure 3.3-7. Under the Dyess AFB snapshot scenario, 6,577 acres and an estimated 923 residents could be exposed to off-installation noise levels exceeding 65 dBA DNL near Dyess AFB (Table 3.3-15). This represents a decrease of 4,446 acres and 571 off-installation residents from the No Action Alternative. The decrease in noise exposure is attributable to the decrease in B-1 airfield operations under the Dyess AFB snapshot scenario compared to the No Action Alternative and the fact that the B-21 is projected to be less loud than the B-1.

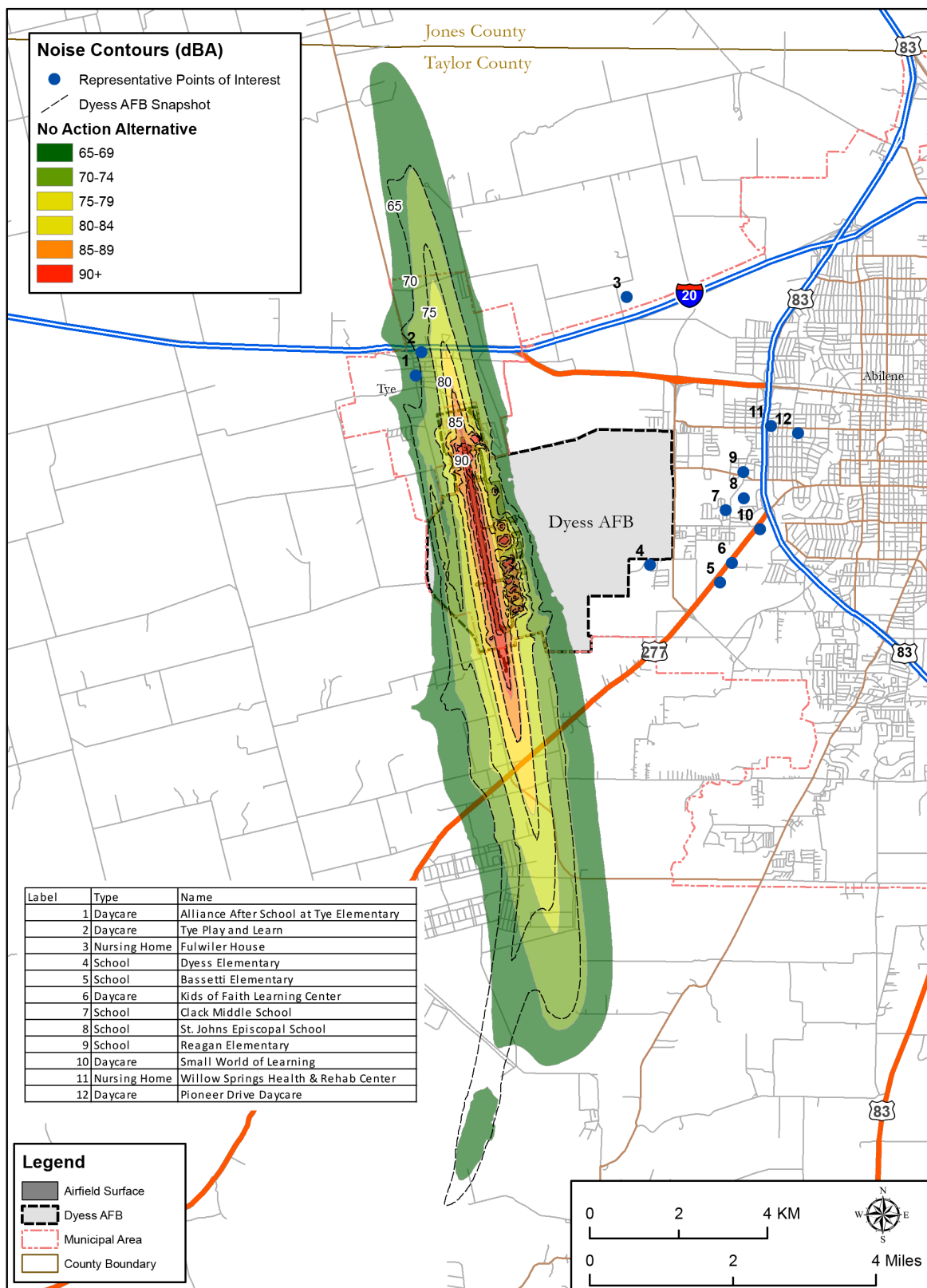


Table 3.3-15. Acreage and Population Affected by Elevated Noise Levels Under the Snapshot Scenario at Dyess AFB

Noise Level (dBA DNL)	No Action Alternative Acres Off Installation	Dyess AFB Snapshot Acres Off Installation	Change from No Action Acres Off Installation	No Action Off-Installation Population ^(a)	Dyess AFB Snapshot Off-Installation Population ^(a)	Change from No Action Off-Installation Population
65–69	5,764	4,367	-1,397	673	553	-120
70–74	3,262	1,556	-1,706	465	242	-223
75–79	1,361	493	-868	230	100	-130
80–84	452	139	-313	93	24	-69
85–90	146	22	-124	27	4	-23
≥90	38	0	-38	6	0	-6
Total	11,023	6,577	-4,446	1,494	923	-571

Key: > = greater than; - = minus; AFB = Air Force Base; dBA = A-weighted decibels; DNL = day-night average sound level

Note:

a. Population estimates were made based on 2017–2021 American Community Survey 5-Year Estimates data (U.S. Census Bureau, 2021a) assuming an even population distribution within each census subdivision. The number of persons currently residing in affected areas may differ from what has been stated.

Under the snapshot scenario at Dyess AFB, DNL at representative points of interest, which are shown in Figure 3.3-7, would decrease by as much as 6 dBA and the highest SEL values typically experienced would remain the same (Table 3.3-16). The DNL values at locations near Dyess AFB would decrease for the reasons mentioned previously (i.e., the substantial decrease in B-1 operations and addition of B-21 operations that are less loud than B-1 operations). The highest SEL values typically experienced would remain the same because B-1 aircraft that generate these noise events would continue to operate at Dyess AFB under the Dyess AFB snapshot scenario.

Table 3.3-16. DNL and SEL at Representative Points of Interest Under the Snapshot Scenario at Dyess AFB

Point of Interest ^(a)		DNL (dBA) ^(b)			Highest Typical SEL (dBA) ^(b)		
ID	Description	No Action	Dyess AFB Snapshot	Change from No Action	No Action	Dyess AFB Snapshot	Change from No Action
01	Alliance After School at Tye Elementary	68	64	-4	114	114	0
02	Tye Play and Learn	71	67	-4	117	117	0
03	Fulwiler House	48	43	-5	93	93	0
04	Dyess Elementary	54	48	-6	98	98	0
05	Bassetti Elementary	47	42	-5	89	89	0
06	Kids of Faith Learning Center	45	40	-5	88	88	0
07	Clark Middle School	44	39	-5	87	87	0
08	St. John's Episcopal School	42	38	-4	86	86	0

Table 3.3-16. DNL and SEL at Representative Points of Interest Under the Snapshot Scenario at Dyess AFB

Point of Interest ^(a)		DNL (dBA) ^(b)			Highest Typical SEL (dBA) ^(b)		
ID	Description	No Action	Dyess AFB Snapshot	Change from No Action	No Action	Dyess AFB Snapshot	Change from No Action
09	Reagan Elementary	42	38	-4	86	86	0
10	Small World of Learning	43	38	-5	88	88	0
11	Willow Springs Health & Rehab Center	46	40	-6	95	95	0
12	Pioneer Drive Daycare	45	39	-6	95	95	0

Key: - = minus; AFB = Air Force Base; dBA = A-weighted decibels; DNL = day-night average sound level; ID = identification code; SEL = sound exposure level

Notes:

a. Points of Interest presented in this table are provided to help understand the noise environment. As such, this table may not include all noise-sensitive facilities (schools, churches, daycares, etc.) that are affected by noise contours.

b. Values in this table are rounded.

Potential Classroom Disruption. Under the Dyess Snapshot Scenario, $L_{eq(8hr)}$ during a typical school day (7:00 a.m. to 4:00 p.m., Monday through Friday) would decrease by as much as 7 dBA (Table 3.3-17). The $L_{eq(8hr)}$ at Alliance After School at Tye Elementary (01) and Tye Play and Learn (02) would decrease to 46 and 49 dBA $L_{eq(8hr)}$, respectively, if windows are open but would be below 40 dBA $L_{eq(8hr)}$ if windows are closed. Classroom noise levels would be below the 40 dBA $L_{eq(8hr)}$ noise level classroom guideline at the other schools studied. The number of potential speech interference events per average hour at the schools studied would decrease by one or remain the same. The potential for classroom disruption would be reduced under the Dyess AFB snapshot scenario.

Table 3.3-17. Potential Classroom Disruption at Schools Near Dyess AFB Under the Snapshot Scenario

Point of Interest ^(a)		Dyess AFB Snapshot Scenario ^(b)					Change from No Action				
		Outdoor Leq(8hr) (dBA)	Indoor ^(c)				Outdoor Leq(8hr) (dBA)	Indoor ^(c)			
			Windows Open		Windows Closed			Windows Open		Windows Closed	
			Leq(8hr) (dBA)	Events per Hour ^(d)	Leq(8hr) (dBA)	Events per Hour ^(d)		Leq(8hr) (dBA)	Events per Hour ^(d)	Leq(8hr) (dBA)	Events per Hour ^(d)
ID	Description										
01	Alliance After School at Tye Elementary	61	46	3	<40	0	-5	-5	-1	-5	-1
02	Tye Play and Learn	64	49	3	<40	2	-6	-6	0	-6	0
04	Dyess Elementary	46	<40	0	<40	0	-6	-6	-1	-6	0
05	Bassetti Elementary	<40	<40	0	<40	0	-6	-6	0	-6	0
06	Kids of Faith Learning Center	<40	<40	0	<40	0	-5	-5	0	-5	0
07	Clark Middle School	<40	<40	0	<40	0	-5	-5	0	-5	0

Table 3.3-17. Potential Classroom Disruption at Schools Near Dyess AFB Under the Snapshot Scenario

Point of Interest ^(a)		Dyess AFB Snapshot Scenario ^(b)					Change from No Action				
		Outdoor L _{eq} (8hr) (dBA)	Indoor ^(c)				Outdoor L _{eq} (8hr) (dBA)	Indoor ^(c)			
			Windows Open		Windows Closed			Windows Open		Windows Closed	
			L _{eq} (8hr) (dBA)	Events per Hour ^(d)	L _{eq} (8hr) (dBA)	Events per Hour ^(d)		L _{eq} (8hr) (dBA)	Events per Hour ^(d)	L _{eq} (8hr) (dBA)	Events per Hour ^(d)
ID	Description										
08	St. John's Episcopal School	<40	<40	0	<40	0	-5	-5	0	-5	0
09	Reagan Elementary	<40	<40	0	<40	0	-5	-5	0	-5	0
10	Small World of Learning	<40	<40	0	<40	0	-5	-5	0	-5	0
12	Pioneer Drive Daycare	<40	<40	0	<40	0	-7	-7	0	-7	0

Key: < = less than; - = minus; AFB = Air Force Base; ANSI = American National Standards Institute; dBA = A-weighted decibels; ID = identification code; L_{eq}(8hr) = 8-hour equivalent sound level

Notes:

- Daycares/schools presented in this table are provided to help understand the noise environment. As such, this table may not include all such facilities that are affected by noise contours.
- Schools that meet the 2009 ANSI standard of less than 40 dBA L_{eq} are listed as having an L_{eq} of <40 dBA.
- Assumes 15 dBA and 25 dBA of noise level reductions for windows open and closed, respectively. Events per hour are rounded values.
- For the purposes of this analysis, any noise event exceeding 50 dBA L_{max} was conservatively assumed to have the potential to interfere with speech at least momentarily.

Potential Hearing Loss. Under the Dyess snapshot scenario, noise levels near the installation would decrease such that no off-installation residents would be exposed to noise levels at or exceeding 80 dBA DNL (see Table 3.3-15). The level of PHL risk would be sufficiently low that detailed analysis is not warranted, as per DoD policy (Undersecretary of Defense for Acquisition Technology and Logistics, 2009).

Airspace and Range Utilization

Time-averaged noise levels beneath military training airspace would decrease by as much as 6.2 dBA L_{dnmr} or remain the same under the Dyess AFB Snapshot Alternative (Table 3.3-18 and Figure 3.3-8). Noise levels would remain well below the 65 dBA level at which some land uses are not considered to be compatible. Reductions would occur primarily because B-21 aircraft are projected to be less loud than the B-1 aircraft operating in training airspace currently. Impacts would be beneficial or non-existent under the Dyess snapshot scenario.

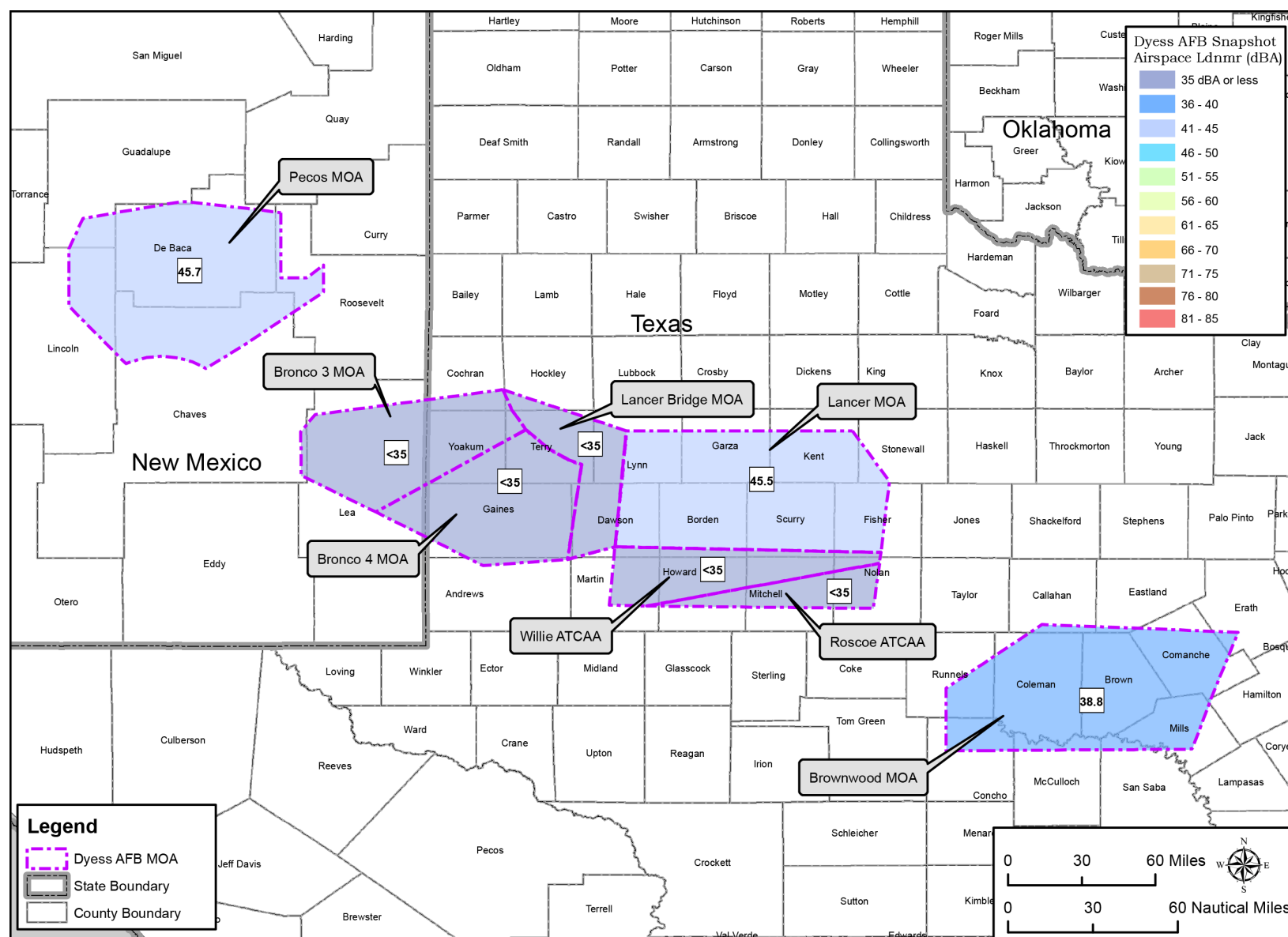


Figure 3.3-8. L_{dnmr} Under the Dyess AFB Snapshot Scenario

Table 3.3-18. Dyess AFB Snapshot Scenario Training Airspace Noise Levels (dBA L_{dnmr})

Airspace	No Action Alternative (dBA L_{dnmr})	Dyess AFB Snapshot (dBA L_{dnmr})	Dyess AFB Snapshot Change from No Action Alternative (dBA L_{dnmr})
Lancer MOA	48	45.5	-2.5
Willie-Roscoe ATCAA	38.9	<35	-3.9
Pecos MOA	51.9	45.7	-6.2
Lancer Bridge MOA	<35	<35	0
Brownwood MOA	39	38.8	-0.2
Bronco MOA	<35	<35	0

Key: < = less than; - = minus; AFB = Air Force Base; ATCAA = Air Traffic Control Assigned Airspace; dBA = A-weighted decibels; dBA; L_{dnmr} = onset-rate adjusted monthly day-night average sound level; MOA = Military Operating Area

3.3.2.2.7 Reasonably Foreseeable Future Actions and Environmental Trends

Applicable reasonably foreseeable future actions and environmental trends are described in Table 3.1-2. Potential effects of noise on the surrounding communities, wildlife, and cultural resources would be associated with construction and other noise-generating activities, operation of new facilities, and increased aircraft and vehicle use. In Table 3.1-2, only the parking apron repair would include construction/demolition activities. Construction noise is temporary, lasting only for the duration of the construction project and typically limited to normal working hours (7:00 a.m. to 5:00 p.m.). However, construction noise would be noticeable to persons living and working nearby and may cause additional annoyance. Noise impacts parking apron repair are expected to be limited to the immediate areas surrounding the individual projects and would be insignificant.

Any effects of climate change on the transmission of sound through the atmosphere would be minimal. Increases in air temperature generally increase the sound absorption coefficient and would potentially slightly reduce sound levels received at sensitive locations.

Under the Dyess AFB Alternative, aircraft noise would decrease in the region, as shown and discussed in Section 3.3.2.2.2 (Noise, Environmental Consequences, Dyess AFB Alternative, Airfield Operations). As a result, there would be no incremental noise impacts from the Dyess AFB Alternative. Furthermore, no significant impacts from noise are anticipated from the Dyess AFB Alternative combined with reasonably foreseeable future projects and environmental trends.

3.3.2.2.8 Proposed Resource-Specific Mitigations and Management Actions to Reduce the Potential for Environmental Impacts

Based on the noise analysis in this EIS, no mitigations would be necessary. However, the DAF is responsible for monitoring the predictions (e.g., impact, mitigations) made in its completed NEPA documentation (40 CFR 1505.3, 1505.2(a)(3)). If substantial changes are recognized that are relevant to environmental concerns or that bear on a proposed action or its impacts, the DAF would reevaluate for potential impacts related to those changes. This would include monitoring noise and public noise complaints and developing potential mitigation measures that could be implemented based on DAF monitoring.

3.3.2.3 Whiteman AFB Alternative (Preferred Alternative)

3.3.2.3.1 Personnel

Additional personnel would not be likely to appreciably contribute to noise in the area. The area near Whiteman AFB is characterized by aircraft noise and vehicular noise. Personnel would continue to commute on established roads and would not impact noise adversely.

3.3.2.3.2 Airfield Operations

Annoyance. Figure 3.3-9 depicts noise contours in the vicinity of Whiteman AFB under the Whiteman AFB Alternative compared with the No Action Alternative. Under the Whiteman AFB Alternative, 1,604 acres and an estimated 329 off-installation residents would be exposed to off-installation noise levels exceeding 65 dBA DNL near Whiteman AFB (Table 3.3-19). This represents an increase of 498 acres and 89 residents from the No Action Alternative. The change in noise levels is due primarily to an increase in the number of airfield operations flown per year at Whiteman AFB from 29,771 to 31,751. As described in Section 3.3.1.3.1 (Noise, Affected Environment, Analysis Methodology, Noise Level Calculation), individual B-21 overflight noise levels are expected to be similar to noise levels generated by B-2 aircraft overflights.

Table 3.3-19. Acreage and Population Affected by Elevated Noise Levels Under the Whiteman AFB Alternative

Noise Level (dBA DNL)	No Action Alternative Acres Off Installation	Whiteman Alternative Acres Off Installation	Change from No Action Acres Off Installation	No Action Off-Installation Population (a)	Whiteman AFB Off-Installation Population (a)	Change from No Action Off-Installation Population
65–69	993	1,365	372	223	281	58
70–74	113	239	126	17	48	31
75–79	0	0	0	0	0	0
80–84	0	0	0	0	0	0
85–89	0	0	0	0	0	0
≥90	0	0	0	0	0	0
Total	1,106	1,604	498	240	329	89

Key: > = greater than; - = minus; AFB = Air Force Base; dBA = A-weighted decibels; DNL = day-night average sound level

Note:

a. Population estimates were made based on 2017–2021 American Community Survey 5-Year Estimates data (U.S. Census Bureau, 2021a).

The number of persons currently residing in affected areas may differ from what has been stated.

Under the Whiteman AFB Alternative, noise levels at 16 of the 24 representative points of interest near Whiteman AFB would slightly increase (by 1 or 2 dBA DNL), with a maximum noise level of 68 dBA DNL (Table 3.3-20). There would be no change in DNL at eight representative points of interest. The DNL values at some representative points of interest would increase for the reasons mentioned previously. The highest SEL values typically experienced would not change relative to the No Action Alternative at any of the representative points of interest studied. This lack of change reflects the fact that B-21 aircraft overflights would be similar in noise level to the B-2 overflight noise levels that occur under baseline conditions.

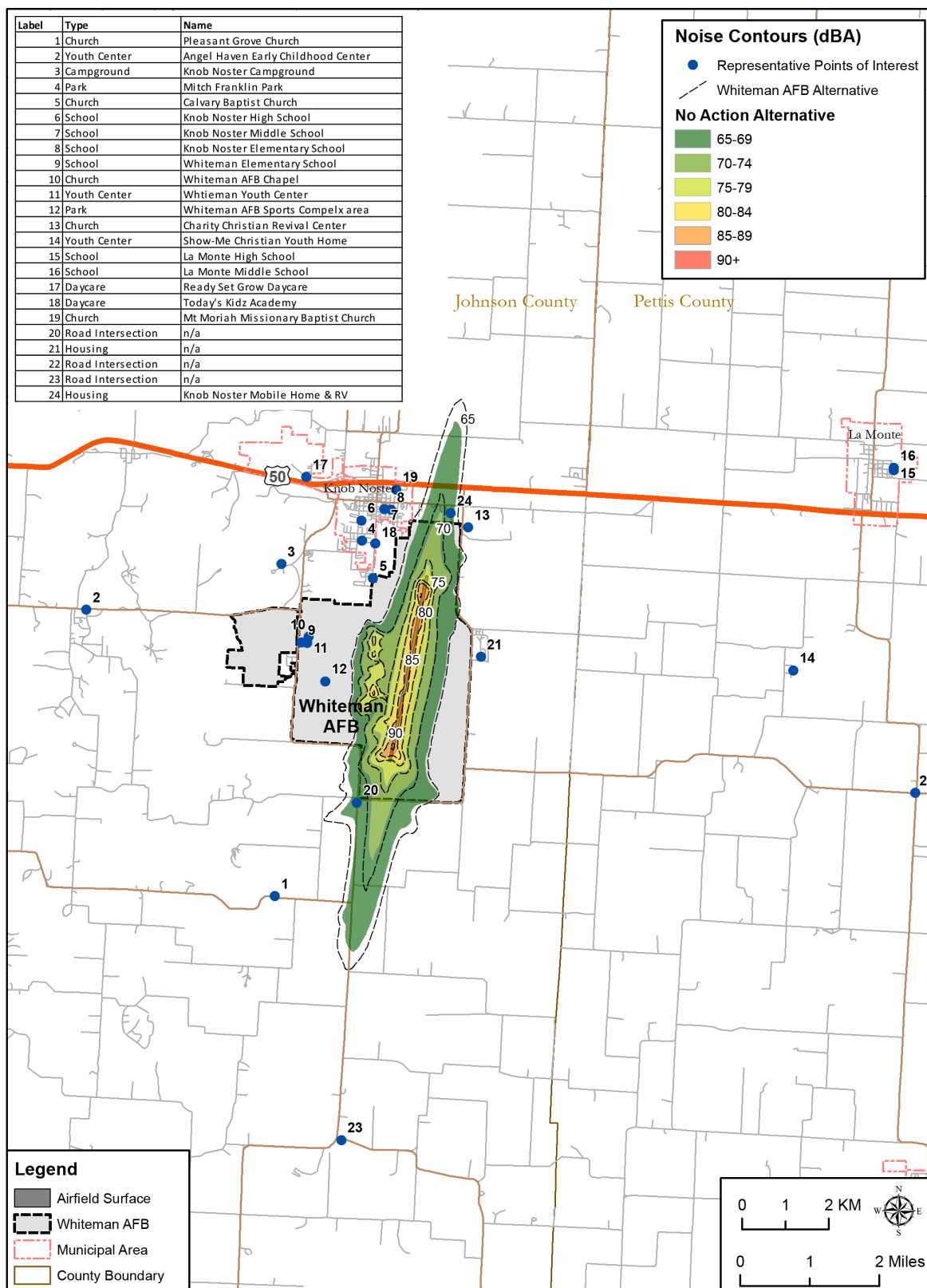


Figure 3.3-9. Noise Contours at Whiteman AFB Under the Whiteman AFB Alternative Compared With the No Action Alternative

Table 3.3-20. DNL and SEL at Representative Points of Interest Under the Whiteman AFB Alternative

Point of Interest ^(a)		DNL (dBA) ^(b)			Highest Typical SEL (dBA) ^(b)		
ID	Description	No Action	Whiteman AFB Alternative	Change from No Action	No Action	Whiteman AFB Alternative	Change from No Action
01	Pleasant Grove Church	53	54	+1	96	96	0
02	Angel Haven Early Childhood Center	42	43	+1	89	89	0
03	Knob Noster Campground	51	51	0	95	95	0
04	Mitch Franklin Park	58	58	0	103	103	0
05	Calvary Baptist Church	59	60	+1	103	103	0
06	Knob Noster High School	55	56	+1	100	100	0
07	Knob Noster Middle School	59	60	+1	107	107	0
08	Knob Noster Elementary School	60	61	+1	109	109	0
09	Whiteman Elementary School	51	52	+1	96	96	0
10	Whiteman AFB Chapel	52	52	0	97	97	0
11	Whiteman Youth Center	51	52	+1	97	97	0
12	Whiteman AFB Sports Complex area	55	56	+1	101	101	0
13	Charity Christian Revival Center	63	64	+1	112	112	0
14	Show-Me Christian Youth Home	46	46	0	95	95	0
15	La Monte High School	39	39	0	85	85	0
16	La Monte Middle School	39	40	+1	86	86	0
17	Ready Set Grow Daycare	55	57	+2	106	106	0
18	Today's Kidz Academy	60	60	0	106	106	0
19	Mt Moriah Missionary Baptist Church	59	60	+1	108	108	0
20	Road Intersection	67	68	+1	111	111	0
21	Housing	57	57	0	103	103	0
22	Road Intersection	32	33	+1	85	85	0
23	Road Intersection	52	52	0	100	100	0
24	Knob Noster Mobile Home & RV	66	68	+2	109	109	0

Key: - = minus; AFB = Air Force Base; dBA = A-weighted decibels; DNL = day-night average sound level; ID = identification code; SEL = sound exposure level

Notes:

a. Points of Interest presented in this table are provided to help understand the noise environment. As such, this table may not include all noise-sensitive facilities (schools, churches, daycares, etc.) that are affected by noise contours.

b. Values in this table are rounded.

Potential Classroom Disruption. Under the Whiteman AFB Alternative, $L_{eq(8hr)}$ during a typical school day (7:00 a.m. to 4:00 p.m., Monday through Friday) at schools near

Whiteman AFB would increase by 1 dBA or less (Table 3.3-21). Indoor $L_{eq(8hr)}$ would continue to equal or exceed 40 dBA, indicating a potential exceedance of ANSI classroom criteria, at four schools if windows are open and would not exceed 40 dBA at any schools if windows are closed. The number of potential speech interference events per average hour would increase by one at Today's Kidz Academy (18) if windows are open but would remain the same if windows are closed. The number of potential speech interference events per average hour would remain the same at all other schools regardless of whether windows are open or closed.

Table 3.3-21. Potential Classroom Disruption at Schools Near Whiteman AFB Under the Whiteman AFB Alternative

Point of Interest ^(a)		Whiteman AFB Alternative ^(b)					Change from No Action				
		Outdoor <									

Key: < = less than; + = plus; AFB = Air Force Base; ANSI = American National Standards Institute; dBA = A-weighted decibels; ID = identification code; $L_{eq(8hr)}$ = 8-hour equivalent sound level

Notes:

- Daycares/schools presented in this table are provided to help understand the noise environment. As such, this table may not include all such facilities that are affected by noise contours.
- Schools that meet the 2009 ANSI standard of less than 40 dBA L_{eq} are listed as having an L_{eq} of <40 dBA.
- Assumes 15 dBA and 25 dBA of noise level reductions for windows open and closed, respectively. Events per hour are rounded values.
- For the purposes of this analysis, any noise event exceeding 50 dBA maximum sound level (L_{max}) was conservatively assumed to have the potential to interfere with speech at least momentarily.

Potential Hearing Loss. Under the Whiteman AFB Alternative, no off-installation residents would be exposed to noise levels at or exceeding 80 dBA DNL (see Table 3.3-19). The level of PHL risk would be sufficiently low that detailed analysis is not warranted, as per DoD policy (Undersecretary of Defense for Acquisition Technology and Logistics, 2009).

3.3.2.3.3 Airspace and Range Utilization

Time-averaged noise levels (dBA L_{dnmr}) beneath training airspace would not change relative to the No Action Alternative under the Whiteman AFB Alternative (Table 3.3-22). These noise levels and the locations of Whiteman AFB training airspace is depicted in Figure 3.3-4). Noise levels would remain at 42.2 dBA L_{dnmr} or less, well below the 65 dBA level at which some land uses are not considered to be compatible. As noted previously, B-21 aircraft overflights are expected to generate noise levels similar to those generated by B-2 aircraft. No noise impacts are expected beneath training airspace under the Whiteman AFB Alternative.

Table 3.3-22. Whiteman AFB Alternative Training Airspace Noise Levels
(dBA L_{dnmr})

Airspace Name	No Action Alternative (dBA L_{dnmr})	Whiteman AFB Alternative (dBA L_{dnmr})	Change From No Action Alternative (dBA L_{dnmr})
Ada MOA (East and West)	<35	<35	0
Truman MOA (A, B, C)	<35	<35	0
Lindbergh MOA (A, B, C)	<35	<35	0
Cannon Range (R-4501) and MOA	40	40	0
Smoky Hill Range (R-3601)	42.2	42.2	0
Smoky MOA	40	40	0
Bison MOA	38.1	38.1	0
Ozark ATCAA (A, B, C)	<35	<35	0

Key: < = less than; dBA = A-weighted decibels; L_{dnmr} = onset-rate adjusted monthly day-night average sound level

3.3.2.3.4 Facilities and Infrastructure

Facilities and infrastructure C&D activities would result in temporary, localized increases in noise levels that could be disruptive and potentially annoying. Construction noise levels would be similar to noise generated by construction projects that are ongoing currently or that would occur under the No Action Alternative on Whiteman AFB (see Table 3.3-7). The installation and surrounding area are exposed to frequent, loud aircraft operations noise and ground vehicle traffic noise under baseline conditions. Additionally, C&D activities would be conducted during normal business hours. In this context, the temporary and localized noise generated by C&D activities on the installation could be disruptive and potentially annoying but would not be significant.

3.3.2.3.5 Weapons Generation Facility

North WGF Site Subalternative (Preferred Subalternative)

North WGF Site C&D activities would generate typical construction noise as shown in Table 3.3-7, which would decrease proportionally as the distance from the noise source to the receptor increases. The North WGF Site is closer to the residential community of Knob Noster than the South WGF site but is still more than 1,000 feet away from the nearest residence, and noise levels at the nearest residence would be below 65 dBA L_{max} .

Any annoyance resulting from the noise would be minor and temporary and impacts would not be significant.

South WGF Site Subalternative

South WGF Site C&D activities would generate typical construction noise as shown in Table 3.3-7, which would decrease proportionally as the distance from the noise source to the receptor increases. WGF Site C&D activities would occur more than 1,000 feet from the nearest residence, and noise levels at the nearest residences would be less than 65 dBA L_{max} . Any annoyance resulting from the noise would be minor and temporary and impacts would not be significant.

3.3.2.3.6 Snapshot

Because the snapshot scenario reflects operational conditions at Whiteman AFB that could exist for a relatively brief time period during which B-2 and B-21 missions could overlap, noise levels and potential noise impacts associated with the snapshot scenario would be temporary. Once the transition to the B-21 mission is complete, noise impacts would be as described for the Whiteman AFB Alternative.

Airfield Operations

Annoyance. Noise contours in the vicinity of Whiteman AFB under the Whiteman AFB snapshot scenario are depicted in Figure 3.3-10. Under the Whiteman AFB snapshot scenario, 1,787 acres and an estimated 361 residents could be exposed to off-installation noise levels exceeding 65 dBA DNL near Whiteman AFB (Table 3.3-23). This represents an increase of 681 acres and 121 off-installation residents from the No Action Alternative. Changes in noise level under the snapshot scenario would be primarily caused by addition of B-21 flight operations while based B-2 aircraft would also continue to operate (although at 20 percent of baseline tempo).

Under the snapshot scenario at Whiteman AFB, DNL at representative points of interest, which are shown in Figure 3.3-10, would increase by as much as 2 dBA and the highest SEL values typically experienced would remain the same (Table 3.3-24). The DNL values at certain locations near Whiteman AFB would increase for the reasons mentioned previously (i.e., addition of B-21 operations and continuation of some B-2 operations). The highest SEL values typically experienced would remain the same because the aircraft types that generate these noise events would continue to operate and because individual B-21 aircraft operations would not be louder than these baseline aircraft operations.

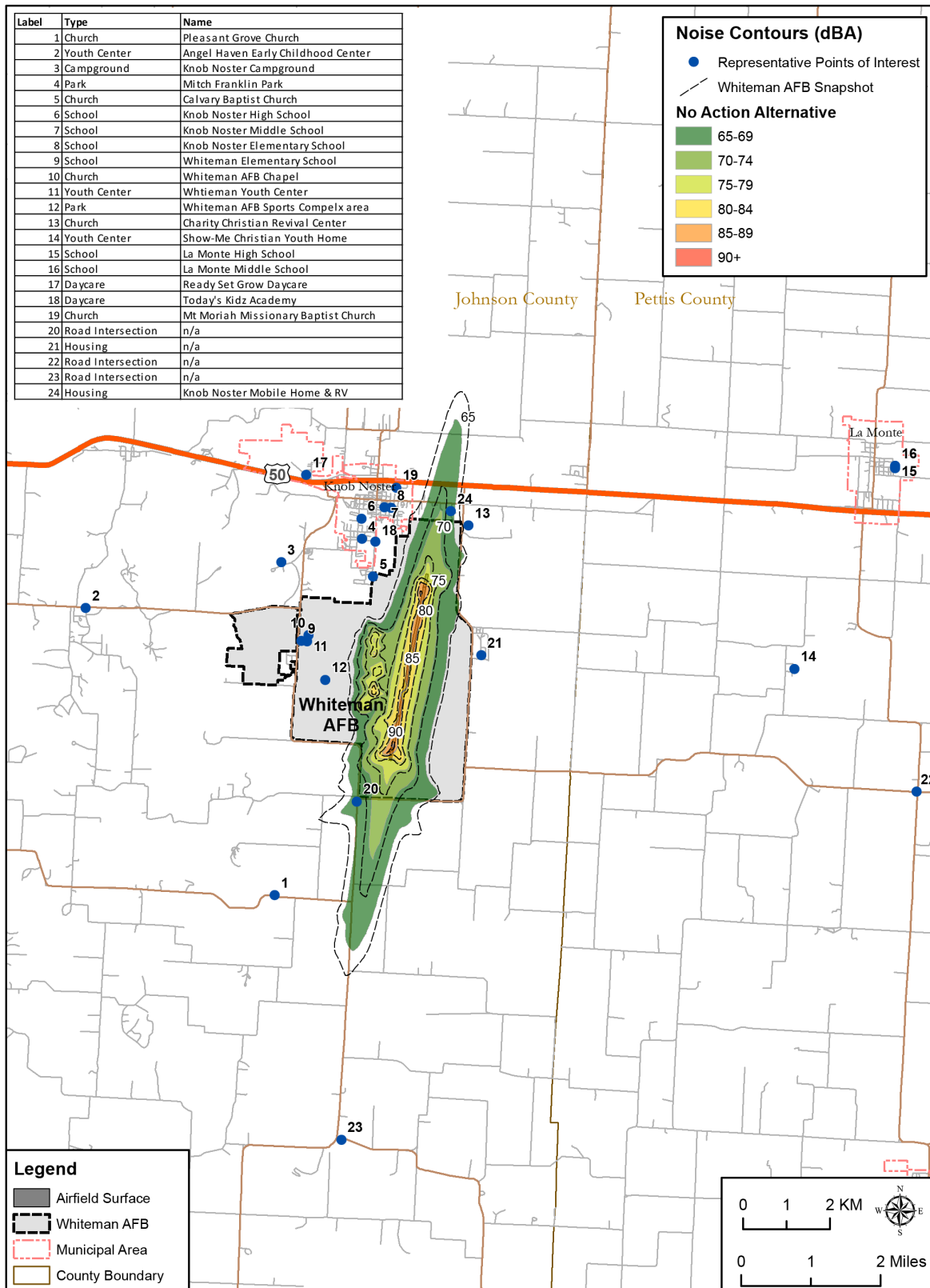


Figure 3.3-10. Noise Contours at Whiteman AFB Under the Snapshot Scenario Compared With the No Action Alternative

Table 3.3-23. Acreage and Population Affected by Elevated Noise Levels Under the Snapshot Scenario at Whiteman AFB

Noise Level (dBA DNL)	No Action Alternative Acres Off Installation	Whiteman AFB Snapshot Acres Off Installation	Change from No Action Acres Off Installation	No Action Off-Installation Population ^(a)	Whiteman AFB Snapshot Off-Installation Population ^(a)	Change from No Action Off-Installation Population
65–69	993	1,492	499	223	299	76
70–74	113	295	182	17	62	45
75–79	0	0	0	0	0	0
80–84	0	0	0	0	0	0
85–89	0	0	0	0	0	0
≥90	0	0	0	0	0	0
Total	1,106	1,787	681	240	361	121

Key: > = greater than; ≥ = greater than or equal to; AFB = Air Force Base; dBA = A-weighted decibels; DNL = day-night average sound level
 Note:

a. Population estimates were made based on 2017–2021 American Community Survey 5-Year Estimates data (U.S. Census Bureau, 2021a). The number of persons currently residing in affected areas may differ from what has been stated.

Table 3.3-24. DNL and SEL at Representative Points of Interest Under the Whiteman AFB Snapshot Alternative

Point of Interest ^(a)		DNL (dBA)			Highest Typical SEL (dBA)		
ID	Description	No Action	Whiteman AFB Snapshot	Change from No Action	No Action	Whiteman AFB Snapshot	Change from No Action
01	Pleasant Grove Church	53	55	+2	96	96	0
02	Angel Haven Early Childhood Center	42	44	+2	89	89	0
03	Knob Noster Campground	51	52	+1	95	95	0
04	Mitch Franklin Park	58	58	0	103	103	0
05	Calvary Baptist Church	59	60	+1	103	103	0
06	Knob Noster High School	55	57	+2	100	100	0
07	Knob Noster Middle School	59	60	+1	107	107	0
08	Knob Noster Elementary School	60	62	+2	109	109	0
09	Whiteman Elementary School	51	52	+1	96	96	0
10	Whiteman AFB Chapel	52	53	+1	97	97	0
11	Whiteman Youth Center	51	53	+2	97	97	0
12	Whiteman AFB Sports Complex area	55	56	+1	101	101	0
13	Charity Christian Revival Center	63	64	+1	112	112	0
14	Show-Me Christian Youth Home	46	46	0	95	95	0
15	La Monte High School	39	39	0	85	85	0
16	La Monte Middle School	39	40	+1	86	86	0
17	Ready Set Grow Daycare	55	57	+2	106	106	0

Table 3.3-24. DNL and SEL at Representative Points of Interest Under the Whiteman AFB Snapshot Alternative

Point of Interest ^(a)		DNL (dBA)			Highest Typical SEL (dBA)		
ID	Description	No Action	Whiteman AFB Snapshot	Change from No Action	No Action	Whiteman AFB Snapshot	Change from No Action
18	Today's Kidz Academy	60	60	0	106	106	0
19	Mt Moriah Missionary Baptist Church	59	61	+2	108	108	0
20	Road Intersection	67	68	+1	111	111	0
21	Housing	57	58	+1	103	103	0
22	Road Intersection	32	33	+1	85	85	0
23	Road Intersection	52	52	0	100	100	0
24	Knob Noster Mobile Home & RV	66	68	+2	109	109	0

Key: + = plus; AFB= Air Force Base; dBA = A-weighted decibels; DNL = day-night average sound level; ID = identification code; SEL = sound exposure level

Note:

a. Points of Interest presented in this table are provided to help understand the noise environment. As such, this table may not include all noise-sensitive facilities (schools, churches, daycares, etc.) that are affected by noise contours. Values in this table are rounded.

Potential Classroom Disruption. Under the Whiteman AFB snapshot scenario, potential classroom disruption impacts would be similar to impacts described previously for the Whiteman AFB Alternative. $L_{eq(8hr)}$ during a typical school day (7:00 a.m. to 4:00 p.m., Monday through Friday) at schools near Whiteman AFB would increase by 2 dBA or less (Table 3.3-25). Indoor $L_{eq(8hr)}$ at the schools studied would continue to equal or exceed 40 dBA at four schools if windows are open and would not exceed 40 dBA at any schools if windows are closed. The number of potential speech interference events per average hour under the Whiteman AFB snapshot scenario would increase by one at Today's Kidz Academy (18) if windows are open but would remain the same if windows are closed. The number of potential speech interference events per average hour under the Whiteman AFB snapshot scenario would remain the same at all other schools regardless of whether windows are open or closed.

Table 3.3-25. Potential Classroom Disruption at Schools Near Whiteman AFB Under the Snapshot Scenario

Point of Interest ^(a)		Whiteman AFB Snapshot Scenario ^(b)					Change from No Action				
		Outdoor Leq(8hr) (dB)	Indoor ^(c)					Indoor ^(c)			
			Windows Open		Windows Closed			Outdoor Leq(8hr) (dB)	Windows Open		Windows Closed
ID	Description		Leq(8hr) (dB)	Events per Hour ^(d)	Leq(8hr) (dB)	Events per Hour ^(d)			Leq(8hr) (dB)	Events per Hour ^(d)	Leq(8hr) (dB)
02	Angel Haven Early Childhood Center	<40	<40	0	<40	0	+1	+1	0	+1	0
06	Knob Noster High School	56	41	2	<40	1	+1	+1	0	0	0

Table 3.3-25. Potential Classroom Disruption at Schools Near Whiteman AFB Under the Snapshot Scenario

Point of Interest ^(a)		Whiteman AFB Snapshot Scenario ^(b)					Change from No Action				
		Outdoor L _{eq} (8hr) (dB)	Indoor ^(c)				Outdoor L _{eq} (8hr) (dB)	Indoor ^(c)			
			Windows Open		Windows Closed			Windows Open		Windows Closed	
ID	Description		L _{eq} (8hr) (dB)	Events per Hour ^(d)	L _{eq} (8hr) (dB)	Events per Hour ^(d)		L _{eq} (8hr) (dB)	Events per Hour ^(d)	L _{eq} (8hr) (dB)	Events per Hour ^(d)
07	Knob Noster Middle School	57	42	2	<40	1	+1	+1	0	+1	0
08	Knob Noster Elementary School	58	43	2	<40	1	+1	+1	0	+1	0
09	Whiteman Elementary School	51	<40	1	<40	0	0	0	0	0	0
15	La Monte High School	<40	<40	0	<40	0	0	0	0	0	0
16	La Monte Middle School	<40	<40	0	<40	0	0	0	0	0	0
17	Ready Set Grow Daycare	52	<40	1	<40	0	+2	+2	0	+2	0
18	Today's Kidz Academy	61	46	3	<40	1	0	0	+1	0	0

Key: < = less than; + = plus; AFB = Air Force Base; ANSI = American National Standards Institute; dB = decibels; dBA = A-weighted decibels; ID = identification code; Leq(8hr) = 8-hour equivalent sound level

Notes:

- Daycares/schools presented in this table are provided to help understand the noise environment. As such, this table may not include all such facilities that are affected by noise contours.
- Schools that meet the 2009 ANSI standard of less than 40 dBA Leq are listed as having an Leq of <40 dBA.
- Assumes 15 dBA and 25 dBA of noise level reductions for windows open and closed, respectively. Events per hour are rounded values.
- For the purposes of this analysis, any noise event exceeding 50 dBA maximum sound level (L_{max}) was conservatively assumed to have the potential to interfere with speech at least momentarily.

Potential Hearing Loss. Under the Whiteman AFB snapshot scenario, no off-installation residents would be exposed to noise levels at or exceeding 80 dBA DNL (see Table 3.3-23). PHL risk would continue to be minimal.

Airspace and Range Utilization

Time-averaged noise levels (dBA L_{dnmr}) beneath training airspace would not change relative to the No Action Alternative under the Whiteman AFB snapshot scenario (Table 3.3-26). These noise levels and the locations of Whiteman AFB training airspace are depicted in Figure 3.3-4. Noise levels would remain at 42.2 dBA L_{dnmr} or less, well below the 65 dBA level at which some land uses are not considered to be compatible. As

noted previously, B-21 aircraft overflights are expected to generate noise levels similar to those generated by B-2 aircraft. The addition of proposed B-21 operations and continuation of B-2 operations (at 20 percent of baseline operations tempo) under the snapshot scenario would not result in measurable changes in overall L_{dnmr} . As noise levels would not change measurably, no noise impacts are expected beneath training airspace under the Whiteman AFB snapshot scenario.

Table 3.3-26. Whiteman AFB Snapshot Scenario Training Airspace Noise Levels (dBA L_{dnmr})

Airspace	No Action Alternative (dBA L_{dnmr})	Snapshot Scenario (dBA L_{dnmr})	Change from No Action Alternative (dBA)
Ada MOA (East and West)	<35	<35	0
Truman MOA (A, B, C)	<35	<35	0
Lindbergh MOA (A, B, C)	<35	<35	0
Cannon Range (R-4501) and MOA	40	40	0
Smoky Hill Range (R-3601)	42.2	42.2	0
Smoky MOA	40	40	0
Bison MOA	38.1	38.1	0
Ozark ATCAA (A, B, C)	<35	<35	0

Key: < = less than; dBA = A-weighted decibels; L_{dnmr} = onset-rate adjusted monthly day-night average sound level; MOA = Military Operating Area

3.3.2.3.7 Reasonably Foreseeable Future Actions and Environmental Trends

Applicable reasonably foreseeable future actions and environmental trends are described in Table 3.1-2. Potential effects of noise on the surrounding communities, wildlife, and cultural resources would be associated with construction and other noise-generating activities, operation of new facilities, and increased vehicle use.

Reasonably foreseeable actions that could contribute to overall noise levels in the area include airfield surface drainage corrections and the re-location of the Arnold Gate (Table 3.1-2). Both projects involve construction of a new facility or demolition or renovation of an existing facility or infrastructure. Construction noise is temporary, lasting only for the duration of the construction project, and is typically limited to normal working hours (7:00 a.m. to 5:00 p.m.). However, construction noise would be noticeable to persons living and working nearby and may cause additional annoyance. Noise impacts associated with these projects are expected to be limited to the immediate areas surrounding the individual projects and would be insignificant.

Any effects of climate change on the transmission of sound through the atmosphere would be minimal. Changes in atmospheric absorption, which is affected by air temperature, would not substantively alter sound levels received at sensitive locations.

Under the Whiteman AFB Alternative, aircraft noise would slightly increase (by 1 or 2 dBA DNL) in the region, as shown and discussed in Section 3.3.2.3.2 (Noise, Environmental Consequences, Whiteman AFB Alternative, Airfield Operations). However, the highest SEL values typically experienced would not change. As a result, there would be no incremental noise impacts from the Whiteman AFB Alternative. Furthermore, no

significant impacts from noise are anticipated from the Whiteman AFB Alternative combined reasonably foreseeable future projects and environmental trends.

3.3.2.3.8 Proposed Resource-Specific Mitigations and Management Actions to Reduce the Potential for Environmental Impacts

Based on the noise analysis in this EIS, no mitigations would be necessary. However, the DAF is responsible for monitoring the predictions (e.g., impact, mitigations) made in its completed NEPA documentation (40 CFR 1505.3, 1505.2(a)(3)). If substantial changes are recognized that are relevant to environmental concerns or that bear on a proposed action or its impacts, the DAF would reevaluate for potential impacts related to those changes. This would include monitoring noise and public noise complaints and developing potential mitigation measures that could be implemented based on DAF monitoring.

3.4 AIR QUALITY

3.4.1 Air Quality, Affected Environment

Air quality in the project area and surrounding region would be affected by emissions from the Proposed Action and alternatives. The following sections describe the existing conditions related to air quality, including the (1) description of air quality as an environmental resource as well as applicable rules and regulations, (2) ROI, and (3) baseline air quality and emissions.

3.4.1.1 Description of Resource

Air quality is determined by the type and amount of pollutants emitted into the atmosphere, the size and topography of the air basin, and the prevailing meteorological conditions. The levels of pollutants are generally expressed on a concentration basis in units of parts per million or micrograms per cubic meter.

The baseline standards for pollutant concentrations are the National Ambient Air Quality Standards (NAAQS) and state air quality standards established under the Clean Air Act of 1990. These standards represent the maximum allowable atmospheric concentration that may occur and still protect public health and welfare. The NAAQS provide both short- and long-term standards for the following criteria pollutants: carbon monoxide, nitrogen dioxide, sulfur dioxide, particulate matter with a diameter of less than or equal to 10 microns (PM₁₀) or 2.5 microns (PM_{2.5}), ozone, and lead. None of the activities associated with the proposed action would produce any lead emissions, so lead is not evaluated or discussed further in this analysis.

Under the Clean Air Act, it is the responsibility of the individual states to achieve and maintain the NAAQS. To accomplish this, states use the EPA-required State Implementation Plan. A State Implementation Plan identifies goals, strategies,

schedules, and enforcement actions designed to reduce the level of pollutants in the air and bring the state into compliance with the NAAQS.

All areas of the United States are designated as having air quality better than the NAAQS (“attainment” areas) or worse than the NAAQS (“nonattainment” areas). Areas where there are insufficient air quality data for EPA to form a basis for attainment status are unclassifiable. Thus, such areas are treated as attainment areas until proven otherwise. “Maintenance areas” are those that were previously classified as nonattainment areas but where air pollution concentrations have been successfully reduced to levels below the standard. Maintenance areas are subject to special maintenance plans to ensure compliance with the NAAQS.

General Conformity ensures that the actions taken by federal agencies do not interfere with a state’s plans to attain and maintain national standards for air quality.

Established under the Clean Air Act (section 176I(4)), the General Conformity rule plays an important role in helping states and tribes improve air quality in those areas that do not meet the NAAQS. Under the General Conformity rule, federal agencies must work with state, tribal, and local governments in nonattainment or maintenance areas to ensure that federal actions conform to the air quality plans established in the applicable state or tribal implementation plan. The Proposed Action would occur primarily in one of two separate geographic regions surrounding Dyess AFB, Texas, or Whiteman AFB, Missouri. However, aircraft training operations would take place in SUA overlying parts of Kansas, North Dakota, South Dakota, Oklahoma, Missouri, Montana, Wyoming, Texas, and New Mexico.

Within the Texas project region, the Texas Commission on Environmental Quality (TCEQ), Office of Air, has adopted the NAAQS to regulate air pollutant levels within the state. In Missouri, the Missouri Department of Natural Resources is the responsible regulatory organization and has also adopted the national standards. The national and state ambient air quality standards are shown in Appendix B (Air Quality Calculations).

Prevention of Significant Deterioration

The Clean Air Act established Prevention of Significant Deterioration (PSD) regulations to protect the air quality in regions that already meet the NAAQS. The major requirement of the PSD regulations is that the air quality impacts from new or modified PSD sources in combination with impacts from other PSD sources must not exceed the maximum allowable incremental increases for nitrogen dioxide, PM₁₀, or sulfur dioxide, as identified in Table 3.4-1.

Table 3.4-1. Maximum Allowable Pollutant Concentration Increases Under PSD Regulations

Pollutant	Averaging Time	PSD Increments (µg/m ³)	
		Class I	Class II
NO ₂	Annual	2.5	25
PM ₁₀	Annual	4	17
	24-hour	8	30
SO ₂	Annual	2	20
	24-hour	5	91
	3-hour	25	512

Table 3.4-1. Maximum Allowable Pollutant Concentration Increases Under PSD Regulations

Pollutant	Averaging Time	PSD Increments ($\mu\text{g}/\text{m}^3$)	
		Class I	Class II

Key: $\mu\text{g}/\text{m}^3$ = micrograms per cubic meter; NO_2 = nitrogen dioxide; PM_{10} = particulate matter with a diameter of less than or equal to 10 microns; PSD = Prevention of Significant Deterioration; SO_2 = sulfur dioxide

GHG Emissions/Baseline

Greenhouse gases (GHGs) are gases that trap heat in the atmosphere; the accumulation of these gases in the atmosphere has been attributed to the regulation of Earth's temperature. Human activities, principally through emissions of GHGs, have unequivocally caused global warming, with global surface temperature reaching 1.1 degrees Celsius ($^{\circ}\text{C}$) above 1850–1900 in 2011–2020. Global GHG emissions have continued to increase, with unequal historical and ongoing contributions arising from unsustainable energy use, land use and land-use change, lifestyles and patterns of consumption and production across regions, between and within countries, and among individuals (IPCC, 2023).

Any GHG analysis contained in this document was prepared in accordance with the USAF Air Quality Environmental Impact Analysis Process (EIAP) guidance. The six primary GHGs as defined by EPA under Section 202(a) of the Clean Air Act by rulemaking (see Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act, 74 Federal Register 66495–66546, December 15, 2009) are carbon dioxide (CO_2), methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Each GHG has an estimated global warming potential (GWP), which is a function of its atmospheric lifetime and its ability to absorb and radiate infrared energy emitted from Earth's surface. The GWP allows GHGs to be compared with each other by converting the GHG quantity into the common unit "carbon dioxide equivalent" (CO_2e). Hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride are produced in relatively very small quantities and most often by very specific niche industries such as electronic component manufacture. Additionally, EPA's National Emissions Inventory (NEI) database only tracks the most abundant GHGs (CO_2 , nitrous oxide, and methane). Therefore, analysis focuses on these three primary GHGs represented as CO_2e based on their GWP.

3.4.1.2 Region of Influence

3.4.1.2.1 Dyess AFB

Dyess AFB is located in Taylor County, therefore that is the ROI. According to EPA, Taylor County is in attainment for all criteria pollutants (EPA, 2023a), and a conformity determination would not be required.

Emissions that would be generated under the Proposed Action were compared with Taylor County emissions obtained from EPA's 2017 NEI. NEI data are the latest available; these are presented in Table 3.4-2. The county data include emissions amounts from point sources, area sources, and mobile sources. *Point sources* are stationary sources that can be identified by name and location. *Area sources* are point

sources from which emissions are too low to track individually, such as a home or small office building, or a diffuse stationary source, such as wildfires or agricultural tilling. *Mobile sources* are any kind of vehicle or equipment with gasoline or diesel engine, an airplane, or a ship. Two types of mobile sources are considered: on-road and nonroad. On-road sources consist of vehicles such as cars, light trucks, heavy trucks, buses, engines, and motorcycles. Nonroad sources are aircraft, locomotives, diesel and gasoline boats and ships, personal watercraft, lawn and garden equipment, agricultural and construction equipment, and recreational vehicles (EPA, 2021a).

Table 3.4-2. National Emissions Inventory 2017 Criteria Pollutant Emissions Inventory for Taylor County, Texas

County	Criteria Pollutant (Tons/Year)					
	CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	VOC
Taylor	15,229	4,648	6,714	1,355	60	8,563

Source: (EPA, 2021a)

Key: CO = carbon monoxide; NO_x = nitrogen oxides; PM₁₀ and PM_{2.5} = particulate matter with a diameter of less than or equal to 10 microns and 2.5 microns, respectively; SO₂ = sulfur dioxide; VOC = volatile organic compound

GHG Emissions/Baseline

National Emissions Inventory 2017 GHG emissions for Taylor County, obtained from EPA's 2017 NEI, are summarized in Table 3.4-3.

Table 3.4-3. National Emissions Inventory 2017 Greenhouse Gas Emissions Inventory for Taylor County, Texas

County	Greenhouse Gas (Tons/Year)			
	CO ₂	CH ₄	N ₂ O	CO ₂ e
Taylor	1,233,951	138	18	1,242,656

Source: (EPA, 2021a)

Key: CH₄ = methane; CO₂ = carbon dioxide; CO₂e = carbon dioxide equivalent; N₂O = nitrous oxide

3.4.1.2.2 Dyess AFB Airspace

All the counties under Dyess AFB airspace other than Howard County are in attainment for all criteria pollutants. A portion of Howard County, under the Willie-Roscoe ATCAA, is classified as being in nonattainment for sulfur dioxide (EPA, 2023a).

Lancer MOA

Lancer MOA airspace covers all or part of eight counties in Texas. These counties and their respective 2017 NEI annual air emissions are provided below in Table 3.4-4. All the counties under Lancer MOA airspace are in attainment for all criteria pollutants, so General Conformity is not applicable (EPA, 2023a).

Table 3.4-4. National Emissions Inventory 2017 Criteria Pollutant and Greenhouse Gas Emissions Inventory for Lancer MOA

State	County	CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	VOC	CO ₂	CH ₄	N ₂ O	CO ₂ e
TX	Borden	1,770	1,128	1,868	364	17	5,491	40,586	7	0	40,799
	Dawson	4,228	1,758	5,293	962	29	7,248	239,101	44	2	240,708
	Fisher	2,378	1,324	3,561	712	22	4,727	148,708	18	1	149,345
	Garza	3,115	1,615	3,574	548	32	5,976	160,431	12	1	161,111
	Kent	1,939	1,596	590	136	7	6,094	100,935	180	0	105,496
	Lynn	2,684	1,408	8,739	1,594	26	4,148	208,516	17	1	209,263

Table 3.4-4. National Emissions Inventory 2017 Criteria Pollutant and Greenhouse Gas Emissions Inventory for Lancer MOA

State	County	CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	VOC	CO ₂	CH ₄	N ₂ O	CO _{2e}
	Scurry	5,315	3,192	5,160	930	69	13,928	919,774	1,531	4	959,202
	Stonewall	2,467	1,109	1,373	314	10	5,486	63,924	38	0	64,947
	ROI Total	23,896	13,129	30,158	5,560	211	53,098	1,881,976	1,846	9	1,930,871

Source: (EPA, 2021a)

Key: CH₄ = methane; CO = carbon monoxide; CO₂ = carbon dioxide; CO_{2e} = carbon dioxide equivalent; MOA = Military Operating Area; N₂O = nitrous oxide; NO_x = nitrogen oxides; PM₁₀ and PM_{2.5} = particulate matter with a diameter of less than or equal to 10 microns and 2.5 microns, respectively; ROI = region of influence; SO₂ = sulfur dioxide; TX = Texas; VOC = volatile organic compound

Note: ROI totals may not sum perfectly due to rounding of significant figures.

Lancer Bridge MOA

Lancer Bridge MOA airspace covers all or part of eight counties in Texas. These counties and their respective 2017 NEI annual air emissions are provided below in Table 3.4-5. All the counties under Lancer Bridge MOA airspace are in attainment for all criteria pollutants, so General Conformity is not applicable (EPA, 2023a).

Table 3.4-5. National Emissions Inventory 2017 Criteria Pollutant and Greenhouse Gas Emissions Inventory for Lancer Bridge MOA

State	County	CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	VOC	CO ₂	CH ₄	N ₂ O	CO _{2e}
TX	Andrews	8,566	6,448	3,679	546	855	34,414	472,739	140	2	476,929
	Cochran	2,136	1,347	3,826	742	9	5,547	90,123	8	0	90,457
	Dawson	4,229	1,758	5,293	962	29	7,248	239,101	44	2	240,708
	Gaines	7,810	4,279	9,289	1,651	528	21,733	757,265	104	3	760,800
	Hockley	6,119	2,991	7,485	1,363	19	13,259	444,269	103	4	447,998
	Lynn	2,698	1,409	8,745	1,599	26	4,149	208,516	17	1	209,263
	Martin	6,566	5,444	6,047	1,057	499	34,087	286,010	23	1	286,982
	Terry	3,820	1,857	6,607	1,189	10	6,511	264,211	34	2	265,619
	ROI Total	41,945	25,532	50,972	9,109	1,975	126,948	2,762,233	473	16	2,778,757

Source: (EPA, 2021a)

Key: CH₄ = methane; CO = carbon monoxide; CO₂ = carbon dioxide; CO_{2e} = carbon dioxide equivalent; MOA = Military Operating Area; N₂O = nitrous oxide; NO_x = nitrogen oxides; PM₁₀ and PM_{2.5} = particulate matter with a diameter of less than or equal to 10 microns and 2.5 microns, respectively; ROI = region of influence; SO₂ = sulfur dioxide; TX = Texas; VOC = volatile organic compound

Note: ROI totals may not sum perfectly due to rounding of significant figures.

Brownwood MOA

Brownwood MOA airspace covers all or part of 12 counties in Texas. These counties and their respective 2017 NEI annual air emissions are provided below in Table 3.4-6. All the counties under Brownwood MOA airspace are in attainment for all criteria pollutants, so General Conformity is not applicable (EPA, 2023a).

Table 3.4-6. National Emissions Inventory 2017 Criteria Pollutant and Greenhouse Gas Emissions Inventory for Brownwood MOA

State	County	CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	VOC	CO ₂	CH ₄	N ₂ O	CO _{2e}
TX	Brown	7,093	2,306	3,601	670	27	6,942	412,306	79	6	416,097
	Callahan	4,869	2,099	2,609	518	14	5,019	412,363	53	2	414,333
	Coleman	4,002	1,776	2,869	519	9	7,041	161,485	33	1	162,711
	Comanche	4,726	1,415	3,688	742	19	5,143	201,407	83	2	204,079

Table 3.4-6. National Emissions Inventory 2017 Criteria Pollutant and Greenhouse Gas Emissions Inventory for Brownwood MOA

State	County	CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	VOC	CO ₂	CH ₄	N ₂ O	CO ₂ e
	Concho	3,142	1,231	2,617	505	10	5,951	126,416	39	1	127,585
	Eastland	7,447	2,817	2,886	654	31	7,219	534,558	144	4	539,222
	Erath	8,573	2,147	5,758	1,176	48	7,108	456,248	173	5	462,083
	Hamilton	4,130	1,209	2,616	571	22	5,156	177,383	92	1	180,062
	McCulloch	4,189	1,468	3,379	628	22	7,660	223,814	71	1	225,999
	Mills	2,437	1,079	1,722	308	6	4,035	109,638	25	1	110,516
	Runnels	3,883	1,624	4,604	879	12	5,825	199,142	34	2	200,439
	San Saba	5,125	1,243	2,194	593	33	8,808	124,657	145	1	128,552
ROI Total		59,616	20,416	38,545	7,762	253	75,908	3,139,417	971	27	3,171,677

Source: (EPA, 2021a)

Key: CH₄ = methane; CO = carbon monoxide; CO₂ = carbon dioxide; CO₂e = carbon dioxide equivalent; MOA = Military Operating Area; N₂O = nitrous oxide; NO_x = nitrogen oxides; PM₁₀ and PM_{2.5} = particulate matter with a diameter of less than or equal to 10 microns and 2.5 microns, respectively; ROI = region of influence; SO₂ = sulfur dioxide; TX = Texas; VOC = volatile organic compound

Note: ROI totals may not sum perfectly due to rounding of significant figures.

Pecos MOA

Pecos MOA airspace covers all or part of five counties in New Mexico. These counties and their respective 2017 NEI annual air emissions are provided below in Table 3.4-7. All the counties under Pecos MOA airspace are in attainment for all criteria pollutants, so General Conformity is not applicable (EPA, 2023a).

Table 3.4-7. National Emissions Inventory 2017 Criteria Pollutant and Greenhouse Gas Emissions Inventory for Pecos MOA

State	County	CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	VOC	CO ₂	CH ₄	N ₂ O	CO ₂ e
NM	Chaves	17,943	4,790	8,880	1,414	80	33,745	478,392	53	13	483,513
	DeBaca	3,842	3,532	1,314	244	3	8,951	49,701	3	1	50,020
	Guadalupe	7,520	4,897	1,674	340	9	9,719	429,783	42	4	432,018
	Lincoln	12,054	2,640	4,122	863	41	21,422	273,909	185	6	280,176
	Roosevelt	5,700	2,827	4,516	771	23	8,530	202,865	14	4	204,347
ROI Total		47,059	18,687	20,505	3,632	157	82,366	1,434,650	298	27	1,450,075

Source: (EPA, 2021a)

Key: CH₄ = methane; CO = carbon monoxide; CO₂ = carbon dioxide; CO₂e = carbon dioxide equivalent; MOA = Military Operating Area; N₂O = nitrous oxide; NM = New Mexico; NO_x = nitrogen oxides; PM₁₀ and PM_{2.5} = particulate matter with a diameter of less than or equal to 10 microns and 2.5 microns, respectively; ROI = region of influence; SO₂ = sulfur dioxide; VOC = volatile organic compound

Note: ROI totals may not sum perfectly due to rounding of significant figures.

Bronco 3 MOA

Bronco 3 MOA airspace covers all or part of four counties in Texas and two counties in New Mexico. These counties and their respective 2017 NEI annual air emissions are provided below in Table 3.4-8. All the counties under Bronco 3 MOA airspace are in attainment for all criteria pollutants, so General Conformity is not applicable (EPA, 2023a; EPA, 2023b).

Table 3.4-8. Baseline Criteria Pollutant and Greenhouse Gas Emissions Inventory for Bronco 3 MOA

State	County	CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	VOC	CO ₂	CH ₄	N ₂ O	CO _{2e}
TX	Cochran	2,136	1,347	3,826	742	9	5,547	90,123	8	0	90,457
	Hockley	6,119	2,991	7,485	1,363	19	13,259	444,269	103	4	447,998
	Terry	3,820	1,857	6,607	1,189	10	6,511	264,211	34	2	265,619
	Yoakum	4,379	3,477	4,592	885	923	17,727	1,750,816	314	4	1,759,819
NM	Chaves	18,024	4,791	8,966	1,452	80	33,767	476,150	53	13	481,272
	Lea	23,582	15,514	12,309	2,048	6,185	65,207	4,227,377	2,594	19	4,297,947
ROI Total		58,059	29,977	43,785	7,680	7,227	142,019	7,252,946	3,106	42	7,343,111

Source: (EPA, 2021a)

Key: CH₄ = methane; CO = carbon monoxide; CO₂ = carbon dioxide; CO_{2e} = carbon dioxide equivalent; MOA = Military Operating Area; N₂O = nitrous oxide; NM = New Mexico; NO_x = nitrogen oxides; PM₁₀ and PM_{2.5} = particulate matter with a diameter of less than or equal to 10 microns and 2.5 microns, respectively; SO₂ = sulfur dioxide; TX = Texas; VOC = volatile organic compound

Note: ROI totals may not sum perfectly due to rounding of significant figures.

Bronco 4 MOA

Bronco 4 MOA airspace covers all or part of five counties in Texas and one county in New Mexico. These counties and their respective 2017 NEI annual air emissions are provided below in Table 3.4-9. All the counties under Bronco 4 MOA airspace are in attainment for all criteria pollutants, so General Conformity is not applicable (EPA, 2023a; EPA, 2023b).

Table 3.4-9. National Emissions Inventory 2017 Criteria Pollutant and Greenhouse Gas Emissions Inventory for Bronco 4 MOA

State	County	CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	VOC	CO ₂	CH ₄	N ₂ O	CO _{2e}
TX	Andrews	8,566	6,448	3,679	546	855	34,414	472,739	140	2	476,929
	Dawson	4,229	1,758	5,293	962	29	7,248	239,101	44	2	240,708
	Gaines	7,810	4,279	9,289	1,651	528	21,733	757,265	104	3	760,800
	Terry	3,820	1,857	6,607	1,189	10	6,511	264,211	34	2	265,619
	Yoakum	4,379	3,477	4,592	885	923	17,727	1,750,816	314	4	1,759,819
NM	Lea	23,582	15,514	12,309	2,048	6,185	65,207	4,227,377	2,594	19	4,297,947
ROI Total		52,386	33,333	41,770	7,281	8,530	152,841	7,711,509	3,231	32	7,801,822

Source: (EPA, 2021a)

Key: CH₄ = methane; CO = carbon monoxide; CO₂ = carbon dioxide; CO_{2e} = carbon dioxide equivalent; MOA = Military Operating Area; N₂O = nitrous oxide; NM = New Mexico; NO_x = nitrogen oxides; PM₁₀ and PM_{2.5} = particulate matter with a diameter of less than or equal to 10 microns and 2.5 microns, respectively; SO₂ = sulfur dioxide; TX = Texas; VOC = volatile organic compound

Note: ROI totals may not sum perfectly due to rounding of significant figures.

Willie-Roscoe ATCAA

Willie-Roscoe ATCAA covers all or part of eight counties in Texas. These counties and their respective 2017 NEI annual air emissions are provided below in Table 3.4-10. All the counties under Willie-Roscoe ATCAA other than Howard County are in attainment for all criteria pollutants. A portion of Howard County is classified as being in nonattainment for sulfur dioxide (EPA, 2023a).

Table 3.4-10. National Emissions Inventory 2017 Criteria Pollutant and Greenhouse Gas Emissions Inventory for Willie-Roscoe ATCAA

State	County	CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	VOC	CO ₂	CH ₄	N ₂ O	CO ₂ e
TX	Borden	1,773	1,128	1,870	365	17	5,491	40,586	7	0	40,799
	Dawson	4,229	1,758	5,293	962	29	7,248	239,101	44	2	240,708
	Fisher	2,390	1,325	3,566	717	22	4,730	148,708	18	1	149,345
	Howard	13,018	6,408	4,143	914	6,842	26,271	1,959,698	1,395	13	1,998,528
	Martin	6,566	5,444	6,047	1,057	499	34,087	286,010	23	1	286,982
	Mitchell	4,103	2,226	1,918	405	21	7,069	291,945	28	1	293,043
	Nolan	5,367	2,908	4,555	949	117	5,556	714,227	48	3	716,330
	Scurry	5,343	3,193	5,172	940	940	13,933	919,774	1,531	4	959,202
ROI Total		42,789	24,389	32,565	6,308	8,487	104,385	4,600,050	3,093	25	4,684,937

Source: (EPA, 2021a)

Key: CH₄ = methane; CO = carbon monoxide; CO₂ = carbon dioxide; CO₂e = carbon dioxide equivalent; MOA = Military Operating Area; N₂O = nitrous oxide; NO_x = nitrogen oxides; PM₁₀ and PM_{2.5} = particulate matter with a diameter of less than or equal to 10 microns and 2.5 microns, respectively; SO₂ = sulfur dioxide; TX = Texas; VOC = volatile organic compound

Note: ROI totals may not sum perfectly due to rounding of significant figures.

3.4.1.2.3 Whiteman AFB

Whiteman AFB is located in Johnson County, Missouri. Johnson County is in attainment for all pollutants (EPA, 2023c), and a General Conformity determination would not be required.

Emissions that would be generated under the Proposed Action were compared with Johnson County's emissions obtained from EPA's 2017 NEI. NEI data are the latest available; these are presented in Table 3.4-11.

Table 3.4-11. National Emissions Inventory 2017 Criteria Pollutant Emissions Inventory for Johnson County, Missouri

County	Criteria Pollutant (Tons/Year)					
	CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	VOC
Johnson	12,426	2,373	6,964	1,548	65	5,883

Source: (EPA, 2021a)

Key: CO = carbon monoxide; NO_x = nitrogen oxides; PM₁₀ and PM_{2.5} = particulate matter with a diameter of less than or equal to 10 microns and 2.5 microns, respectively; ROI = region of influence; SO₂ = sulfur dioxide; VOC = volatile organic compound

National Emissions Inventory 2017 GHG emissions for Johnson County, obtained from EPA's 2017 NEI, are summarized in Table 3.4-12.

Table 3.4-12. National Emissions Inventory 2017 Greenhouse Gas Emissions Inventory for Johnson County, Missouri

County	Greenhouse Gas (Tons/Year)			
	CO ₂	CH ₄	N ₂ O	CO ₂ e
Johnson	542,606	2,153	10	599,310

Source: (EPA, 2021a)

Key: CH₄ = methane; CO₂ = carbon dioxide; CO₂e = carbon dioxide equivalent; ROI = region of influence; N₂O = nitrous oxide

3.4.1.2.4 Whiteman AFB Airspace

The ROI airspace covers includes 10 MOAs. These MOAs overlay all or part of 26 counties in Missouri and 13 counties in Kansas. These counties and their respective 2017 NEI annual air emissions are provided later in this section in Table 3.4-14 through Table 3.4-20. Most of the counties under MOA airspace are in attainment for all criteria pollutants. However, parts of Dent, Iron, and Reynolds Counties are classified as being in nonattainment for the lead (2008) standard (EPA, 2023c; EPA, 2023d). Approximately 50 square miles of this nonattainment area fall beneath the Lindbergh A MOA. Table 3.4-13 provides nonattainment areas located within/beneath airspace associated with Whiteman AFB operations (ATCAAs and MOAs), the criteria pollutants for which they are classified as being in nonattainment, and the number of square miles of nonattainment area overlapped by the ROI.

In the context of air quality and General Conformity, it is important to note that the B-2 and B-21 will run on JP-8 fuel or an equivalent. JP-8 is a kerosene-derived fuel with several performance-enhancing additives. JP-8 does not contain or produce lead emissions. Further, neither the B-2 nor the B-21 flies below the 3,000-foot above ground level (AGL) mixing layer within the SUA. Therefore, there are zero emissions from criteria pollutants of concern within the nonattainment area and a General Conformity Determination is not required.

Table 3.4-13. Nonattainment Areas for Whiteman AFB Airspace

Airspace	Square Miles	Counties Within	Area Name
Lead Nonattainment Area 2008 Standard			
Lindbergh A MOA	49.95	Dent, Iron, Reynolds	Dent, Iron, Reynolds
Ozark C ATCAA	49.95		
Ozone 8-Hour 2008 Standard			
Ozark B ATCAA	630.79	Franklin, Jefferson	St. Louis Area, MO-IL
Ozone 8-Hour 2015 Standard			
Ozark B ATCAA	58.96	Franklin, Jefferson	St. Louis Area, MO-IL

Source: (EPA, 2021a)

Key: ATCAA = Air Traffic Control Assigned Airspace; IL = Illinois; MO = Missouri; MOA = Military Operating Area

Ada East/West MOA

Ada East/West MOA airspace covers parts of 10 counties in Kansas. These counties and their respective 2017 NEI annual air emissions are provided below in Table 3.4-14. All the counties under Ada East/West MOA airspace are in attainment for all criteria pollutants, so General Conformity is not applicable (EPA, 2023d).

Table 3.4-14. National Emissions Inventory 2017 Criteria Pollutant and Greenhouse Gas Emissions Inventory for Ada East/West MOA

County	CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	VOC	CO ₂	CH ₄	N ₂ O	CO ₂ e
Ada East MOA										
Clay	10,163	1,252	3,878	1,188	97	4,162	209,601	407	2	220,314
Cloud	7,615	1,997	4,109	987	67	3,736	176,151	242	2	182,809
Dickinson	19,598	3,050	7,269	2,270	183	6,624	527,856	914	4	551,990
Ottawa	15,448	1,267	5,634	1,772	135	5,431	300,756	651	2	317,530
Republic	6,137	1,174	4,465	939	48	3,337	159,376	210	1	164,980
Washington	10,352	1,647	6,414	1,524	97	4,903	230,641	423	1	241,651
Ada East MOA Total	69,313	10,388	31,769	8,680	628	28,193	1,604,382	2,846	13	1,679,274
Ada West MOA										
Cloud	7,615	1,997	4,109	987	67	3,736	176,151	242	2	182,809
Lincoln	6,831	993	3,472	915	60	3,540	163,116	260	1	169,892
Mitchell	6,214	1,064	4,366	946	44	3,476	135,979	202	2	141,509
Osborne	2,627	938	3,545	582	14	3,121	61,704	52	1	63,330
Ottawa	15,448	1,267	5,634	1,772	135	5,431	300,756	651	2	317,530
Russell	10,824	1,679	6,270	1,531	90	6,832	365,122	390	2	375,440
Ada West MOA Total	49,560	7,938	27,396	6,735	411	26,136	1,202,828	1,797	9	1,250,510
Ada East/West MOA Total	118,873	18,326	59,165	15,415	1,039	54,329	2,807,210	4,643	22	2,929,784

Source: (EPA, 2021a)

Key: CH₄ = methane; CO = carbon monoxide; CO₂ = carbon dioxide; CO₂e = carbon dioxide equivalent; MOA = Military Operating Area; NO_x = nitrogen oxides; N₂O = nitrous oxide; PM₁₀ and PM_{2.5} = particulate matter with a diameter of less than or equal to 10 microns and 2.5 microns; SO₂ = sulfur dioxide; VOC = volatile organic compound

Note: Totals may not sum perfectly due to rounding of significant figures.

Smoky Hill Range

The Smoky Hill Range ROI includes portions of three counties in Kansas, primarily in Saline County. These counties and their respective 2017 NEI annual air emissions are provided below in Table 3.4-15. All the counties under Smoky Hill Range airspace other than Saline County are in attainment for all criteria pollutants. A portion of Saline County, Kansas, is classified as being in nonattainment. However, the Smoky Hill Range airspace does not overlap the portion of the county classified as being in nonattainment, so General Conformity is not applicable (EPA, 2023d).

Table 3.4-15. National Emissions Inventory 2017 Criteria Pollutant and Greenhouse Gas Emissions Inventory for Smoky Hill Range

County	CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	VOC	CO ₂	CH ₄	N ₂ O	CO ₂ e
Ellsworth	7,856	1,401	5,361	1,214	68	4,113	245,411	261	2	252,413
McPherson	22,263	4,311	9,087	2,762	239	8,700	2,017,428	908	17	2,045,272
Saline	28,101	2,893	9,792	2,792	288	8,494	800,501	4,314	11	911,698
Total	58,221	8,605	24,239	6,768	595	21,307	3,063,339	5,483	30	3,209,383

Table 3.4-15. National Emissions Inventory 2017 Criteria Pollutant and Greenhouse Gas Emissions Inventory for Smoky Hill Range

Source: (EPA, 2021a)

Key: CH₄ = methane; CO = carbon monoxide; CO₂ = carbon dioxide; CO_{2e} = carbon dioxide equivalent; NO_x = nitrogen oxides; N₂O = nitrous oxide; PM₁₀ and PM_{2.5} = particulate matter with a diameter of less than or equal to 10 microns and 2.5 microns; SO₂ = sulfur dioxide; VOC = volatile organic compound

Note: Totals may not sum perfectly due to rounding of significant figures.

Cannon MOA

Cannon MOA airspace covers parts of four counties in Missouri. These counties and their respective 2017 NEI annual air emissions are provided below in Table 3.4-16. All the counties under Cannon MOA airspace are in attainment for all criteria pollutants, so General Conformity is not applicable (EPA, 2023c).

Table 3.4-16. National Emissions Inventory 2017 Criteria Pollutant and Greenhouse Gas Emissions Inventory for Cannon MOA

County	CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	VOC	CO ₂	CH ₄	N ₂ O	CO _{2e}
Cannon A MOA										
Laclede	28,863	2,234	14,771	3,506	188	16,200	767,183	1,011	9	795,070
Wright	50,448	2,296	13,007	5,166	387	30,663	845,584	2,195	6	902,373
Texas	24,589	1,780	8,681	2,778	187	11,633	476,796	6,454	5	639,588
Cannon A MOA Total	103,900	6,310	36,459	11,449	762	58,496	2,089,562	9,660	20	2,337,032
Cannon B MOA										
Laclede	28,863	2,234	14,771	3,506	188	16,200	767,183	1,011	9	795,070
Pulaski	20,294	1,520	11,223	2,483	129	16,235	584,803	1,069	7	613,612
Cannon B MOA Total	49,156	3,754	25,993	5,988	317	32,435	1,351,986	2,080	16	1,408,683
Cannon MOA Total	124,193	7,830	47,682	13,932	891	74,731	2,674,366	10,729	27	2,950,644

Source: (EPA, 2021a)

Key: CH₄ = methane; CO = carbon monoxide; CO₂ = carbon dioxide; CO_{2e} = carbon dioxide equivalent; MOA = Military Operating Area; NO_x = nitrogen oxides; N₂O = nitrous oxide; PM₁₀ and PM_{2.5} = particulate matter with a diameter of less than or equal to 10 microns and 2.5 microns; SO₂ = sulfur dioxide; VOC = volatile organic compound

Note: Totals may not sum perfectly due to rounding of significant figures. The Cannon MOA grand totals reflect the summation of emissions associated with Laclede County, Wright County, Texas, and Pulaski County. Laclede County appears in the table twice but is counted only once in the grand total.

Lindbergh MOA

The Lindbergh MOA ROI includes all of Shannon County and parts of 11 other counties in south-central Missouri. These counties and their respective 2017 NEI annual air emissions are provided below in Table 3.4-17. Parts of Dent, Iron, and Reynolds Counties are classified as being in nonattainment for the lead (2008) standard (EPA, 2023c). Approximately 50 square miles of this nonattainment area fall beneath the Lindbergh A MOA. However, as discussed in Section 3.4.2.3.3 (Airspace and Range Utilization), B-21 aircraft operations would not occur below the 3,000-foot AGL mixing layer; therefore, a General Conformity determination is not necessary.

Table 3.4-17. National Emissions Inventory 2017 Criteria Pollutant and Greenhouse Gas Emissions Inventory for Lindbergh MOA

County	CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	VOC	CO ₂	CH ₄	N ₂ O	CO ₂ e
Lindbergh A MOA										
Crawford	20,244	1,572	9,880	2,266	120	20,885	521,716	643	7	539,844
Dent	19,944	993	4,790	1,966	144	20,597	323,871	804	4	345,040
Howell	41,164	2,913	14,894	4,513	293	21,185	797,787	1,557	10	839,753
Iron	22,341	508	3,662	892	2,669	18,904	254,763	224	3	261,187
Phelps	27,099	1,934	13,971	3,197	173	19,625	735,256	928	9	761,065
Reynolds	21,308	599	4,531	1,934	142	28,904	286,284	885	2	308,929
Shannon	29,741	863	5,402	2,701	215	34,738	416,683	1,299	2	449,773
Texas	50,448	2,296	13,007	5,166	387	30,663	845,584	2,195	6	902,373
Washington	14,940	892	5,208	1,522	157	23,547	285,178	2,795	5	356,518
Lindbergh A Total	247,230	12,570	75,343	24,156	4,301	219,048	4,467,122	11,330	47	4,764,482
Lindbergh B MOA										
Carter	26,906	716	5,153	2,499	205	24,419	408,009	1,209	1	438,570
Howell	41,164	2,913	14,894	4,513	293	21,185	797,787	1,557	10	839,753
Oregon	18,326	1,110	5,096	1,869	129	20,082	301,884	748	2	321,251
Reynolds	21,308	599	4,531	1,934	142	28,904	286,284	885	2	308,929
Shannon	29,741	863	5,402	2,701	215	34,738	416,683	1,299	2	449,773
Texas	50,448	2,296	13,007	5,166	387	30,663	845,584	2,195	6	902,373
Lindbergh B Total	187,893	8,497	48,082	18,682	1,372	159,992	3,056,232	7,892	24	3,260,649
Lindbergh C MOA										
Carter	26,906	716	5,153	2,499	205	24,419	408,009	1,209	1	438,570
Howell	41,164	2,913	14,894	4,513	293	21,185	797,787	1,557	10	839,753
Oregon	18,326	1,110	5,096	1,869	129	20,082	301,884	748	2	321,251
Ripley	41,633	1,180	6,399	3,759	317	24,895	577,517	1,887	3	625,593
Lindbergh C Total	128,029	5,919	31,541	12,639	944	90,582	2,085,198	5,400	17	2,225,166
Lindbergh MOA Total	563,153	26,986	154,967	55,477	6,616	469,622	9,608,553	24,622	88	10,250,298

Source: (EPA, 2021a)

Key: CH₄ = methane; CO = carbon monoxide; CO₂ = carbon dioxide; CO₂e = carbon dioxide equivalent; MOA = Military Operating Area; NO_x = nitrogen oxides; N₂O = nitrous oxide; PM₁₀ and PM_{2.5} = particulate matter with a diameter of less than or equal to 10 microns and 2.5 microns; SO₂ = sulfur dioxide; VOC = volatile organic compound

Note: Totals may not sum perfectly due to rounding of significant figures.

Truman MOA

The Truman MOA ROI includes all of Benton County and parts of 11 other counties in southeastern Missouri. These counties and their respective 2017 NEI annual air emissions are provided below in Table 3.4-18. All the counties under Truman MOA

airspace are in attainment for all criteria pollutants, so General Conformity is not applicable (EPA, 2023c).

Table 3.4-18. National Emissions Inventory 2017 Criteria Pollutant and Greenhouse Gas Emissions Inventory for Truman MOA

County	CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	VOC	CO ₂	CH ₄	N ₂ O	CO ₂ e
Truman A MOA										
Cooper	8,495	1,864	9,791	1,568	40	4,019	406,535	166	4	412,002
Henry	13,227	2,100	9,981	1,981	1,282	7,074	882,098	351	14	894,918
Johnson	12,426	2,373	6,964	1,548	65	5,883	542,606	2,153	10	599,310
Lafayette	10,526	2,572	6,722	1,258	39	4,072	561,828	152	8	568,019
Moniteau	5,957	1,162	4,620	973	36	3,433	188,893	165	3	193,901
Morgan	19,644	1,294	7,267	2,171	129	13,672	389,874	726	4	409,313
Pettis	11,254	3,449	6,822	1,545	195	5,895	590,664	4,307	8	700,864
Saline	11,812	2,449	6,371	1,440	59	4,854	561,313	288	5	570,122
Truman A Total	93,341	17,261	58,539	12,485	1,846	48,903	4,123,810	8,309	57	4,348,449
Truman B MOA										
Benton	31,074	1,506	8,515	3,101	218	17,408	538,028	1,248	4	570,505
Cooper	8,495	1,864	9,791	1,568	40	4,019	406,535	166	4	412,002
Henry	13,227	2,100	9,981	1,981	1,282	7,074	882,098	351	14	894,918
Moniteau	5,957	1,162	4,620	973	36	3,433	188,893	165	3	193,901
Morgan	19,644	1,294	7,267	2,171	129	13,672	389,874	726	4	409,313
Pettis	11,254	3,449	6,822	1,545	195	5,895	590,664	4,307	8	700,864
Truman B Total	89,651	11,374	46,996	11,339	1,901	51,502	2,996,091	6,964	38	3,181,503
Truman C MOA										
Benton	31,074	1,506	8,515	3,101	218	17,408	538,028	1,248	4	570,505
Camden	41,000	2,055	12,826	3,977	265	22,582	801,377	1,495	10	841,625
Henry	13,227	2,100	9,981	1,981	1,282	7,074	882,098	351	14	894,918
Hickory	24,075	933	5,267	2,390	186	12,365	378,168	1,055	2	405,159
Morgan	19,644	1,294	7,267	2,171	129	13,672	389,874	726	4	409,313
St. Clair	42,541	1,616	8,998	4,080	319	16,668	661,770	1,864	3	709,170
Truman C Total	171,560	9,503	52,855	17,700	2,400	89,769	3,651,316	6,738	37	3,830,690
Truman MOA Total	354,551	38,138	158,390	41,523	6,147	190,175	10,771,217	22,011	131	11,360,643

Source: (EPA, 2021a)

Key: CH₄ = methane; CO = carbon monoxide; CO₂ = carbon dioxide; CO₂e = carbon dioxide equivalent; MOA = Military Operating Area; NO_x = nitrogen oxides; N₂O = nitrous oxide; PM₁₀ and PM_{2.5} = particulate matter with a diameter of less than or equal to 10 microns and 2.5 microns; SO₂ = sulfur dioxide; VOC = volatile organic compound

Note: Totals may not sum perfectly due to rounding of significant figures.

Bison MOA

The Bison MOA ROI includes portions of five counties in Kansas. These counties and their respective 2017 NEI annual air emissions are provided below in Table 3.4-19. All the counties under Bison MOA airspace are in attainment for all criteria pollutants, so General Conformity is not applicable (EPA, 2023d).

Table 3.4-19. National Emissions Inventory 2017 Criteria Pollutant and Greenhouse Gas Emissions Inventory for Bison MOA

County	CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	VOC	CO ₂	CH ₄	N ₂ O	CO ₂ e
Barton	7,561	2,084	8,589	1,558	65	6,282	245,859	1,698	6	290,021
Ellsworth	7,856	1,401	5,361	1,214	68	4,113	245,411	261	2	252,413
Rice	6,552	3,492	5,385	1,096	48	4,708	269,243	163	2	273,994
Rush	1,994	1,175	5,078	783	8	2,918	57,455	9	1	57,973
Russell	10,824	1,679	6,270	1,531	90	6,832	365,122	390	2	375,440
Total	34,787	9,832	30,683	6,182	278	24,852	1,183,090	2,520	13	1,249,842

Source: (EPA, 2021a)

Key: CH₄ = methane; CO = carbon monoxide; CO₂ = carbon dioxide; CO₂e = carbon dioxide equivalent; MOA = Military Operating Area; NO_x = nitrogen oxides; N₂O = nitrous oxide; PM₁₀ and PM_{2.5} = particulate matter with a diameter of less than or equal to 10 microns and 2.5 microns; SO₂ = sulfur dioxide; VOC = volatile organic compound

Note: Totals may not sum perfectly due to rounding of significant figures.

Ozark ATCAA

Ozark ATCAA covers all or part of 56 counties in Missouri, four counties in Kansas, and one county in Oklahoma. These counties and their respective 2017 NEI annual air emissions are provided below in Table 3.4-20. Most of the counties under Ozark ATCAA are in attainment for all criteria pollutants. However, Dent, Iron, and Reynolds Counties are classified as being in nonattainment for lead. Franklin, Jefferson, and Jackson Counties are in nonattainment for ozone, and Franklin and Jefferson are also in nonattainment for PM_{2.5} (EPA, 2023c; EPA, 2023d; EPA, 2023e).

Table 3.4-20. National Emissions Inventory 2017 Criteria Pollutant and Greenhouse Gas Emissions Inventory for Ozark ATCAA

County	CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	VOC	CO ₂	CH ₄	N ₂ O	CO ₂ e
Ozark A										
Audrain	6,715	1,680	9,400	1,594	49	4,005	371,804	126	5	376,324
Barry	17,264	1,892	9,946	2,259	108	13,837	450,101	519	7	465,088
Barton	10,924	1,761	7,224	1,688	87	4,634	304,511	2,926	3	378,630
Bates	10,039	2,040	8,951	1,830	65	5,315	333,488	290	4	342,034
Benton	31,074	1,506	8,515	3,101	218	17,408	538,028	1,248	4	570,505
Boone	27,100	4,739	33,841	4,808	1,559	10,067	1,731,505	2,375	35	1,801,304
Bourbon	18,456	1,936	5,800	2,058	197	7,269	410,539	790	3	431,157
Callaway	19,807	2,697	19,317	3,146	133	11,728	818,637	452	10	832,971
Camden	41,000	2,055	12,826	3,977	265	22,582	801,377	1,495	10	841,625
Carroll	10,754	2,326	4,932	1,469	90	4,923	348,776	411	2	359,682
Cass	17,663	3,606	10,091	1,915	60	6,509	1,349,181	183	18	1,359,139
Cedar	15,551	1,026	4,584	1,681	115	7,499	277,805	605	3	293,895
Cherokee	10,106	1,974	9,339	1,830	96	96	791,851	317	5	801,324
Christian	22,605	2,020	16,473	3,231	133	12,297	670,421	580	13	688,859

Table 3.4-20. National Emissions Inventory 2017 Criteria Pollutant and Greenhouse Gas Emissions Inventory for Ozark ATCAA

County	CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	VOC	CO ₂	CH ₄	N ₂ O	CO ₂ e
Cole	16,049	2,351	16,221	2,523	84	6,603	658,066	1,228	13	692,731
Cooper	8,495	1,864	9,791	1,568	40	4,019	406,535	166	4	412,002
Crawford	12,017	2,093	7,102	1,615	117	5,559	346,919	3,249	7	430,296
Dade	15,118	1,231	4,827	1,766	121	6,637	272,694	635	2	289,025
Dallas	20,510	1,139	6,220	2,227	156	10,692	379,179	18	4	380,677
Gasconade	12,423	1,022	4,351	1,368	80	10,463	232,955	447	3	245,159
Greene	41,927	8,062	65,837	8,773	2,820	12,221	4,621,824	4,210	82	4,751,394
Henry	13,227	2,100	9,981	1,981	1,282	7,074	882,098	351	14	894,918
Hickory	24,075	933	5,267	2,390	186	12,365	378,168	1,055	2	405,159
Howard	6,619	854	3,152	848	44	4,198	153,541	227	2	159,823
Jackson	91,656	20,269	70,492	10,534	5,973	21,226	11,387,722	7,758	187	11,637,357
Jasper	24,729	4,943	28,705	4,479	1,099	7,904	3,579,036	573	46	3,606,936
Johnson	12,426	2,373	6,964	1,548	65	5,883	542,606	2,153	10	599,310
Johnson	66,172	11,155	15,820	3,134	678	18,652	3,754,401	5,224	71	3,906,000
Laclede	28,863	2,234	14,771	3,506	188	16,200	767,183	1,011	9	795,070
Lafayette	10,526	2,572	6,722	1,258	39	4,072	561,828	152	8	568,019
Lawrence	16,613	2,466	14,739	2,678	98	6,053	620,677	436	11	634,814
Maries	15,894	1,027	4,681	1,801	132	10,262	276,748	658	2	293,855
McDonald	17,352	1,617	8,324	2,123	109	12,310	459,071	1,154	5	489,420
Miller	22,711	1,458	9,571	2,614	154	13,545	502,318	847	5	525,049
Moniteau	5,957	1,162	4,620	973	36	3,433	188,893	165	3	193,901
Montgomery	11,115	1,692	11,913	1,942	551	6,996	415,862	309	5	425,040
Morgan	19,644	1,294	7,267	2,171	129	13,672	389,874	726	4	409,313
Newton	23,041	3,198	19,381	3,611	145	9,190	817,252	664	13	837,647
Osage	14,322	1,311	6,110	1,769	97	9,362	293,612	539	3	307,943
Ottawa	10,421	2,032	5,960	1,268	56	5,414	479,395	230	6	486,846
Pettis	11,254	3,449	6,822	1,545	195	5,895	590,664	4,307	8	700,864
Polk	19,120	1,732	11,247	2,599	129	7,965	495,313	653	8	513,970
Pulaski	20,294	1,520	11,223	2,483	129	16,235	584,803	1,069	7	613,612
Ray	7,917	1,977	3,603	1,004	46	3,859	221,944	203	5	228,383
Saline	11,812	2,449	6,371	1,440	59	4,854	561,313	288	5	570,122
St. Clair	42,541	1,616	8,998	4,080	319	16,668	661,770	1,864	3	709,170
Stone	14,122	1,284	7,522	1,544	65	12,265	344,693	312	7	354,573
Vernon	13,888	2,252	9,259	2,030	107	8,132	490,656	462	5	503,571
Webster	20,298	2,240	15,314	3,040	127	8,301	648,003	653	8	666,853

Table 3.4-20. National Emissions Inventory 2017 Criteria Pollutant and Greenhouse Gas Emissions Inventory for Ozark ATCAA

County	CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	VOC	CO ₂	CH ₄	N ₂ O	CO ₂ e
Ozark A Total	982,205	132,226	610,387	124,818	18,832	456,349	47,165,640	56,312	698	48,781,359
Ozark B										
Barry	17,264	1,892	9,946	2,259	108	13,837	450,101	519	7	465,088
Camden	19,807	2,697	19,317	3,146	133	11,728	818,637	452	10	832,971
Christian	22,605	2,020	16,473	3,231	133	12,297	670,421	580	13	688,859
Crawford	20,244	1,572	9,880	2,266	120	20,885	521,716	643	7	539,844
Dallas	20,510	1,139	6,220	2,227	156	10,692	379,179	18	4	380,677
Dent	19,944	993	4,790	1,966	144	20,597	323,871	804	4	345,040
Douglas	36,583	1,326	7,137	3,574	295	21,048	565,777	1,675	1	608,057
Franklin	33,852	11,035	9,864	4,090	33,262	17,799	17,865,130	2,545	301	18,018,358
Gasconade	12,423	1,022	4,351	1,368	80	10,463	232,955	447	3	245,159
Greene	41,927	8,062	65,837	8,773	2,820	12,221	4,621,824	4,210	82	4,751,394
Jefferson	41,254	11,498	11,185	3,544	22,879	19,254	12,917,798	1,559	197	13,015,464
Laclede	28,863	2,234	14,771	3,506	188	16,200	767,183	1,011	9	795,070
Maries	15,894	1,027	4,681	1,801	132	10,262	276,748	658	2	293,855
Miller	22,711	1,458	9,571	2,614	154	13,545	502,318	847	5	525,049
Osage	14,322	1,311	6,110	1,769	97	9,362	293,612	539	3	307,943
Phelps	27,099	1,934	13,971	3,197	173	19,625	735,256	928	9	761,065
Pulaski	20,294	1,520	11,223	2,483	129	16,235	584,803	1,069	7	613,612
Stone	14,122	1,284	7,522	1,544	65	12,265	344,693	312	7	354,573
Taney	39,667	2,081	15,988	4,243	269	23,077	822,999	1,419	12	862,062
Texas	50,448	2,296	13,007	5,166	387	30,663	845,584	2,195	6	902,373
Washington	14,940	892	5,208	1,522	157	23,547	285,178	2,795	5	356,518
Webster	20,298	2,240	15,314	3,040	127	8,301	648,003	653	8	666,853
Wright	24,589	1,780	8,681	2,778	187	11,633	476,796	6,454	5	639,588
Ozark B Total	579,661	63,313	291,045	70,105	62,195	365,534	45,950,583	32,333	707	46,969,476
Ozark C										
Crawford	20,244	1,572	9,880	2,266	120	20,885	521,716	643	7	539,844
Dent	19,944	993	4,790	1,966	144	20,597	323,871	804	4	345,040
Douglas	36,583	1,326	7,137	3,574	295	21,048	565,777	1,675	1	608,057
Howell	41,164	2,913	14,894	4,513	293	21,185	797,787	1,557	10	839,753
Iron	22,341	508	3,662	892	2,669	18,904	254,763	224	3	261,187
Phelps	27,099	1,934	13,971	3,197	173	19,625	735,256	928	9	761,065
Pulaski	20,294	1,520	11,223	2,483	129	16,235	584,803	1,069	7	613,612

Table 3.4-20. National Emissions Inventory 2017 Criteria Pollutant and Greenhouse Gas Emissions Inventory for Ozark ATCAA

County	CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	VOC	CO ₂	CH ₄	N ₂ O	CO ₂ e
Reynolds	21,308	599	4,531	1,934	142	28,904	286,284	885	2	308,929
Shannon	29,741	863	5,402	2,701	215	34,738	416,683	1,299	2	449,773
Texas	50,448	2,296	13,007	5,166	387	30,663	845,584	2,195	6	902,373
Washington	14,940	892	5,208	1,522	157	23,547	285,178	2,795	5	356,518
Wright	24,589	1,780	8,681	2,778	187	11,633	476,796	6,454	5	639,588
Ozark C Total	328,696	17,196	102,384	32,990	4,912	267,964	6,094,499	20,528	61	6,625,740
Ozark ATCAA Total	1,890,562	212,735	1,003,816	227,913	85,939	1,089,846	99,210,722	109,173	1,465	102,376,575

Source: (EPA, 2021a)

Key: CH₄ = methane; CO = carbon monoxide; CO₂ = carbon dioxide; CO₂e = carbon dioxide equivalent; MOA = Military Operating Area; NO_x = nitrogen oxides; N₂O = nitrous oxide; PM₁₀ and PM_{2.5} = particulate matter with a diameter of less than or equal to 10 microns and 2.5 microns; SO₂ = sulfur dioxide; VOC = volatile organic compound

Note: Totals may not sum perfectly due to rounding of significant figures.

3.4.1.3 Analysis Methodology

Air quality in the project area and immediately surrounding region would be affected by emissions from sources associated with aircraft operations, ground disturbance (construction, demolition, renovation, etc.), and ground support equipment operations at the two prospective installations. Neither the Texas nor Missouri State Implementation Plans specify a mixing height; therefore, the default 3,000-foot AGL ceiling was assumed to be the atmospheric mixing height above which any pollutant generated would not contribute to increased pollutant concentrations at ground level. Low-level flights (below the 3,000-foot AGL atmospheric mixing layer) may also impact the air quality of the counties beneath training area airspace. The following sections provide a description of air quality impacts that would occur from each alternative. Emissions from any alternative that cause an exceedance of any state or national ambient air quality standard would result in environmental impacts. In airspace associated with the Dyess AFB Alternative, there are no flight operations that occur below the 3,000-foot AGL mixing layer in the Bronco MOAs, Brownwood MOA, or Willie-Roscoe ATCAA. Therefore, there is no impact or contribution to the regional air quality beneath the Bronco MOAs, Brownwood MOA, or Willie-Roscoe ATCAA, and they are not discussed further in this section. In airspace associated with the Whiteman AFB Alternative, there are no flight operations that occur below the 3,000-foot AGL mixing layer in the Bison MOA, Smoky MOA, Cannon MOA, or Ozark ATCAA. Therefore, there is no impact or contribution to the regional air quality beneath these airspace units, and they are not discussed further in this section.

Total net direct and indirect emissions associated with the action were estimated through the Air Conformity Applicability Model (ACAM) on a calendar-year basis for the start of the action through achieving “steady state” (i.e., net gain/loss upon action fully implemented) emissions. The ACAM analysis used the latest and most accurate emission estimation techniques available; all algorithms, emission factors, and

methodologies used are described in detail in the *USAF Air Emissions Guide for Air Force Stationary Sources* (DAF, 2021a), the *USAF Air Emissions Guide for Air Force Mobile Sources* (DAF, 2021b), and the *USAF Air Emissions Guide for Air Force Transitory Sources* (DAF, 2021c).

“Insignificance indicators” were used in the analysis to provide an indication of the significance of potential impacts to air quality based on current ambient air quality relative to the NAAQS. These insignificance indicators are the 250 tons per year PSD major source threshold for actions occurring in areas that are “Clearly Attainment” (i.e., not within 5 percent of any NAAQS) and the General Conformity Rule *de minimis* values (25 tons per year for lead and 100 tons per year for all other criteria pollutants) for actions occurring in areas that are “Near Nonattainment” (i.e., within 5 percent of any NAAQS). These indicators do not define a significant impact; however, they do provide a threshold to identify actions that are insignificant. Any action with net emissions below the insignificance indicators for all criteria pollutant is considered so insignificant that the action will not cause or contribute to an exceedance on one or more NAAQS. For further details on insignificance indicators, see Chapter 4 of the *Air Force Air Quality Environmental Impact Analysis Process (EIAP) Guide, Volume II – Quantitative Assessment, Insignificance Indicators* (DAF, 2023).

ACAM Version 5.0.18a was utilized to provide a level of consistency with respect to emissions factors and calculations. ACAM is utilized to provide a quantification air quality analysis for a proposed action by estimating emissions from all activities expected in an ROI. The ACAM was utilized to calculate construction emissions. Emission factors for aircraft were also obtained from the ACAM. Equations and emission factors can be found in Appendix B (Air Quality Calculations). However, it should be noted that since the B-21 is a new airframe and validated emissions factors are not yet available, ACAM emissions factors for the B-2A were used in air quality calculations.

GHGs were included in the analysis. The primary source of CO₂ emissions would be fuel combustion from aircraft emissions during training activities. Consistent with Executive Order (EO) 13990, *Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis*, the CEQ submitted interim guidance titled *National Environmental Policy Act [NEPA] Guidance on Consideration of Greenhouse Gas [GHG] Emissions and Climate Change* (January 9, 2023) (CEQ, 2023). This interim guidance is similar to previous iterations and suggests that agencies should calculate estimated GHG emissions in NEPA analyses to assess potential effects on climate change, as well as include guidance that agencies should consider the potential effects of project alternatives on climate change, as indicated by its estimated GHG emissions. The DAF is currently preparing a process for the development of estimates of the social cost of GHG emissions (SC-GHG) for application in future DAF NEPA documents. The DAF process will provide specifics on applying the SC-GHG to ensure standardization across the DAF. Therefore, no SC-GHG analysis should be conducted for Environmental Assessments and EISs that are currently ongoing.

The interim guidance also states that agencies should explain how a proposed action and alternatives would help meet or detract from achieving climate action goals or commitments, including international agreements, federal governmentwide and agency goals and planning documents, and state, regional, and tribal goals. The interim guidance

states that NEPA reviews should consider the projected future state of the environment and the effects of climate change on a proposed action based on the best available climate change reports, such as the National Climate Assessment. The CEQ also encourages agencies to mitigate GHG emissions to the greatest extent possible. As such, this document quantifies GHG emissions associated with the Proposed Action and provides the regional air basin baseline GHG annual emissions (per the 2017 NEI) for context and comparison. Additional information regarding calculations for GHGs is provided in Appendix B (Air Quality Calculations).

However, it should be noted at this time that climate change presents a global problem caused by increasing global atmospheric concentrations of GHG emissions and the current state of the science surrounding it does not support determining the global significance of local or regional emissions of GHGs from a particular action.

3.4.2 Air Quality, Environmental Consequences

3.4.2.1 No Action Alternative Consequences

3.4.2.1.1 No Action at Dyess AFB

Personnel

Under the No Action Alternative, there would be no change to the numbers or types of personnel at Dyess AFB. Emissions associated with worker commutes, home heating, etc. would remain at current historical levels. Taylor County would remain in attainment for all pollutants, and no adverse impacts to air quality would be anticipated.

Airfield Operations

Impacts to air quality occur from aircraft fossil fuel combustion emissions, and these would continue at Dyess AFB under the No Action Alternative.

However, impacts due to aircraft emissions would be insignificant because these emission sources would be mobile and intermittent and pollutant emissions would not be large enough in a localized area to cause any exceedance of an ambient air quality standard. Also, the ground-level impact of aircraft emissions released above the atmospheric mixing layer (3,000 feet AGL) would be negligible due to the inability of the released pollutants to penetrate the mixing layer and mix downward to ground level.

Operational activities under the No Action Alternative would not increase from activities that presently occur in this area.

Airspace and Range Utilization

Aircraft operations occur in the MOAs and MTRs under the No Action Alternative. B-1Bs conduct low-level flights (below 3,000 feet AGL) in the Lancer and Pecos MOAs currently. However, this represents a small percentage of B-1B operations and emissions do not contribute to exceedances of any criteria pollutant thresholds.

Facilities and Infrastructure

There are no construction, demolition, or renovation activities included under the No Action Alternative. However, it is likely that these types of activities would be ongoing at Dyess AFB as components of other actions that are either covered in other NEPA documents or categorically excluded from the need for detailed NEPA analysis. These activities would continue to contribute air emissions to the study area from fossil fuel combustion equipment. However, these activities would be temporary and minor in nature. These types of activities have been ongoing and typical of the installation and the region for years, and Taylor County has remained classified as being in attainment for all criteria pollutants.

Summary of No Action at Dyess AFB

Emissions associated with the No Action Alternative are minimal for all criteria pollutants, and it is important to note that these activities have been ongoing at Dyess AFB for many years and have not adversely impacted the air quality of the region. Taylor County continues to be in attainment with the NAAQS for all criteria pollutants. GHG emissions in Taylor County are approximately 1.2 million tons annually. Therefore, there would be no adverse impacts to regional air quality under the No Action Alternative at Dyess AFB.

Consistent with 2023 CEQ guidance, the No Action Alternative would also include anticipated climate change effects that are expected to occur regardless of implementation of the Proposed Action. Global warming, reaching 1.5°C in the near term, would cause unavoidable increases in multiple climate hazards and present multiple risks to ecosystems and humans. Near-term warming and increased frequency, severity, and duration of extreme events will place many terrestrial, freshwater, coastal, and marine ecosystems at high or very high risks of biodiversity loss. Continued and accelerating sea-level rise will encroach on coastal settlements and infrastructure and commit low-lying coastal ecosystems to submergence and loss. Biodiversity loss and degradation, damages to and transformation of ecosystems are already key risks for every region due to past global warming and will continue to escalate with every increment of global warming in the mid- to long term. Climate change risks to cities, settlements, and key infrastructure will rise rapidly in the mid- and long term with further global warming, especially in places already exposed to high temperatures, along coastlines, or with high vulnerabilities. Climate change impacts and risks are becoming increasingly complex and more difficult to manage. Multiple climate hazards will occur simultaneously, and multiple climatic and non-climatic risks will interact, resulting in compounding overall risk and risks cascading across sectors and regions. Some responses to climate change result in new impacts and risks (IPCC, 2023).

3.4.2.1.2 No Action at Whiteman AFB

Personnel

Under the No Action Alternative, there would be no change to the numbers or types of personnel at Whiteman AFB. Emissions associated with worker commutes, home

heating, etc. would remain at current historical levels. Johnson County would remain in attainment for all pollutants, and no adverse impacts to air quality would be anticipated.

Airfield Operations

Under the No Action Alternative at Whiteman AFB, there would continue to be annual emissions associated with flight operations. However, impacts due to aircraft emissions would be insignificant because these emission sources would be mobile and intermittent and pollutant emissions would not be large enough in a localized area to cause any exceedance of an ambient air quality standard. Also, the ground-level impact of aircraft emissions released above the atmospheric mixing layer (3,000 feet AGL) would be negligible due to the inability of the released pollutants to penetrate the mixing layer and mix downward to ground level.

Operational activities under the No Action Alternative would not increase from activities that presently occur in this area.

Airspace and Range Utilization

Aircraft operations occur in the MOAs and MTRs under the No Action Alternative. B-2A do not conduct low-level flights (below 3,000 feet AGL) in any of the MOAs currently. Therefore, emissions in the MOAs and MTRs would remain at current levels under the No Action Alternative.

Facilities and Infrastructure

There are no construction, demolition, or renovation activities included under the No Action Alternative. However, it is likely that these types of activities would be ongoing at Whiteman AFB as components of other actions that are either covered in other NEPA documents or categorically excluded from the need for detailed NEPA analysis. These activities would continue to contribute air emissions to the ROI from fossil fuel combustion of equipment. However, these activities would be temporary and minor in nature. These types of activities have been ongoing and typical of the installation and the region for years, and Johnson County has remained classified as being in attainment for all criteria pollutants.

Summary of No Action at Whiteman AFB

Emissions associated with the No Action Alternative are minimal for all criteria pollutants. It is also worth noting that these activities have been ongoing at Whiteman AFB for many years and have not adversely impacted the air quality of the region. Johnson County continues to be in attainment with the NAAQS for all criteria pollutants. GHG emissions for Johnson County are approximately 600,000 tons annually. Therefore, there would be no adverse impacts to regional air quality under the No Action Alternative at Whiteman AFB.

Consistent with 2023 CEQ guidance, the No Action Alternative would also include anticipated climate change effects that are expected to occur regardless of implementation of the Proposed Action. Global warming, reaching 1.5°C in the near term,

would cause unavoidable increases in multiple climate hazards and present multiple risks to ecosystems and humans. Near-term warming and increased frequency, severity, and duration of extreme events will place many terrestrial, freshwater, coastal, and marine ecosystems at high or very high risks of biodiversity loss. Continued and accelerating sea-level rise will encroach on coastal settlements and infrastructure and commit low-lying coastal ecosystems to submergence and loss. Biodiversity loss and degradation, damages to and transformation of ecosystems are already key risks for every region due to past global warming and will continue to escalate with every increment of global warming in the mid- to long term. Climate change risks to cities, settlements, and key infrastructure will rise rapidly in the mid- and long term with further global warming, especially in places already exposed to high temperatures, along coastlines, or with high vulnerabilities. Climate change impacts and risks are becoming increasingly complex and more difficult to manage. Multiple climate hazards will occur simultaneously, and multiple climatic and non-climatic risks will interact, resulting in compounding overall risk and risks cascading across sectors and regions. Some responses to climate change result in new impacts and risks (IPCC, 2023).

3.4.2.2 Dyess AFB Alternative

3.4.2.2.1 Personnel

Under the Dyess AFB Alternative, it was estimated that the B-21 program would require approximately 2,550 military personnel (Section 2.3.2, Personnel). The ACAM estimates the potential air emissions introduced to the region by personnel commuter vehicles. Table 3.4-21 shows the potential emissions associated with the end-state personnel under the Dyess AFB Alternative, as well as the net change resulting from subtraction of B-1B personnel and addition of B-21 personnel at Dyess AFB compared to the ROI baseline annual emissions.

Table 3.4-21. Personnel Emissions With the Dyess AFB Alternative

Source	Pollutants (Tons/Year)						
	CO	NO _x	PM ₁₀	PM _{2.5}	SO _x	VOC	CO _{2e}
Dyess AFB Alternative B-21 Personnel Emissions	14.18	0.59	0.02	0.02	0.01	1.00	1,449
Dyess AFB Alternative B-1B Personnel Emissions	-1.96	-0.08	0.00	0.00	0.00	-0.14	-200
Dyess AFB Alternative Personnel Net Total Emissions	12.22	0.51	0.02	0.01	0.01	0.87	1,249
ROI Baseline ^(a)	15,229	4,648	6,714	1,355	60	8,563	1,242,656
Net Change as Percentage of ROI	0.08%	0.01%	0.00%	0.00%	0.01%	0.01%	0.10%

Source: (EPA, 2021a)

Key: % = percent; AFB = Air Force Base; CO = carbon monoxide; CO_{2e} = carbon dioxide equivalent; NO_x = nitrogen oxides; PM₁₀ or PM_{2.5} = particulate matter with a diameter less than or equal to 10 or 2.5 microns, respectively; ROI = region of influence; SO_x = sulfur oxides; VOC = volatile organic compound

Note: Totals may not sum perfectly due to rounding of significant figures.

a. The ROI for Dyess AFB emissions is Taylor County, Texas. See Table 3.4-2 and Table 3.4-3.

3.4.2.2.2 Airfield Operations

Under the Dyess AFB Alternative, B-1 aircraft would be phased out and replaced by B-21 aircraft. Table 3.4-22 shows the potential change (increase or decrease) in criteria pollutant and GHG emissions associated with the Dyess AFB Alternative from the No Action Alternative compared to the ROI baseline. Emissions of carbon monoxide would decrease slightly, and emissions of nitrogen oxides, PM₁₀, PM_{2.5}, sulfur oxides, volatile organic carbons would increase by a nominal 2.22 percent, 0.07 percent, 0.28 percent, 5.82 percent, and 0.02 percent, respectively, from the baseline levels per year as illustrated in Table 3.4-22.

Table 3.4-22. Airfield Operations Emissions With the Dyess AFB Alternative

Source	Pollutants (Tons/Year)						
	CO	NO _x	PM ₁₀	PM _{2.5}	SO _x	VOC	CO _{2e}
Dyess AFB Alternative B-21 LTO Emissions	63.26	147.50	15.16	13.43	9.63	5.62	21,336
Dyess AFB Alternative B-21 TGO Emissions	5.89	81.12	16.37	14.74	5.02	0.18	15,181
Dyess AFB Alternative B-1B LTO Emissions	-85.81	-73.18	-14.79	-13.23	-6.23	-3.76	-16,515
Dyess AFB Alternative B-1B TGO Emissions	-4.28	-52.15	-12.33	-11.08	-4.93	-0.18	-14,904
Dyess AFB Net Total Air Operations Emissions	-20.94	103.28	4.42	3.85	3.49	1.85	5,098
ROI Baseline ^(a)	15,229	4,648	6,714	1,355	60	8,563	1,242,656
Net Change as Percentage of ROI	-0.14%	2.22%	0.07%	0.28%	5.82%	0.02%	0.41%

Source: (EPA, 2021a)

Key: % = percent; - = minus; AFB = Air Force Base; CO = carbon monoxide; CO_{2e} = carbon dioxide equivalent; LTO = landing and takeoff operations; NO_x = nitrogen oxides; PM₁₀ or PM_{2.5} = particulate matter with a diameter less than or equal to 10 or 2.5 microns, respectively; ROI = region of influence; SO_x = sulfur oxides; TGO = touch and go operations; VOC = volatile organic compound

Note: Totals may not sum perfectly due to rounding of significant figures.

a. The ROI for Dyess AFB emissions is Taylor County, Texas. See Table 3.4-2 and Table 3.4-3.

3.4.2.2.3 Airspace and Range Utilization

MOA/MTR Operations

Under the Dyess AFB Alternative, there would be no B-21 aircraft emissions below the 3,000-foot AGL mixing layer. Therefore, emissions would decrease by the quantities shown in Table 3.4-23, which represent the current B-1B operations occurring below 3,000 feet AGL as these would draw down.

Table 3.4-23. Lancer and Pecos MOA/MTR Air Operations Emissions With the Dyess AFB Alternative

Source	Pollutants (Tons/Year)						
	CO	NO _x	PM ₁₀	PM _{2.5}	SO _x	VOC	CO _{2e}
Dyess AFB Alternative Net Total Lancer/Pecos MOA/MTR Emissions	-2.14	-33.11	-3.40	-3.05	-2.69	-0.10	-8,143
ROI Baseline ^(a)	70,955	31,816	50,663	9,192	368	135,464	3,380,946

Table 3.4-23. Lancer and Pecos MOA/MTR Air Operations Emissions With the Dyess AFB Alternative

Source	Pollutants (Tons/Year)						
	CO	NO _x	PM ₁₀	PM _{2.5}	SO _x	VOC	CO _{2e}
Net Change as Percentage of ROI	0.00%	-0.10%	-0.01%	-0.03%	-0.73%	0.00%	-0.24%

Source: (EPA, 2021a)

Key: % = percent; - = minus; AFB = Air Force Base; CO = carbon monoxide; CO_{2e} = carbon dioxide equivalent; MOA = Military Operating Area; MTR = Military Training Route; NO_x = nitrogen oxides; PM₁₀ or PM_{2.5} = particulate matter with a diameter less than or equal to 10 or 2.5 microns, respectively; ROI = region of influence; SO_x = sulfur oxides; VOC = volatile organic compound

Note: Totals may not sum perfectly due to rounding of significant figures.

a. The ROI for Lancer MOA emissions includes portions of eight counties in Texas and the ROI for Pecos MOA emissions includes portions of five counties in New Mexico. See Table 3.4-4 and Table 3.4-7. The B-1 always flies above the 3,000-foot above ground level mixing layer in the Lancer Bridge MOA area (DAF, 2021d), so the Lancer Bridge MOA area is not included in this baseline ROI.

3.4.2.2.4 Facilities and Infrastructure

Under the Dyess AFB Alternative, there would be a number of new facilities constructed to support the B-21 mission (Section 2.3.5, Facilities and Infrastructure). ACAM 5.0.18a was used to calculate the emissions associated with construction, demolition, and renovation activities under the Dyess AFB Alternative (Table 3.4-24).

Table 3.4-24. Facilities and Infrastructure Emissions With the Dyess AFB Alternative

Source	Pollutants (Tons/Year)						
	CO	NO _x	PM ₁₀	PM _{2.5}	SO _x	VOC	CO _{2e}
Dyess AFB Alternative Construction/Demolition/Renovation	18.93	16.88	572.73	0.63	0.05	21.23	5,706
ROI Baseline ^(a)	15,229	4,648	6,714	1,355	60	8,563	1,242,656
Percentage of ROI	0.12%	0.36%	8.53%	0.05%	0.09%	0.25%	0.46%

Source: (EPA, 2021a)

Key: % = percent; AFB = Air Force Base; CO = carbon monoxide; CO_{2e} = carbon dioxide equivalent; NO_x = nitrogen oxides; PM₁₀ or PM_{2.5} = particulate matter with a diameter less than or equal to 10 or 2.5 microns, respectively; ROI = region of influence; SO_x = sulfur oxides; VOC = volatile organic compound

Note: Totals may not sum perfectly due to rounding of significant figures.

a. The ROI for Dyess AFB emissions is Taylor County, Texas. See Table 3.4-2 and Table 3.4-3.

Emissions associated with facilities construction, demolition, and renovation would be minor and temporary, and there would be no adverse impacts associated with these activities under the Dyess AFB Alternative. Additionally, construction would likely be phased, which would serve to further minimize impacts over the length of the construction timeframe. PM₁₀ emissions could be further reduced by implementation of standard construction best management practices (BMPs) such as watering and/or covering of piles, loads, and temporary access roads. Facilities operations in the end-state would not be likely to impact Dyess AFB's status as a synthetic minor source, as restrictions would remain in place. However, should their permit require updating or revision, Dyess AFB would comply with all TCEQ requirements.

3.4.2.2.5 Weapons Generation Facility

Construction of the WGF would generate criteria pollutants and GHGs from the combustion of fossil fuels in construction equipment and worker commutes. Table 3.4-25 shows

emissions from WGF construction at Dyess AFB compared with the ROI baseline. Emissions would be minor and temporary, representing less than 3.92 percent of the ROI annual emissions baseline. No adverse impacts to regional air quality would be anticipated.

Table 3.4-25. Weapons Generation Facility Construction Emissions With the Dyess AFB Alternative

Source	Pollutants (Tons/Year)						
	CO	NO _x	PM ₁₀	PM _{2.5}	SO _x	VOC	CO _{2e}
Dyess AFB Alternative WGF Construction Emissions	13.20	11.06	262.98	0.44	0.04	2.95	3,555
ROI Baseline ^(a)	15,229	4,648	6,714	1,355	60	8,563	1,242,656
Percentage of ROI	0.09%	0.24%	3.92%	0.03%	0.06%	0.03%	0.29%

Source: (EPA, 2021a)

Key: % = percent; AFB = Air Force Base; CO = carbon monoxide; CO_{2e} = carbon dioxide equivalent; NO_x = nitrogen oxides; PM₁₀ or PM_{2.5} = particulate matter with a diameter less than or equal to 10 or 2.5 microns, respectively; ROI = region of influence; SO_x = sulfur oxides; VOC = volatile organic compound; WGF = Weapons Generation Facility

Note: Totals may not sum perfectly due to rounding of significant figures.

a. The ROI for Dyess AFB emissions is Taylor County, Texas. See Table 3.4-2 and Table 3.4-3.

Summary of Dyess AFB Alternative Air Quality Environmental Consequences

Table 3.4-26 shows the estimated annual emissions under the Dyess AFB Alternative. Emissions of all criteria pollutants other than PM₁₀ would be below indicator thresholds. PM₁₀ emissions could be further reduced by implementation of standard construction BMPs such as watering and/or covering of piles, loads, and temporary access roads. Emissions from C&D activities would also be minor and temporary, lasting only the duration of the construction phase.

Table 3.4-26. Summary of Dyess AFB Alternative Emissions

Source	Pollutants (Tons/Year)						
	CO	NO _x	PM ₁₀	PM _{2.5}	SO _x	VOC	CO _{2e}
Dyess AFB Alternative Net Total Personnel Emissions	12.22	0.51	0.02	0.01	0.01	0.87	1,249
Dyess AFB Alternative Net Total Aircraft Emissions	-23.08	70.17	1.02	0.81	0.80	1.75	-3,045
Dyess AFB Alternative Facilities Construction and Demolition Emissions	18.93	16.88	572.73	0.63	0.05	21.23	5,706
Dyess AFB Alternative WGF Construction Emissions	13.20	11.06	262.98	0.44	0.04	2.95	3,555
Total Dyess AFB Alternative Emissions	21.27	98.63	836.75	1.89	0.89	26.80	7,464
ROI Baseline ^(a)	15,229	4,648	6,714	1,355	60	8,563	1,242,656
Net Change as Percentage of ROI	0.14%	2.12%	12.46%	0.14%	1.49%	0.31%	0.60%
Indicator	250	250	250	250	250	250	250
Exceedance (Yes or No)	No	No	Yes	No	No	No	No

Table 3.4-26. Summary of Dyess AFB Alternative Emissions

Source	Pollutants (Tons/Year)						
	CO	NO _x	PM ₁₀	PM _{2.5}	SO _x	VOC	CO _{2e}

Source: (EPA, 2021a)

Key: % = percent; - = minus; AFB = Air Force Base; CO = carbon monoxide; CO_{2e} = carbon dioxide equivalent; NO_x = nitrogen oxides; PM₁₀ or PM_{2.5} = particulate matter with a diameter less than or equal to 10 or 2.5 microns, respectively; ROI = region of influence; SO_x = sulfur oxides; VOC = volatile organic compound; WGF = Weapons Generation Facility

Note: Totals may not sum perfectly due to rounding of significant figures.

a. The ROI for Dyess AFB emissions is Taylor County, Texas. See Table 3.4-2 and Table 3.4-3.

3.4.2.2.6 Greenhouse Gases

GHG emissions for the Dyess AFB Alternative have been estimated at 7,464 tons per year for personnel, construction activities, and aircraft operations. C&D emissions would be temporary, only lasting the duration of the construction, demolition, and renovation process, and would not be repeated on an annual basis. During the C&D period, some of these emissions may be mitigated through implementation of construction BMPs, such as limiting idling time and spraying and/or covering unpaved roads and piles.

3.4.2.2.7 Snapshot

Personnel

Under the snapshot scenario at Dyess AFB, it was estimated that the total number of personnel, including B-21 personnel (Section 2.3.2, Personnel) and 20 percent of B-1 personnel, would be approximately 5,487 military personnel, 695 civilians, and 10 contractors.

Table 3.4-27 shows the potential emissions associated with the snapshot scenario and the change (increase/decrease) as compared with the ROI baseline annual emissions.

Table 3.4-27. Personnel Emissions for the Snapshot Scenario With the Dyess AFB Alternative

Source	Pollutants (Tons/Year)						
	CO	NO _x	PM ₁₀	PM _{2.5}	SO _x	VOC	CO _{2e}
Dyess AFB Snapshot Scenario B-21 Personnel Emissions	14.18	0.59	0.02	0.02	0.01	1.00	1,449
Dyess AFB Snapshot Scenario B-1B Personnel Emissions	-1.96	-0.08	0.00	0.00	0.00	-0.14	-200
Dyess AFB Snapshot Scenario Net Total Personnel Emissions	12.22	0.51	0.02	0.01	0.01	0.87	1248.50
ROI Baseline ^(a)	15,229	4,648	6,714	1,355	60	8,563	1,242,656
Net Change as Percentage of ROI	0.08%	0.01%	0.00%	0.00%	0.01%	0.01%	0.10%

Source: (EPA, 2021a)

Key: % = percent; AFB = Air Force Base; CO = carbon monoxide; CO_{2e} = carbon dioxide equivalent; NO_x = nitrogen oxides; PM₁₀ or PM_{2.5} = particulate matter with a diameter less than or equal to 10 or 2.5 microns, respectively; ROI = region of influence; SO_x = sulfur oxides; VOC = volatile organic compound

Note: Totals may not sum perfectly due to rounding of significant figures.

a. The ROI for Dyess AFB emissions is Taylor County, Texas. See Table 3.4-2 and Table 3.4-3.

Airfield Operations

Table 3.4-28 shows the potential change (increase or decrease) in criteria pollutant and GHG emissions associated with the Dyess AFB snapshot scenario from the baseline. Emissions of all criteria pollutants would increase from the baseline levels except for carbon monoxide, which would decrease by 3.01 tons per year. The highest increase would be 155.86 tons for nitrogen oxides, an increase by 3.35 percent over the nitrogen oxides ROI baseline for Taylor County.

Table 3.4-28. Airfield Operations Emissions for the Snapshot Scenario With the Dyess AFB Alternative

Source	Pollutants (Tons/Year)						
	CO	NO _x	PM ₁₀	PM _{2.5}	SO _x	VOC	CO ₂ e
Dyess AFB Snapshot Scenario B-21 LTO Emissions	63.26	147.50	15.16	13.43	9.63	5.62	21,336
Dyess AFB Snapshot Scenario B-21 TGO Emissions	5.89	81.12	16.37	14.74	5.02	0.18	15,181
Dyess AFB Snapshot Scenario B-1B LTO Emissions	-71.31	-62.32	-12.74	-11.41	-5.32	-3.10	-14,258
Dyess AFB Snapshot Scenario B-1B TGO Emissions	-0.86	-10.43	-2.47	-2.22	-0.99	-0.04	-2,981
Dyess AFB Snapshot Scenario Net Total Aircraft Emissions	-3.01	155.86	16.33	14.55	8.34	2.66	19,277
ROI Baseline ^(a)	15,229	4,648	6,714	1,355	60	8,563	1,242,656
Net Change as Percentage of ROI	-0.02%	3.35%	0.24%	1.07%	13.90%	0.03%	1.55%

Source: (EPA, 2021a)

Key: % = percent; - = minus; AFB = Air Force Base; CO = carbon monoxide; CO₂e = carbon dioxide equivalent; LTO = landing and takeoff operations; NO_x = nitrogen oxides; PM₁₀ or PM_{2.5} = particulate matter with a diameter less than or equal to 10 or 2.5 microns, respectively; ROI = region of influence; SO_x = sulfur oxides; TGO = touch and go operations; VOC = volatile organic compound

Note: Totals may not sum perfectly due to rounding of significant figures.

a. The ROI for Dyess AFB emissions is Taylor County, Texas. See Table 3.4-2 and Table 3.4-3.

Airspace and Range Utilization

MOA/MTR Operations

Under the Dyess AFB snapshot scenario, emissions below the 3,000-foot AGL mixing layer would decrease because the B-21 would not fly below the mixing layer in the Lancer or Pecos MOAs. Therefore, emissions would decrease by the quantities shown in Table 3.4-29.

Table 3.4-29. Lancer and Pecos MOA/MTR Air Operations Emissions for the Snapshot Scenario With the Dyess AFB Alternative

Source	Pollutants (Tons/Year)						
	CO	NO _x	PM ₁₀	PM _{2.5}	SO _x	VOC	CO ₂ e
Dyess AFB Alternative Net Total Lancer/Pecos MOA/MTR Emissions (Snapshot)	-1.71	-26.49	-2.72	-2.44	-2.16	-0.08	-6,514
ROI Baseline ^(a)	70,955	31,816	50,663	9,192	368	135,464	3,380,946
Net Change as Percentage of ROI	0.00%	-0.08%	-0.01%	-0.03%	-0.59%	0.00%	-0.19%

Table 3.4-29. Lancer and Pecos MOA/MTR Air Operations Emissions for the Snapshot Scenario With the Dyess AFB Alternative

Source: (EPA, 2021a)

Key: % = percent; - = minus; AFB = Air Force Base; CO = carbon monoxide; CO_{2e} = carbon dioxide equivalent; MOA = Military Operating Area; NO_x = nitrogen oxides; PM₁₀ or PM_{2.5} = particulate matter with a diameter less than or equal to 10 or 2.5 microns, respectively; ROI = region of influence; SO_x = sulfur oxides; VOC = volatile organic compound

Note: Totals may not sum perfectly due to rounding of significant figures.

a. The ROI for Lancer MOA emissions includes portions of eight counties in Texas and the ROI for Pecos MOA emissions includes portions of five counties in New Mexico. See Table 3.4-4 and Table 3.4-7. The B-1 always flies above the 3,000-foot above ground level mixing layer in the Lancer Bridge MOA area (DAF, 2021d), so the Lancer Bridge MOA area is not included in this baseline ROI.

Summary of Dyess AFB Snapshot Scenario

Table 3.4-30 shows the estimated annual emissions under the Dyess AFB snapshot scenario. Emissions of all criteria pollutants other than PM₁₀ would be below indicator thresholds. PM₁₀ emissions could be further reduced by implementation of standard construction BMPs such as watering and/or covering of piles, loads, and temporary access roads. Emissions from C&D activities would also be minor and temporary, lasting only the duration of the construction phase.

Table 3.4-30. Summary of Dyess AFB Snapshot Scenario Emissions

Source	Pollutants (Tons/Year)						
	CO	NO _x	PM ₁₀	PM _{2.5}	SO _x	VOC	CO _{2e}
Dyess AFB Alternative Net Total Personnel Emissions (Snapshot)	12.22	0.51	0.02	0.01	0.01	0.87	1,249
Dyess AFB Alternative Net Total Aircraft Emissions (Snapshot)	-4.73	129.37	13.61	12.11	6.19	2.58	12,763
Dyess AFB Alternative Facilities Construction and Demolition Emissions	18.93	16.88	572.73	0.63	0.05	21.23	5,706
Dyess AFB Alternative WGF Construction Emissions	13.20	11.06	262.98	0.44	0.04	2.95	3,555
Total Dyess AFB Alternative Emissions (Snapshot)	39.62	157.83	849.34	13.20	6.28	27.63	23,272
ROI Baseline ^(a)	15,229	4,648	6,714	1,355	60	8,563	1,242,656
Net Change as Percentage of ROI	0.26%	3.40%	12.65%	0.97%	10.47%	0.32%	1.87%
Indicator	250	250	250	250	250	250	250
Exceedance (Yes or No)	No	No	Yes	No	No	No	No

Source: (EPA, 2021a)

% = percent; - = minus; AFB = Air Force Base; CO = carbon monoxide; CO_{2e} = carbon dioxide equivalent; NO_x = nitrogen oxides; PM₁₀ or PM_{2.5} = particulate matter with a diameter less than or equal to 10 or 2.5 microns, respectively; ROI = region of influence; SO_x = sulfur oxides; VOC = volatile organic compound; WGF = Weapons Generation Facility

Note: Totals may not sum perfectly due to rounding of significant figures.

a. The ROI for Dyess AFB emissions is Taylor County, Texas. See Table 3.4-2 and Table 3.4-3.

Greenhouse Gases

GHG emissions for the Dyess AFB Alternative snapshot scenario have been estimated at 23,272 tons per year for personnel, construction activities, and aircraft operations. C&D emissions would be temporary, only lasting the duration of the construction,

demolition, and renovation process, and would not be repeated on an annual basis. During the C&D period, some of these emissions may be mitigated through implementation of construction BMPs, such as limiting idling time and spraying and/or covering unpaved roads and piles.

3.4.2.2.8 Proposed Resource-Specific Mitigations and Management Actions to Reduce the Potential for Environmental Impacts

Construction activities would employ standard management measures for construction such as watering of graded areas, covering of soil stockpiles, and contour grading (if necessary), to minimize temporary generation of dust and particulate matter. This would serve to minimize air emissions associated with the elements of the Proposed Action.

3.4.2.3 Whiteman AFB Alternative (Preferred Alternative)

3.4.2.3.1 Personnel

It has been estimated that the B-21 program would require approximately 2,550 military personnel (Section 2.4.2, Personnel). The ACAM estimates the potential air emissions introduced to the Whiteman AFB Alternative region by personnel commuter vehicles. Table 3.4-31 shows the potential emissions associated with additional B-21 personnel at Whiteman AFB, the net change from the No Action Alternative, and the change compared with the ROI baseline annual emissions. Additionally, construction would likely be phased, which would serve to further minimize impacts over the length of the construction timeframe. Facilities operations in the end-state would not be likely to impact Whiteman AFB's permit status under their Intermediate State Permit to Operate (Permit Number: OP2018-11). However, should their permit require updating or revision, Whiteman AFB would comply with all Missouri Department of Natural Resources requirements.

Table 3.4-31. Personnel Emissions With the Whiteman AFB Alternative

Source	Pollutants (Tons/Year)						
	CO	NO _x	PM ₁₀	PM _{2.5}	SO _x	VOC	CO _{2e}
Whiteman AFB Alternative B-21 Personnel Emissions	16.06	0.74	0.03	0.02	0.01	1.12	1,564
Whiteman AFB Alternative B-2A Personnel Emissions	-6.47	-0.30	-0.01	0.01	0.00	-0.45	-630
Whiteman AFB Alternative Net Total Personnel Emissions	9.59	0.44	0.02	0.03	0.02	0.67	934
ROI Baseline ^(a)	12,426	2,373	6,964	1,548	65	5,883	599,310
Net Change as Percentage of ROI	0.08%	0.02%	0.00%	0.00%	0.03%	0.01%	0.16%

Source: (EPA, 2021a)

Key: % = percent; AFB = Air Force Base; CO = carbon monoxide; CO_{2e} = carbon dioxide equivalent; NO_x = nitrogen oxides; PM₁₀ or PM_{2.5} = particulate matter with a diameter less than or equal to 10 or 2.5 microns, respectively; ROI = region of influence; SO_x = sulfur oxides; VOC = volatile organic compound

Note: Totals may not sum perfectly due to rounding of significant figures.

a. The ROI for Whiteman AFB emissions includes Johnson County in Missouri. See Table 3.4-11 and Table 3.4-12.

3.4.2.3.2 Airfield Operations

Under the Whiteman AFB Alternative, B-2 aircraft would be phased out and replaced by B-21 aircraft. Table 3.4-32 shows the potential change (increase or decrease) in criteria pollutant and GHG emissions associated with the Whiteman AFB Alternative from the baseline. Emissions of all criteria pollutants would increase from the baseline levels.

Table 3.4-32. Airfield Operations Emissions With the Whiteman AFB Alternative

Source	Pollutants (Tons/Year)						
	CO	NO _x	PM ₁₀	PM _{2.5}	SO _x	VOC	CO ₂ e
Whiteman AFB Alternative B-21 LTO Emissions	146.72	228.99	22.80	20.11	16.90	10.37	37,372
Whiteman AFB Alternative B-21 TGO Emissions	5.91	77.77	16.38	14.75	4.94	0.17	14,943
Whiteman AFB Alternative B-2A LTO Emissions	-68.79	-123.12	-12.91	-11.44	-8.64	-4.78	-19,844
Whiteman AFB Alternative B-2A TGO Emissions	-3.46	-45.52	-9.59	-8.63	-2.89	-0.10	-8,746
Whiteman AFB Alternative Aircraft Net Total Air Operations Emissions	80.38	138.13	16.68	14.79	10.31	5.66	23,725
ROI Baseline ^(a)	12,426	2,373	6,964	1,548	65	5,883	599,310
Net Change as Percentage of ROI	0.65%	5.82%	0.24%	0.96%	15.87%	0.10%	3.96%
Indicator	250	250	250	250	250	250	250
Exceedance (Yes or No)	No	No	No	No	No	No	No

Source: (EPA, 2021a)

Key: % = percent; - = minus; AFB = Air Force Base; CO = carbon monoxide; CO₂e = carbon dioxide equivalent; NO_x = nitrogen oxides; PM₁₀ or PM_{2.5} = particulate matter with a diameter less than or equal to 10 or 2.5 microns, respectively; ROI = region of influence; SO_x = sulfur oxides; VOC = volatile organic compound

Note: Totals may not sum perfectly due to rounding of significant figures.

a. The ROI for Whiteman AFB emissions includes Johnson County in Missouri. See Table 3.4-11 and Table 3.4-12.

3.4.2.3.3 Airspace and Range Utilization

Under the Whiteman AFB Alternative, there would be no B-21 aircraft operations occurring below the 3,000-foot AGL mixing layer within the Whiteman AFB SUA. Therefore, emissions would remain the same as under the No Action Alternative baseline emissions for all SUA (see Section 3.4.1.2.4, Table 3.4-14 through Table 3.4-20).

3.4.2.3.4 Facilities and Infrastructure

Under the Whiteman AFB Alternative, there would be a number of new facilities constructed to support the B-21 mission (Section 2.4.5, Facilities and Infrastructure). ACAM 5.0.18a was used to calculate the emissions associated with construction, demolition, and renovation activities under the Whiteman AFB Alternative (Table 3.4-33).

Table 3.4-33. Facilities and Infrastructure Emissions With the Whiteman AFB Alternative

Source	Pollutants (Tons/Year)						
	CO	NO _x	PM ₁₀	PM _{2.5}	SO _x	VOC	CO ₂ e
Whiteman AFB Alternative Construction/Demolition/Renovation	12.34	9.69	102.33	0.36	0.03	10.19	3,299

Table 3.4-33. Facilities and Infrastructure Emissions With the Whiteman AFB Alternative

Source	Pollutants (Tons/Year)						
	CO	NO _x	PM ₁₀	PM _{2.5}	SO _x	VOC	CO _{2e}
ROI Baseline ^(a)	12,426	2,373	6,964	1,548	65	5,883	599,310
Percentage of ROI	0.10%	0.41%	1.47%	0.02%	0.05%	0.17%	0.55%

Source: (EPA, 2021a)

Key: % = percent; AFB = Air Force Base; CO = carbon monoxide; CO_{2e} = carbon dioxide equivalent; NO_x = nitrogen oxides; PM₁₀ or PM_{2.5} = particulate matter with a diameter less than or equal to 10 or 2.5 microns, respectively; ROI = region of influence; SO_x = sulfur oxides; VOC = volatile organic compound

Note: Totals may not sum perfectly due to rounding of significant figures.

a. The ROI for Whiteman AFB emissions includes Johnson County in Missouri. See Table 3.4-11 and Table 3.4-12.

Emissions associated with facilities construction, demolition, and renovation would be minor and temporary, and there would be no adverse impacts associated with these activities under the Whiteman AFB Alternative. Additionally, construction would likely be phased, which would serve to further minimize impacts over the length of the construction timeframe.

3.4.2.3.5 Weapons Generation Facility

Construction of the WGF at Whiteman AFB would generate criteria pollutants and GHGs from the combustion of fossil fuels in construction equipment and worker commutes. Table 3.4-34 shows emissions from WGF construction at Whiteman AFB compared with the ROI baseline. Emissions would be minor and temporary, representing less than 3.78 percent of the ROI annual emissions baseline for all criteria pollutants. No adverse impacts to regional air quality would be anticipated.

Table 3.4-34. Weapons Generation Facility Subalternative Construction Emissions With the Whiteman AFB Alternative

Source	Pollutants (Tons/Year)						
	CO	NO _x	PM ₁₀	PM _{2.5}	SO _x	VOC	CO _{2e}
Whiteman AFB Alternative North WGF Site Construction Emissions	14.36	12.08	263.00	0.46	0.04	12.20	4,156
ROI Baseline ^(a)	12,426	2,373	6,964	1,548	65	5,883	599,310
Percentage of ROI	0.12%	0.51%	3.78%	0.03%	0.06%	0.21%	0.69%

Source: (EPA, 2021a)

Key: % = percent; AFB = Air Force Base; CO = carbon monoxide; CO_{2e} = carbon dioxide equivalent; NO_x = nitrogen oxides; PM₁₀ or PM_{2.5} = particulate matter with a diameter less than or equal to 10 or 2.5 microns, respectively; ROI = region of influence; SO_x = sulfur oxides; VOC = volatile organic compound; WGF = Weapons Generation Facility

Note: Totals may not sum perfectly due to rounding of significant figures.

a. The ROI for Whiteman AFB emissions includes Johnson County in Missouri. See Table 3.4-11 and Table 3.4-12.

Summary of Whiteman AFB Alternative Air Quality Environmental Consequences

Table 3.4-35 shows the estimated annual emissions under the Whiteman AFB Alternative. Emissions of all criteria pollutants other than PM₁₀ would be below indicator thresholds. PM₁₀ emissions could be further reduced by implementation of standard construction BMPs such as watering and/or covering of piles, loads, and temporary access roads. Emissions from C&D activities would also be minor and temporary, lasting only the duration of the construction phase.

Table 3.4-35. Summary of Whiteman AFB Alternative Emissions ^(a)

Source	Pollutants (Tons/Year)						
	CO	NO _x	PM ₁₀	PM _{2.5}	SO _x	VOC	CO _{2e}
Whiteman AFB Net Total Alternative Personnel Emissions	9.59	0.44	0.02	0.03	0.02	0.67	934
Whiteman AFB Alternative Aircraft Net Total Emissions	80.38	138.13	16.68	14.79	10.31	5.66	23,725
Whiteman AFB Alternative Facilities Construction and Demolition Emissions	12.34	9.69	102.33	0.36	0.03	10.19	3,299
Whiteman AFB Alternative WGF Construction Emissions	14.36	12.08	263.00	0.46	0.04	12.20	4,156
Total Whiteman AFB Alternative Emissions	116.67	160.34	382.02	15.64	10.40	28.72	32,114
ROI Baseline ^(b)	12,426	2,373	6,964	1,548	65	5,883	599,310
Net Change as Percentage of ROI	0.94%	6.76%	5.49%	1.01%	16.00%	0.49%	5.36%
Indicator	250	250	250	250	250	250	250
Exceedance (Yes or No)	No	No	Yes	No	No	No	No

Source: (EPA, 2021a)

Key: % = percent; - = minus; AFB = Air Force Base; CO = carbon monoxide; CO_{2e} = carbon dioxide equivalent; NO_x = nitrogen oxides; PM₁₀ or PM_{2.5} = particulate matter with a diameter less than or equal to 10 or 2.5 microns, respectively; ROI = region of influence; SO_x = sulfur oxides; VOC = volatile organic compound; WGF = Weapons Generation Facility

Notes: Totals may not sum perfectly due to rounding of significant figures.

a. Construction emissions for the Preferred Subalternative (the North WGF Site) are reflected in the summary.

b. The ROI for Whiteman AFB emissions includes Johnson County in Missouri. See Table 3.4-11 and Table 3.4-12.

3.4.2.3.6 Greenhouse Gases

GHG emissions for the Whiteman Alternative have been estimated at 32,114 tons per year for personnel, construction activities, and aircraft operations. C&D emissions would be temporary, only lasting the duration of the construction, demolition, and renovation process, and would not be repeated on an annual basis. During the C&D period, some of these emissions may be mitigated through implementation of construction BMPs, such as limiting idling time and spraying and/or covering unpaved roads and piles.

3.4.2.3.7 Snapshot

Personnel

It was estimated that the B-21 program would require approximately 2,550 military personnel (Section 2.4.2, Personnel). Table 3.4-36 shows the potential emissions associated with additional B-21 personnel and 20 percent of remaining B-2A personnel for the snapshot scenario at Whiteman AFB, compared to the ROI baseline annual emissions.

Table 3.4-36. Personnel Emissions for the Snapshot Scenario With the Whiteman AFB Alternative

Source	Pollutants (Tons/Year)						
	CO	NO _x	PM ₁₀	PM _{2.5}	SO _x	VOC	CO _{2e}
Whiteman AFB Snapshot Scenario B-21 Personnel Emissions	16.06	0.74	0.03	0.02	0.01	1.12	1,564
Whiteman AFB Snapshot Scenario B-2A Personnel Emissions	-6.47	-0.30	-0.01	-0.01	0.00	-0.45	-630

Table 3.4-36. Personnel Emissions for the Snapshot Scenario With the Whiteman AFB Alternative

Source	Pollutants (Tons/Year)						
	CO	NO _x	PM ₁₀	PM _{2.5}	SO _x	VOC	CO _{2e}
Whiteman AFB Snapshot Scenario Net Total Personnel Emissions	9.59	0.44	0.02	0.01	0.01	0.67	934
ROI Baseline ^(a)	12,426	2,373	6,964	1,548	65	5,883	599,310
Net Change as Percentage of ROI	0.08%	0.02%	0.00%	0.00%	0.01%	0.01%	0.16%

Source: (EPA, 2021a)

Key: % = percent; AFB = Air Force Base; CO = carbon monoxide; CO_{2e} = carbon dioxide equivalent; NO_x = nitrogen oxides; PM₁₀ or PM_{2.5} = particulate matter with a diameter less than or equal to 10 or 2.5 microns, respectively; ROI = region of influence; SO_x = sulfur oxides; VOC = volatile organic compound

Note: Totals may not sum perfectly due to rounding of significant figures.

a. The ROI for Whiteman AFB emissions includes Johnson County in Missouri. See Table 3.4-11 and Table 3.4-12.

Airfield Operations

Table 3.4-37 shows the potential change (increase or decrease) in criteria pollutant and GHG emissions associated with the Whiteman AFB snapshot scenario from the baseline. Emissions of all criteria pollutants would increase slightly from the baseline levels. The greatest increase would be for nitrogen oxides, which would increase by 165.05 tons per year (6.96 percent of the ROI baseline for nitrogen oxides in Johnson County).

Table 3.4-37. Airfield Operations Emissions for the Snapshot Scenario With the Whiteman AFB Alternative

Source	Pollutants (Tons/Year)						
	CO	NO _x	PM ₁₀	PM _{2.5}	SO _x	VOC	CO _{2e}
Whiteman AFB Snapshot Scenario B-21 LTO Emissions	146.72	228.99	22.80	20.11	16.90	10.37	37,372
Whiteman AFB Snapshot Scenario B-21 TGO Emissions	5.91	77.77	16.38	14.75	4.94	0.17	14,943
Whiteman AFB Snapshot Scenario B-2A LTO Emissions	-55.67	-105.30	-11.25	-9.98	-7.25	-3.84	-16,894
Whiteman AFB Snapshot Scenario B-2A TGO Emissions	-2.77	-36.41	-7.67	-6.91	-2.31	-0.08	-6,997
Whiteman AFB Snapshot Scenario Net Total Aircraft Emissions	94.19	165.05	20.26	17.98	12.28	6.62	28,425
ROI Baseline ^(a)	12,426	2,373	6,964	1,548	65	5,883	599,310
Net Change as Percentage of ROI	0.76%	6.96%	0.29%	1.16%	18.89%	0.11%	4.74%

Source: (EPA, 2021a)

Key: % = percent; - = minus; CO = carbon monoxide; CO_{2e} = carbon dioxide equivalent; LTO = landing and takeoff operations; NO_x = nitrogen oxides; PM₁₀ or PM_{2.5} = particulate matter with a diameter less than or equal to 10 or 2.5 microns, respectively; ROI = region of influence; SO_x = sulfur oxides; TGO = touch and go operations; VOC = volatile organic compound

Note: Totals may not sum perfectly due to rounding of significant figures.

a. The ROI for Whiteman AFB emissions includes Johnson County in Missouri. See Table 3.4-11 and Table 3.4-12.

Airspace and Range Utilization

Under the Whiteman AFB snapshot scenario, there would be no B-2 or B-21 aircraft operations occurring below the 3,000-foot AGL mixing layer within the Whiteman AFB

SUA. Therefore, emissions would remain the same as under the No Action Alternative baseline emissions for all SUA.

Summary of Whiteman AFB Snapshot Scenario

Table 3.4-38 shows the estimated annual emissions under the Whiteman AFB snapshot scenario. Emissions of all criteria pollutants other than PM₁₀ would be below indicator thresholds. PM₁₀ emissions could be further reduced by implementation of standard construction BMPs such as watering and/or covering of piles, loads, and temporary access roads. Emissions from C&D activities would also be minor and temporary, lasting only the duration of the construction phase.

Table 3.4-38. Summary of Whiteman AFB Snapshot Scenario Emissions

Source	Pollutants (Tons/Year)						
	CO	NO _x	PM ₁₀	PM _{2.5}	SO _x	VOC	CO _{2e}
Whiteman AFB Alternative Net Total Personnel Emissions (Snapshot)	9.59	0.44	0.02	0.01	0.01	0.67	934
Whiteman AFB Alternative Net Total Aircraft Emissions (Snapshot)	94.19	165.05	20.26	17.98	12.28	6.62	28,425
Whiteman AFB Alternative Facilities Construction and Demolition Emissions	12.34	9.69	102.33	0.36	0.03	10.19	3,299
Whiteman AFB Alternative WGF Construction Emissions	14.36	12.08	263.00	0.46	0.04	12.20	4,156
Total Whiteman AFB Alternative Emissions (Snapshot)	130.48	187.26	385.60	18.81	12.36	29.68	36,813
ROI Baseline ^(a)	12,426	2,373	6,964	1,548	65	5,883	599,310
Net Change as Percentage of ROI	1.05%	7.89%	5.54%	1.22%	19.02%	0.50%	6.14%
Indicator	250	250	250	250	250	250	250
Exceedance (Yes or No)	No	No	Yes	No	No	No	No

Source: (EPA, 2021a)

Key: % = percent; - = minus; CO = carbon monoxide; CO_{2e} = carbon dioxide equivalent; NO_x = nitrogen oxides; PM₁₀ or PM_{2.5} = particulate matter with a diameter less than or equal to 10 or 2.5 microns, respectively; ROI = region of influence; SO_x = sulfur oxides; VOC = volatile organic compound

Note: Totals may not sum perfectly due to rounding of significant figures.

a. The ROI for Whiteman AFB emissions includes Johnson County in Missouri. See Table 3.4-11 and Table 3.4-12.

Greenhouse Gases

GHG emissions for the Whiteman AFB Alternative snapshot scenario have been estimated at 36,813 tons per year for personnel, construction activities, and aircraft operations. C&D emissions would be temporary, only lasting the duration of the construction, demolition, and renovation process, and would not be repeated on an annual basis. During the C&D period, some of these emissions may be mitigated through implementation of construction BMPs, such as limiting idling time and spraying and/or covering unpaved roads and piles.

3.4.2.3.8 Proposed Resource-Specific Mitigations and Management Actions to Reduce the Potential for Environmental Impacts

Construction activities would employ standard management measures for construction such as watering of graded areas, covering of soil stockpiles, and contour grading (if necessary), to minimize temporary generation of dust and particulate matter. This would serve to minimize air emissions associated with the elements of the Proposed Action.

3.5 LAND USE

3.5.1 Land Use, Affected Environment

3.5.1.1 Description of Resource

Land use refers to the management and use of land by people. Attributes of land use include general land use patterns, land ownership, land management plans, and special use areas. Typical land uses include residential, commercial, industrial, agricultural, transportation, communication/utilities, military, public/institutional, and recreational. Land use also includes areas set aside for preservation or protection of natural resources or unique features. Management plans, policies, ordinances, zoning, and regulations determine the types of uses that are allowable or that protect specially designated or environmentally sensitive uses. Typically, the primary objectives of land use planning are to ensure managed growth and compatible uses relative to adjacent properties.

Land use adjacent to military installations that support aircraft operations is typically considered in terms of noise and accident potential. Aircraft noise zones, APZs, and height restrictions for nearby structures are usually identified in AICUZ studies prepared for such installations. The studies provide information on off-base land uses and identify uses that are compatible, incompatible, or conditionally compatible with noise and accident zones. “Conditionally compatible” refers to land use in areas where additional evaluation of noise impacts is required, and where noise attenuation measures may be required in facility design and construction to reduce noise to acceptable levels. Use zones included in this document consist of the CZ, APZ I, APZ II, and four noise zones.

The CZ, APZ I, and APZ II are zones classified by the military that are located immediately off the end of runways. These zones delineate areas with the highest potential for accidents based on historical accident data. The CZ, which is nearest the runway, presents a risk that is generally high enough for the DoD to acquire or control the land through purchase or easement. Although aircraft accident potential in APZs I and II does not warrant acquisition, land use planning and controls are strongly encouraged for protection of the public.

AICUZ noise zones are typically defined as 65 to 69 dBA DNL, 70 to 74 dBA DNL, 75 to 79 dBA DNL, and greater than 80 dBA DNL. Noise levels are stated in dBA, which emphasizes the frequencies of best human hearing. Certain land uses, including residential uses, are considered to be incompatible at noise levels equal to or exceeding 65 dB DNL. Where the community determines that residential uses must be allowed in

the 65 to 69 dB DNL and 70 to 74 dB DNL noise contours, special construction measures to achieve outdoor-to-indoor noise level reduction goals should be incorporated into building codes and considered in individual approvals. At noise levels equal to or exceeding 75 dB DNL, noise level reduction design measures to achieve noise level goals are considered infeasible (Dyess AFB, 2015).

In the remainder of Section 3.5 (Land Use), unless stated otherwise, the term “accident zone” refers to the area encompassed by the CZ, APZ I, and APZ II, while the term “noise zone” refers to the area encompassed by noise levels of 65 dBA DNL or greater.

3.5.1.2 Region of Influence

The ROI for land use includes all existing areas within the alternative MOB 2 locations (Dyess AFB and Whiteman AFB), as well as adjacent off-base land areas that would potentially be affected by noise and safety risks associated with B-21 operations. The ROI also includes all land areas under the proposed training airspace, including the Brownwood, Lancer, Lancer Bridge, Pecos, and Bronco MOAs, as well as the Willie-Roscoe ATCAA (for aircraft flying out of Dyess AFB); and the Smoky Hill Range, Ada, Truman, Lindbergh, and Cannon MOAs, as well as the Ozark ATCAA (for aircraft flying out of Whiteman AFB) and all associated ATCAAs.

3.5.1.2.1 Dyess AFB

On-Base Land Use

Existing land use on Dyess AFB is described in the Installation Development Plan (IDP) (Dyess AFB, 2018a) and is shown in Figure 3.5-1. The area west of the flightline consists of airfield pavements, clearance areas, and open space. All routinely inhabited facilities occur east of the airfield. Existing land use follows a tiered pattern extending east from the aircraft parking apron.

First tier land uses are directly related to aircraft operations and maintenance. Second-tier facilities, which are mostly located between 2nd Street and 3rd Street, consist primarily of industrial and logistics functions. The third tier is a mix of land uses that include unaccompanied housing, temporary lodging, outdoor recreation, community service, administrative, and community commercial. Much of this tier forms “downtown” Dyess AFB.

An area of mostly open space occurs at the south end of the installation. This area includes ERP sites, security forces and expeditionary training areas, and ecological restoration areas.

Some open space areas potentially affected by construction associated with the Proposed Action are designated as “prime farmland soils” under the Farmland Protection Policy Act (FPPA). The purpose of the FPPA is to minimize the extent to which federal actions contribute to unnecessary and irreversible conversion of farmland to nonagricultural uses. Prime farmland is defined as land that has the best combination of physical and chemical characteristics for producing food and other plant-based products. Acquisition or use of farmland by a federal agency for national defense purposes is exempt from the FPPA.

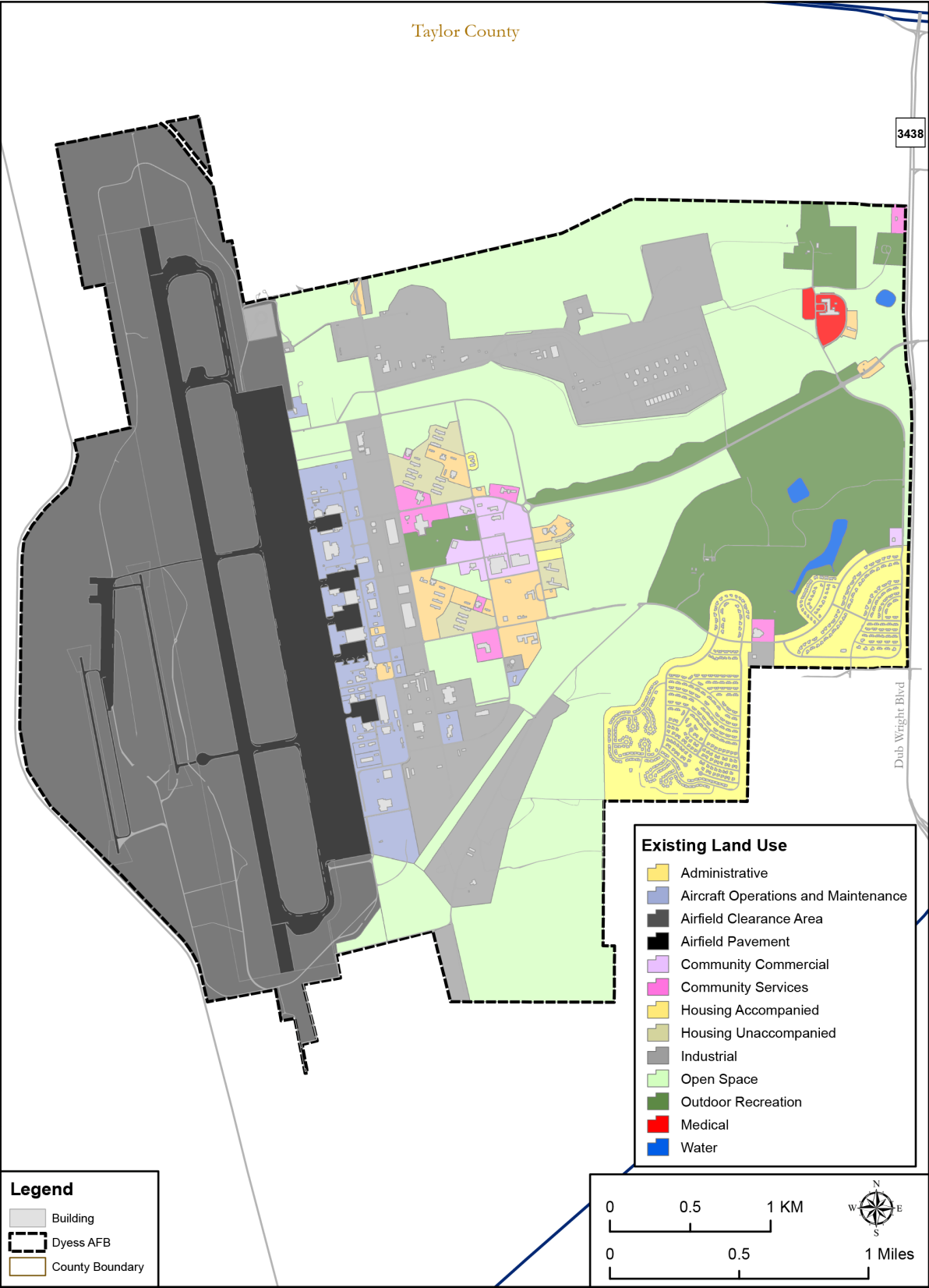


Figure 3.5-1. Land Use on Dyess AFB

With the exception of clearance areas (e.g., safety arcs, APZs, and noise zones), floodplains, and functional compatibility considerations in areas near the airfield, development constraints are relatively minor on the base (Dyess AFB, 2018a). The installation is divided into nine districts, based in part on land use patterns, for development planning purposes. Because previous land use decisions were made with the goal of maximizing aircraft mission effectiveness, future land use designations are expected to require only minor changes to accommodate potential growth. To minimize on-base sprawl and increase compact infill development, a growth boundary that incorporates the main cantonment area and flightline has been established. To the extent feasible, most new development is limited to areas within the boundary.

Off-Base Land Use

Dyess AFB is located in Taylor County, Texas, within the city limits of Abilene. The city of Tye is adjacent to the installation to the north. The community of Caps is located approximately 1.5 miles south. Off-base land use categories that potentially occur in these areas were defined in the 2015 Dyess AFB AICUZ study (Dyess AFB, 2015) and include residential, commercial, industrial, public/quasi-public, recreational, and open space/low density. Definitions of these categories are provided in Appendix C (Land Use) of this EIS.

In the context of the AICUZ study definitions, land use in most areas adjacent to the base consists primarily of open space/low density, with a small amount of residential, commercial, and industrial. A mix of residential, commercial, industrial, and other uses occur in developed portions of Abilene, Tye, and Caps. A detailed description of off-base land use is provided in the 2015 AICUZ study's Section 4.1 through Section 4.4 and is summarized in Appendix C (Land Use) of this EIS. Current off-base land use is shown in Figure 3.5-2. Note that land use categories have been updated since publication of the 2015 AICUZ study. Definitions of the revised categories are provided in Appendix C. In the context of current definitions, most adjacent land use outside of developed portions of Abilene consists of shrub/scrub, herbaceous, cultivated crops, and forest.

Off-base land use adjacent to Dyess AFB may potentially be affected by noise and safety issues associated with aircraft operations. Noise contours, CZs, and APZs extend in an approximately north-south axis along the primary runway centerline. The off-base area exposed to various noise levels (outside of CZs and APZs) and accident zones for each land use type, based on geographic information system (GIS) data available at the time, is provided in the 2015 AICUZ study's Section 4.3.

A total of 9,009 acres were associated with various noise zones and a total of 1,688 acres were associated with the accident zones (Dyess AFB, 2015, pp. 4-6). Approximately 96 percent of the noise zone area and 87 percent of the accident zone area was identified as open space/low density use, with the remainder of each area consisting of a mix of residential, commercial, industrial, and public/quasi-public use.

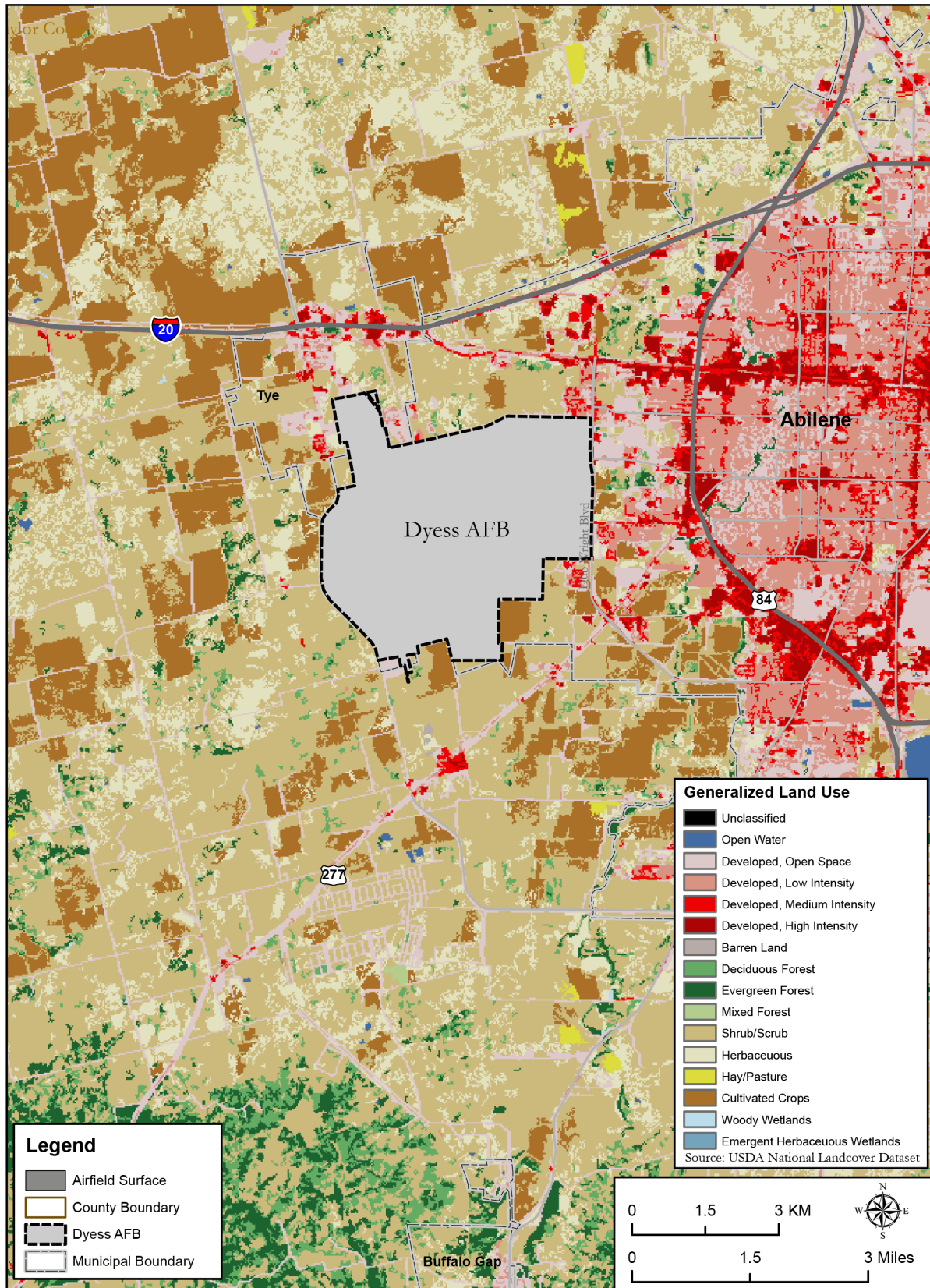


Figure 3.5-2. Land Use Adjacent to Dyess AFB

Detailed descriptions of the areas located within the noise zones and APZs are provided in the 2015 AICUZ study's Section 4.5, Section 4.2.3 of the Installation Complex Encroachment Management Action Plan (ICEMAP) (Dyess AFB, 2014), and summarized in Appendix C (Land Use) of this EIS.

Of the total land area encompassed by noise and APZs, a relatively small portion (163 acres) was considered incompatible based on guidelines presented in the 2015 AICUZ study (Dyess AFB, 2015, pp. 4-12). Table 3.5-1 presents these off-base incompatible land use areas. Note that the 30 acres of noise zone/accident zone overlap are not included in the total, to prevent double counting of that area.

Table 3.5-1. Off-Base Incompatible Land Use Area Identified in the 2015 Dyess AICUZ Study

Land Use Category	Incompatible Area (Acres)		
	Noise (65 dBA DNL or greater)	CZ/APZ	Overlap of Noise/CZ/APZ
Residential	108	39	28
Commercial	1	0	0
Industrial	0	0	0
Public/Quasi-Public	10	2	2
Open Space/Low-Density	33	0	0
Recreational	0	0	0
Total	152	41	30

Source: (Dyess AFB, 2015)

Key: AICUZ = Air Installations Compatible Use Zones; APZ = accident potential zone; CZ = clear zone; dBA = A-weighted decibels; DNL = day-night average sound level

3.5.1.2.2 Whiteman AFB

On-Base Land Use

Existing land use on Whiteman AFB is described in the IDP (Whiteman AFB, 2015b) and Design Guide (Whiteman AFB, 2016b), and is shown in Figure 3.5-3. The base consists of 10 land use types, although five general categories (aircraft operations and maintenance, industrial, administrative, community service, and housing) are considered primarily important for overall installation organization and efficiency. Land use types are configured spatially to form a campus-like pattern and, to the extent feasible, facilities within each type are functionally compatible. Aircraft operations, aircraft maintenance, and airfield clearance areas are located in the central and eastern portions of the installation and directly support flight activities. The industrial area, which contains facilities such as maintenance and storage structures, is located near the airfield between Arnold Avenue and Vandenberg Avenue. The cantonment area is located west of the airfield and contains administrative, community, housing, and other supporting land uses. Accompanied housing is located farthest from the airfield. Open space and outdoor recreation areas occur on the western portion of the installation, including areas west of Missouri Highway 23.

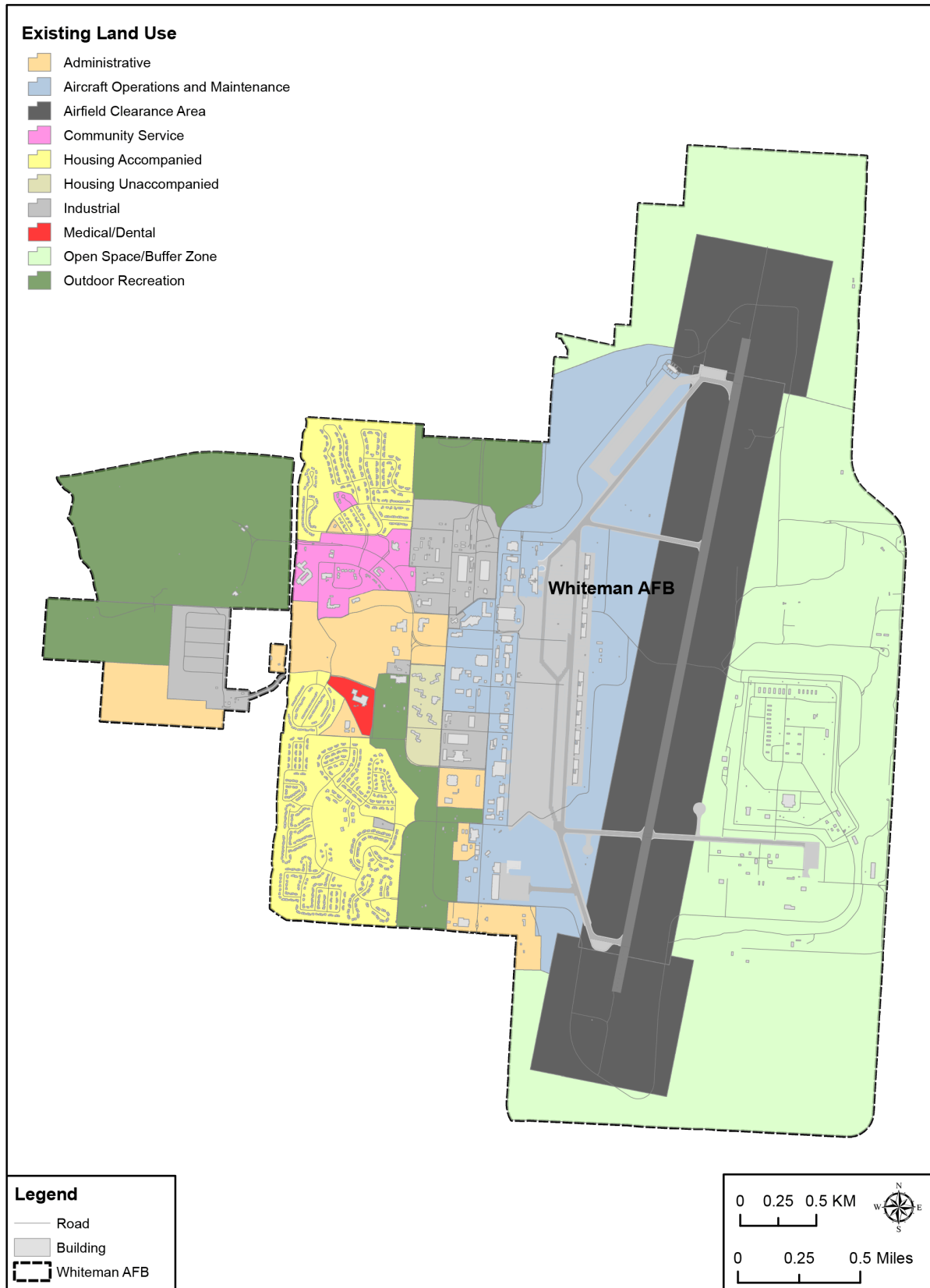


Figure 3.5-3. Land Use on Whiteman AFB

Some open space areas potentially affected by construction associated with the Proposed Action are designated as “prime farmland soils” or “farmland of statewide importance” under the FPPA. This designation refers to land that is important to the state in the production of food and other plant-based products. Acquisition or use of farmland by a federal agency for national defense purposes is exempt from the FPPA.

With the exception of explosive safety zones and floodplains, development constraints are considered minor on Whiteman AFB (Whiteman AFB, 2015b). The base is divided into six planning districts and numerous smaller planning areas, based in part on land use patterns, for development planning purposes. The future planning areas are intended to facilitate a coherent and complementary development pattern across districts and throughout the installation. Future planning strategies encourage infill development, as well as mixed or alternative land uses when applicable.

Off-Base Land Use

Whiteman AFB is located in Johnson County in western Missouri. The Pettis County boundary is about 1.5 miles to the east. The installation is located about 2 miles south of the city of Knob Noster, 9 miles east of Warrensburg, and 16 miles west of Sedalia. Kansas City is about 70 miles to the northwest. Off-base land use categories that potentially occur in these areas were defined in the Whiteman AFB AICUZ study (Whiteman AFB, 2015a) and include residential, commercial, industrial, public/quasi-public, recreational, and open space/agricultural/low density. Definitions of these categories are provided in Appendix C (Land Use) of this EIS.

In the context of the AICUZ study definitions, land use adjacent to the base consists primarily of open space/agricultural/low density (mostly agricultural use), with a small amount of residential (mostly single-family residential), commercial, industrial, and municipal/institutional.

The dominant land use in developed portions of Knob Noster is residential, with some commercial, public, agricultural, and industrial land uses also present within the city limits (Whiteman AFB, 2015a). A description of off-base land use is provided in the 2015 AICUZ study's Section 4.1 through Section 4.3, the 2008 Joint Land Use Study (JLUS) (Whiteman AFB, 2008a) Section 4.3, and the 2014 ICEMAP (Whiteman AFB, 2014a) Sections 2.1 and 2.2, and is summarized in Appendix C (Land Use) of this EIS. Current off-base land use is shown in Figure 3.5-4. Note that land use categories have been updated since publication of the 2015 AICUZ study. Definitions of the revised categories are provided in Appendix C of this EIS. In the context of current definitions, most adjacent land use consists of hay/pasture, cultivated crops, deciduous forest, and developed areas associated with Knob Noster.

Off-base land use adjacent to Whiteman AFB may potentially be affected by noise and safety issues associated with aircraft operations. Noise contours, CZs, and APZs extend approximately north and south along the runway centerline. The off-base area exposed to various noise levels and accident zones for each land use type, based on GIS data available at the time, is provided in the 2008 JLUS. A total of 3,039 acres were associated with various noise zones, and a total of 1,766 acres were associated with accident zones (Whiteman AFB, 2008a, pp. 4–6).

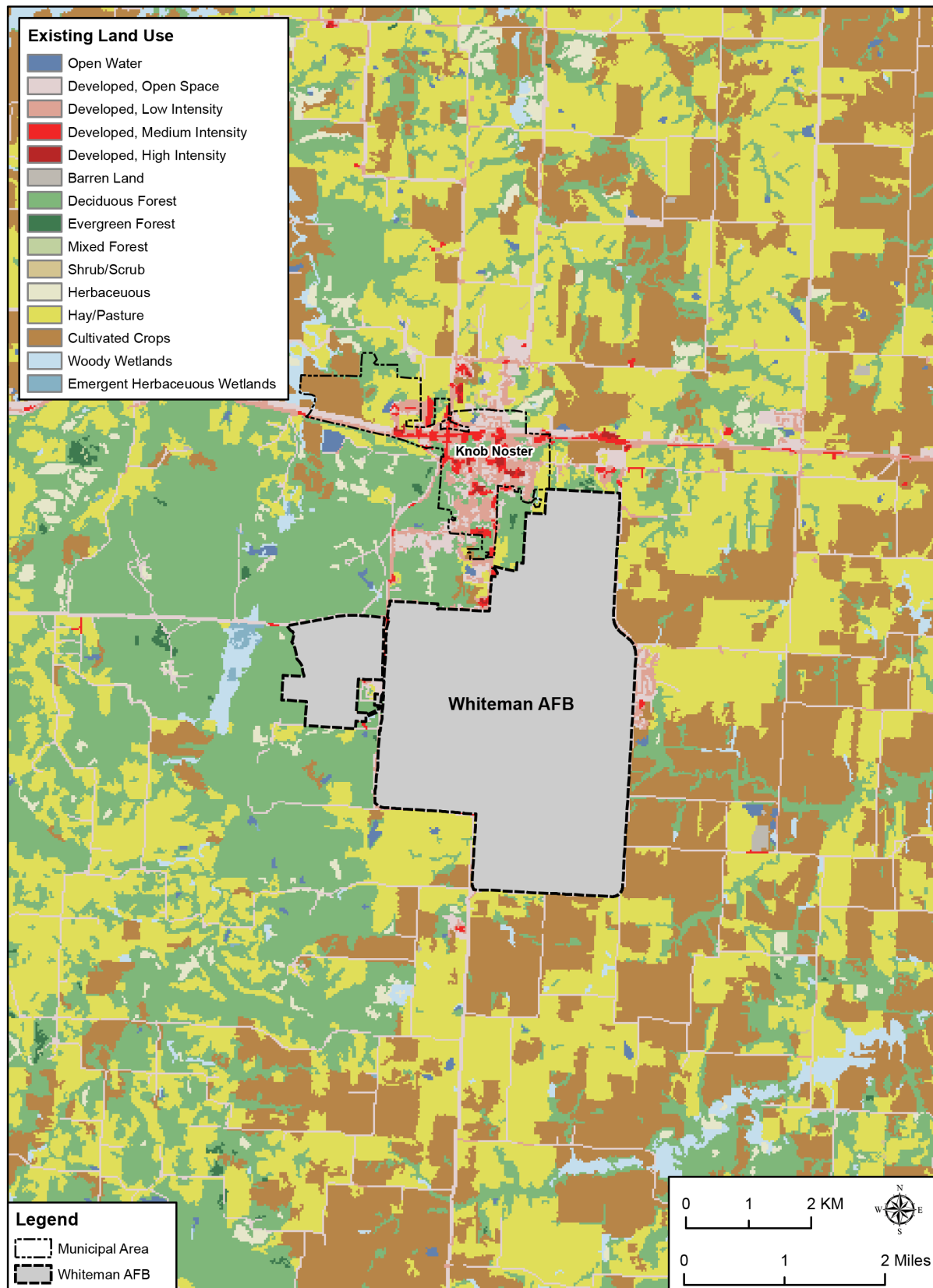


Figure 3.5-4. Land Use Adjacent to Whiteman AFB

Approximately 82 percent of the noise zone area and 88 percent of the accident zone area was identified as agricultural use. Approximately 10 percent of the noise zone area and 6 percent of the accident zone area was identified as single-family residential. The remainder of the noise and accident zones consisted of a mix of mobile home, commercial, industrial, municipal/institutional, and vacant/undeveloped use.

Of the total land area encompassed by noise and APZs, a small portion (87 acres) was considered incompatible based on guidelines presented in the JLUS (Whiteman AFB, 2008a, pp. 4-6 and 4-7) and ICEMAP Volume 1 (Whiteman AFB, 2014a, p. 10 and 16) (pp. 10 and 16). Table 3.5-2 presents these off-base incompatible land use areas. Note that areas considered incompatible due to both noise and accident potential were not included in noise zone calculations in the JLUS and ICEMAP to prevent double counting of those areas. However, incompatible off-base land use acreage, based on noise levels, was identified in a recent EIS that evaluated a potential F-35A operational beddown at Whiteman AFB (DAF, 2020a). This acreage is provided in Table 3.5-2.

Table 3.5-2. Off-Base Incompatible Land Use Area Identified for Whiteman AFB

Land Use Category	Acreage Within Accident Zones			Acreage Within Noise Zones (dBA DNL)			
	CZ	APZ I	APZ II	65–69	70–74	75–79	80+
Single Family Residential	0	61	0	0	0	0	0
Mobile Home	0	25	0	0	0	0	0
Residential (unspecified type)	0	0	0	79 ^(a)	19	0	0
Total	0	86	0	79	19	0	0

Sources: (Whiteman AFB, 2008a; Whiteman AFB, 2014a; DAF, 2020a)

Key: APZ = accident potential zone; CZ = clear zone; dBA = A-weighted decibels; DNL = day-night average sound level

Note:

a. Based on information in the 2008 Joint Land Use Study, incompatible land use area in the 65–69 dBA DNL noise zone includes at least 2 acres designated as Mobile Home.

3.5.1.2.3 Airspace and Military Operating Areas

Aircraft Flying Out of Dyess AFB

Land use under the airspace of the Lancer, Lancer Bridge, Brownwood, Pecos, and Bronco MOAs, as well as the Willie-Roscoe ATCAA, are shown in Figure 3.5-5. Land use under the Lancer, Brownwood, and Pecos MOAs has not changed substantially since completion of the MOB 1 EIS (DAF, 2021e). Most land use under the Lancer MOA, Lancer Bridge MOA, and Willie-Roscoe ATCAA consists of shrub/scrub, herbaceous, and cultivated crops.

Overall, the land area under the Lancer MOA airspace is characterized by large, sparsely inhabited areas with scattered, isolated towns, small communities, and homesteads (DAF, 2000). Due to the adjacent location, this characterization likely applies to both the Lancer Bridge MOA and Willie-Roscoe ATCAA. About 86 percent of the land under the Lancer MOA airspace is privately held rangeland used for grazing livestock, with the remainder overseen by a variety of state and federal entities.

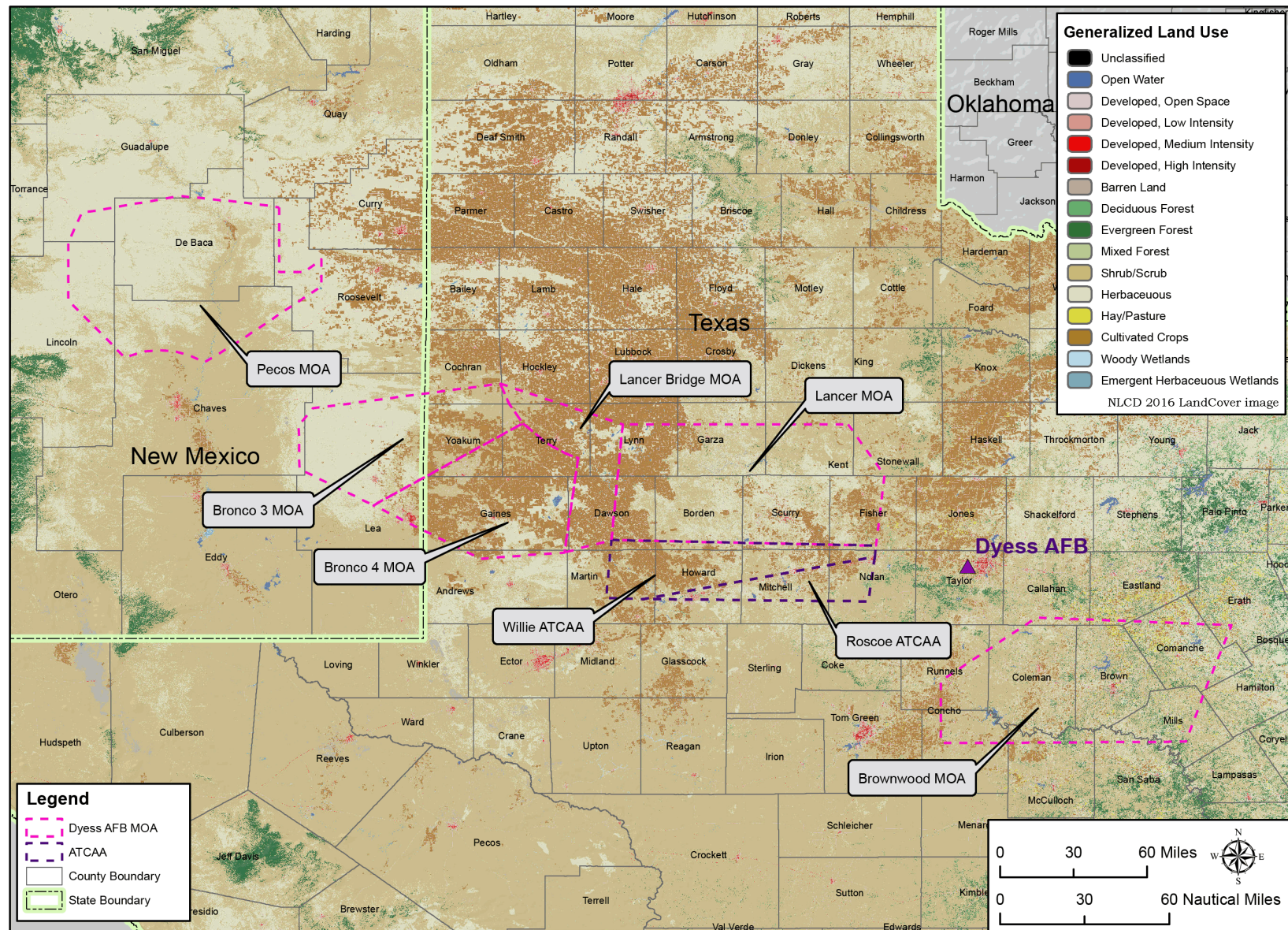


Figure 3.5-5. Land Use Associated With Dyess AFB Airspace

Under the Brownwood MOA, most land consists of shrub/scrub and herbaceous, which is generally used for rangeland and agriculture. Due to the close proximity, overall land use conditions are probably similar to that of the Lancer MOA, where land under the airspace is characterized by large, sparsely inhabited areas with scattered, isolated towns, small communities, and homesteads. Compared to the Lancer MOA, there are larger forested and developed (open space) land areas.

Nearly all land under the Pecos MOA consists of herbaceous and shrub/scrub, which is generally used for rangeland and agriculture. About 78 percent of land under the airspace is privately held, with the remainder overseen by a variety of state, Native American, military, and other federal entities (DAF, 2006).

Overall, most land under the Bronco MOA consists of shrub/scrub, herbaceous, and cultivated crops. Herbaceous land cover is considerably more prominent under Bronco 3, and cultivated crop is more prevalent under Bronco 4. In general, the land area under the Bronco MOA is characterized by large, sparsely inhabited areas with scattered, isolated towns, small communities, and homesteads (DAF, 2007). Land is owned and managed by a variety of entities, including private owners, the states of New Mexico and Texas, and various federal agencies. The primary land use outside population centers is livestock grazing and agriculture. Designated special land uses are limited to the Muleshoe National Wildlife Refuge, which is managed by the U.S. Fish and Wildlife Service (USFWS).

Aircraft Flying Out of Whiteman AFB

Land use under the airspace of the Smoky Hill Range, Ozark ATCAA, and Ada, Cannon, Truman, and Lindbergh MOAs are shown in Figure 3.5-6. Under the Smoky Hill Range, land use is mostly categorized as herbaceous. About one-third of the range consists of an air-to-ground training impact area (ANG Readiness Center and Smoky Hill ANG Range, 2007). Most of the remaining area is in an agricultural lease program (private leases) and is used for cattle grazing. A few of the leases are used for crop production and hay.

The large area of land under the Ozark ATCAA encompasses numerous land use types, but the primary uses are deciduous forest, hay/pasture, and cultivated crops. Deciduous forest occurs extensively under the central, eastern, and southern portions of the airspace. Cultivated crops occurs mostly in the northern and western portions. Hay/pasture is intermingled with other land use types throughout the area. Developed areas of varying densities (e.g., Springfield, Joplin) are also interspersed under the airspace.

Most land under the Ada MOA consists of cultivated crops and herbaceous. These categories are typically compatible with rangeland and agriculture.

Land use under the Cannon MOA consists primarily of deciduous forest and hay/pasture. Developed areas are largely absent underneath this MOA.

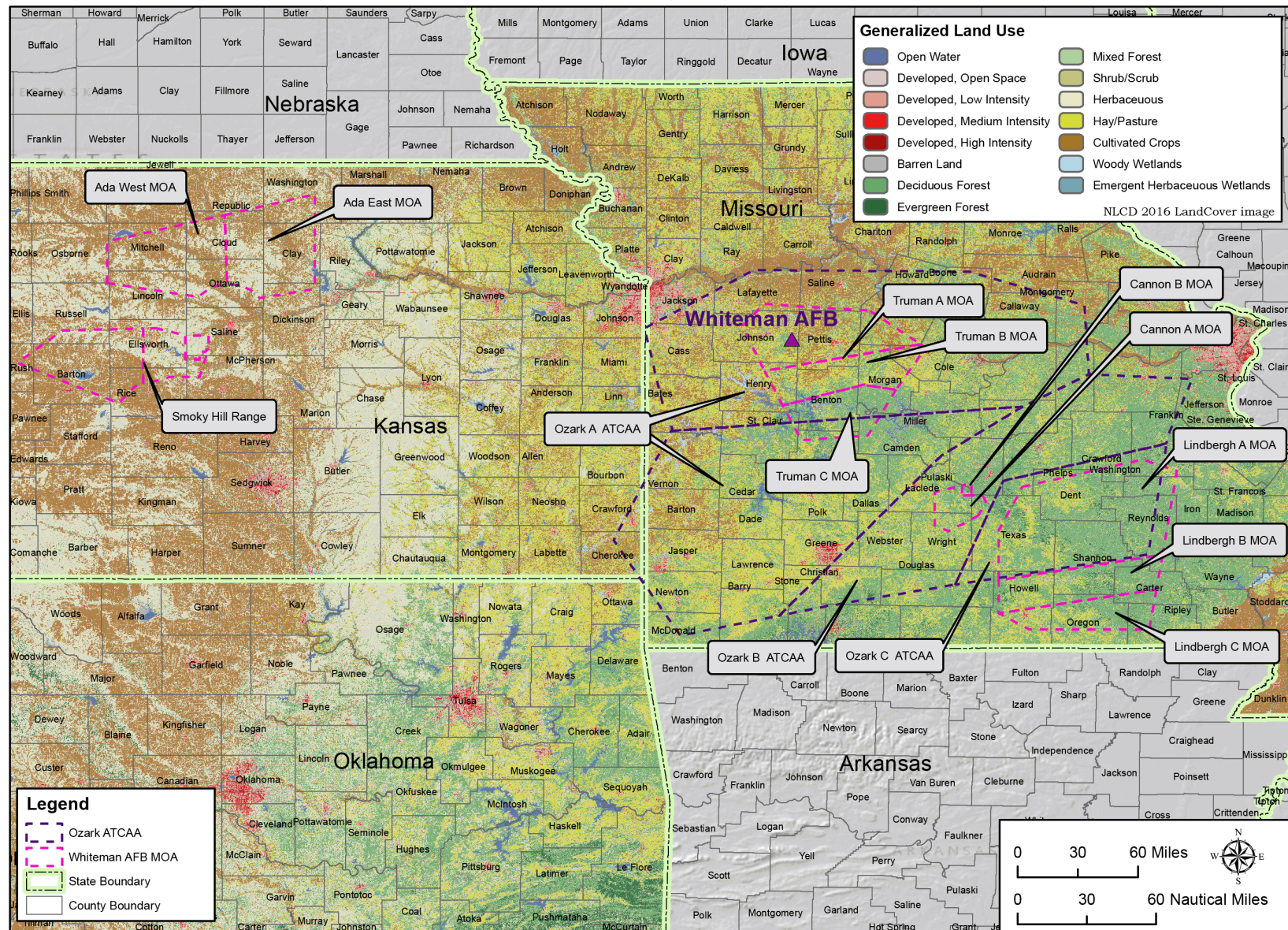


Figure 3.5-6. Land Use Associated With Whiteman AFB Airspace

Land use under the Truman MOA consists primarily of hay/pasture, cultivated crops, and deciduous forest. Hay/pasture and cultivated crop categories are more prevalent in the northern portion (Truman A and B), while deciduous forest is more concentrated in the southern portion (Truman C). Developed areas of varying densities, (e.g., Whiteman AFB and populated areas near southeastern Kansas City) are also interspersed under the airspace.

The predominant land uses under the Lindbergh MOA are deciduous forest and hay/pasture. A moderate amount of evergreen forest also occurs throughout the area. Some of the forested area is owned by the U.S. Forest Service. Populated areas are scattered and generally of low density.

3.5.1.3 Analysis Methodology

Potential on-base impacts at Dyess AFB and Whiteman AFB were determined based on whether the Proposed Action would result in changes to land use compatibility due to facility and infrastructure placement or on-base noise levels. Potential impacts to off-base areas adjacent to Dyess AFB and Whiteman AFB were determined based on whether changes in noise exposure or accident potential would affect land use compatibility.

As discussed in Section 3.5.1.2 (Land Use, Affected Environment, Region of Influence), AICUZ studies prepared for Dyess AFB and Whiteman AFB, as well as the ICEMAP and JLUS prepared for Whiteman AFB, describe the off-base land use area affected by noise zones. However, for this EIS, noise modeling was conducted for current operations and the results are considered to represent baseline conditions under the No Action Alternative. Noise modeling was also conducted for the Proposed Action (i.e., the Dyess AFB Alternative and the Whiteman AFB Alternative). Refer to Section 3.3 (Noise) for a detailed description of the modeling method.

For analysis under the No Action Alternative, acreage associated with baseline noise contours and accident zones is compared to acreages presented in the respective AICUZ studies and other applicable documents to determine the extent to which current operations affect on-base and off-base land use relative to previous analyses conducted for Dyess AFB and Whiteman AFB. Land use analysis for the Proposed Action compares potential changes to noise exposure, APZs, and land use compatibility to baseline conditions presented under the No Action Alternative. Analysis under the No Action Alternative also includes relevant projects listed in Table 3.1-1 that would occur either on or in the vicinity of Dyess AFB and Whiteman AFB as part of the baseline.

There would be no development or associated potential changes to land use compatibility under any of the proposed training airspace; therefore, land use impacts for areas under the MOAs and ATCAAs were evaluated based on projected changes in noise levels under these airspace areas.

3.5.2 Land Use, Environmental Consequences

3.5.2.1 No Action Alternative Consequences

Under the No Action Alternative, the B-21 would not be beddown at either Dyess AFB or Whiteman AFB, and there would be no associated personnel changes; C&D, or renovation activities; or changes to existing noise zones and APZs resulting from B-21 aircraft operations. On-base land use would continue to adhere to existing plans and guidelines. Future development that is not associated with the B-21 beddown or the baseline projects identified in Table 3.1-1 would continue to be evaluated and implemented as appropriate. The IDPs prepared for each base provide information on potential future development and construction projects. It is anticipated that future development would occur in accordance with guidance in each base's IDP, JLUS, AICUZ study, ICEMAP, future land use plan, and design guide, as applicable, and adverse impacts would, therefore, not be expected. Potential impacts related to noise levels, APZs, and land use compatibility related to development and infrastructure projects are discussed in the following subsections.

3.5.2.1.1 No Action Alternative at Dyess AFB

Development and Infrastructure Land Use Compatibility

It is expected that all baseline development and infrastructure activities within the installation boundary (Table 3.1-1) would be conducted in accordance with applicable installation land use planning procedures and requirements, including guidance contained in the IDP and future land use plan. Electrical system upgrades would result in negligible change to the existing infrastructure footprint, and the completed water system upgrades have resulted in no change to the infrastructure footprint. Dormitory construction and renovation, community center complex development, and security forces conversion would occur in areas compatible with those land uses. There would be no change to on-base land use associated with baseline projects.

On-Base and Off-Base Noise Zones and Accident Zones

On-base land use and aircraft noise contours under the No Action Alternative are shown in Figure 3.5-7. The on-base land use area encompassed by each noise zone is shown in Table 3.5-3.

The on-base 65 dBA DNL aircraft noise contour is mostly limited to industrial, aircraft operations and maintenance, open space, and airfield use categories on the eastern portion of the base, which are compatible uses. The 75 dBA DNL noise contour is almost entirely limited to the airfield and aircraft operations and maintenance functions along the flightline. The 80 dBA DNL contour is mostly confined to the runway, ramps, and taxi areas, but also extends to some aircraft operations and maintenance functions as well.

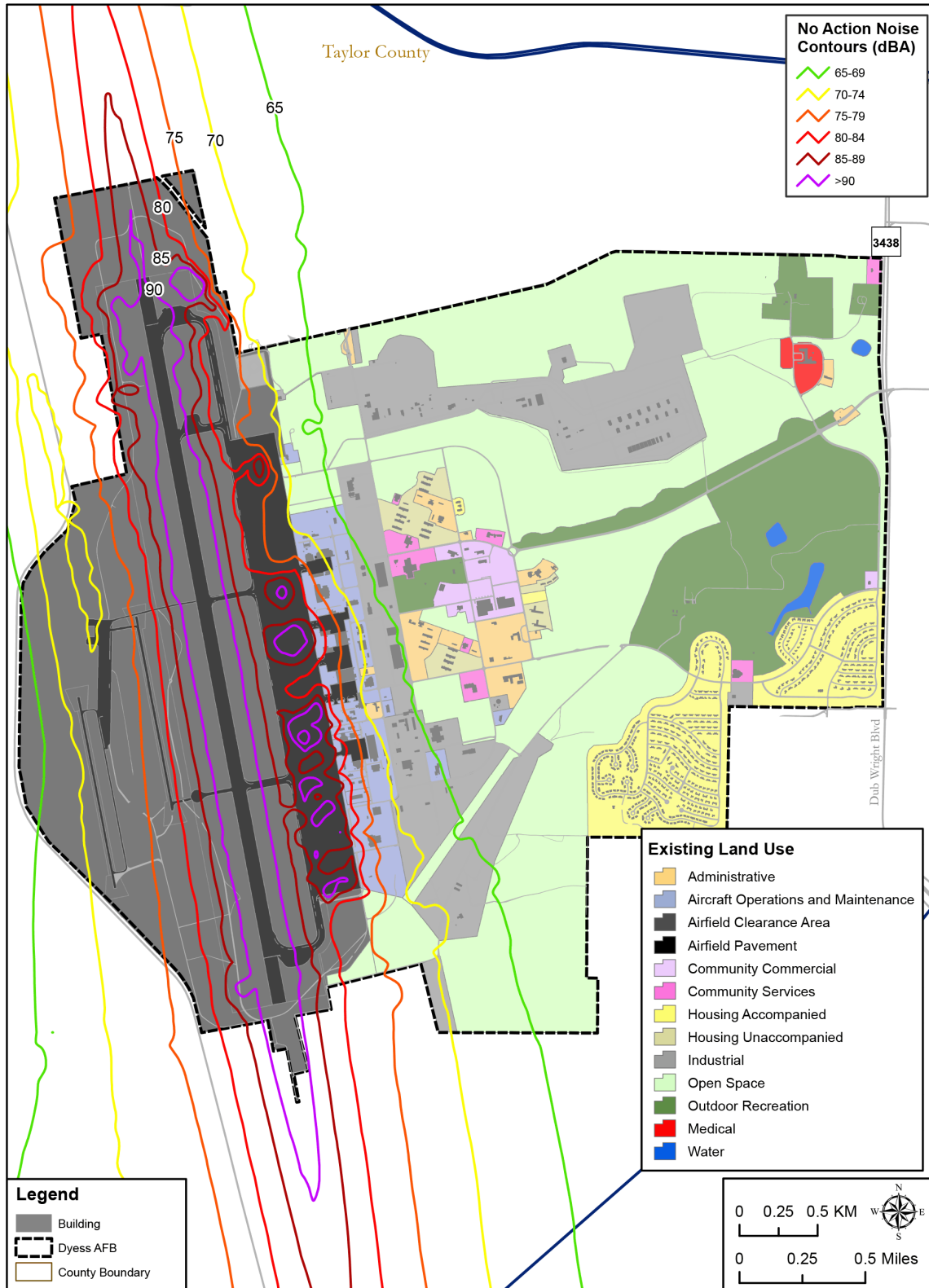


Table 3.5-3. On-Base Area Exposed to Noise Zones on Dyess AFB, No Action Alternative

On-Base Land Use Category	On-Base Acres Within Noise Zones (dBA DNL)						Total
	65–69	70–74	75–79	80–84	85–89	>90	
Administrative	4	0.4	0	0	0	0	4.4
Airfield Clearance Area	113	288	252	273	265	246	1,437
Airfield Pavement	3	67	73	82	88	141	454
Airfield Operations/Maintenance	58	73	39	16	0.4	0	186.4
Industrial	150	33	1	0	0	0	184
Open Space/Buffer Zone	153	39	16	2	0	0	210
Total ^(a)	481	500	381	373	353	387	2,475

Key: > = greater than; AFB = Air Force Base; dBA = A-weighted decibels; DNL = day-night average sound level

Note:

a. During data analysis, numbers were rounded and then totaled.

Air Force Handbook 32-7084, *AICUZ Program Manager's Guide*, considers these land use activities compatible with implementation of noise attenuation measures. Noise attenuation is incorporated into building design in the flightline area. Sensitive noise receptors are outside the 65 dBA DNL noise contour. Regarding baseline development and infrastructure activities (Table 3.1-1), noise levels associated with aircraft operations would be less than 65 dBA DNL at the dormitory, community center complex, and security forces sites. Noise generated during C&D projects would be temporary and would not affect land use on the installation. There would be no significant impacts due to on-base noise levels under the No Action Alternative.

Off-base land use and aircraft noise contours under the No Action Alternative are shown in Figure 3.5-8. The off-base area encompassed by each noise zone is shown in Table 3.5-4. Approximately 96 percent of the land use associated with noise contours is undeveloped (e.g., shrub/scrub and herbaceous) or developed (open space). Exceptions include developed areas (primarily low and medium intensity) in Tye and Caps that likely contain residential, commercial, and industrial functions.

The total off-base area exposed to noise zones near Dyess AFB as shown in Table 3.5-4 is 2,014 acres more than the total area presented in the 2015 AICUZ study (see Appendix C, Land Use, of this EIS). However, the areas may not be directly comparable due to differences in noise modeling, land use classifications, and source GIS data. Off-base land use acreage in the 2015 AICUZ study was determined based on a combination of three GIS datasets produced between 2001 and 2013, while the acreage presented in this EIS is based on the U.S. Department of Agriculture (USDA) National Land Cover Database produced in 2016. The percentage of land use categorized as open space/low density in the 2015 AICUZ study (96 percent) is the same as the percentage categorized as undeveloped or developed/open space under the No Action Alternative. These categories describe similar land use, and the similarity of percent coverage suggests there has been no substantial change in use since the 2015 AICUZ study was prepared.

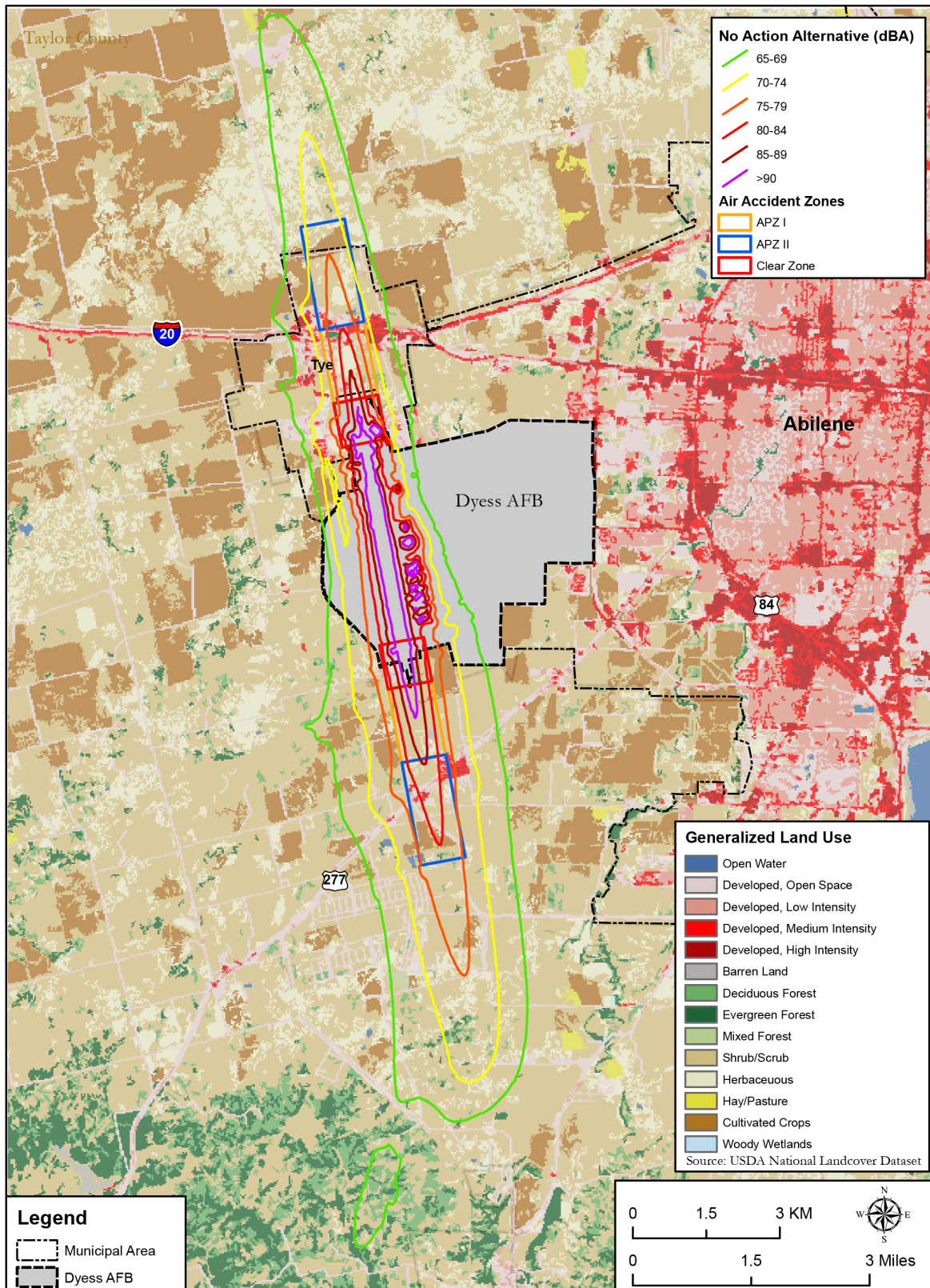


Figure 3.5-8. Off-Base Land Use, Noise Contours, and Accident Potential Zones Adjacent to Dyess AFB – No Action Alternative

Table 3.5-4. Off-Base Land Use Area Exposed to Noise Zones Near Dyess AFB, No Action Alternative

Off-Base Land Use Category	Off-Base Acres Within Noise Zones (dBA DNL)						Total
	65–69	70–74	75–79	80–84	85–89	>90	
Barren Land	0	0	0	12	1	0	13
Cultivated Crops	381	275	144	11	0.7	0	811.7
Deciduous Forest	201	66	16	3	3	1	290
Developed, High Intensity ^(a)	36	22	5	4	0	0	67
Developed, Low Intensity ^(b)	85	73	30	9	0.5	0	197.5
Developed, Medium Intensity ^(c)	72	64	53	8	0	0	197
Developed, Open Space	560	421	219	79	15	7	1,301
Evergreen Forest	69	28	11	10	0.5	0	118.5
Herbaceous	816	479	111	74	17	0.1	1,497
Mixed Forest	28	0	0	0	0	0	28
Open Water	10	11	6	0	0	0	27
Shrub/Scrub	3,505	1,823	766	242	108	30	6,474
Woody Wetlands	0.6	0	0	0	0	0	0.6
Total ^(d)	5,764	3,262	1,361	452	146	38	11,023

Key: > = greater than; AFB = Air Force Base; dBA = A-weighted decibels; DNL = day-night average sound level

Notes:

a. High intensity developed = Highly developed areas where people reside or work in high numbers. Examples include apartment complexes, row houses and commercial/industrial. Impervious surfaces account for 80% to 100% of the total cover.

b. Low intensity developed = Areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20% to 49% percent of total cover. These areas most commonly include single-family housing units.

c. Medium intensity developed = Areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 50% to 79% of the total cover. These areas most commonly include single-family housing units.

d. During data analysis, numbers were rounded and then totaled.

Noise generated during C&D projects associated with baseline development and infrastructure activities (Table 3.1-1) would be temporary and would not affect land use adjacent to the installation. The recently completed Academy of Technology, Engineering, Mathematics and Science (ATEMS)/CTE (CTE) schools and Dyess Elementary School are located outside the installation boundary in areas where aircraft noise levels are below 65 dBA DNL. Similarly, ongoing and proposed new school construction sites associated with the Wylie Independent School District (ISD) bond program are located outside the 65 dBA DNL noise zone. There would be no significant impacts due to off-base noise levels under the No Action Alternative.

The off-base land use associated with the CZ and APZs is shown in Figure 3.5-8, and the off-base area encompassed by each zone is shown in Table 3.5-5. Most land use associated with APZs is undeveloped (e.g., shrub/scrub and herbaceous) and developed (open space). The total off-base area exposed to the CZ and APZs at Dyess AFB as shown in Table 3.5-5 is 77 acres more than the total area presented in the 2015 AICUZ study. All the additional acreage is associated with the APZ I and APZ II zones. There is less area associated with developed land use (e.g., residential, commercial, industrial) under the No Action Alternative compared to acreages presented in the 2015 AICUZ. However, as discussed above, it is uncertain whether the areas are directly comparable due to the different classifications and GIS data used.

The recently completed ATEMS/CTE schools and Dyess Elementary School, as well as ongoing and proposed new school construction sites associated with the Wylie ISD bond

program, are located outside the aircraft APZs and there are no safety issues due to building height.

Table 3.5-5. Off-Base Land Use Area Exposed to the Clear Zone and Accident Potential Zones at Dyess AFB, No Action Alternative

Off-Base Land Use Category	Off-Base Acres Within CZ and APZs			
	CZ	APZ I	APZ II	Total
Barren Land	0	11	3	14
Cultivated Crops	1	8	132	141
Deciduous Forest	5	9	5	19
Developed, High Intensity ^(a)	0	5	4	9
Developed, Low Intensity ^(b)	0	30	27	57
Developed, Medium Intensity ^(c)	0	28	36	64
Developed, Open Space	44	94	155	293
Evergreen Forest	1	7	2	10
Herbaceous	1	108	121	230
Open Water	0	0	8	8
Shrub/Scrub	60	388	472	920
Total ^(d)	112	688	965	1,765

Key: APZ = accidental potential zone; CZ = clear zone

Notes:

a. High intensity developed = Highly developed areas where people reside or work in high numbers. Examples include apartment complexes, row houses and commercial/industrial. Impervious surfaces account for 80% to 100% of the total cover.

b. Low intensity developed = Areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20% to 49% percent of total cover. These areas most commonly include single-family housing units.

c. Medium intensity developed = Areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 50% to 79% of the total cover. These areas most commonly include single-family housing units.

d. During data analysis, numbers were rounded and then totaled.

The area encompassed by noise zones and accident zones may be considered in the context of land use compatibility. As discussed in Section 3.5.1.2.1 (Land Use, Affected Environment, Region of Influence, Dyess AFB), the 2015 AICUZ study identified the incompatible acreages shown in Table 3.5-1. Due to revised land use categories and definitions, the 2015 compatibility table is not directly applicable to analysis under the No Action Alternative. A revised compatibility table was developed by comparing previous and updated land use definitions, as well as considering compatibility guidance for commercial airports (Texas DOT, 2003; Landrum and Brown Team, 2013) (see Appendix C, Land Use). Based on a comparison of the revised table and the noise and accident zone areas provided above, potentially incompatible land use acreages under the No Action Alternative are shown in Table 3.5-6. A total of 206 acres and 58 acres are associated with noise and accident zones, respectively, while a total of 152 acres and 41 acres were associated with these respective zones in the 2015 AICUZ study. Because of some uncertainties associated with comparing the 2015 and current land use definitions, as well as varying GIS source data, differences in the acreages should be considered notional and for general comparative purposes only. In addition to the noise zone acreage presented in Table 3.5-6, the Alliance After School at the former Tye Elementary School and the Tye Play and Learn childcare facility are located in areas with noise levels of 68 and 71 dBA DNL, respectively (Table 3.3-4). Such facilities are generally considered incompatible within noise zones of 65 to 75 dBA DNL without sound attenuation measures. Although any incompatible land use is undesirable, the area considered incompatible is small compared to the total land area associated with noise and accident zones. With regard to potential incompatible off-base development, it is expected that Dyess AFB will implement

strategies identified in the Mission Sustainment Risk Report (Dyess AFB, 2021b) to the extent feasible. These strategies primarily consist of acquiring easements or property rights on targeted parcels and monitoring off-base development, including placement of structures that could present flight safety concerns. While specific actions are unknown at this time, it is anticipated that implementation of the strategies will decrease the potential for incompatible land use adjacent to the installation, therefore significant impacts would not be anticipated under the No Action Alternative.

Table 3.5-6. Notional Off-Base Incompatible Land Use Area Near Dyess AFB, No Action Alternative

Off-Base Land Use Category	Incompatible Area (Acres)			
	Noise (dBA DNL)		Accident Potential	
	75–79	80+	CZ	APZ I
Developed, Open Space	0	101	0	0
Developed, High Intensity ^(a)	0	4	0	0
Developed, Low Intensity ^(b)	30	10	0	30
Developed, Medium Intensity ^(c)	53	8	0	28
Total ^(d)	83	123	0	58

Key: + = plus; AFB = Air Force Base; APZ = accident potential zone; CZ = clear zone; dBA = A-weighted decibels; DNL = day-night average sound level

Notes:

- High intensity developed = Highly developed areas where people reside or work in high numbers. Examples include apartment complexes, row houses and commercial/industrial. Impervious surfaces account for 80% to 100% of the total cover.
- Low intensity developed = Areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20% to 49% percent of total cover. These areas most commonly include single-family housing units.
- Medium intensity developed = Areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 50% to 79% of the total cover. These areas most commonly include single-family housing units.
- During data analysis, numbers were rounded and then totaled.

Airspace and Range Utilization

Under the No Action Alternative, there are no known DAF initiatives that would result in ground-disturbing activities that would cause changes to land use under the Lancer MOA, Lancer Bridge MOA, Brownwood MOA, Pecos MOA, Bronco MOA, or Willie-Roscoe ATCAA. Aircraft operations would continue at current levels because the B-21 MOB 2 beddown would not occur. Based on previous NEPA analyses, ongoing airspace use under current operational parameters would remain compatible with designated land uses. Summaries of the land use evaluation in the applicable NEPA documents for those airspaces are provided below.

Analysis of flight operations in the Lancer MOA is provided in Section 4.2 of the *Realistic Bomber Training Initiative EIS* (DAF, 2000). Analysis concluded that noise levels would be below 65 dBA DNL (DAF, 2000, pp. 4-60). Therefore, overall, flight operations would not be expected to affect land use, recreation resources, or visual settings in areas under the airspace (DAF, 2000, pp. 4-68). In addition, flight operations would not likely preclude existing land uses or continued use or occupation of an area, preempt recreational uses, threaten public health and safety, or be inconsistent with applicable regulations. Flight operations would not change features of the physical environment or block aesthetic landscape features from view. Nevertheless, flight operations could be perceived by the public as negatively affecting quality of life. For example, a startle effect, which occurs

when a loud noise is experienced in a setting where it is not expected and when there is no visual or audible warning, can negatively affect wilderness and solitude experiences (DAF, 2000, pp. 4-69). The effects on land use under the Lancer Bridge MOA would be less than those described for the Lancer MOA because there are fewer aircraft operations in Lancer Bridge MOA (277 annual operations) compared to Lancer MOA (1,914 annual operations) (Table 2.3-3). Additionally, the lower noise level (Table 3.5-7) under the Lancer Bridge MOA indicate that the potential for adverse effects on land use is lower compared to the Lancer MOA.

The Brownwood MOA supports aircraft operations similar to that of the Lancer MOA, with the exception that supersonic flight is permitted in airspace above the Brownwood MOA at altitudes of 30,000 feet MSL or higher. Due to the adjacent location, aircraft operations at the Willie-Roscoe ATCAA may be similar to those conducted at the Lancer MOA as well. Under the No Action Alternative, average noise levels would be less than 65 dBA DNL and human annoyance would therefore generally not be expected. Perception of noise produced by aircraft overflight could at times diminish the value of outdoor recreational activities. Aircraft operations would continue to comply with minimum altitude (floor) requirements. Some individuals may be annoyed by sonic booms produced during supersonic flight, but most sonic booms generated at or above 30,000 feet MSL do not reach the ground.

Analysis of aircraft operations at the Pecos MOA is provided in Sections 3.2 and 4.7 of the *New Mexico Training Range Initiative EIS* (DAF, 2006). Analysis concluded that noise levels would be below 65 dBA DNL (DAF, 2006, pp. 3-54), and human annoyance would generally not be likely. However, some individuals may be annoyed by sonic booms (pp. 4-19 & 4-46). In general, supersonic operations would not change land use patterns, land ownership, land management plans, or special use areas under the airspace (pp. 4-46). The DAF has established special operating procedures to avoid overflight of specific locations considered to be sensitive to aircraft noise, including residences, ranches, resorts, communities, churches, and schools (pp. 3-52).

Analysis of aircraft operations in the Bronco MOA is provided in the *AFSOC Assets Beddown EIS* (DAF, 2007). Analysis concluded that noise levels would be below 65 dBA DNL (pp. 5-11). Evaluation of land use concluded that there would be no anticipated change in general land use patterns, land access, land ownership, land management plans, or special use areas for the lands underlying the MOAs, including the Bronco MOA (pp. 5-66 to 5-69). Access to recreation areas or other public and private land would be unchanged. It is not likely that hunting on ranches would be detrimentally affected by overflights. Agriculture, the predominate land use, would not require a change in land management.

Based on noise modeling of the current affected environment, noise levels under the airspace of the MOAs are presented in Table 3.5-7. These noise levels also consider the Air Force Reserve Command beddown action at Joint Base Fort Worth that involves replacement of F-16 aircraft with F-35A aircraft (Table 3.1-1). This action contributes to baseline noise levels in the Lancer and Brownwood MOAs.

Table 3.5-7. Noise Levels Under Training Airspace for the No Action Alternative at Dyess AFB

Noise Level (dBA L _{dnmr})					
Lancer MOA	Lancer Bridge MOA	Willie-Roscoe ATCAA	Brownwood MOA	Bronco MOA	Pecos MOA
48	<35	38.9	39	<35	51.9

Key: < = less than; AFB = Air Force Base; ATCAA = Air Traffic Control Assigned Airspace; dBA = A-weighted decibels; L_{dnmr} = onset-rate adjusted monthly day-night average sound level; MOA = Military Operating Area

Refer to Section 3.3 (Noise) of this EIS for details of the modeling. Noise levels below 65 dBA DNL are not likely to cause significant public annoyance, including speech interference and sleep disturbance, or impact land use. For analysis of potential noise effects under training airspace, the L_{dnmr} metric is relevant because it accounts for factors specific to aircraft training operations (e.g., sudden onset noise and uneven operational tempo). In the context of airspace training, L_{dnmr} is considered functionally equivalent to DNL. Based on the noise levels shown in Table 3.5-7, no adverse impacts to land use resulting from aircraft noise have been identified for the Lancer MOA, Lancer Bridge MOA, Brownwood MOA, Pecos MOA, Bronco MOA, and Willie-Roscoe ATCAA, and there would be no significant impacts under the No Action Alternative at Dyess AFB.

3.5.2.1.2 No Action Alternative at Whiteman AFB

Development and Infrastructure Land Use Compatibility

It is expected that all baseline development and infrastructure activities within the installation boundary (Table 3.1-1) would be conducted in accordance with applicable installation land use planning procedures and requirements, including strategies contained in the IDP and installation design guide. Heat and power plant construction, airfield pavement repair, and water main replacement would result in negligible changes to the existing infrastructure footprint. All new facilities would occur in areas compatible with those land uses. There would be no change to on-base land use associated with baseline projects.

On-Base and Off-Base Noise Zones and Accident Zones

On-base land use at Whiteman AFB and aircraft noise contours under the No Action Alternative are shown in Figure 3.5-9. The on-base land use area encompassed by each noise zone is presented in Table 3.5-8.

Table 3.5-8. On-Base Area Exposed to Noise Zones on Whiteman AFB, No Action Alternative

On-Base Land Use Category	On- Base Acres Within Noise Zones (dBA DNL)						Total
	65–69	70–74	75–79	80–84	85–89	>90	
Administrative	21	2	0	0	0	0	23
Aircraft Operations/Maintenance	218	316	121	11	0	0	666
Airfield Clearance Area	66	221	326	253	115	0.6	981.6
Industrial	0.3	0	0	0	0	0	0.3
Open Space/Buffer Zone	633	295	6	0	0	0	934
Outdoor Recreation	0.1	0	0	0	0	0	0.1
Total	938	834	453	264	115	0.6	2,605

Key: > = greater than; AFB = Air Force Base; dBA = A-weighted decibels; DNL = day-night average sound level

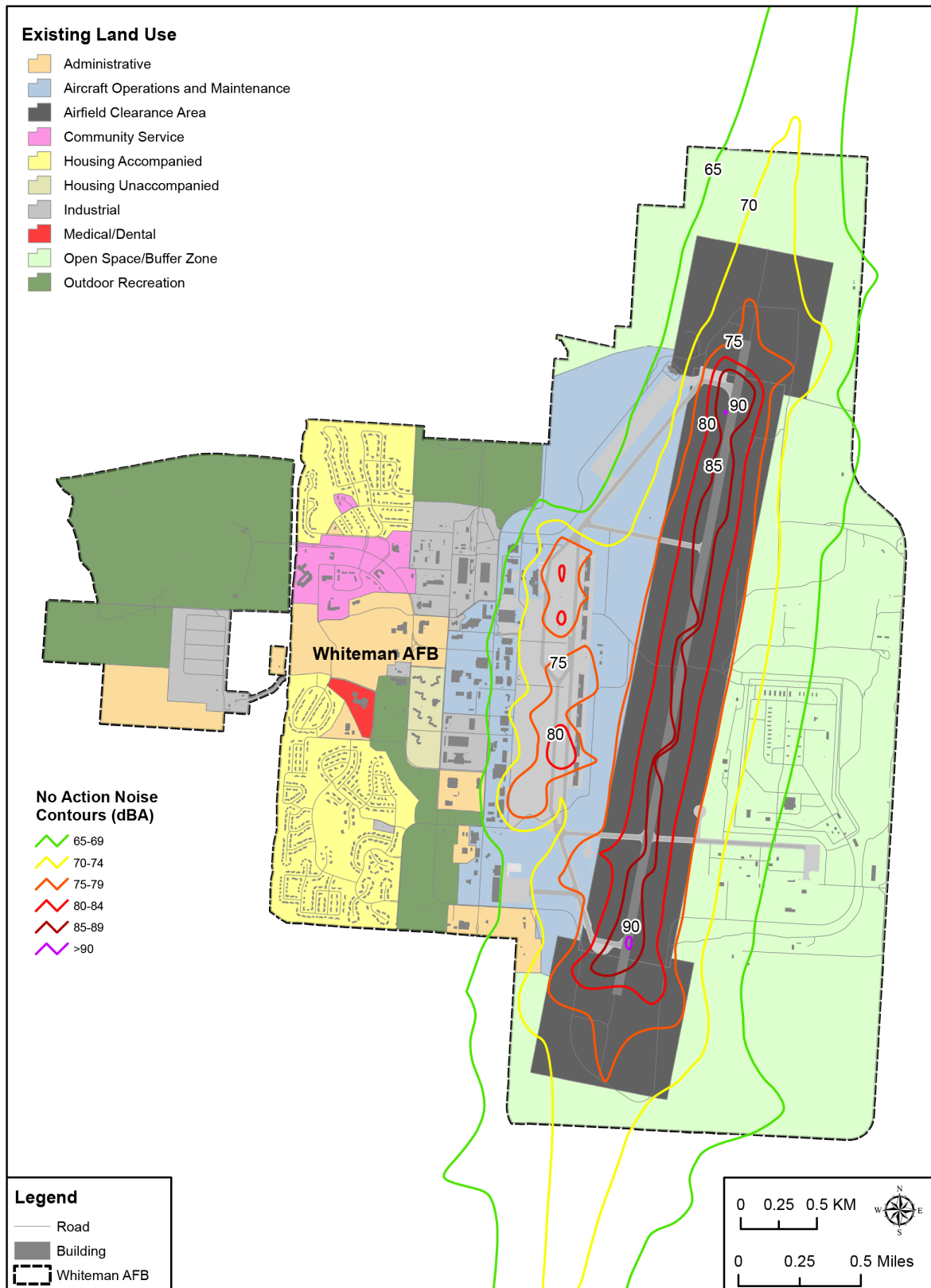


Figure 3.5-9. On-Base Land Use and Noise Contours on Whiteman AFB – No Action Alternative

The on-base 65 dBA DNL aircraft noise contour overlaps several land use categories, including administrative, aircraft operations and maintenance, airfield, industrial, and open space. These categories are considered to be compatible uses. The 75 dBA DNL noise contour is almost entirely limited to the airfield and aircraft operations and maintenance functions along the flightline, but also includes a small area of open space. These functions are considered compatible uses. The 80 dBA DNL contour is confined to the runway, ramps, and taxi areas. Sensitive on-base noise receptors are outside the 65 dBA DNL noise contour. Regarding baseline development and infrastructure activities (Table 3.1-1), all new facilities would occur in areas of compatible land use, including compatibility associated with aircraft operations noise levels. Noise generated during C&D projects would be temporary and would not affect land use on the installation. There would be no significant impacts due to on-base noise levels under the No Action Alternative.

Off-base land use and aircraft noise contours under the No Action Alternative are shown in Figure 3.5-10. The off-base area encompassed by each noise zone is shown in Table 3.5-9. Approximately 96 percent of the land use associated with noise contours is undeveloped (e.g., cultivated crops, hay/pasture) or developed (open space). However, an area of eastern Knob Noster containing low-, medium-, and high-intensity developed land use occur within the 65–69 dBA DNL noise contour. High-intensity developed areas are compatible within this noise zone, while low- and medium-intensity developed areas are conditionally compatible.

The total off-base area exposed to noise zones near Whiteman AFB as shown in Table 3.5-9 is 1,933 acres less than the total area presented in the 2008 Whiteman AFB JLUS (see Appendix C, Land Use). The reasons for the difference are uncertain but could potentially include changes in aircraft operations or in noise modeling methods. Also, there are differences in land use classifications and source GIS data. For this EIS, the acreage for the No Action Alternative for Whiteman AFB was calculated based on the 2016 USDA National Land Cover Database. The percentage of land use categorized generally as undeveloped in the 2008 JLUS and for the No Action Alternative is high (85 percent and 96 percent, respectively), suggesting that there has been no adverse change to overall land use since publication of the JLUS. There would be no significant impacts due to off-base noise levels under the No Action Alternative.

Noise generated during C&D projects associated with baseline development and infrastructure activities (Table 3.1-1) would be temporary and would not affect land use adjacent to the installation. The new LeMay Gate and POV check station would be in an area with aircraft noise levels below 75 dBA DNL, which is consistent with the noise level at the current location. Construction actions at various roadway segments near the installation associated with Missouri Department of Transportation (DOT) projects would not affect land use at these locations, including land use compatibility in the context of aircraft noise. There would be no significant impacts due to off-base noise levels under the No Action Alternative.

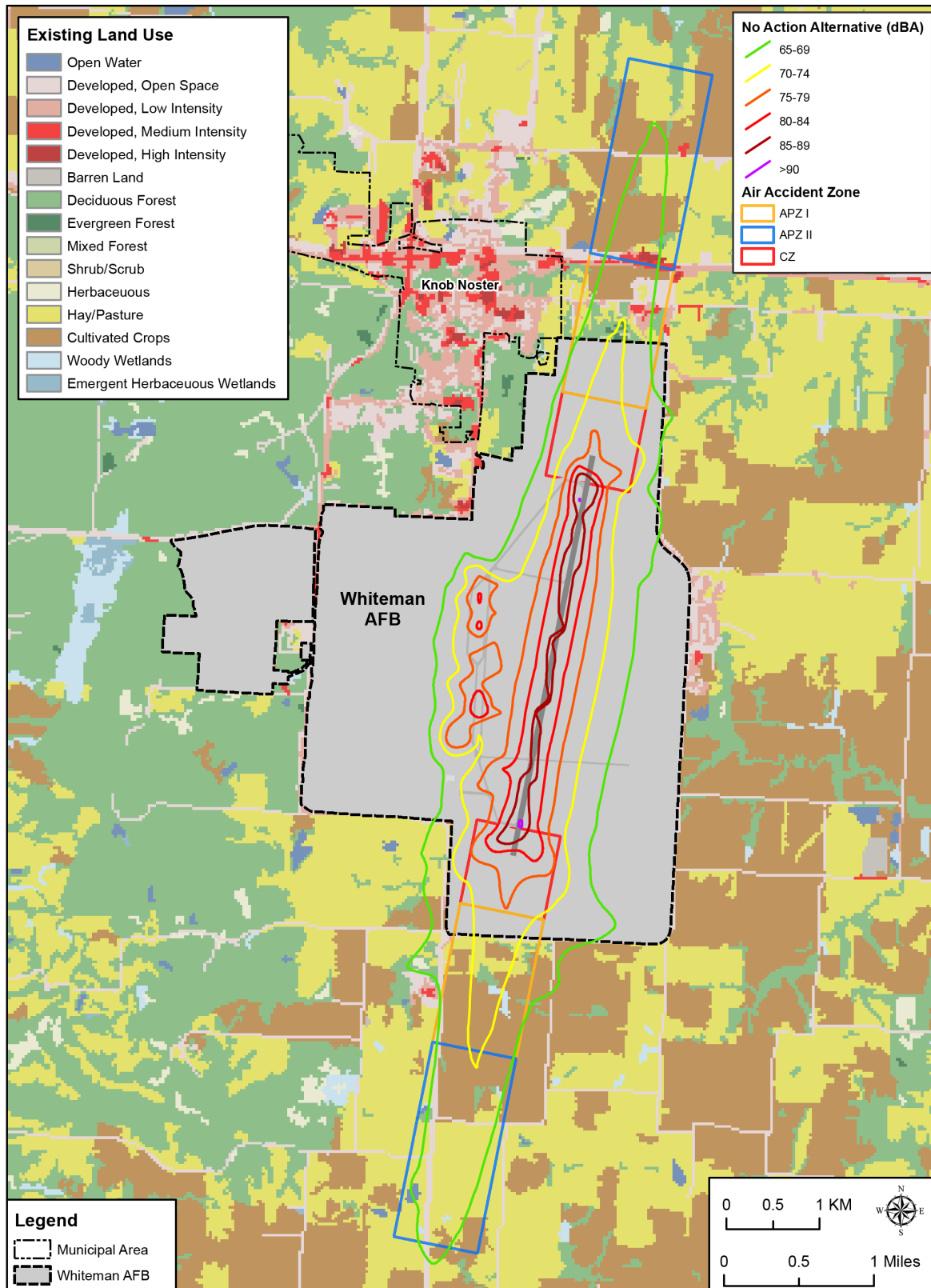


Figure 3.5-10. Off-Base Land Use, Noise Contours, and Accident Potential Zones Adjacent to Whiteman AFB – No Action Alternative

Table 3.5-9. Off-Base Land Use Area Exposed to Noise Zones Near Whiteman AFB, No Action Alternative

Off-Base Land Use Category	Off-Base Acres Within Noise Zones (dBA DNL)						Total
	65–69	70–74	75–79	80–84	85–89	>90	
Cultivated Crops	439	64	0	0	0	0	503
Deciduous Forest	63	11	0	0	0	0	74
Developed, High Intensity ^(a)	5	0	0	0	0	0	5
Developed, Low Intensity ^(b)	21	0	0	0	0	0	21
Developed, Medium Intensity ^(c)	15	0	0	0	0	0	15
Developed, Open Space	109	3	0	0	0	0	112
Evergreen Forest	2	3	0	0	0	0	5
Hay/Pasture	320	28	0	0	0	0	348
Herbaceous	4	0	0	0	0	0	4
Mixed Forest	2	1	0	0	0	0	3
Open Water	4	0	0	0	0	0	4
Woody Wetlands	9	3	0	0	0	0	12
Total ^(d)	993	113	0	0	0	0	1,106

Key: > = greater than; AFB = Air Force Base; dBA = A-weighted decibels; DNL = day-night average sound level

Notes:

a. High intensity developed = Highly developed areas where people reside or work in high numbers. Examples include apartment complexes, row houses and commercial/industrial. Impervious surfaces account for 80% to 100% of the total cover.

b. Low intensity developed = Areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20% to 49% percent of total cover. These areas most commonly include single-family housing units.

c. Medium intensity developed = Areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 50% to 79% of the total cover. These areas most commonly include single-family housing units.

d. During data analysis, numbers were rounded and then totaled.

The off-base land use associated with the APZs is shown in Figure 3.5-10, and the off-base area encompassed by each zone is shown in Table 3.5-10. The north and south CZs are entirely contained within the base boundary. Most land use associated with APZs is undeveloped (e.g., cultivated crops and hay/pasture) and developed (open space). The total off-base area exposed to the CZ and APZs at Whiteman AFB as shown in Table 3.5-10 is 319 acres less than the total area presented in the 2008 JLUS. As discussed above, it is uncertain whether the areas are directly comparable due to the different classifications and GIS data used. However, compared to acreages presented in the 2008 JLUS, there is less area associated with developed land use (low-, medium, and high-density developed) under the No Action Alternative. It is anticipated that the new LeMay Gate and POV check station, as well as Missouri DOT projects, would be located in areas of compatible land use with regard to accident zones; there would be no safety issues related to structure height.

The area encompassed by noise zones and accident zones may be considered in the context of land use compatibility. Due to revised land use categories and definitions, the compatibility table provided in the Whiteman AFB 2008 JLUS is not directly applicable to analysis under the No Action Alternative. A revised compatibility table was developed by comparing previous and updated land use definitions, as well as considering compatibility guidance for commercial airports (Texas DOT, 2003; Landrum and Brown Team, 2013) (see Appendix C, Land Use) and the Whiteman AFB JLUS (Whiteman AFB, 2008a).

Based on a comparison of the revised table with the noise and accident zone areas provided above, potentially incompatible use acreages are shown in Table 3.5-11. A total of 29 acres and 59 acres are associated with noise and accident zones, respectively, while a total of 87 acres and 85 acres were associated with these respective zones in the 2008 JLUS. Because of some uncertainties associated with comparing land use definitions, as well as varying GIS source data, differences in the acreages should be considered notional and for general comparative purposes only. Although any incompatible land use is undesirable, the area considered incompatible is small compared to the total land area associated with noise and accident zones. Significant impacts would not be anticipated under the No Action Alternative.

Table 3.5-10. Off-Base Land Use Area Exposed to the Clear Zone and Accident Potential Zones at Whiteman AFB, No Action Alternative

Off-Base Land Use Category	Off-Base Acres Within CZ and APZs			
	CZ	APZ I	APZ II	Total
Cultivated Crops	0	244	420	664
Deciduous Forest	0	52	35	87
Developed, High Intensity ^(a)	0	0	6	6
Developed, Low Intensity ^(b)	0	19	3	22
Developed, Medium Intensity ^(c)	0	13	10	23
Developed, Open Space	0	49	51	100
Evergreen Forest	0	6	0	6
Hay/Pasture	0	89	426	515
Mixed Forest	0	2	0	2
Open Water	0	0	8	8
Shrub/Scrub	0	0	1	1
Woody Wetlands	0	8	5	13
Total ^(d)	0	482	965	1,447

Key: AFB = Air Force Base; APZ = accident potential zone; CZ = clear zone

Notes:

a. High intensity developed = Highly developed areas where people reside or work in high numbers. Examples include apartment complexes, row houses and commercial/industrial. Impervious surfaces account for 80% to 100% of the total cover.

b. Low intensity developed = Areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20% to 49% percent of total cover. These areas most commonly include single-family housing units.

c. Medium intensity developed = Areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 50% to 79% of the total cover. These areas most commonly include single-family housing units.

d. During data analysis, numbers were rounded and then totaled.

Table 3.5-11. Notional Off-Base Incompatible Land Use Area Near Whiteman AFB, No Action Alternative

Off-Base Land Use Category	Incompatible Area (Acres)			
	Noise (dBA DNL)		Accident Potential	
	65–79	80+	CZ	APZ I
Developed, Low Intensity	0	0	0	19
Developed, Medium Intensity	0	0	0	13
Developed, Mobile Home	29	0	0	27
Total	29	0	0	59

Key: + = plus; APZ = accident potential zone; CZ = clear zone; dBA = A-weighted decibels; DNL = day-night average sound level

Airspace and Range Utilization

Under the No Action Alternative at Whiteman AFB, there are no known DAF initiatives that would result in ground-disturbing activities that would cause changes to land use under the Smoky Hill Range, Ozark ATCAA, Ada MOA, Cannon MOA, Truman MOA, or Lindbergh MOA airspace. Aircraft operations would continue at current levels because the B-21 MOB 2 beddown would not occur. Analysis of aircraft operations at the Smoky Hill Range and the Ada, Cannon, Truman, and Lindbergh MOAs is provided in Section WH3.2 of the *F-35A Operational Beddown – Air Force Reserve Command EIS* (DAF, 2020a). Analysis concluded that land use is compatible with aircraft operations in the context of overall noise levels (pp. WH3-27). Therefore, flight operations would generally not be expected to affect land use or recreation resources under the airspace. Supersonic operations at Smoky Hill Range are conducted at altitudes above 30,000 feet, which limits the potential for noise impacts, although noise produced during such operations may reach ground level (184th Wing, 2022). Noise effects on livestock under the Smoky Hill airspace, including effects from supersonic operations, are not considered significant under existing conditions. Underlying land use at the Ozark ATCAA is considered compatible with current military aircraft operations as well (see Section 3.5.1.2.3, Land Use, Affected Environment, Region of Influence, Airspace and Military Operating Areas). Low-altitude flights in some areas could at times be perceived by the public as negatively affecting quality of life (e.g., diminishing the value of outdoor recreational activities). For example, low-altitude overflights occur at the Truman I MOA, where the floor altitude is 500 feet (Whiteman AFB, 2014b), and at the Cannon MOA, where the floor altitude is 300 feet (Cannon A) and 100 feet (Cannon B) (DAF, 2020a).

Based on noise modeling of the current affected environment, noise levels under the airspace of the Smoky Hill Range, Ozark ATCAA, and MOAs are presented in Table 3.5-12.

Table 3.5-12. Noise Levels Under the Training Airspace for the No Action Alternative at Whiteman AFB

Noise Level (dBA L _{dnmr})					
Smoky Hill Range ^(a)	Ozark ATCAA	Ada MOA	Cannon MOA	Truman MOA	Lindbergh MOA
<43	<35	<35	40	<35	<35

Key: < = less than; AFB = Air Force Base; ATCAA = Air Traffic Control Assigned Airspace; dBA = A-weighted decibels; L_{dnmr} = onset-rate adjusted monthly day-night average sound level; MOA = Military Operating Area

Note:

a. Modeled noise levels (dBA L_{dnmr}) in Smoky Hill Range sub-areas are 40 dBA L_{dnmr} (Smoky MOA), 38.1 dBA L_{dnmr} (Bison MOA), and 42.2 dBA L_{dnmr} (R-3601).

Refer to Section 3.3 (Noise) of this EIS for details of the modeling. Noise levels below 65 dBA DNL are not likely to cause significant public annoyance, including speech interference and sleep disturbance, or impact land use. As discussed for Dyess AFB, the L_{dnmr} metric is relevant for analysis of aircraft training operations because it accounts for factors such as sudden onset noise and uneven operational tempo and is considered functionally equivalent to DNL. Based on the noise levels shown in Table 3.5-12, no adverse impacts to land use resulting from aircraft noise have been identified for the Smoky Hill Range, Ozark ATCAA, Ada MOA, Cannon MOA, Truman MOA, and Lindbergh MOA, and there would be no significant impacts under the No Action Alternative at Whiteman AFB.

3.5.2.2 Dyess AFB Alternative

3.5.2.2.1 Personnel

Under the Dyess AFB Alternative, there would be a net increase of 1,318 personnel, including dependents, and a resulting increase in demand for on-base and off-base housing and services. On-base construction and renovation projects, including construction of a new dorm, are listed in Table 2.3-4. All on-base development resulting from the MOB 2 beddown would occur in accordance with the established tiering system and with guidance in the base's IDP, JLUS, AICUZ study, ICEMAP, and future land use plan. Incorporation of the installation's development strategies would prevent incompatible land uses. The beddown would result in demand for additional off-base housing (refer to Section 3.6, Socioeconomics) and could potentially result in demand for additional off-base services. It is expected that any adjacent off-base development associated with the beddown would occur with consideration of aircraft noise, APZs, height restrictions, and corresponding land use compatibility. The City of Abilene's land use and development strategies include establishment of land use standards near Dyess AFB (Dyess AFB, 2015). In addition, the City of Tye recognizes the noise zones and APZs of Dyess AFB as a development constraint. Dyess AFB may also implement strategies identified in the Mission Sustainment Risk Report (Dyess AFB, 2021b) to decrease the potential for incompatible land use adjacent to the installation. There would be no significant impacts due to a personnel increase under the Dyess AFB Alternative.

3.5.2.2.2 Airfield Operations

On-base land use and aircraft noise contours under the Dyess AFB Alternative are shown in Figure 3.5-11. The on-base land use area encompassed by each noise zone is shown in Table 3.5-13. Compared to the No Action Alternative, the total overall on-base area encompassed by noise levels greater than 65 dBA DNL would decrease by 561 acres (Table 3.5-14). All on-base land use would be compatible with the associated noise levels. Sensitive noise receptors would be located outside the 65 dBA DNL noise contour.

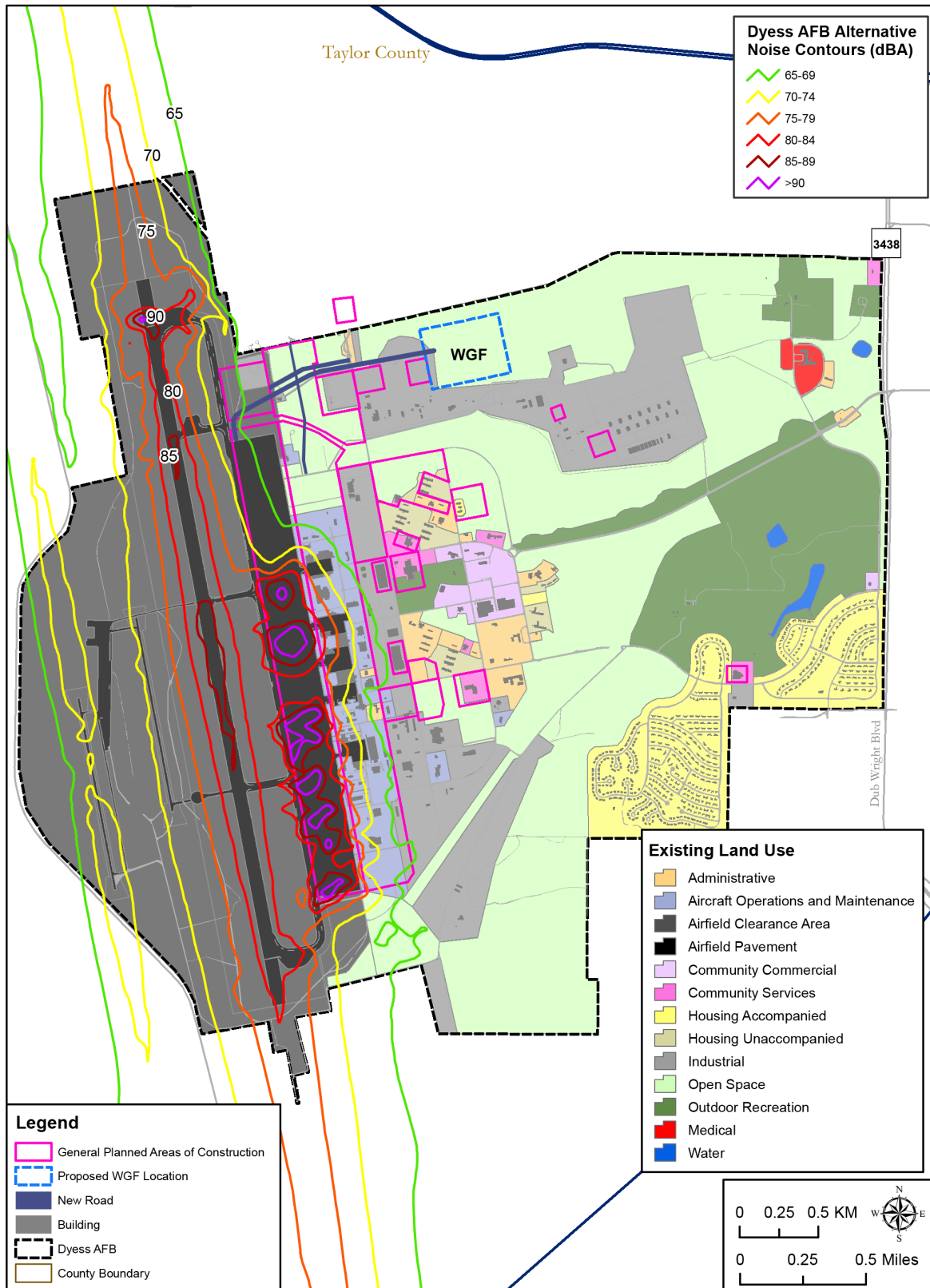


Table 3.5-13. On-Base Area Exposed to Noise Zones at Dyess AFB – Dyess AFB Alternative

On-Base Land Use Category	On-Base Acres Within Noise Zones (dBA DNL)						Total
	65–69	70–74	75–79	80–84	85–89	>90	
Administrative	2	0	0	0	0	0	2
Airfield Clearance Area	441	352	357	129	4	0.1	1,283.1
Airfield Pavement	82	39	60	162	67	22	432
Airfield Operations/Maintenance	83	41	23	3	0.1	0	150.1
Industrial	11	0	0	0	0	0	11
Open Space/Buffer Zone	31	4	0.6	0	0	0	35.6
Total	650	436	441	294	71	22	1,914

Key: > = greater than; AFB = Air Force Base; dBA = A-weighted decibels; DNL = day-night average sound level

Table 3.5-14. Comparison of Total On-Base Area Exposed to Noise Zones at Dyess AFB Under the No Action Alternative and the Dyess AFB Alternative

Noise Zones (dBA DNL)	On-Base Acres Within Noise Zones		
	No Action Alternative	Dyess AFB Alternative	Change from No Action
65–69	481	650	169
70–74	500	436	-64
75–79	381	441	60
80–84	373	294	-79
85–89	353	71	-282
>90	387	22	-365
Total	2,475	1,914	-561

Key: > = greater than; - = minus; AFB = Air Force Base; dBA = A-weighted decibels; DNL = day-night average sound level

Off-base land use and noise contours under the Dyess AFB Alternative are shown in Figure 3.5-12. The off-base land use area encompassed by each noise zone is shown in Table 3.5-15. Potentially incompatible land use area is shown in Table 3.5-16. Approximately 96 percent of off-base land use associated with the noise zones is undeveloped (e.g., shrub/scrub and herbaceous) or developed (open space). Compared to the No Action Alternative, the total off-base land area encompassed by noise levels greater than 65 dBA DNL would decrease by 7,251 acres (Table 3.5-17). There would be no off-base area, including any portion of Tye or Caps, exposed to noise levels above 80 dBA DNL. The area of these communities encompassed by noise levels between 65 and 79 dBA DNL would decrease substantially to just 0.4 acre (Table 3.5-16). All sensitive noise receptors, including daycare facilities, would be located in areas with noise levels below 65 dBA DNL. The total area of off-base land use notionally considered incompatible with noise levels and accident zones would decrease to 58.4 acres, resulting in an approximate 206-acre reduction from the No Action Alternative (Table 3.5-18). There would be no change in the area of incompatible use associated with accident zones because those areas have fixed dimensions.

Due to the overall reduction in on-base and off-base noise levels, there would be no adverse impacts to land use resulting from the B-21 beddown under the Dyess AFB Alternative. Potentially, there would be beneficial impacts in the context of land use compatibility in developed portions of Tye and Caps.

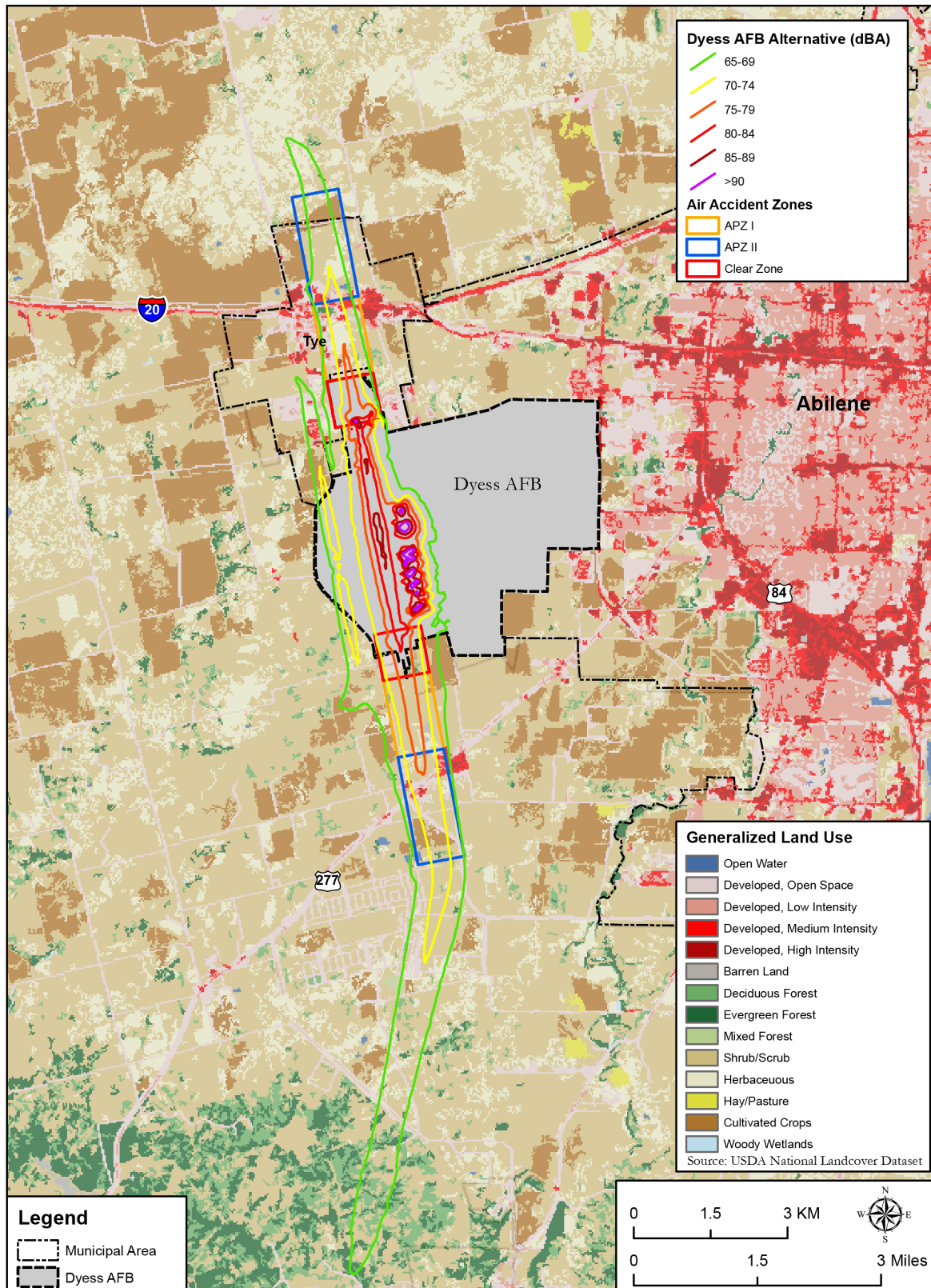


Figure 3.5-12. Off-Base Land Use, Noise Contours, and Accident Potential Zones Adjacent to Dyess AFB – Dyess AFB Alternative

Table 3.5-15. Off-Base Land Use Area Exposed to Noise Zones Under the Dyess AFB Alternative

Off-Base Land Use Category	Off-Base Acres Within Noise Zones (dBA DNL)						Total
	65–69	70–74	75–79	80–84	85–89	>90	
Barren Land	0.3	13	0.1	0	0	0	13.4
Cultivated Crops	229	32	0.2	0	0	0	261.2
Deciduous Forest	171	9	2	0	0	0	182
Developed, High Intensity ^(a)	10	4	0	0	0	0	14
Developed, Low Intensity ^(b)	42	20	0.4	0	0	0	62.4
Developed, Medium Intensity ^(c)	66	17	0	0	0	0	83
Developed, Open Space	369	124	16	0	0	0	509
Evergreen Forest	82	6	0	0	0	0	88
Hay/Pasture	0	0	0	0	0	0	0
Herbaceous	345	84	17	0	0	0	446
Mixed Forest	10	0	0	0	0	0	10
Open Water	12	0	0	0	0	0	12
Shrub/Scrub	1,547	424	120	0	0	0	2,091
Woody Wetlands	0	0	0	0	0	0	0
Total ^(d)	2,883	733	156	0	0	0	3,772

Key: > = greater than; AFB = Air Force Base; dBA = A-weighted decibels; DNL = day-night average sound level

Notes:

- High intensity developed = Highly developed areas where people reside or work in high numbers. Examples include apartment complexes, row houses and commercial/industrial. Impervious surfaces account for 80% to 100% of the total cover.
- Low intensity developed = Areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20% to 49% percent of total cover. These areas most commonly include single-family housing units.
- Medium intensity developed = Areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 50% to 79% of the total cover. These areas most commonly include single-family housing units.
- During data analysis, numbers were rounded and then totaled.

Table 3.5-16. Notional Off-Base Incompatible Land Use Area With the Dyess AFB Alternative

Off-Base Land Use Category	Off-Base Incompatible Area (Acres)			
	Noise (dBA DNL)		Accident Potential	
	75–79	80+	CZ	APZ I
Developed, Open Space	0	0	0	0
Developed, High Intensity ^(a)	0	0	0	0
Developed, Low Intensity ^(b)	0.4	0	0	30
Developed, Medium Intensity ^(c)	0	0	0	28
Total ^(d)	0.4	0	0	58

Key: + = plus; AFB = Air Force Base; APZ = accident potential zone; CZ = clear zone; dBA = A-weighted decibels; DNL = day-night average sound level

Notes:

- High intensity developed = Highly developed areas where people reside or work in high numbers. Examples include apartment complexes, row houses and commercial/industrial. Impervious surfaces account for 80% to 100% of the total cover.
- Low intensity developed = Areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20% to 49% percent of total cover. These areas most commonly include single-family housing units.
- Medium intensity developed = Areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 50% to 79% of the total cover. These areas most commonly include single-family housing units.
- During data analysis, numbers were rounded and then totaled.

Table 3.5-17. Comparison of Total Off-Base Area Adjacent to Dyess AFB Exposed to Noise Zones Under the No Action Alternative and the Dyess AFB Alternative

Noise Zones (dBA DNL)	Off-Base Acres Within Noise Zones		
	No Action Alternative	Dyess AFB Alternative	Change from No Action
65–69	5,764	2,883	-2,881
70–74	3,262	733	-2,529
75–79	1,361	156	-1,205
80–84	452	0	-452
85–89	146	0	-146
>90	38	0	-38
Total	11,023	3,772	-7,251

Key: > = greater than; - = minus; AFB = Air Force Base; dBA = A-weighted decibels; DNL = day-night average sound level

Table 3.5-18. Comparison of Total Off-Base Incompatible Land Use Area Under the No Action Alternative and Dyess AFB Alternative

Incompatible Land Use Effector	Off-Base Incompatible Area (Acres)		
	No Action Alternative	Dyess AFB Alternative	Change from No Action
75–79 dBA DNL Noise Zone	83	0.4	-82.6
80+ dBA DNL Noise Zone	123	0	-123
CZ	0	0	0
APZ I	58	58	0
Total	264	58.4	-205.6

Key: - = minus; + = plus; AFB = Air Force Base; APZ = accident potential zone; CZ = clear zone; dBA = A-weighted decibels; DNL = day-night average sound level

3.5.2.2.3 Airspace and Range Utilization

The Dyess AFB Alternative would not result in ground-disturbing activities that would affect land use under the Lancer MOA, Lancer Bridge MOA, Brownwood MOA, Pecos MOA, Bronco MOA, or Willie-Roscoe ATCAA. As described for the No Action Alternative, analyses presented in the *Realistic Bomber Training Range EIS*, the *New Mexico Training Range Initiative EIS*, and the *AFSOC Assets Beddown EIS* indicate there are no adverse impacts to land use due to aircraft operations in the Lancer MOA, Pecos MOA, and Bronco MOA airspace (DAF, 2006; DAF, 2000; DAF, 2007). Additionally, land use under the Lancer Bridge MOA, Brownwood MOA and Willie-Roscoe ATCAA is compatible with aircraft operations, as average noise levels are below those associated with human annoyance. Based on the results of modeling described in Section 3.3 (Noise), noise levels under the airspace of the Lancer, Lancer Bridge, Brownwood, Pecos, and Bronco MOAs, as well as the Willie-Roscoe ATCAA (Table 3.5-19) would either decrease or remain the same relative to the No Action Alternative as discussed in Section 3.3.2.1.1 (Noise, Environmental Consequences, No Action Alternative at Dyess AFB).

Table 3.5-19. Noise Levels Under the Training Airspace for the Dyess AFB Alternative

Noise Level (dBA L _{dnmr})					
Lancer MOA	Lancer Bridge MOA	Brownwood MOA	Pecos MOA	Bronco MOA	Willie-Roscoe ATCAA
44.6	<35	38.8	36.9	<35	<35

Key: < = less than; AFB = Air Force Base; ATCAA = Air Traffic Control Assigned Airspace; dBA = A-weighted decibels; L_{dnmr} = onset-rate adjusted monthly day-night average sound level; MOA = Military Operating Area

Noise levels under all operating areas would be well below 65 dBA L_{dnmr} and would not adversely affect land use. There would be no significant impacts due to airspace and range utilization under the Dyess AFB Alternative.

3.5.2.2.4 Facilities and Infrastructure

Land use associated with facilities and infrastructure projects consists mostly of airfield pavement, aircraft operations and maintenance, industrial, and open space (Figure 3.5-13). Land use associated with a few projects includes administrative, community services, and housing areas. It is expected that all renovation and new construction would be consistent with the existing land use tiering system and that all functions would be located within acceptable noise zones and would incorporate noise attenuation features if necessary. It is further expected that siting of new facilities and infrastructure would occur in accordance with existing safety arcs and the potential future WGF safety arc. No significant impacts to land use would be anticipated.

3.5.2.2.5 Weapons Generation Facility

Land use associated with the WGF and connecting road consists of industrial and open space (Figure 3.5-13). The site is located in an area of generally compatible land use, near the existing munitions storage compound and explosives cargo area, and slightly overlapping the existing munitions storage quantity-distance (QD) safety arcs. Additional QD arcs would be developed for the WGF specifically (refer to Section 3.12, Health and Safety), and any incompatible functions, if present, would be relocated outside of the new arcs. No significant impacts to land use would be anticipated.

3.5.2.2.6 Reasonably Foreseeable Future Actions and Environmental Trends

Applicable reasonably foreseeable future actions and environmental trends are described in Table 3.1-2. Potential effects would be associated with changes to on-base and off-base land use compatibility related to infrastructure and facility placement, noise, and climate change.

Parking apron repair would occur within the installation boundary, near the airfield. Activities related to the repairs would be consistent with applicable installation land use planning procedures and requirements, including guidance contained in the IDP and future land use plan, and would not change existing land use or cause incompatible land use. Reasonably foreseeable future actions and environmental trends would not have significant impacts on land use when combined with potential impacts from the Dyess AFB Alternative.

3.5.2.2.7 Proposed Resource-Specific Mitigations and Management Actions to Reduce the Potential for Environmental Impacts

No mitigations would be necessary to implement the Dyess AFB Alternative.

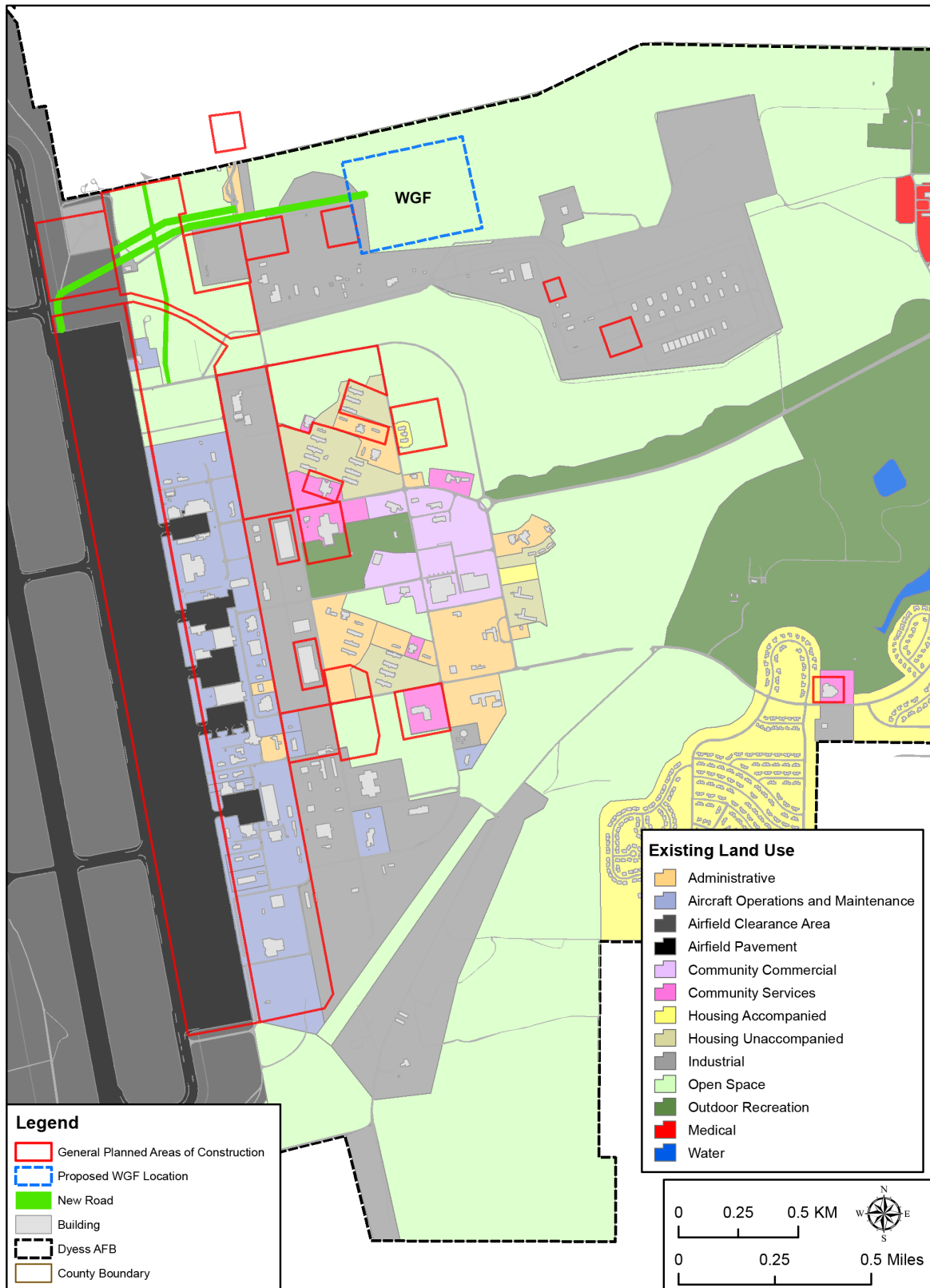


Figure 3.5-13. Land Use at the Facilities and Infrastructure Projects Locations for the Dyess AFB Alternative

3.5.2.3 Whiteman AFB Alternative (Preferred Alternative)

3.5.2.3.1 Personnel

Under the Proposed Action, there would be a net increase of 1,021 personnel at Whiteman AFB, including dependents. Increased population would result in increased demand for on-base and off-base housing and services. On-base construction and renovation projects, including construction of a new dorm, are listed in Table 2.4-4. All on-base development resulting from the MOB 2 beddown would occur in accordance with guidance in the base's IDP, JLUS, AICUZ study, and design guide, and incompatible land use would not be expected. The beddown would result in demand for additional off-base housing (refer to Section 3.6, Socioeconomics) and could potentially result in demand for additional off-base services. Any adjacent off-base development associated with the beddown would likely occur with consideration of aircraft noise, APZs, height restrictions, and corresponding land use compatibility. The City of Knob Noster has established an Airport Overlay District and Johnson County has implemented a Military Airport Zone buffer area around Whiteman AFB. These measures establish land use controls (LUCs) within noise zones and APZs around the installation. There would be no significant impacts due to a personnel increase under the Whiteman AFB Alternative.

3.5.2.3.2 Airfield Operations

On-base land use and aircraft noise contours under the Whiteman AFB Alternative are shown in Figure 3.5-14. The on-base land use area encompassed by each noise zone is shown in Table 3.5-20. Compared to the No Action Alternative, the total overall on-base area encompassed by noise levels greater than 65 dBA DNL would increase by 146 acres, mostly in the 75-79 dBA DNL noise zone (Table 3.5-21). The 65 dBA DNL noise contour would encompass primarily open space/buffer zone, aircraft operations and maintenance, and industrial uses but would also coincide with smaller areas of airfield clearance, administration, and outdoor recreation areas, which are compatible uses. The 75 dBA DNL contour would not extend to any residential, community service, or administrative use areas. Sensitive noise receptors would be located outside the 65 dBA DNL noise contour. All on-base land use would be compatible with the associated noise levels.

Table 3.5-20. On-Base Area Exposed to Noise Zones at Whiteman AFB – Whiteman AFB Alternative

On-Base Land Use Category	On-Base Acres Within Noise Zones (dBA DNL)						Total
	65–69	70–74	75–79	80–84	85–89	>90	
Administrative	19	6	0	0	0	0	25
Airfield Operations/Maintenance	219	304	159	16	0.9	0	698.9
Airfield Clearance Area	42	193	339	245	160	3	982
Industrial	2	0	0	0	0	0	2
Open Space/Buffer Zone	649	364	29	0	0	0	1,042
Outdoor Recreation	0.7	0	0	0	0	0	0.7
Total	932	867	527	261	161	3	2,751

Key: > = greater than; AFB = Air Force Base; dBA = A-weighted decibels; DNL = day-night average sound level

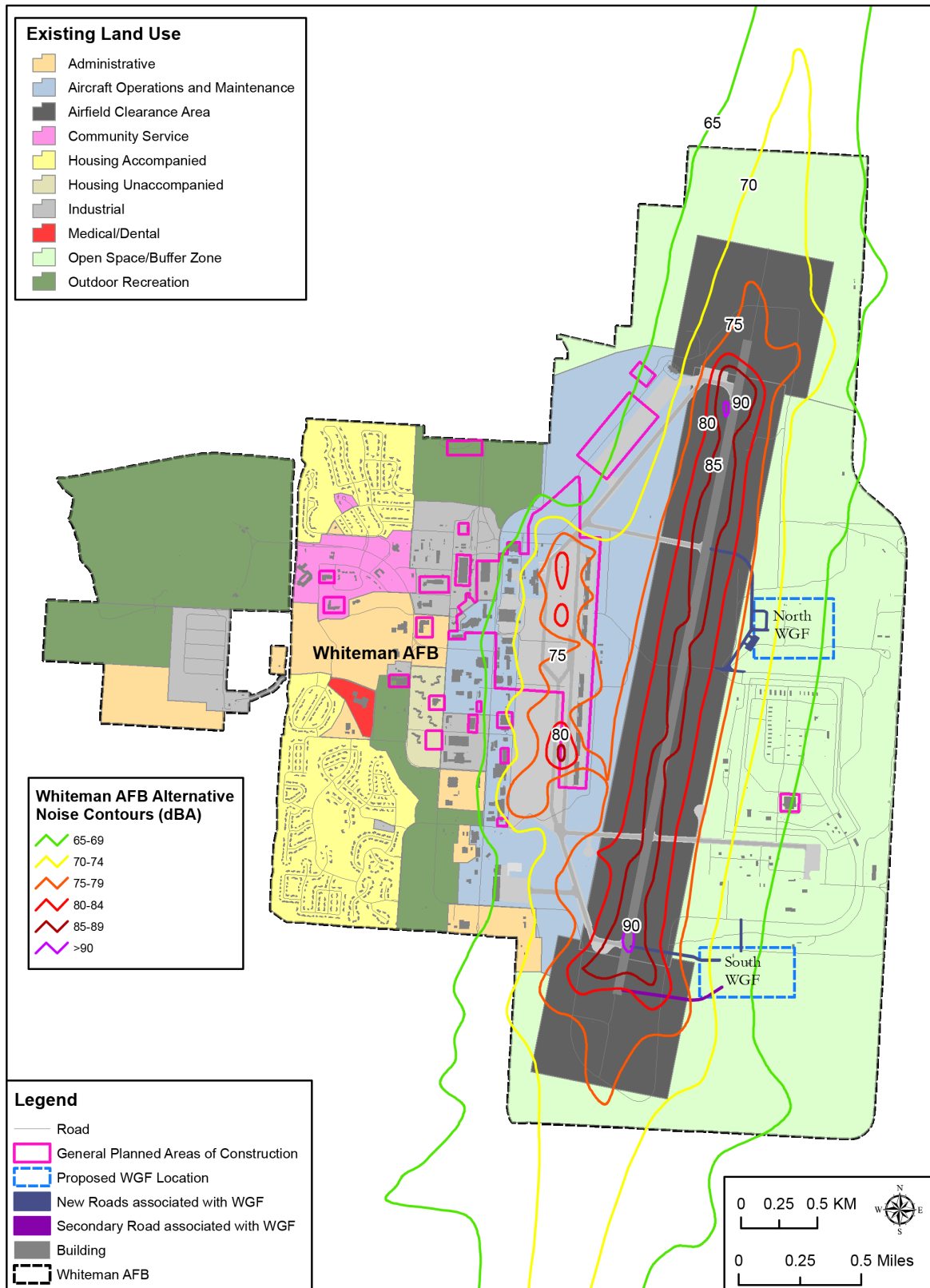


Figure 3.5-14. On-Base Land Use and Noise Contours on Whiteman AFB – Whiteman AFB Alternative

Table 3.5-21. Comparison of Total On-Base Area Exposed to Noise Zones at Whiteman AFB Under the No Action Alternative and Whiteman AFB Alternative

Noise Zones (dBA DNL)	On-Base Acres Within Noise Zones		
	No Action Alternative	Whiteman AFB Alternative	Change from No Action
65–69	938	932	-6
70–74	834	867	33
75–79	453	527	74
80–84	264	261	-3
85–89	115	161	46
>90	1	3	2
Total	2,605	2,751	146

Key: > = greater than; - = minus; AFB = Air Force Base; dBA = A-weighted decibels; DNL = day-night average sound level

Off-base land use and noise contours under the Whiteman AFB Alternative are shown in Figure 3.5-15. The off-base land use area encompassed by each noise zone is shown in Table 3.5-22. Potentially incompatible off-base land use area is shown in Table 3.5-23. Approximately 97 percent of off-base land use associated with the noise zones is undeveloped (e.g., herbaceous and shrub/scrub) or developed (open space). Compared to the No Action Alternative, the total off-base land area encompassed by noise levels of 65 dBA DNL or greater would increase by 498 acres (Table 3.5-24). There would be no off-base area exposed to noise levels above 75 dBA DNL. However, an area of eastern Knob Noster containing low, medium, and high intensity developed land use occurs within the 65–69 dBA DNL noise contour. High-intensity developed areas are compatible within this noise zone, while low- and medium-intensity developed areas are conditionally compatible. In addition, approximately one combined acre of low- and medium-intensity developed land use occurs within the 70–74 dBA DNL noise contour. Both land use types are conditionally compatible. A total of 29 acres of Mobile Home land use was designated as incompatible under the No Action Alternative due to noise (Table 3.5-11). Although current land use classifications do not include Mobile Home land use specifically, it is presumed that the acreage would remain categorized as an incompatible use due to the overall slight increase in off-base noise. The total area of off-base land use notionally considered incompatible with noise levels and accident zones would remain the same as under the No Action Alternative (Table 3.5-25). There would be no change in the area of incompatible use associated with accident zones because those areas have fixed dimensions.

In summary, under the Whiteman AFB Alternative, there would be a relatively small increase in the on-base and off-base area exposed to various noise levels compared to the No Action Alternative. All on-base land use would remain compatible. The area of off-base conditionally compatible land use would increase slightly, but there would be no change in the area of incompatible use. Although the Mobile Home parcel's location within airfield operations noise contours and APZ I is undesirable, there would be no substantive change in the status of this area relative to the No Action Alternative. Overall, significant impacts would not be anticipated under the Whiteman AFB Alternative.

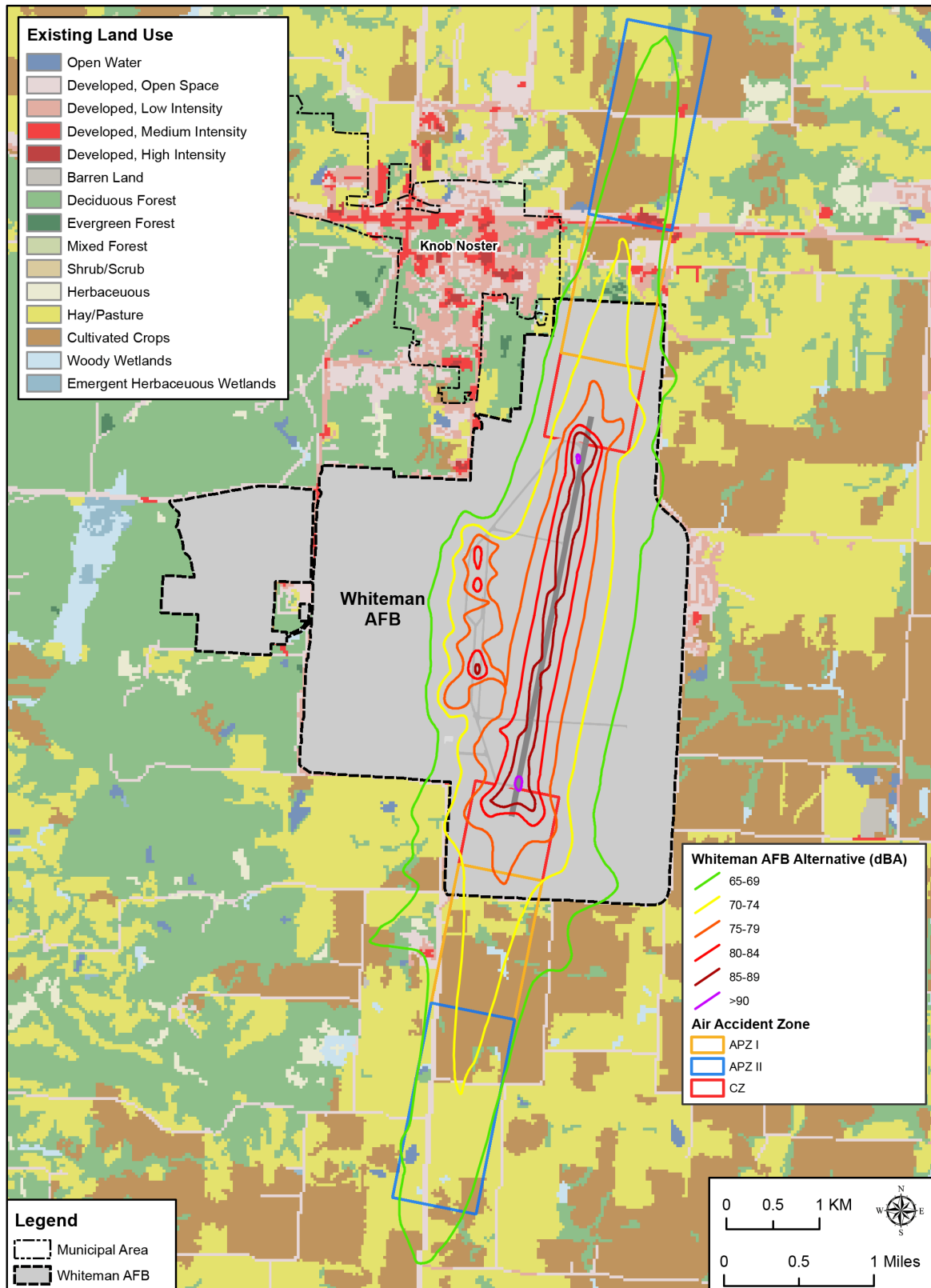


Figure 3.5-15. Off-Base Land Use, Noise Contours, and Accident Potential Zones Adjacent to Whiteman AFB – Whiteman AFB Alternative

Table 3.5-22. Off-Base Land Use Area Exposed to Noise Zones Under the Whiteman AFB Alternative

Off-Base Land Use Category	Off-Base Acres Within Noise Zones (dBA DNL)						Total
	65–69	70–74	75–79	80–84	85–89	>90	
Cultivated Crops	546	146	0	0	0	0	692
Deciduous Forest	90	24	0	0	0	0	114
Developed, High Intensity ^(a)	6	0	0	0	0	0	6
Developed, Low Intensity ^(b)	27	1	0	0	0	0	28
Developed, Medium Intensity ^(c)	21	0.1	0	0	0	0	21.1
Developed, Open Space	147	8	0	0	0	0	155
Evergreen Forest	0	6	0	0	0	0	6
Hay/Pasture	508	46	0	0	0	0	554
Herbaceous	4	0	0	0	0	0	4
Mixed Forest	0.4	2	0	0	0	0	2.4
Open Water	8	0	0	0	0	0	8
Shrub/Scrub	0.6	0	0	0	0	0	0.6
Woody Wetlands	7	6	0	0	0	0	13
Total ^(d)	1,365	239	0	0	0	0	1,604

Key: > = greater than; AFB = Air Force Base; dBA = A-weighted decibels; DNL = day-night average sound level

Notes:

a. High intensity developed = Highly developed areas where people reside or work in high numbers. Examples include apartment complexes, row houses and commercial/industrial. Impervious surfaces account for 80% to 100% of the total cover.

b. Low intensity developed = Areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20% to 49% percent of total cover. These areas most commonly include single-family housing units.

c. Medium intensity developed = Areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 50% to 79% of the total cover. These areas most commonly include single-family housing units.

d. During data analysis, numbers were rounded and then totaled.

Table 3.5-23. Notional Off-Base Incompatible Land Use Area With the Whiteman AFB Alternative

Off-Base Land Use Category	Off-Base Incompatible Area (Acres)			
	Noise (dBA DNL)		Accident Potential	
	65–79	80+	CZ	APZ I
Developed, Low Intensity	0	0	0	19
Developed, Medium Intensity	0	0	0	13
Developed, Mobile Home	29	0	0	27
Total	29	0	0	59

Key: + = plus; AFB = Air Force Base; APZ = accident potential zone; CZ = clear zone; dBA = A-weighted decibels; DNL = day-night average sound level

Table 3.5-24. Comparison of Total Off-Base Area Adjacent to Whiteman AFB Exposed to Noise Zones Under the No Action Alternative and the Whiteman AFB Alternative

Noise Zones (dBA DNL)	Off-Base Acres Within Noise Zones		
	No Action Alternative	Whiteman AFB Alternative	Change from No Action
65–69	993	1,365	372
70–74	113	239	126
75–79	0	0	0
80–84	0	0	0
85–89	0	0	0
>90	0	0	0
Total	1,106	1,604	498

Key: > = greater than; - = minus; AFB = Air Force Base; dBA = A-weighted decibels; DNL = day-night average sound level

Table 3.5-25. Comparison of Total Off-Base Incompatible Land Use Area Under the No Action Alternative and Whiteman AFB Alternative

Incompatible Land Use Effector	Off-Base Incompatible Area (Acres)		
	No Action Alternative	Whiteman AFB Alternative	Change from No Action
65–79 dBA DNL Noise Zone	29	29	0
CZ	0	0	0
APZ I	59	59	0
Total	88	88	0

Key: AFB = Air Force Base; APZ = accident potential zone; CZ = clear zone; dBA = A-weighted decibels; DNL = day-night average sound level

3.5.2.3.3 Airspace and Range Utilization

The Whiteman AFB Alternative would not result in ground-disturbing activities under the Smoky Hill Range, Ozark ATCAA, Ada MOA, Cannon MOA, Truman MOA, or Lindbergh MOA airspace. As described for the No Action Alternative, analysis in the *F-35A Operational Beddown – Air Force Reserve Command EIS* (DAF, 2020a) indicate there are no adverse impacts to land use from noise associated with aircraft operations in the Smoky Hill Range or the Ada MOA, Cannon MOA, Truman MOA, and Lindbergh MOA (Section WH3.2.4, pp. WH3-27). Additionally, land use under the Ozark ATCAA is compatible with noise levels associated with aircraft operations because average noise levels are below those associated with human annoyance and other adverse impacts to land use (see Section 3.5.1.2.3, Land Use, Affected Environment, Region of Influence, Airspace and Military Operating Areas). Based on the results of modeling described in Section 3.3 (Noise), noise levels under the airspace of the ranges would remain the same relative to the No Action Alternative (Table 3.5-26). Noise levels under all operating areas would be well below 65 dBA L_{dnmr} and would not adversely affect land use. There would be no significant impacts due to airspace and range utilization under the Whiteman AFB Alternative.

Table 3.5-26. Noise Levels Under the Training Airspace for the Whiteman AFB Alternative

Noise Level (dBA L_{dnmr})					
Smoky Hill Range ^(a)	Ozark ATCAA	Ada MOA	Cannon MOA	Truman MOA	Lindbergh MOA
<43	<35	<35	40	<35	<35

Key: < = less than; AFB = Air Force Base; ATCAA = Air Traffic Control Assigned Airspace; dBA = A-weighted decibels; L_{dnmr} = onset-rate adjusted monthly day-night average sound level; MOA = Military Operating Area

Note:

a. Modeled noise levels (dBA L_{dnmr}) in Smoky Hill Range sub-areas are 40 (Smoky MOA), 38.1 (Bison MOA), and 42.2 (R-3601).

3.5.2.3.4 Facilities and Infrastructure

Most types of existing on-base land use would be associated with some portion of the facilities and infrastructure projects footprint. Affected land use would consist of airfield pavement, aircraft operations and maintenance, industrial, community service, administrative, unaccompanied housing, outdoor recreation, and open space (Figure 3.5-16).

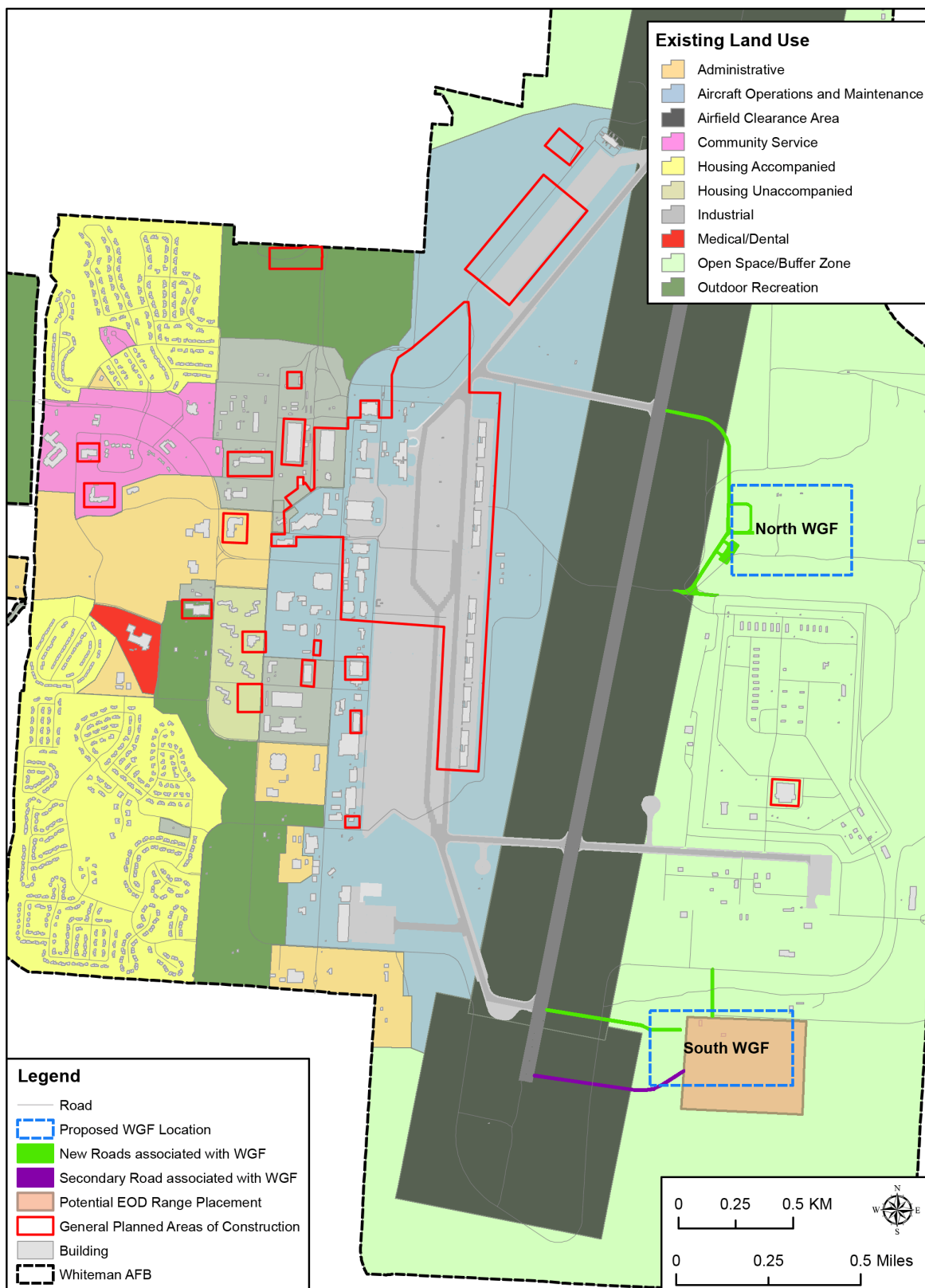


Figure 3.5-16. Land Use at the Facilities and Infrastructure Projects Locations for the Whiteman AFB Alternative

It is expected that all renovation and new construction would be consistent with existing land use policies and strategies. It is further expected that all functions would be located within acceptable noise zones, incorporating noise attenuation features as necessary, and that siting would occur in accordance with existing and potential future safety arcs. No significant impacts to on-base land use would be anticipated under the Whiteman AFB Alternative.

3.5.2.3.5 Weapons Generation Facility

North WGF Site Subalternative (Preferred Subalternative)

Land use associated with the North WGF Site consists of open space (Figure 3.5-16). The new roads would occur in open space and airfield clearance areas. The overall north WGF site footprint is located in an area of compatible land use, within existing weapons storage area QD arcs. Additional QD arcs would be developed for the WGF specifically (refer to Section 3.12, Health and Safety), and any incompatible functions, if present, would be relocated outside of the new arcs. The existing EOD range would be relocated to an area of compatible land use (open space) near the southern end of the runway. No significant impacts to land use would be anticipated.

South WGF Site Subalternative

Land use associated with the South WGF Site consists of open space (Figure 3.5-16). The new roads would occur in open space and airfield clearance areas. The overall south WGF site footprint is located in an area of compatible land use (open space) adjacent to weapons storage area QD arcs and near the southern CZ. A secondary access road would be routed through the southern CZ. Additional QD arcs would be developed for the WGF specifically (refer to Section 3.12, Health and Safety), and any incompatible functions, if present, would be relocated outside of the new arcs. The roadway traversing the CZ would only be used by authorized personnel involved in airfield operations. Roadway placement at the existing ERP site would be subject to established LUCs (refer to Section 3.11, Hazardous Materials and Hazardous and Solid Wastes, for detailed discussion of the ERP site). No significant impacts to land use would be anticipated.

3.5.2.3.6 Reasonably Foreseeable Future Actions and Environmental Trends

Applicable reasonably foreseeable future actions and environmental trends are described in Table 3.1-2. Potential effects would be associated with changes to on-base and off-base land use compatibility related to infrastructure and facility placement, noise, and climate change.

Surface drainage corrective actions would occur within the installation boundary, near the airfield. The activities would be consistent with applicable installation land use planning procedures and requirements, including strategies contained in the IDP and installation design guide, and would not change existing land use or cause incompatible land use. Similarly, relocation of the Arnold Gate, associated roads, guardhouse, parking lot, B-52

static display, and fencing would occur in areas of compatible land use designation. B-21 beddown actions would not affect land characteristics or associated land uses relative to baseline conditions and would therefore not contribute to changes in land use potentially related to the effects of climate change (e.g., changes to floodplain or wetland boundaries). The Whiteman AFB Alternative would not have significant impacts on land use when combined with reasonably foreseeable future actions and environmental trends.

3.5.2.3.7 Proposed Resource-Specific Mitigations and Management Actions to Reduce the Potential for Environmental Impacts

No mitigations would be necessary to implement the Whiteman AFB Alternative.

3.6 SOCIOECONOMICS

3.6.1 Socioeconomics, Affected Environment

3.6.1.1 Description of Resource

Socioeconomic resources are defined as the basic attributes associated with human activities. Of particular interest are the population characteristics; economic factors including employment and income; and public services including schools, law enforcement, and emergency services. Actions that impact these socioeconomic indicators may have effects on other socioeconomic factors such as housing availability.

3.6.1.2 Region of Influence

The ROI for the socioeconomics analysis focuses on the area most affected by the action alternative. Dyess AFB is located immediately west of Abilene, Texas. The ROI for Dyess AFB is the Abilene Metropolitan Statistical Area (MSA), which includes Taylor, Jones, and Callahan Counties. Whiteman AFB is located approximately 3 miles south of Knob Noster, Missouri. The ROI for Whiteman AFB includes Johnson and Pettis Counties.

The ROI also includes the areas beneath the airspace. For Dyess AFB, the airspace ROI includes the Brownwood, Lancer, Lancer Bridge, Bronco 3 and 4, and Pecos MOAs, as well as the Willie-Roscoe ATCAA. For Whiteman AFB, the airspace ROI includes the Smoky Hill Range, Ada East/West MOA, Cannon MOA, Lindbergh MOA, and Truman MOA, including all associated ATCAAs, as well as the Ozark ATCAA.

As discussed in Section 3.3.2 (Noise, Environmental Consequences) under the Dyess AFB Alternative and Whiteman AFB Alternative, end-state and snapshot noise levels across all airspace units would either be the same or decrease compared to the No Action Alternative. The noise analysis uses L_{dnmr} as the noise metric for subsonic aircraft noise in military airspace. Since L_{dnmr} always equals or exceeds DNL (see Section 3.3.1.1), the resulting noise levels under the Proposed Action are less than the EPA level of 55 dBA

DNL below which no effects to public health and welfare would occur (EPA, 1974). They are also well below 65 dBA DNL, the level that would potentially impact land use compatibility. Therefore, airspace and range utilization would have no significant socioeconomic impacts under any alternative and is not analyzed further in this section.

3.6.1.3 Analysis Methodology

Potential impacts to the number and dollar value of indirect jobs created as a result of the B-21 MOB 2 beddown follow the method used for the respective Economic Impact Statements for Dyess AFB and Whiteman AFB. The total number of indirect jobs created was calculated by taking the total number of new DAF base jobs, by personnel type, and multiplying the numbers by the multiplier reported in the respective base's Economic Impact Statement (see Table 3.6-1). The sum of the indirect jobs was then multiplied by the average annual pay for the local community as shown in Table 3.6-1.

Cost estimates for construction, demolition, and remodeling of facilities and infrastructure are not yet available for purposes of quantitative analyses; as a result, a qualitative assessment of the potential impacts associated with these activities is provided.

Table 3.6-1. Numbers Used to Determine the Indirect Jobs and Dollar Value of Air Force Personnel Associated With the B-21 MOB 2 Beddown

Type of Personnel	Multiplier	
	Dyess AFB	Whiteman AFB
Active-Duty Military	0.29	0.29
Reserve/ANG/Trainees	0.13	0.13
Appropriated Fund Civilians	0.43	0.43
Other Civilians	0.43	0.43
Average Annual Pay for the Local Community	\$42,930	\$41,908

Sources: (Dyess AFB, 2021a; Whiteman AFB, 2021a)

Key: AFB = Air Force Base; ANG = Air National Guard; MOB = Main Operating Base

Demand for housing is estimated under several assumptions that are similar to those made in previous DAF documents, such as the *Final Environmental Impact Statement for the B-21 Main Operating Base 1 (MOB 1) Beddown at Dyess AFB, Texas or Ellsworth AFB, South Dakota* (DAF, 2021e) and the *Final Environmental Impact Statement for F-35A Wing Beddown at Tyndall AFB and MQ-9 Wing Beddown at Tyndall AFB or Vandenberg AFB* (DAF, 2020b). The assumptions were also based on the specific details for incoming personnel described in Section 2.3.2 (Dyess AFB Alternative, Personnel) and Section 2.4.2, (Whiteman AFB, Alternative Personnel). First, it is assumed that all incoming military personnel would be active duty. Therefore, to estimate the number of incoming active-duty personnel that would be living on or off base, the current percentages of active-duty personnel living on base and off base are applied to the incoming personnel. At Dyess AFB, the estimated number of active-duty DAF personnel living on base is 21.8 percent and off base is 78.2 percent (Dyess AFB, 2021a). At Whiteman AFB, the estimated number of active-duty DAF personnel living on base is 32.6 percent and off base is 67.4 percent (Whiteman AFB, 2021a). Second, it is assumed that each incoming military personnel would require either one housing unit or dormitory unit since the incoming personnel is not broken out into military grades. Third,

it is assumed that the overall negative change in civilian or contractor personnel would not affect the number of housing units available or demanded. As presented in Table 2.3-1 and Table 2.4-1, there would be an overall decrease in the number of civilian and contractors at the end-state compared to the No Action under each alternative. It is possible that the end-state reduction in civilian and/or contractors would result in some of those personnel leaving the area, which could provide a benefit to housing from the additional availability of housing units for incoming active-duty military personnel. However, the DAF cannot reliably estimate the number of civilian and/or contractors that would potentially move out of the area or the number of housing units that could become available. Finally, it is assumed that there would be enough on-base housing supply to support the incoming personnel if the total number of on-base housing is more than the total on-base housing demand estimated.

For the purposes of the snapshot scenario analysis, the number of personnel residing on base is expected to remain the same as calculated for the Dyess AFB Alternative and the Whiteman AFB Alternative with the remaining DAF personnel residing off base.

To determine the impact on education resources in the ROI, the number of incoming school-aged children was based on the number of dependents shown in Table 2.2-1 and Table 2.2-3. From the most recent DoD demographic statistics (DoD, 2022b) it would be assumed that approximately 56.9 percent of dependent children would be of school age (6 to 18 years of age).

Changes in the demand for public services, such as law enforcement, fire emergency services, and medical services associated with any in-migration or out-migration of people to the area under the alternatives were evaluated. These changes were determined based on regional or national averages available on the number of professionals per capita.

One of the main concerns regarding aircraft operations over residential areas is the potential impacts to property values and safety. Potential impacts to property values from aircraft noise surrounding the AFB and beneath the airspace were assessed by reviewing available literature and comparing changes in the population affected by noise levels of 65 dBA DNL or greater, the threshold at which residential land use is not compatible with that noise level. The most common human health effects associated with aircraft noise at 65 dBA DNL or greater include annoyance, speech and learning interference, and sleep disturbance, which in turn can disrupt normal daily activities (Nelson, 2003). These health effects could also result in impacts to an individual's quality of life. Quality of life is a measure of comfort, health, and happiness of an individual or groups based on such factors as physical health, family, education, employment, wealth, freedom, environment, and safety. Aircraft noise has the potential to affect these factors; subsequently, it has the potential to directly and indirectly impact an individual's or a group's perceived quality of life. Aircraft noise can also affect the value of homes. Economic studies of property values based on selling prices and noise have been conducted to find a direct correlation. Enough data are available to conclude that aircraft noise has a real effect on property values. This effect falls in the range of 0.2 to 2 percent per decibel, with the average of 0.5 percent per decibel at noise exposure levels of 75 dBA or less (Nelson, 2003). The actual value varies from location to location and is very often small compared to factors other than noise. Additionally,

proximity to the air force base where aircraft noise may be more prevalent could also result in positive effects on property values as it provides access to on-base services for military personnel, less travel time for military and civilian personnel, and additional employment opportunities for the community.

The complex nature of property valuation makes any estimation of the potential effects of airspace modifications on land values highly speculative. Socioeconomic factors, such as business activity, employment, interest rates, and land scarcity (or availability) are much more likely to affect property values than training airspace. Also, noise exposure is distributed across a vast area and no single location would be expected to receive a consistently high exposure to noise. Public health and safety from aircraft operations are discussed in detail in Section 3.12 (Health and Safety).

3.6.2 Socioeconomics, Environmental Consequences

3.6.2.1 No Action Alternative Consequences

3.6.2.1.1 No Action at Dyess AFB

Under the No Action Alternative, the B-21 would not be based at Dyess AFB and there would be no associated personnel changes or construction, demolition, or renovation activities. Under this alternative, approximately 1,494 off-base residents are affected by aircraft noise of 65 dBA DNL or greater in Taylor County, Texas (see Table 3.3-3).

The most recent economic impact statement from Dyess AFB reported annual local expenditures for procurements and contracts of over \$42.6 million (Dyess AFB, 2021a). Construction, demolition, and renovation of facilities and infrastructure are a regular activity of an operational DAF base and contribute to the base's overall economic impact to the local region from the use of labor and supplies. Expenditures for facilities and infrastructure would continue to be required as facilities and infrastructure age and need to be replaced or upgraded.

Population

The total population throughout the three-county ROI is 183,537 according to the most recent decennial census (U.S. Census Bureau, 2022a). As shown in Table 3.6-2, Taylor County comprises the largest proportion of the population in the Abilene MSA while Callahan comprises the smallest proportion. Jones County is the only county in the ROI projected to experience a decrease in population between 2010 and 2025 from the Texas Populations Projections Program (Texas Demographic Center, 2022a). Table 3.6-3 presents the total number of active-duty military, dependents, civilian, and contractors supported by Dyess AFB (estimates from Table 2.2-1). Personnel supporting current B-1 operations at Dyess AFB are also presented in Table 3.6-3.

**Table 3.6-2. Population Estimates and Projections for Dyess AFB
Region of Influence**

Geographic Area	Census 2010	Census 2020	Projected 2025 ^(a)	Average Annual Change 2010–2020 ^(b)
Callahan County	13,544	13,708	14,025	0.1%
Jones County	20,202	19,663	19,380	-0.3%
Taylor County	131,506	143,208	150,132	0.9%
Abilene MSA (ROI)	165,252	176,579	183,537	0.7%
State of Texas	25,145,561	29,145,505	30,995,030	1.5%

Sources: (U.S. Census Bureau, 2022a; Texas Demographic Center, 2022a; Texas Demographic Center, 2022b)

Key: % = percent; AFB = Air Force Base; MSA = Metropolitan Statistical Area; ROI = region of influence

Notes:

a. Based on the most current projections from the 2022 Texas Populations Projections Program with the 2020 census equal to the 2020 census count (Texas Demographic Center, 2022a).

b. Percentages rounded to the nearest tenth.

Table 3.6-3. Personnel Estimates at Dyess AFB

Personnel ^(a)	Total Number of Individuals ^(b)	Number of B-1 Mission Individuals
Active Military	4,606	1,855
Civilian ^(a)	736	46
Contractor	50	50
Spouses ^(c, d)	2,901	1,050
Children ^(c, d)	3,570	1,292
Total	11,862	4,292

Key: AFB = Air Force Base

Notes:

a. Includes appropriated and non-appropriated fund civilians.

b. Source: (Dyess AFB, 2021a)

c. Based on number of contractors associated with B-1 mission.

d. Numbers of spouses and children were calculated assuming 1.2 dependents per military, civilian, and contractor personnel and that 53.8 percent of personnel are married with the remaining dependents being children.

Economy, Employment, and Income

Dyess AFB has a major influence on the regional economy. As of Fiscal Year (FY) 2021, (the total annual economic impact of Dyess AFB to the local Abilene area was over \$528 million (Dyess AFB, 2021a). The *2021 Economic Impact Statement for Dyess AFB* calculated payroll, expenditures and indirect jobs associated with the base (see Table 3.6-4) (Dyess AFB, 2021a). Construction, renovation, and maintenance projects such as those shown in Table 3.1-1 are typical of a large and operational AFB such as Dyess, which support the local economy through employment and income.

Data from the Bureau of Economic Analysis indicates that there were 107,895 full-time and part-time jobs throughout the Abilene MSA during 2021 (Bureau of Economic Analysis, 2022a). This is 11,086 more jobs than reported in 2010, indicating that over the past 11 years, the job growth rate has increased at an average annual rate of approximately 1 percent in the ROI (Bureau of Economic Analysis, 2022a). Table 3.6-5 shows that based on the available data, the largest nonfarm employment sectors in terms of the number of jobs in the ROI were the government and government enterprises sector and the retail trade sector. There were 6,658 construction jobs in the Abilene MSA in 2021, which accounted for 6.2 percent of total employment (Bureau of Economic Analysis, 2022a).

Table 3.6-4. Economic Impact of Dyess AFB, Fiscal Year 2021

Category	Total
Annual Payrolls by Classification	
Appropriated Fund Military	\$274,752,800
Appropriated Fund Civilians	\$39,951,815
Non-Appropriated Fund, Contract, Civilians, and Private Business	\$6,750,763
Military Retirees (Within a 50-Mile Radius)	\$92,460,000
Total Annual Payroll	\$413,915,378
Annual Expenditures	
Total Local Expenditures	\$42,621,527
Value of Indirect Jobs	
Estimated Number of Indirect Jobs Created	1,678
Average Annual Pay for the Local Community	\$42,930
Total Annual Dollar Value of Jobs Created	\$72,036,540
Total Economic Impact of Dyess AFB	\$528,573,445

Source: (Dyess AFB, 2021a)

Key: % = percent; \$ = dollars; AFB = Air Force Base

Table 3.6-5. Total Full-Time and Part-Time Employment (Number of Jobs) by Industry in the Abilene Metropolitan Statistical Area, 2021

Industry	Total Number of Jobs	Percent of Total Employment
Forestry, Fishing, and Related Activities	(D)	NA
Mining, Quarrying, and Oil and Gas Extraction	3,170	2.9%
Utilities	(D)	NA
Construction	6,658	6.2%
Manufacturing	3,776	3.5%
Wholesale Trade	(D)	NA
Retail Trade	11,117	10.3%
Transportation and Warehousing	3,118	2.9%
Information	1,149	1.1%
Finance and Insurance	6,911	6.4%
Real Estate and Rental and Leasing	3,883	3.6%
Professional, Scientific, and Technical Services	4,198	3.9%
Management of Companies and Enterprises	(D)	NA
Administrative and Support and Waste Management and Remediation Services	(D)	NA
Educational Services	(D)	NA
Health Care and Social Assistance	(D)	NA
Arts, Entertainment, and Recreation	1,498	1.4%
Accommodation and Food Services	7,764	7.2%
Other Services	6,184	5.7%
Government and Government Enterprises	17,497	16.2%
Total Employment	107,895	100.0%

Source: (Bureau of Economic Analysis, 2022a)

Key: % = percent; (D) = Not shown to avoid disclosure of confidential information but included in total; MSA = Metropolitan Statistical Area; NA = not available but included in total

Table 3.6-6 compares several economic characteristics in the Abilene MSA with the state of Texas and the nation.

Table 3.6-6. Selected Economic Characteristics, Dyess AFB Region of Influence

Geographic Area	Unemployment Rate	Per Capita Income	Median Household Income	Percent of Population With Incomes Below Poverty Level
Callahan County	4.5%	\$28,303	\$55,820	8.3%
Jones County	5.8%	\$19,153	\$55,575	12.4%
Taylor County	2.8%	\$29,698	\$57,811	14.0%
Abilene MSA (ROI)	3.1%	\$28,402	\$57,356	13.4%
State of Texas	5.4%	\$34,255	\$67,321	14.0%
United States	5.5%	\$37,638	\$69,021	12.6%

Source: (U.S. Census Bureau, 2021b)

Key: % = percent; \$ = dollars; AFB = Air Force Base; MSA = Metropolitan Statistical Area; ROI = region of influence

Housing

On-base housing is available for appropriated fund military personnel. Dyess Family Housing includes over 650 military family housing units. The housing units are located on base in seven neighborhoods for officer and enlisted personnel (Dyess Family Homes, 2022). There are also over 400 apartment, duplex, and townhome-style homes located off base in Abilene within the Quail Hollow Family Housing for active-duty members and civilians. The most recent IDP for Dyess AFB identified accompanied housing as having adequate capacity or capacity that meets current mission(s) requirements with growth capability (Dyess AFB, 2018a). As of the most recent Economic Impact Statement for Dyess AFB, 958 of the total appropriated fund military personnel were reported to live on base and 3,648 appropriated fund military personnel live off base (Dyess AFB, 2021a).

Unaccompanied housing at Dyess AFB consists of 12 buildings with 750 beds/rooms for unaccompanied Airmen in the ranks of E-1 to E-3 and E-4 with fewer than 3 years of service (Dyess AFB, 2021a). As described in Table 3.1-1, there is a new dormitory programmed for construction with renovation and demolition projects planned for several other dormitories at Dyess AFB.

The communities that support the off-base personnel include the Abilene MSA (which comprises Taylor, Jones, and Callahan Counties) and portions of Shackelford, Fisher, Nolan, Runnels, and Coleman Counties. Table 3.6-7 displays several housing characteristics in the Abilene MSA as of 2021.

The median price for a single-family home in the Abilene MSA was \$229,900 in January 2023 compared to \$215,000 in January 2022 representing a 6.93 percent year-over-year increase (TAMU, 2023). Subsequently, the price per square foot for single-family homes also increased from \$130.65 to \$135.73 year-over-year. During the same time, the months of inventory for single-family homes in the Abilene MSA rose from 1.4 months to 2.5 months (TAMU, 2023). Months of inventory refers to the number of months it would take for all homes currently on the market to sell if sales continue at the average pace over the last 12 months, assuming no new listings on the market. A market with months of inventory below six months is indicative of a seller's market (Kramer, 2018).

Table 3.6-7. Selected Housing Characteristics, Dyess AFB Region of Influence

Geographic Area	Total Housing Units	Occupied Units	Vacant Units	Owner-Occupied Units	Renter-Occupied Units	Homeowner Vacancy Rate	Median Value of Owner-Occupied Units	Median Gross Rent
Callahan County	6,505	5,247	1,258	4,274	973	0.9	\$111,900	\$790
Jones County	7,018	5,792	1,226	4,739	1,053	1.4	\$79,000	\$782
Taylor County	60,376	53,292	7,084	31,579	21,713	1.6	\$147,200	\$964
Abilene MSA (ROI)	73,899	64,331	9,568	40,592	23,739	1.5	\$134,000	\$949

Source: (U.S. Census Bureau, 2021c)

Key: \$ = dollars; AFB = Air Force Base; MSA = Metropolitan Statistical Area; ROI = region of influence

Education

There are no public schools located on Dyess AFB. Dependents of DAF personnel would be expected to attend one of the schools in the ROI. Table 3.6-8 lists the school districts within the three-county ROI, the total enrollment, full-time teachers employed, and the number of students per teacher for each district.

Table 3.6-8. Schools, Dyess AFB Region of Influence, 2020

County	School District	Number of Schools	Total Enrollment ^(a)	Total Teacher FTE ^(b)	Number of Students per Teacher ^(b, c)
Taylor	Texas College Preparatory Academies	36	13,078	882.4	14.8
Taylor	Abilene ISD	28	16,456	1,077.4	15.3
Taylor	Merkel ISD	4	1,106	100.2	11.0
Taylor	Trent ISD	1	157	16.0	9.8
Taylor	Jim Ned CISD	4	1,362	98.9	13.8
Taylor	Wylie ISD	7	4,773	312.9	15.3
Jones	Anson ISD	3	726	71.8	10.1
Jones	Hamlin Collegiate ISD	2	417	31.8	13.1
Jones	Hawley ISD	3	809	77.1	10.5
Jones	Leuders-Avoca ISD	2	105	17.1	6.2
Jones	Stamford ISD	3	640	57.1	11.2
Callahan	Baird ISD	3	279	33.2	8.4
Callahan	Clyde CISD	4	1,453	107.7	13.5
Callahan	Cross Plains ISD	2	359	35.9	10.0
Callahan	Eula ISD	3	426	42.5	10.0
Total ROI		105	42,146	2,962	14.2

Source: (TEA, 2020)

Key: AFB = Air Force Base; CISD = Consolidated Independent School District; FTE = full-time employee; ISD = Independent School District

Notes:

a. Total enrollment during the 2019-2020 school year.

b. As reported in the Snapshot 2020 District Detail for each school district.

c. Number of students per teacher is calculated by the total enrollment divided by the total full-time teachers in each district and may be subject to rounding errors.

Additional construction projects in the ROI to accommodate the growing student population include those associated with the Wylie ISD Bond 2019 Program (see Table 3.1-1). In

2021, the Abilene ISD constructed two new facilities including the new ATEMS/CTE Center and Dyess Elementary School, both of which were in service for the 2021–2022 school year. As of the 2021–2022 school year, the number of students (early education through 12th grade) enrolled in Callahan County was 2,571, 2,658 students in Jones County, and 38,575 in Taylor County, for a total of 43,508 students in the ROI (TEA, 2022).

There is a child development center located on Dyess AFB that provides childcare for infants and children up to four years old. The current capacity is 218 children, but the 7th Force Support Squadron and Dyess Child Development Center have started plans to renovate its classroom space and increase childcare capacity to 230 children (Dyess AFB, 2022a). The increase in capacity would shorten the wait time for families seeking on-base childcare.

Public Services

Public services include emergency, police, and medical services and are provided by the county and city governments in the ROI and other government agencies. Expenditures and revenues define the level of service that may be provided as well as specific service metrics. Changes in the population would affect the demand for these services as well as the ability to fund them. Table 3.6-9 shows the estimated number of public service professionals per 1,000 capita in the ROI.

Table 3.6-9. Estimated Public Service Professionals Per 1,000 Capita, Dyess AFB Region of Influence

Profession	Multiplier (per 1,000 Capita)
Primary Care Physicians	0.76
Career Firefighters	1.81
Volunteer Firefighters	6.06
Law Enforcement	1.58

Sources: (Texas Department of State Health Services, 2019; U.S. Department of Justice, 2020; Everts & Stein, 2020)

Note: The ratios are not intended to provide a threshold or recommendation of personnel per residents, but rather identify conditions on average throughout the region.

3.6.2.1.2 No Action at Whiteman AFB

Under the No Action Alternative, the B-21 would not be based at Whiteman AFB and there would be no associated personnel changes or construction, demolition, or renovation activities. Under this alternative, approximately 240 off-base residents are affected by aircraft noise levels between 65 dBA DNL to 74 dBA DNL in the ROI (see Table 3.3-8).

The most recent economic impact statement from Whiteman AFB reported annual base expenditures of over \$192 million (Whiteman AFB, 2021a). Construction, demolition, and renovation of facilities and infrastructure are a regular activity of an operational DAF base and contribute to the base's overall economic impact to the local region from the use of labor and supplies. Expenditures for facilities and infrastructure would continue to be required as facilities and infrastructure age and need to be replaced or upgraded.

Population

As of the most recent decennial census, the population in the two-county ROI is 96,993 people (U.S. Census Bureau, 2022b). Johnson County comprises the largest proportion of the population in the ROI and is projected to experience the largest increase in population out of the two counties that comprise the ROI (see Table 3.6-10). Table 3.6-11 presents the total number of military, dependents, civilian, and contractors supported by Whiteman AFB (also see Table 2.2-3). Personnel supporting current B-2 operations at Whiteman AFB are also presented in Table 3.6-11.

Table 3.6-10. Population Estimates and Projections for Whiteman AFB Region of Influence

Geographic Area	Census 2010	Census 2020	Projected 2025 ^(a)	Average Annual Change 2010–2020 ^(b)
Johnson County	52,595	54,013	59,771	0.3%
Pettis County	42,201	42,980	45,781	0.2%
Total ROI	94,796	96,993	105,552	0.2%
State of Missouri	5,988,927	6,154,913	6,580,868	0.3%

Sources: (U.S. Census Bureau, 2022b; Missouri Office of Administration Division of Budget & Planning, 2023)

Key: % = percent; AFB = Air Force Base; ROI = region of influence

Notes:

a. Projections from the Missouri Office of Administration Division of Budget and Planning.

b. Percentages are rounded to the nearest tenth.

Table 3.6-11. Personnel Estimates at Whiteman AFB

Personnel	Total Number of Individuals ^(a)	Number of B-2 Mission Individuals
Military	6,490	1,773
Civilian ^(b)	2,098	79
Contractor	234	234
Spouses ^(c)	4,746	1,122
Children ^(c)	5,840	1,381
Total	19,408	4,589

Key: AFB = Air Force Base

Notes:

a. Source: (Whiteman AFB, 2021a)

b. Includes appropriated and non-appropriated fund civilians and private businesses.

c. Numbers of spouses and children were calculated assuming 1.2 dependents per military, civilian, and contractor personnel and that 53.8 percent of personnel are married with the remaining dependents being children.

Economy, Employment, and Income

Whiteman AFB has a major influence on the regional economy. As of FY 2021, the total annual economic impact of Whiteman AFB within a 50-mile radius was over \$766 million. The *Whiteman Air Force Base Economic Impact Report for Fiscal Year 2021* calculated payroll, expenditures and indirect jobs associated with the base (see Table 3.6-12) (Whiteman AFB, 2021a). Construction, renovation, and maintenance projects such as those shown in Table 3.1-1 are typical of a large and operational AFB such as Whiteman which support the local economy through employment and income.

Table 3.6-12. Economic Impact of Whiteman AFB, Fiscal Year 2020

Category	Total
Annual Payrolls by Classification	
Appropriated Fund Military (Active-Duty Military and Reserve/Air and Army National Guard)	\$294,413,341
Appropriated Fund Civilians	\$60,425,205
Other Civilians	\$16,724,482
Total Annual Payroll	\$371,563,028
Annual Expenditures	
Total Annual Expenditures and Contracts	\$192,729,005
Value of Indirect Jobs	
Estimated Number of Indirect Jobs Created	2,441
Average Annual Pay for the Local Community	\$41,908
Total Annual Dollar Value of Jobs Created	\$102,297,428
Total Economic Impact of Whiteman AFB	\$666,589,461
Retiree Payroll	\$100,165,000
Total Economic Impact of Whiteman AFB Including Retiree Payroll	\$766,754,461

Source: (Whiteman AFB, 2021a)

Key: AFB = Air Force Base; \$ = dollars

In 2021, there were 53,461 full-time and part-time jobs throughout Johnson and Pettis Counties. This represents approximately 3,087 more jobs than in 2010, which is a less than 1 percent average annual increase in the number of full-time and part-time jobs in the ROI (Bureau of Economic Analysis, 2022b). As shown in Table 3.6-13, the largest nonfarm employment sectors in the two-county ROI were the government and government enterprises sector and manufacturing. There were 2,592 construction jobs in the two-county ROI in 2021, which accounted for 4.8 percent of total employment (Bureau of Economic Analysis, 2022b).

Table 3.6-13. Total Full-Time and Part-Time Employment (Number of Jobs) by Industry in Johnson County and Pettis County, 2020

Industry	Total Number of Jobs			Percent of Total Employment in the ROI
	Johnson County	Pettis County	Total ROI	
Forestry, Fishing, and Related Activities	(D)	(D)	NA	NA
Mining, Quarrying, and Oil and Gas Extraction	(D)	(D)	NA	NA
Utilities	91	68	159	0.3%
Construction	1,355	1,237	2,592	4.8%
Manufacturing	1,473	4,682	6,155	11.5%
Wholesale Trade	738	903	1,641	3.1%
Retail Trade	2,313	2,854	5,167	9.7%
Transportation and Warehousing	730	1,307	2,037	3.8%
Information	129	318	447	0.8%
Finance and Insurance	736	727	1,463	2.7%
Real Estate and Rental and Leasing	904	758	1,662	3.1%
Professional, Scientific, and Technical Services	631	823	1,454	2.7%
Management of Companies and Enterprises	30	159	189	0.4%
Administrative and Support and Waste Management and Remediation Services	619	1,280	1,899	3.6%

Table 3.6-13. Total Full-Time and Part-Time Employment (Number of Jobs) by Industry in Johnson County and Pettis County, 2020

Industry	Total Number of Jobs			Percent of Total Employment in the ROI
	Johnson County	Pettis County	Total ROI	
Educational Services	352	230	582	1.1%
Health Care and Social Assistance	1,581	2,139	3,720	7.0%
Arts, Entertainment, and Recreation	289	208	497	0.9%
Accommodation and Food Services	2,029	1,648	3,677	6.9%
Other Services	1,211	1,458	2,669	5.0%
Government and Government Enterprises	10,937	3,418	14,355	26.9%
Total Employment	27,807	25,654	53,461	100.00%

Source: (Bureau of Economic Analysis, 2022b)

Key: (D) = not provided by Bureau of Economic Analysis to avoid disclosure of confidential information but included in higher-level total; NA = not available but included in total; ROI = region of influence

Table 3.6-14 compares several economic characteristics in Johnson and Pettis Counties with the state of Missouri and the nation.

Table 3.6-14. Selected Economic Characteristics, Whiteman AFB Region of Influence

Geographic Area	Unemployment Rate	Per Capita Income	Median Household Income	Percent of Population With Incomes Below Poverty Level
Johnson County	4.6%	\$28,484	\$59,952	11.8%
Pettis County	4.3%	\$27,939	\$51,936	16.1%
Missouri	4.5%	\$33,770	\$61,043	12.8%
United States	5.5%	\$37,638	\$69,021	12.6%

Source: (U.S. Census Bureau, 2021b)

Key: % = percent; \$ = dollars; AFB = Air Force Base

Housing

On-base housing is available for appropriated fund military personnel. As of 2021, there were 1,241 military family housing units on base for officers and enlisted personnel and 752 Non-Commissioned Officers/airman quarters at Whiteman AFB (Whiteman AFB, 2021a). At the time of the most recent Economic Impact Report for Whiteman AFB, 1,437 appropriated fund military were reported to live on base and 5,053 appropriated fund military live off base (Whiteman AFB, 2021a). Surrounding communities that support a large number of the off-base personnel include Knob Noster, Warrensburg, and Sedalia. Table 3.6-15 displays several housing characteristics in the two-county ROI.

Table 3.6-15. Selected Housing Characteristics, Whiteman AFB Region of Influence

Geographic Area	Total Housing Units	Occupied Units	Vacant Units	Owner Occupied Units	Renter-Occupied Units	Homeowner-Vacancy Rate	Median Value of Owner-Occupied Units	Median Gross Rent
Johnson County	22,538	20,537	2,001	12,900	7,637	0.8	\$173,400	\$829

**Table 3.6-15. Selected Housing Characteristics, Whiteman AFB
Region of Influence**

Geographic Area	Total Housing Units	Occupied Units	Vacant Units	Owner Occupied Units	Renter-Occupied Units	Homeowner-Vacancy Rate	Median Value of Owner-Occupied Units	Median Gross Rent
Pettis County	18,529	16,608	1,921	11,545	5,063	2.0	\$133,900	\$774

Source: (U.S. Census Bureau, 2021c)

Key: \$ = dollars; AFB = Air Force Base

The housing market in the ROI, as throughout many regions, is currently characterized by high demand, low inventory, and rising prices. Recent interest rate hikes put some pressure on the rising prices but due to the limited housing supply, homes remain unaffordable for many, particularly first-time homebuyers.

There are eight cities/towns throughout Pettis County. The median listing home price throughout the county in January 2023 was \$179,500—an increase of 10.5 percent since January of the previous year (Realtor.com, 2023a). There are nine cities throughout Johnson County. The median listing home price throughout the county in January 2023 was \$245,000. Housing prices in January increased by 8.9 percent from the previous year (Realtor.com, 2023b)

Education

There is one elementary school, Whiteman AFB Elementary, located on Whiteman AFB. Whiteman AFB Elementary is part of the Knob Noster R-VIII school district. Dependents of DAF personnel at Whiteman AFB would be expected to attend one of the schools in the ROI. Table 3.6-16 lists the school districts within the two-county ROI, the total enrollment as of September 2022 and the number of students per teacher for each district. The state of Missouri is not an open-enrollment state; therefore, students are required to attend the public school in the city or town in which they reside.

Table 3.6-16. Schools, Whiteman AFB Region of Influence

County	School District	Number of Schools	Total Number of Students ^(a)	Number of Students per Teacher ^(a, b)
Johnson	Chilhowee R-IV (051153)	2	172	10:1
Johnson	Holden R-III (051152)	3	1,135	18:1
Johnson	Johnson Co. R-VII (051154)	2	551	15:1
Johnson	Kingsville R-I (051150)	2	257	13:1
Johnson	Knob Noster R-VIII (051155)	4	1,529	17:1
Johnson	Leeton R-X (051156)	3	286	13:1
Johnson	Warrensburg R-VI (051159)	6	3,351	16:1
Pettis	Green Ridge R-VIII	2	393	12:1
Pettis	La Monte R-IV	2	329	11:1
Pettis	Pettis Co. R-V	2	330	16:1
Pettis	Pettis Co. R-XII	1	116	8:1

Table 3.6-16. Schools, Whiteman AFB Region of Influence

County	School District	Number of Schools	Total Number of Students ^(a)	Number of Students per Teacher ^(a, b)
Pettis	Sedalia 200	9	4,988	19:1
Pettis	Smithton R-VI	2	550	15:1
Total ROI		40	13,987	16:1

Sources: (Missouri Department of Elementary and Secondary Education, 2021; 2022)

Notes:

a. Statistics as of September 2022.

b. Students in grades K-12 to regular classroom teachers.

Public Services

Public services include emergency, police, and medical services and are provided by the county and city governments in the ROI and other government agencies. Expenditures and revenues define the level of service that may be provided as well as specific service metrics. Changes in the population would affect the demand for these services as well as the ability to fund them. Table 3.6-17 shows the estimated number of public service professionals per 1,000 capita in the ROI.

Table 3.6-17. Estimated Public Service Professionals per 1,000 Capita, Whiteman AFB Region of Influence

Profession	Multiplier (per 1,000 Capita)
Primary Care Physicians	1.81
Career Firefighters	1.81
Volunteer Firefighters	6.06
Law Enforcement	1.1

Sources: (Washington University in St. Louis, 2022a; Washington University in St. Louis, 2022b; U.S. Department of Justice, 2020; Evarts & Stein, 2020)

Note: The ratios are not intended to provide a threshold or recommendation of personnel per residents, but rather identify conditions on average throughout the nation.

3.6.2.2 Dyess AFB Alternative

3.6.2.2.1 Personnel

Population

Table 3.6-18 presents the approximate end-state of personnel for the Dyess AFB Alternative. There would be 2,550 military personnel associated with the B-21 beddown, no civilian personnel or contractors and 3,060 dependents (spouses and children) for a total end-state of 5,301 military personnel, 690 civilian personnel, and 7,189 dependents at Dyess AFB under this alternative. Once the personnel and dependents associated with the B-1 aircraft depart, there would be a total change in the three-county ROI population of 1,318 people (see Table 3.6-18). The incoming and outgoing personnel would be anticipated to occur in phases over multiple years and would not be anticipated to occur all at once.

Table 3.6-18. Personnel Estimates in the Region of Influence Under the Dyess AFB Alternative

Personnel	Number of Individuals				
	No Action Alternative ^(a)	B-1 Departing	B-21 Incoming	End-State	Change
Military	4,606	1,855	2,550	5,301	695
Civilian	736	46	0	690	-46
Contractor	50	50	0	0	-50
Spouses	2,901	1,050	1,372	3,223	322
Children	3,570	1,292	1,688	3,966	397
Total	11,862	4,292	5,610	13,180	1,318

a. Source: (Dyess AFB, 2021a)

Economy, Employment, and Income

The overall increase in military employment would be expected to have a positive, long-term economic impact to the ROI. The direct employment of DAF personnel would result in indirect and induced employment. Estimates for the total change in the number of direct jobs associated with this alternative and the number of indirect jobs and income generated are shown in Table 3.6-19.

Table 3.6-19. Estimated Indirect Jobs and Value Associated With Active-Duty Military and Civilian Personnel in the Region of Influence Under the Dyess AFB Alternative

Type of Personnel	No Action Alternative	End-State	Change
Military	4,606	5,301	695
Civilian	736	690	-46
Total Military and Civilian Base Direct Jobs ^(a)	5,342	5,991	649
Total Indirect Jobs	1,652	1,834	182
Value of Indirect Jobs	\$70,929,804.6	\$78,733,190.7	\$7,803,386

Key: AFB = Air Force Base

Note:

a. Total base direct jobs include active military and civilian employed by the DAF and does not include contractors.

Housing

There would be an increase in housing demand in the Abilene MSA as a result of the additional personnel. Following the methodology described in Section 3.6.1.3 (Socioeconomics, Affected Environment, Analysis Methodology), it is estimated that at the end-state, there would be 1,110 personnel on base and 4,191 personnel off base, representing an increase in demand for 152 on-base housing units and 543 off-base housing units under this alternative compared to the No Action Alternative (Table 3.6-20).

Based on the number of housing units at Dyess AFB (see Section 3.6.2.1.1, (Socioeconomics, Environmental Consequences, No Action at Dyess AFB, Housing)), on-base housing units would be expected to support the end-state of 1,110 on-base military personnel under this alternative. Additionally, the Proposed Action would include the construction of a new 144-person dormitory (Table 2.3-4), which would help offset some of the demand for on-base units from incoming unaccompanied personnel.

Table 3.6-20. Estimated Housing Units Demanded in the Region of Influence Under the Dyess AFB Alternative

Type of Personnel and Unit	No Action Alternative ^(c)	End-State ^(c)	Change
Military	4,606	5,301	695
Personnel On Base ^(a)	958	1,110	152
Personnel Off Base ^(b)	3,648	4,191	543

Key: AFB = Air Force Base

Notes:

- a. Assumes 21.8 percent of active-duty military personnel live on base.
- b. Assumes 78.2 percent of active-duty military personnel live off base.
- c. Assumes that each military member would require one housing unit.

Under this alternative, up to an additional 543 housing units off base would be required to support the incoming military personnel. The increased cost of housing and the availability of jobs would be expected to increase the average number of people per household. Housing costs could continue to rise as supply tries to catch up with demand before leveling off as new housing is constructed. As indicated in Table 3.6-7, there are approximately 9,568 vacant housing units throughout the three-county ROI that could support the incoming military personnel (U.S. Census Bureau, 2021c). Any lack of affordable homes in the interim may require homebuyers to expand their search to include areas outside their desired location and price range.

Any direct, indirect, and induced employment (number of jobs) associated with construction activities would likely require an in-migration of workers. Workers would be anticipated to require lodging and housing during the term of their employment which would last for the duration of the construction activity. It would be anticipated that once the activity is complete, workers would leave the ROI. Therefore, the demand for housing would be even greater during construction activity in the short term.

Education

The estimated total number of school-aged dependents (ranging in ages of 6 to 18 years) associated with the Dyess AFB Alternative at the end-state would be 2,257 children. This represents an additional 226 school-aged students to school districts within the ROI compared to the No Action Alternative. Table 3.6-21 shows the estimated number of incoming students by age range as a result of the beddown at Dyess AFB. Approximately 16 teachers (K–12 grades) could potentially be required to maintain the average student to teacher ratio in the ROI of 14.2:1. However, school-aged students would be of varying ages and would attend one of the many schools throughout the ROI. Additional students may result in larger class sizes and additional pressure on school resources and expenditures. The increase in the number of students would also contribute to revenue generated.

Under this alternative, there would be 145 more children ages 0 to 5, some of which may require childcare services. On-base childcare is limited and may result in longer wait times for care or require parents to seek childcare services off base or outside of their desired area. As indicated in Table 2.3-4, an 8,000-square-foot addition to the Child

Development Center would be constructed and would likely result in increased capacity for more children and could potentially offset some of the additional demand from incoming personnel for childcare services.

Table 3.6-21. Total School Age Children Enrolling in the Region of Influence Under the Dyess AFB Alternative

Dependent Age Range	No Action Alternative	End-State	Change
0 to 5 years	1,314	1,459	145
6 to 18 years (i.e., school age)	2,031	2,257	226
19 to 22 years	225	250	25
Total Children Dependents	3,570	3,966	396

Public Services

The total end-state of 13,180 personnel and dependents under this alternative would be an increase of 1,318 personnel and dependents compared to the No Action Alternative. The additional population would result in increased demand for public services such as police, fire, and medical services. Public service personnel would also be needed to support indirect workers and their families during construction. Public service personnel would compete with all others for housing in the ROI.

Table 3.6-22 shows the estimated number of public service professionals that may be associated with the additional population. The number of public service professionals per 1,000 people are based on regional and national averages. The level of service, such as response times, could potentially be impacted in the short run if there is a large influx of personnel in a short period of time, but would adjust as more public service personnel jobs become available and positions are filled.

Table 3.6-22. Estimated Number of Public Service Professionals in the Region of Influence Associated With Personnel Under the Dyess AFB Alternative

Profession	Multiplier (per 1,000 Capita)	No Action Alternative	End-State	Change
Primary Care Physicians	0.76	9	10	1
Career Firefighters	1.81	21	24	3
Volunteer Firefighters	6.06	72	80	8
Law Enforcement	1.58	19	21	2

3.6.2.2.2 Airfield Operations

Under this alternative approximately 541 people off base reside within noise levels of 65 dBA DNL or greater. This represents a decrease of 953 people residing within the 65 dBA DNL and greater noise contours compared to the No Action Alternative. This alternative would result in a benefit to those that would no longer reside with the 65 dBA DNL or greater noise levels. Potential impacts from noise levels of 65 dBA DNL or greater are discussed in Section 3.6.1.3 (Socioeconomics, Affected Environment, Analysis Methodology). In the event that a citizen would incur adverse noise impacts due to DAF

activity, the individual would be able to contact Dyess AFB Public Affairs for established procedures to report any noise claim.

3.6.2.2.3 Facilities, Infrastructure, and the WGF

New construction, demolition, and modifications to facilities and infrastructure (shown in Table 2.3-4), including construction of the WGF, would result in direct, indirect, and induced economic impacts in the ROI. Cost details regarding the facilities and infrastructure are not available at the time of this EIS. However, it would be anticipated that construction, demolition, and renovations for base facilities and infrastructure would result in near-term economic benefits to the ROI driven by an increase in construction spending. Construction-related impacts would last for the duration of the activities.

3.6.2.2.4 Snapshot

The snapshot analysis presents a maximum case scenario in which it would be assumed that a portion of the personnel and dependents associated with the B-1 aircraft are still present in the community and have yet to migrate out of the area. Therefore, the number of people would be greater under this scenario than under the Dyess AFB Alternative resulting in greater potential impacts that would only be temporary until the transition is final.

There would be an estimated 13,609 people associated with Dyess AFB (including military, civilian, contractors, and dependents) under this scenario compared to 11,862 people under the No Action Alternative. During the snapshot scenario, there would be approximately 299 more children of school age (6 to 18 years old) present or entering the local area schools compared to the No Action Alternative. The crowding of students would likely increase the student to teacher ratio and put additional pressure on school resources but would be temporary during the transition.

The direct employment of 5,487 military and 695 civilian personnel jobs would create indirect and induced employment of 1,890 jobs for a total value of over \$81.1 million. Compared to the No Action Alternative, this snapshot analysis would result in an additional 881 military personnel, less 41 civilian personnel jobs, and 238 additional indirect jobs. However, this impact would also be temporary during the transition period.

Under the snapshot scenario, with a total of 5,487 military personnel, approximately 1,150 would require on-base housing and 4,337 would require off-base housing, which is 192 more on-base units and 689 more off-base units compared to under the No Action Alternative. Construction workers and secondary workers may also require housing and compete for affordable housing.

There would be demand for additional public services throughout the Abilene MSA, which may require additional public service professionals. The number of additional personnel to support the incoming personnel would be negligible and any new employment would be anticipated to be filled from the local workforce.

The number of people estimated to reside within the 65 dBA DNL or greater noise contours associated with airfield operations under the snapshot scenario is less than

under the No Action Alternative. Under the Dyess AFB snapshot, 923 people are estimated to reside within these noise levels compared to 1,494 people under the No Action Alternative.

3.6.2.2.5 Reasonably Foreseeable Future Actions and Environmental Trends

Personnel changes and facility construction and modifications would generate direct, indirect, and induced employment, additional wages and income, and economic growth in the ROI. Implementation of the B-21 beddown separately or in conjunction with relevant reasonably foreseeable future projects within the ROI and environmental trends (Table 3.1-2) would increase the demand for employment, as well as for housing, schools, and other services within the region. Construction activities would provide temporary benefits from the use of local labor and supplies for the duration of the activity. However, multiple construction projects that occur simultaneously and sequentially would provide long-term benefits. Incremental effects of the B-21 beddown, in combination with potential impacts associated with other Dyess AFB projects, would be expected to create employment and population growth. This growth has the potential to result in additional impacts to socioeconomic resources in the ROI. On-base projects would increase demand for socioeconomic resources, while off-base projects would have the potential to address some of the increased demand, especially for labor and housing.

3.6.2.2.6 Proposed Resource-Specific Mitigations and Management Actions to Reduce the Potential for Environmental Impacts

The DAF would work with the local community to assist in any way practicable with the planning for increased population and increased requirements for support to minimize additional pressure on socioeconomic resources (i.e., affordable housing, educational resources, and public services).

3.6.2.3 Whiteman AFB Alternative (Preferred Alternative)

3.6.2.3.1 Personnel

Population

Table 3.6-23 presents the approximate end-state of personnel for the Whiteman AFB Alternative. There would be 2,550 military personnel associated with the B-21 beddown, no civilian personnel or contractors and 3,060 dependents for a total end-state of 7,267 military personnel, 2,019 civilian personnel, and 11,143 dependents at Whiteman AFB under this alternative. Once the personnel and dependents associated with the B-2 aircraft depart, there would be a total change in the two-county ROI population of 1,021 people (see Table 3.6-23). The incoming and outgoing personnel would be anticipated to occur in phases over multiple years and would not be anticipated to occur all at once.

Table 3.6-23. Personnel Estimates in the Region of Influence Under the Whiteman AFB Alternative

Personnel	Number of Individuals				
	No Action Alternative (a)	B-2 Departing	B-21 Incoming	End-State	Change
Military	6,490	1,773	2,550	7,267	777
Civilian	2,098	79	0	2,019	-79
Contractor	234	234	0	0	-234
Spouses	4,746	1,122	1,372	4,996	250
Children	5,840	1,381	1,688	6,147	307
Total	19,408	4,589	5,610	20,429	1,021

a. Source: (Whiteman AFB, 2021a)

Economy, Employment, and Income

The overall increase in military employment would be expected to have a positive, long-term economic impact to the ROI. The direct employment of DAF personnel would result in indirect and induced employment. Estimates for the total change in the number of direct jobs associated with this alternative and the number of indirect jobs and income generated are shown in Table 3.6-24.

Table 3.6-24. Estimated Indirect Jobs and Value Associated With Active-Duty Military and Civilian Personnel in the Region of Influence Under the Whiteman AFB Alternative

Type of Personnel	No Action Alternative	End-State	Change
Military	6,490	7,267	777
Civilian	2,098	2,019	-79
Total Military and Civilian Direct Jobs (a)	8,588	9,286	698
Total Indirect Jobs	2,784	2,976	191
Value of Indirect Jobs	\$116,681,930	\$124,701,445	\$8,019,515

Key: - = minus; AFB = Air Force Base

Note:

a. Total base direct jobs include active military and civilian employed by the Department of the Air Force and does not include contractors.

Housing

There would be an increase in housing demand in Johnson and Pettis Counties as a result of the additional personnel. Following the methodology described in Section 3.6.1.3 (Socioeconomics, Affected Environment, Analysis Methodology), it is estimated that at the end-state, there would be 1,690 personnel on base and 5,577 personnel off base, representing an increase in demand for 253 on-base housing units and 524 off-base housing units under this alternative compared to the No Action Alternative.

Based on the number of housing units at Whiteman AFB (see Section 3.6.2.1.2, Socioeconomics, Environmental Consequences, No Action at Whiteman AFB,

Housing), on-base housing units would be expected to support the end-state of 1,690 on-base military personnel under this alternative.

Table 3.6-25. Estimated Housing Units Demanded in the Region of Influence Under the Whiteman AFB Alternative

Type of Personnel and Unit	No Action Alternative	End-State	Change
Military ^(a)	6,490	7,267	777
Personnel On Base ^(b)	1,437	1,690	253
Personnel Off Base ^(c)	5,053	5,577	524

Notes:

a. Assumes that each military member would require one housing unit.

b. Assumes 32.6 percent of active-duty military personnel live on base.

c. Assumes 67.4 percent of active-duty military personnel live off base.

Under this alternative, an additional 524 housing units off base would be required to support the incoming military personnel (Table 3.6-25). The increased cost of housing and the availability of jobs would be expected to increase the average number of people per household. Housing costs could continue to rise as supply tries to catch up with demand before leveling off as new housing is constructed. As indicated in Table 3.6-15, there are approximately 3,922 vacant housing units throughout the two-county ROI (U.S. Census Bureau, 2021c). Any lack of affordable homes in the interim may require homebuyers to expand their search to include areas outside their desired location and price range.

Any direct, indirect, and induced employment (number of jobs) associated with construction activities would likely require an in-migration of workers. Workers would be anticipated to require lodging and housing during the term of their employment which would last for the duration of the construction activity. It would be anticipated that once the activity is complete, workers would leave the ROI. Therefore, the demand for housing would be even greater during construction activity in the short term.

Education

The estimated total number of school-aged dependents (ranging in ages of 6 to 18 years) associated with the Whiteman AFB Alternative at the end-state would be 3,498 children. This represents an additional 175 school-aged students to school districts within the ROI compared to the No Action Alternative. Table 3.6-26 shows the estimated number of incoming students by age range as a result of the beddown at Whiteman AFB. Approximately 11 teachers (K–12 grades) could potentially be required to maintain the average student to teacher ratio in the ROI of 16:1. However, school-aged students would be of varying ages and would attend one of the many schools throughout the ROI. Additional students may result in larger class sizes and additional pressure on school resources and expenditures. The increase in the number of students would also contribute to revenue generated. Under this alternative, there would be 113 more children ages 0 to 5, some of which may require childcare services. On-base childcare is limited and may result in longer wait times for care or require parents to seek childcare services off base or outside of their desired area.

Table 3.6-26. Total School Age Children Enrolling in the Region of Influence Under the Whiteman AFB Alternative

Dependent Age Range	No Action Alternative	End-State	Change
0 to 5 years	2,149	2,262	113
6 to 18 years (i.e., school age)	3,323	3,498	175
19 to 22 years	368	387	19
Total Children Dependents	5,840	6,147	307

Public Services

The total end-state of 20,429 personnel and dependents under this alternative would be an increase of 1,021 personnel and dependents compared to the No Action Alternative. The additional population would result in increased demand for public services such as police, fire, and medical services. Public service personnel would also be needed to support indirect workers and their families and during construction. Public service personnel would compete with all others for housing in the ROI.

Table 3.6-27 shows the estimated number of public service professionals that may be associated with the additional population. The number of public service professionals per 1,000 people are based on regional and national averages. The level of service, such as response times, could potentially be impacted in the short run if there is a large influx of personnel in a short period of time but would adjust as more public service personnel jobs become available and positions are filled.

Table 3.6-27. Estimated Number of Public Service Professionals in the Region of Influence Associated With the Personnel Under the Whiteman AFB Alternative

Profession	Multiplier (per 1,000 Capita)	No Action Alternative	End-State	Change
Primary Care Physicians	1.81	35	37	2
Career Firefighters	1.81	35	37	2
Volunteer Firefighters	6.06	118	124	6
Law Enforcement	1.1	21	22	1

3.6.2.3.2 Airfield Operations

Under this alternative, approximately 329 people off base reside within noise levels of 65 dBA DNL to 74 dBA DNL. This represents an increase of 89 people compared to the No Action Alternative in which an estimated 240 people reside within the 65 dBA DNL and greater noise contours. Potential impacts from noise levels of 65 dBA DNL or greater are discussed in Section 3.6.1.3 (Socioeconomics, Affected Environment, Analysis Methodology). In the event that a citizen would incur adverse noise impacts due to DAF activity, the individual would be able to contact Whiteman AFB Public Affairs for established procedures to report any noise claim.

No significant direct impacts to land use have been identified (see Section 3.5.2.3.2, Land Use, Environmental Consequences, Whiteman AFB Alternative, Airfield Operations) under this alternative that would result in impacts to socioeconomic factors such as employment or income generating activities.

3.6.2.3.3 Facilities, Infrastructure, and the WGF

New construction, demolition, and modifications to facilities and infrastructure (shown in Table 2.4-4), including construction of the WGF, would result in direct, indirect, and induced economic impacts in the ROI. Cost details regarding the facilities and infrastructure are not available at the time of this EIS. However, it would be anticipated that construction, demolition, and renovations for base facilities and infrastructure would result in near-term economic benefits to the ROI driven by an increase in construction spending. Construction-related impacts would last for the duration of the activities.

3.6.2.3.4 Snapshot

The snapshot analysis presents a maximum case scenario in which it would be assumed that a portion of the personnel and dependents associated with the B-2 aircraft are still present in the community and have yet to migrate out the area. Therefore, the number of people would be greater under this scenario than under the Whiteman AFB Alternative resulting in greater potential impacts but that would only be temporary until the transition is final.

There would be an estimated 20,888 people associated with Whiteman AFB (including military, civilian, contractors, and dependents) under this scenario compared to 19,408 people under the No Action Alternative. During the snapshot scenario, there would be approximately 253 more children of school age (6 to 18 years old) present or entering the local area schools compared to the No Action Alternative. The crowding of students would likely increase the student to teacher ratio and put additional pressure on school resources but would be temporary during the transition.

The direct employment of 7,444 military and 2,027 civilian personnel jobs would create indirect and induced employment of 3,027 jobs for a total value of over \$126.8 million. Compared to the No Action Alternative, this snapshot analysis would result in an additional 954 military personnel, less 71 civilian personnel jobs, and 243 additional indirect jobs. However, this impact would also be temporary during the transition period.

Under the snapshot scenario, with a total of 7,444 military personnel, approximately 1,748 would require on-base housing and 5,696 would require off-base housing, which is 311 more on-base units and 643 more off-base units compared to the No Action Alternative. Construction workers and secondary workers may also require housing and compete for affordable housing.

There would be demand for additional public services throughout the two-county ROI, which may require additional public service professionals. The number of additional

personnel to support the incoming personnel would be negligible and any new employment would be anticipated to be filled from the local workforce.

The number of people estimated to reside within the 65 dBA DNL or greater noise contours associated with airfield operations under the snapshot scenario is more than under the No Action Alternative. Under the Whiteman AFB snapshot, 361 people are estimated to reside within these noise levels compared to 240 people under the No Action Alternative.

3.6.2.3.5 Reasonably Foreseeable Future Actions and Environmental Trends

Personnel changes and facility construction and modifications would generate direct, indirect, and induced employment, additional wages and income, and economic growth in the ROI. Implementation of the B-21 beddown separately or in conjunction with relevant past, present, and reasonably foreseeable future projects within the ROI would increase the demand for employment, as well as for housing, schools, and other services within the region. Construction projects such as the Whiteman AFB Airfield Surface Drainage Corrections and Whiteman AFB Arnold Gate Relocation projects would provide temporary benefits from the use of local labor and supplies for the duration of the activity. However, multiple construction projects that occur simultaneously and sequentially would provide long-term benefits. Incremental effects of the B-21 beddown, in combination with potential impacts associated with other Whiteman AFB projects, would be expected to create employment and population growth. This growth has the potential to result in additional impacts to socioeconomic resources in the ROI.

3.6.2.3.6 Proposed Resource-Specific Mitigations and Management Actions to Reduce the Potential for Environmental Impacts

The DAF would work with the local community to assist in any way practicable with the planning for the increased population and increased requirements for support to minimize additional pressure on socioeconomic resources (i.e., affordable housing, educational resources, and public services).

3.7 ENVIRONMENTAL JUSTICE

3.7.1 Environmental Justice, Affected Environment

3.7.1.1 Description of Resource

Analysis of environmental justice and other sensitive receptors is conducted pursuant to EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, and EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*. Environmental justice addresses impacts to minority and low-income populations. If there is a potential for the Proposed Action to result in

adverse impacts to resource areas that may affect human populations, analysis is conducted to determine whether environmental justice Communities of Comparison (COCs) would be disproportionately impacted. This analysis focuses on increased aircraft noise resulting from the Proposed Action as the primary impact to these populations. Noise from construction activities is not applicable because all construction would occur within installation boundaries and noise would be intermittent and temporary. Per DAF guidelines for environmental justice analysis, Census data (i.e., percentages of populations identifying themselves as minority, low income, etc.) was used to determine potential impacts to these populations. The guidelines also address youth (under 18) and elderly (65 and older) as additional sensitive populations.

This analysis is completed to determine if implementation of the Proposed Action would result in disproportionate noise impacts to environmental justice populations (i.e., DNL of 65 dBA or greater).

3.7.1.2 Region of Influence

Environmental justice analysis overlays the 65 dBA DNL contour on the census data polygons. The smallest census data segment that has the information necessary for analysis of potential impacts to environmental justice populations is used to determine potential impacts. The smallest group of census data which contain the needed information for this analysis is the census “block group.” Each block group that is partially or wholly encompassed by the 65 dBA DNL contour is defined as an ROI. There could be few or many ROIs for a specific environmental justice analysis, depending on the extent of the noise contour and the size of the block groups. The next higher level of census data is the census tract. Each census tract contains a number of block groups (ROIs).

3.7.1.2.1 Dyess AFB

For Dyess AFB, there are six census tracts containing eight block groups, which are partially or wholly exposed to DNL of 65 dBA or greater under baseline conditions (Figure 3.7-1). Table 3.7-1 provides baseline demographic conditions in Taylor County, where Dyess AFB is located. Also shown in Table 3.7-1 is the existing proportion of environmental justice populations in the six census tracts located in the ROI and the eight block groups at Dyess AFB (Figure 3.7-1). The six census tracts compose the COC for the environmental justice analysis. As identified in Table 3.7-1, the COC has a lower proportion of low-income populations as well as a lower proportion of minority populations than Taylor County, the state of Texas, or the nation.

3.7.1.2.2 Whiteman AFB

For Whiteman AFB, there are four census tracts containing six block groups, which are partially or wholly exposed to DNL of 65 dBA or greater under baseline conditions (Figure 3.7-2). Table 3.7-2 provides baseline demographic conditions in Johnson County, where Whiteman AFB is located. Also shown in Table 3.7-2 is the existing proportion of environmental justice populations in the four census tracts located in the

ROI and the six block groups at Whiteman AFB (Figure 3.7-2). The four census tracts are the COC for the environmental justice analysis. As identified in Table 3.7-2, the COC has a higher proportion of minority populations than Johnson County and less than the state of Missouri or the nation. The COC has a lower proportion of low-income populations than Johnson County, the state of Missouri, or the nation.

3.7.1.2.3 Airspace and Range Utilization

For military aircraft flying out of Dyess AFB, the Lancer MOA, Lancer Bridge MOA, Bronco MOA (3 and 4), the Pecos MOA, and all associated ATCAAs, including the Willie-Roscoe ATCAA would be utilized. Noise levels in the airspace proposed for use for Dyess AFB would decrease or remain the same under the Dyess AFB Alternative and the Dyess Snapshot Scenario (Section 3.3.2.2, Noise, Environmental Consequences, Dyess AFB Alternative).

For military aircraft flying out of Whiteman AFB, the DAF would utilize the Smoky Hill Range, Canon, Lindbergh, Truman and Ada East/West MOAs, including all associated ATCAAs, as well as the Ozark ATCAA. As described in Section 3.3.2.3 (Noise, Environmental Consequences, Whiteman AFB Alternative), noise levels in the airspace used for Whiteman AFB would not increase under the Whiteman AFB and the Whiteman Snapshot Alternative.

Since noise levels will remain unchanged or decrease under the training airspace associated with the action alternatives and the general population would have no adverse effects related to noise, there is no potential for disproportionate adverse impacts to minority or low-income populations under the airspace proposed for use. As there is no potential for effects, the areas under the proposed airspace are not discussed in further detail in this section.

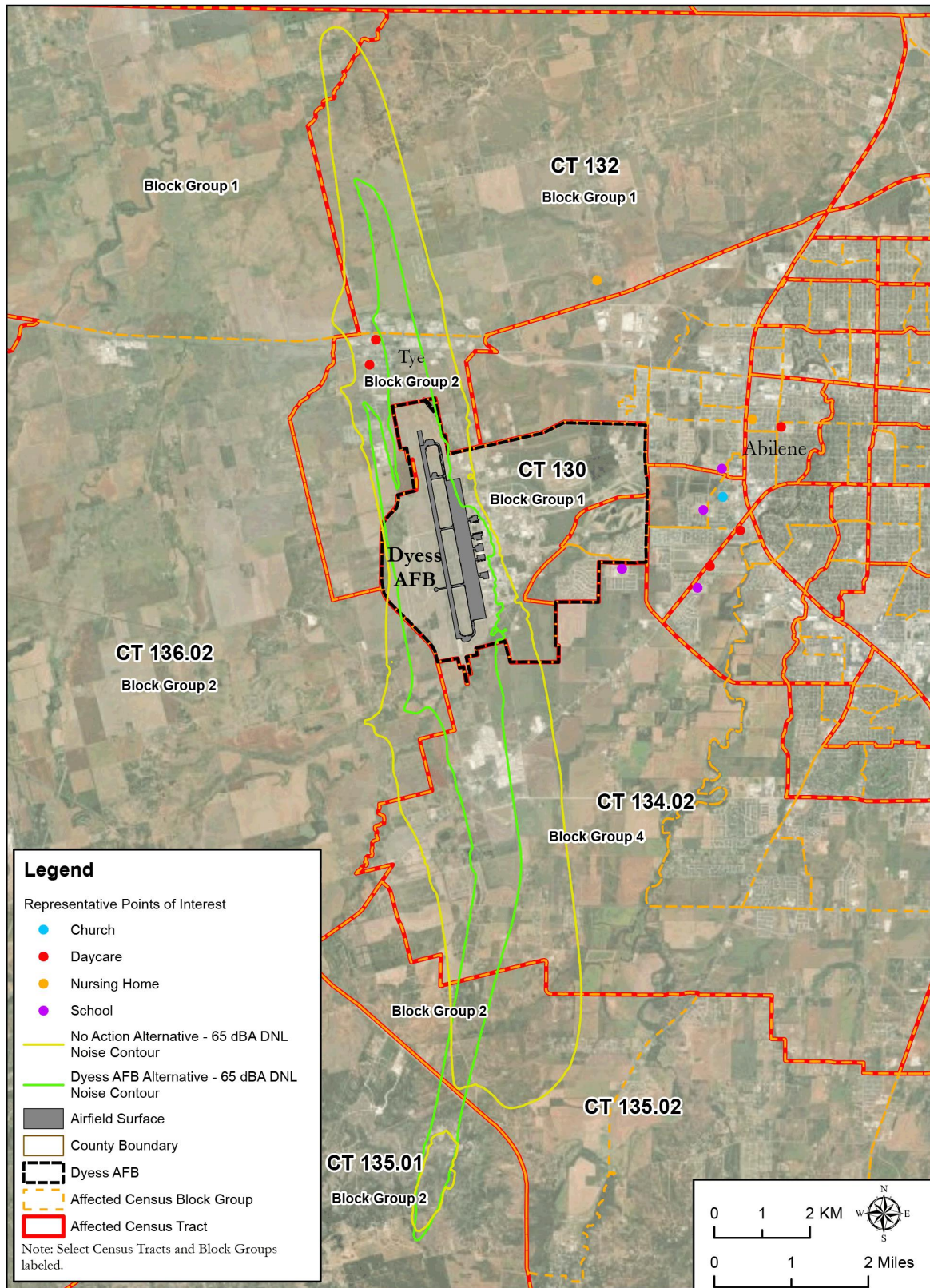


Figure 3.7-1. Dyess AFB Census Tracts and Block Groups Exposed to DNL of 65 dBA or Greater Under Baseline and Proposed Action

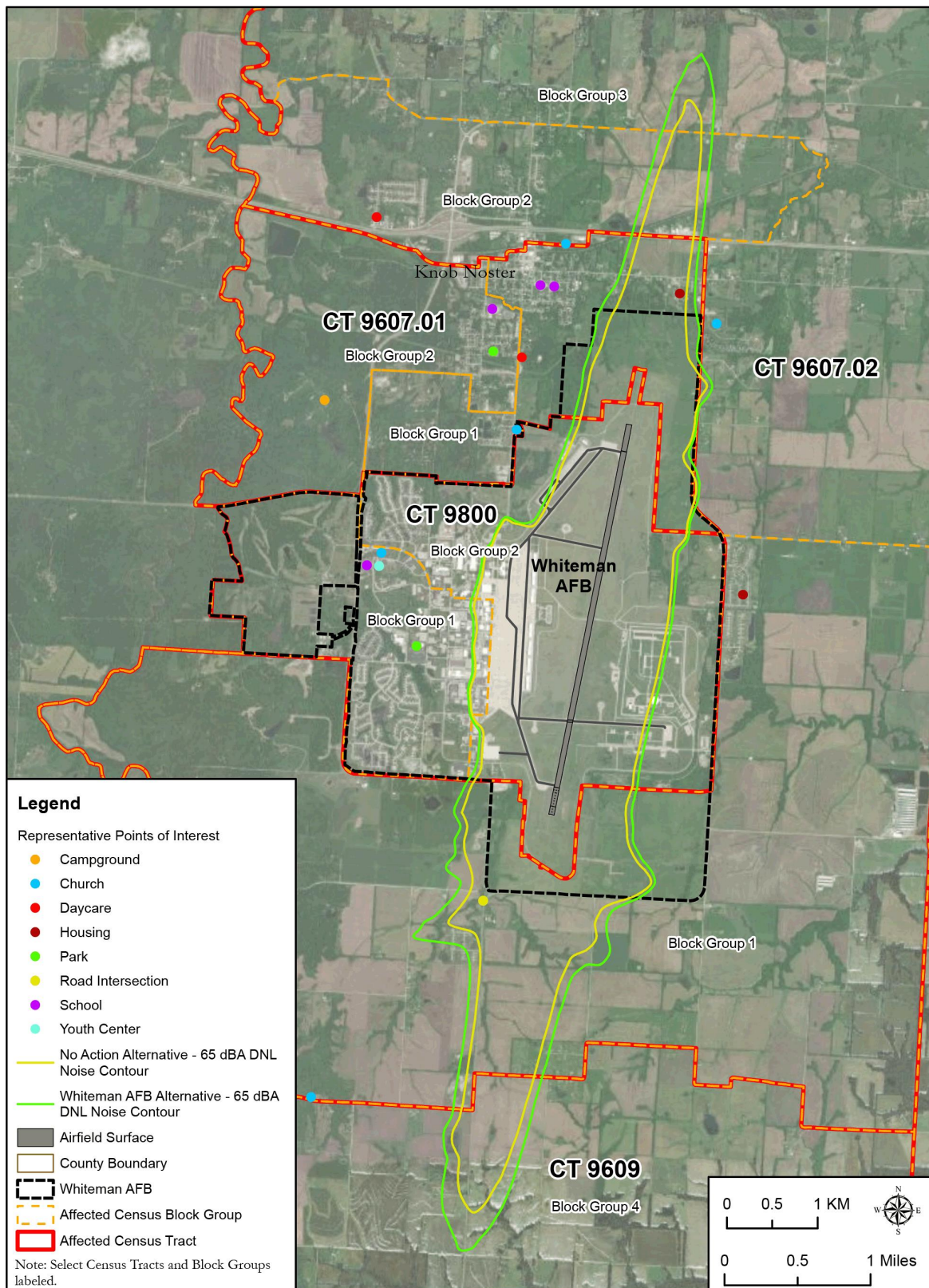


Figure 3.7-2. Whiteman AFB Census Tracts and Block Groups Exposed to DNL of 65 dBA or Greater Under Baseline and Proposed Action

Table 3.7-1. Environmental Justice Communities and Sensitive Populations – Baseline Conditions (Dyess AFB)

Geographic Unit	Total Population	Population for Whom Poverty Is Determined	Minority		Low Income		Youth		Elderly	
			Number	Percent	Number	Percent	Number	Percent	Number	Percent
Block Groups (ROI)										
BG 1, CT 130	1,214	206	638	52.55	24	1.94	84	6.92	5	0.41
BG 1, CT 132	727	727	199	27.37	89	12.24	140	19.26	144	19.81
BG 2, CT 132	1,149	1,136	429	37.34	200	17.61	264	22.98	206	17.93
BG 2, CT 135.01	1,598	1,598	315	19.71	31	1.94	446	27.91	454	28.41
BG 2, CT 135.02	513	513	41	7.99	63	12.28	200	38.98	75	14.62
BG 1, CT 136.02	1,021	1,021	92	9.01	61	5.97	208	20.37	262	25.66
BG 2, CT 136.02	1,400	1,400	110	7.86	89	6.36	335	23.93	245	17.50
BG 4, CT 134.02	2,237	2,209	653	29.19	0	0	735	32.86	128	5.72
Census Tracts										
CT 130	1,214	206	638	52.55	4	1.94	84	6.92	5	0.41
CT 132	1,876	1,863	628	33.48	289	15.51	404	21.53	350	18.65
CT 134.02	9,432	9,296	2,382	25.25	414	4.45	3,015	31.96	1,150	12.19
CT 135.01	2,639	2,639	423	16.03	98	3.71	599	22.69	715	27.09
CT 135.02	5,634	5,619	795	14.11	269	4.78	1,388	24.63	996	17.68
CT 136.02	2,421	2,421	202	8.34	150	6.19	543	22.43	507	20.94
COC	23,216	22,044	5,068	21.83	1,224	5.55	N/R	N/R	N/R	N/R
Taylor County	141,739	135,713	53,887	38.02	19,031	14.02	35,433	25.0%	20,374	14.4%
State of Texas	28,862,581	28,260,264	17,117,549	59.31	3,965,117	14.03	7,446,176	25.8%	3,620,798	12.5%
United States	329,725,481	321,897,703	133,715,111	40.55	40,661,636	12.63	74,234,075	22.5%	52,888,621	16.0%

Sources: (U.S. Census Bureau, 2021d; U.S. Census Bureau, 2021e)

Key: AFB = Air Force Base; BG = Block Group; COC = Community of Comparison; CT = Census Tract; ROI = region of influence, N/R = Not Relevant-COCs are established for environmental justice communities only

Note:

Shading indicates a block group where the ROI percentages for minority or low-income populations are higher than the COC.

Table 3.7-2. Environmental Justice Communities and Sensitive Populations – Baseline Conditions (Whiteman AFB)

Geographic Unit	Total Population	Population for Whom Poverty Is Determined	Minority		Low Income		Youth		Elderly	
			Number	Percent	Number	Percent	Number	Percent	Number	Percent
Block Groups (ROI)										
BG 1, CT 9607.01	1,076	1,061	118	10.96	82	7.72	263	24.44	44	4.08
BG 1, CT 9607.02	1,270	1,245	321	25.27	169	13.57	321	25.27	45	3.54
BG 2, CT 9607.02	965	965	234	24.24	47	4.87	273	28.29	105	10.88
BG 2, CT 9800	691	691	161	23.29	104	15.05	215	31.11	0	0
BG 3, CT 9607.02	1,026	1,026	432	42.10	55	5.36	275	26.80	77	7.50
BG 4, CT 9609	833	833	26	3.12	83	9.96	189	22.68	154	18.48
Census Tracts										
CT 9607.01	2,004	1,989	456	22.75	269	13.52	419	20.90	186	9.28
CT 9607.02	3,261	3,236	987	30.26	271	8.37	869	26.64	227	6.96
CT 9609	4,872	4,818	203	4.16	580	12.03	1,315	26.99	751	15.41
CT 9800	4,227	2,919	1,245	29.45	276	9.45	1,006	23.79	0	0
COC	14,364	12,962	2,891	20.13	1396	10.77	N/R	N/R	N/R	N/R
Johnson County	53,889	49,367	8217	15.25	5,833	11.82	11,651	21.6	6,742	12.5
Missouri	6,141,534	5,967,909	1,340,771	21.83	762,023	12.77	1,392,375	22.7	1,033,836	16.8

Sources: (U.S. Census Bureau, 2021d; U.S. Census Bureau, 2021e)

Key: AFB = Air Force Base; BG = Block Group; COC = Community of Comparison; CT = Census Tract; ROI = region of influence; N/R = Not Relevant-COCs are established for environmental justice communities only

Note:

Shading indicates a block group tract where the ROI percentages for minority or low-income populations are higher than the COC.

Tribes associated with airspace are identified in Section 3.9 (Cultural Resources). As described above noise levels in the training airspace used for Dyess and Whiteman AFB would remain the same or decrease and there would be no adverse effects related to noise; therefore, there is no potential for disproportionate adverse impacts to Tribal lands under the airspace proposed for use and is not discussed further in this section.

3.7.1.3 Analysis Methodology

To identify disproportionate impacts from baseline or Proposed Action noise levels, a COC is needed. The COC is defined by summing the population in all the census tracts that contain any part of an ROI exposed to the 65 dBA DNL contour. The percentages of minority and low-income residents are calculated for each ROI (i.e., block groups). In accordance with the DAF guidelines for environmental justice analysis, if no adverse impacts are identified within the ROI, then there would be no potential for disproportionate impacts on environmental justice or sensitive populations (DAF, 2020c). If there is a potential for disproportionate impacts, the ROI and COC percentages are then compared. If the percentage of minorities or low-income residents in an ROI is equal to or greater than the percentage of minorities or low-income residents in the COC, it is likely that a disproportionate impact to the environmental justice population could occur (DAF, 2020c).

3.7.2 Environmental Justice, Environmental Consequences

3.7.2.1 No Action Alternative Consequences

3.7.2.1.1 No Action at Dyess AFB

Under the No Action Alternative at Dyess AFB, aircraft operations and the resulting noise levels would continue at existing levels. Table 3.7-3 and Table 3.7-4 identify the number of environmental justice and sensitive populations currently impacted under the No Action Alternative. None of the projects identified in Table 3.1-1 would increase the aircraft related noise exposure of the environmental justice or sensitive populations in the Dyess AFB ROI.

Table 3.7-3. Number of Residents Exposed to Aircraft Noise in the Region of Influence Under Existing Conditions (No Action – Dyess AFB)

Average Noise Levels	Total Affected Off-Base Population	Minority	Low Income	Youth	Elderly
65–69 dBA	673	192	62	193	88
70–74 dBA	465	138	39	135	56
75–79 dBA	230	73	13	67	23
80–84 dBA	93	30	6	27	10
85+ dBA	33	10	1	10	3
Total >65 dBA DNL ^(a)	1,494	443	121	432	180

Sources: (U.S. Census Bureau, 2021d; U.S. Census Bureau, 2021e) Block group data used.

Key: > = greater than; + = plus; AFB = Air Force Base; dBA = A-weighted decibels; DNL = day-night average sound level

Note:

a. During data analysis, numbers were rounded and then totaled.

Table 3.7-4. Number of Residents Exposed to Aircraft Noise in the Region of Influence Under Existing Conditions by Block Group (No Action – Dyess AFB)

County	Geographic Unit	Total Off-Base Population Affected (65 dBA DNL or Greater)	Minority Number	Population for Whom Poverty Is Determined	Low-Income Number	Youth	Elderly
Taylor	BG 1, CT 130	6	3	1	0	0	0
Taylor	BG 1, CT 132	95	26	95	12	18	19
Taylor	BG 2, CT 132	520	194	514	91	119	93
Taylor	BG 1, CT 136.02	9	1	9	1	2	2
Taylor	BG 2, CT 135.01	3	1	3	0	1	1
Taylor	BG 2, CT 135.02	145	12	145	18	57	21
Taylor	BG 2, CT 136.02	10	1	10	1	2	2
Taylor	BG 4, CT 134.02	707	206	698	0	232	40

Sources: (U.S. Census Bureau, 2021d; U.S. Census Bureau, 2021e) Block group data used.

Key: > = greater than; + = plus; AFB = Air Force Base; BG = Block Group; CT = Census Tract; dBA = A-weighted decibels; DNL = day-night average sound level

Note:

During data analysis, numbers were rounded and then totaled.

Under the No Action Alternative, two childcare facilities (Alliance After School at the former Tye Elementary School and Tye Play and Learn) are currently exposed to DNL of 65 dBA or greater (Figure 3.3-1). Alliance After School is within the DNL contour of 65 to 69 dBA and Tye Play and Learn is within the DNL contour of 70 to 74 dBA. Rister Park is located within the DNL contour of 70 to 74 dBA. No hospitals or libraries are exposed to DNL of 65 dBA or greater under baseline conditions.

3.7.2.1.2 No Action at Whiteman AFB

Under the No Action Alternative at Whiteman AFB, aircraft operations and the resulting noise levels would continue at existing levels. Table 3.7-5 and Table 3.7-6 identify the number of environmental justice and sensitive populations currently impacted by noise levels 65 dBA DNL and greater. There are no daycare facilities or schools exposed to DNL of 65 dBA DNL or greater. None of the projects identified in Table 3.1-1 would increase the aircraft related noise exposure of the environmental justice or sensitive populations in the ROI.

Table 3.7-5. Number of Residents Exposed to Aircraft Noise in the Region of Influence Under Existing Conditions (No Action – Whiteman AFB)

Average Noise Levels	Total Affected Off-Base Population	Minority	Low Income	Youth	Elderly
65–69 dBA DNL	223	42	19	57	14
70–74 dBA DNL	17	4	2	4	1
75–79 dBA DNL	0	0	0	0	0

Table 3.7-5. Number of Residents Exposed to Aircraft Noise in the Region of Influence Under Existing Conditions (No Action – Whiteman AFB)

Average Noise Levels	Total Affected Off-Base Population	Minority	Low Income	Youth	Elderly
80–84 dBA DNL	0	0	0	0	0
85+ dBA DNL	0	0	0	0	0
Total >65 dBA DNL^(a)	240	46	21	61	15

Sources: (U.S. Census Bureau, 2021d; U.S. Census Bureau, 2021e) Block group data used.

Key: > = greater than; + = plus; AFB = Air Force Base; BG = Block Group; dBA = A-weighted decibels; DNL = day-night average sound level

Note:

a. During data analysis, numbers were rounded and then totaled.

Table 3.7-6. Number of Residents Exposed to Aircraft Noise in the Region of Influence Under Existing Conditions by Block Group (No Action – Whiteman AFB)

County	Geographic Unit	Total Off-Base Population Affected (65 dBA DNL or Greater)	Minority Number	Population for Whom Poverty Is Determined	Low-Income Number	Youth	Elderly
Johnson	BG 1, CT 9607.01	98	11	97	8	24	4
Johnson	BG 1, CT 9607.02	74	19	73	10	19	3
Johnson	BG 2, CT 9607.02	62	15	62	3	18	7
Johnson	BG 2, CT 9800	0	0	0	0	0	0
Johnson	BG 3, CT 9607.02	2	1	2	0	1	0
Johnson	BG 4, CT 9609	3	0	3	0	1	1

Sources: (U.S. Census Bureau, 2021d; U.S. Census Bureau, 2021e) Block group data used.

Key: > = greater than; + = plus; AFB = Air Force Base; BG = Block Group; CT = Census Tract; dBA = A-weighted decibels; DNL = day-night average sound level

Note:

During data analysis, numbers were rounded and then totaled.

3.7.2.2 Dyess AFB Alternative

The number of residents exposed to aircraft noise in the 65 dBA DNL or greater contours would decrease under the Dyess AFB Alternative (Table 3.7-7). Under the No Action Alternative, a total of 1,494 residents are exposed to noise levels greater than 65 dBA DNL. This would decrease by 64 percent to 541 residents under the Dyess AFB Alternative. The number of minority and low-income residents exposed to noise levels greater than 65 dBA DNL would decrease by 62 and 64 percent, respectively, as compared to the No Action Alternative (Table 3.7-7). Table 3.7-8 shows populations of minority and low-income populations by block group. The number of residents affected by aircraft related noise in the total off-base population is less than the number of residents affected under the No Action Alternative. Therefore, there are no adverse disproportionate impacts anticipated to environmental justice populations.

With regard to sensitive residential populations, the number of youth and elderly residents exposed to noise levels greater than 65 dBA DNL would decrease by 64 and 65 percent, respectively (Table 3.7-9). Table 3.7-10 shows which census tracts have a higher percent of youth (under 18 years) and elderly (65 years and older) populations. Since the number of sensitive residents exposed to noise in the 65 dBA DNL or greater contour is less than the number of people affected under the No Action Alternative, the Dyess AFB Alternative would have an overall positive impact and there would be no adverse impacts to sensitive residential populations anticipated.

Only two sensitive receptor locations (Alliance After School and Tye Play and Learn) were identified in the 65 dBA DNL or greater contour under the No Action Alternative. Both of these receptors are located outside of the 65 dBA DNL contour (see Figure 3.3-5) under the Dyess AFB Alternative.

3.7.2.2.1 Snapshot

The number of residents exposed to aircraft noise in the 65 dBA DNL or greater contours would decrease under the snapshot scenario at Dyess AFB (Table 3.7-11, Figure 3.7-3) by 38 percent to 923 residents compared to the No Action Alternative at Dyess AFB. Additionally, the number of minority and low-income residents exposed to noise levels greater than 65 dBA DNL would decrease by 37 and 39 percent, respectively (Table 3.7-11). Table 3.7-12 shows populations of minority and low-income populations by block group. The number of people affected by aircraft related noise in the total off-base population is less than the number of people affected under the No Action Alternative. Therefore, there are no adverse disproportionate impacts anticipated to environmental justice populations. For sensitive populations, the number of youth and elderly residents exposed to noise levels greater than 65 dBA DNL would decrease by 38 and 41 percent, respectively, as compared to the No Action Alternative (Table 3.7-13). Table 3.7-14 shows which census tracts have a higher percent of youth (under 18 years) and elderly (65 years and older) populations.

Since the number of sensitive residents impacted is fewer than the number of people affected under the No Action Alternative, the snapshot scenario at Dyess AFB would have an overall positive impact as fewer residents are exposed to noise in the 65 dBA DNL or greater contour. Therefore, there are no adverse impacts to sensitive populations anticipated.

Two sensitive receptor locations were located in the 65 dBA DNL or greater contour under the No Action Alternative. Under the snapshot scenario at Dyess AFB, only one sensitive receptor location (Alliance After School), as shown in Figure 3.3-7, was identified within the 65 to 69 dBA DNL contour. Once the B-21 has replaced the B-1, noise levels would decrease and the Alliance After School would no longer be within the 65 to 69 dBA DNL contour.

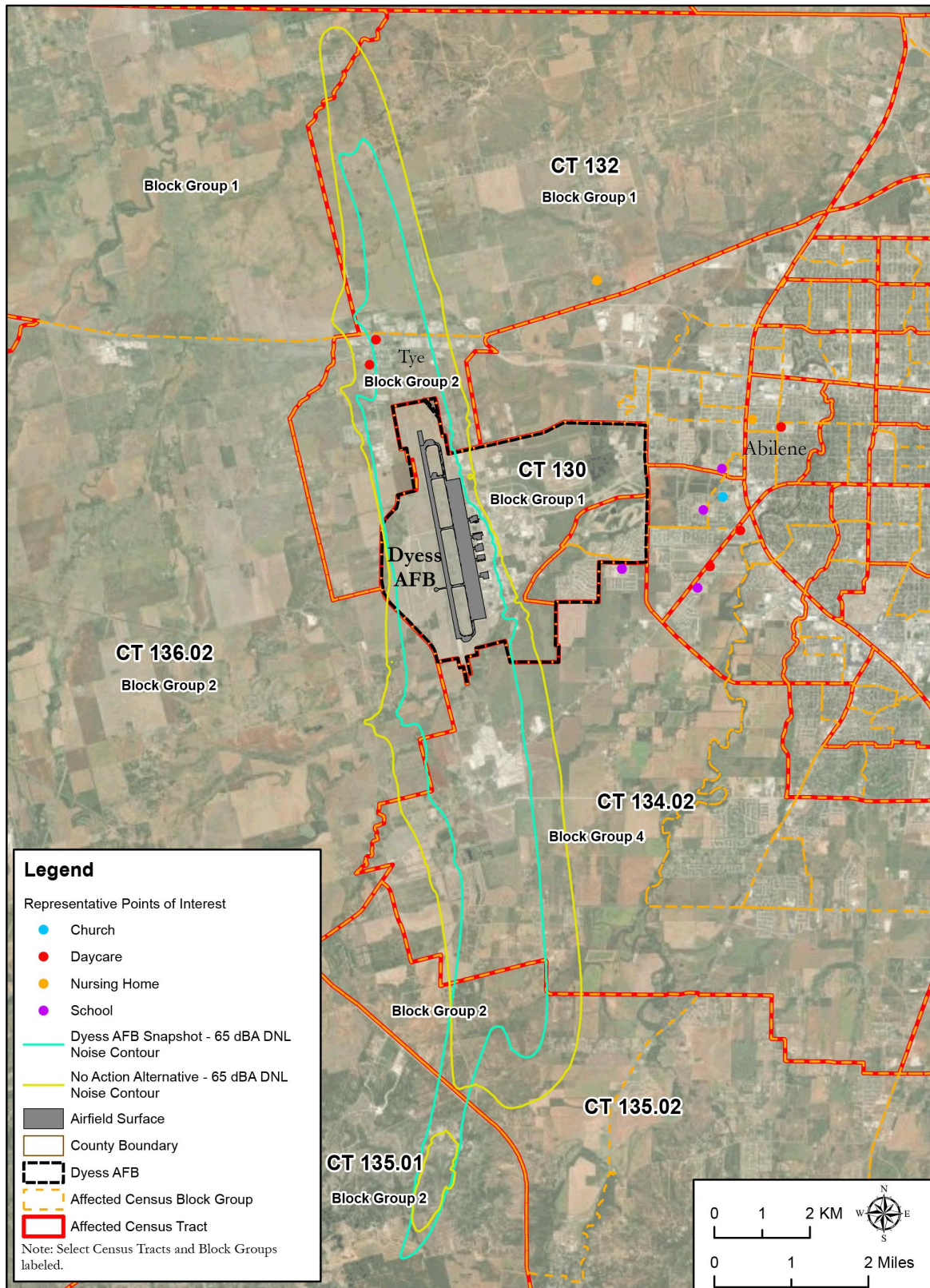


Figure 3.7-3. Dyess AFB Census Tracts and Block Groups Exposed to DNL of 65 dBA or Greater Under Baseline and Snapshot

Table 3.7-7. Environmental Justice Populations Exposed to Aircraft Noise Under the Dyess AFB Alternative

Average Noise Levels	Total Affected Off-Base Population			Minority			Low Income		
	No Action Alternative	Dyess AFB Alternative	Change	No Action Alternative	Dyess AFB Alternative	Change	No Action Alternative	Dyess AFB Alternative	Change
65–69 dBA	673	375	-298	192	114	-78	62	34	-28
70–74 dBA	465	139	-326	138	45	-93	39	9	-30
75–79 dBA	230	27	-203	73	9	-64	13	1	-12
80–84 dBA	93	0	-93	30	0	-30	6	0	-6
85+ dBA	33	0	-33	10	0	-10	1	0	-1
Total (a)	1,494	541	-953	443	168	-275	121	44	-77

Sources: (U.S. Census Bureau, 2021d; U.S. Census Bureau, 2021e) Block group data used.

Key: - = minus; + = plus; AFB = Air Force Base; BG = Block Group; dBA = A-weighted decibels; DNL = day-night average sound level

Note:

a. During data analysis, numbers were rounded and then totaled.

Table 3.7-8. Environmental Justice Populations Exposed to Aircraft Noise by Block Group (Dyess AFB Alternative)

County	Geographic Unit	Total Off-Base Population Affected (65 dBA DNL or Greater)	Minority		Disproportionate Impact ^(a)	Population for Whom Poverty Is Determined	Low Income		Disproportionate Impact ^(a)
			Number	Percent			Number	Percent	
Taylor	BG 1, CT 130	4	2	53	Yes	1	0	2	No
Taylor	BG 1, CT 132	19	5	27	Yes	19	2	12	Yes
Taylor	BG 2, CT 132	206	77	37	Yes	203	36	18	Yes
Taylor	BG 2, CT 135.01	4	1	20	No	4	0	2	No
Taylor	BG 2, CT 135.02	36	3	8	No	36	4	12	Yes
Taylor	BG 2, CT 136.02	3	0	8	No	3	0	6	Yes
Taylor	BG 4, CT 134.02	270	79	29	Yes	267	0	0	No

Sources: (U.S. Census Bureau, 2021d; U.S. Census Bureau, 2021e)

AFB = Air Force Base; BG = Block Group; COC = Community of Comparison; CT = Census Tract; dBA= A-weighted decibels; DNL = day-night average sound level

Notes:

During data analysis, numbers were rounded and then totaled.

a. Although block groups (see Table 3.7-1) were identified as having a percentage of minority/low-income populations higher than the COC, no disproportionate adverse impacts would occur as the number of people affected by aircraft-related noise in the total off-base population is less than the number of people affected under the No Action Alternative. See Table 3.7-7.

Table 3.7-9. Sensitive Populations Exposed to Aircraft Noise in the Region of Influence (Dyess AFB Alternative)

Average Noise Levels	Total Affected Off-Base Population			Youth			Elderly		
	No Action Alternative	Dyess AFB Alternative	Change	No Action Alternative	Dyess AFB Alternative	Change	No Action Alternative	Dyess AFB Alternative	Change
65–69 dBA	673	375	-298	193	107	-86	88	47	-41
70–74 dBA	465	139	-326	135	41	-94	56	14	-42
75–79 dBA	230	27	-203	67	8	-59	23	2	-21
80–84 dBA	93	0	-93	27	0	-27	10	0	-10
85+ dBA	33	0	-33	10	0	-10	3	0	-3
Total ^(a)	1,494	541	-953	432	156	-276	180	63	-117

Sources: (U.S. Census Bureau, 2021d; U.S. Census Bureau, 2021e) Block group data used.

Key: - = minus; + = plus; AFB = Air Force Base; BG = Block Group; dBA = A-weighted decibels; DNL = day-night average sound level

Note:

a. During data analysis, numbers were rounded and then totaled.

Table 3.7-10. Sensitive Populations Exposed to Aircraft Noise by Block Group (Dyess AFB Alternative)

County	Geographic Unit	Total Off-Base Population Affected (65 dBA DNL or Greater)	Youth		Elderly	
			Number	Percent	Number	Percent
Taylor	BG 1, CT 130	4	0	7	0	0
Taylor	BG 1, CT 132	19	4	19	4	20
Taylor	BG 2, CT 132	206	47	23	37	18
Taylor	BG 2, CT 135.01	4	1	28	1	28
Taylor	BG 2, CT 135.02	36	14	39	5	15
Taylor	BG 2, CT 136.02	3	1	24	0	18
Taylor	BG4, CT 134.02	270	89	33	15	6

Sources: (U.S. Census Bureau, 2021d; U.S. Census Bureau, 2021e)

Key: AFB = Air Force Base; BG = Block Group; CT = Census Tract; dBA = decibels; DNL = day-night average sound level

Note:

During data analysis, numbers were rounded and then totaled. In some cases, the total population numbers (e.g., total off-base population affected) may differ slightly between tables.

Table 3.7-11. Environmental Justice Populations Exposed to Aircraft Noise in the Region of Influence Under the Dyess AFB Snapshot Scenario

Average Noise Levels	Total Affected Off-Base Population			Minority			Low Income		
	No Action Alternative	Dyess AFB Snapshot	Change	No Action Alternative	Dyess AFB Snapshot	Change	No Action Alternative	Dyess AFB Snapshot	Change
65–69 dBA	673	553	-120	192	160	-32	62	52	-10
70–74 dBA	465	242	-223	138	76	-62	39	14	-25
75–79 dBA	230	100	-130	73	32	-41	13	7	-6
80–84 dBA	93	24	-69	30	8	-22	6	1	-5
85+ dBA	33	4	-29	10	1	-9	1	0	-1
Total^(a)	1,494	923	-571	443	277	-166	121	74	-47

Sources: (U.S. Census Bureau, 2021d; U.S. Census Bureau, 2021e) Block group data used.

Key: - = minus; + = plus; AFB = Air Force Base; BG = Block Group; dBA = A-weighted decibels; DNL = day-night average sound level

Note:

a. During data analysis, numbers were rounded and then totaled.

Table 3.7-12. Environmental Justice Populations Exposed to Aircraft Noise by Block Group (Dyess AFB Alternative Snapshot)

County	Geographic Unit	Total Off-Base Population Affected (65 dBA DNL or Greater)	Minority		Disproportionate Impact ^(a)	Population for Whom Poverty Is Determined	Low Income		Disproportionate Impact ^(a)
			Number	Percent			Number	Percent	
Taylor	BG 1, CT 130	5	3	53	Yes	1	0	2	No
Taylor	BG 1, CT 132	41	11	27	Yes	41	5	12	Yes
Taylor	BG 1, CT 136.02	0	0	9	No	0	0	6	Yes
Taylor	BG 2, CT 132	328	123	37	Yes	324	58	18	Yes
Taylor	BG 2, CT 135.01	6	1	20	No	6	0	2	No
Taylor	BG 2, CT 135.02	85	7	8	No	85	10	12	Yes
Taylor	BG 2, CT 136.02	5	0	8	No	5	0	6	Yes
Taylor	BG 4, CT 134.02	453	132	29	Yes	447	0	0	No

Sources: (U.S. Census Bureau, 2021d; U.S. Census Bureau, 2021e)

Key: AFB = Air Force Base; BG = block group; COC = Community of Comparison; CT = Census Tract; dBA = A-weighted decibels; DNL = day-night average sound level

Notes: During data analysis, numbers were rounded and then totaled.

a. Although block groups (see Table 3.7-1) were identified as having a percentage of minority/low-income populations higher than the COC, no disproportionate impacts would occur as the number of people affected by aircraft-related noise in the total off-base population is less than the number of people affected under the No Action Alternative. See Table 3.7-11.

Table 3.7-13. Sensitive Populations Exposed to Aircraft Noise Under the Dyess AFB Alternative Snapshot

Average Noise Levels	Total Affected Off-Base Population			Youth			Elderly		
	No Action Alternative	Dyess AFB Alternative Snapshot	Change	No Action Alternative	Dyess AFB Alternative Snapshot	Change	No Action Alternative	Dyess AFB Alternative Snapshot	Change
65–69 dBA	673	553	-120	193	161	-32	88	71	-17
70–74 dBA	465	242	-223	135	70	-65	56	24	-32
75–79 dBA	230	100	-130	67	29	-38	23	10	-13
80–84 dBA	93	24	-69	27	8	-19	10	2	-8
85+ dBA	33	4	-29	10	1	-9	3	0	-3
Total ^(a)	1,494	923	-571	432	269	-163	180	107	-73

Sources: (U.S. Census Bureau, 2021d; U.S. Census Bureau, 2021e) Block group data used.

Key: = minus; + = plus; AFB = Air Force Base; dBA = A-weighted decibel

Note:

a. During data analysis, numbers were rounded and then totaled.

Table 3.7-14. Sensitive Populations Exposed to Aircraft Noise by Block Group (Dyess AFB Alternative Snapshot)

County	Geographic Unit	Total Off-Base Population Affected (65 dBA DNL or Greater)	Youth		Elderly	
			Number	Percent	Number	Percent
Taylor	BG 1, CT 130	5	0	7	0	4
Taylor	BG 1, CT 132	41	8	19	8	20
Taylor	BG 1, CT 136.02	0	0	20	0	26
Taylor	BG 2, CT 132	328	75	23	59	18
Taylor	BG 2, CT 135.01	6	2	28	2	28
Taylor	BG 2, CT 135.02	85	33	39	12	15
Taylor	BG 2, CT 136.02	5	1	24	1	18
Taylor	BG 4, CT 134.02	453	149	33	26	6

Sources: (U.S. Census Bureau, 2021d; U.S. Census Bureau, 2021e)

Key: AFB = Air Force Base; BG = Block Group; CT = Census Tract

Note:

During data analysis, numbers were rounded and then totaled. In some cases, the total population numbers (e.g., total off-base population affected) may differ slightly between tables.

3.7.2.2.2 Reasonably Foreseeable Future Actions and Environmental Trends

A number of projects have been identified (Table 3.1-2) that are in proximity to construction activities in the Proposed Action area. All projects identified involve the construction of new facilities and are not anticipated to have adverse impacts to environmental justice or other sensitive populations.

Environmental justice analysis in this EIS indicated that no adverse impacts would occur to environmental justice or other sensitive populations and that implementing the Proposed Action would result in positive impacts. Therefore, no disproportionately high and adverse impacts to environmental justice or other sensitive populations would be anticipated from the Proposed Action combined with reasonably foreseeable future projects and environmental trends.

3.7.2.2.3 Proposed Resource-Specific Mitigations and Management Actions to Reduce the Potential for Environmental Impacts

No mitigations would be necessary to implement the Dyess AFB Alternative.

3.7.2.3 Whiteman AFB Alternative (Preferred Alternative)

The number of residents exposed to aircraft noise in the 65 dBA DNL or greater contours would increase under the Whiteman AFB Alternative (Table 3.7-15). Under the No Action Alternative, 240 residents are exposed to noise levels greater than 65 dBA DNL. This would increase by 37 percent to 329 residents under the Whiteman AFB Alternative. Additionally, the number of minority and low-income residents exposed to noise levels greater than 65 dBA DNL would increase by 39 and 33 percent, respectively (Table 3.7-15). New noise exposure for environmental justice populations would occur within the 65–69 dBA DNL and the 70–74 dBA DNL noise contours.

Table 3.7-16 shows populations of minority and low-income populations by block group. Four block groups (BG 1, CT 9607.02; BG 2, CT 9607.02; BG 2, CT 9800; BG 3, CT 9607.02) would have a disproportionate population of minority residents impacted by the increase in noise levels. Combined, these block groups would see a total of 18 additional minority residents exposed to noise levels above 65 dBA DNL. Since these block groups are disproportionately minority, impacts in these block groups represent a disproportionate impact to minority populations. This impact would be moderate as the increase in minority residents impacted is relatively low compared to the total number of minority residents in the ROI. The increase in noise would only occur in the 65 to 74 dBA DNL contours and would not be significant. Two block groups have a disproportionate impact to low-income populations (BG 1, CT 9607.02 and BG 2, CT 9800). Combined, these block groups would see a projected increase of an estimated 7 additional low-income residents exposed to noise levels above 65 dBA DNL. Since these block groups are disproportionately low-income, impacts in these block groups represent a disproportionate impact to low-income populations. This impact would be moderate as the increase in low-income residents impacted is relatively low compared to the total number of low-income residents in the ROI. The increase in noise would only occur in

the 65 to 74 dBA DNL contours and would not be significant as no adverse health effects would occur to residents within those contours.

For sensitive populations, the number of youth and elderly residents exposed to noise levels greater than 65 dBA DNL would increase by 33 and 39 percent, respectively, as compared to the No Action Alternative (Table 3.7-17). Impacts to youth and elderly populations would be moderate and represent a disproportionate impact as there are an additional 24 and 5 residents, respectively, exposed to noise increases. This impact would be moderate as the increase in youth and elderly residents impacted is relatively low compared to the total number of youth and elderly residents in the ROI. The increase in noise would only occur in the 65 to 74 dBA DNL contours and would not be significant as no adverse health effects would occur to residents within those contours. No schools or daycare facilities are exposed to DNL of 65 dBA or greater. Table 3.7-18 shows which census tracts have a higher percent of youth (under 18 years) and elderly (65 years and older) populations.

3.7.2.3.1 Snapshot

The number of residents exposed to aircraft noise in the 65 dBA DNL or greater contours would increase under the snapshot scenario at Whiteman AFB (Table 3.7-19 and Figure 3.7-4). Under the No Action Alternative, 240 residents are exposed to noise levels greater than 65 dBA DNL. This would increase by 50 percent to 361 residents under the snapshot scenario at Whiteman AFB. Additionally, the number of minority and low-income residents exposed to noise levels greater than 65 dBA DNL would increase by 54 and 48 percent, respectively (Table 3.7-19).

Table 3.7-20 shows populations of minority and low-income populations by block group. Four block groups (BG 1, CT 9607.02; BG 2, CT 9607.02; BG 2, CT 9800; BG 3, CT 9607.02) would have a disproportionate population of minority residents impacted by the increase in noise levels. Combined, these block groups would see a projected increase of 25 minority residents exposed to additional noise levels above 65 dBA. Since these block groups are disproportionately minority, impacts in these block groups represent a disproportionate impact to minority populations. This impact would be moderate as the increase in minority residents impacted is relatively low compared to the total number of minority residents in the COC. The increase in noise would only occur in the 65 to 74 dBA DNL contours and would not be significant. Two block groups have a disproportionate impact to low-income populations (BG 1, CT 9607.02 and BG 2, CT 9800). Combined, these block groups would see a projected increase of an estimated 10 low-income residents exposed to additional noise levels above 65 dBA DNL. Since these block groups are disproportionately low-income, impacts in these block groups represent a disproportionate impact to low-income populations. This impact would be moderate as the increase in low-income residents impacted is relatively low compared to the total number of low-income residents in the ROI. The increase in noise would only occur in the 65 to 74 dBA DNL contours and would not be significant as no adverse health effects would occur to residents within those contours.

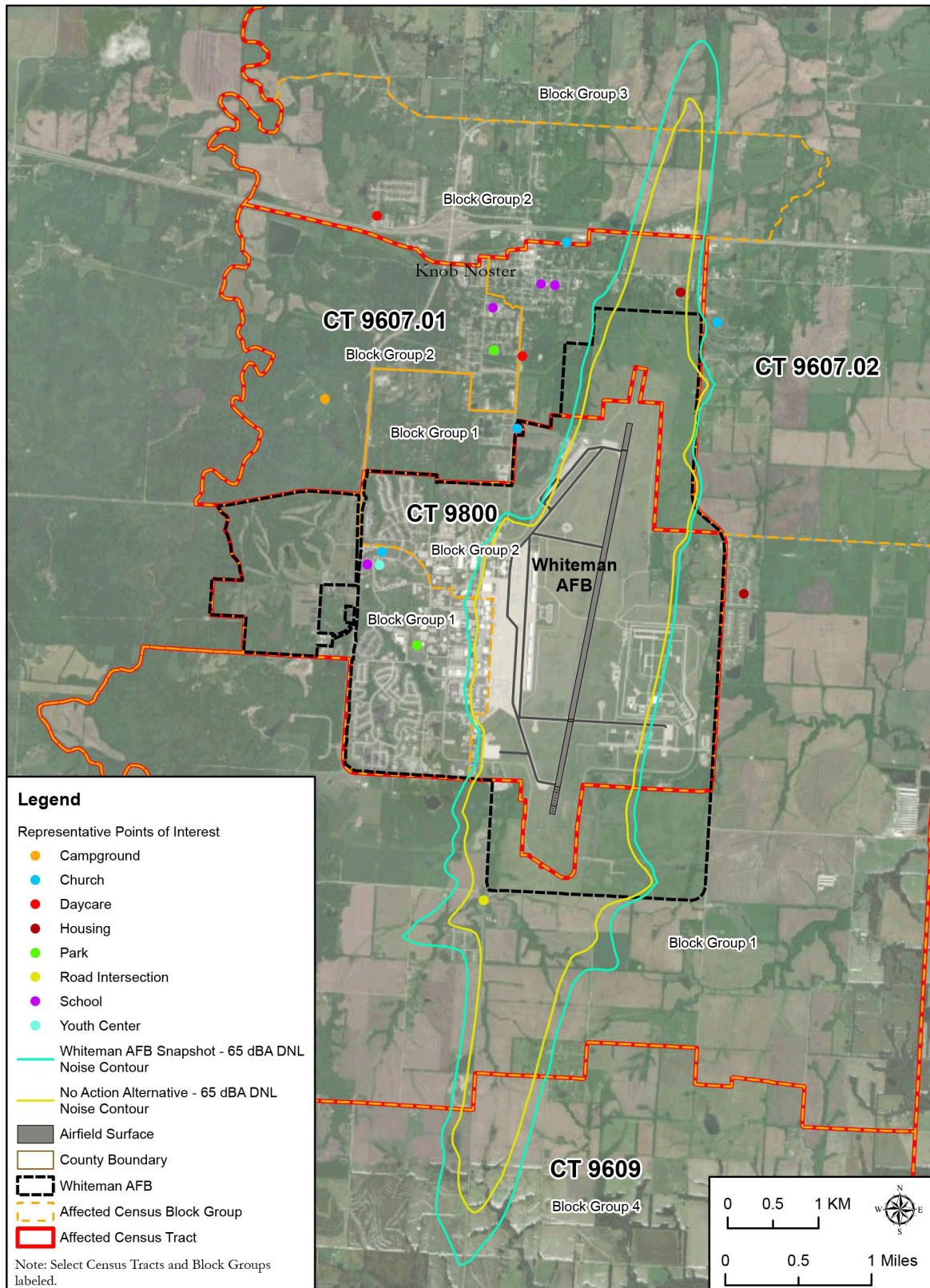


Figure 3.7-4. Whiteman AFB Census Tracts and Block Groups Exposed to DNL of 65 dBA or Greater Under Baseline and Snapshot

Table 3.7-15. Environmental Justice Populations Exposed to Aircraft Noise in the Region of Influence Under the Whiteman AFB Alternative

Average Noise Levels	Total Affected Off-Base Population			Minority			Low Income		
	No Action Alternative	Whiteman AFB Proposed	Change	No Action Alternative	Whiteman AFB Proposed	Change	No Action Alternative	Whiteman AFB Proposed	Change
65–69 dBA	223	281	58	42	55	13	19	23	4
70–74 dBA	17	48	31	4	9	5	2	5	3
75–79 dBA	0	0	0	0	0	0	0	0	0
80–84 dBA	0	0	0	0	0	0	0	0	0
85+ dBA	0	0	0	0	0	0	0	0	0
Total (a)	240	329	89	46	64	18	21	28	7

Sources: (U.S. Census Bureau, 2021d; U.S. Census Bureau, 2021e) Block group data used.

Key: - = minus; + = plus; AFB = Air Force Base; dBA = A-weighted decibels; DNL = day-night average sound level

Note:

a. During data analysis, numbers were rounded and then totaled.

Table 3.7-16. Environmental Justice Populations Exposed to Aircraft Noise by Block Group (Whiteman AFB Alternative)

County	Geographic Unit	Total Off-Base Population Affected (65 dBA DNL or Greater)	Minority		Disproportionate Impact	Population for Whom Poverty is Determined	Low Income		Disproportionate Impact
			Number	Percent BG			Number	Percent BG	
Johnson	BG 1, CT 9607.01	128	14	11	No	126	10	8	No
Johnson	BG 1, CT 9607.02	98	25	25	Yes	96	13	14	Yes
Johnson	BG 2, CT 9607.02	89	22	24	Yes	89	4	5	No
Johnson	BG 2, CT 9800	0	0	23	Yes	0	0	15	Yes
Johnson	BG 3, CT 9607.02	8	3	42	Yes	8	0	5	No
Johnson	BG 4, CT 9609	5	0	3	No	5	1	10	No

Sources: (U.S. Census Bureau, 2021d; U.S. Census Bureau, 2021e)

Key: AFB = Air Force Base; BG = Block Group; COC = Community of Comparison; CT = Census Tract; dBA = A-weighted decibels; DNL = day-night average sound level

Note:

During data analysis, numbers were rounded and then totaled.

Table 3.7-17. Sensitive Populations Exposed to Aircraft Noise Under the Whiteman AFB Alternative

Average Noise Levels	Total Affected Off-Base Population			Youth			Elderly		
	No Action Alternative	Whiteman AFB Proposed	Change	No Action Alternative	Whiteman AFB Proposed	Change	No Action Alternative	Whiteman AFB Proposed	Change
65–69 dBA	223	281	58	57	73	16	14	18	4
70–74 dBA	17	48	31	4	12	8	1	2	1
75–79 dBA	0	0	0	0	0	0	0	0	0
80–84 dBA	0	0	0	0	0	0	0	0	0
85+ dBA	0	0	0	0	0	0	0	0	0
Total (a)	240	329	89	61	85	24	15	20	5

Sources: (U.S. Census Bureau, 2021d; U.S. Census Bureau, 2021e) Block group data used.

Key: - = minus; + = plus; AFB = Air Force Base; dBA = A-weighted decibels; DNL = day-night average sound level

Note:

a. During data analysis, numbers were rounded and then totaled.

Table 3.7-18. Sensitive Populations Exposed to Aircraft Noise by Block Group (Whiteman AFB Alternative)

County	Geographic Unit	Total Off-Base Population Affected (65 dBA DNL or Greater)	Youth		Elderly	
			Number	Percent	Number	Percent
Johnson	BG 1, CT 9607.01	128	31	24	5	4
Johnson	BG 1, CT 9607.02	98	25	25	3	4
Johnson	BG 2, CT 9607.02	89	25	28	10	11
Johnson	BG 2, CT 9800	0	0	31	0	0
Johnson	BG 3, CT 9607.02	8	2	27	1	8
Johnson	BG 4, CT 9609	5	1	23	1	18

Sources: (U.S. Census Bureau, 2021d; U.S. Census Bureau, 2021e)

Key: AFB = Air Force Base; BG = Block Group; CT = Census Tract; dBA = A-weighted decibels; DNL = day-night average sound level

Note:

During data analysis, numbers were rounded and then totaled. In some cases, the total population numbers (e.g., total off-base population affected) may differ slightly between tables.

Table 3.7-19. Environmental Justice Populations Exposed to Aircraft Noise in the ROI Under the Whiteman AFB Alternative Snapshot

Average Noise Levels	Total Affected Off-Base Population			Minority			Low Income		
	No Action Alternative	Whiteman AFB Alternative Snapshot	Change	No Action Alternative	Whiteman AFB Alternative Snapshot	Change	No Action Alternative	Whiteman AFB Alternative Snapshot	Change
65–69 dBA	223	299	76	42	60	18	19	25	6
70–74 dBA	17	62	45	4	11	7	2	6	4
75–79 dBA	0	0	0	0	0	0	0	0	0
80–84 dBA	0	0	0	0	0	0	0	0	0
85+ dBA	0	0	0	0	0	0	0	0	0
Total ^(a)	240	361	121	46	71	25	21	31	10

Sources: (U.S. Census Bureau, 2021d; U.S. Census Bureau, 2021e) Block group data used.

Key: - = minus; + = plus; AFB = Air Force Base; dBA = A-weighted decibels; DNL = day-night average sound level

Note:

a. During data analysis, numbers were rounded and then totaled.

Table 3.7-20. Environmental Justice Populations Exposed to Aircraft Noise by Block Group (Whiteman AFB Alternative Snapshot)

County	Geographic Unit	Total Off-Base Population Affected (65 dBA DNL or Greater)	Minority		Disproportionate Impact	Population for Whom Poverty is Determined	Low Income		Disproportionate Impact
			Number	Percent			Number	Percent	
Johnson	BG 1, CT 9607.01	141	15	11	No	139	11	8	No
Johnson	BG 1, CT 9607.02	106	27	25	Yes	104	14	14	Yes
Johnson	BG 1, CT 9800	0	0	31	Yes	0	0	8	Yes
Johnson	BG 2, CT 9607.02	97	23	24	Yes	97	5	5	No
Johnson	BG 2, CT 9800	0	0	23	Yes	0	0	15	No
Johnson	BG 3, CT 9607.02	11	5	42	Yes	11	1	5	No
Johnson	BG 4, CT 9609	6	0	3	No	6	1	10	No

Sources: (U.S. Census Bureau, 2021d; U.S. Census Bureau, 2021e)

Key: AFB = Air Force Base; BG = Block Group; COC = Community of Comparison; CT = Census Tract; dBA = A-weighted decibels; DNL = day-night average sound level

Note:

During data analysis, numbers were rounded and then totaled.

Table 3.7-21. Sensitive Populations Exposed to Aircraft Noise Under the Whiteman AFB Alternative Snapshot

Average Noise Levels	Total Affected Off-Base Population			Youth			Elderly		
	No Action Alternative	Whiteman AFB Alternative Snapshot	Change	No Action Alternative	Whiteman AFB Alternative Snapshot	Change	No Action Alternative	Whiteman AFB Alternative Snapshot	Change
65–69 dBA	223	299	76	57	78	21	14	20	6
70–74 dBA	17	62	45	4	15	11	1	2	1
75–79 dBA	0	0	0	0	0	0	0	0	0
80–84 dBA	0	0	0	0	0	0	0	0	0
85+ dBA	0	0	0	0	0	0	0	0	0
Total ^(a)	240	361	121	61	93	32	15	22	7

Sources: (U.S. Census Bureau, 2021d; U.S. Census Bureau, 2021e) Block group data used.

Key: - = minus; + = plus; AFB = Air Force Base; dBA = A-weighted decibels

Note:

a. During data analysis, numbers were rounded and then totaled.

Table 3.7-22. Sensitive Populations Exposed to Aircraft Noise by Block Group (Whiteman AFB Alternative Snapshot)

County	Geographic Unit	Total Off-Base Population Affected (65 dBA DNL or Greater)	Youth		Elderly	
			Number	Percent	Number	Percent
Johnson	BG 1, CT 9607.01	141	34	24	6	4
Johnson	BG 1, CT 9607.02	106	27	25	4	4
Johnson	BG 1, CT 9800	0	0	25	0	0
Johnson	BG 2, CT 9607.02	97	27	28	11	11
Johnson	BG 2, CT 9800	0	0	31	0	0
Johnson	BG 3, CT 9607.02	11	3	27	1	8
Johnson	BG 4, CT 9609	6	1	23	1	18

Key: AFB = Air Force Base; BG = Block Group; CT = Census Tract; dBA = A-weighted decibels; DNL = day-night average sound level

With regard to sensitive populations, the number of youth and elderly residents exposed to noise levels greater than 65 dBA DNL would increase by 52 and 47 percent, respectively (Table 3.7-21). Impacts to youth and elderly populations would be moderate and represent a disproportionate impact as there are an additional 32 and 7 residents, respectively exposed to noise increases in the 65 to 69 dBA and 70 to 74 dBA DNL contours. This impact would be moderate as the increase in youth and elderly residents impacted is relatively low compared to the total number of youth and elderly residents in the ROI. The increase in noise would only occur in the 65 to 74 dBA DNL contours and would not be significant as no adverse health effects would occur to residents within those contours. No schools or daycare facilities are exposed to DNL of 65 dBA or greater. Table 3.7-22 shows which census tracts have a higher percent of youth (under 18 years) and elderly (65 years and older) populations.

3.7.2.3.2 Reasonably Foreseeable Future Actions and Environmental Trends

A number of projects have been identified (Table 3.1-2) that are in proximity to construction activities in the Proposed Action. All projects identified involve the construction of new facilities and are not anticipated to have adverse impacts to environmental justice or other sensitive populations.

Under the Whiteman AFB Alternative, four block groups would have a disproportionate population of minority residents impacted by the increase in noise levels and two block groups have a disproportionate impact to low-income populations. However, impacts would not be significant because there would be no adverse health effects from the Proposed Action. When combined with reasonably foreseeable future projects and environmental trends, significant impacts would not be anticipated.

3.7.2.3.3 Proposed Resource-Specific Mitigations and Management Actions to Reduce the Potential for Environmental Impacts

No mitigations would be necessary to implement the Whiteman AFB Alternative.

3.8 BIOLOGICAL RESOURCES

3.8.1 Biological Resources, Affected Environment

3.8.1.1 Description of Resource

Biological resources include the plant and animal species, habitats, and ecological relationships of the land and water areas within the ROI, which is defined as the area directly or indirectly affected by the Proposed Action described in Chapter 2 (Description of Proposed Action and Alternatives). Particular consideration is given to sensitive species, which are those species protected under federal or state law, including threatened and endangered species, migratory birds, and bald and golden eagles.

For the purposes of this EIS, sensitive and protected biological resources include plant and animal species that are federally listed or state-listed for protection. Identifying which species occur in an area affected by an action may be accomplished through literature reviews and coordination with appropriate federal and state regulatory agency representatives, resource managers, and other knowledgeable experts.

3.8.1.2 Region of Influence

The ROI for biological resources for beddown actions at either basing location occurs within the installation boundaries, specifically areas that encompass the construction footprints for proposed facilities and infrastructure projects listed in Table 2.3-4 and Table 2.4-4 (see also Figure 2.3-4, Figure 2.3-5, Figure 2.4-3, Figure 2.4-5, and Figure 2.4-6). Descriptions of biological resources at the proposed beddown locations are based on information provided in the most recent Integrated Natural Resources Management Plan (INRMP) for Dyess AFB (Dyess AFB, 2022b) and Whiteman AFB (Whiteman AFB, 2021b). The INRMP summarizes the natural resources that are present on each installation and outlines strategies to adequately manage those resources. This EIS utilizes other DAF NEPA documents and GIS data from the USFWS to identify and describe biological resources under the airspace and ranges.

For B-21 aircraft operations, the ROI for biological resources includes the lands under the airspace and associated range boundaries. For Dyess AFB, military aircraft will utilize the Lancer, Lancer Bridge, Bronco (3 and 4), Brownwood, and Pecos MOAs, including all associated ATCAAs, as well as the Willie-Roscoe ATCAA.

For Whiteman AFB, the DAF would utilize the Smoky Hill Range (Smoky MOA, Bison MOA, and R-3601A/B), the Ada (East and West), Lindbergh (A, B, C), Cannon, and Truman (A, B, C) MOAs, including all associated ATCAAs, as well as the Ozark ATCAA (A, B, C). There are no plans to modify any of the airspace listed above as a result of the Proposed Action.

Because no ground disturbance would occur under the existing airspace during B-21 aircraft operations, terrestrial and aquatic vegetation, amphibians, reptiles, fish and macroinvertebrates were excluded from further analysis. Additionally, wildlife habitat areas are not considered further in this EIS as they would not be impacted directly or indirectly by aircraft operations. Therefore, the ROI for biological resources under the airspace only applies to mammalian and avian wildlife species known to occur in these areas and that have the potential to be impacted by noise and bird–aircraft collisions associated with B-21 aircraft operations.

Federally designated critical habitats were also evaluated. The USFWS defines critical habitat as the specific areas within the geographic area, occupied by the species at the time it was listed, that contain the physical or biological features that are essential to the conservation of endangered and threatened species and that may need special management or protection. Critical habitat may also include areas that were not occupied by the species at the time of listing but are essential to its conservation (USFWS, 2017).

3.8.1.2.1 Dyess AFB

The B-21 MOB 1 EIS describes the affected environment for biological resources at Dyess AFB, which is incorporated by reference (DAF, 2021e). Details regarding the description of the affected environment are located in Section 3.7.1.2.1 of the B-21 MOB 1 EIS. The following sections summarize the findings of the MOB 1 EIS as well as any updated information specific to the proposed MOB 2 beddown and mission.

Vegetation

Dyess AFB is located within the Central Great Plains ecoregion (EPA, 2022a). Vegetation at Dyess AFB consists of local grasslands, deciduous mesquite woodlands, riparian vegetation, and turf and landscaped areas.

Of the total acreage at Dyess AFB, more than half (2,645 acres, or 62 percent) of the land includes grounds that are either previously developed or are maintained (including grass areas subject to mowing and scheduled landscape maintenance). Approximately 1,000 of these acres (or 38 percent) consist of turf and landscaped areas including the golf course, Airplane Park, picnic grounds, industrial and administrative facilities, base housing, and the hospital. Mesquite woodland and shrubland are dominant plant communities present at Dyess AFB. Ongoing mesquite reduction projects are employed through the Natural Resource Management program to suppress mesquite encroachment and restore native grasses and forbs on base (Dyess AFB, 2022b).

Wildlife

The turf and landscaped areas on base provide little to no habitat for wildlife species but may support small animals accustomed to human activity. Mature mesquite woodlands and old growth mesquite/scrub communities support most of the terrestrial wildlife habitat found at Dyess AFB, which has not changed since the completion of the MOB 1 EIS.

Special Status Species

Special status plant and wildlife species are subject to regulations under the authority of federal and state agencies. The Endangered Species Act (ESA) (16 U.S.C. 1532 et seq.) of 1973, as amended, was enacted to protect and recover imperiled species and the ecosystems upon which they depend. The USFWS maintains a list of special status species considered endangered, threatened, or candidate.

“Endangered” indicates a species is in danger of extinction throughout all or a significant portion of its range. “Threatened” denotes a species is likely to become endangered within the foreseeable future. Candidate species are plants and animals for which the USFWS has sufficient information on their biological status and threats to propose them as endangered or threatened, but for which development of a proposed listing regulation is precluded by other higher priority listing activities. All federal agencies are required to implement protection programs for endangered and threatened species and to use their authority to further the purposes of the act.

The USFWS and Texas Parks and Wildlife Department (TPWD) special status species lists, by county, were obtained to identify species with the potential to occur within the ROI. The USFWS Information for Planning and Consultation (IpaC) system was accessed online to request an *Official Species List* to identify species protected under Section 7I of the ESA that could occur within the ROI (Project Code: 2023-0038002) (see Appendix D, Biological Resources Supporting Information) (USFWS, 2023a). Table 3.8-1 presents these species. The TPWD list of rare species commonly found in Taylor County, Texas, is included in Appendix D (TPWD, 2021).

Table 3.8-1. Federally Listed Species With Potential to Occur at Dyess AFB

Common Name	Scientific Name	Protection Status	Potential for Occurrence at Dyess AFB
Mammals			
Tri-Colored Bat	<i>Perimyotis subflavus</i>	Proposed Endangered	Yes. While this species has not been confirmed present at Dyess AFB, potential suitable roosting habitat occurs within installation hangers where other bat species have been observed. Acoustic monitoring is slated for the summer of 2023 to confirm presence or absence of this species; bat-monitoring surveys were last conducted in 2017.
Fish			
Smalleye Shiner	<i>Notropis buccula</i>	Endangered	None. Suitable habitat not present. This species is endemic to Brazos River drainage.
Sharpnose Shiner	<i>Notropis oxyrhynchus</i>	Endangered	None. Suitable habitat not present. This species is endemic to Brazos River drainage.
Birds			
Piping Plover	<i>Charadrius melodus</i>	Threatened	Potential during migration. Habitat includes sandy beaches and lakeshores. Texas is the wintering home for 35% of the known population of piping plovers. Arrive in late July or early August and will remain for up to nine months.
Red Knot	<i>Calidris canutus rufa</i>	Threatened	Potential during migration. Red knots are long-distance migrants flying more than 9,300 miles. Stopover habitat includes aquatic areas. Breeding occurs outside of the ROI in the central Canadian Arctic.

Table 3.8-1. Federally Listed Species With Potential to Occur at Dyess AFB

Common Name	Scientific Name	Protection Status	Potential for Occurrence at Dyess AFB
Insects			
Monarch Butterfly	<i>Danaus plexippus</i>	Candidate	Potential spring and winter migrant throughout the state. Monarchs migrate north to the United States and Canada in March from the mature oyamel fir forests in the mountains of central Mexico. The fall migration back to overwintering sites in Mexico is from August to November.

Sources: (USFWS, 2023a; Dyess AFB, 2022b; USFWS, 2019a; USFWS, 2005; TPWD, 2022a; USFWS, 2020a; NatureServe, 2022; TPWD, 2023)

Key: % = percent; AFB = Air Force Base; ROI = region of influence

No federally listed plant or animal species are known to occur on Dyess AFB (Laurence, 2023; Dyess AFB, 2022b). Additionally, there is no federally designated critical habitat on base (USFWS, 2023a).

The tri-colored bat, federally proposed for listing as endangered, could occur at Dyess AFB. Tri-colored bats spend six to nine months per year hibernating in caves or mines but may also utilize anthropogenic structures for roosting. Foraging habitat includes forest edges and over ponds and waterways (TPWD, 2023). While tri-colored bats have not been confirmed present at Dyess AFB (the last bat-monitoring effort was conducted in 2017), potential suitable roosting habitat occurs at multiple areas on base, such as bridges, buildings, and trees. As such, the Dyess AFB Natural Resource Manager and staff from TPWD and USFWS will monitor bat populations on and around the installation in the summer of 2023 (Cox, 2023; Dyess AFB, 2022b).

The TPWD indicates that two reptile species of state significance are known to occur or have the potential to occur within Taylor County. These species include the spot-tailed earless lizard (*Holbrookia lacerata*) (no status) and the Texas horned lizard (*Phrynosoma cornutum*) (state threatened) (Dyess AFB, 2022b).

The spot-tailed earless lizard prefers habitat consisting of rocky desert flats, areas with sparse vegetation or mesquite-prickly pear associations, and uplands of the Edwards Plateau in central Texas (Dyess AFB, 2022b). Although potential habitat for the spot-tailed earless lizard exists in most parts of Dyess AFB, there have been no confirmed observations to date (Laurence, 2023).

The Texas horned lizard inhabits open, sandy to gravelly grasslands and deserts, which support grass, mesquite, and cactus. Potential habitat for this species exists throughout the installation; however, the prevalence of tight clay soils may inhibit or limit reproduction. The Texas horned lizard has been occasionally observed by base employees (Dyess AFB, 2022b).

Migratory Birds

The Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703–712) of 1918 prohibits actions resulting in the pursuit, capture, killing, and/or possession of any protected migratory bird, nest, egg, or parts thereof. The USFWS maintains a list of designated migratory birds occurring in various regions of the United States. The USFWS regulations allow for the incidental take of migratory birds for military readiness activities (50 CFR 21.42).

It is DoD policy to promote and support Partners in Flight in the protection and Conservation of neo-tropical migratory birds and their habitat by protecting vital habitat, enhancing biodiversity, and maintaining healthy and productive natural systems consistent with the military mission. Birds of Conservation Concern (BCC) are a subset of MBTA-protected species identified by the USFWS as those in the greatest need of additional conservation action to avoid future listing under the ESA. BCC have been identified at three geographic scales: National, USFWS Regions, and Bird Conservation Regions (BCRs). BCRs are the smallest geographic scale at which BCC have been identified, and the lists of BCC species at this scale are expected to be the most useful for governmental agencies to consider in complying with the MBTA and EO 13186 (USFWS, 2021).

According to the *USFWS Birds of Conservation Concern* (USFWS, 2021), Dyess AFB is located within BCR 19 Central Mixed-Grass Prairie Region, under the Central Flyway migration route (Figure 3.8-1). Twenty-seven BCC occur within the BCR 19 (USFWS, 2021).

Of the 27 listed BCC species for BCR 19, TPWD and Partners in Flight identified five species with breeding populations on Dyess AFB. These include the loggerhead shrike (*Lanius ludovicianus*), Bell's vireo, Cassin's sparrow (*Aimophila cassinii*), Mississippi kite, and scissor-tailed flycatcher (Dyess AFB, 2022b). Migratory birds are known to commonly traverse the area and may present Bird/Wildlife-Aircraft Strike Hazard (BASH) concerns; however, the 7 BW Flight Safety Office implements the BASH plan to reduce this risk to aircraft (Dyess AFB, 2019).

Bald and Golden Eagle Protection Act

The bald eagle (*Haliaeetus leucocephalus*) is protected by the Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668c; 50 CFR 22.3) of 1942 even though it has been delisted under the ESA. Occurrences of bald eagles at Dyess AFB may include overflights during their spring and fall migrations; however, any occasional presence would be transient in nature. Preferred suitable habitat for the bald eagle does not occur at Dyess AFB.

While golden eagles (*Aquila chrysaetos*) are year-round residents in Texas, best available datasets indicate there are no known nests in central Texas or near Dyess AFB (Texas Breeding Bird Atlas, 2007).



3.8.1.2.2 Dyess AFB Airspace and Range Utilization

The B-21 MOB 1 EIS Sections 3.7.1.2.4 through 3.7.1.2.6 describe the affected environment for biological resources under the Lancer MOA, Brownwood MOA, Pecos MOA, and all associated ATCAAs, which is incorporated by reference (DAF, 2021e). The following section summarizes the findings of the MOB 1 EIS as it relates to the Lancer, Brownwood, and Pecos MOAs, as well as the additional proposed airspace specific to the Dyess AFB Alternative for the MOB 2 beddown, including the Lancer Bridge MOA, Bronco MOA, and Willie-Roscoe ATCAA.

Lancer, Lancer Bridge, Brownwood, and Pecos MOAs

Vegetation

Located in Texas, the Lancer MOA is located above three ecoregions: the High Plains, Southwestern Tablelands, and Central Great Plains. The Lancer Bridge MOA is located above the High Plains ecoregion. These areas are comprised mostly of dry grasslands, scattered low trees and shrubs, and croplands (Griffith et al., 2004).

The Brownwood MOA, also in Texas, is over the Central Great Plains and Cross Timbers ecoregions. This area is similar to the ecoregions described for the Lancer MOA, with the addition of forest, woodland, savanna, and prairie habitats (Griffith et al., 2004).

The Pecos MOA is located over New Mexico and stretches across three ecoregions: the Chihuahuan Deserts, High Plains, and Southwestern Tablelands. This area is mostly desert basin and range terrain, with red-hued canyons, mesas, badlands, and dissected river breaks (Griffith et al., 2006).

Wildlife

Wildlife common to the Texas and New Mexico ecoregions described above is diverse, and includes various species of mammals (pronghorn, coyote, fox, deer, rabbits, raccoons, squirrels, skunks, armadillo, prairie dogs, gophers, mice, bats, etc.), birds (songbirds, raptors, game birds, waterfowl, and shorebirds), amphibians (salamanders, frogs, and toads), reptiles (lizards, snakes, turtles, and crocodilians), insects, and fish accustomed to arid and temperate climates.

Special Status Species

For B-21 aircraft operations within the Lancer, Lancer Bridge, Brownwood, and Pecos MOAs, USFWS special status species lists were obtained to identify species with the potential to occur within the 29 counties across Texas and New Mexico within the ROI. Federally listed threatened, endangered, and/or candidate mammal and bird species with potential to occur under the airspace associated with the Dyess AFB Alternative are presented in Table 3.8-2.

Table 3.8-2. Federally Listed Species Known to Occur or With Potential to Occur Under the Dyess AFB Alternative Airspace

Common Name	Scientific Name	Protection Status	Airspace Unit (MOA/ATCAA)	USFWS Designated Critical Habitat Under the Airspace?	Potential for Occurrence Under the Airspace
Birds					
Lesser Prairie-Chicken	<i>Tympanuchus pallidicinctus</i>	Endangered	Lancer Lancer Bridge Pecos Bronco	None	Yes. Species potential habitat includes the ROI. Prefers shortgrass prairies of the southern Great Plains.
Northern Aplomado Falcon	<i>Falco femoralis septentrionalis</i>	Endangered (Texas); Experimental Population, Non-Essential (New Mexico)	Lancer Lancer Bridge Pecos Bronco	None	Yes. Species potential habitat includes the ROI. Historical range included Arizona, New Mexico, Texas. Aplomado falcons inhabit desert grasslands and savannas of Latin America, and formerly inhabited desert grasslands and coastal prairies of Texas, New Mexico, and southeastern Arizona.
Piping Plover	<i>Charadrius melodus</i>	Threatened	Lancer Lancer Bridge Brownwood Pecos Bronco Willie-Roscoe	None	Yes. Potential during migration through Texas but unlikely through New Mexico. Piping plovers winter in Texas along the coast. Texas is the wintering home for 35% of the known population of piping plovers.
Red Knot	<i>Calidris canutus rufa</i>	Threatened	Lancer Lancer Bridge Brownwood Bronco Willie-Roscoe	None	Yes. Potential during migration. Red knots are long-distance migrants flying more than 9,300 miles. Stopover habitat includes aquatic areas. Breeding does not occur within the ROI in the central Canadian Arctic.
Whooping Crane	<i>Grus americana</i>	Endangered	Lancer Brownwood Willie-Roscoe	None	Yes. Potential during migration between Canada and the Texas coast. Whooping cranes utilize use a variety of habitats including sloughs, marshes, rivers, lakes, ponds, croplands, and pastures. Arrive on the Texas coast between late October and mid-December.

Table 3.8-2. Federally Listed Species Known to Occur or With Potential to Occur Under the Dyess AFB Alternative Airspace

Common Name	Scientific Name	Protection Status	Airspace Unit (MOA/ATCAA)	USFWS Designated Critical Habitat Under the Airspace?	Potential for Occurrence Under the Airspace
Golden-Cheeked Warbler	<i>Dendroica chrysoparia</i>	Endangered	Brownwood	None	Yes. Preferred habitat occurs within the ROI. Golden-cheeked warbler habitat includes woodlands with tall Ashe juniper, oaks, and other hardwood trees.
Mexican Spotted Owl	<i>Strix occidentalis lucida</i>	Threatened	Pecos	None	Unlikely. Species' historical range is outside of the ROI.
Southwestern Willow Flycatcher	<i>Empidonax traillii extimus</i>	Endangered	Pecos	None	Yes. Potential spring and fall migrant. Breeding habitat does not occur within the ROI.
Yellow-Billed Cuckoo	<i>Coccyzus americanus</i>	Threatened	Pecos Bronco	None	Yes. Species' potential habitat includes the ROI. In New Mexico, the species is found in riparian zones with dense understory vegetation, most commonly in the south and along major drainages. In western Texas, the species is considered common and widespread throughout the state. Preferred habitat includes open woodlands with dense undergrowth, overgrown orchards and pastures, moist thickets, and willow groves along stream banks.
Mammals					
Tri-Colored Bat	<i>Perimyotis subflavus</i>	Proposed Endangered	Lancer Lancer Bridge Brownwood Bronco	None	Yes. Species' potential habitat includes the ROI. Found in a variety of terrestrial habitats, including grasslands, old fields, suburban areas, orchards, urban areas, and woodlands.
New Mexico Meadow Jumping Mouse	<i>Zapus hudsonius luteus</i>	Endangered	Pecos	None	Unlikely. ROI occurs outside of the species' current native distribution.

Table 3.8-2. Federally Listed Species Known to Occur or With Potential to Occur Under the Dyess AFB Alternative Airspace

Common Name	Scientific Name	Protection Status	Airspace Unit (MOA/ATCAA)	USFWS Designated Critical Habitat Under the Airspace?	Potential for Occurrence Under the Airspace
Penasco Least Chipmunk	<i>Tamias minimus atristriatus</i>	Proposed Endangered	Pecos	None	Unknown. The Penasco least chipmunk has a narrow range and small population size—only two known populations occur in the White and Sacramento Mountain ranges in Otero and Lincoln Counties in New Mexico.

Sources: (DAF, 2021e; USFWS, 2023b)

Key: ATCAA = Air Traffic Control Assigned Airspace; MOA = Military Operating Area; ROI = region of influence; USFWS = U.S. Fish and Wildlife Service

Note:

The ROI for federally listed species under the airspace only applies to various bird and mammal species known to occur or with potential to occur in these areas and that have the potential to be impacted by noise associated with B-21 aircraft operations.

GIS data queries verified that there are federally designated critical habitats under the Lancer, Lancer Bridge, Brownwood, and Pecos MOAs airspace. Federally designated critical habitat for two fish species, the endangered smalleye shiner (*Notropis buccula*) and sharpnose shiner (*Notropis oxyrhynchus*) occurs under the Lancer airspace. Federally designated critical habitat for two proposed endangered clam species, Texas fatmucket (*Lampsilis bracteata*) and Texas pimpleback (*Quadrula petrina*), occurs under the Brownwood airspace. Federally designated critical habitat for one fish, the threatened Pecos bluntnose shiner (*Notropis simus pecosensis*), is present under the Pecos MOA airspace. However, because no ground disturbance would occur under the existing airspace during B-21 aircraft operations, fish and clam species, and their associated critical habitats, were excluded from the analysis and are not discussed further in this EIS. The DAF determines there would be *no effect* to smalleye shiner critical habitat, sharpnose shiner critical habitat, Texas fatmucket critical habitat, Texas pimpleback critical habitat, and Pecos bluntnose shiner critical habitat.

Migratory Birds

The Lancer, Lancer Bridge, Brownwood, and Pecos MOAs are all within the Central Flyway migration route (Figure 3.8-1). The Lancer MOA is located within the USFWS designated BCR 18 Shortgrass Prairie and BCR 19 Central Mixed-Grass Prairie. The Brownwood MOA is located within the USFWS designated BCR 19 Central Mixed-Grass Prairie and BCR 21 Oaks and Prairies. The Pecos MOA is located within the USFWS designated BCR 16 Southern Rockies/Colorado Plateau, BCR 18 Shortgrass Prairie, and BCR 35 Chihuahuan Desert (USFWS, 2021).

Bald and Golden Eagles

Bald and golden eagle habitats are present under the Lancer, Lancer Bridge, Brownwood, and Pecos MOAs airspace.

The Texas bald eagle population is divided into two populations: breeding birds and nonbreeding or wintering birds. Breeding populations occur primarily in the eastern half of the state and along coastal counties from Rockport to Houston. Nonbreeding or wintering populations are located primarily in the Panhandle, Central, and East Texas, and in other areas of suitable habitat throughout the state (TPWD, 2020). Golden eagles are year-round residents in Texas.

In New Mexico, bald eagles are primarily migratory, supporting large populations of wintering eagles. Migrating bald eagles can be found near rivers and lakes, where occasional tall trees provide lookout perches and night roosts (New Mexico Game and Fish, 1996). Golden eagles breed locally in suitable habitats throughout the state. Suitable habitat in New Mexico occurs primarily in areas of mountain cliffs or canyons, or rimrock terrain adjacent to open desert or grassland areas (NMACP, n.d.).

Bronco MOA

Wildlife

The Bronco MOA (3 and 4) airspace is located over the High Plains ecoregion in western Texas and southeastern New Mexico (EPA, 2021b). Common mammalian wildlife within the High Plains Dry ecoregion includes coyotes (*Canis latrans* Say), skunks (*Mephitis mephitis*), swift fox (*Vulpes velox*), muledeer (*Odocoileus hemionus*), whitetail deer (*Odocoileus virginianus*), pronghorn (*Antilocapra americana*), raccoons (*Procyon lotor*), armadillo (*Dasypus novemcinctus* Linnaeus), black-tailed prairie dogs (*Cynomys ludovicianus*), gophers (various species), mice (various species), and bats (various species) (TPWD, 2022b).

Texas is utilized by hundreds of species of migratory birds annually. Bird species that typically occur in the High Plains ecoregion include various species of doves, sparrows, swallows, finches, warblers, owls, hawks, falcons, and various shorebirds and waterfowl. The most commonly species observed include northern cardinal, northern mockingbird, white-winged dove, blue jay, Carolina chickadee (*Poecile carolinensis*), Carolina wren (*Thryothorus ludovicianus*), house sparrow (*Passer domesticus*), brown-headed cowbird (*Molothrus ater*), and roadrunner (*Geococcyx californianus*). Wild turkey, mourning dove, scaled quail (*Callipepla squamata*), and bobwhite are common game birds (TPWD, 2022b).

Texas and New Mexico are home to a diverse group of reptiles that consist of lizards, snakes, turtles, and crocodilians (alligators). Amphibians in Texas and New Mexico include multiple species of salamanders, frogs, and toads.

Special Status Species

For B-21 aircraft operations under the Bronco MOA airspace, USFWS special status species lists, by county, were obtained to identify species with the potential to occur within the nine counties across Texas and New Mexico within the ROI (USFWS, 2023b). Federally listed threatened, endangered, and/or candidate mammal and bird species with potential to occur under the Bronco MOA airspace are presented in Table 3.8-2. GIS data queries verified that there is no federally designated critical habitat under the Bronco MOA airspace.

Migratory Birds

Airspace under the Bronco MOA is located within the USFWS-designated BCR 18 Shortgrass Prairie, under the Central Flyway migration route (Figure 3.8-1) (USFWS, 2021).

Bald and Golden Eagles

Bald and golden eagle habitats are present under the Bronco MOA airspace. Bald eagles that would occur under the Bronco MOA airspace are likely part of the nonbreeding or wintering populations. In New Mexico, migrating bald eagles can be found near rivers and lakes, where occasional tall trees provide look-out perches and night roosts. Golden

eagles are year-round residents in Texas and New Mexico (Texas Breeding Bird Atlas, 2007; NMACP, n.d.).

Willie-Roscoe ATCAA

Wildlife

The Willie-Roscoe ATCAA is located over four ecoregions in north central Texas—High Plains, Southwestern Tablelands, Great Central Plains, and Edwards Plateau (EPA, 2022a). Common mammalian species include pronghorn, coyote, swift fox, whitetail deer, raccoons, skunks, armadillo, black-tailed prairie dogs, pocket gophers (*Cratogeomys castanops*), collared peccary (*Pecari tajacu*), various mice, and various bat species.

Bird species that typically occur in central Texas include bobwhites, scaled quail, mourning doves, and a variety of songbirds, waterfowl, and shorebirds (TPWD, 2022c).

The four ecoregions are home to multiple species of reptiles and amphibians. Common amphibians include plains spadefoot toad (*Spea bombifrons*), western spadefoot toad (*Spea hammondi*), plains leopard frog (*Lithobates blairi*), Great Plains toad (*Anaxyrus cognatus*), and spotted chorus frog (*Pseudacris clarkii*). Reptiles include species such as Texas horned lizard, round-tailed horned lizard (*Phrynosoma modestum*), Great Plains skink (*Plestiodon obsoletus*), western diamondback rattlesnake (*Crotalus atrox*), western cottonmouth (*Agkistrodon piscivorus leucostoma*), and plains black-headed snake (*Tantilla nigriceps*) (iNaturalist, 2023).

Special Status Species

For B-21 aircraft operations under the Willie-Roscoe ATCAA airspace, USFWS special status species lists, by county, were obtained to identify species with the potential to occur within the eight counties across Texas within the ROI (USFWS, 2023b). Federally listed threatened, endangered, and/or candidate mammal and bird species with potential to occur under the Willie-Roscoe ATCAA airspace are presented in Table 3.8-2. GIS data queries verified that there is no federally designated critical habitat under the Willie-Roscoe ATCAA airspace.

Migratory Birds

Airspace under the Willie-Roscoe ATCAA is located within the USFWS-designated BCR 18 Shortgrass Prairie and BCR 19 Central Mixed Grass Prairie under the Central Flyway migration route (Figure 3.8-1) (USFWS, 2021).

Bald and Golden Eagles

Bald and golden eagle habitats are present under the Willie-Roscoe ATCAA. As previously stated, the Texas bald eagle population is divided into breeding birds and nonbreeding or wintering birds (TPWD, 2020). Bald eagles that would occur under the Willie-Roscoe ATCAA are likely part of the nonbreeding or wintering populations. Golden eagles are year-round residents in Texas; however, best available datasets indicate there are no known nests in central Texas (Texas Breeding Bird Atlas, 2007).

3.8.1.2.3 Whiteman AFB

Vegetation

Whiteman AFB is located in the Central Irregular Plains–Wooded Osage Plains ecoregion (Chapman et al., 2002). Vegetation associated with this ecoregion includes a mosaic of oak–hickory woodland and tallgrass prairie. Historical land use of the area included a mosaic of woodland, cropland, and grassland or rangeland habitat (Whiteman AFB, 2021b).

Whiteman AFB is composed of improved or semi-improved grounds, primarily consisting of landscaped areas and mowed former agricultural fields. Unimproved grounds at the installation include open prairie, mixed wood and hardwood urban forests, green belt areas, streams, and ponds. Vegetation management at Whiteman AFB is guided by the INRMP (Whiteman AFB, 2021b), Forest Management Plan (Whiteman AFB, 2018), and the BASH Plan (Whiteman AFB, 2022b).

Wildlife

Information on wildlife occurring on Whiteman AFB is provided in the INRMP (Whiteman AFB, 2021b). Whiteman AFB supports a diversity of wildlife species common to an agricultural landscape including deer mice (*Peromyscus maniculatus*), fox (*Vulpes vulpes*), white-tailed deer (*Odocoileus virginianus*), wild turkey, coyote (*Canis latrans*), blackbirds (*Turdus merula*), robins (*Turdus migratorius*), crows (*Corvus brachyrhynchos*), barn swallows (*Hirundo rustica*), blue jays (*Cyanocitta cristata*), turkey vultures (*Cathartes aura*), downy woodpeckers (*Picoides pubescens*), and field sparrows (*Spizella pusilla*). Hardwood forests and riparian habitats support a wide variety of amphibian and reptile species, including toads, frogs, lizards, turtles, and snakes. Fish species are limited to the installation ponds that are periodically stocked with largemouth bass (*Micropterus salmoides*), crappie (*Pomoxis* spp.), and bluegill (*Lepomis macrochirus*) for recreational fishing. At Whiteman AFB, deer, coyotes, and large concentrations of birds pose wildlife aircraft strike hazards. As a result, airfields and runways are monitored for the presence of wildlife activity (Whiteman AFB, 2022b).

Special Status Species

USFWS and Missouri Department of Conservation (MDC) special status species lists, by county, were obtained to identify species with the potential to occur within the ROI. The USFWS IpaC system was accessed online to request an *Official Species List* to identify species protected under Section 7 of the ESA that could occur within the ROI (Project Code: 2022-0011639) (see Appendix D, Biological Resources Supporting Information) (USFWS, 2023c). Table 3.8-3 presents these species. The MDC lists of rare species found in Johnson County, Missouri, are included in Appendix D (MDC, 2022a).

Table 3.8-3. Federally Listed Species With Potential to Occur at Whiteman AFB

Common Name	Scientific Name	Protection Status	Potential for Occurrence at Whiteman AFB
Mammals			
Indiana Bat	<i>Myotis sodalis</i>	Endangered	Yes. Potential suitable foraging habitat occurs along the stream corridors with well-developed riparian woods. Roosting habitat may be present within hardwood forested areas within the installation and surrounding areas (northwest corner of the base, within the Royal Oaks Golf Course, and in Knob Noster Park).
Tri-Colored Bat	<i>Perimyotis subflavus</i>	Proposed Endangered	
Gray Bat	<i>Myotis grisescens</i>	Endangered	Yes. Potential suitable foraging habitat occurs along the stream corridors and riparian woods. Suitable roosting habitat (caves) not present on base.
Northern Long-Eared Bat	<i>Myotis septentrionalis</i>	Endangered	Yes. Potential suitable foraging habitat occurs along the stream corridors and riparian woods. Suitable roosting habitat (i.e., caves and mines) not present on base.
Insects			
Monarch Butterfly	<i>Danaus plexippus</i>	Candidate	Potential fall and spring migrant throughout the state. Monarchs migrate north to the United States and Canada in March from the mature oyamel fir forests in the mountains of central Mexico. The fall migration back to overwintering sites in Mexico is from August to November.

Sources: (USFWS, 2023c; Whiteman AFB, 2021b; USFWS, 2019a; USFWS, 2019b; USFWS, 2019c; USFWS, 2019d; USFWS, 2020b)
 Key: AFB = Air Force Base

No federally listed or proposed for listing threatened, endangered, or candidate species are currently known to occur on Whiteman AFB. This assessment is based on historical surveys completed by the USDA, the MDC, and the base Natural Resource Manager as part of the installation's INRMP and natural resource program, with the most recent surveys completed in 2020 (Whiteman AFB, 2021b). Additionally, no critical habitat occurs on or adjacent to Whiteman AFB (USFWS, 2023c). Potential suitable habitats (i.e., foraging and roosting) for federally listed and proposed for listing bats are present in the mixedwood and hardwood urban forests, green belt areas, streams and ponds on base. However, there are no known roost locations on the base (Donaldson, 2023).

The state-listed endangered northern harrier has been observed soaring within the installation's airspace, however there are no known nesting locations on base (Donaldson, 2023). The northern harrier is an uncommon migrant in Missouri. The species utilizes prairies, marshes, and hay fields as habitat within the state (MDC, 2022b).

Migratory Birds

According to the *USFWS Birds of Conservation Concern* (USFWS, 2021), Whiteman AFB is located within BCR 22 Eastern Tallgrass Prairie Region, under the Mississippi Flyway migration route, which is a migratory bird corridor used by large populations of passerines, raptors, shorebirds, and waterfowl (Figure 3.8-1). Thirty-nine BCC occur within BCR 22 (USFWS, 2021).

At Whiteman AFB, migratory birds present strike hazards and safety risks; as such, Whiteman AFB maintains a BASH Plan that establishes an overall bird/wildlife control program to minimize aircraft exposure to potentially hazardous wildlife strikes. The BASH Plan delineates responsibilities for minimizing potential hazards in the areas where tasked units assigned to Whiteman AFB conduct flying operations. In coordination with the MDC, Whiteman AFB annually reports to the USFWS Migratory Bird Office regarding migratory bird activity and other wildlife control at the installation (Donaldson, 2022). Additionally, a USDA wildlife biologist employed at Whiteman AFB manages potential wildlife hazards by removal, dispersal, and wildlife control methods to avoid any BASH incidents. Commonly controlled avian species include turkey vultures (*Cathartes aura*), pigeons (*Columba livia*), blackbirds (*Turdus merula*), and wild turkeys (Whiteman AFB, 2022b). BASH habitat is managed intensively around the airfield environment to reduce the threat to human health and safety.

Bald and Golden Eagle Protection Act

No bald or golden eagles are known to nest at or in the vicinity of Whiteman AFB. Bald eagles have been observed infrequently within the airspace utilized by Whiteman AFB (Donaldson, 2022). Although suitable bald eagle habitat is present in the mixed forest and open-water habitats near the vicinity of the base, bald eagles have not been reported in Johnson County, Missouri (MDC, 2023). Golden eagles do not live in Missouri year-round but could occur as winter migrants in small numbers (MDC, 2009).

3.8.1.2.4 Whiteman AFB Airspace and Range Utilization

Ozark ATCAA

Wildlife

The Ozark ATCAA (A, B, C) airspace is located over four Missouri ecoregions including the Ozark Highlands, Central Irregular Plains, Western Corn Belt Plains, and Interior River Valleys and Hills (EPA, 2021b). Common mammalian wildlife that occurs in these ecoregions include cottontail and rabbits (various species), skunks (*Mephitis mephitis*), marmots (*Marmota monax*), squirrels (various species), opossums (*Didelphis virginiana*), armadillos (*Dasypus novemcinctus mexicanus*), voles (various species), mice (various species), bats (various species), deer (*Odocoileus virginianus*), bobcats, beavers (*Castor canadensis*), river otters (*Lontra canadensis*), and American badgers (*Taxidea taxus*).

Common bird species include mourning doves, cardinals, American robins (*Turdus migratorius*), blue jays, woodpeckers (various species), titmice (various species), whip-poor-wills (*Caprimulgus vociferus*), mockingbirds, sparrows (various species), hawks (various species), owls (various species), wild turkeys, and multiple waterfowl varieties (such as ducks and geese). Airspace within the Ozark ATCAA is located within the North American Mississippi and Central Flyways, migration routes used by over 400 bird species annually (Audubon, 2020a).

Amphibians and reptiles of the Ozark Highlands, Central Irregular Plains, and Interior River Lowlands ecoregions include a wide variety of frogs, toads, skinks, salamanders, lizards, turtles, and snakes.

Special Status Species

For B-21 aircraft operations under the Ozark ATCAA, USFWS special status species lists, by county, were obtained to identify species with the potential to occur within the 62 counties across Kansas, Missouri, and Oklahoma within the ROI (USFWS, 2023b). Federally listed threatened, endangered, and/or candidate mammal and bird species with potential to occur under the Ozark ATCAA are presented in Table 3.8-4. GIS data queries verified that there is federally designated critical habitat under the Ozark ATCAA for four species: the federally endangered Neosho mucket (*Lampsilis rafinesqueana*), federally threatened Niangua darter (*Etheostoma nianguae*), federally endangered Hine's emerald dragonfly, and federally endangered Indiana bat (*Myotis sodalis*) (Figure 3.8-2). No ground disturbance would occur under the proposed training airspace and aircraft noise from operations greater than 3,000 feet AGL is not considered to have appreciable effects to freshwater mussels, fish, and insect species, and their associated critical habitats. The DAF determines there would be *no effect* to Neosho mucket, Niangua darter, and Hine's emerald dragonfly, and their associated critical habitat. Therefore, they were excluded from the analysis and are not discussed further in this EIS.

Migratory Birds

Airspace under the Ozark ATCAA is located within the USFWS-designated BCR 22 Eastern Tallgrass Prairie and BCR 24 Central Hardwoods under the Mississippi Flyway migration route (Figure 3.8-1) (USFWS, 2021).

Bald and Golden Eagles

Bald and golden eagle wintering habitats are present under the Ozark ATCAA. In Missouri, bald eagles are usually observed near lakes, rivers, and marshes as they forage for fish or carrion (MDC, 2022c). Golden eagles do not live in Missouri year-round but could occur as winter migrants in small numbers (MDC, 2009).

Cannon MOA

Wildlife

The Cannon MOA (A and B) is located over the Ozark Highlands ecoregion. Common mammalian wildlife that occurs in this ecoregion likely includes cottontails and rabbits (various species), skunks, marmots, squirrels (various species), opossums, armadillos, mice (various species), bats (various species), deer, bobcats, beavers, otters, and badgers.

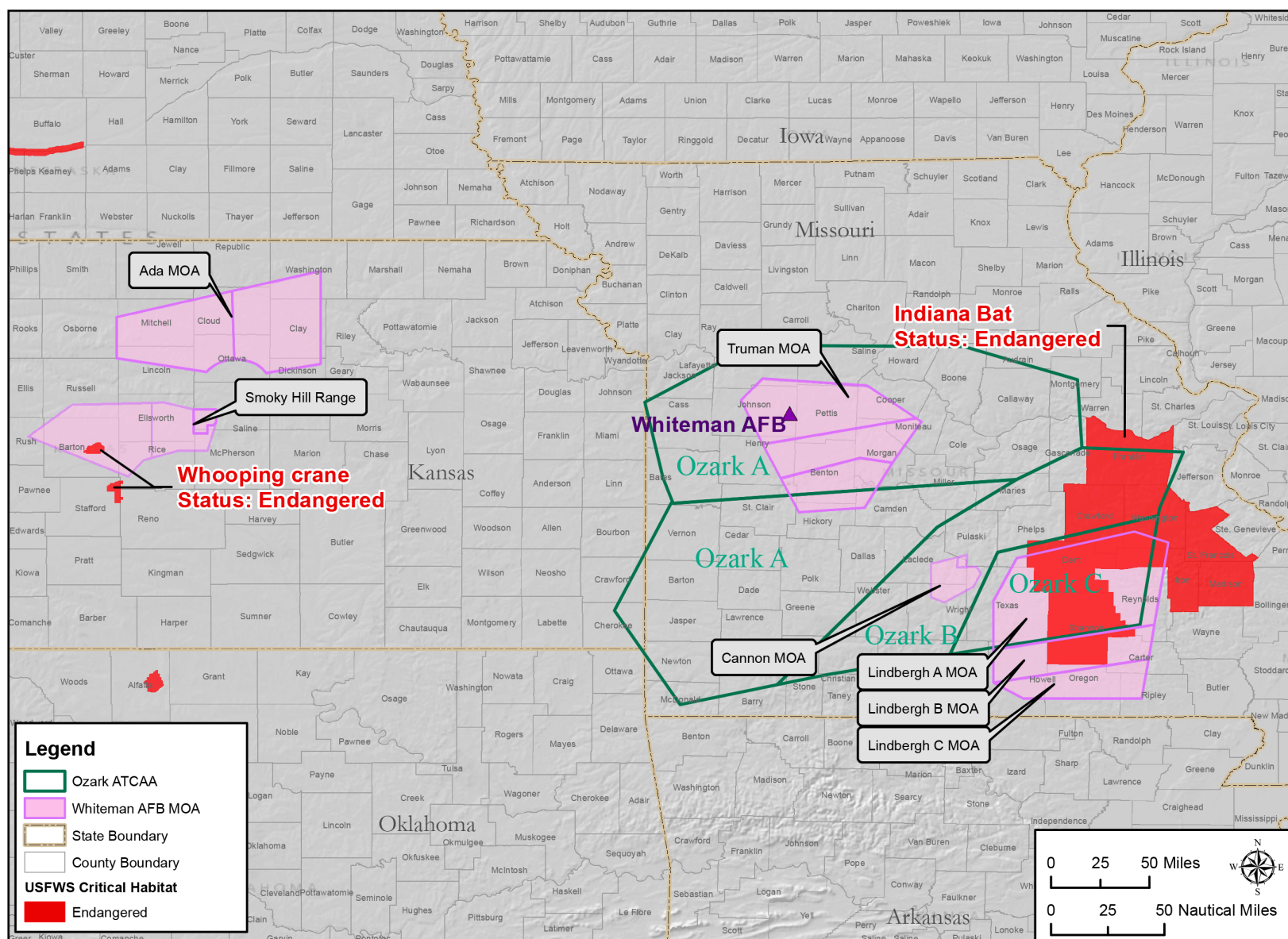


Figure 3.8-2. Critical Habitat Under Whiteman AFB Airspace

Table 3.8-4. Federally Listed Species Known to Occur or With Potential to Occur Under the Whiteman AFB Alternative Airspace

Common Name	Scientific Name	Protection Status	Airspace Unit (MOA/ATCAA)	USFWS Designated Critical Habitat Under the Airspace?	Potential for Occurrence Under the Airspace
Birds					
Whooping Crane	<i>Grus americana</i>	Endangered	Ada Cannon Ozark Smoky Hill Range	Smoky Hill Range	Yes. Whooping cranes are regular spring and fall transients through Kansas. Whooping cranes utilize sloughs, marshes, rivers, lakes, ponds, croplands, and pastures.
Red Knot	<i>Calidris canutus rufa</i>	Threatened	Cannon Ozark	None	Yes. Potential during migration. Red knots are long-distance migrants flying more than 9,300 miles. Stopover habitat includes aquatic areas. Breeding occurs outside of the ROI in the central Canadian Arctic.
Piping Plover	<i>Charadrius melodus</i>	Threatened	Cannon Ozark	None	Yes. Potential during migration. The piping plover is a biannual migrant in Oklahoma, traveling between its nesting habitat to the north of Oklahoma (the Great Plains population nests from Kansas to southern Canada), and its wintering grounds on the Gulf coast.
Mammals					
Indiana Bat	<i>Myotis sodalis</i>	Endangered	Cannon, Lindbergh, Ozark Truman	Lindbergh Ozark	Yes. Known occurrences in the ROI. Missouri's numerous cave systems and sinkholes, provide year-round roosting locations for bat populations. In Kansas, bats utilize wooded or semi-wooded areas.
Gray Bat	<i>Myotis grisescens</i>	Endangered	Cannon, Lindbergh, Ozark Truman	None	
Northern Long-Eared Bat	<i>Myotis septentrionalis</i>	Endangered	Ada Cannon, Lindbergh, Ozark	None	Yes. Known occurrences within the ROI. Species range includes 39 states. Roost in caves, mines, and live and dead trees.

Table 3.8-4. Federally Listed Species Known to Occur or With Potential to Occur Under the Whiteman AFB Alternative Airspace

Common Name	Scientific Name	Protection Status	Airspace Unit (MOA/ATCAA)	USFWS Designated Critical Habitat Under the Airspace?	Potential for Occurrence Under the Airspace
			Smoky Hill Range Truman		
Ozark Big-Eared Bat	<i>Corynorhinus townsendii ingens</i>	Endangered	Cannon Ozark	None	Unknown. Found only in a small number of caves in Arkansas, Oklahoma, and Missouri. Inhabits caves year-round. The caves typically are in oak–hickory hardwood forest.
Tri-Colored Bat	<i>Perimyotis subflavus</i>	Proposed Endangered	Cannon Ozark Truman	None	Yes. Species potential habitat includes the ROI. Found in a variety of terrestrial habitats, including grasslands, old fields, suburban areas, orchards, urban areas and woodlands.

Source: (USFWS, 2023b)

Key: ATCAAs = Air Traffic Control Assigned Airspaces; MOA = Military Operating Area; ROI = region of influence; USFWS = U.S. Fish and Wildlife Service

Note:

The ROI for federally listed species under the airspace only applies to various bird and mammal species known to occur or with potential to occur in these areas and that have the potential to be impacted by noise associated with B-21 aircraft operations.

Common bird species include mourning doves, cardinals, American robins, blue jays, woodpeckers (various species), titmice (various species), whip-poor-wills, mockingbirds, sparrows (various species), hawks (various species), owls (various species), wild turkeys, and multiple waterfowl varieties (such as ducks and geese).

Airspace within the Cannon MOA is located within the North American Mississippi Flyway, migration routes used by over 400 bird species annually (Audubon, 2020a).

Amphibians and reptiles of the Ozark Highlands ecoregion include a wide variety of frogs, toads, skinks, salamanders, lizards, turtles, and snakes.

Special Status Species

For B-21 aircraft operations under the Cannon MOA airspace, USFWS special status species lists, by county, were obtained to identify species with the potential to occur within the four counties across Missouri within the ROI (USFWS, 2023b). Federally listed threatened, endangered, and/or candidate mammal and bird species with potential to occur under the Cannon MOA airspace are presented in Table 3.8-4. GIS data queries verified that there is no federally designated critical habitat under the Cannon MOA airspace.

Migratory Birds

Airspace under the Cannon MOA is located within the USFWS-designated BCR 24 Central Hardwoods under the Mississippi Flyway migration route (Figure 3.8-1) (USFWS, 2021).

Bald and Golden Eagles

Bald and golden eagle wintering habitats are present under the Cannon MOA airspace. In Missouri, bald eagles are usually observed near lakes, rivers, and marshes as they forage for fish or carrion (MDC, 2022c). Golden eagles do not live in Missouri year-round but could occur as winter migrants in small numbers (MDC, 2009).

Ada MOAs and Smoky Hill Range

Wildlife

The Ada MOAs (East and West) and Smoky Hill Range (Smoky MOA, Bison MOA, and R-3601A/B) are located over the Central Great Plains and Flint Hills ecoregions (EPA, 2021b). Common mammalian wildlife within these ecoregions includes cottontail and rabbits (various species), skunks (*Mephitis mephitis*), marmots, squirrels (various species), opossums, armadillos (*Dasypus novemcinctus mexicanus*), voles (various species), mice (various species), deer (*Odocoileus virginianus*), plains bison (*Bos bison*), black-tailed prairie dogs (*Cynomys ludovicianus*), and American badgers (*Taxidea taxus*).

The Central Great Plains ecoregion is among the top 10 ecoregions in the number of reptile species and is an important breeding area for endemic Great Plains bird species. It also contains very important stopover sites for migratory birds, particularly on wetland sites scattered throughout this region. Native grassland bird species include the greater

prairie-chicken (*Tympanuchus cupido*), upland sandpiper (*Bartramia longicauda*), Swainson's hawk (*Buteo swainsoni*), prairie falcon (*Falco mexicanus*), various lark species, longspurs (various species), sparrows (various species), dickcissel (*Spiza americana*), and bobolink (*Dolichonyx oryzivorus*) (WWF, 2022).

Special Status Species

For B-21 aircraft operations under the Ada MOAs and Smoky Hill Range, USFWS special status species lists, by county, were obtained to identify species with the potential to occur within the 10 counties across Kansas within the ROI (USFWS, 2023b). Federally listed threatened, endangered, and/or candidate mammal and bird species with potential to occur under the Ada MOAs and Smoky Hill Range airspace are presented in Table 3.8-4. GIS data queries verified that there is federally designated critical habitat under the Smoky Hill Range airspace for the federally endangered whooping crane (*Grus americana*) (Figure 3.8-2).

Migratory Birds

Airspace under the Ada MOAs and Smoky Hill Range are located within the USFWS designated BCRs 19 Central Mixed Grass Prairie and BCR 22 Eastern Tallgrass Prairie under the Central Flyway migration route (Figure 3.8-1) (USFWS, 2021).

Bald and Golden Eagles

Bald and golden eagle wintering habitats are present under the Ada MOAs and Smoky Hill Range airspace. Bald eagles utilize aquatic habitats (coastal areas, river, lakes, and reservoirs) with forested shorelines or cliffs in North America (USFWS, 2015). Throughout their range they select large roost trees that are open and accessible. Bald eagles winter primarily in coastal estuaries and river systems. Golden eagles are less likely to occur but may be observed as rare migrants or possible winter residents in small numbers. Preferred habitats include open mountains, foothills, plains, and open country (Audubon, 2020b). In Kansas, golden eagles occur most regularly over open grasslands in the western part of the state (KDWP, 2022).

Lindbergh MOAs

Wildlife

The Lindbergh MOAs (A, B, and C) are located within the Ozark Highlands ecoregion (EPA, 2021b). Common mammalian wildlife that likely occur under the airspace in this ecoregion include rabbits, skunks, marmots, squirrels (various species), opossums, armadillos, voles (various species), mice (various species), deer, river otters (*Lontra canadensis*), muskrats (*Ondatra zibethicus*), bobcats, and bats (various species). Common bird species include mockingbirds, sparrows (various species), cardinals, American robins, blue jays, woodpeckers (various species), whip-poor-wills, hawks (various species), owls (various species), wild turkeys, and multiple waterfowl varieties (such as ducks and geese).

Lakes, creeks, streams, and ponds within the ecoregion support various fish, amphibians, and reptiles such as lizards, salamanders, toads, frogs, snakes, and turtles. Some common species known to occur include American toad (*Bufo americanus*), northern spring peeper (*Pseudacris crepitans crucifer*), gray treefrogs (*Hyla cinerea*), western chorus frog (*Pseudacris triseriata triseriata*), bullfrog (*Rana catesbeiana*), southern leopard frog (*Rana utricularia*), box turtles (various species), snapping turtles (various species), red-eared sliders (*Trachemys scripta elegans*), softshell turtles (various species), and multiple species of snakes, lizards, and skinks (National Park Service, 2015; Washington University, 2020).

Special Status Species

For B-21 aircraft operations within the Lindbergh MOA airspace, USFWS special status species lists were obtained to identify species with the potential to occur within the 16 counties across Missouri within the ROI (USFWS, 2023b). Federally listed threatened, endangered, and/or candidate mammal and bird species with potential to occur under the Lindbergh MOAs airspace are presented in Table 3.8-4. GIS data queries verified that there is federally designated critical habitat for the federally endangered Indiana bat (*Myotis sodalis*) under the Lindbergh MOA airspace (Figure 3.8-2).

Migratory Birds

The Lindbergh MOA is located within the USFWS-designated BCR 24 Central Hardwoods under the Mississippi Flyway migration route (Figure 3.8-1) (USFWS, 2021).

Bald and Golden Eagles

Bald and golden eagle habitats are present under the Lindbergh MOA airspace. In Missouri, bald eagles are usually observed near lakes, rivers, and marshes as they forage for fish or carrion (MDC, 2022c). Golden eagles do not live in Missouri year-round but could occur as winter migrants in small numbers (MDC, 2009).

Truman MOAs

Wildlife

The Truman MOAs (A, B, C) are located over four ecoregions: the Ozark Highlands, the Central Irregular Plains, the Western Corn Belt Plains, and the Interior River Valleys and Hills (EPA, 2021b). These ecoregions support a wide variety of wildlife species. Common mammalian wildlife that likely occur under the airspace include rabbits, muskrats, raccoons, skunks, squirrels, opossums, foxes, armadillos, bats, various species of mice and voles, deer, bobcats, and coyotes (iNaturalist, 2022). Common bird species include cardinals, blue jays, American robins, mourning doves, various woodpecker species, American crows (*Corvus brachyrhynchos*), European starlings (*Sturnus vulgaris*), common grackle (*Quiscalus quiscula*), Carolina wrens (*Thryothorus ludovicianus*), eastern bluebirds (*Sialia sialis*), various finches, swallows, and sparrows (MBS, 2022).

Amphibians and reptiles include the various species of frogs, toads, skinks, salamanders, turtles, lizards, and snakes (Daniel & Edmond, 2017).

Special Status Species

For B-21 aircraft operations within the Truman MOAs airspace, USFWS special status species lists were obtained to identify species with the potential to occur within 12 counties in Missouri (USFWS, 2023b). Federally listed threatened, endangered, and/or candidate mammal and bird species with potential to occur under the Truman MOAs airspace are presented in Table 3.8-4. GIS data queries verified that there is no federally designated critical habitat under the Truman MOAs (Figure 3.8-2).

Migratory Birds

The Truman MOAs are located within the USFWS-designated BCR 22 Eastern Tallgrass Prairie and BCR 24 Central Hardwoods under the Mississippi Flyway migration route (Figure 3.8-1) (USFWS, 2021).

Bald and Golden Eagles

Bald and golden eagle habitats are present under the Truman MOAs airspace. In Missouri, bald eagles are usually seen near lakes, rivers, and marshes as they forage for fish or carrion (MDC, 2022c). Golden eagles do not live in Missouri year-round but may occur as winter migrants in small numbers (MDC, 2009).

3.8.1.3 Analysis Methodology

The first step in the analysis of potential impacts to biological resources was to determine and map out the locations of sensitive habitats and species in relation to the Proposed Action. Next, areas of overlap for the Proposed Action and sensitive habitats and species were identified. Scientific literature was reviewed for studies that examined similar types of impacts to biological resources. Literature review included an analysis of basic characteristics and habitat requirements of each sensitive species. Where available, information was also gathered relative to management considerations and threats to each sensitive species. Impact analysis was then conducted based on the information gathered from the literature review and correspondence with experts in these areas. The analysis included an assessment of the impacts on biological resources resulting from both construction activities and aircraft operations.

Impacts to biological resources for beddown actions at either basing location could result from activities associated with construction, demolition, and renovation projects as well as from aircraft operations on the installation airfields including noise effects and bird/wildlife aircraft strike considerations (Section 3.3, Noise, and Section 3.12, Health and Safety).

Impacts to biological resources occurring under the airspace proposed for use for B-21 operations would result from associated overflight noise and bird–aircraft collisions. Aircraft noise may result in adverse health and environmental impacts to wildlife (a review

of current literature evaluating potential noise effects on wildlife is presented in the Noise Supporting Information document, Section 1.5.11 Effects on Domestic Animals and Wildlife). Bird–aircraft collisions pose BASH and safety concerns.

The significance of potential impacts to biological resources was determined based on (1) the importance of the resource (i.e., legal, commercial, recreational, ecological, or scientific), (2) the proportion of the resource that would be affected relative to its occurrence in the region, (3) the sensitivity of the resource to proposed activities, and (4) the duration of ecological ramifications.

Impacts to biological resources would be significant if species or habitats of special concern would be adversely affected over relatively large areas or if disturbances would cause reductions in population size or distribution of a special status species. This analysis focuses on wildlife and special status species that occur or potentially occur on the installations or under the airspace proposed for use for B-21 operations that could be impacted by the Proposed Action and alternatives.

Changes to personnel would not impact biological resources and therefore are not discussed further for this resource area.

3.8.2 Biological Resources, Environmental Consequences

3.8.2.1 No Action Alternative Consequences

3.8.2.1.1 No Action at Dyess AFB

Under the No Action Alternative, the B-21 would not beddown at Dyess AFB, and there would be no associated construction, demolition, or renovation activities. Noise resulting from baseline aircraft operations at the airfield would continue at current levels (Section 3.3.2.1.1, Noise, No Action at Dyess AFB, Aircraft Noise, and Figure 3.3-1) because the B-21 MOB 2 beddown would not occur.

On-base biological resources would continue to be managed through the Dyess AFB INRMP and BASH program. Construction projects on base in Table 3.1-1 that have already been completed include the Dyess AFB Water Main Replacement, repair of the electrical distribution system, new dormitories, the Dyess AFB Community Center Complex, and the Dyess AFB Security Forces Conversion. Since these activities have already been completed, no additional impacts to biological resources at Dyess AFB are anticipated under the No Action Alternative. Similarly, off-base projects associated with the Wylie and Abilene ISDs would not impact biological resources at Dyess AFB because these projects primarily involve renovations of existing buildings that are not in close proximity to wildlife species or vegetation on the installation.

Present and future development that is not associated with the B-21 beddown, including projects listed in Table 3.1-1, would continue to be evaluated and implemented as appropriate. The IDP prepared for Dyess AFB provides information on potential future development and construction projects (Dyess AFB, 2018a). It is anticipated that future

development would occur in accordance with guidance in the IDP and INRMP, as applicable, and, thus, adverse impacts would not be expected.

Airspace and Range Utilization

Under the No Action Alternative, there would be no development or any other ground-disturbing activities that would cause changes to the biological resources under the Lancer, Lancer Bridge, Brownwood, Pecos, and Bronco MOAs, the Willie-Roscoe ATCAA, as well as their associated ATCAAs. Aircraft operations and airspace use and operational parameters would continue at current levels (Section 3.2.2.1.1, No Action at Dyess AFB, Aircraft Noise) because the B-21 MOB 2 beddown would not occur.

Under the baseline No Action Alternative for Dyess AFB, baseline noise levels beneath the Bronco, Brownwood, Pecos, Lancer, and Lancer Bridge MOAs, as well as the Willie-Roscoe ATCAA would range from less than 35 dBA L_{dnmr} to 51.9 dBA L_{dnmr} (Figure 3.3-2), which is below the 65 dBA DNL noise level that would potentially impact noise-sensitive wildlife listed species. Previous NEPA analyses conducted for the Realistic Bomber Training Initiative (DAF, 2000) and New Mexico Training Range Initiative (DAF, 2006) concluded that noise from aircraft operations would not significantly impact any biological resources under the Lancer and Pecos MOAs. Similarly, the B-21 MOB 1 EIS determined that baseline noise levels under the Brownwood, Pecos, and Lancer MOAs would not result in significant impacts to biological resources (see the MOB 1 EIS Section 3.7.2.2.3, Airspace and Range Utilization) (DAF, 2021e). The Air Force Reserve F-35A Operational Mission would involve F-35A aircraft operations in the Lancer and Brownwood MOAs (Table 3.1-1) and analyses indicated there would be no significant impacts to wildlife or threatened and endangered species from operations in these MOAs as well (DAF, 2020a).

Since the B-1 will continue to operate under the No Action Alternative, there is the potential that species could be impacted by low-level flights. Individual overflight noise levels (i.e., SEL) under current operations can reach up to 117 dBA. SELs above 90 dB where low-level overflights occur are associated with a number of behaviors to wildlife, such as retreating from the sound, freezing, or exhibiting a strong startle response. Animals typically exhibit continually decreasing responses to noise exposure, and this suggests habituation as the noise is not perceived as a threat. Threshold noise levels for mild responses (rising of the head, pricking ears, and scenting of the air) to wildlife range from 65 dB for to 85 dB. It has been reported that the intensities and durations of the startle response decrease with the numbers and frequencies of exposures, suggesting no long-term adverse effects. The majority of the literature suggests that domestic animal species (cows, horses, chickens) and wildlife species exhibit adaptation, acclimation, and habituation after repeated exposure to jet aircraft noise and sonic booms. The previous NEPA analyses concluded that minimal to no effects are expected to threatened, endangered, and other special status species (DAF, 2020a; DAF, 2000; DAF, 2006; DAF, 2021e). Any impact to sensitive species would likely be short term and unlikely to significantly affect the population.

Potential bird–aircraft strikes could occur where migratory flyways converge. Migratory bird species involved in bird–aircraft strike would be considered an incidental taking and would be exempt from any permitting requirement, per 50 CFR 21.42. An infrequent bird–aircraft strike would not be expected to adversely affect any populations.

3.8.2.1.2 No Action at Whiteman AFB

Under the No Action Alternative, the B-21 would not beddown at Whiteman AFB, and there would be no associated construction, demolition, or renovation activities. Noise resulting from baseline aircraft operations at the airfield would continue at current levels (Section 3.3.2.1.2, Noise, No Action at Whiteman AFB, Aircraft Noise and Figure 3.3-3) because the B-21 MOB 2 beddown would not occur.

On-base biological resources would continue to be managed through the installation's INRMP and BASH program. Construction projects on base in Table 3.1-1 that have already been completed include modernizing LeMay Gate and various other maintenance, operations, and storage facilities, a power plant, airfield pavement repairs, and water main replacement. Since these activities have already been completed, no additional impacts to biological resources at Whiteman AFB are anticipated under the No Action Alternative. Missouri DOT projects that occur off base would not impact biological resources at Whiteman AFB because these projects are not in close proximity to wildlife species or vegetation on the installation.

Present and future development that is not associated with the B-21 beddown, including projects listed in Table 3.1-1, would continue to be evaluated and implemented as appropriate. The IDP prepared for Whiteman AFB provides information on potential future development and construction projects (Whiteman AFB, 2015b). It is anticipated that future development would occur in accordance with guidance in the IDP and INRMP, as applicable, and, thus, adverse impacts would not be expected.

Airspace and Range Utilization

Under the No Action Alternative for Whiteman AFB, there would be no development or any other ground-disturbing activities that would cause changes to the biological resources under the current Whiteman AFB airspace. Aircraft operations and airspace operational parameters would continue at current levels because the B-21 MOB 2 beddown would not occur. Noise levels range from less than 35 dBA L_{dnmr} to 42.2 dBA L_{dnmr} across the Whiteman AFB SUA; well below the 65 dBA DNL level that would potentially impact noise sensitive wildlife species. Therefore, there would be no adverse impacts to wildlife associated with noise beneath the Whiteman AFB airspace under the No Action Alternative.

As previously stated in under the No Action Alternative for Dyess, there is the potential that species could be impacted where low-level overflights occur at SELs above 90 dBA under current B-2 operations (individual overflight noise levels could reach up to 112 dBA SEL). Wildlife could retreat from the sound, freeze, or have a strong startle response. Threshold noise levels for mild responses to wildlife range from 65 dB for to 85 dB.

Impacts to sensitive species would likely be short term (lasting the duration of the overflight) and unlikely to significantly affect the population.

Potential bird–aircraft strikes could occur where migratory flyways converge. Migratory bird species involved in bird–aircraft strikes would be considered an incidental taking and would be exempt from any permitting requirement per 50 CFR 21.42. An infrequent bird–aircraft strike would not be expected to adversely affect any populations.

3.8.2.2 Dyess AFB Alternative

3.8.2.2.1 Airfield Operations

Under the Dyess AFB Alternative, airfield operations would decrease from the No Action Alternative baseline conditions at Dyess AFB by approximately 4.2 percent. Additionally, noise levels at Dyess AFB would decrease by as much as 12 dBA DNL compared to the No Action Alternative (Section 3.3.2.2, Noise, Dyess AFB Alternative, Airfield Operations and Table 3.3-12). As a result, the number of acres and wildlife exposed from B-21 operations would decrease overall from establishing the B-21 MOB 2 beddown at Dyess AFB. Therefore, under the Dyess AFB Alternative, there would be a reduced potential for adverse noise effects to noise sensitive wildlife, migratory birds (including BCC), and bald or golden eagles on or near Dyess AFB as a result of B-21 airfield operations.

Similar to noise, an overall reduction in aircraft operations would likely decrease the potential for bird/wildlife aircraft strike encounters. During B-21 aircraft operations at Dyess AFB, current procedures for avoiding flight operations during periods of high concentrations of migratory birds would continue. Adherence to the existing BASH Program and the USFWS-issued Depredation Permit conditions would further minimize the risk of bird–aircraft strikes at Dyess AFB, including those for migratory birds (including BCC), and special status species birds to negligible levels. The Dyess AFB BASH Plan provides guidance for bird/wildlife strike hazard reduction in areas where flying operations are conducted. Tasked organizations such as USDA Wildlife Services and the 7 BW /Flight Safety Bird Hazard Working Group implement procedures in accordance with the plan. Procedures include (but are not limited to) reporting hazardous bird activity and altering or discontinuing flying operations; disseminating information to all assigned and transient aircrew for specific bird hazards and procedures for avoidance; eliminating or reducing environmental conditions that attract birds to the airfield; and dispersing birds on the airfield using nonlethal measures that prevent or minimize bird damage without purposefully killing or trapping birds (Dyess AFB, 2019). When nonlethal measures cannot be used, Dyess AFB abides by the USFWS-issued Depredation Permit that authorizes the take of specific species and numbers of birds. The conditions of the permit are updated annually. Additionally, all bird–aircraft strikes and hazards will continue to be reported per AFI 91-204, *Safety Investigations and Reports*, and Air Force Manual (AFMAN) 91-223, *Aviation Safety Investigations and Reports*.

Due to the overall decreases in airfield operations, the noise environment, and potential reduction in bird/wildlife-aircraft strike encounters, impacts to wildlife, special status

species, migratory birds (including BCC), and bald or golden eagles at or near Dyess AFB are not anticipated to occur under the Dyess AFB Alternative.

No federally listed species or federally designated critical habitat occur at Dyess AFB (as presented in Table 3.8-1. There is a potential for piping plover and red knot to occur during seasonal migrations but these species have not been observed or documented on the base (Laurence, 2023; Dyess AFB, 2022b). Based on the decrease in aircraft operations at Dyess AFB, there would be *no effect* to ESA-listed species or critical habitats from airfield operations under the Dyess AFB Alternative. Similarly, species of state significance (spot-tailed earless lizard and the Texas horned lizard) would not be impacted by airfield operations under the Dyess AFB Alternative.

3.8.2.2.2 Airspace and Range Utilization

Under the Dyess AFB Alternative, overall aircraft operations would decrease from baseline conditions at the Bronco MOA (by approximately 7.66 percent), the Willie-Roscoe ATCAA (by approximately 66.47 percent), the Brownwood MOA (by approximately 0.45 percent), the Lancer MOA (by approximately 23.20 percent), the Lancer Bridge MOA (by approximately 39.71 percent), and the Pecos MOA (by approximately 19.68 percent).

Resulting noise levels from B-21 aircraft operations beneath the training airspace would remain the same for Lancer Bridge MOA, Brownwood MOA, and Bronco MOA (less than 35 dBA L_{dnmr}) or would decrease by 15 dBA L_{dnmr} , 10.4 dBA L_{dnmr} , and 5.6 dBA L_{dnmr} for Pecos MOA, Lancer MOA, and Willie-Roscoe ATCAA, respectively. These training airspace areas are very large, and training operations are sufficiently spread out such that intense overflight noise events at any one location are infrequent. Overflight activity occurs less frequently than in other areas. The noise in the area and the number of acres and wildlife exposed would decrease overall as a result of establishing the B-21 MOB 2 beddown at Dyess AFB. Therefore, under the Dyess AFB Alternative, there would be a reduced potential for adverse noise effects to noise sensitive wildlife, migratory birds (including BCC), and bald or golden eagles within training airspace and ranges as a result of B-21 operations.

A reduction in aircraft operations throughout the training airspace would likely decrease the potential for bird–aircraft strike encounters or, at a minimum, pose no additional strike risks in these areas. Migratory bird species involved in bird–aircraft strike would be considered an incidental taking and would be exempt from any permitting requirement, per 50 CFR 21.42. An infrequent special status bird–aircraft strike would not be expected to adversely affect any populations. Aircraft operations would not generally occur below 3,000 feet AGL. Therefore, collision impacts with the federally listed avian species presented in Table 3.8-2 would not be likely, as these species tend to utilize elevations below 3,000 feet. Additionally, there is no federally designated critical habitat (excluding fish and mussel species) under any of the MOAs. The DAF anticipates no significant impacts to wildlife, special status species, migratory birds (including BCC), and bald or golden eagles within training airspace and ranges would occur under the Dyess AFB Alternative. The DAF determines that airspace and range utilization under the Dyess

AFB Alternative would have *no effect* on federally listed species identified in Table 3.8-2. Additionally, species or habitats of special concern would not be adversely affected or cause disturbances or reductions in population size or distribution of a special status species.

3.8.2.2.3 Facilities and Infrastructure

Vegetation and Wildlife

Under the Dyess AFB Alternative, approximately 696 acres of land would be disturbed for facilities and infrastructure projects listed in Table 2.3-4. Of which, approximately 136 acres (or about 20 percent) of the proposed construction footprint (shown in Figure 2.3-4), would occur in previously undeveloped areas. The following vegetation communities would be permanently disturbed from land clearing and construction activities in these areas: little bluestem-sideoats grama Central Great Plains grassland alliance, Ashe's juniper southeast great plains ruderal forest alliance, honey mesquite shortgrass prairie ruderal scrub alliance, and honey mesquite scrub woodland alliance. While vegetation would be removed permanently, the affected area is considered small compared with other similar habitats immediately available on base and nearby. Overall, significant impacts to these vegetation communities are not expected. Mesquite scrub is widely distributed throughout the Rolling Plains areas in Texas (TPWD, 1984). Ashe's juniper southeast great plains ruderal forest alliance is found from the Edwards Plateau in Texas, to Oklahoma, Arkansas, and Missouri (NatureServe, 2021a). Little bluestem – sideoats grama Central Great Plains grassland alliance is found largely in the central and southern Great Plains and is widespread and common (NatureServe, 2021b).

Approximately 560 acres (or 80 percent) of the proposed construction footprint would consist of previously developed areas containing pavement or previous construction and maintained turf or landscaped areas. Revegetation of temporarily disturbed areas would be conducted as directed by the base Natural Resource Manager to minimize the potential for erosion and dust generation. As such, impacts to vegetation in these areas would not be considered significant.

In addition to the above facilities and infrastructure projects, an approximately 24-acre Alternate Alert Pad and 4.2-acre Alternate Alert Road would be constructed within previously developed areas. Significant impacts to vegetation would not be anticipated as construction impacts would occur on previously disturbed areas and would not impact undeveloped lands.

Potential impacts to wildlife would include loss of mesquite habitats and exposure to construction noise from the associated facility and infrastructure projects. Wildlife utilizing the mesquite habitats within the general planned areas of construction would be permanently displaced by the development. While adult mesquite plants are not palatable and are not browsed by mammals (except for new regrowth sprouts), they provide cover for many wildlife species on site such as birds and small mammals. Mesquite trees, understory growth, and other vegetation subject to clearing could support foraging, nesting, and other behaviors for mammals, birds (including migratory birds and BCC), and reptiles. Wildlife in the vicinity may also be temporarily disturbed from the increase in

construction related noise and additional human activity. Noise resulting from the proposed construction, demolition, and renovation activities would be localized, short term, and only occur during daylight hours. Areas proposed for construction are in a military industrial land use with frequent elevated noise levels. Impacts to wildlife from construction noise would be temporary and thus considered minimal.

Areas planned for development for facilities and infrastructure are within previously disturbed or developed lands (approximately 560 acres), are highly disturbed, and do not provide high quality habitat for wildlife species. A small number of wildlife species could occur in the turf grass and landscaped areas during construction; however, those species are generally tolerant of human presence and activity and would be expected habituate, or flush or flee to similar habitats that are immediately available on and in the vicinity of the base. Therefore, no significant impacts to wildlife would result from implementation of the Dyess AFB Alternative.

Special Status Species

No federally listed species or federally designated critical habitat occur at Dyess AFB (as presented in Table 3.8-1). There is a potential for piping plovers, red knots, and monarch butterflies to occur during seasonal migrations however these species have not been observed or documented on the base (Laurence, 2023; Dyess AFB, 2022b). For the tri-colored bat, the Dyess AFB Natural Resource Manager will conduct studies with TPWD and USFWS to monitor bat populations on and around the installation in the summer of 2023. Tri-colored bats were not detected during 2017 surveys. However, if tri-colored bats are detected within the buildings proposed for construction, demolition, or renovation, Dyess AFB would notify the USFWS Natural Resource Program Manager (from the Military Lands Conservation Program) immediately to determine next steps and the requisite conservation actions required prior to disturbance (Cox, 2023). As such, construction, demolition, and renovation activities at Dyess AFB would have *no effect* on the six federally listed/proposed for listing species presented in Table 3.8-1.

Of the two reptile species of state significance with potential to occur at Dyess AFB, only the Texas horned lizard has been observed at Dyess AFB. The presence of listed species is monitored, and updates to the INRMP are completed every five years. Consistent with TPWD recommendations, Dyess AFB requires that site-specific surveys be conducted for the state-listed threatened Texas horned lizard during the warm months when the lizards are active and prior to any proposed habitat disturbance activity. Prior to commencement of construction activities, the Dyess AFB Environmental Management System would identify areas of potential Texas horned lizard habitat and coordinate species surveys to be conducted by a permitted biologist. If Texas horned lizards are found on any project site, the DAF would contact TPWD to develop relocation plans. To minimize impacts to Texas horned lizards, BMPs, as described in the *Texas Horned Lizard Watch – Management and Monitoring Packet* (TPWD, n.d.), would be implemented.

Migratory Birds

Although mesquite habitats generally attract many types of birds, the areas planned for development are currently highly disturbed from ongoing military operations with frequent

elevated noise levels and provide little habitat for migratory bird species. The TPWD recommends excluding vegetation clearing during migratory bird nesting season, March through August (Dyess AFB, 2017). To the extent practicable, Dyess AFB would avoid tree removal during this nesting season. While any habitat loss could adversely affect individual birds, the amount of impacted habitat is relatively small compared to similar habitat available. Overall, population-level effects to any migratory bird species are not expected.

Noise resulting from construction, demolition, and renovation activities would be localized, short term, and only occur during daylight hours. As such, significant impacts to migratory birds (including BCC) would not be anticipated under implementation of the Dyess AFB Alternative.

Bald and Golden Eagles

No bald or golden eagles or eagle nesting is known to occur at Dyess AFB or in the immediate vicinity of the installation and therefore impacts to sensitive nesting habitat would not occur. No significant impacts to eagles protected under the BGEPA are anticipated to result from implementation of the Dyess AFB Alternative.

3.8.2.2.4 Weapons Generation Facility

Construction of the WGF on Dyess AFB would occur within previously undeveloped areas, totaling approximately 49.5 acres. Additionally, approximately 11.5 acres (including approximately 3 acres of undeveloped land and 8.5 acres of semi-improved lands [i.e., landscaped, maintained and paved areas]) would be impacted to construct a new road associated with the WGF. Vegetation communities impacted would include honey mesquite shortgrass prairie ruderal scrub alliance and small areas of little bluestem – sideoats grama central Great Plains Grassland alliance.

Potential impacts to vegetation and wildlife would be similar to those previously described under Section 3.8.2.2.3 (Biological Resources, Environmental Consequences, Dyess AFB Alternative, Facilities and Infrastructure, Special Status Species). Similarly, the TPWD recommends excluding vegetation clearing during migratory bird nesting season, March through August (Dyess AFB, 2017). To the extent practicable, Dyess AFB would follow the same management practices discussed above for facilities and infrastructure projects to minimize impacts to Texas horned lizards.

There would be no impacts to federally listed species or designated critical habitat from activities associated with construction of the WGF because none occur in the Dyess AFB ROI. Constructing the WGF at Dyess AFB would have *no effect* on the six federally listed/proposed for listing species presented in Table 3.8-1.

3.8.2.2.5 Reasonably Foreseeable Future Actions and Environmental Trends

The Main Parking Apron Repair is the only reasonably foreseeable future action at Dyess AFB that is in proximity to construction, demolition, and renovation activities in the Proposed Action area (Table 3.1-2). The location of this project is on the existing parking apron and no direct impacts to biological resources would occur. There would be short-

term increases in noise resulting from the proposed repairs; however, short-term additive noise effects would only occur if construction activities from the Proposed Action and reasonably foreseeable future actions were conducted during the same timeframe. Overall construction noise levels would not raise above those that typically occur on the installation and impacts to wildlife on the base would be negligible. Note that any future development projects would be subject to project-specific environmental review under the EIAP.

None of the reasonably foreseeable future projects identified in Table 3.1-2 have the potential to interact with airfield operations at Dyess AFB or aircraft operations in the training airspace. Given the proposed reduction in operations and noise under the Dyess AFB Alternative, a potentially beneficial impact to biological resources may occur.

Overall, no population-level impacts to biological resources would occur under the Dyess AFB Alternative and, when coupled with long-term climate change trends, adverse impacts to biological resources are not anticipated. Therefore, no impacts to biological resources would be anticipated from the Proposed Action combined with reasonably foreseeable future actions and environmental trends.

3.8.2.2.6 Proposed Resource-Specific Mitigations and Management Actions to Reduce the Potential for Environmental Impacts

No mitigations would be necessary to implement the Dyess AFB Alternative. Management actions to reduce the potential for environmental impacts to biological resources include the following:

- The TPWD recommends excluding vegetation clearing during migratory bird nesting season, March through August (Dyess AFB, 2017). To the extent practicable, Dyess AFB would avoid tree removal during this nesting season.
- Measures outlined in the Integrated Pest Management Program will continue to be implemented to reduce and minimize impacts from invasive species (Dyess AFB, 2022b).
- Measures outlined in the BASH Plan will continue to be implemented to reduce and minimize impacts to migratory birds (Dyess AFB, 2019).
- Consistent with TPWD recommendations, Dyess AFB requires that site-specific surveys be conducted for the state-listed threatened Texas horned lizard during the warm months when the lizards are active and prior to any proposed habitat disturbance activity. Prior to commencement of construction activities, the Dyess AFB Environmental Management System would identify areas of potential Texas horned lizard habitat and coordinate species surveys to be conducted by a permitted biologist. If Texas horned lizards are found on any project site, the DAF would contact TPWD to develop relocation plans. To minimize impacts to Texas horned lizards, BMPs, as described in the *Texas Horned Lizard Watch – Management and Monitoring Packet* (TPWD, n.d.), would be implemented.

- Measures outlined in the INRMP will continue to be implemented to manage and monitor special status species at the installation in accordance with the Sikes Act (Dyess AFB, 2022b).

3.8.2.3 Whiteman AFB Alternative (Preferred Alternative)

3.8.2.3.1 Airfield Operations

Under the Whiteman AFB Alternative, aircraft operations would increase from the No Action Alternative by approximately 6.7 percent. Additionally, noise levels at Whiteman AFB would slightly increase by 1 or 2 dBA DNL compared to the No Action Alternative (Section 3.3.2.3.2, Noise, Whiteman AFB Alternative, Airfield Operations and Table 3.3-20). Maximum noise levels from airfield operations would be 68 dBA DNL and the highest SEL values typically experienced would not change compared to the No Action Alternative.

Under the Whiteman AFB Alternative, the total overall on-base area encompassed by noise levels greater than 65 dBA DNL would increase by 146 acres compared to the No Action Alternative (Section 3.5.2.3.2, Land Use, Environmental Consequences, Whiteman AFB Alternative, Airfield Operations and Table 3.5-21). Land off base affected by noise levels greater than 65 dBA DNL would also increase; however, there would be no off-base areas exposed to noise levels above 75 dBA DNL (Section 3.5.2.3.2, Land Use, Environmental Consequences, Whiteman AFB Alternative, Airfield Operations and Table 3.5-24). Terrestrial species in these areas are already exposed to elevated noise under baseline conditions for B-2 operations. Threshold noise levels for mild responses to wildlife range from 65 dB for to 85 dB. Impacts to wildlife in newly exposed areas would likely be short term (lasting the duration of the overflight) and unlikely to significantly affect populations. Loud overflight events would be relatively infrequent. Overflights at the lowest allowable altitude would be extremely rare, and maximum noise levels would only occur at specific overflight locations and over an extremely short duration (a few seconds) while the aircraft is overhead. Species disturbances would be infrequent (spread out across the training airspace) and short term, lasting only the duration of the overflight. As such, noise effects to wildlife from airfield operations under the Whiteman AFB Alternative would not be considered significant.

A 6.7 percent increase in airfield operations may increase the potential for bird/wildlife aircraft strike encounters. However, the potential for bird/wildlife aircraft strikes could fluctuate because of the cyclical patterns of bird populations. During B-21 aircraft operations at Whiteman AFB, current procedures for avoiding flight operations during periods of high concentrations of migratory birds would continue. Adherence to the existing BASH Program and the USFWS-issued Depredation Permit conditions would minimize the risk of bird–aircraft strikes at Whiteman AFB, including those for migratory birds (including BCC), and special status species birds to negligible levels. The Whiteman AFB BASH Plan provides guidance for bird/wildlife strike hazard reduction in areas where flying operations are conducted. Tasked organizations such as USDA Wildlife Services (and the 509 BW/CC Bird Hazard Working Group implement procedures

in accordance with the plan. Procedures include (but are not limited to) airfield miniatous managing grass height; control of broad leaf weeds; planting bare areas; pest and insect control; reporting hazardous bird activity and altering or discontinuing flying operations; disseminating information to all assigned and transient aircrew for specific bird hazards and procedures for avoidance; eliminating or reducing environmental conditions that attract birds to the airfield; and dispersing birds on the airfield using nonlethal measures that prevent or minimize bird damage without purposefully killing or trapping birds (Whiteman AFB, 2022b). When nonlethal measures cannot be used, Whiteman AFB abides by the USFWS-issued Depredation Permit that authorizes the take of specific species and numbers of birds. The conditions of the permit are updated annually. Additionally, all bird–aircraft strikes and hazards will continue to be reported per AFI 91-204, *Safety Investigations and Reports*, and AFMAN 91-223, *Aviation Safety Investigations and Reports*.

As such, impacts to wildlife, special status species, migratory birds (including BCC), and bald or golden eagles at or near Whiteman AFB are not anticipated to occur under the Whiteman AFB Alternative.

No federally listed species or designated critical habitat (as presented in Table 3.8-3) occur at Whiteman AFB. Potential suitable foraging and roosting habitat for special status bats (Indiana, northern long-eared, gray, and tri-colored) occurs in the forested areas located on the west of the installation; however, these species have not been observed historically or documented on the base by the Natural Resource Manager (Donaldson, 2023). Therefore, the DAF determines there would be *no effect* to ESA-listed species or critical habitats from airfield operations under the Whiteman AFB Alternative. Similarly, species of state significance would not be impacted by airfield operations under the Whiteman AFB Alternative because none have been observed on the installation.

3.8.2.3.2 Airspace and Range Utilization

Under the Whiteman AFB Alternative, aircraft operations within the Smoky Hill Range (Smoky MOA, Bison MOA and R-3601A/B) and Ada (East and West), Lindbergh (A, B, and C), Cannon (A and B) and Truman (A, B, and C) MOAs, including all associated ATCAAs, as well as the Ozark ATCAA (A, B, and C) would remain the same as under the No Action Alternative baseline (Table 2.4-3). Similarly, the associated noise levels would not change in the proposed SUA for the Whiteman AFB Alternative (Section 3.3.2.3.3, Noise, Environmental Consequences, Whiteman AFB Alternative, Airspace and Range Utilization and Table 3.3-22), therefore impacts to wildlife from noise effects and potential bird–aircraft strikes would be the same as those described for the No Action Alternative in Section 3.8.2.1.2 (No Action at Whiteman AFB, Airspace and Range Utilization).

Given that noise levels would remain the same (Table 3.3-22), and there is no increased risk of aircraft strikes from B-21 operations compared to baseline conditions, there would be no significant impacts to wildlife, special status species, federally designated critical habitats, migratory birds (including BCC), and bald or golden eagles under the Whiteman AFB Alternative. The DAF determines that airspace and range utilization under the

Whiteman AFB Alternative would have *no effect* on federally listed species and critical habitat identified in Table 3.8-4.

3.8.2.3.3 Facilities and Infrastructure

Vegetation and Wildlife

Under the Whiteman AFB Alternative, activities associated with construction, renovation, and demolition projects listed in Table 2.4-4. Would occur in previously developed or turf or landscaped areas. Approximately 311 acres of land would be disturbed for facilities and infrastructure projects. Of which, approximately 70 acres, or about 23 percent of the proposed construction footprint (shown in Figure 2.4-3), would include newly impacted areas consisting of maintained turf grass or landscaped areas. Approximately 241 acres (or about 77 percent of the proposed construction footprint) would consist of developed areas containing pavement or previous construction. Revegetation of temporarily disturbed areas would be conducted as directed by the base Environmental Element Chief to minimize the potential for erosion and dust generation. Therefore, no significant impacts to vegetation would result from implementation of the Whiteman AFB Alternative.

Noise resulting from the proposed construction, demolition, and renovation activities would be localized, short term, and only occur during daylight hours. Areas proposed for construction are in a military industrial land use with frequent elevated noise levels. Impacts to wildlife from construction noise would be minimal. Reduction of maintained turf and landscaped areas on Whiteman AFB would not result in population-level effects because these are considered low-quality habitat areas. Therefore, no significant impacts to wildlife would result from implementation of the Whiteman AFB Alternative.

Special Status Species

No state-listed species, federally listed species, or designated critical habitat occur at Whiteman AFB (Table 3.8-3). Potential suitable roosting habitat for special status bats (Indiana, northern long-eared, gray, and tri-colored) does not occur within the areas proposed for construction, demolition, and renovation activities and there have been no documented occurrences of federally listed species at Whiteman AFB. As such, construction, demolition, and renovation activities at Whiteman AFB would have *no effect* on the five federally listed species presented in Table 3.8-3.

There is no suitable habitat within the development areas for any state-listed species that have been documented on base. The land slated for facilities and infrastructure development has been previously disturbed and/or consists of turf grass and landscaped areas, which is not suitable habitat for the northern harrier and there have been no documented occurrences of the northern harrier on the base. State-listed species management would continue to be monitored under the installation's INRMP program.

Migratory Birds

The areas planned for development are highly disturbed and provide little to no habitat for migratory bird species. Noise resulting from construction, demolition, and renovation activities would be localized, short term, and only occur during daylight hours. Although a relatively small number of migratory birds could occur in the grass areas during construction (generally those tolerant of human presence and activity), the limited habitat value substantially decreases the biological importance of the site. No significant impacts to migratory birds (including BCC) would occur as no high-quality migratory bird habitats occur within the proposed construction footprint on Whiteman AFB.

Bald and Golden Eagles

No bald or golden eagle nesting is known to occur at Whiteman AFB or in the immediate vicinity of the installation and therefore impacts to sensitive nesting habitat would not occur. No significant impacts to eagles protected under the BGEPA are anticipated to result from implementation of the Whiteman AFB Alternative.

3.8.2.3.4 Weapons Generation Facility

North WGF Site Subalternative (Preferred Subalternative)

Construction of the WGF under this subalternative would occur within approximately 50.6 acres consisting of 42.4 acres of developed, open space and approximately 8.2 acres of deciduous forest.

Additionally, the North WGF Site Subalternative would require the construction of two access roads, consisting of approximately 4 acres (including 0.5 acre of developed lands [paved surfaces] and 3.5 acres of developed/open space lands), and the relocation of the existing EOD range. The construction footprint for the North WGF Site, associated roads, and relocation of facilities are identified in Figure 2.4-5.

Permanent and temporary impacts to vegetation and wildlife may result from land clearing and construction activities. Vegetation subject to clearing could support habitats for some small mammals (including federally protected Indiana, northern long-eared, gray, and tri-colored bats), foraging birds (including migratory birds and BCC), and small reptiles. Wildlife within the North WGF Site would be permanently displaced by new construction, and wildlife surrounding the site may be temporarily disturbed from increased noise and human activity. It is expected that noise effects would be short term and would only affect wildlife in the immediate vicinity. Affected individuals would generally be able to return to the surrounding areas after the WGF is constructed. While some wildlife would be displaced and vegetation would be removed, the affected area would be small compared with other similar habitat available nearby. Overall, population-level effects to wildlife species are not expected.

While no federally listed species have been documented at Whiteman AFB, potential suitable habitat for four federally listed bat species (Indiana, northern long-eared, gray, and tri-colored) may be present within the 8.2 acres of deciduous forest habitats within the proposed North WGF footprint. Tree clearing can have a variety of impacts on bats

depending on the quality, amount, location of the lost habitat and the time of year of clearing. To avoid potential effects to federally listed bat species, tree clearing within the North WGF footprint would not occur during the active and maternity season (April 1 through October 31) for bats. Tree clearing would be restricted exclusively to the inactive bat season to avoid direct impacts in the form of injury or death to individual bats that could be roosting in the deciduous forested areas. Additionally, tree clearing would follow conservation measures established for forest management as directed by the Natural Resource Manager and the Whiteman AFB Forest Management Plan (Whiteman AFB, 2018).

Knob Noster State Park is located directly adjacent (northwest) to Whiteman AFB and is comprised of approximately 3,934 acres. The state park includes high-quality foraging and roosting habitat for bats that includes open oak woodland with a few patches of prairie along both sides of Clearfork Creek. Due to the quantity and availability of surrounding high-quality forested areas, the permanent loss of 8.2 acres of forested habitat that could support potential roosts, travel corridors, and foraging habitat for federally listed bats would not be considered significant. Based on implementation of seasonal avoidance measures and no documented occurrence of federally listed bat species at Whiteman AFB, the DAF has determined that the Whiteman AFB Alternative would have *no effect* on the Indiana, northern long-eared, gray, and tri-colored bats. Similarly, there would be *no effect* to any of the other federally listed species presented in Table 3.8-3 as there are no documented occurrences of these species on base and potential suitable habitats for these species do not occur at the North WGF Site.

As such, no significant impacts to biological resources would result from the North WGF Site Subalternative. Because no federally listed threatened, endangered, or candidate species and/or designated critical habitat occur in the ROI near Whiteman AFB, no impacts to special status species would occur under the North WGF Site Subalternative.

South WGF Site Subalternative

Construction of the WGF under this subalternative would occur within about 50.3 acres of unimproved areas consisting of deciduous forest, pasture, cultivated crops, and open water. Implementation of the South WGF Site would also require the construction of up to three access roads consisting of approximately 2.9 acres of new roadway. The construction footprint for the South WGF Site and associated roads are identified in Figure 2.4-6.

Under the South WGF Subalternative, 2.8 acres of deciduous forest habitats (potential suitable habitat for Indiana, northern long-eared, gray, and tri-colored bats) would be disturbed, as opposed to the 8.2 acres as part of the proposed North WGF Site. Impacts to biological resources from construction of the South WGF Site Subalternative would be less than, or the same as those discussed for the North WGF Site Subalternative.

As such, the Proposed Action would have *no effect* on the Indiana, northern long-eared, gray, and tri-colored bat. There would be *no effect* to any of the other federally listed species presented in Table 3.8-3. No significant impacts to biological resources (vegetation, wildlife, or special status species) would result from the South WGF Site Subalternative.

3.8.2.3.5 Reasonably Foreseeable Future Actions and Environmental Trends

The Airfield Surface Drainage Corrections and Arnold Gate Relocation are the only reasonably foreseeable future actions at Whiteman AFB that are in proximity to construction, demolition, and renovation activities in the Proposed Action area (Table 3.1-2). The proposed drainage corrections would occur on existing airfield surfaces and there would be no direct impacts to biological resources. The relocation of Arnold Gate would occur in areas that are not considered quality wildlife habitat and the amount of newly disturbed vegetation areas would be small given the remaining areas on the installation. There would be short-term increases in noise resulting from the proposed repairs; however, short-term additive noise effects would only occur if construction activities from the Proposed Action and reasonably foreseeable future actions were conducted during the same timeframe. Overall construction noise levels would not raise above those that typically occur on the installation and impacts to wildlife on the base would be negligible.

None of the reasonably foreseeable future projects identified in Table 3.1-2 have the potential to interact with airfield operations at Whiteman AFB or aircraft operations in the training airspace. Therefore, no additive noise effects to biological resources would occur above those described in Section 3.8.2 (Biological Resources, Environmental Consequences).

Overall, no population-level impacts to biological resources would occur under the Whiteman AFB Alternative and, when coupled with long-term climate change trends, adverse cumulative impacts to biological resources are not anticipated. Therefore, no impacts to biological resources would be anticipated from the Proposed Action combined with reasonably foreseeable future actions and environmental trends.

3.8.2.3.6 Proposed Resource-Specific Mitigations and Management Actions to Reduce the Potential for Environmental Impacts

Mitigation measures necessary to implement the Whiteman AFB Alternative include seasonal avoidance of tree clearing activities for migratory birds and federally listed bat species. Tree clearing within the forested areas of the proposed North or South WGF would take place outside of the migratory bird nesting season (March through August), to the maximum extent practicable. If tree clearing were to take place within the migratory bird season, Whiteman AFB would consult with the USFWS Migratory Bird Office regarding impacts to migratory birds, nests, and/or eggs.

To avoid adverse effects to Indiana, northern long-eared, gray, and proposed listed tri-colored bats, tree clearing would not occur during the maternity and active season (April 1 through October 31). If tree clearing were to take place within the maternity and active season for bats, Section 7 consultation with the USFWS would be required. Additionally, presence/absence surveys for federally listed bats would also be required, pursuant to the USFWS Range-Wide Indiana Bat Survey Guidelines (USFWS, 2022). If federally listed bat species are identified within a 1-mile radius of a known hibernaculum, Whiteman AFB would be required to consult with the USFWS under Section 7 of the ESA to determine next steps, such as additional avoidance and minimization measures, possible mitigation measures, and/or obtaining an incidental take permit.

Mitigation measures and management actions to reduce the potential for environmental impacts to biological resources include the following:

- Whiteman AFB would avoid tree removal within the deciduous forested areas within the proposed North or South WGF during the migratory bird nesting season (March through August).
- Whiteman AFB would avoid tree removal within the deciduous forested areas within the proposed North or South WGF during the maternity season (April 1 through October 31) for the federally listed endangered Indiana bat, northern long-eared, gray bat, and proposed endangered tri-colored bat.
- Measures outlined in the Installation Pest Management Plan (Whiteman AFB, 2016a) will continue to be implemented to reduce and minimize impacts from invasive species.
- Measures outlined in the BASH Plan will continue to be implemented to reduce and minimize impacts to migratory birds (Whiteman AFB, 2022b).
- Measures outlined in the INRMP will continue to be implemented to manage and monitor special status species at the installation in accordance with the Sikes Act (Whiteman AFB, 2021b).

3.9 CULTURAL RESOURCES

3.9.1 Cultural Resources, Affected Environment

3.9.1.1 Description of Resource

Cultural resources consist of prehistoric and historic sites, structures, artifacts, and any other physical or traditional evidence of human activity considered relevant to a particular culture or community for scientific, traditional, religious, or other reasons. For regulatory purposes, cultural resources are assessed to determine if they are significant and exhibit integrity, in accordance with the National Register criteria (36 CFR Part 63) to qualify for listing in the National Register of Historic Places (NRHP).

As defined under 32 CFR 800 (I)(1), “Historic Property means any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria.” A traditional cultural property (TCP), as defined by National Register Bulletin 38, “is eligible for listing in the National Register because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community’s history, and (b) are important in maintaining the continuing cultural identity of the community” (Parker & King, 1990).

This section describes known historic properties within the affected areas that are eligible for listing in the NRHP. As the affected environment is limited to areas already used by the DAF for current bomber operations, information is drawn from existing studies, cultural resource management plans, and previous environmental documents. The DAF initiated government-to-government consultation with Native American tribes with potential interest in the Proposed Action and engaged the appropriate State Historic Preservation Officers (SHPOs) and other consulting parties in accordance with Section 106 of the NHPA (54 U.S.C. 306108) (see Sections 3.9.1.2.1 and 3.9.1.2.2, Affected Environment, Region of Influence, Dyess AFB and Whiteman AFB, respectively and Appendix E, Cultural Resources).

3.9.1.2 Region of Influence

As defined under 36 CFR 800.16, an “Undertaking means a project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a Federal agency, including those carried out by or on behalf of a Federal agency; those carried out with Federal financial assistance; and those requiring a Federal permit, license or approval.” Also, as defined under 36 CFR 800.16, “the Area of Potential Effects is the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if such properties exist. The area of potential effects is influenced by the scale and nature of the undertaking and may be different for different kinds of effects caused by the undertaking.”

The Area of Potential Effects (APE) to historic properties is the ROI for cultural resources in this EIS. The APE is influenced by the scale and nature of the alternatives proposed, and, thus, may differ according to the types of effects caused by the action. The APE for this Proposed Action includes areas directly or indirectly affected by construction and implementation of the proposed B-21 MOB 2 beddown at Dyess AFB or Whiteman AFB, as well as areas beneath the airspace to be utilized for B-21 training operations.

3.9.1.2.1 Dyess AFB

A historical background of Dyess AFB was presented in the MOB 1 EIS in Section 3.8.1.2.1 (DAF, 2021e). A comprehensive summary of information about cultural resources at Dyess AFB is presented in the 2017 Integrated Cultural Resources Management Plan (ICRMP), which implements AFMAN 32-7003, *Environmental Conservation* (April 20, 2020), which supersedes AFI 32-7065, *Cultural Resources Management* (June 1, 2004), Air Force Policy Directive 32-70, *Environmental Quality*, and DoD Instruction (DoD) 4715.3, *Environmental Conservation Program* (May 3, 1996, amended July 20, 1998). As described in the ICRMP, the entirety of Dyess AFB has been subject to archaeological and historic site inventories to identify historic properties. These inventories identified no eligible archaeological sites and six eligible historic buildings (Figure 3.9-1).

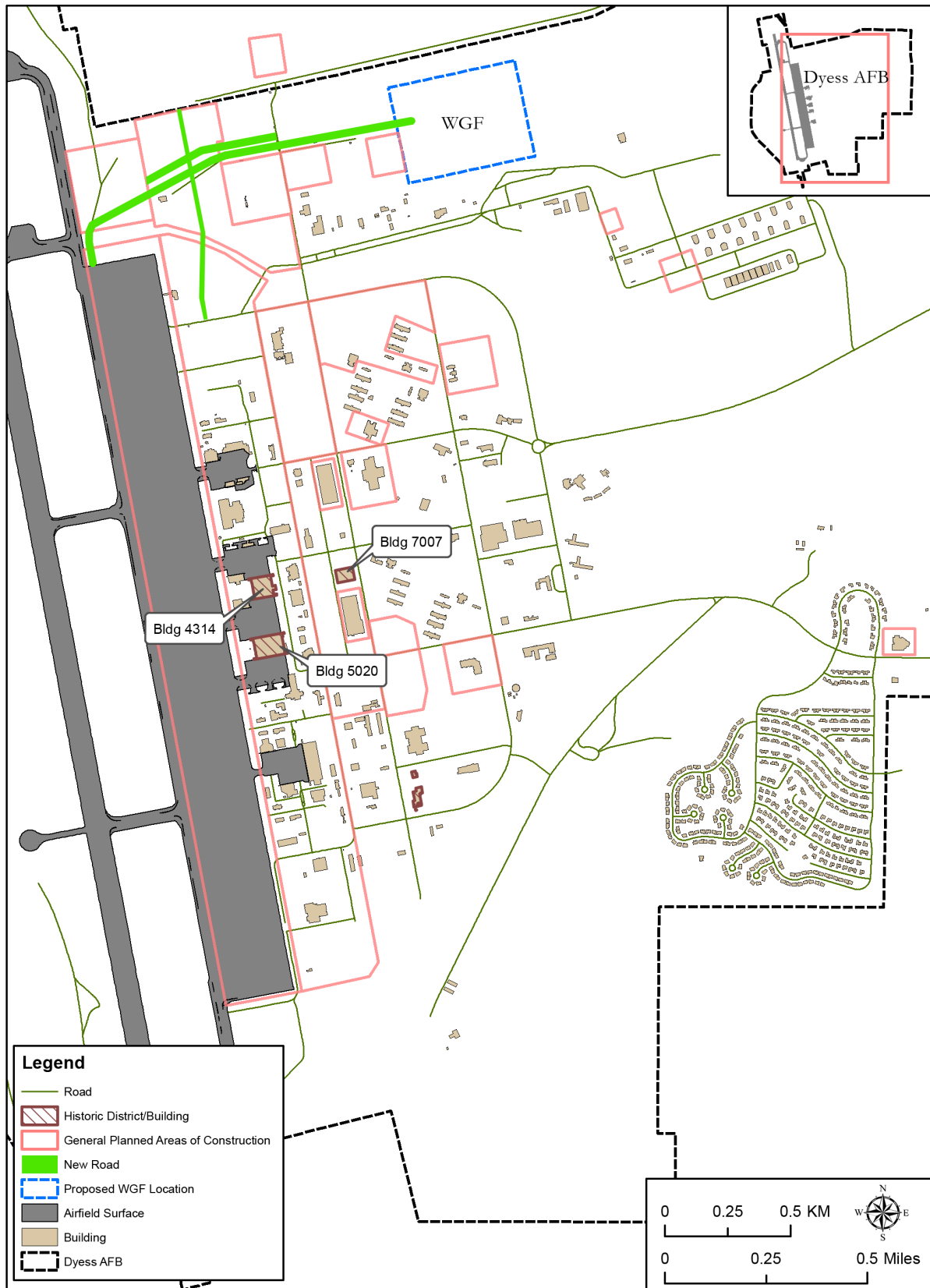


Figure 3.9-1. Location of Historic Properties at Dyess AFB

Two comprehensive archaeological surveys have been completed at Dyess AFB. In 1989, the Texas Archaeological Research Laboratory surveyed approximately 450 acres of the installation for the proposed Peacekeeper Rail Garrison Facilities (Powell, 1989). In 1995, 1,013 acres were surveyed as part of a proactive effort by the DAF to identify archaeological resources in compliance with federal cultural resources regulations (Haywood & Russell, 1995).

As a result of these two surveys, five prehistoric, two historic, and one prehistoric and historic era archaeological sites were recorded; none of these sites were determined eligible for listing in the NRHP. As of 2010, portions of Dyess AFB, consisting of developed grounds, channelized waterways, and thick stands of honey mesquite, had not been subject to archaeological survey. As such, an archaeological needs assessment was completed in 2011 and recommended that since the entire base is so heavily disturbed no additional archaeological investigations are required. The Texas SHPO concurred with this recommendation (DAF, 2017).

Six architectural surveys have been conducted at Dyess AFB including a 1994 baseline survey of Cold War material by Mariah Associates, a 1994–1995 study of DoD aircraft hangars by the U.S. Army Corps of Engineers (USACE), a 1995 study by the National Park Service, a 1995 survey of historic objects by the curator of the Dyess Visitor Center and Memorial Park, a 2006 survey of Cold War–era resources by Geo-Marine, Inc., and a subsequent revaluation and consultation with the Texas SHPO in 2010. Together, these architectural surveys have evaluated all World War II resources and all major (and some minor) Cold War–era resources. Some minor Cold War–era resources, such as gas mains, railroad tracks, and fire hydrants, and resources constructed after 1991 have not been evaluated.

Based on the 2006 Geo-Marine study and the 2010 revaluation and consultation with the Texas SHPO, six Cold War–era buildings and structures (Buildings 4314, 5020, 8129, 8130, 8131, and 7007) have been determined eligible for listing in the NRHP (DAF, 2017). While unaccompanied personnel housing (1946–1974) (Buildings 6125, 6126, 6127, 6136, 6137, 7218, 7219, 7220, 7221, 7403, 7407, 7409, 7420, 7421, 7422, and 9212) and World War II– and Cold War–era ammunition storage facilities (1939–1974) (Buildings 9117, 9122, 9123, 9124, 9125, 9126, 9127, 9128, 9129, 9130, 9131, 9132, 9133, 9134, 9135, 9136, and 9139) at Dyess AFB are covered under two Advisory Council on Historic Preservation Program Comments, both signed August 18, 2006 (ACHP, 2006a; ACHP, 2006b), SHPO concurred that these resources are not eligible for listing in the NRHP in a letter dated March 15, 2010. Building 5020 is proposed for renovation for the MOB 2 or 3 beddown. None of the other eligible properties are located within the planned construction areas for the MOB 2 or 3 beddown.

The ICRMP identifies no known TCPs, Native American burials, or sacred areas on Dyess AFB. There are six federally recognized tribes affiliated with the lands managed by Dyess AFB. These are the Apache Tribe of Oklahoma, Comanche Nation, Fort Sill Apache Tribe of Oklahoma, Jicarilla Apache Nation, Kiowa Indian Tribe of Oklahoma, and Mescalero Apache Tribe (DAF, 2017). Additionally, the Caddo Nation of Oklahoma, Kickapoo Traditional Tribe of Texas, Wichita and Affiliated Tribes, Tonkawa Tribe of

Indians of Oklahoma, and Ysleta Del Sur Pueblo may potentially be affected by the Proposed Action (the Mescalero Reservation is within 38 miles of the Pecos MOA. Scoping notification letters were sent to all tribes and no responses or comments were received during the scoping period (Appendix A, Public Involvement). The DAF initiated Government-to-Government consultation via letters that were mailed to each tribe in July 2023. Those letters and responses received are included in Appendix E (Cultural Resources).

Lancer MOA

A records search and historical background of the Lancer MOA was presented in the MOB 1 EIS in Section 3.8.1.2.4 (DAF, 2021e). The MOB 1 EIS identified a total of 15 NRHP-listed properties, including two petroglyph sites; two pueblos, ruins, and other archaeological sites; five historic districts; three public buildings; two houses; and one other site. No National Historic Landmarks were identified within 20 miles of the airspace, and no Native American pueblos, reservations, or TCPs were located below the airspace. A review of NRHP records undertaken for the MOB 1 EIS indicated nine listed properties beneath the Lancer MOA in Texas; IR-178 was not considered for the MOB 1 EIS. These included four archaeological sites near Post in Garza County; the county sanitarium and courthouse in Post, Garza County; the First National Bank building in Jayton, Kent County; the Lynn County Courthouse in Tahoka; and the Lamesa Farm Workers Community Historic District in Los Ybanez, Dawson County. The Old Algerita Hotel in Post has been demolished (National Park Service, 2020; Texas Historical Commission, 2020).

A more recent records search was conducted in 2023 (National Park Service, 2023). No changes were noted to identified resources.

Lancer Bridge MOA

An NRHP records search for the B-21 MOB 2 beddown at Dyess AFB identified no historic properties beneath the Lancer Bridge MOA in Texas (National Park Service, 2023).

Brownwood MOA

A records search and historical background of the Brownwood MOA was presented in the MOB 1 EIS in Section 3.8.1.2.5 (DAF, 2021e). The MOB 1 EIS identified 17 listed properties beneath the Brownwood MOA in Texas. These included a homestead and a railroad depot in Comanche County; the county jailhouse and courthouse in Goldthwaite and the Regency Suspension Bridge in Mills County; a railroad station, church, jail, high school, and two houses in Brownwood, Brown County; the Camp Colorado Replica in Coleman County; two houses and a Carnegie Library in Ballinger, Runnels County; and the county courthouse and Paint Rock Native American Pictograph Site in Concho County (National Park Service, 2020; Texas Historical Commission, 2020).

A more recent records search was conducted in 2023 (National Park Service, 2023). No changes were noted to previously identified resources.

Pecos MOA

A records search and historical background of the Brownwood MOA was presented in the MOB 1 EIS in Section 3.8.1.2.6 (DAF, 2021e). The MOB 1 EIS identified four NRHP-listed sites and one additional state register site (Rodrick Drug Store) located in Fort Sumner. No Native American reservations underlie the Pecos MOA. Fort Sumner State Monument and the Bosque Redondo Memorial were identified as a site of significant cultural activity for Navajo visitors who commemorate their forced removal, known as The Long Walk, and confinement at Bosque Redondo. A review of NRHP records undertaken for the MOB 1 EIS indicated five listed properties beneath the Pecos MOA, all located in Fort Sumner, DeBaca County, New Mexico. These included the Fort Sumner Ruins, Fort Sumner Cemetery Wall and Entry, Fort Sumner Railroad Bridge, Fort Sumner Community House, and the DeBaca County Courthouse (National Park Service, 2020).

A more recent records search was conducted in 2023 (National Park Service, 2023). No changes were noted to previously identified resources.

Bronco MOA

A review of NRHP records undertaken for the B-21 MOB 2 beddown at Dyess AFB identified five listed properties beneath the Bronco MOA. These include the Lea County Courthouse; the Lovington Fire Department; the Mathew Elmore Sewalt House; the Lea Theater; and the Pyburn House (National Park Service, 2023).

Willie-Roscoe ATCAA

An NRHP records search for the B-21 MOB 2 beddown at Dyess AFB identified six listed properties beneath the Willie-Roscoe ATCAA in Texas (National Park Service, 2023). These historic properties include the Potton-Hayden House, Settles Hotel, First National Bank Building, Scott-Majors House, Ragland, R.A., Building, and the Newman, I.M. and Margaret House.

3.9.1.2.2 Whiteman AFB

A comprehensive summary of information about cultural resources at Whiteman AFB is presented in the 2021 ICRMP (DAF, 2021f). As described in the ICRMP, the entirety of Whiteman AFB has been subject to archaeological and historic site inventories to identify historic properties. The architectural assessment completed in 1994 included a Historic American Building Survey Level IV recordation for all above-ground structures on base. This survey identified three properties (buildings T-12, S-6, and site Oscar-01) that were eligible for listing in the NRHP. Building T-12 was subsequently demolished while building S-6 is slated for demolition. Under Section 110 of the NHPA, Whiteman AFB would be required to minimize harm to Oscar-01 as a National Historic

Landmark if future mission plans required alteration or destruction. Currently, Oscar-01 has already been recorded to Historic American Engineering Record standards, and no additional mitigative measures are required.

A subsequent 2009 survey (Weitze et al. 2009) recommended two additional resources on base for NRHP-eligibility as highly intact examples of special storage units for ordnance (Buildings A and C). C structure was subsequently demolished and Building 4017 (A Structure) was recommended as NRHP eligible, but SHPO concurrence was not pursued as the structure, an ordnance storage igloo, is not considered significant or outstanding. Buildings 1, 27, 91, 5050, and 5051, which were part of the B-2 Program are considered NRHP ineligible (Figure 3.9-2) (DAF, 2021f).

Archaeological investigations conducted at the base in 1989 included background research and archaeological field surveys of the portions of the base that were identified as having the potential to contain historic and prehistoric archaeological remains. Five historic sites associated with late 19th century farmsteads were identified as a result of the investigations, but none of these sites were determined to be NRHP eligible. A subsequent archaeological assessment conducted in 1994 identified five remaining areas for subsurface investigation on the base. Surveys of these areas were conducted in 1996 and 2002 and determined that each of these areas were negative for pre-contact and historic archaeological resources. A few modern historic trash dump locations were encountered and recorded, but none of these were found to be of cultural significance. No other areas within the current boundaries of the base require archaeological investigation (DAF, 2021f).

Additionally, an assessment was conducted in 1995 within the surrounding 10,000 square mile Whiteman AFB Missile Range to evaluate the potential for the presence of significant archaeological resources. Nothing was found as part of the effort and resulted in SHPO concurrence that no further investigation of the missile range area is warranted (DAF, 2021f).

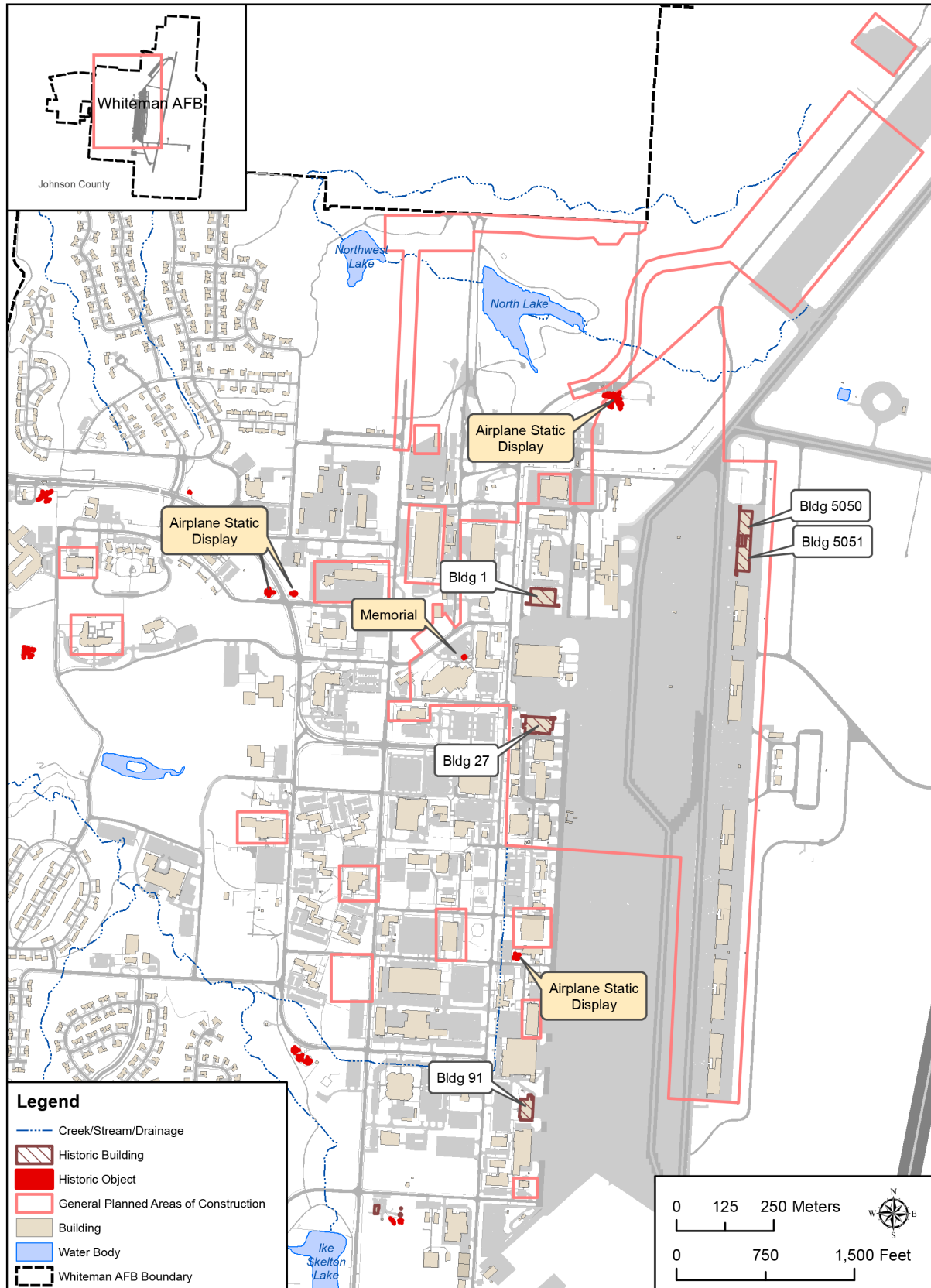


Figure 3.9-2. Location of Cultural Resources at Whiteman AFB

The ICRMP identifies no known TCPs, Native American burials, or sacred areas on Whiteman AFB (DAF, 2021f). There is one federally recognized tribe affiliated with the lands managed by Whiteman AFB, the Osage Nation of Oklahoma. A scoping notification letter was sent to the Osage Nation of Oklahoma (Appendix A, Public Involvement) and no response or comments were received during the scoping period. The DAF initiated Government-to-Government consultation via letter mailed in July 2023 (Appendix E, Cultural Resources).

Ozark ATCAA

The NRHP records search identified 388 listed buildings and structures and 7 archaeological sites beneath the Ozark ATCAA. Representative properties include the Old Bonnie & Clyde Garage Apartment; the Joplin Carnegie Library, Route 66 Steak'n Shake; Missouri, Kansas, and Texas Railroad Depot; Arrow Rock State Historic Site Bridge; the Dam and Spillway in the Hatchery Area at Montauk State Park; Santa Fe Trail–Grand Pass Trail Segments; and Berry Cemetery (National Park Service, 2023). There are 47 NRHP-listed districts under the Ozark ATCAA. Representative districts include Kansas Route 66 Historic District–East Galena; Ava Ranger Station Historic District; and the New Lebanon Historic District.

Approximately 1,400 acres of the Ozark ATCAA overlaps with the Quapaw Oklahoma Tribal Statistical Area border in Kansas. The Quapaw Nation is headquartered in Quapaw in Ottawa County, Oklahoma. Their tribal jurisdictional area is 13,000 acres in size.

Truman MOA

A review of the NRHP records identified a total of 37 listed properties beneath the Truman MOA in Missouri. Representative properties include Montserrat Recreational Demonstration Area Rock Bath House; Johnson County Courthouse; Mount Nebo Baptist Church; and the Montserrat Recreation Demonstration Area Bridge (National Park Service, 2023).

There are 12 NRHP-listed districts under the Truman MOA. Representative districts include Osage Farms Units No. 5 and No. 6 Historic District; Grover Street Victorian Historic District; and the Bois d'Arc Cooperative Dairy Farm Historic District.

Cannon MOA

An NRHP records search for the B-21 MOB 2 beddown at Whiteman AFB identified no historic properties beneath the Cannon MOA in Missouri (National Park Service, 2023).

Lindbergh MOA

NRHP records identified 16 listed buildings and structures and one listed archaeological site beneath the Lindbergh MOA in Missouri. Representative properties include the Old Mill at Montauk State Park; the Dent County Courthouse, International Shoe Company Building; Mount Zion Lodge Masonic Temple; Civil War Fortification at Barnesville; and Osterhout Mound Park (National Park Service, 2023).

There is one NRHP-listed district under the Lindbergh MOA: the Houston Ranger Station Historic District (National Park Service, 2023).

Ada West/Ada East MOAs

A review of NRHP records identified eight listed properties beneath the Ada West MOA in Kansas. Representative properties include the Salt Creek Truss Leg Bedstead Bridge; Pott's Ford Bridge; and Mitchell County Courthouse (National Park Service, 2023). Five listed properties are located beneath the Ada East MOA in Kansas. These include the Republican River Pegram Truss; Clay County Courthouse; and Clay Center Carnegie Library (National Park Service, 2023).

Smoky Hill Range

A review of NRHP records identified 18 NRHP-listed properties or districts beneath the Smoky Hill Range in Kansas (National Park Service, 2023). Representative properties include the Fort Harker Officers Quarters, the Arthur Larkin House, Ellsworth Downtown Historic District, and the Beaver Creek Native Stone Bridge.

3.9.1.3 Analysis Methodology

Potential impacts to cultural resources are evaluated with respect to the extent, context, and intensity of the impact in relation to existing regulatory guidance and historic properties present within the APE. Determining significance of impacts (40 CFR 1508.27) requires the action to be analyzed with respect to the setting of that action and consideration relative to the severity of the impact.

NEPA regulations (40 CFR 1508.27[b]) also provide for the consideration of the severity of an impact (i.e., intensity). There are numerous factors to consider when determining the intensity of potential impacts. For cultural resources, the degree to which a proposed action may adversely affect historic properties or objects listed in (or eligible for listing in) the NRHP or could lead to a loss or destruction of significant scientific, cultural, or historical resources are a primary point of consideration. Other considerations include but are not limited to unique geographic areas, the potential for significance determinations to establish future precedents, the potential for cumulative impacts, and whether an action may violate a federal, state, or local law concerning the protection of cultural resources and the environment. Together, these factors define the intensity of potential impacts.

NHPA obligations (as described herein) for a federal agency are independent from the NEPA process and must be complied with even when environmental documentation is not required. When both are required, the DAF may coordinate NEPA compliance with their NHPA responsibilities to ensure that historic properties, as defined under 36 CFR 800.16(l)(1), are given adequate consideration. As per AFMAN 32-7003 Section 2.10.4, and 36 CFR 800.8(a), the DAF has chosen to incorporate NHPA Section 106 review into the NEPA process, rather than substituting the NEPA process for a separate NHPA

Section 106 review of alternatives (AFMAN 32-7003 Section 2.10.4.3, and 36 CFR 800[c]).

The regulatory NHPA Section 106 compliance process consists of four primary stages. These include (1) the initiation of the Section 106 process (36 CFR 800.3); (2) identification of historic properties (36 CFR 800.4), which includes identifying historic properties potentially affected by undertakings; (3) assessment of adverse effects (36 CFR 800.5), which determines whether the undertaking would affect historic properties and if effects to those properties might be adverse; and (4) resolution of adverse effects (36 CFR 800.6) between affected and consulting parties such as the SHPO, the Advisory Council on Historic Preservation, Indian tribes, and interested individuals. Additional stipulations are provided for in the NHPA should a failure to resolve adverse effects occur during this process (36 CFR 800.7).

The DAF is conducting Section 106 consultation with applicable state SHPOs regarding the entire B-21 MOB 2 and MOB 3 beddown action at Dyess AFB and Whiteman AFB. On March 22, 2023, the DAF sent scoping notification letters to the applicable state SHPOs and all tribes with potential interest in activities at Dyess AFB, Whiteman AFB, and their proposed training airspace units, as part of the environmental review process for the B-21 MOB 2 and MOB 3 beddown. The DAF also initiated Section 106 consultation via mailed letters to applicable SHPOs in July 2023. Those letters and responses received are included in Appendix E (Cultural Resources).

As described above, Dyess AFB and Whiteman AFB previously have been subject to archaeological and architectural surveys to identify historic properties. These efforts provide comprehensive coverage of the bases. While the areas below the affected airspaces have not been fully surveyed, they have been subject to past identification efforts, NHPA consultation, and NEPA assessments associated with the establishment of the current programs in these areas. Given the expansive area covered by the airspaces, a comprehensive survey is neither practical nor necessary. An assessment of effects to known historic properties will provide a baseline for understanding the Proposed Action's potential to affect historic properties.

Effects (i.e., impacts) to cultural resources are defined as "alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the National Register" (36 CFR 800.16(i)). For the purposes of this analysis, there are three types of effects when considering historic properties. These include "no historic properties affected," which applies when there are no historic properties present or there are historic properties present but the undertaking would have no effect upon them; "no adverse effect," which means that there is a direct or indirect effect to a historic property, but the effect does not diminish the qualities that make the property significant; and "adverse effect," which "is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, and association" (36 CFR 800.5(a)(1)).

3.9.2 Cultural Resources, Environmental Consequences

3.9.2.1 No Action Alternative Consequences

3.9.2.1.1 No Action at Dyess AFB

Under the No Action Alternative, there would be no change in aircraft noise because the B-21 beddown would not occur. While construction activities associated with the B-21 beddown would also not occur, other construction activities identified in Table 3.1-1 would contribute to baseline conditions at the base. Cultural resources at Dyess AFB would continue to be managed in accordance with the Base ICRMP (DAF, 2017) and for each undertaking an individual Section 106 process and any associated consultations would be required. The six NRHP-eligible buildings will be maintained in accordance with the Standard Operating Procedures (SOPs) established in Appendix A of the ICRMP (see Figure 3.9-1). The base has been previously surveyed for cultural resources; however, the DAF has recommended a base-wide archaeological survey scheduled for 2025 to update previous survey efforts and utilize the most recent scientific standards. Implementation of these SOPs would minimize potential effects to historic properties at Dyess AFB, therefore no significant impacts to cultural resources would occur under the No Action Alternative.

Aircraft from Dyess AFB would continue to utilize the Lancer, Lancer Bridge, Brownwood, Bronco, and Pecos MOAs as well as the Willie-Roscoe ATCAA for training operations and would not exceed levels currently authorized for these training areas. The Air Force Reserve Command F-35A Operational Mission (see Table 3.1-1) may have beneficial impacts to cultural resources under the Brownwood MOA as the F-35A would fly fewer sorties in this airspace and supersonic flights would continue to occur above 30,000 feet MSL, which would reduce the number of sonic booms and potential visual intrusions (DAF, 2020a). Noise levels beneath all Dyess training airspace units under baseline conditions would range from less than 35 dBA L_{dnmr} to 51.9 dBA L_{dnmr} (Figure 3.3-2 and Table 3.9-1). Since these levels are below 65 dBA L_{dnmr} , impacts to cultural resources are not anticipated.

Table 3.9-1. Noise Levels Under the Dyess AFB No Action Alternative Airspace

Airspace Unit	No Action Alternative (dBA L_{dnmr})
Lancer MOA	48
Willie-Roscoe ATCAA	38.9
Pecos MOA	51.9
Lancer Bridge MOA	<35
Brownwood MOA	39
Bronco MOA	<35

Key: < = less than; AFB = Air Force Base; ATCAA = Air Traffic Control Assigned Airspace; dBA = A-weighted decibels; L_{dnmr} = onset-rate adjusted monthly day-night average sound level; MOA = Military Operating Area

3.9.2.1.2 No Action at Whiteman AFB

Under the No Action Alternative, cultural resources at Whiteman AFB would continue to be managed in accordance with the ICRMP. For each specific undertaking for projects listed in Table 2.5-1 an individual Section 106 process and any associated consultations would be required. The four NRHP-eligible buildings would be maintained in accordance with the SOPs established in Section 7.9 of the ICRMP. The ICRMP identifies potential plans to demolish Building S-6, a Cold War historic structure. A reevaluation recommended a downgrade to NRHP-ineligible status due to loss of architectural integrity (DAF, 2021f). Buildings 1, 27, 5050, and 5051 are within the currently considered area of proposed construction but are considered NRHP ineligible.

Aircraft from Whiteman AFB would continue to utilize the Smoky Hill Range, Ozark ATCAA, Ada East/West MOA, Lindbergh MOA, and Truman MOA for training operations, and noise levels would range from less than 35 dBA L_{dnmr} to 42.2 dBA L_{dnmr} (Figure 3.3-4 and Table 3.9-2). Since these levels are below 65 dB DNL, impacts to cultural resources are not anticipated.

Table 3.9-2. Noise Levels Under the Whiteman AFB No Action Alternative Airspace

Airspace Unit	No Action Alternative (dBA L_{dnmr})
Lindbergh MOA	<35
Ozark ATCAA	<35
Truman MOA	<35
Smoky Hill Range	40
Ada East/West	<35
Bison	38.1
R-3601	42.2
Cannon MOA	40
Cannon Range R-4501	40

Key: < = less than; AFB = Air Force Base; ATCAA = Air Traffic Control Assigned Airspace; dBA = A-weighted decibels; L_{dnmr} = onset-rate adjusted monthly day-night average sound level; MOA = Military Operating Area

3.9.2.2 Dyess AFB Alternative

3.9.2.2.1 Airfield Operations

Table 3.9-3 provides the current and projected noise levels at historic properties at Dyess AFB. Previous studies have found it is unlikely that noise and vibration associated with air operations would cause structural damage to buildings. In fact, several studies of the effects of noise on historic properties located in high aircraft-noise zones have found that vibration resulting from the activities of tour groups, and even vacuuming, generated more structural vibration than that generated by aircraft noise (National Research Council/National Academy of Sciences, 1977; NASA, 1976; NASA, 1978). Subsonic sound of less than 130 dB is highly unlikely to damage structural elements. Noticeable vibration of windowpanes and objects within buildings may occur at sound levels of 110 dB or greater (Wyle, n.d.).

It is anticipated that the noise in the area and the number of acres and people impacted would decrease overall as a result of implementing the B-21 MOB 2 beddown at Dyess AFB (see Section 3.3.2.2.2, Noise, Environmental Consequences, Dyess AFB Alternative, Airfield Operations). Noise contours for the base show that noise received by each of the historic properties at Dyess AFB would be expected to decrease under the Dyess AFB Alternative.

Table 3.9-3. Current and Projected Noise Levels at Historic Properties at Dyess AFB

Building	Current Noise Level (dBA DNL)	Projected Noise Level (dBA DNL)
4314	70 to 79	70 to 79
5020	70 to 79	65 to 69
7007	65 to 69	<65
8129	65 to 69	<65
8130	65 to 69	<65
8131	65 to 69	<65

Key: AFB = Air Force Base; dBA = A-weighted decibels; DNL = day-night average sound level

In all cases, these noise levels are well below the thresholds (well over 100 dB) that might cause damage to structures.

3.9.2.2.2 Airspace and Range Utilization

Under the Dyess AFB Alternative, noise levels beneath all proposed training airspace would remain the same or decrease by as much as 15 dBA L_{dnmr} compared to the No Action Alternative (Table 3.3-14). Noise levels for Lancer Bridge MOA, Willie-Roscoe ATCAA, and Bronco MOA would remain less than 35 dBA L_{dnmr} , and operations would decrease by 39.71 percent, 66.47 percent, and 7.66 percent, respectively (Section 3.2.2.2.2, Airspace, Environmental Consequences, Dyess AFB Alternative, Airspace and Range Utilization). Lancer MOA, Pecos MOA, and Brownwood MOA would experience reduced noise levels, where operations would decrease by 12.03 percent, 19.68 percent, and 0.36 percent, respectively (Section 3.2.2.2.2, Airspace, Environmental Consequences, Dyess AFB Alternative, Airspace and Range Utilization). Overall, noise levels in the training airspace under the Dyess AFB Alternative would range from less than 35 dBA L_{dnmr} to 44.6 dBA L_{dnmr} . These levels are well below the 65 dBA DNL level.

Since operations would continue to observe current guidelines and noise levels would remain the same or decrease from the No Action Alternative, no adverse impacts from noise would be expected under the Dyess AFB Alternative. Furthermore, the B-21 flies higher than the B-1, so the visibility of the aircraft from historic properties below these airspaces would decrease.

3.9.2.2.3 Facilities and Infrastructure

One historic property, Building 5020, is proposed for renovation as part of the B-21 MOB 2 beddown at Dyess AFB. Proposed alterations to the building are primarily interior modifications to mechanical/electrical systems. Building 5020 would not be subject to exterior renovations inconsistent with the building's historic use or interior renovations considered significant or irreversible. The interior renovations will not be visible from the exterior, will be consistent with the building's historic use, and will ensure its future

usefulness to Dyess AFB's mission. Overall, Building 5020 will retain the character-defining features that convey its historic significance. As such, the DAF has determined, in consultation with the Texas SHPO, that the Proposed Action will result in No Adverse Effects to Building 5020. New and renovated facilities and infrastructure associated with the B-21 MOB 2 beddown at Dyess AFB would not directly impact any other historic properties. All other historic properties are located outside of the general planned areas of construction. Previous studies have not identified any historic districts at Dyess AFB; the base reflects development over time as mission needs have changed, resulting in the ongoing removal and addition of facilities. While the proposed facilities and infrastructure may be within view of some historic properties, these historic resources currently exist within the setting of an active DAF base made up of a combination of historic and non-historic facilities, and thus visual effects of the new construction would be minimal. Due to the heavy disturbance and development on the base, and as previously concurred by the Texas SHPO for the MOB 1 EIS (DAF, 2021e), there would be no effect to archaeological resources. The Texas SHPO reaffirmed the finding of No Historic Properties Affected with regards to archaeological resources and concurred with the DAF's finding of No Adverse Effects to above-ground resources in a letter dated February 14, 2024 (THC Tracking # 202406125) (Appendix E, Cultural Resources).

3.9.2.2.4 Weapons Generation Facility

The WGF would not directly impact any historic properties at Dyess AFB as all historic properties are located outside of the proposed footprint of the WGF. While the WGF may be within view of some historic properties, these historic resources currently exist within the setting of an active DAF base made up of a combination of historic and non-historic facilities, and thus visual effects of the new construction would be minimal.

3.9.2.2.5 Reasonably Foreseeable Future Actions and Environmental Trends

Impacts to cultural resources from reasonably foreseeable future actions and environmental trends can result from alterations or demolition of historic structures or disturbance of archaeological resources that incrementally diminish the integrity of the cultural resources at Dyess AFB. Dyess AFB does not contain any eligible historic districts, and the proposed B-21 MOB 2 beddown at Dyess AFB would not directly impact any eligible historic structures. If the proposed work on the Dyess AFB Main Parking Apron Repair (Table 3.1-2) has the potential to affect historic structures, the DAF will follow SOP 1 (New Construction) and SOP 2 (Demolition) of the Dyess AFB ICRMP to implement Section 106 of the NHPA (DAF, 2017). Therefore, no additional effects associated with reasonably foreseeable future action and environmental trends in combination with the Proposed Action are expected.

3.9.2.2.6 Proposed Resource-Specific Mitigations and Management Actions to Reduce the Potential for Environmental Impacts

- Per Dyess AFB ICRMP (DAF, 2017) Standard Operating Procedure #5, *Inadvertent Discovery of Archaeological Materials*, when cultural resources are discovered during mission-related training or construction related to ground-disturbing activities, work shall cease in the area of the discovery. The property is to be treated as eligible and avoided until an eligibility determination is made.

Dyess AFB will make reasonable efforts to avoid or minimize harm to the property until the Section 106 process is completed.

- Standard Operating Procedure #6, Native American Human Remains and Associated Funerary Objects, Sacred Objects, or Objects of Cultural Patrimony Compliance and Protocol, when cultural resources are discovered during mission-related training or construction related to ground-disturbing activities, work shall cease in the area of the discovery. The property is to be treated as eligible and avoided until an eligibility determination is made. Dyess AFB will make reasonable efforts to avoid or minimize harm to the property until the Section 106 process is completed (DAF, 2017).

3.9.2.3 Whiteman AFB Alternative (Preferred Alternative)

3.9.2.3.1 Airfield Operations

As described in Section 3.3.1.3.1 (Noise, Affected Environment, Analysis Methodology, Noise Level Calculation), the B-21 is a new aircraft and noise level data is not yet available. The B-21 is similar in several aspects to the B-2 aircraft and is expected to generate noise levels similar to those generated by the B-2. A slight increase in noise levels (up to 2 dBA DNL) would occur due to an increase in the number of airfield operations flown per year at Whiteman AFB from 29,771 to 31,751 (a 6.65 percent increase) (see Section 3.3.2.3.2, Noise, Environmental Consequences, Whiteman AFB Alternative, Airfield Operations). Noise model results show that noise received by each of the historic properties at Whiteman AFB would be well below the thresholds that might cause damage to structures (Table 3.9-4).

Table 3.9-4. Current and Projected Noise Levels at Historic Properties at Whiteman AFB

Building	Current Noise Level (dBA DNL)	Projected Noise Level (dBA DNL)
1	65 to 69	65 to 69
27	65 to 69	65 to 69
91	70 to 74	70 to 74
5050	70 to 79	70 to 79
5051	70 to 74	70 to 74
4017 Structure A	65 to 69	65 to 69

Key: AFB = Air Force Base; dB = decibels; DNL = day-night average sound level

3.9.2.3.2 Airspace and Range Utilization

Under the Whiteman AFB Alternative, operations and noise under the SUA associated with the Whiteman AFB Alternative would be the same as those for the No Action Alternative (see Section 3.9.2.1.2, Cultural Resources, Environmental Consequences, No Action at Whiteman AFB). Noise levels under the training airspace would remain at 42.2 dBA L_{dnmr} or less, well below the 65 dBA DNL level.

Therefore, no adverse impacts from noise would be expected. Furthermore, the B-21 will operate at altitudes like the B-2; therefore, visibility of the aircraft from historic properties below these airspaces would be similar.

3.9.2.3.3 Facilities and Infrastructure

The development of facilities and infrastructure for the Whiteman AFB Alternative would require construction, demolition, and renovation activities in a general area of four historic properties. No historic properties would be adversely affected.

The DAF has not recognized any historic districts at Whiteman AFB; the base reflects development over time as mission needs have changed, resulting in the ongoing removal and addition of facilities. While the newly proposed facilities and infrastructure associated with the B-21 MOB 2 beddown may be within view of some historic properties, these historic resources currently exist within the setting of an active DAF base made up of a combination of historic and non-historic facilities, and thus visual effects of the new construction would be minimal.

3.9.2.3.4 Weapons Generation Facility

North WGF Site Subalternative (Preferred Subalternative)

The North WGF Site Subalternative would not directly impact any historic properties at Whiteman AFB as all historic properties are located outside of the proposed footprint of the North WGF Site Subalternative. While the WGF may be within view of some historic properties, these historic resources currently exist within the setting of an active DAF base made up of a combination of historic and non-historic facilities, and thus visual effects of the new construction would be minimal.

South WGF Site Subalternative

The South WGF Site Subalternative would not directly impact any historic properties at Whiteman AFB as all historic properties are located outside of the proposed footprint of the South WGF Site Subalternative. While the WGF may be within view of some historic properties, these historic resources currently exist within the setting of an active DAF base made up of a combination of historic and non-historic facilities, and thus visual effects of the new construction would be minimal.

3.9.2.3.5 Reasonably Foreseeable Future Actions and Environmental Trends

The Whiteman AFB Airfield Surface Drainage Corrections and Whiteman AFB Arnold Gate Relocation projects listed in Table 3.1-2 would not directly impact any of the individually eligible historic structures at the base or have the potential for significant indirect effects to historic properties. Historic resources on Whiteman AFB currently exist within the setting of an active DAF installation made up of a combination of historic and non-historic facilities, and thus visual effects of any new construction would be minimal. If any of these projects result in inadvertent discoveries, SOP 7.4 in the Whiteman AFB ICRMP would be followed (DAF, 2021f). Implementing the Whiteman AFB Alternative would not have incremental effects above those described in Section 3.9.2.3 (Cultural Resources, Environmental Consequences, Whiteman AFB Alternative). Adherence to requirements outlined during Section 106 consultation would reduce the severity of adverse effects. Therefore, no additional effects to aboveground historic properties or archaeological resources would occur under the Whiteman AFB Alternative combined with reasonably foreseeable future actions and environmental trends.

3.9.2.3.6 Proposed Resource-Specific Mitigations and Management Actions to Reduce the Potential for Environmental Impacts

- As per the Whiteman AFB ICRMP (DAF, 2021f), Section 7.4 *Discoveries of Archaeological Resources and NAGPRA Cultural Items*, when accidental or unanticipated discoveries of archaeological resources occur, the proper actions must be taken to minimize damage to these resources and to ensure that legal requirements are met.
- DAF or contractor personnel that make or become aware of a potential archaeological discovery on installation lands should immediately notify the Cultural Resources Manager of the nature and location of the discovery and cease potentially damaging activities and take efforts to ensure protection of resources until arrival of the Cultural Resources Manager or designee.
- If human remains are discovered or if there is sufficient reason to suspect that human remains are present, the Cultural Resources Manager should determine (with the aid of a coroner or forensic anthropologist) if the remains are human, and whether or not they are associated with an archaeological deposit. If the remains are human that additional steps to identify and protect the remains will be followed per Section 7.4 stipulations.

3.10 PHYSICAL RESOURCES

3.10.1 Physical Resources, Affected Environment

3.10.1.1 Description of Resource

Physical resources include topography, geology, soils, and water. Topography pertains to the relief (elevation) and local landforms of a given region. Geological resources typically include features such as bedrock and minerals. However, geology is not addressed in this EIS because impacts are not anticipated on such features based on implementation of any of the alternatives. Neither bedrock nor minerals, including extraction of minerals by mining, would be affected by any of the actions.

Soil refers to unconsolidated accumulation of organic and mineral materials on the land surface that is either formed from the breakdown of underlying bedrock or other parent material, or transported to an area by wind, water, or human activities. Eroded soil particles that are transported and deposited are known as sediment. The delivery and deposition of sediment in waterways is known as sedimentation. Sediment generated by erosion can alter water quality, aquatic habitats, and hydrologic characteristics of streams and wetlands, and increase flooding. Once erosion has occurred, it can lead to increased land management and operating costs. Erosion can also transport chemical contaminants that may be attached to sediment particles. Therefore, in the context of soil, the focus of this EIS is on erosion that could potentially occur as a result of the proposed activities. Topography is addressed because the erosion potential of soil depends in part on the steepness of the land.

Water resources relevant to this EIS are surface water features (including streams, lakes, floodplains, and wetlands) and ground water. Surface water is defined as any water on Earth's surface and includes lakes, rivers, streams, and ponds (U.S. Geological Survey, 2023a). Surface waters form where the average rate of precipitation exceeds the rate at which runoff seeps into the soil, evaporates, or is absorbed by vegetation. Surface waters also form where the water table intersects the ground surface. Surface waters are important for a variety of reasons including economic, ecological, and recreational functions, and human health. Surface water features also serve as reservoirs to mitigate the impacts of flooding, and they can be impacted by sedimentation and by deposition of contaminants that are transported by stormwater runoff or erosion. Ground water can be impacted directly by spills or by infiltration of contaminated surface waters, specifically for this EIS, from stormwater.

A floodplain is defined as an area of relatively flat and normally dry land alongside a stream, river, or lake that is covered by water during a flood (U.S. Geological Survey, 2023a). Floodplains mitigate flood risk by slowing stormwater runoff and storing floodwaters during flood events (Federal Emergency Management Agency, 2018). Other floodplain functions include ground water recharge and nutrient cycling. Vegetation and soils in the floodplain act as filters, intercepting surface water runoff before it reaches lakes, streams, or rivers. This filtration process aids in the removal of excess nutrients, pollutants, and sediments from the water. Floodplains are biologically unique ecosystems that support a wide variety of aquatic and terrestrial species. Floodplain boundaries are typically described in terms of average frequency of inundation. For example, a 100-year floodplain is defined as an area subject to inundation by a flood that has that has a 1 percent or greater chance of being equaled or exceeded in any given year. A 500-year floodplain is subject to the flood with a 0.2 percent chance of being equaled or exceeded in any given year.

Actions potentially affecting the floodplain are subject to the requirements of EO 11988, *Floodplain Management*, and EO 13690, *Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input*. EO 13690 was revoked in 2017 but was reinstated in 2021 through EO 14030, *Climate-Related Financial Risk*. EO 11988 requires federal agencies to avoid to the extent possible the long- and short-term adverse impacts associated with occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative (Federal Emergency Management Agency, 2015). EO 11988 applies to actions within the 100-year floodplain (also called the base flood) except for activities associated with a critical facility (e.g., a hospital), in which case the 500-year floodplain applies. EO 13690 amends the methods that may be used to establish the floodplain. One method is to identify the area subject to flooding by the 0.2-percent annual chance flood (500-year floodplain). An alternative method is to establish the freeboard elevation, which for non-critical actions is determined by adding 2 feet in elevation to the 100-year base flood boundary. Actions that are in the interest of national security may potentially be exempt from the revised floodplain determination methods identified by EO 13690.

USACE (33 CFR § 328.3) and the EPA (40 CFR § 120.2) define wetlands as “areas that are inundated or saturated by surface or ground water 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.” Wetlands are considered jurisdictional waters of the United States (WOTUS) if they are deemed “navigable waters” as defined in the CWA as “the waters of the United States.” Jurisdictional WOTUS determinations are vested with USACE. Under the CWA, the definition of WOTUS includes federal waterways and wetlands that are “relatively permanent, standing or continuously flowing bodies of water,” and have a “continuous surface connection to bodies of water that are ‘waters of the United States’ in their own right” (40 CFR 120).

Ground water is defined as water that flows or seeps downward and saturates soil or rock, supplying springs and wells (U.S. Geological Survey, 2023a). Below the water table, nearly all open spaces in sediments and rocks are filled with water, and the water contained in this zone is called *ground water*. An aquifer is a geological formation (e.g., a layer of rock or sediment) that stores relatively large volumes of ground water, and through which ground water typically can easily move. Ground water is an important source of water supply and is also a recharge source for streams and wetlands.

3.10.1.2 Region of Influence

The ROI for physical resources consists of areas within and adjacent to the alternative area of construction boundaries where soil and water resources may be directly or indirectly affected by components of the Proposed Action (e.g., construction activities). Off-base areas could be affected if, for example, stormwater or surface water carries contaminants or sediments to nearby streams and wetlands; or if contaminants migrate to ground water, which subsequently flows to off-base portions of the aquifer.

Airspace and range utilization would not affect physical resources under any of the MOAs or ATCAAs associated with the Dyess AFB and Whiteman AFB Alternatives and are therefore not discussed further.

3.10.1.2.1 Dyess AFB

Topography

Dyess AFB is in the southern part of the Osage Plains Section in the Central Lowlands physiographic province (U.S. Geological Survey, 2023b). The Osage Plains Section spans an area that includes north-central Texas, central Oklahoma, southeastern Kansas, and a small part of southwest Missouri, and is characterized by gently rolling terrain (Madole et al., 1991). Figure 3.10-1 shows the topography of Dyess AFB. Each line (referred to as a contour line) in the figure represents locations with the same ground surface elevation. Within the largest planned construction areas in the vicinity of the airfield, the ground surface elevation ranges from approximately 1,780 feet on the western edge to 1,770 feet on the eastern edge of the areas, corresponding to 10 feet in elevation change over a distance of 2,000 feet and a slope of approximately 0.5 percent. At the WGF site, the ground surface elevation drops approximately 10 feet to the lowest point on the southwest corner over a distance of 2,000 feet, also corresponding to a slope of approximately 0.5 percent. Slopes between 0.5 and 1 percent are considered flat (United Nations, 1985).

Soils

The soil types found in the planned construction areas and WGF site for the MOB 2 beddown at Dyess AFB consist of Tobosa clay, Urban land, Vernon clay, Tillman clay loam, Hamby sandy loam, Sagerton clay loam, Gageby clay loam, Rotan clay loam, Rowena clay loam, and Stamford clay, as well as “complexes” (or combinations) of these soil types (Figure 3.10-2) (NRCS, 2022a). Table 3.10-1 presents a description of each soil type. Table 3.10-2 and Table 3.10-3 show the areal extent and erosion factor for each soil type and soil type complex at the planned construction areas and WGF site, respectively. The erosion factor indicates the relative susceptibility of a soil to sheet or rill erosion by water. Values range from 0.02 for the least erodible soils to 0.64 for the most erodible (NRCS, 2022b). Erosion factors for soils in the planned construction areas and WGF site at Dyess AFB range from 0.17 to 0.32, which indicates the soils have low to moderate erodibility.

Table 3.10-1. Soil Types in Planned Construction Areas and WGF Site, Dyess AFB

Soil Type	Description
Tobosa Clay	Consists of very deep, well-drained, very slowly permeable soils that formed in calcareous clayey alluvium derived from limestone. These nearly level to very gently sloping soils occur on dissected plateaus.
Urban Land	Soils extensively influenced by human activities.
Vernon Clay	Consists of moderately deep over claystone bedrock, well-drained, very slowly permeable soils that formed in residuum derived from non-cemented claystone bedrock or dense clay of the Permian Age.
Tillman Clay Loam	Consists of very deep, well-drained, slowly permeable soils that formed in loamy and clayey alluvium derived from redbed clays and claystone sediments of the Permian Age.
Hamby Sandy Loam	Consists of very deep, well-drained, moderately slowly permeable soils that formed in loamy and clayey residuum from cretaceous sediments.
Sagerton Clay Loam	Consists of very deep, well-drained, moderately slowly permeable soils that formed in calcareous loamy alluvium.
Gageby Clay Loam	Consists of very deep, well-drained, moderately permeable soils that formed in calcareous, loamy alluvium. These nearly level to very gently sloping soils occur on floodplains or draws on dissected plains.
Rotan Clay Loam	Consists of deep, well-drained, moderately slowly permeable soils that formed in calcareous loamy alluvium of the Quaternary Age. These soils are on nearly level to very gently sloping terraces.
Rowena Clay Loam	Consists of very deep, well-drained, moderately slowly permeable soils that formed in calcareous loamy and clayey alluvium. These nearly level to gently sloping soils occur on terraces on dissected plains.
Stamford Clay	Consists of moderately deep, well-drained, very slowly permeable soils that formed in calcareous clayey alluvium over residuum derived from shale and siltstone. These nearly level to gently sloping soils occur on hillslopes and pediments on dissected plains.

Source: (NRCS, 2022a)

Key: AFB = Air Force Base; WGF = Weapons Generation Facility

Table 3.10-2. Areal Extent and Erosion Factors for Soil Types at Planned Construction Areas, Dyess AFB

Soil Unit Name	Soil Map Symbol	Erosion Factor	Acres in Area of Interest ^(a)	Percent of Area of Interest ^(a)
Gageby Clay Loam, 0 to 1% Slopes, Occasionally Flooded	Ga	0.28	26.1	3.7%
Hamby Fine Sandy Loam, 0 to 1% Slopes	HbA	0.32	16.0	2.3%
Hamby Fine Sandy Loam, 1 to 3% Slopes	HbB	0.32	6.5	0.9%
Hamby-Urban Land Complex, 0 to 3% Slopes	HuB	0.32	123.4	17.4%
Rotan Clay Loam, 0 to 1% Slopes	RnA	0.24	7.2	1.0%
Rowena Clay Loam, Dry, 0 to 1% Slopes	RoA	0.17	2.8	0.4%
Rowena-Urban Land Complex, 0 to 1% Slopes	RuA	0.17	0.5	0.1%
Sagerton Clay Loam, Moist, 0 to 1% Slopes	SaA	0.28	3.1	0.4%
Sagerton-Urban Land Complex 0 to 3% Slopes	SeB	0.28	0.2	0%*
Stamford Clay, 1 to 3% Slopes	StB	0.28	4.8	0.7%
Tillman Clay Loam, 1 to 3% Slopes	TmB	0.32	0.8	0.1%
Tobosa Clay, 0 to 1% Slopes	ToA	0.24	165.7	23.4%
Tobosa-Urban Land Complex, 0 to 3% Slopes	TuB	0.24	143.3	20.3%
Urban Land	Ub	N/A	201.6	28.5%
Vernon Clay, 1 to 3% Slopes	VeB	0.28	5.5	0.8%
Vernon Clay, 3 to 8% Slopes	VeE	0.28	0.1	0%*
Total for Area of Interest			707.6	100%

Sources: (NRCS, 2023; NRCS, 2022a)

Key: % = percent; AFB = Air Force Base

*Less than 0.1 percent

Note:

a. Area of Interest consists of the planned construction areas at Dyess AFB.

Table 3.10-3. Areal Extent and Erosion Factors for Soil Types at the WGF Site, Dyess AFB

Soil Unit Name	Soil Map Symbol	Erosion Factor	Acres in Area of Interest ^(a)	Percent of Area of Interest ^(a)
Tillman Clay Loam, 1 to 3% Slopes	TmB	0.32	6.2	12.5%
Tobosa Clay, 0 to 1% Slopes	ToA	0.24	2.3	4.6%
Vernon Clay, 1 to 3% Slopes	VeB	0.28	41.1	82.9%
Total for Area of Interest			49.6	100%

Source: (NRCS, 2022a)

Key: % = percent; AFB = Air Force Base; WGF = Weapons Generation Facility

Note:

a. Area of Interest consists of the WGF site at Dyess AFB.

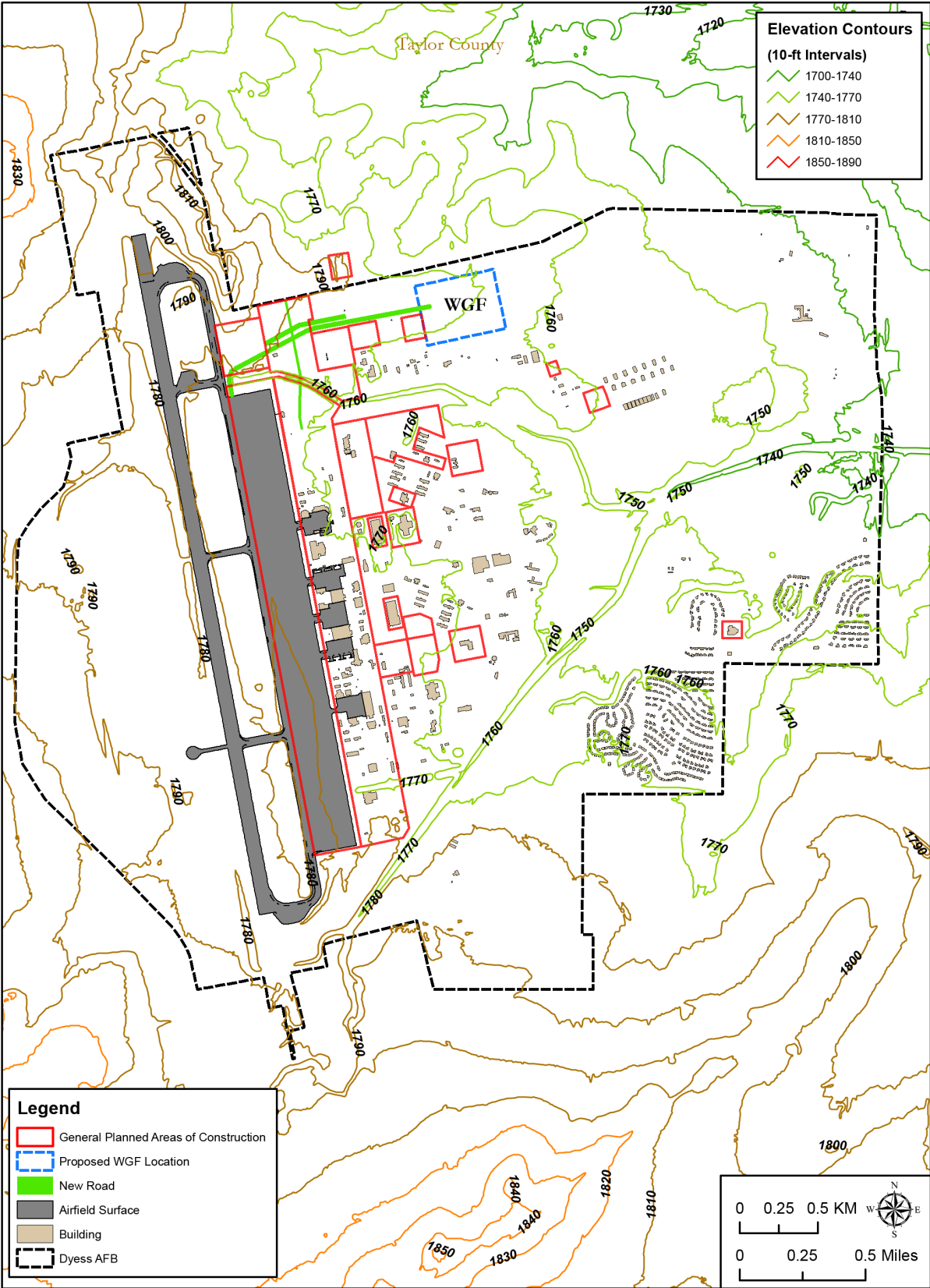


Figure 3.10-1. Topography, Dyess AFB

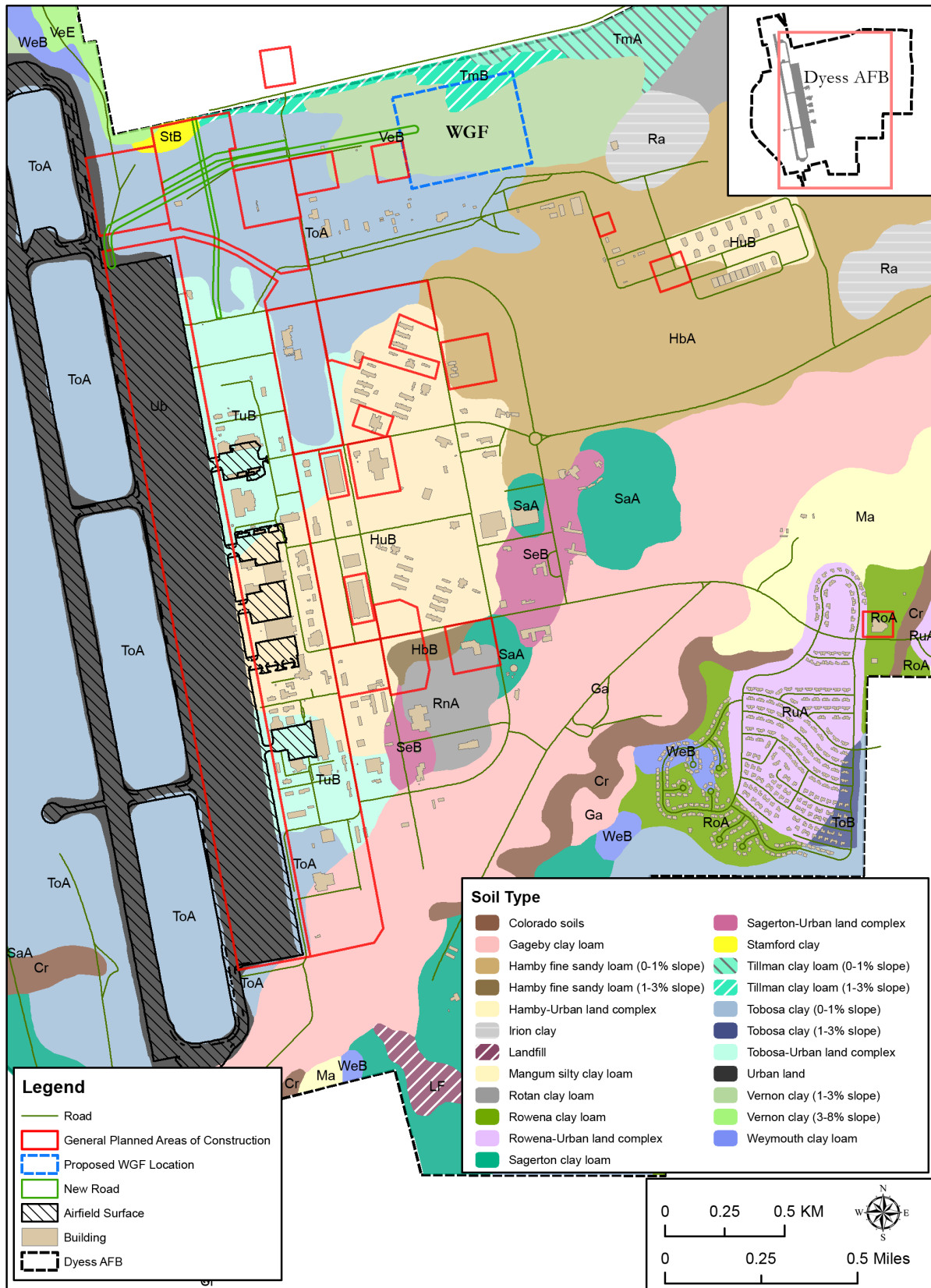


Figure 3.10-2. Soil Types, Planned Construction Areas and WGF Site, Dyess AFB

Water Resources – Surface Water, Floodplains, and Wetlands

The streams that flow through Dyess AFB consist of Little Elm Creek and smaller unnamed streams that flow into Little Elm Creek, also referred to as tributaries (Figure 3.10-3). Little Elm Creek has been diverted from its original course and has been channelized through the base via the South Diversion Ditch. A portion of one of the unnamed tributaries has also been channelized and is referred to as the North Diversion Ditch.

Two unnamed tributaries of Little Elm Creek flow through the golf course and housing area of Dyess AFB (Figure 3.10-3). One of these tributaries was impounded in the 1950s to create Lake Totten. Two storage ponds were constructed in 2002–2003 to supply an irrigation system (Dyess AFB, 2022b). The ponds are fed by effluent (water that has been treated, but not sufficiently purified to drink) from the City of Abilene (Department of Energy, 2009). One pond is in the golf course area and covers roughly 4.5 acres with a capacity of 9 million gallons. The second is located east of the hospital and covers approximately 2.75 acres with a capacity of nearly 13 million gallons. Effluent water stored in the ponds is used to irrigate the golf course and other landscaped areas at the base.

The North Diversion Ditch and the South Diversion Ditch are the two main drainageways that receive stormwater from Dyess AFB. Stormwater is carried to these ditches through an underground stormwater system consisting of a network of concrete, vitrified clay, or corrugated metal pipes. The unnamed creeks that flow through the golf course and housing area receive stormwater from the southeastern part of the base.

The North Diversion Ditch flows southeast, joining the South Diversion Ditch (the channelized section of Little Elm Creek) within the property approximately 1 mile from the base's east fence line/property boundary.

The South Diversion Ditch is dammed by a weir and discharges through two outlets that are controlled by valves located approximately 50 feet west of the base boundary (see photograph, *right*). In the event of an emergency, the valves can be shut to prevent stormwater from exiting Dyess AFB property except in cases of heavy rainfall (Dyess AFB, 2018b).

Under normal conditions, water flows through the outlets into a concrete catch basin which directs water across the base boundary. After exiting the base, the ditch becomes Little Elm Creek, which flows for about 4.5 miles before discharging into Big Elm Creek. Approximately 9 miles downstream, Big Elm Creek flows into Lake Fort Phantom Hill, a reservoir that is owned and operated by the City of Abilene for municipal,



Photograph of Weir System on the South Diversion Ditch, Dyess AFB

industrial, and recreational use (Texas Water Development Board, 2020). The lake serves as a principal drinking water source for the city.

Dyess AFB holds a permit from the TCEQ for stormwater discharges associated with industrial activities (permit number TXR05FK77 with coverage beginning December 3, 2021). As one of the permit requirements, the base has prepared a Storm Water Pollution Prevention Plan (SWPPP) (Dyess AFB, 2018b) that describes stormwater controls (e.g., the weir system described above) and BMPs that the base implements to prevent the release of stormwater pollutants. As outlined in the SWPPP and required by the permit, Dyess AFB monitors stormwater outfalls to ensure compliance with permit limits. The weir system on the South Diversion Ditch is one of the outfalls routinely monitored. The SWPPP also notes that the Military Family Housing Area of Dyess AFB is subject to Phase II Municipal Separate Storm Sewer System Permit requirements (TXR040000).

In addition to surface water features, Figure 3.10-3 also shows the 100-year and 500-year floodplains and wetlands at Dyess AFB. Floodplains are generally associated with drainage ditches, Little Elm Creek, and the unnamed streams in the golf course and on-base housing area. There are 12 jurisdictional wetland areas at Dyess AFB, all of which are less than an acre in area (Dyess AFB, 2022b).

Some of the planned construction areas are partially located within the 500-year floodplain for the South Diversion Ditch/Little Elm Creek and the 100-year floodplain of North Diversion Ditch, and one planned area of construction is completely within the 100-year/500-year floodplain for a tributary of Little Elm Creek (Figure 3.10-3).

Water Resources – Ground Water

Figure 3.10-4 depicts the active water supply wells near Dyess AFB.

The Texas Water Development Board has identified 9 major aquifers and 22 minor aquifers that are used for water supply in the state of Texas (Texas Water Development Board, 2023). Major aquifers are defined as “aquifers that produce large amounts of water over large areas,” and minor aquifers are defined as “aquifers that produce minor amounts of water over large areas or large amounts of water over small areas.”

None of the major aquifers are located within 5 miles of the base boundary, but a minor aquifer (the Cross Timbers Aquifer) lies beneath Dyess AFB. Wells of an average depth of 174 to 193 feet are present and can draw ground water from the Cross Timbers Aquifer (Texas Water Development Board, 2019). Although this aquifer is present beneath the area around Dyess AFB, it does not appear to be frequently used as a water supply source (Figure 3.10-4). There are only two wells within 1 mile of the base. These wells are 32 and 33 feet deep and draw water from alluvium, a shallow unconsolidated aquifer that consists of loose deposits of clay, silt, sand, and gravel left by flowing water and often found near streams (in this case, Little Elm Creek).

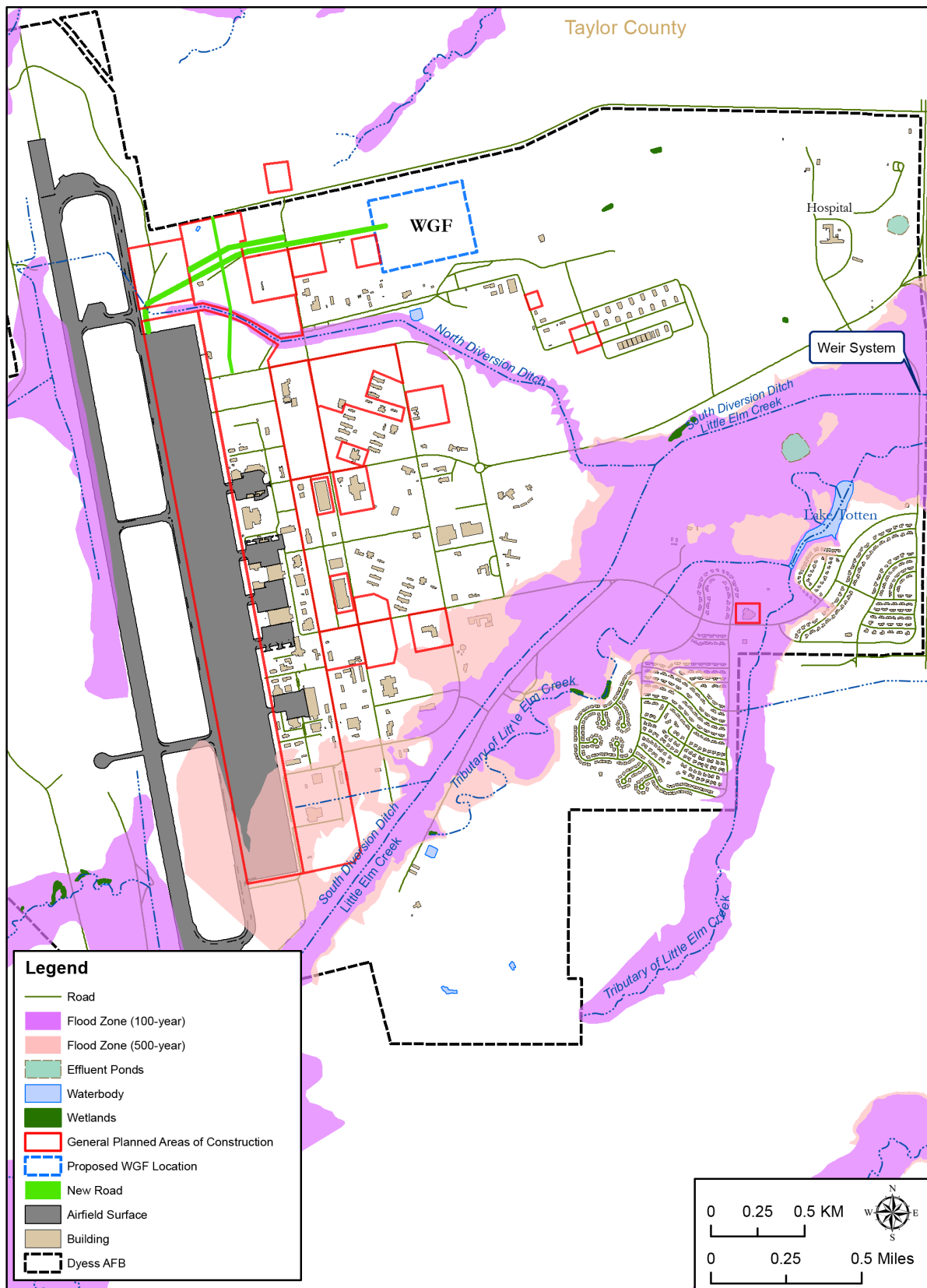


Figure 3.10-3. Streams, Lakes, Floodplains, and Wetlands – Dyess AFB

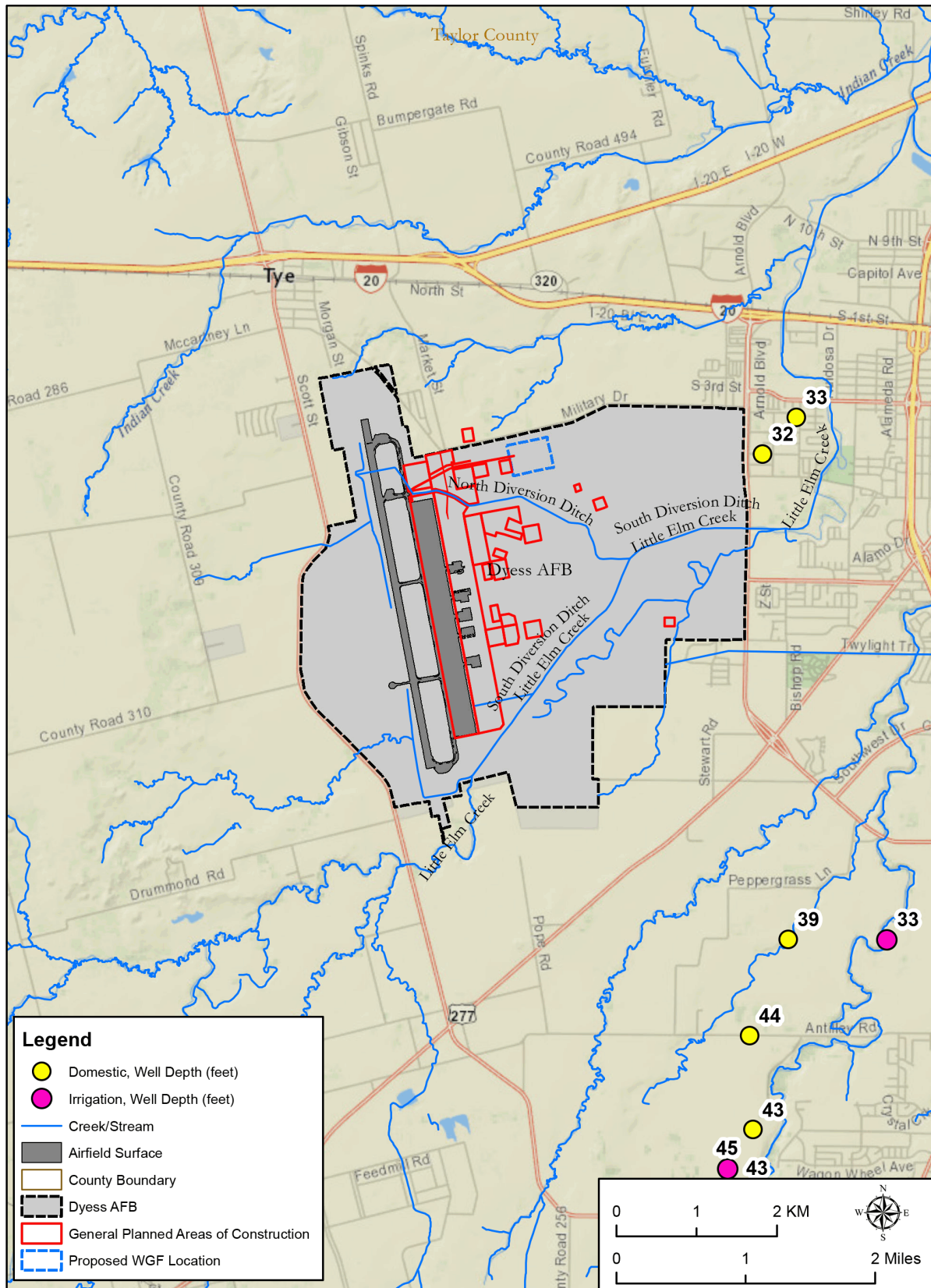


Figure 3.10-4. Active Water Supply Wells Near Dyess AFB

3.10.1.2.2 Whiteman AFB

Topography

Whiteman AFB is also in the Osage Plains Section of the Central Lowland province (U.S. Geological Survey, 2023b). As noted previously, the Osage Plains Section is characterized by gently rolling terrain (Madole et al., 1991).

Figure 3.10-5 shows the topography of Whiteman AFB. The ground surface is flat near the center of the base, with more topographic relief toward the northern and southern boundaries. The largest planned construction area is located on the central flat part of the base. The North and South WGF Sites are in areas with surface slopes of about 1 to 2 percent. Slopes between 1 percent and 2.5 percent are considered moderate (United Nations, 1985). There are greater elevation changes within the planned construction areas in the vicinity of Northwest Lake and North Lake and north of the flightline, as indicated by contour lines that are closer together in these areas as shown in Figure 3.10-5. Small sections of some of these planned construction areas have slopes that are greater than 2.5 percent, which is considered steep (United Nations, 1985).

Soils

Soil types in the planned construction areas and WGF sites at Whiteman AFB consist of Mandeville silt loam, Sampsel silty clay loam, Nodaway silt loam, Gorin silt loam, Haig silt loam, Zook silty clay loam, Deepwater silt loam, Norris channery silt loam, Weller silt loam, and Haplaquents-Urban land complex (Figure 3.10-6) (USDA, 1980; NRCS, 2022a). Table 3.10-4 presents a description of each soil type. Table 3.10-5, Table 3.10-6, and Table 3.10-7) show the areal extent and erosion factor for each soil type and soil type complex at Whiteman AFB in the vicinity of the planned construction areas, North WGF Site, and the South WGF Site/Potential EOD Range, respectively.

Erosion factors range from 0.02 for the least erodible to 0.64 for the most erodible soils. Erosion factors for soils in the planned construction areas and WGF sites/Potential EOD Range at Whiteman AFB range from 0.28 to 0.49, which indicates the soils are moderately erodible.

Table 3.10-4. Soil Types in Planned Construction Areas and WGF Sites, Whiteman AFB

Soil Type	Description
Mandeville Silt Loam	Consists of well and moderately well-drained, moderately permeable soils moderately deep to shale. They formed in residuum weathered from acid micaceous shales. These soils are on convex ridgetops and side slopes.
Sampsel Silty Clay Loam	Consists of deep and very deep, poorly drained, slowly permeable soils that formed in residuum from alkaline or calcareous shale or colluvium and alluvium from the shale and associated materials. These soils are on gently to strongly sloping uplands.
Nodaway Silt Loam	Consists of very deep, moderately well-drained soils formed in alluvium. These soils are on floodplains, upland drainageways, and alluvial fans.
Gorin Silt Loam	Consists of very deep, somewhat poorly drained, slowly permeable soils formed in loess and loamy sediments or loess, loamy sediments and a paleosol from glacial till. These soils are typically found on ridgetops.

Table 3.10-4. Soil Types in Planned Construction Areas and WGF Sites, Whiteman AFB

Soil Type	Description
Haig Silt Loam	Consists of very deep, poorly drained soils formed in Wisconsin Age loess. These soils are on broad interfluvies on dissected till plains.
Zook Silty Clay Loam	Consists of very deep, poorly drained and very poorly drained soils formed in alluvium. These soils are on floodplains and stream terraces in river valleys and in drainageways on uplands.
Deepwater Silt Loam	Consists of deep, moderately well-drained, moderately permeable soils formed in a thin loess mantle and underlying residuum from shales. Slope ranges from 1 to 10%, but typically are less than 5%.
Norris Channery Silt Loam	Consists of shallow, well-drained, moderately permeable soils that formed in loamy residuum from acid shale.
Weller Silt Loam	Consists of deep, moderately well-drained, slowly permeable soils formed in loess on uplands and high stream benches.
Haplaquents-Urban Complex	Consists of a near-level, fine-textured, poorly drained soil that has been graded, cut, filled, or otherwise disturbed during construction and urbanization.

Sources: (USDA, 1980; NRCS, 2022a; NRCS, 2022c)

Key: % = percent; AFB = Air Force Base; WGF = Weapons Generation Facility

Table 3.10-5. Areal Extent and Erosion Factors for Soil Types at Planned Construction Areas, Whiteman AFB

Soil Unit Name	Erosion Factor	Acres in Area of Interest ^(a)	Percent of Area of Interest ^(a)
Mandeville Silt Loam, 5 to 9% Slopes	0.37	3.5	1.1%
Sampsel Silty Clay Loam, 2 to 5% Slopes	0.28	1.5	0.5%
Sampsel Silty Clay Loam, 5 to 9% Slopes, Severely Eroded	0.32	9.2	3.0%
Nodaway Silt Loam, 1 to 3% Slopes, Occasionally Flooded	0.37	0.01	0% ^(b)
Gorin Silt Loam, 5 to 9 % Slopes, Eroded	0.43	17.1	5.5%
Haig Silt Loam, 0 to 2% Slopes	0.37	39.9	12.8%
Norris Channery Silt Loam, 5 to 14% Slopes	0.28	2.1	0.7%
Weller Silt Loam, 2 to 5% Slopes	0.49	4.1	1.3%
Haplaquents-Urban Land Complex, 0 to 2% Slopes	0.43	233.6	75.1%
Total for Area of Interest		311.0	100%

Source: (NRCS, 2022a)

Key: % = percent; AFB = Air Force Base

Notes:

a. Area of Interest consists of the planned construction areas at Whiteman AFB.

b. Less than 0.1 percent.

Table 3.10-6. Areal Extent and Erosion Factors for Soil Types at the North WGF Site, Whiteman AFB

Soil Unit Name	Erosion Factor	Acres in Area of Interest ^(a)	Percent of Area of Interest ^(a)
Sampsel Silty Clay Loam, 2 to 5% Slopes	0.28	31.6	62.7%
Haig Silt Loam, 0 to 2% Slopes	0.37	12.9	25.4%
Zook Silty Clay Loam, 1 to 5% Slopes, Frequently Flooded	0.28	6.0	11.9%
Total for Area of Interest		50.5	100%

Source: (NRCS, 2022a)

% = percent; AFB = Air Force Base; WGF = Weapons Generation Facility

Note:

a. Area of Interest consists of the North WGF site at Whiteman AFB.

Table 3.10-7. Areal Extent and Erosion Factors for Soil Types at the South WGF Site, Whiteman AFB

Soil Unit Name	Erosion Factor	Acres in Area of Interest ^(a)	Percent of Area of Interest ^(a)
Sampsel Silty Clay loam, 5 to 9% Slopes, Severely Eroded	0.32	4.4	8.7%
Haig Silt Loam, 0 to 2% Slopes	0.37	35.3	70.1%
Deepwater Silt Loam, 5 to 9% Slopes, Eroded	0.43	5.9	11.7%
Haplaquents-Urban Land Complex, 0 to 2% Slopes	0.43	0.7	1.3%
Water	N/A	4.1	8.2%
Total for Area of Interest		50.3	100%

Source: (NRCS, 2022a)

Key: % = percent; AFB = Air Force Base; N/A = not applicable; WGF = Weapons Generation Facility

Note:

a. Area of Interest consists of the South WGF site at Whiteman AFB.

Water Resources – Surface Water, Floodplains, and Wetlands

Whiteman AFB is drained by Long Branch Creek, Brewer Branch, and unnamed tributaries of Clear Fork Creek (Figure 3.10-7). Long Branch Creek enters Whiteman AFB near the southwestern corner of the base and then flows in the form of a canal toward the eastern boundary. A tributary of Long Branch Creek flows south near the eastern boundary and converges with Long Branch Creek before exiting the base. Brewer Branch starts at the southwestern corner of the base, exits at the western boundary, and continues to flow west until it discharges into Clear Fork Creek. Brewer Branch is fed by stormwater sewer pipes from the southwestern flightline and by tributaries that drain the housing and industrial area. Bear Lake and Ice Skelton Lake are man-made ponds on tributaries that drain the housing and industrial areas, respectively. A retention basin upstream of Ice Skelton Lake collects runoff from an industrial area and is equipped with a shut-off valve that is used in the event of a spill (Whiteman AFB, 2020a). There are two unnamed tributaries of Clear Fork Creek that drain the north/northwest area of the base. One of these tributaries contains North Lake and Northwest Lake (Figure 3.10-7). Northwest Lake is located near the base boundary and discharge from this lake is controlled by a weir outfall structure.

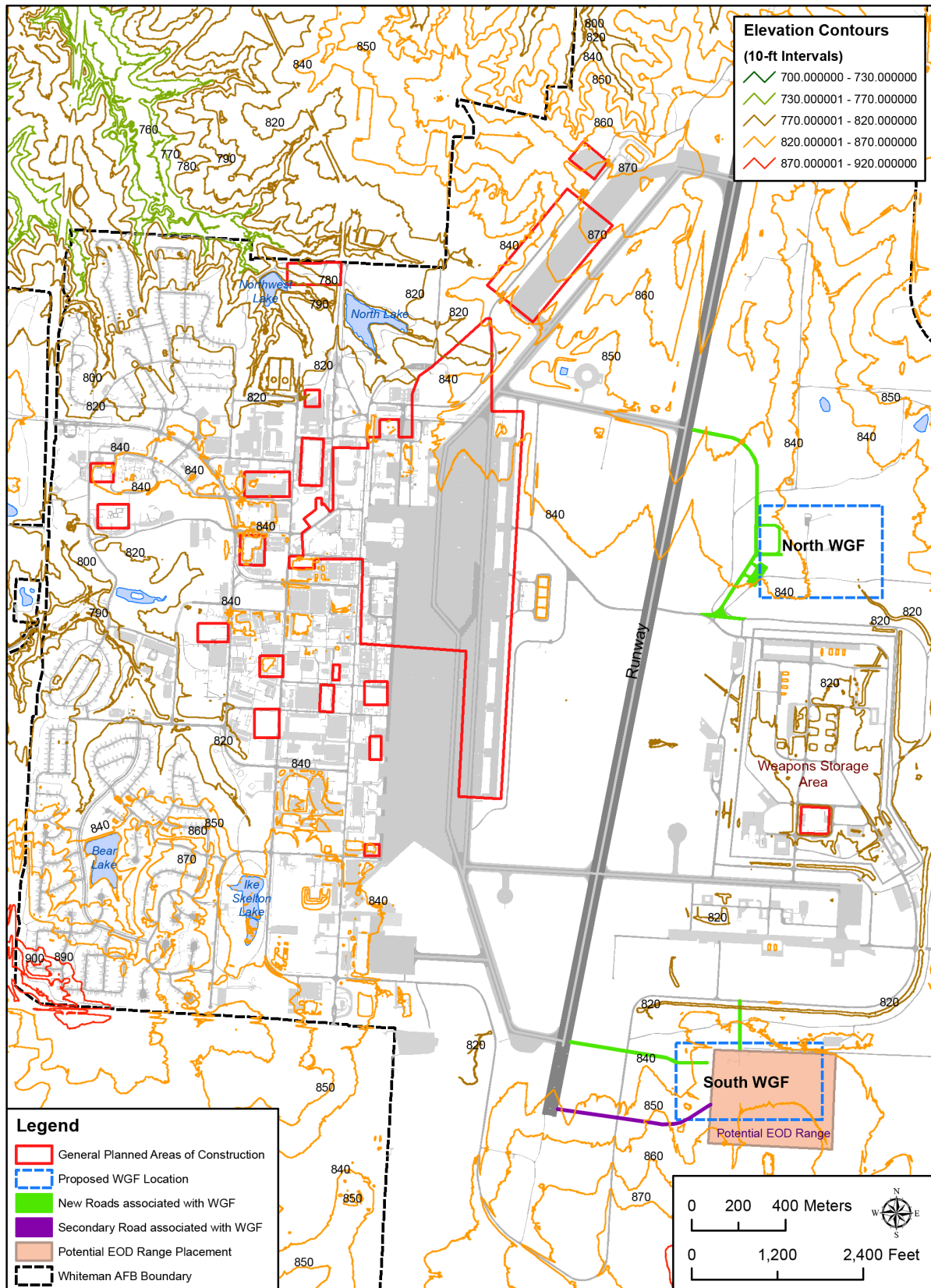


Figure 3.10-5. Topography, Whiteman AFB

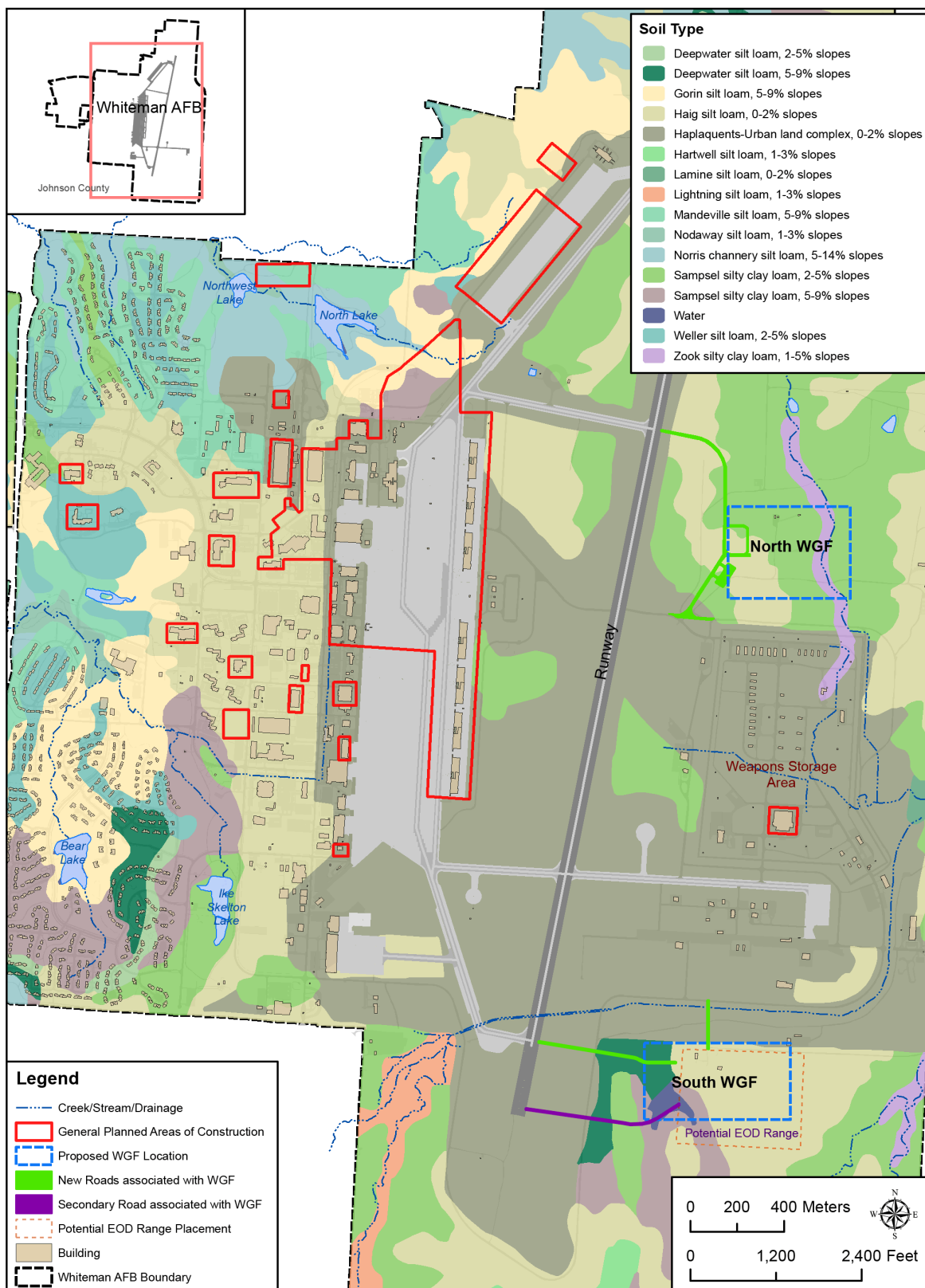


Figure 3.10-6. Soil Types, Planned Construction Areas, WGF Sites and Potential Explosive Ordnance Disposal Range, Whiteman AFB

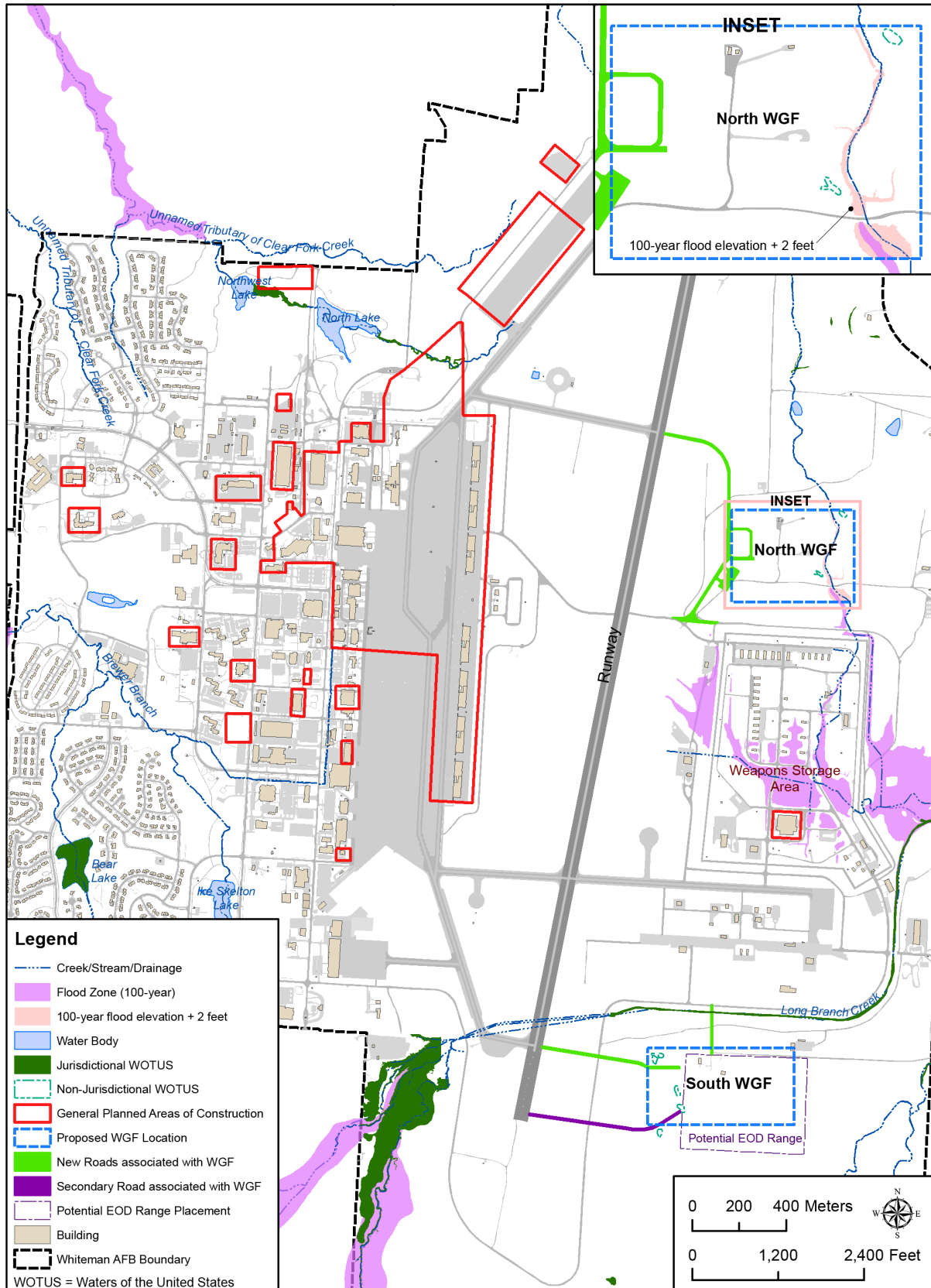


Figure 3.10-7. Streams, Lakes, Floodplains, and Wetlands – Whiteman AFB

Since the planned construction areas are located in the north/northwestern part of the base, surface runoff from these areas would flow toward Brewer Branch or the unnamed tributaries of Clear Fork Creek. Surface runoff from the North WGF Site would flow into the tributary of Long Branch Creek located along the eastern boundary of the base, while surface runoff from the South WGF and potential EOD range would flow directly into Long Branch Creek (Figure 3.10-7).

Whiteman AFB holds a permit from the Missouri Department of Natural Resources (MDNR) for stormwater discharges from air transportation facilities involved in vehicle maintenance and/or deicing (permit # MOR80F35). As one of the permit requirements, the base has prepared a SWPPP (Whiteman AFB, 2020a) that describes stormwater controls and BMPs that the base implements to prevent the release of pollutants. As outlined in the SWPPP and required by the permit, Whiteman AFB monitors stormwater outfalls to ensure compliance with permit limits. Runoff from areas where industrial activities are performed flow through stormwater outfalls that are routinely monitored and sampled in accordance with the stormwater permit requirements.

In addition to surface water features, Figure 3.10-7 also shows floodplains and wetlands at Whiteman AFB. Floodplains (100-year flood zone) occur near the southwestern boundary of the base along Long Branch Creek and its tributary (Whiteman AFB, 2020a), and also within the Weapons Storage Area and a small portion of the North WGF site (inset map in Figure 3.10-7). Due to the presence of floodplains, proposed MOB 2 construction activities at the North WGF site would potentially be subject to the requirements of EO 11988 and EO 13690. Since the 500-year floodplain has not been delineated for Whiteman AFB, the alternative freeboard approach (see Section 3.10.1.1, Physical Resources, Affected Environment, Description of Resource) described in EO 13690 was used to define the floodplain at the North WGF Site and ensure compliance with EO 11988. With this approach, the flood elevation is set to the 100-year flood elevation plus 2 feet. Using the elevation contours at Whiteman AFB, the floodplain at the North WGF Site is defined by the “100-year flood elevation +2 feet” area shown in the inset map in Figure 3.10-7.

Wetland surveys were conducted in 2021 and 2022 in areas that would potentially be affected by the B-21 MOB 2 beddown construction (XCEL Engineering, 2023). The surveys identified surface waters that are jurisdictional WOTUS, as well as surface waters and small wetlands that are not WOTUS. Jurisdictional surface waters consist of streams associated with Northwest Lake and North Lake and a segment of Long Branch Creek (Figure 3.10-7). A tributary of Long Branch Creek in the North WGF Site/Munitions Storage Area is a non-relatively permanent water that is not jurisdictional based on the lack of evidence of continuous flows or ground water discharge. A total of seven small, isolated wetlands, which are located within or adjacent to the North and South WGF sites, are hydrologically isolated and therefore do not qualify as jurisdictional WOTUS according to the most recent EPA and USACE rule and interpretation (refer to Section 3.10.1.1, Physical Resources, Affected Environment, Description of Resource).

Two additional small wetlands were previously identified by Whiteman AFB immediately west of the South WGF Site, based on 2015 GIS data. However, these wetlands are not identified in the National Wetlands Inventory, and the 2021 and 2022 field surveys found

that hydric indicators were absent at the sites (XCEL Engineering, 2023). Therefore, the two sites are not included in Figure 3.10-7. Jurisdictional and non-jurisdictional WOTUS identified during the 2021 and 2022 field surveys are shown in Figure 3.10-7. The DAF received an approved JD (see Appendix F, Physical Resources) from USACE on November 2, 2023, verifying the jurisdictional status of WOTUS (surface waters or wetlands) identified in the 2021 and 2022 field surveys and potentially impacted by B-21 beddown activities (USACE, 2023a; USACE, 2023b).

Water Resources – Ground Water

Ground water-bearing units in the area surrounding Whiteman AFB consist of shallow unconsolidated deposits and deep bedrock aquifers. The shallow unconsolidated deposits yield small quantities of ground water and are not used locally as a source of water supply (CH2M Hill, 2003). Water wells located at Whiteman AFB draw ground water from bedrock aquifers and are 476 to 1,100 feet deep. Water wells in the area surrounding Whiteman AFB are mostly deeper than 300 feet (Figure 3.10-8).

As a result of historical activities at Whiteman AFB, ground water in the shallow unconsolidated deposits was contaminated by fuels and chemicals previously used for maintenance and operations. Ground water contamination was limited to depths less than 30 to 40 feet in localized areas near former landfills and a former fire training area and has not migrated off base (URS, 2016).

3.10.1.3 Analysis Methodology

Soils

Soils in the planned construction areas and WGF sites were evaluated to identify soil types and erosion potential, which is influenced by drainage characteristics and site topography. The Proposed Action involves new construction, which would require land disturbance and introduce the potential for soil erosion that can possibly impact surface water features within and downstream of Dyess AFB and Whiteman AFB.

Water Resources

Potential impacts on water resources were evaluated by identifying surface water features and ground water within and around Dyess AFB and Whiteman AFB. This allowed for the determination of direct impacts on water resources (e.g., construction in floodplains, stormwater runoff to streams, migration of contaminants into ground water), as well as the potential for impacts on water resources downstream or downgradient of the planned construction areas and WGF sites for each alternative. Potential impacts were also evaluated in the context of Section 303 of the CWA, which requires states to establish water quality standards for waterways, identify those that fail to meet the standards, and take action to clean up impaired waterways. Waters determined to be impaired are submitted to EPA for approval as each state's 303(d) list.



3.10.2 Physical Resources, Environmental Consequences

3.10.2.1 No Action Alternative Consequences

Under the No Action Alternative, impacts on physical resources related to the B-21 MOB 2 beddown would not occur because there would be no associated construction, demolition or renovation activities. However, the baseline development and infrastructure projects identified in Table 3.1-1 would occur as planned at Dyess AFB and Whiteman AFB. In addition, demolition, construction, and maintenance activities not associated with the B-21 beddown or baseline projects would continue as part of normal operations and installation development. These activities may affect physical resources and would therefore be subject to project-specific environmental review under the EIAP. Physical resources concerns for these activities would be addressed during the EIAP review. Installation-specific impacts are discussed in the following subsections.

3.10.2.1.1 No Action at Dyess AFB

Soils

On-base construction, demolition, and renovation activities associated with baseline projects (Table 3.1-1) and typical ongoing operations and development would involve ground disturbance and the potential for soil erosion and related sedimentation and contaminant transport. The potential for such impacts would be minimized by implementing erosion control, sediment control, and stormwater management measures. Work involving soil disturbance, building enhancements, and construction projects at Dyess AFB are required to be reviewed by the 7th Civil Engineering Squadron (7 CES) Environmental Group under the EIAP for approval. The review provides the 7 CES Environmental Group the opportunity to identify the potential for adverse impacts, to determine the need for additional project specific NEPA analysis, and to include erosion and sediment control requirements in the work order or contract. All ground-disturbing activities would be subject to applicable BMPs and procedures identified in the Dyess AFB SWPPP and Spill Prevention, Control, and Countermeasures (SPCC) Plan, applicable requirements in the construction general permit for construction projects, and requirements for stormwater control and conveyance structures. The site topography at Dyess AFB is essentially flat, which results in low erosion potential at facilities currently regulated under the base's stormwater discharge permit (Dyess AFB, 2018b), as well as areas likely to be affected by future ground-disturbing activities.

Erosion control and assessment of the erosion control program is ensured by including sediment and erosion control as an element in the annual and quarterly stormwater inspection program. Construction projects encompassing more than 1 acre of disturbed area require a separate permit and are inspected by the 7 CES Environmental Group (Dyess AFB, 2018b). Continuing implementation of EIAP reviews, the erosion control program, the stormwater inspection program, and associating permitting procedures would prevent significant impacts on soils at Dyess AFB under the No Action Alternative.

There are no known issues with soil disturbance or erosion resulting from the recently completed ATEMS/CTE schools and Dyess Elementary School. It is anticipated that off-base construction activities associated with the Wylie ISD bond program would be subject to erosion control measures. Therefore, there would be minimal potential for impacts on soil resources in the ROI.

Water Resources

On-base construction, demolition, and renovation activities associated with baseline projects (Table 3.1-1) and general ongoing development could affect water resources through soil erosion and related sedimentation and contaminant transport, and through leaks or spills of contaminants. New construction could result in increased impervious surface area and stormwater runoff. Dyess AFB maintains and implements a SWPPP (Dyess AFB, 2018b) that includes BMPs and controls for reducing the potential for impacts on surface water, floodplains, and wetlands. The SWPPP provides spill prevention measures and response actions, and describes employee training, as well as monitoring and inspection programs. These programs protect surface water and ground water at and downgradient from the base.

Dyess AFB also maintains an SPCC Plan. The SPCC Plan contains spill response procedures and a list of facilities that have containers for petroleum, oils, and lubricants (POLs) with storage capacities of 55 gallons or greater. Many requirements implemented in the SPCC Plan prevent stormwater pollution and adverse impacts on surface water, floodplains, wetlands, and ground water. Ground-disturbing projects are reviewed to identify potential impacts on wetlands and floodplains specifically. With these measures in place, there would be no significant impacts to on-base water resources, and transport of sediments or contaminants to off-base water features would be very unlikely.

Off-base construction activities associated with the Wylie ISD bond program would also be subject to erosion control measures. Stormwater runoff resulting from increased impervious surface area around the new schools, as well as the recently completed ATEMS/CTE schools and Dyess Elementary School, would be attenuated and managed within existing stormwater control systems. Due to implementation of stormwater control measures during these actions, there would be minimal potential for impacts on water resources in the ROI.

3.10.2.1.2 No Action at Whiteman AFB

Soils

On-base construction, demolition, and renovation activities associated with baseline projects (Table 3.1-1) and typical ongoing operations and development would involve ground disturbance and the potential for soil erosion and related sedimentation and contaminant transport. The potential for such impacts would be minimized by implementing erosion control, sediment control, and stormwater management measures. All ground-disturbing activities would be subject to applicable BMPs and procedures identified in the Whiteman AFB SWPPP and SPCC Plan, applicable requirements in the construction general permit for construction projects, and requirements for stormwater

control and conveyance structures. Whiteman AFB implements EPA- and MDNR-required measures to limit erosion and sedimentation throughout the base, as described in the SWPPP (Whiteman AFB, 2020a). Measures used by the base include maintaining as much vegetation as possible, minimizing soil exposure, preventing runoff from flowing across disturbed areas, stabilizing disturbed soil as soon as possible, slowing runoff from flowing across disturbed sites, providing runoff drainage paths, and removing sediment from runoff before it leaves disturbed sites. For areas of erosion identified during inspections, base personnel responsible for compliance with the SWPPP requirements develop work orders to have these areas repaired either by the base operations workers, contractors, or grounds maintenance.

Sediment and erosion control is included as an element in the stormwater inspection program. Construction projects encompassing more than 1 acre of disturbed area require a separate permit. Continuing implementation of the SWPPP and SPCC Plan, EIAP reviews, and the stormwater inspection program and associating permitting procedures would prevent significant impacts on soils at Whiteman AFB under the No Action Alternative.

Off-base roadway and bridge construction and repair actions undertaken by the Missouri DOT would involve ground disturbance that could result in erosion and related impacts. It is expected that erosion control measures would be implemented during and after construction and repair activities. These measures would minimize the potential for impacts on soil resources in the ROI.

Water Resources

On-base construction, demolition, and renovation activities associated with baseline projects (Table 3.1-1) and general ongoing development could affect water resources through soil erosion and related sedimentation and contaminant transport, and through leaks or spills of contaminants. New construction could result in increased impervious surface area and stormwater runoff. Whiteman AFB maintains and implements a SWPPP (Whiteman AFB, 2020a) that includes BMPs and controls for reducing the potential impact from ongoing military activities on surface water, floodplains, or wetlands. The SWPPP identifies potential pollution sources, provides stormwater control measures, describes procedures for stormwater monitoring, and presents a schedule of inspections to ensure compliance with the SWPPP and corrective actions if required. The measures implemented to protect surface water also serve to prevent contamination of ground water at and downgradient from the base.

Whiteman AFB also maintains an SPCC Plan, which specifies spill response actions to minimize the potential impact to human health and the environment. Spills are contained using spill kits, drain covers, spill catch basins, and overflow protection devices on fueling equipment. In addition, personnel provide monitoring during fuel transfer operations. Requirements implemented in the SPCC Plan prevent stormwater pollution and adverse impacts on surface water, floodplains, wetlands, and ground water. Ground-disturbing projects are reviewed to identify potential impacts on wetlands and floodplains specifically. With these measures in place, there would be no significant impacts to on-

base water resources, and transport of sediments or contaminants to off-base water features would be very unlikely.

Off-base roadway and bridge construction and repair actions undertaken by the Missouri DOT would involve ground disturbance that could result in sedimentation and transport of contaminants to water features. It is expected that erosion control measures would be implemented during and after construction and repair activities, and that stormwater runoff associated with new impervious surface areas would be routed and managed through the existing stormwater system. These measures would minimize the potential for impacts on water resources in the ROI.

3.10.2.2 Dyess AFB Alternative

3.10.2.2.1 Personnel

Potable water is supplied to Dyess AFB by the City of Abilene, which obtains its water primarily from Fort Phantom Hill Lake. The water treatment system for the City of Abilene has a maximum capacity of 46,000,000 gallons per day (gpd) (City of Abilene, 2023). Dyess AFB currently uses approximately 169,000 gallons of water per day on average. Water usage would be expected to increase to support the increased number of personnel at the base with the B-21 beddown (Section 3.14, Utilities and Infrastructure). The increased water usage rate is a small percentage of the maximum capacity of the water treatment system for the City of Abilene. As such, this increase is not expected to have significant impacts on Fort Phantom Hill Lake, from which the City of Abilene primarily draws its water.

The increased number of personnel would also result in increased vehicle use and related potential for oil/lubricant spills and leaks. However, the increase is not expected to be significant, given that the end-state increase in traffic volume on the installation is estimated to be approximately 15 percent over baseline conditions (Section 3.13, Transportation). Furthermore, vehicular spills and leaks would be captured by the base's stormwater system, which is managed and monitored under the SWPPP (Dyess AFB, 2018b). No adverse impacts on soils or water resources would be expected from oil/lubricant spills and leaks associated with increased vehicle operation.

3.10.2.2.2 Airfield Operations

Water resources at Dyess AFB could potentially be impacted by inadvertent releases of hazardous chemicals that may occur during airfield operations such as fueling, conventional and unconventional munitions storage, equipment maintenance, and waste disposal. Hazardous chemical releases could also occur from leaking fuel storage tanks. The volume of fuels and hazardous chemicals used at Dyess AFB, and the volume of hazardous waste generated, are not expected to change if the B-21 beddown occurs at this location, although the nature of some hazardous wastes could change based on the type of materials used in repair operation. Hazardous Material Management and Hazardous Waste Disposal programs described in Section 3.11 (Hazardous Materials and Hazardous and Solid Wastes) are currently being implemented, and these programs would protect surface waters and ground water resources downstream of the proposed

construction footprints for projects listed in Table 2.3-4 and the WGF site. The Dyess AFB SWPPP (Dyess AFB, 2018b) includes BMPs for spill prevention and response actions. It also describes employee training, monitoring, and inspection programs. The potential for accidental chemical releases would be substantially reduced by these control measures. If these events do occur, spills can be prevented from leaving the base boundary by the weir/valve control system at the South Diversion Ditch/Little Elm Creek. In the event of an emergency, the valves can be shut to prevent chemicals from exiting the Dyess AFB property except in cases of heavy rainfall events (Dyess AFB, 2018b).

The Dyess AFB SPCC Plan contains spill response procedures and a list of facilities that have containers for POLs with storage capacities of 55 gallons or greater. The plan would need to be updated to include new POL storage tanks associated with the proposed B-21 MOB 2. Many requirements implemented in the SPCC Plan also prevent stormwater pollution and adverse impacts on surface water as well as ground water.

3.10.2.2.3 Facilities, Infrastructure, and the Weapons Generation Facility

Soils

Establishment of the B-21 MOB 2 at Dyess AFB would require construction of new facilities, as well as renovation and demolition of existing structures. There would also be temporary ground disturbance resulting from a contractor laydown area. Construction and other ground-disturbing activities may cause soil disturbance and soil erosion unless mitigation practices are implemented.

The soils in the planned areas of construction and WGF site are shown in Figure 3.10-2. Erosion factors range from 0.17 to 0.32, which indicate low to moderate erodibility (Table 3.10-2). The slopes in the planned areas of construction and WGF site are less than 1 percent, which is considered flat (United Nations, 1985). Overall, there is low potential for soil erosion at the planned construction areas and WGF site due to construction and other ground-disturbing activities.

The potential for soil erosion would be further reduced by controls implemented by Dyess AFB for construction projects at the base. The Civil Engineering Squadron (CES) Environmental Group reviews construction projects (Dyess AFB, 2018b) and identifies additional erosion and sediment control requirements in the work order or contract if baseline runoff BMPs do not provide adequate protection of surface water during construction. Examples of erosion and sediment controls include minimization of earth-moving activities during wet-weather conditions, covering soil stockpiles, installation of silt fencing and sediment traps, and revegetation of disturbed areas with native plants (using correct seed mixes identified by the local U.S. Natural Resource Conservation Service [NRCS] office) as soon as possible to contain and prevent off-site migration of sediment or eroded soils from the project areas.

In addition to BMPs specified in the SWPPP or project-specific requirements from the CES Environmental Group, construction of the B-21 MOB 2 facilities and WGF would be covered under the TCEQ construction general permit (TXR150000) because the area of the WGF building and the areas of many of the new facilities (Table 2.3-4) would be greater than 1 acre (43,560 square feet). Adherence to provisions in the construction

general permit will be required, including development of a site-specific SWPPP that describes BMPs for erosion and sediment control. The SWPPP will specify BMPs for discharges of stormwater from construction activities and construction support activities (e.g., borrow pits, staging areas, and material storage areas). The DAF will ensure that National Pollutant Discharge Elimination System (NPDES) requirements are met during execution of construction projects and will coordinate with TCEQ as needed.

In summary, beddown of the B-21 at Dyess AFB would not result in significant impacts on soil because of the low erosion potential associated with the flat topography at the base in general, and in the planned areas of construction and WGF site specifically. The likelihood of potential impacts would be further reduced by the application of BMPs identified in the Dyess AFB SWPPP, adherence to erosion and sediment control requirements established by the 7 CES Environmental Group, and implementation of requirements in the construction general permit for construction projects where land disturbance is greater than 1 acre.

Water Resources

Surface waters that could potentially be affected by construction and operations at the planned areas of construction and WGF site are the North Diversion Ditch, South Diversion Ditch, Little Elm Creek (downstream of these ditches), and tributaries of Little Elm Creek. Little Elm Creek is not on the Texas 303(d) list of impaired waters (TCEQ, 2022a). Establishment of the B-21 MOB 2 at Dyess AFB would not be expected to cause impairment of this surface water. Wetlands at Dyess AFB would not be affected because there are no wetlands in the planned areas of construction for projects listed in Table 2.3-4 or in the WGF construction footprint.

Surface runoff from planned construction areas would flow either toward the North Diversion Ditch or the South Diversion Ditch; surface runoff from one planned construction area would flow toward a tributary of Little Elm Creek (Figure 3.10-3). Surface runoff from the WGF Site would flow toward North Diversion Ditch.

Potential impacts on surface water typically occur during construction/demolition activities from land disturbance due to eroded soil being transported into nearby drainageways. However, these impacts are unlikely to occur under the Dyess AFB Alternative because of the low likelihood of soil erosion, which stems from the flat topography in the construction footprints for projects listed in Table 2.3-4 and the WGF site. Additionally, erosion control measures would be implemented in accordance with the Dyess AFB SWPPP (Dyess AFB, 2018b), and requirements in the TCEQ construction general permit (TXR150000) for construction areas where land disturbance would be greater than 1 acre. As noted previously, adherence to provisions in the construction general permit will be required, including development of a site-specific SWPPP that describes BMPs for erosion and sediment control. The SWPPP will specify BMPs for discharges of stormwater from construction activities and construction support activities (e.g., borrow pits, staging areas, and material storage areas). The DAF will ensure that NPDES requirements are met during execution of construction projects and will coordinate with TCEQ as needed.

A new road connecting the WGF to Avenue A would cross the North Diversion Ditch near the airfield. The stream crossing would likely occur via a new culvert. Construction and grading work on the stream bank, and culvert placement within the stream channel, have the potential to cause erosion, siltation, sedimentation, and changes to stream flow characteristics. Culvert placement and associated construction activities would be reviewed by the 7 CES Environmental Group prior to installation. It is expected that erosion controls and other applicable BMPs would be identified during project planning and would be implemented during construction. It is further expected that culvert design (e.g., flow capacity), installation, and maintenance would adhere to standard engineering practices. With proper planning and installation, culvert placement would not significantly alter the flow or ecological functions of North Diversion Ditch. The potential for road construction and operation to impact waters of the North Diversion Ditch would be minimized by application of BMPs identified in the Dyess AFB SWPPP and adherence to erosion control requirements established by the 7 CES Environmental Group. In addition, because land disturbance associated with road construction would be greater than 1 acre, requirements in the construction general permit would be implemented.

Surface water could also potentially be impacted by increased impervious surface area from new facilities and other structures, which would result in a higher discharge volume of stormwater flowing into drainageways. Impervious surface area would increase by an estimated 38 acres for all projects combined, including new roads. This estimate is based on the notional footprint of new construction and facility additions in currently unpaved areas. It is assumed that renovation of existing facilities and placement of new facilities and structures on existing hard surfaces would result in no net change in impervious surface area. Additional stormwater runoff volume would need to be evaluated by the 7 CES Environmental Group in the context of capacity of the existing stormwater drainage system. The Dyess AFB IDP indicates that new construction on base would require localized improvements to the drainage system (Dyess AFB, 2018a).

Increased runoff can be managed by conveyance structures (e.g., roadways, channels, and culverts) designed in accordance with established engineering standards. In addition, stormwater impacts can be reduced by using site controls that treat, store, and infiltrate runoff on site before it can affect water bodies downstream (EPA, 2022b). These control measures include but are not limited to grassed swales, infiltration basins and trenches, rain gardens, and pervious pavements. Stormwater management controls would conform with Section 438 of the Energy Independence and Security Act, which requires agencies to protect water resources by reducing stormwater runoff from any federal development projects (EPA, 2009).

Because 100- and 500-year floodplains are present in some planned areas of construction (Figure 3.10-3), siting new facilities in these areas at Dyess AFB would comply with EO 11988, *Floodplain Management*, and EO 13690, *Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input*. It should be noted that the floodplain areas within the planned areas of construction consist of land that had already been previously disturbed and developed. Therefore, redevelopment of these areas for B-21 MOB 2 would not change the hydrologic properties of the floodplain from current conditions. Since Dyess AFB does not have available land to be able to establish B-21 MOB 2 at the base without working

within the 100- and 500-year floodplains, a Finding of No Practicable Alternative will be included in the ROD if the Dyess AFB Alternative is chosen.

No significant impacts on ground water would be anticipated to result from establishment of the B-21 MOB 2 at Dyess AFB. BMPs and spill prevention practices in the Dyess AFB SWPPP and SPCC Plan would serve to protect ground water. Contamination of the underlying Cross Timbers Aquifer is unlikely given its depth (174 to 193 feet, based on the existing water wells that draw ground water from this aquifer) (Texas Water Development Board, 2019).

In summary, the potential for construction and operations to impact surface waters and ground water would be small. Wetlands would not be affected. Development in the floodplain would not change hydrologic properties of the floodplain. Placement of a culvert associated with a new road near the WGF site could affect the North Diversion Ditch, but it is expected that the culvert would be designed in accordance with standard engineering practices, which would decrease the potential for adverse effects. Increased stormwater runoff from new impervious surface areas could strain the existing stormwater drainage system. Dyess AFB would evaluate the need for potential drainage modifications. With sufficient planning and implementation of applicable engineering practices, impacts on physical resources under the Dyess AFB Alternative would be less than significant.

3.10.2.2.4 Reasonably Foreseeable Future Actions and Environmental Trends

Soil disturbance from multiple projects may result in impacts on soil and water resources. Parking apron repair could potentially cause soil erosion and associated sedimentation and transport of contaminants to water features on and near Dyess AFB. Apron repair could also result in increased impervious surface area and stormwater runoff. The potential for such impacts would be minimized by implementing erosion control, sediment control, and stormwater management measures. All ground-disturbing activities would be subject to erosion and sediment control requirements specified by the 7 CES Environmental Group, applicable BMPs and procedures identified in the Dyess AFB SWPPP and SPCC Plan, applicable requirements in the construction general permit for construction projects, and requirements for stormwater control and conveyance structures. With these measures in place, there would be no adverse impacts to on-base soil and water resources, and transport of sediments or contaminants to off-base water features would be very unlikely. With implementation of the management measures discussed above, B-21 beddown actions would not appreciably affect soil or water characteristics relative to baseline conditions and would therefore not contribute to changes potentially related to the effects of climate change (e.g., changes to erosion potential or surface water, floodplain, or wetland boundaries). The Dyess AFB Alternative would not have significant impacts on physical resources in combination with reasonably foreseeable future actions and environmental trends.

3.10.2.2.5 Proposed Resource-Specific Mitigations and Management Actions to Reduce the Potential for Environmental Impacts

Construction-related impacts on soil and surface water quality can be reduced through implementation of erosion and sediment control measures. Examples of controls include minimization of earth-moving activities during wet weather/conditions, covering soil stockpiles, installation of silt fencing and sediment traps, and revegetation of disturbed areas with native plants (using correct seed mixes identified by the local NRCS office) as soon as possible to contain and prevent off-site migration of sediment or eroded soils from the project areas. For construction involving land disturbances greater than 1 acre, coverage under the TCEQ construction general permit (TXR150000) will be required, including development of a site-specific SWPPP that describes BMPs for erosion and sediment control. The SWPPP will specify BMPs for discharges of stormwater from construction activities and construction support activities (e.g., borrow pits, staging areas, and material storage areas). The DAF will ensure that NPDES requirements are met during execution of construction projects and will coordinate with TCEQ as needed.

Site drainage around the new facilities would be designed to manage the anticipated increase in runoff from increased impervious surfaces through properly sized stormwater conveyance structures and incorporating stormwater management features such as porous pavements and infiltration basins that treat, store, and infiltrate runoff on site before it can affect downstream water bodies (EPA, 2022b). These measures would reduce the potential for the stormwater drainage system to function inadequately due to runoff volume.

Erosion controls and engineering planning would reduce the potential for the new road crossing of North Diversion Ditch to cause siltation, sedimentation, and hydrologic changes to the stream.

3.10.2.3 Whiteman AFB Alternative (Preferred Alternative)

3.10.2.3.1 Personnel

Potable water is supplied to Whiteman AFB by on-site water wells (locations are shown in Figure 3.10-8). The projected personnel increase associated with the B-21 beddown would result in increased water usage but is expected to remain within the capacity of the on-site water wells (Section 3.14, Utilities and Infrastructure).

Like the Dyess AFB Alternative, an increased number of personnel would also increase vehicle use and potential oil/lubricant spills and leaks (Section 3.13, Transportation). However, no adverse impacts on soils or water resources are expected from potential increased vehicular spills and leaks. The end-state increase in traffic volume on the installation is estimated to be approximately 12 percent over baseline conditions (Section 3.13, Transportation). Any spills or leaks would be captured by the base's stormwater system, which is managed and monitored under the SWPPP (Whiteman AFB, 2020a).

3.10.2.3.2 Airfield Operations

Surface water could potentially be impacted by inadvertent releases of hazardous chemicals that may occur during airfield operations and from leaking fuel storage tanks. The volume of fuels and hazardous chemicals used at Whiteman AFB and the volume of hazardous waste generated would not be expected to change if the B-21 MOB 2 were established at this location, although the nature of some hazardous wastes could change based on the type of materials used in repair operations. Hazardous Material Management and Hazardous Waste Disposal programs described in Section 3.11 (Hazardous Materials and Hazardous and Solid Wastes) are currently being implemented and would protect surface waters in the planned areas of construction, WGF site, and downstream of the proposed construction footprints. The Whiteman AFB SWPPP (Whiteman AFB, 2020a) includes BMPs and controls for reducing the potential impacts from ongoing military activities on surface water, floodplains, or wetlands. The SWPPP also provides spill prevention measures and response actions, as well as employee training, monitoring, and inspection programs. If the B-21 MOB 2 were established at Whiteman AFB, the SWPPP would need to be updated to include descriptions of new areas where operations have the potential for pollutant releases, the outfalls that may be impacted, and BMPs that will be implemented to address potential pollutant releases.

The Whiteman AFB SPCC Plan identifies regulated areas where POLs are used, stored, and handled. The SPCC also describes the spill prevention and control devices as well as procedures used by Whiteman AFB to prevent unregulated discharges to the environment. The SPCC would need to be revised if there are changes to the number and location of POL storage tanks associated with the proposed B-21 MOB 2 construction activities. Many requirements implemented in the SPCC prevent stormwater pollution and adverse impacts on surface water, floodplains, wetlands, and ground water.

Whiteman AFB has spill control structures that prevent the release of liquid spills to surface waters. These include retention basins equipped with shut-off valves, spill release prevention weirs, and containment booms (Whiteman AFB, 2020a). These physical barriers would prevent releases from going off site of Whiteman AFB and impacting surface waters downstream.

3.10.2.3.3 Facilities, Infrastructure, and the Weapons Generation Facility

Soils

The soils in the planned areas of construction and the North and South WGF Sites/Potential EOD Range at Whiteman AFB are identified in Figure 3.10-6. Erosion factors range from 0.28 to 0.49, which indicate moderate erodibility (Table 3.10-5, Table 3.10-6, and Table 3.10-7). The largest construction area is in the flat part of the base, but some small construction areas specifically in the vicinity of North Lake and Northwest Lake have slopes that are greater than 2.5 percent, which is considered steep. The North and South WGF Sites/Potential EOD Range have slopes of about 1 to 2 percent.

There is low to moderate likelihood of soil erosion in the largest construction area and the WGF sites. However, based on the soil erosion factors and surface slopes in some of the planned construction areas where slopes are greater than 2.5 percent, there is

moderate to high likelihood for soil erosion in these areas unless mitigation practices are implemented. According to Whiteman AFB SWPPP (Whiteman AFB, 2020a), contractors performing construction at the base operate under an MDNR construction land-disturbance permit which requires the development of a site-specific SWPPP for construction sites exceeding 1 acre. The SWPPP will describe BMPs to minimize soil erosion and prevent sediments and pollutants from leaving the site. The SWPPP will specify BMPs for discharges of stormwater from construction activities and construction support activities (e.g., borrow pits, staging areas, and material storage areas). The DAF will ensure that NPDES requirements are met during execution of construction projects and will coordinate with MDNR as needed. Base personnel monitor construction sites to ensure that contractors are implementing stormwater BMPs and following permit requirements.

In summary, there is potential for soil erosion during construction of the B-21 MOB 2 beddown at Whiteman AFB in some areas with steep slopes. With the application of erosion and sediment control measures as required by the Whiteman AFB SWPPP, and adherence to requirements in MDNR construction land-disturbance permits and site-specific SWPPPs for construction sites exceeding 1 acre, potential impacts on soil would be reduced to less than significant if the B-21 MOB 2 were established at Whiteman AFB.

Water Resources

Based on the proposed footprint for B-21 MOB 2 facilities (see Figure 3.10-7 for planned areas of construction and the North and South WGF sites), surface waters associated with Northwest Lake and North Lake and a segment of Long Branch Creek were identified as jurisdictional WOTUS during 2021 and 2022 surveys and could potentially be impacted by construction of the North WGF. USACE verified jurisdictional status of these surface waters through an approved JD (see Appendix F, Physical Resources) (USACE, 2023a; USACE, 2023b). If construction activities would impact any jurisdictional WOTUS, then an application for a CWA Section 404 permit would be required. Permit applicants generally must show that they have, to the extent practicable, taken steps to avoid impacts to WOTUS, minimize potential impacts to WOTUS, or provide compensatory mitigation for any unavoidable impacts. Alternatively, facility placement could potentially be designed to avoid impacts to the jurisdictional WOTUS.

Long Branch Creek immediately downstream of Whiteman AFB has been designated by MDNR as an impaired listed water on the 303(d) list (Whiteman AFB, 2020a). Pollutants of concern include total suspended solids, total nitrogen, and total phosphorus. In a report published in 2008, MDNR listed runoff from Whiteman AFB as a potential source of pollutants but also noted animal feeding operations and agricultural land use upstream of the base as potential sources (Whiteman AFB, 2020a). Clear Fork Creek is also an impaired listed water due to low dissolved oxygen. Operations and chemicals anticipated to be used for B-21 MOB 2 at Whiteman AFB would not be expected to contribute nitrogen or phosphorus to Long Branch Creek. Erosion control measures as specified in the SWPPP would mitigate contribution of suspended solids. Low dissolved oxygen at Clear Fork Creek is not expected to be exacerbated by B-21 MOB 2 operations since the base implements spill control, waste management, and good housekeeping measures that

would prevent the release of pollutants into Clear Fork Creek that consume dissolved oxygen. Impacts on surface waters from erosion during construction/demolition could be avoided by implementation of erosion and sediment control measures specified in the Whiteman AFB SWPPP (Whiteman AFB, 2020a). Furthermore, for construction projects involving land disturbance greater than 1 acre, an MDNR construction land-disturbance permit including the development of a site-specific SWPPP would be required. As noted previously, the SWPPP would describe BMPs to minimize soil erosion and prevent sediments and pollutants from leaving the site as a result of stormwater discharges during construction activities and construction support activities (e.g., borrow pits, staging areas, and material storage areas). The DAF will ensure that NPDES requirements are met during execution of construction projects and will coordinate with MDNR as needed. Erosion would be controlled through adherence to permit requirements and site-specific construction SWPPPs.

As noted previously, the 100-year floodplain at Whiteman AFB is associated with Long Branch Creek and its tributaries. None of the B-21 MOB 2 areas are located on or near the 100-year floodplain except for a small area in the southeast corner of the North WGF Site (discussed in the following subsection).

Surface water could potentially be impacted by increased impervious surface area from new facilities and other structures, which would result in a higher discharge volume of stormwater flowing into streams. Impervious surface area would increase by an estimated 6 acres for all projects combined. As with the Dyess AFB Alternative, the estimate is based on the notional footprint of new construction and facility additions in currently unpaved areas. It is expected that the relatively small increase in stormwater runoff at Whiteman AFB could be managed by properly designed stormwater conveyance structures and by using site designs, such as rain gardens and pervious pavement that treat, store, and infiltrate runoff on site before it can affect downstream water bodies (EPA, 2022b). Stormwater management controls would conform with Section 438 of the Energy Independence and Security Act, which requires agencies to protect water resources by reducing stormwater runoff from any federal development projects (EPA, 2009).

No significant impacts on ground water would be anticipated to result from establishment of the B-21 MOB 2 at Whiteman AFB. Site ground water will be protected by Hazardous Material and Waste Management programs at Whiteman AFB, described in Section 3.11 (Hazardous Materials and Hazardous and Solid Wastes), as well as BMPs and spill prevention practices in the Whiteman AFB SWPPP and SPCC. The shallow unconsolidated deposits at Whiteman AFB do not yield enough ground water to serve as a water supply source. Water wells at the base are very deep (475 to 1,100 feet), as are water wells in the surrounding area (greater than 300 feet deep).

In summary, there would be no significant impacts on physical resources under the Whiteman AFB Alternative for proposed MOB 2 construction activities.

North WGF Site Subalternative (Preferred Subalternative)

The North WGF Site contains a tributary of Long Branch Creek and associated 100-year floodplain. Direct impacts to the tributary would be avoided during WGF facilities siting and related construction activities. The presence of floodplains at this site would require

evaluation in the context of EO 11988 and EO 13690. Accordingly, the freeboard flood elevation (100-year flood elevation plus 2 feet) was identified and is shown on the inset map of Figure 3.10-7. If the North WGF subalternative were selected, siting of facilities within this area would need to comply with EO 11988 and EO 13690. Since the freeboard floodplain zone is a small fraction of the North WGF Site area, it would likely be feasible to either avoid disturbing the zone or to limit development in the zone to structures that would cause minimal impacts (e.g., security fencing). Nonetheless, to ensure compliance with EO 11988, a Finding of No Practicable Alternative will be included in the ROD if the Whiteman AFB/North WGF Site alternative is chosen.

Ground surface slope at the North WGF Site is about 1 to 2 percent, with moderate likelihood of erosion that can be reduced by application of erosion and sediment control measures and adherence to requirements in the construction land-disturbance permit and associated construction SWPPP for construction projects resulting in land disturbance greater than 1 acre. Stormwater runoff from the North WGF Site would likely flow into the tributary of Long Branch Creek. Potential impacts from the stormwater runoff would be addressed by stormwater management features, which would prevent long-term impacts associated with operation of the WGF facility. Establishment of the WGF at the North Site would require relocation of the existing EOD range (Figure 3.10-7). There are small, isolated wetlands near the potential new location for the EOD range; however, these wetlands are hydrologically isolated and are therefore non-jurisdictional WOTUS (XCEL Engineering, 2023).

South WGF Site Subalternative

Slopes at the South WGF Site are also about 1 to 2 percent. The erosion control measures identified for the North WGF Site would be applicable to the South WGF Site as well. There are small, isolated wetlands in and next to the South WGF Site; however, these wetlands are hydrologically isolated and are non-jurisdictional WOTUS (XCEL Engineering, 2023). Selection of the South WGF Site would require a new roadway crossing Long Branch Creek, which is a jurisdictional WOTUS. Depending on how the roadway is designed, an application for a CWA Section 404 permit, as well as compensatory mitigation for impacts, may be required for construction of this roadway. Long Branch Creek would likely receive stormwater runoff from the South WGF Site. However, negative impacts on this impaired surface water would be reduced by erosion and sediment control measures that would be part of construction land-disturbance permit requirements and associated construction SWPPPs for construction projects involving land disturbance greater than 1 acre. In addition, stormwater management features would prevent long-term impacts associated with operation of the WGF facility.

The road crossing of Long Branch Creek would likely occur via a new culvert. As described for the Dyess AFB alternative, construction activities and culvert placement have the potential to cause erosion, siltation, sedimentation, and changes to stream flow characteristics. Culvert placement and associated construction activities would be reviewed by the base prior to installation. It is expected that erosion controls and other applicable BMPs would be identified during project planning, and that culvert design, installation, and maintenance would adhere to standard acceptable practices. With

proper planning and installation, culvert placement would not significantly alter the flow or ecological functions of Long Branch Creek. The potential for road construction and operation to impact Long Branch Creek would be minimized by erosion and sediment control measures specified in the Whiteman AFB SWPPP. In addition, because land disturbance associated with road construction would be greater than 1 acre, requirements in the construction land-disturbance permit would be implemented.

3.10.2.3.4 Reasonably Foreseeable Future Actions and Environmental Trends

As with the Dyess AFB Alternative, soil disturbance from multiple projects may result in additional impacts on soil and water resources. Airfield drainage corrections and relocation of the Arnold Gate and associated structures could potentially cause soil erosion and related sedimentation and transport of contaminants to water features on and near Whiteman AFB. The activities could also result in increased impervious surface area and stormwater runoff. The potential for such impacts would be minimized by implementing erosion control, sediment control, and stormwater management measures.

All ground-disturbing activities would be subject to applicable BMPs, and procedures identified in the Whiteman AFB SWPPP and SPCC Plan, applicable requirements in the construction land-disturbance permit and associated SWPPPs for construction projects resulting in land disturbance greater than 1 acre, and requirements for stormwater control and conveyance structures. Planned projects would be reviewed to identify potential impacts on wetlands and floodplains.

Some components of the Arnold Gate relocation project could affect jurisdictional wetlands near North Lake and Northwest Lake (XCEL Engineering, 2023). Depending on final project siting, a CWA Section 404 permit could be required. With appropriate management and mitigation measures in place, there would be no adverse impacts to on-base soil and water resources, and transport of sediments or contaminants to off-base water features would be unlikely.

With implementation of the management measures discussed above, B-21 beddown actions would not appreciably affect soil or water characteristics relative to baseline conditions and would therefore not contribute to changes potentially related to the effects of climate change (e.g., changes to erosion potential or surface water, floodplain, or wetland boundaries). The Whiteman AFB Alternative would not have significant impacts on physical resources when combined with reasonably foreseeable future actions and environmental trends.

3.10.2.3.5 Proposed Resource-Specific Mitigations and Management Actions to Reduce the Potential for Environmental Impacts

Construction-related impacts on soil and surface water quality can be reduced through implementation of erosion and sediment control measures, especially in areas with steep slopes such as in the vicinity of North Lake and Northwest Lake. For construction projects involving land disturbance greater than 1 acre, an MDNR construction land-disturbance permit including the development of a site-specific SWPPP will be required. The site-specific construction SWPPP will describe BMPs to minimize soil erosion and prevent sediments and other pollutants from leaving the site resulting from stormwater discharges

during construction activities and construction support activities (e.g., borrow pits, staging areas, and material storage areas). The DAF will ensure that NPDES requirements are met during execution of construction projects and will coordinate with MDNR as needed. If land disturbed by construction will be revegetated by native plants, the correct seed mix identified by the local NRCS office will be used. Facility locations within the North WGF Site can be selected to avoid direct impacts to the tributary of Long Branch Creek. In addition, facility locations can either be selected to avoid construction within the small freeboard floodplain area or designed to minimize impacts on the floodplain. The roadway to access the South WGF Site would be designed to avoid impacts to Long Branch Creek to the greatest extent possible. However, if the roadway design requires construction within the stream, then USACE would likely require compensatory mitigation measures to be implemented. However, the need for and nature of specific mitigation measures would be determined, in consultation with USACE, when road design specifications are developed.

Site drainage around the new facilities should be designed to manage the anticipated increased runoff from the increased impervious surface through properly sized stormwater conveyance structures, and by incorporating stormwater management features such as porous pavements and infiltration basins that treat, store, and infiltrate runoff on site before it can affect downstream water bodies (EPA, 2022b). These measures would reduce the potential for the stormwater drainage system to function inadequately due to runoff volume.

Erosion controls and engineering planning would reduce the potential for the new road crossing of Long Branch Creek to cause siltation, sedimentation, and hydrologic changes to the stream.

Facilities and structures where military operations would involve handling of hazardous chemicals or fueling operations would be best placed where spill control structures serve as physical barriers that could prevent releases from flowing into streams. This would minimize the potential for adverse impacts to surface waters resulting from spills.

3.11 HAZARDOUS MATERIALS AND HAZARDOUS AND SOLID WASTES

3.11.1 Hazardous Materials and Hazardous and Solid Wastes, Affected Environment

3.11.1.1 Description of Resource

This resource area evaluates hazardous material usage and hazardous waste generation and storage. Hazardous materials and hazardous wastes refer to substances defined as hazardous by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) or the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act (RCRA). In general, hazardous materials include

substances that, because of their quantity concentration or physical, chemical, or infectious characteristics, may present substantial danger to public health or the environment when released into the environment.

Hazardous wastes are regulated under RCRA and defined as any solid, liquid, contained gaseous, or semisolid waste, or any combination of wastes that either exhibit one or more of the hazardous characteristics of ignitability, corrosivity, toxicity, or reactivity, or are listed as a hazardous waste under 40 CFR Part 261. Texas and Missouri generally follow federal regulations related to hazardous waste management. In Texas, specific requirements may be found in Texas Administrative Code, Title 30, Chapter 335, *Industrial Solid Waste and Municipal Hazardous Waste*. Missouri regulations are found under the Missouri Code of State Regulations (CSR), Title 10, Division 25, *Hazardous Waste Management Commission*. The state hazardous waste programs are responsible for regulating the storage, treatment, transport, and disposal of hazardous waste, and provide technical assistance, conduct inspections, and assign generator identification numbers.

The affected resources include ERP sites. The CERCLA established prohibitions and requirements concerning closed and abandoned hazardous waste sites; provided for liability of persons responsible for releases of hazardous waste at these sites; and established a trust fund to provide for cleanup when no responsible party could be identified. The Superfund Amendments Reauthorization Act mandated the military departments within DoD to follow the same cleanup regulations that apply to private entities under CERCLA and established the Defense ERP. The ERP is used by the DoD to identify, characterize, clean up, and restore sites contaminated with toxic and hazardous substances, low-level radioactive materials, petroleum products, or other pollutants and contaminants.

The affected resources also include the potential presence of toxic substances in structures (i.e., asbestos in building materials and lead in paints). Asbestos is a naturally occurring mineral that is a very effective heat and sound insulator. Consequently, it was used in many buildings as a fire and noise retardant. Asbestos has been linked to several diseases, including lung cancer, and has not been used in construction materials since 1987. Friable (brittle) asbestos becomes hazardous when fibers become airborne and are inhaled. Asbestos management is addressed in various federal and state regulations, key among these is the Asbestos National Emission Standards for Hazardous Air Pollutants. This regulation is intended to minimize the release of asbestos fibers during activities involving the handling of asbestos.

Lead was used as an additive and pigment in paints for many years prior to 1978; therefore, older structures on the base that have multiple layers of older paint are potential sources of lead. Lead has been associated with central nervous system disorders, particularly among children and other sensitive populations. Exposure to lead is usually through inhalation during renovation and demolition activities or through ingestion of paint chips or lead-contaminated drinking water. Title IV of the Toxic Substances Control Act,

as well as other authorities in the Residential Lead-Based Paint Hazard Reduction Act of 1992, directs EPA to regulate lead-based paint (LBP) hazards.

Finally, this resource area evaluates impacts associated with solid waste disposal from proposed activities. This includes both municipal solid waste (MSW) and C&D debris. In Texas, requirements related to solid waste management may be found in Texas Administrative Code, Title 30, Chapter 330, *Municipal Solid Waste*, while Missouri solid waste regulations are found under Missouri CSR, Title 10, Division 80, *Solid Waste Management*. These regulations require the effective and safe disposal of solid waste.

Commonalities

The following elements of hazardous materials and hazardous waste management are common to Dyess AFB and Whiteman AFB.

Hazardous Materials Management

A variety of products containing hazardous materials are used by the installations as part of day-to-day operations. These include fuels, oils and lubricants, solvents, paints, etc. To administer these materials, the installations have implemented a comprehensive hazardous materials management process, including the use of a Hazardous Material Pharmacy (HAZMART). The HAZMART encompasses a storage facility and an established set of procedures designed to control the acquisition, storage, issue, and disposition of serviceable hazardous materials. Working in coordination with the Environmental Management, Bio-Environmental, and Safety Offices, the HAZMART ensures that only approved products are purchased and stored and that they are only issued to authorized users. In addition, the HAZMART helps minimize waste by ensuring residual materials are returned to use until the products are exhausted. Unserviceable or excess materials may also be returned for proper disposal. Contractors conducting operations on the installation are required to supply information to the installation regarding any hazardous materials utilized (DAF, 2018).

Hazardous Waste Management

Hazardous waste at both installations is generated from maintenance of aircraft, vehicle, and aviation support equipment activities and from POLs management and distribution. Types of hazardous waste generated include waste paint and paint-related products, used solvents, used sealants/adhesives, and waste corrosive or flammable liquids. Petroleum and recyclable waste are also generated (managed as regulated non-hazardous waste) that include used oil and filters, waste antifreeze, reclaimed jet fuel, waste diesel, used hydraulic fluid, etc. In addition to the typical waste, Whiteman AFB also generates low-level radiological mixed waste. Universal wastes, a subset of hazardous wastes, generated include used fluorescent lamps and batteries (DAF, 2016a; DAF, 2020d).

Hazardous wastes at each industrial facility (shop) are accumulated at Initial Accumulation Points (IAPs)/SAP (SAPs), as long as the amount of waste does not exceed 55 gallons or 1 quart of acute hazardous waste (P-Listed waste as listed in 40 CFR

261.33), and the accumulation container remains in good condition. Additionally, Whiteman AFB requires that waste is not accumulated in SAP beyond one year. Each IAP/SAP is under the control of an appointed and trained Accumulation Point Manager. Once a container is full at the IAP and/or reaches the 1-year time limit, the container is relocated to the Central Accumulation Point/90-Day Accumulation Point, where it is stored for up to 90 days until it can be shipped off site. The waste is then transported to an approved off-base treatment, storage, or disposal facility where it is managed in accordance with all applicable local, state, federal, DAF, and DoD regulations (DAF, 2016a).

Both installations have implemented Hazardous Waste Management Plans that identify waste generating locations and waste types and addresses proper labeling, storage, and handling of these wastes (DAF, 2016a; DAF, 2020d). These plans include requirements associated with record keeping, spill contingency and emergency response, as well as personnel training requirements.

Other Ongoing Investigations

As part of the overall program to identify impacts from historical operations, the DAF is also currently investigating potential effects related to chemicals known as per- and polyfluoroalkyl substances (i.e., PFAS). This family of chemicals was developed in the 1940s and include the chemicals perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA). While PFOS was used in stain- and water-resistant products, PFOA was used for protective coatings. PFASs have been used in many industrial and consumer products since the 1950s. Although aqueous film forming foam (AFFF) containing PFAS (i.e., PFOS and/or PFOA) was developed and deployed by the Navy in the early 1960s, AFFFs have been used at U.S. airports, municipal fire stations and airports, petroleum facilities, and other industries to effectively extinguish hydrocarbon-based fires.

The history of AFFFs placed on the Qualified Product List indicates that multiple AFFFs were available for use between the 1970s and 1990s, when firefighters on military bases regularly trained with AFFF. Due to the uncontained nature of AFFF use during emergencies and firefighter training, perfluoroalkyl carboxylates, sulfonates (PFSAs), and precursors that degrade to these compounds, along with other AFFF constituents (e.g., hydrocarbon surfactants) and co-contaminants (e.g., petroleum hydrocarbons and chlorinated solvents) have contaminated surrounding soils, sediment, surface water, and ground water. Note: PFAS are in numerous consumer goods and AFFF is only one of many products that has been produced. Additionally, both installations have AFFF as part of legacy systems, but these systems are currently being renovated to remove all AFFF.

In May 2016, the EPA Office of Water issued lifetime drinking water Health Advisory (HA) values for PFOS and PFOA: 0.07 µg/L for each constituent; however, when these two chemicals co-occur in a drinking water source, a conservative and health protective approach is recommended that compares the sum of the concentrations (PFOS + PFOA)

to the HA value (0.07 µg/L). HA values are not legally enforceable federal standards and are subject to change as new information becomes available.

Although EPA has not established HA values for PFAS in soil, the DAF calculated a residential screening level of 1.26 milligrams per kilogram for PFOS and PFOA in soil. EPA has also derived Tap Water Regional Screening Level (RSL) values for perfluorobutanesulfonic acid (PFBS) for which there is a Tier 2 toxicity value of 40 µg/L (DAF, 2019a).

3.11.1.2 Region of Influence

The ROI for hazardous materials and hazardous and solid wastes is defined as the installation boundaries where hazardous materials are used, and hazardous and solid wastes generated. The ROI includes on-base contamination (ERP) areas as well as any off-base areas potentially impacted by this contamination. Finally, the ROI includes off-base landfills where solid wastes are disposed of.

3.11.1.2.1 Dyess AFB

Hazardous Materials Management

Dyess AFB has implemented a comprehensive hazardous materials management process, including the use of a HAZMART described above (Building 7004), to effectively manage hazardous materials. Dyess AFB has also implemented various procedures, such as the Hazardous Material Planning and Emergency Response Plan (One Plan). The concept of the One Plan involves consolidating requirements in multiple plans (including a petroleum SPCC) to facilitate and streamline emergency response efforts in case of an unintended release of hazardous materials or petroleum products (DAF, 2018).

Hazardous Waste Management

Dyess AFB is classified as a Large Quantity Generator of hazardous waste per federal and Texas regulations and maintains an EPA Identification Number of TX3571924643. Large Quantity Generators are defined as facilities that generate more than 1,000 kilograms (2,240 pounds) of hazardous waste per month. According to the most recent summary data, during Calendar Year 2021, Dyess AFB generated and disposed of a total of approximately 21,000 pounds of hazardous waste (DAF, 2021g). The location of hazardous waste sites is depicted in Figure 3.11-1.

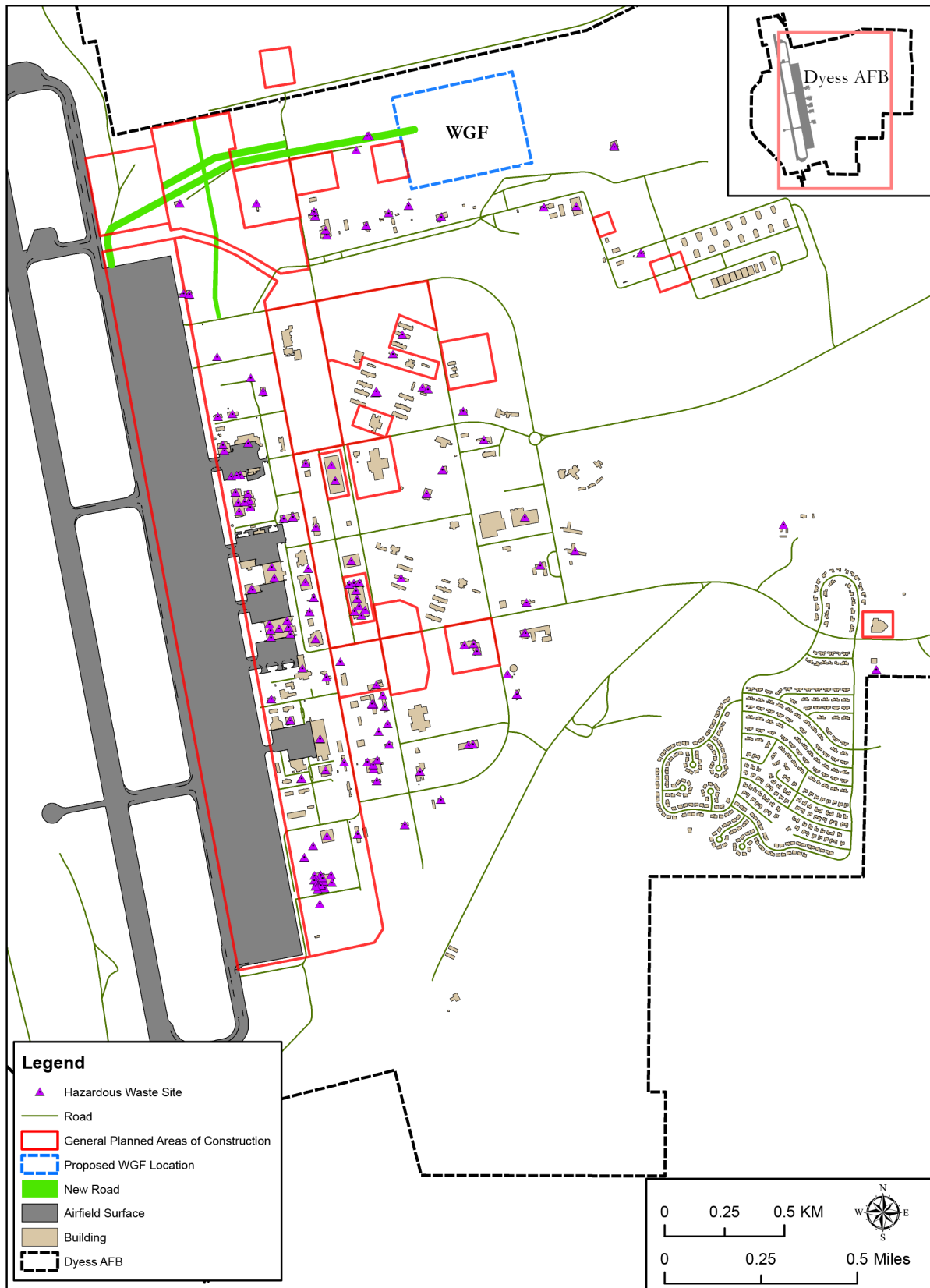


Figure 3.11-1. Hazardous Waste Sites at Dyess AFB

Dyess AFB utilizes two Central Accumulation Points, located at Buildings 4313 and 5205, where hazardous wastes are stored for up to 90 days until they can be shipped off site (DAF, 2016a). To manage hazardous wastes, the Dyess AFB *Hazardous Waste Management Plan* includes requirements associated with record keeping, spill contingency and emergency response, as well as personnel training requirements (DAF, 2016a).

Toxic Substances

Surveys at Dyess AFB have identified asbestos-containing materials (ACM) in older buildings or have identified buildings built before 1979 which may have the potential for ACM; this includes Buildings 4111, 4112, 4218, and 9001, which are proposed for demolition under the Proposed Action (DAF, 2020e). Buildings 7004 and 7008 are proposed for demolition under the Proposed Action. Friable and nonfriable ACM in this and other older buildings may include pipe insulation, caulk, mastic, ceiling panels, asphalt shingles, and floor tiles. The base's *Asbestos Management Plan* (DAF, 2019b) guides all activities associated with existing ACM. ACM is typically managed in-place unless demolition or renovation occurs. Unless buildings have been previously tested or have been certified that ACM is not present, all buildings undergoing renovation or demolition must be tested for the presence of ACM prior to the commencement of work (DAF, 2019b).

No comprehensive base-wide survey has been conducted to determine the presence and extent of LBP on all buildings; however, the potential for LBP exists for buildings constructed prior to 1978. If older buildings have not been rehabilitated (i.e., LBP has been removed or encapsulated with new paint), it is assumed that LBP is present. Dyess AFB's process for management of LBP is described in the *Lead Management Plan* (DAF, 2004) and is as follows: (1) maintain in place LBP that is undamaged and does not pose a health risk, (2) repair, which involves sealing or encapsulating LBP to prevent the release of LBP dust, and (3) abatement (removal).

Base facilities are prioritized for LBP surveys, with facilities including childcare facilities, medical facilities, and residential housing receiving the highest priority. Surveys are also conducted prior to the commencement of renovation or demolition work on any building suspected of containing LBP (DAF, 2004)

ERP Sites

The ERP at Dyess AFB began in 1984 with a base-wide records search that identified seven ERP sites for further investigation. Supplemental site assessments and investigations in the later 1980s and early 1990s have brought the total number of sites to 43. Most ERP sites have undergone regulatory closure with No Further Action approved. These sites include storage tanks, oil/water separators, landfills, drainage areas, fire training areas, spill areas, and waste disposal pits.

Environmental assessment and response actions for Dyess AFB have generally been conducted under 30 Texas Administrative Code, Chapter 335, Subchapter S, the Risk Reduction Rule. This program establishes procedures for closure or remediation of sites. Three Risk Reduction Standards (RRSs) are associated with the program and are described below:

- RRS 1 – Closure With No Further Action/Remediation to Background
- RRS 2 – Closure/Remediation to Health-Based Standards and Criteria
- RRS 3 – Closure/Remediation With Controls

Based on this program, the remaining 16 ERP sites at Dyess AFB have received regulatory closure with established LUCs (see Table 3.11-1 and Figure 3.11-2).

Table 3.11-1. Dyess AFB ERP Sites With Established Land Use Controls

Site ID	Site Name	Closure Dates	Remedy Components	Current Status
FT001	FPTA No. 1A (SWMU 3A)	January 1998 (Soil and Ground Water)	Closure for ground water under TCEQ RRS 2 with an LUC for non-potable ground water use within the site boundaries. Closure for soil under TCEQ RRS 3 with deed recordation of site boundaries requiring LUCs to maintain non-residential property use.	Site is currently under LTM.
FT002	FPTA Area No. 1B (SWMU 3B)	January 1998 (Soil)	Closure for soil under TCEQ RRS 3 with deed recordation of site boundaries requiring LUCs to maintain non-residential property use.	Site is currently under LTM.
LF004 / DP043	Landfill No. 4 (SWMU 7) POL Sludge Disposal Area No. 2 (SWMU 39)	January 1998 (Soil and Ground Water)	Closure for ground water under TCEQ RRS 3 with LUCs for non-potable ground water use within the site boundaries. Closure for soil under TCEQ RRS 3 with deed recordation of site boundaries requiring LUCs to maintain non-residential property use.	Site is currently under LTM.
WP005 / LF013	Evaporation Pit Area (SWMU 6) Hardfill No. 1 (SWMU 9)	Ground water Monitoring Requirements Removed in 2003	Closure for soil under TCEQ RRS 3 with deed recordation of site boundaries requiring LUCs to maintain non-residential property use.	Site is currently under LTM.
SD007	South Diversion Ditch (SWMU 34)	January 1998 (Soil/Sediment)	Closure for ground water under TCEQ RRS 1 with no further action required. Closure for sediment under TCEQ RRS 3 with deed recordation of site boundaries requiring LUCs to maintain non-residential property use.	Site is currently under LTM.
OT011	DRMO-Building 9104 Waste Storage Area (SWMU 1)	July 1996 (Ground Water) January 1998 (Soil)	Closure for ground water under TCEQ RRS 2 with LUCs for non-potable ground water use within the site boundaries. Closure for soil under TCEQ RRS 3 with deed recordation of site boundaries requiring LUCs to maintain non-residential property use.	Site is currently under LTM.
SD015	Building 4116 OWS (SWMU 12)	January 1998 (Soil and Ground Water) TCEQ Issued Final Closure Letter March 2016	Closure for ground water under TCEQ RRS 3 with LUCs for non-potable ground water use within the site boundaries. Closure for soil under TCEQ RRS 3 with deed recordation of site boundaries requiring LUCs to maintain non-residential property use.	Site is currently under LTM.
SD017	Building 4311 OWS	January 1998 (Soil and Ground		Site is currently under LTM.

Table 3.11-1. Dyess AFB ERP Sites With Established Land Use Controls

Site ID	Site Name	Closure Dates	Remedy Components	Current Status
	(SWMU 14)	Water) TCEQ Issued Final Closure Letter March 2016		
SD020	Building 4317 OWS (SWMU 17)	July 1996 (Soil) January 1998 (Ground Water)		Site is currently under LTM.
SD025	Building 5204 OWS (SWMU 23)	July 1996 (Soil) January 1998 (Ground Water)	Closure for soil and ground water under TCEQ RRS 3 with deed recordation of site boundaries requiring LUCs to maintain non-residential property use and non-potable ground water use.	Site is currently under LTM.
SD028	Building 7040 OWS (SWMU 26)	January 1998 (Soil) July 1996 (Ground Water)	Closure for ground water under TCEQ RRS 1 with no further action required. Closure for soil under TCEQ RRS 3 with deed recordation of site boundaries requiring LUCs to maintain non-residential property use.	Site is currently under LTM.
SD029	Building 8007 OWS (SWMU 27)	January 1998	Closure for soil under TCEQ RRS 3 with deed recordation of site boundaries requiring LUCs to maintain non-residential property use.	Site is currently under LTM.
OT031	463 FMS/Refurb Shop – Building 5017 (SWMU 19)	January 1998 (Soil) July 1996 (Ground Water)	Closure for ground water under TCEQ RRS 1 with no further action required. Closure for soil under TCEQ RRS 3 with deed recordation of site boundaries requiring LUCs to maintain non-residential property use.	Site is currently under LTM.
ST032	Auto Hobby Shop Waste Oil Tank (SWMU 29)	January 1998 (Soil) July 1996 (Ground Water)	Closure for ground water under TCEQ RRS 2 with no further action required. Closure for soil under TCEQ RRS 3 with deed recordation of site boundaries requiring LUCs to maintain non-residential property use.	Site is currently under LTM.
OT035	Golf Course Maintenance Shop (SWMU 32)	July 1996	Closure for ground water under TCEQ RRS 1 with no further action required. Closure for soil under TCEQ RRS 3 with deed recordation of site boundaries requiring LUCs to maintain non-residential property use.	Site is currently under LTM.
SS042	Background Boring 2	July 1996	boundaries requiring LUCs to maintain non-residential property use.	Site is currently under LTM.

Sources: (DAF, 2016b; Hudson, 2023)

Key: AFB = Air Force Base; DRMO = Defense Reutilization Marketing Office; ERP = Environmental Restoration Program; FMS = Field Maintenance Shop; FPTA = Fire Protection Training Area; ID = identification code; LTM = Long Term Management; LUC = land use control; No. = number; OWS = oil/water separator; POL = petroleum, oil, and lubricant; RRS = Risk Reduction Standard; SWMU = Solid Waste Management Unit; TCEQ = Texas Commission on Environmental Quality

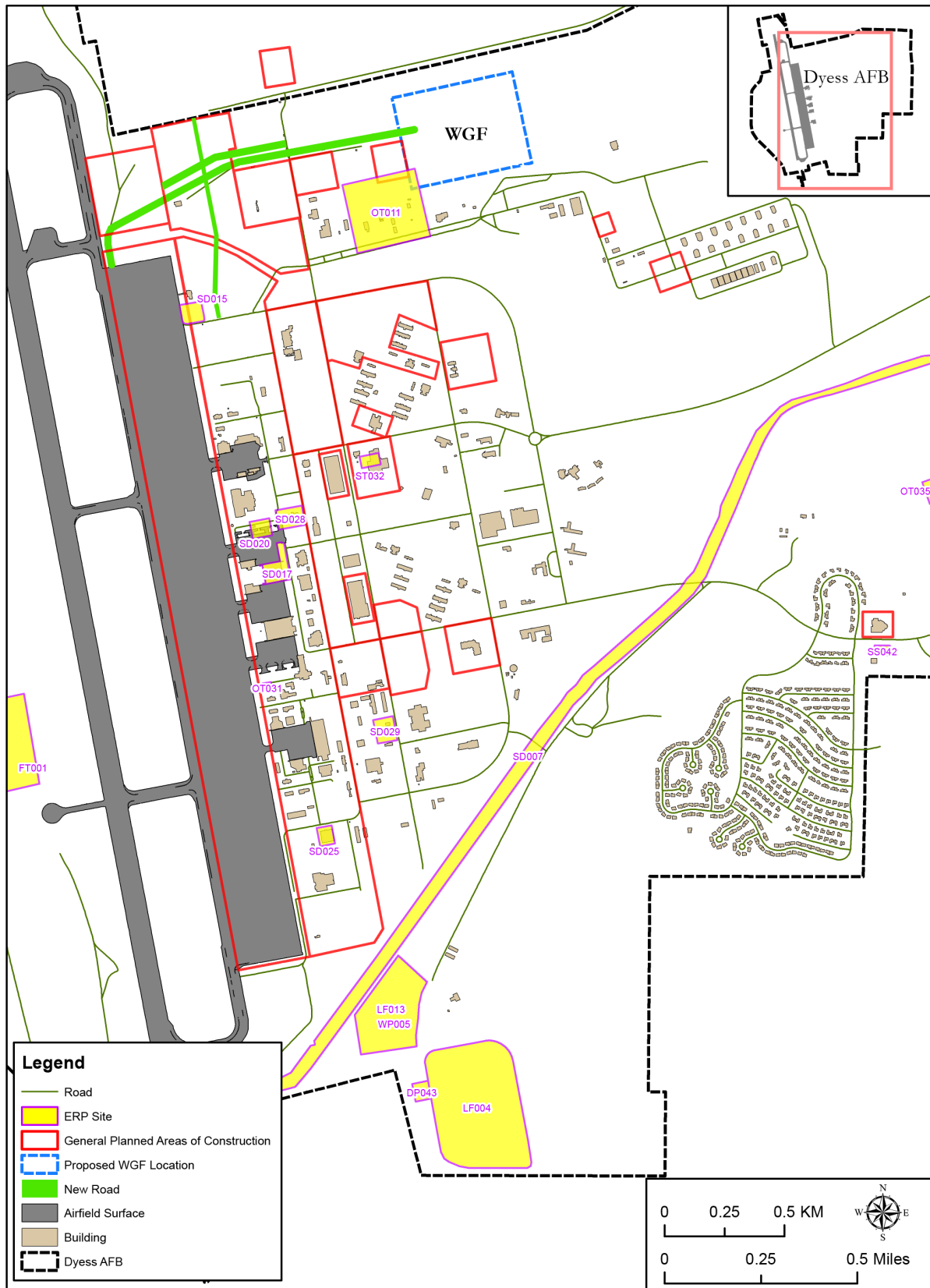


Figure 3.11-2. Environmental Restoration Program Sites at Dyess AFB

LUCs are used when it has been determined that it is safe to leave specific types of contamination at a property if defined restrictions are adhered to. They are designed to prevent exposure of human receptors to unacceptable risk associated with contaminants remaining in place. LUCs are specified in a decision document that identifies the remedy for environmental contamination that best fits the site condition. The regulatory agency (in this case the TCEQ) and the DAF enter an LUC that allows ongoing use of the property within the limits defined in the decision document. Common LUC provisions include establishing that a remedial system (e.g., monitoring wells) would not be disturbed, limiting on-site soil disturbance or ground water use, disallowing sensitive uses of the property (i.e., residential development). An LUC is codified with a revision to the property deed and remains in effect until it is formally removed or modified. The regulatory agency will review applications and information supporting an LUC termination or variance. For example, if the owner completes additional cleanup to remove contamination, the agency could go through the process of a public notice and terminate the LUC. Annual LUC site inspections conducted in 2020 found that all ERP sites identified in Table 3.11-1 were in compliance with established LUCs (AFCEC, 2020a).

Other Ongoing Investigations

In September 2014, TCEQ established Protective Concentration Levels (PCLs) for 16 PFAS in soil and ground water as part of the Texas Risk Reduction Program (TRRP). The TRRP rule provides a three-tiered process for establishing human-health PCLs for contaminants of concern in soil and ground water. The TRRP does not provide PCLs for sediment or surface water (DAF, 2019a).

A Site Inspection Report, published In April 2019, documented results of an investigation of PFOS/PFOA at Dyess AFB. Measured concentrations of these chemicals in ground water, soil, and sediment were compared to the federal and TCEQ regulatory thresholds discussed above. The investigation identified 27 potential AFFF release areas on Dyess AFB, with the following 15 identified for further investigation under an Expanded Site Inspection (Table 3.11-2 and Figure 3.11-3) (DAF, 2019a).

Table 3.11-2. Summary of PFAS Investigation Results ^(a) for Dyess AFB

Site ID	Parameter	Exceeds Screening Level ^(b)	Potentially Complete GW Exposure Pathway
AFFF Release Area 1, Former Fire Protection Training Area 2	Surface Soil	Yes	No
	Subsurface Soil	Yes	
	GW	Yes	
AFFF Release Area 2, Active Fire Training Area	Surface Soil	Yes	No
	Subsurface Soil	Yes	
	GW	Yes	
AFFF Release Area 3, Hangar 4225	Surface Soil	Yes	No
	Subsurface Soil	- ^(c)	
	GW	Yes	
AFFF Release Areas 4, 5, and 6; Hangars 4312, 4314, and 4315	Surface Soil	Yes	No
	Subsurface Soil	- ^(c)	
	GW	Yes	

Table 3.11-2. Summary of PFAS Investigation Results ^(a) for Dyess AFB

Site ID	Parameter	Exceeds Screening Level ^(b)	Potentially Complete GW Exposure Pathway
AFFF Release Area 7, Hangar 5020	Surface Soil	Yes	No
	Subsurface Soil	- ^(c)	
	GW	Yes	
AFFF Release Areas 8, 9, and 10; Hangars 5105, 5110, and 5112	Surface Soil	Yes	No
	Subsurface Soil	- ^(c)	
	GW	Yes	
AFFF Release Area 11, Former Fire Station (Building 4003)	Surface Soil	Yes	No
	Subsurface Soil	No	
	GW	- ^(c)	
AFFF Release Area 12, Spray Test Area No. 1	Surface Soil	Yes	No
	Subsurface Soil	Yes	
	GW	Yes	
AFFF Release Area 13, Spray Test Area No. 2	Surface Soil	Yes	No
	Subsurface Soil	- ^(c)	
	GW	Yes	
AFFF Release Area 14, North and South Diversion Ditches	Sediment	Yes	No
	Surface Water	Yes	
	GW	- ^(c)	
AFFF Release Area 15, Taxiway C	Surface Soil	Yes	No
	Subsurface Soil	No	
	GW	Yes	

Source: (DAF, 2019a)

Key: AFB = Air Force Base; AFFF = aqueous film forming foam; ID = identification number; GW = ground water; PFAS = per- and polyfluoroalkyl substances; PFOA = perfluorooctanoic acid; PFOS = perfluorooctane sulfonate

Notes:

a. Remedial investigations are planned for all sites listed in the table (Varley, 2020).

b. A "Yes" indicated exceedance of any of 16 PFAS-related constituents evaluated, including PFOA and PFOS.

c. A dash (-) means that no sampling was conducted.

The 2019 Site Inspection report showed PFOS was detected in soil at concentrations exceeding the EPA RSL based on a residential exposure scenario, at AFFF Areas 1 through 4, 7 through 9, 11, and 12. PFOA was also detected in soil at concentrations exceeding the EPA RSL based on a residential exposure scenario at AFFF Areas 1 and 8. PFOS and PFOA were also detected in surface water at concentrations exceeding the EPA HA at all sample locations, and PFOS and PFOA were detected in ground water at concentrations exceeding the EPA HA at all sample locations (DAF, 2019a).

Additionally, PFBS was detected at concentrations above the EPA Tapwater RSL at Areas 2 and 12 (DAF, 2019a). With respect to TCEQ TRRP Tier 1 Residential PCLs, at all soil locations sampled PFAS concentrations exceeding PCLs. Likewise, PFAS were detected in ground water and surface water at concentrations exceeding the TCEQ TRRP Tier 1 Residential PCLs at all sample locations. These sites were recommended for further investigation to evaluate if exposure pathways are complete and to better quantify the level of ground water impacts (DAF, 2019a).

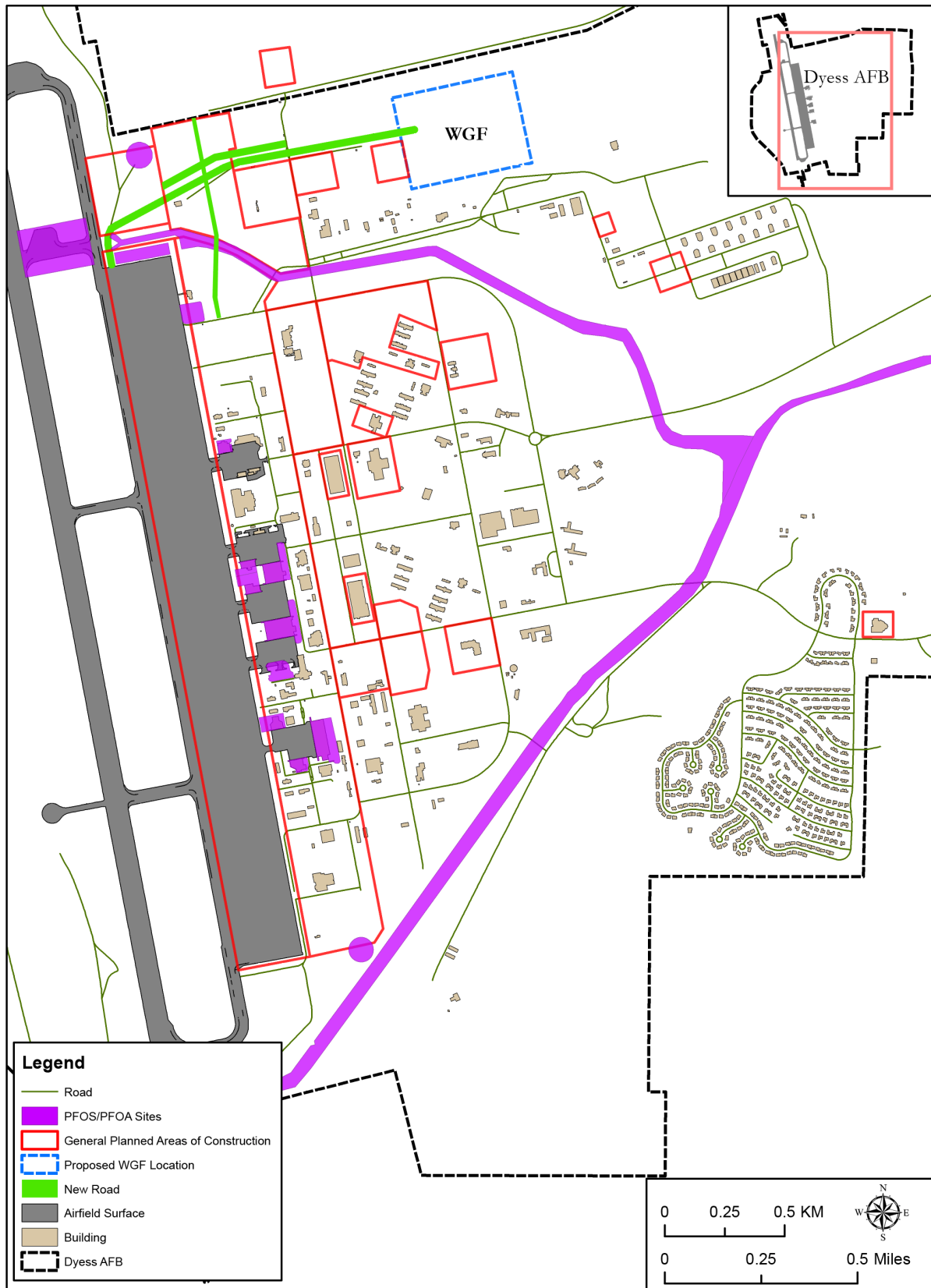


Figure 3.11-3. PFAS on Dyess AFB

Solid Wastes

Wastes generated and requiring management under the Proposed Action would be associated with MSW and C&D debris. Solid waste tracking data show that during FY 2021, Dyess AFB disposed to the landfill approximately 978 tons of MSW (Hudson, 2023). This number includes both MSW from industrial operations as well as from military family housing located on the installation. During the same period, Dyess AFB generated and disposed of approximately 666 tons of C&D debris (DAF, 2021h). Note: The quantities of C&D wastes generated fluctuates significantly annually depending on the amount of construction, renovation, and demolition occurring on base. Disposal of C&D debris generated during development activities at the installation is the responsibility the construction contractor.

There are no on-base disposal facilities for MSW. Two on-base municipal landfills were used in the past, but both have been closed. Solid waste (including C&D debris) generated at the base are disposed of at the Abilene Environmental Landfill, located on Farm-to-Market Road 3034, approximately 2.5 miles north of I-20 in Abilene, Texas. The facility has been in operation since 2006 and is permitted to provide disposal of MSW, C&D debris, and non-hazardous industrial wastes. The facility encompasses 246 acres and a reported compaction rate of 1,446 in pounds per cubic yards. There were 108,572 total tons landfilled in 2021, with MSW comprising approximately 65 percent of the total waste stream and C&D comprising most of the remainder. The landfill is expected to remain in operation for an additional 64 years and has a remaining capacity of 12,762,089 (Rhodes, 2020; TCEQ, 2022b). MSW and C&D debris may also be disposed of at the BFI Landfill, also located on Farm-to-Market Road 3034. This landfill, which has been in operation since 1983 and covers nearly 400 acres, has a projected life expectancy of nearly 12 years. The landfill has a reported compaction rate of 1,892 in pounds per cubic yards of mixed waste (Grothaus, 2011; TCEQ, 2022b).

3.11.1.2.2 Whiteman AFB

Hazardous Materials Management

At Whiteman AFB, a variety of products containing hazardous materials are used as part of day-to-day operations. Whiteman AFB has also implemented a HAZMART to administer these materials. As described previously, the HAZMART helps minimize waste by ensuring residual materials are returned to use until the products are exhausted. Unserviceable or excess materials may also be returned for proper disposal (DAF, 2020d).

To effectively manage hazardous materials, Whiteman AFB has implemented various procedures, such as the SPCC Plan, to mitigate and respond to releases of hazardous materials and petroleum products (DAF, 2020f).

Hazardous Waste Management

Whiteman AFB is classified as a Large Quantity Generator of hazardous waste per Federal and Missouri regulations and maintains an EPA Identification Number of ID# MO8571924549 and Missouri identification number 003195 (DAF, 2020d). Hazardous wastes at Whiteman AFB are also generated from maintenance of aircraft, vehicle, and aviation support equipment. During the calendar year (CY) 2020, Whiteman AFB generated and disposed of a total of approximately 25,281 pounds of hazardous waste (Long, 2021). The 509th Civil Engineer Squadron (509 CES/CEIE) operates a 90-day hazardous waste storage facility in Building 114. Satellite accumulation points at industrial shops will ensure that waste is transported to Building 114, within 72 hours of accumulating 55 gallons of hazardous waste, 1 quart of Acute hazardous waste, or within the one-year time limit. Turn-in procedures should be initiated well in advance of the 55 gallon or 1 quart limit to allow for contingencies that may delay waste turn-in (DAF, 2020d). The location of hazardous waste sites is depicted in Figure 3.11-4.

The Whiteman AFB *Hazardous Waste Management Plan* identifies waste generating locations and waste types, addresses proper labeling, storage, and handling of these wastes, and summarizes record keeping, emergency response, and training requirements (DAF, 2020d).

Toxic Substances

Asbestos is considered a Special Waste under Missouri regulations (DAF, 2020d). Friable and nonfriable ACM in these buildings may include pipe insulation, caulk, mastic, ceiling panels, asphalt shingles, and floor tiles. The Whiteman AFB Asbestos Policy guides all activities associated with existing ACM. ACM is typically managed in place unless demolition or renovation occurs. Unless buildings have been previously tested or have been certified that ACM is not present, all buildings undergoing renovation or demolition must be tested for the presence of ACM prior to the commencement of work. A certified contractor must perform the removal of asbestos and the waste must be disposed of at a sanitary landfill permitted to accept the materials. Removal and disposal of ACM is carried out in strict compliance with all applicable federal, state, and local laws, rules, regulations, and standards.

Paint used in the older buildings on Whiteman AFB may contain lead. Painted construction debris is a potentially hazardous waste depending on the age of the building. The potential for LBP exists for all buildings constructed prior to 1978. If older buildings have not been rehabilitated (i.e., LBP has been removed or encapsulated with new paint), it is assumed that LBP is present. Whiteman AFB requires testing before project implementation to determine the method of disposal. Bioenvironmental Engineering (509 MDOS/SGOJ) will perform the sampling. Staff from 509 CES/CEIE will inform the shop of the procedures necessary for legal disposal of the debris (DAF, 2020d).

ERP Sites

The ERP at Whiteman AFB began in 1984 with a Base-Wide Phase I Records Search that identified 13 ERP sites for further investigation. Supplemental investigations beginning in the late 1980s brought the total number of sites to 44 that are being investigated and cleaned up under the ERP. These sites include spill areas, storage tanks, landfills, drainage areas, disposal pits, fire training areas, and radiological sites. Primary contaminants in soil and water include fuels, waste solvents, low-level radiological waste, explosive residues, pesticides, paints and inorganics (DAF, 2010). One of these ERP sites (LF-042) is located within the boundary of the proposed construction areas and one (LF-003) is located adjacent to the proposed South WGF. All current ERP sites at Whiteman AFB are depicted in Figure 3.11-5.

Table 3.11-3 list sites undergoing long-term monitoring or other remedial/investigative actions. They include landfills, fire training areas, spill areas, and radioactive waste sites. Primary contaminants in soil and water include fuels, waste solvents, dissolved phase fuels and solvents, and low-level radiation waste (AFCEC, 2020b; DAF, 2020g).

Table 3.11-3. ERP Sites Undergoing Long-Term Monitoring or Other Remedial/Investigative Actions

Site ID	Description	Current Status
LF-003	Landfill No. 5	Long-term monitoring. Industrial land use designation.
LF-011	Landfill No. 3 (Old Landfill No. 2)	Long-term monitoring. Industrial land use designation.
LF-013	Landfill No. 4	Long-term monitoring. Industrial land use designation.
LF-034	Old Hospital Landfill, Area of Concern X	Long-term monitoring.
LF-042	Hardfill Landfill, Area of Concern A	Long-term monitoring. Industrial land use designation.
MB-963	Former Pistol Range	Phase II Comprehensive Site Evaluation conducted fall 2021. Currently finalizing workplan docs for regulatory review. Surface/subsurface soil sampling, an XRF survey and three monitoring wells installed at the site. Fieldwork planned summer/fall 2022.
SS-030	4th Street Spill Site	Long-term monitoring. The ground water concentrations at SS030 have been below remediation goals since April 2004 in the southern plume area.
SS-045	Building 140 Ground Water Contamination	Whiteman AFB will be initiating a ROD later this year at Site SS045 in the area near the B-2 sim buildings. No Action or LUC/ground water monitoring-type remedy anticipated.
FT-002	Fire Protection Training Area	ROD Amendment done in September 2011 at Site FT002. Fieldwork occurred November 2021. Chlorinated solvent contamination in ground water slightly higher than 2018. FT002 sampling to occur April/May 2021. Site has PFOS/PFOA and will also have additional fieldwork (soil borings, more monitoring wells, and a risk assessment) in FY 2023. FT002 is located in the area of the helo pads just south of the main apron. No word yet on anticipated remediation but will work around the mission there.

Source: (Takacs, 2021; Takacs, 2022)

Key: AFB = Air Force Base; FY = Fiscal Year; LUC = land use control; No = Number; PFOA = perfluorooctanoic acid; PFOS = perfluorooctane sulfonate; ROD = Record of Decision; XRF = X-ray fluorescence

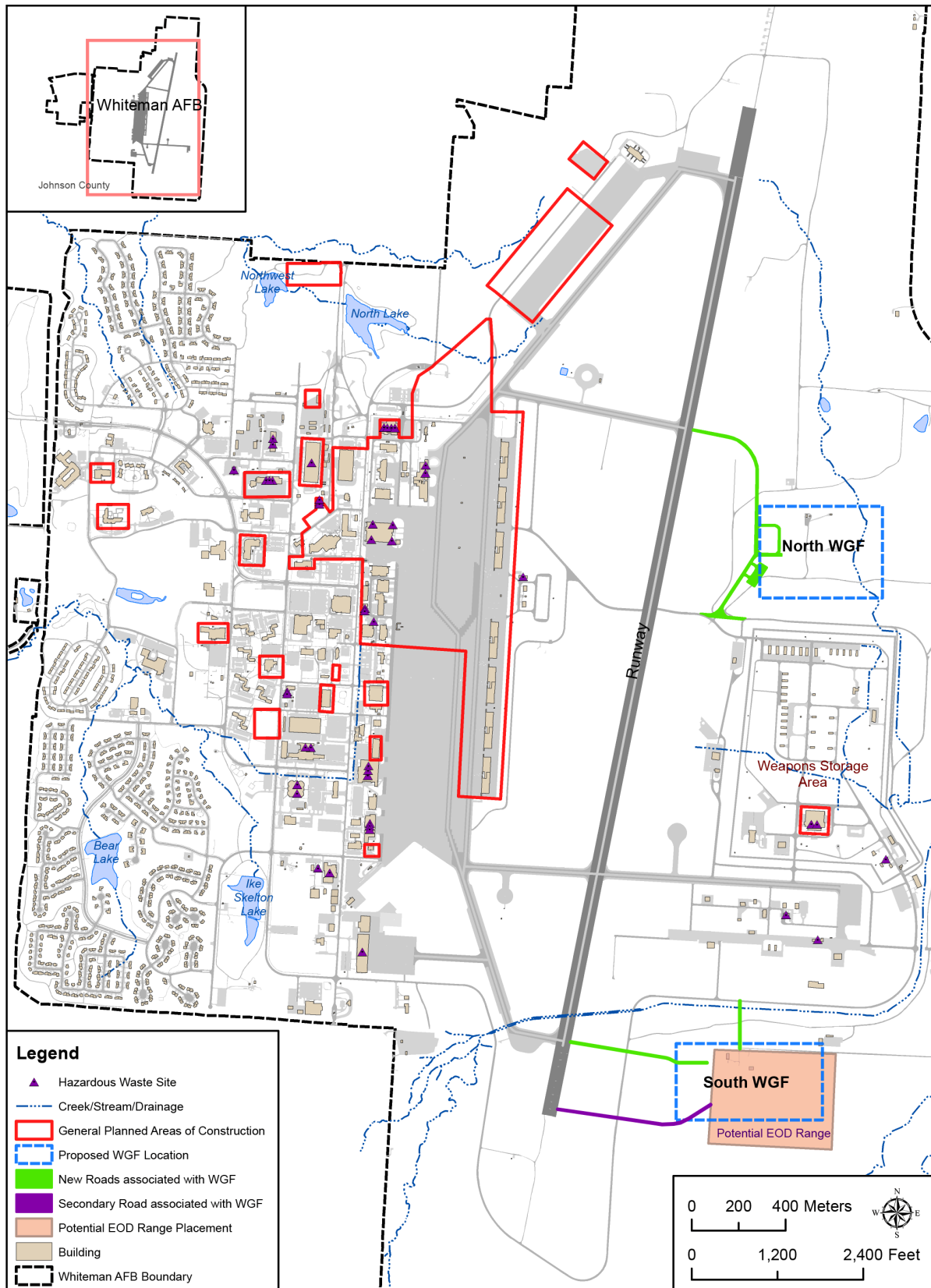
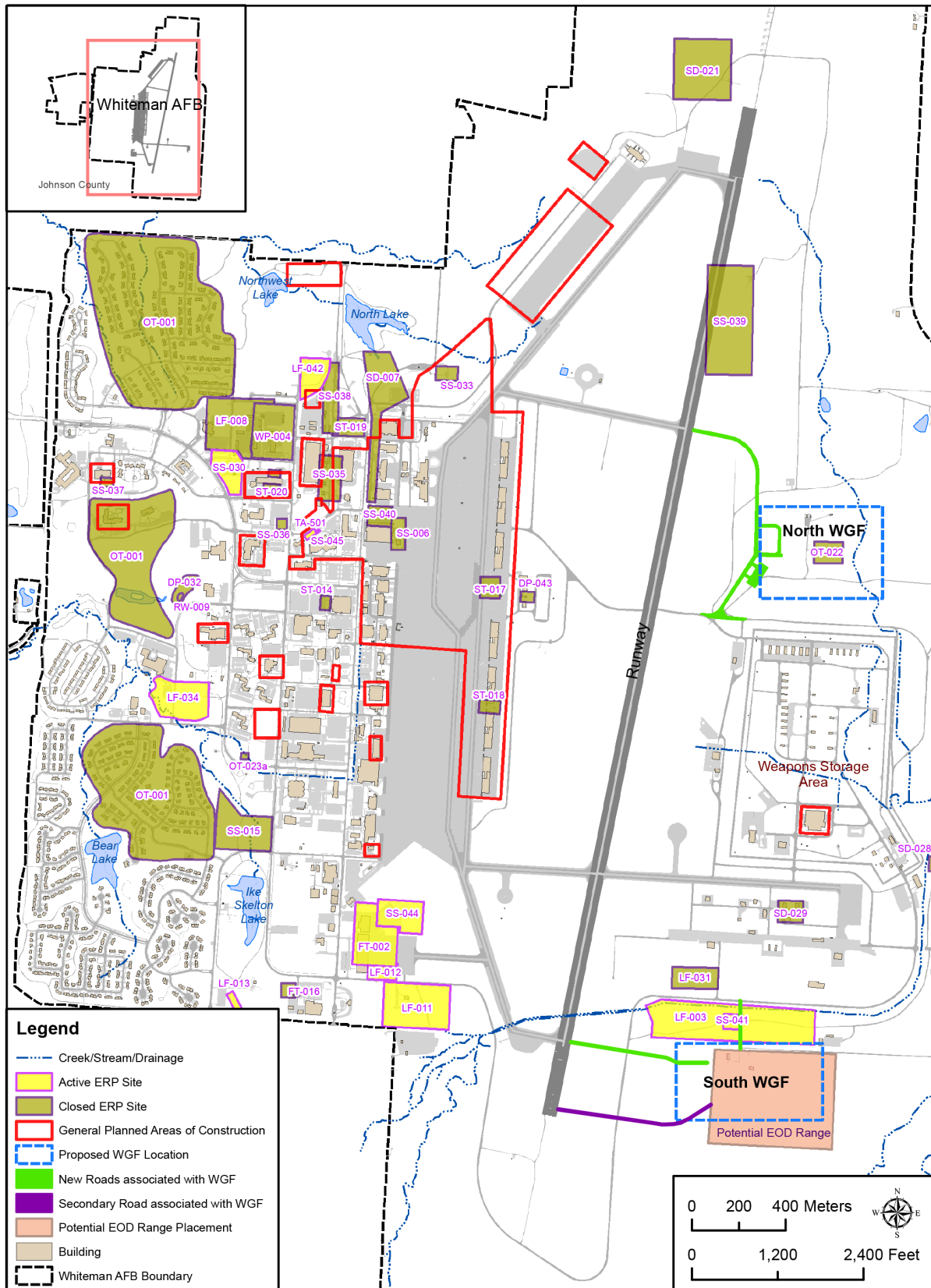


Figure 3.11-4. Hazardous Waste Sites at Whiteman AFB



Other Ongoing Investigations

Perfluorinated compounds (PFCs) are a class of synthetic fluorinated chemicals used in many industrial and consumer products, including defense-related applications. They are persistent, found at low levels in the environment, and bioaccumulate. PFCs have demonstrated toxicity, but levels that cause effects are not yet established. In 1970, the DAF began using AFFF firefighting agents containing PFCs to extinguish petroleum fires.

AFFF can contain and degrade into PFOS and may further degrade into PFOA. In 2010, the Air Force Civil Engineer Center began a comprehensive assessment process to identify locations where PFOS and PFOA may have been released across Air Force installations. Ground water, surface water, and soil sediment sampling at Whiteman AFB was conducted in late 2017.

Low levels of PFOS and PFOA were detected at Whiteman AFB at historical fire training pits and wastewater treatment areas. Possible pathways to drinking water sources were mapped and, due to the underlying geologic composition at Whiteman AFB, contamination of drinking water sources is highly unlikely, according to the reports. In 2017, drinking water sampling was conducted at all installations to ensure drinking water supplies meet EPA guidelines. Sampling of Whiteman AFB's drinking water resulted in undetectable levels of PFOS and PFOA (509th CES, 2018). In 2018, USACE conducted a site inspection of the AFFF areas on Whiteman AFB (USACE, 2018). Table 3.11-4 below shows the AFFF areas and rationale for site inspections.

Table 3.11-4. AFFF Areas and Selection Rationale for Site Inspections at Whiteman AFB

AFFF Area	Location	Associated Existing IRP ID	Rationale	Media of Concern
1	WWTP Holding Ponds	New site	Wastewater treatment ponds for high strength wastewater discharges from locations that store AFFF on base.	Subsurface Soil Ground Water Sediment Surface Water
2	Outfall 001 ^(a)	New site	WWTP effluent is discharged to Outfall 001. Water from holding ponds that may contain AFFF is routed through the WWTP.	Surface Soil Subsurface Soil Ground Water Sediment Surface Water
3	Former FTA (FT-02)	FT-02	Unknown amounts of suspected AFFF released. Potential for soil and ground water contamination with PFAS. Containment unknown	Subsurface Soil Ground Water
4	Former FTA (FT-16)	FT-16	Unknown amounts of suspected AFFF released. Potential for soil and ground water contamination with PFAS. Containment unknown.	Surface Soil Subsurface Soil Ground Water

Source: Table adapted from (USACE, 2018)

Key: AFFF = aqueous film forming foam; FTA = fire training area; ID = identification; IRP = Installation Restoration Program; WWTP = wastewater treatment plant

Note:

a. Outfall 001 was incorrectly identified as Outfall 1A in the PA (USACE, 2018).

In October 2017, Whiteman AFB firefighting equipment was upgraded to the new, environmentally friendly system. Before certifying firefighting installations for use with the new formula, systems will be drained, triple rinsed, and refilled removing any chemicals, which will be captured and disposed of properly (509th CES, 2018).

A Site Inspection Report, published in October 2018, documented results of an investigation of PFBS, PFOA, and PFOS at Whiteman AFB. Field activities included collecting surface and subsurface soil samples, installing monitoring wells, collecting ground water samples, and collecting surface water and sediment samples. Sample locations were selected in areas most likely to have been impacted by known or suspected AFFF releases. Measured concentrations of these chemicals in ground water, soil, and sediment were compared to the regulatory thresholds discussed above. The investigation identified four potential AFFF release areas on Whiteman AFB (USACE, 2018).

Only one ERP/AFFF site near the project area, FT-002, the Site Fire Protection Training Area has been noted as an area of PFOS/PFOA ground water concerns and additional fieldwork is currently being conducted, however, it is in its early stages and the results will be included when available (Hudson, 2023). The 2021 Annual Water Quality Report from Whiteman AFB provides the test results for both PFOS and PFOA. EPA has not established Secondary Maximum Contaminant Levels (for PFOS or PFOA) but currently recommend keeping concentrations below 70 nanograms per liter. Levels tested on Whiteman AFB drinking water produced levels below detectable levels for both contaminants (Whiteman AFB, 2021c).

Solid Wastes

Solid waste data show during the 1-year period of October 2020 to September 2021, Whiteman AFB generated approximately 4,351 tons of solid waste, of which approximately 1,726 tons were disposed to the landfill. During the same period, the installation disposed of 391 tons of C&D debris to the landfill (Long, 2021).

There are no active landfills on Whiteman AFB. Solid waste generated at the base, including C&D debris, is collected by contractors and transported to the Show-Me Regional Landfill that has been in operation since 1975. As of 2019, the landfill had approximately 3,946,099 tons of waste in place with a capacity of 9,933,643 cubic yards (EPA, 2022c). The landfill is currently permitted to operate until 2051 (EPA, 2022c).

3.11.1.2.3 Airspace and Range Utilization

B-21 operations proposed in the training airspace associated with the Dyess AFB Alternative and the Whiteman AFB Alternative would have no impact on the affected environment for hazardous materials, hazardous or solid wastes, or ERP sites; consequently, these are not discussed further.

3.11.1.3 Analysis Methodology

The significance of potential impacts associated with hazardous materials, constituents, substances, and wastes is based primarily on their characteristics, distribution, transportation, storage, and disposal. Factors used to assess significance include the extent or degree to which implementation of an alternative would substantially increase the human health risk or environmental exposure resulting from the storage, use, handling, transportation, or disposal of these hazardous materials, toxic substances, and hazardous wastes. A second measure of significance is whether the use, storage, or disposal of hazardous wastes is consistent with applicable federal and state requirements.

To evaluate significance related to impacts on existing ERP/contaminated sites, the location of these sites was compared with the location of proposed activities. Site-specific conditions, including the existence of LUCs, were then analyzed against proposed activities to assess whether these activities could result in health impacts to workers or releases of hazardous constituents to the environment. Additionally, significance was evaluated in terms of whether project-generated C&D debris and MSW would exceed available disposal capabilities (e.g., landfill space) or require extraordinary effort to meet applicable solid waste regulatory requirements.

3.11.2 Hazardous Materials and Hazardous and Solid Wastes, Environmental Consequences

Commonalities

The following potential environmental consequences for hazardous materials and hazardous waste management and toxic substances are common to both the Dyess AFB Alternative and Whiteman AFB Alternative.

Hazardous Materials Management

Hazardous materials and petroleum products (e.g., paints, solvents, lubricants, fuels) would be used during construction and renovation activities. These materials would be stored in proper containers, employing secondary containment as necessary to prevent and limit accidental spills. Additionally, emergency generators with integral fuel storage tanks may be required at proposed construction sites. All spills and accidental discharges of hazardous materials or petroleum products would be reported and mitigated in accordance with installation emergency response plans and procedures for the management of hazardous materials as described previously.

Hazardous materials would also be used as part of aircraft maintenance to support aircraft operations. Many of the hazardous materials used under the Proposed Action, such as oils, lubricants, and fuels, would be the same as those currently used under existing conditions (i.e., the No Action Alternative). The primary difference between the B-1 and B-2 aircraft and the B-21 is the extensive use of advanced composites and coatings in the B-21. These composites play a key role in the aircraft's operational and low observable characteristics. Fabricating or repairing composite components and applying coatings would involve the use of hazardous materials including resins, curing agents,

reinforceable fibers, and coatings. Contact with these materials has been shown to potentially result in acute health effects, such eye and skin irritation, respiratory sensitization, contact dermatitis, and conjunctivitis. Continued exposure to some of these hazardous materials may also result in chronic conditions, such as hepatotoxicity (liver toxicity) or cancer (OSHA, 2020).

Potential health hazards associated with the use of advanced composites would be controlled through the implementation established of safe work practices. These safe work practices are identified in the bases' SOPs and comprise engineering controls, work practice controls, proper personal protective equipment, and administrative controls, as listed below:

- *Engineering Controls* – Isolation (e.g., isolated storage, separate process areas, closed systems) and local exhaust ventilation.
- *Work Practice Controls* – Employee training and education; proper procedures for use of process and control equipment; proper use, maintenance, and cleaning of personal protective equipment; periodic inspection and maintenance of process and control equipment; and good supervision.
- *Personal Protective Equipment* – Use of gloves, protective clothing, respirators, and eye protection.
- *Administrative Controls* – Control employee exposures by scheduling operations with the highest exposures at a time when the fewest employees are present.

Use of described safe work practices and of established or new management procedures would ensure there would be no adverse environmental impacts from the use of hazardous materials.

Hazardous Waste Management

Aircraft maintenance operations would also generate liquid and solid hazardous wastes. The total quantity of hazardous wastes generated would not be expected to significantly change under either alternative; however, the nature of these wastes may change based on the type of hazardous materials used in composite repair operations. If any additional waste streams were to be identified as part of new maintenance procedures, the bases would establish new IAPs/SAPs at generation locations, and personnel managing these locations would be properly trained in waste management. This would include the implementation of any new applicable safe work practices (as described above). Management of hazardous wastes would be performed according to prescribed procedures already in place, and the installation-specific Hazardous Waste Management Plans would be updated as required to reflect any new procedures. The existing hazardous waste management process is adequate for the quantity and types of wastes that would be generated at either installation, and no changes to permits or hazardous waste generator status are anticipated.

Use of described safe work practices and of established or new management procedures would ensure there would be no adverse environmental impacts from the generation of hazardous wastes.

Toxic Substances

Due to their age, some of the buildings associated with proposed projects have a potential for containing ACM and LBP. Asbestos was used in almost every public and commercial building constructed before the 1980s in the United States. LBP was banned for consumer use in 1978. Table 3.11-5 and Table 3.11-6 provide a list of the facilities constructed prior to 1980 associated with Dyess AFB Alternative and Whiteman AFB Alternative, respectively.

Table 3.11-5. Buildings Associated With the Dyess AFB Alternative Constructed Prior to 1980

Building Number	Year Constructed	Alternative Action
5020	1956	Re-Use
4315	1958	Re-Use
4111	1955	Demo
4112	1956	Demo
4218	1956	Demo
5015	1955	Demo
5016	1956	Demo
5101	1956	Demo
5102	1955	Demo
9001	1955	Demo

Table 3.11-6. Buildings Associated With the Whiteman AFB Alternative Constructed Prior to 1980

Building Number	Year Constructed	Alternative Action
4	1957	Demolition
9	1954	Re-Use
43	1954	Demolition
52	1979	Re-Use

Prior to any renovation or demolition activities, new building surveys would be conducted, as required, to identify if any such materials are present. Abatement of structures known to contain ACM or LBP would be conducted in accordance with federal and state regulations, including submission of applicable state notifications, use of state-certified contractors, and use of appropriate personal protective equipment. Management and disposal of any resulting ACM- or LBP-contaminated debris would be conducted in accordance with applicable regulations, including the Occupational Safety and Health Act, Toxic Substances Control Act, and National Emission Standards for Hazardous Air Pollutants regulations. Disposal of any contaminated debris would be accompanied by a waste manifest and would only occur at an approved facility.

Implementation of these management procedures would eliminate any adverse impacts resulting from ACM and LBP. These materials would not be employed in new

construction; consequently, there would be beneficial impacts from the removal of existing ACM and LBP.

Solid Waste

Construction, renovation, and demolition activities associated with either the Dyess AFB Alternative or the Whiteman AFB Alternative would generate C&D debris. Buildings would be constructed primarily of masonry and steel construction or be of a prefabricated design over a concrete slab-type foundation, while resulting debris would include wood, drywall, plastic, steel, masonry, etc. To the greatest extent possible, construction projects would incorporate Leadership in Energy and Environmental Design®, commonly referred to as LEED®, and sustainable development concepts to achieve optimum resource efficiency, sustainability, and energy conservation. MSW waste would also be generated from construction site operations (e.g., food waste, office waste, empty containers, and packaging materials). The quantity of this type of waste would be minor when compared to the volume of C&D debris expected to be generated. Construction activities at both installations would occur over multiple years and all feasible waste recycling and management measures would be implemented through enforcement of contract specifications to further minimize the quantity of C&D debris generated. Construction waste recycling and management involves the process and separation of salvaging the recoverable waste materials for recycling and reuse.

As an example, in the case of paved surfaces, debris would likely consist mostly of wooden forms that could be recycled. Also, durable modular metal form systems for use in concrete construction may be selected based on being readily demountable and reusable on other projects, thus eliminating wood waste associated with formwork fabricated of plywood and dimensional lumber. Any suitable substitute for aggregate (e.g., recovered masonry, concrete, and asphalt rubble) may be recycled into new aggregate or asphalt and would be considered during construction. Some building-related waste can also be minimized (e.g., construction products) can be selected based on its being designed and manufactured to be shipped with minimal packaging. Soil excavated during construction activities would be stockpiled for construction and landscaping uses, while woody debris from land-clearing activities could also be chipped or mulched on site and used for landscaping. New materials, such as asphalt and concrete, would not be expected to generate significant waste because they are produced in the needed quantities and can be recycled if the material or its placement does not meet specifications. Additional MSW diversion measures, including recycling of office waste, beverage containers, cardboard, plastics, and scrap metal would further limit any potential adverse impacts on landfill capacity.

3.11.2.1 No Action Alternative Consequences

3.11.2.1.1 No Action at Dyess AFB

Under the No Action Alternative including the baseline projects discussed in Section 3.1 (Affected Environment and Environmental Consequences, Introduction), the Proposed

Action would not occur and there would be no change in the storage or use of hazardous materials or the generation of solid or hazardous wastes at Dyess AFB. Construction activities identified in Table 3.1-1 would contribute to baseline conditions at the base however ongoing activities related to the management of ERP sites and sites impacted by PFOS/PFOA would continue. As such, implementation of the No Action Alternative would not result in significant impacts.

3.11.2.1.2 No Action at Whiteman AFB

Under the No Action Alternative including the baseline projects discussed in Section 3.1 (Affected Environment and Environmental Consequences, Introduction), the Proposed Action would not occur and there would be no change in the storage or use of hazardous materials or the generation of solid or hazardous wastes at Whiteman AFB. Construction activities identified in Table 3.1-1 would contribute to baseline conditions at the base, however ongoing activities related to the management of ERP sites and sites impacted by PFOS/PFOA would continue. As such, implementation of the No Action Alternative would not result in significant impacts.

3.11.2.2 Dyess AFB Alternative

3.11.2.2.1 Personnel

Potential impacts resulting from the proposed change in the number of personnel would be associated with an increase in generation of MSW. These potential impacts are discussed below in Section 3.11.2.2.3 (Hazardous Materials and Hazardous and Solid Wastes, Environmental Consequences, Dyess AFB Alternative, Facilities and Infrastructure).

3.11.2.2.2 Airfield Operations

Potential impacts to hazardous materials and hazardous wastes resulting from aircraft operations would be associated with maintenance activities to support these operations. These potential impacts were discussed above, under Commonalities (Section 3.11.2). A description of these maintenance activities is described in the corresponding management discussions above in Section 3.11.1.1 (Hazardous Materials and Hazardous and Solid Wastes, Affected Environment, Description of Resource, Commonalities). Based on the implementation of appropriate maintenance activities, there would be no significant impacts to hazardous materials and hazardous wastes from airfield operations at Dyess AFB.

3.11.2.2.3 Facilities and Infrastructure

Toxic Substances

Potential impacts associated with toxic substances from upgrades to facilities and infrastructure were discussed above, in Section 3.11.1.1 (Hazardous Materials and Hazardous and Solid Wastes, Affected Environment, Description of Resource, Commonalities).

ERP Sites

As Figure 3.11-2 shows, the general planned areas of construction would overlap areas associated with ERP sites SD015, SD017, SD020, SD028, and OT-11. As shown in Table 3.11-7, these sites that have established LUCs that limit development to industrial uses (i.e., nonresidential). Most sites also limit ground water use to non-potable only.

Table 3.11-7. Affected ERP Sites at Dyess AFB

Site	Affected Site	Remedy Components
General Planned Areas of Construction, Proposed WGF Location	OT011, DRMO-Building 9104 Waste Storage Area	LUCs requiring land use be limited to industrial development and ground water use be limited to non-potable only.
General Planned Areas of Construction	SD015, Building 4116 OWS SD017, Building 4311 OWS SD020, Building 4317 OWS	
	SD028, Building 7040 OWS	An LUC requiring land use be limited to industrial; no restrictions for ground water use.

Source: (DAF, 2016b)

Key: AFB = Air Force Base; DRMO = Defense Reutilization Marketing Office; ERP = Environmental Restoration Program; LUC = land use control; OWS = oil/water separator; WGF = Weapons Generation Facility

As part of proposed activities, these sites would be only redeveloped for industrial use and would not use ground water for potable purposes. Also, exposure to environmental media during construction (soil, surface water, sediment, or ground water) would be unlikely to result in adverse human health effects. Prior to any work on or near ERP sites, the Environmental Office would be notified. This would include disturbance to any existing any remediation infrastructure, such as ground water monitoring wells. Dyess AFB would also coordinate with TCEQ, if required, regarding disturbance at existing ERP sites. The DAF is currently investigating possible contamination at identified PFAS sites. Construction activities would avoid these sites to the greatest extent possible. Any actions at these sites would be coordinated with TCEQ and other applicable stakeholders.

Should contaminated soils need to be removed, transported, treated, and/or disposed of, RCRA regulations would apply to the characterization, transportation, and disposal of this material. Additionally, prior to disturbing these sites, the potential presence of hazardous constituents would be communicated to workers. Site safety briefings that include distribution of material safety data sheets and discussion of safe work practices would be conducted to protect worker health.

With implementation of the procedures described above, there would be no significant impacts to ERP sites.

Solid Waste

Additionally, MSW would be generated as a result of new personnel assigned to the base. During FY 2021, Dyess AFB disposed to the landfill approximately 978 tons of MSW. This number included both MSW from industrial operations as well as from on-base residents in military family housing. Under this alternative, the total number of personnel (including dependents) would increase by approximately 11 percent (11,862 versus

13,180). As a rough approximation, it is assumed the quantity of MSW would similarly increase. This means an additional 108 tons of MSW would be generated annually, for a total of 1,086 tons. Table 3.11-8 shows total tons of MSW and C&D debris associated with the Dyess AFB Alternative. Note: Construction activities at Dyess would occur over multiple years, limiting the quantity of debris generated at any one time.

Table 3.11-8. Total Solid Waste Disposed of From the Dyess AFB Alternative

Action	Total Square Feet ^(a)	C&D Generation Factor ^(b) (lb/sf)	C&D Tons
New Construction	1,423,056	4.34	3,088
Renovation	411,375	11.32	2,328
Demolition	309,663	158	24,463
C&D Debris Total (Tons) ^(c)			29,879
Annual MSW Total (Tons) ^(d)			1,086
Solid Waste Total (Tons)			30,965

Key: AFB = Air Force Base; C&D = construction and demolition; lb = pounds; MSW = municipal solid waste; sf = square feet
Notes:

- Total does not include square footage associated with construction of pavements, aprons, ramps, and parking areas, as construction of these are assumed not to generate significant quantities of C&D debris.
- Source: (EPA, 2003)
- Construction activities at Dyess would occur over multiple years, further limiting the quantity of debris generated at any one time.
- Total assumes an approximate 11 percent increase over current MSW generation quantity, based on the number of additional personnel at the installation.

As the table shows, approximately 30,965 tons of solid waste would be disposed of at the Abilene Environmental Landfill. As discussed in Section 3.11.1.2.1 (Hazardous Materials and Hazardous and Solid Wastes, Affected Environment, Region of Influence, Dyess AFB, Solid Wastes), the Abilene Environmental Landfill receives approximately 108,572 tons of mixed waste in 2021. The combined quantity of C&D debris and MSW generated at Dyess AFB under this alternative would represent approximately 28.5 percent of average annual landfill disposal. At its current disposal capacity, the landfill is expected to remain in operation for an additional 64 years.

Implementation of appropriate waste recycling, diversion and management measures, as described above, would further minimize the quantity of MSW and C&D debris generated. Based on the results of the analyses, the Dyess AFB Alternative would not result in significant impacts to solid wastes or landfill capacity.

3.11.2.2.4 Weapons Generation Facility

There would be no potential impacts associated with hazardous materials, hazardous wastes, toxic substances, and solid wastes for the WGF not previously discussed under the Commonalities section. The construction footprint for the WGF would overlap areas associated with ERP Site OT-11. With implementation of the procedures described in Section 3.11.2.2.3 (Hazardous Materials and Hazardous and Solid Wastes, Environmental Consequences, Dyess AFB Alternative, Facilities and Infrastructure), there would be no significant impacts to this ERP site.

3.11.2.2.5 Reasonably Foreseeable Future Actions and Environmental Trends

Construction of projects under the Dyess AFB Alternative, in combination with the Dyess AFB Main Parking Apron Repair listed in Table 3.1-2, would result in contributions of

MSW and C&D debris to regional landfills. As standard practice for proposed projects, C&D waste would be diverted from the landfill to the greatest extent possible through reuse or recycling. Waste would either be segregated and recycled at a certified facility or disposed of (for mixed or nonsegregated waste) at a certified recycling facility.

As result of the Dyess AFB Alternative, 30,965 tons of solid waste would be disposed of at the Abilene Environmental Landfill. As discussed in Section 3.11.1.2.1 (Hazardous Materials and Hazardous and Solid Wastes, Affected Environment, Region of Influence, Dyess AFB), the Abilene Environmental Landfill receives approximately 108,572 tons of mixed waste in 2021. The combined quantity of C&D debris and MSW generated at Dyess AFB under this alternative would represent approximately 28.5 percent of average annual landfill disposal. At its current disposal capacity, the landfill is expected to remain in operation for an additional 64 years. Solid waste from the Dyess AFB Alternative would be generated over multiple years, further limiting any potential impacts. For reasonably foreseeable future actions, construction of new facilities would be addressed under separate and specific environmental reviews. Because landfill capacity is anticipated to be sufficient for the combined demand of the reasonably foreseeable future actions, as well as projects under the Dyess AFB Alternative, impacts on solid waste facilities would be less than significant.

There would be no significant impacts associated with management of hazardous materials, toxic substances, hazardous wastes, or ERP sites. These would continue to be managed according to established procedures.

3.11.2.2.6 Proposed Resource-Specific Mitigations and Management Actions to Reduce the Potential for Environmental Impacts

There is a potential that construction sites could be impacted by PFOS/PFOA or other contaminants (e.g., fuels, solvents). If construction would require soil removal/disposal, then characterization and disposal would be conducted in accordance with DAF policy and guidance. Contaminated soils may be addressed on site or disposed of in an appropriate landfill. No mitigation measures or additional management actions other than those described in the Commonalities section would be necessary to reduce impacts to below significant levels for hazardous materials and hazardous and solid waste because no significant impacts are anticipated.

3.11.2.3 Whiteman AFB Alternative (Preferred Alternative)

3.11.2.3.1 Personnel

Potential impacts resulting from the proposed change in the number of personnel would be associated with an increase in generation of MSW. These potential impacts are discussed in Section 3.11.2.3.3 (Hazardous Materials and Hazardous and Solid Wastes, Environmental Consequences, Whiteman AFB Alternative, Facilities and Infrastructure).

3.11.2.3.2 Airfield Operations

Potential impacts to hazardous materials and hazardous wastes resulting from aircraft operations would be associated with maintenance activities to support these operations.

A description of these maintenance activities is presented in the corresponding management discussions above in Section 3.11.1.1 (Hazardous Materials and Hazardous and Solid Wastes, Affected Environment, Description of Resource, Commonalities). Based on the implementation of appropriate maintenance activities, there would be no significant impacts to hazardous materials and hazardous wastes from airfield operations at Whiteman AFB.

3.11.2.3.3 Facilities and Infrastructure

Toxic Substances

Potential impacts associated with toxic substances from upgrades to facilities and infrastructure were discussed above in Section 3.11.1.1 (Hazardous Materials and Hazardous and Solid Wastes, Affected Environment, Description of Resource, Commonalities).

ERP Sites

As Figure 3.11-5 shows, the general planned areas of construction would overlap areas associated with ERP site LF-042 (Hardfill Landfill-Area of Concern A) and be adjacent to LF-003 (Landfill Number [No.] 5). Both sites have historically been used as landfills. LF-003 was active between 1972 and 1977, reportedly contains Base refuse, demolition rubble, and drums of waste oil and other chemicals. After closure, the area was used to stockpile contaminated soil from various sites on the Base. No ground water sampling is required at LF-003/SS-041 and no COCs were identified. The human health risk assessment in the 2007 ROD identified no risks to human health or the environment at LF-003/SS-041 (Whiteman AFB, 2014c).

LF-042 was used to store and dispose of miscellaneous undocumented materials. Dumping at the site appears to have occurred as early as 1958, with activity continuing through 1983. Surface cleanup was performed in 2006. All activities that will result in subsurface disturbance at ERP sites must be approved through a waiver/permit process. All projects are reviewed to ensure the activities will not disturb subsurface wastes, contaminated soils, and/or contaminated ground water (Whiteman AFB, 2014c). No new facility construction is planned in known PFAS/PFOA areas.

Proposed construction may occur near areas associated with LF-042 and LF-003, former landfill sites. Construction activities would avoid these sites to the greatest extent possible. If avoidance is not possible, the DAF would obtain a waiver/permit as necessary.

Additionally, prior to any work on or near ERP sites, the Environmental Office and the Air Force Civil Engineer Center Remedial Project Managers would be notified and would engage Missouri agencies and the EPA as needed/required. Any actions at these sites would be coordinated with all applicable stakeholders.

Should contaminated soils need to be removed, transported, treated, and/or disposed, RCRA regulations would apply to the characterization, transportation, and disposal of this material. Additionally, prior to disturbing the site, the potential presence of hazardous

constituents would be communicated to workers. Site safety briefings that include distribution of material safety data sheets and discussion of safe work practices would be conducted to protect worker health. With implementation of the procedures described above, there would be no significant impacts to ERP sites.

Solid Waste

Buildings would be constructed primarily of masonry and steel construction or be of a prefabricated design over a concrete slab-type foundation, while resulting debris would include wood, drywall, plastic, steel, masonry, etc. To the greatest extent possible, construction projects would incorporate Leadership in Energy and Environmental Design®, commonly referred to as LEED®, and sustainable development concepts to achieve optimum resource efficiency, sustainability, and energy conservation. MSW waste would also be generated from construction site operations (e.g., food waste, office waste, empty containers, and packaging materials). The quantity of this type of waste would be minor when compared to the volume of C&D debris expected to be generated. Construction activities at both installations would occur over multiple years and all feasible waste recycling and management measures would be implemented through enforcement of contract specifications to further minimize the quantity of C&D debris generated. Construction waste recycling and management involves the process and separation of salvaging the recoverable waste materials for recycling and reuse.

As an example, in the case of paved surfaces, debris would likely consist mostly of wooden forms that could be recycled. Also, durable modular metal form systems for use in concrete construction may be selected based on being readily demountable and reusable on other projects, thus eliminating wood waste associated with formwork fabricated of plywood and dimensional lumber. Any suitable substitute for aggregate (e.g., recovered masonry, concrete, and asphalt rubble) may be recycled into new aggregate or asphalt and would be considered during construction. Some building-related waste can also be minimized (e.g., construction products) can be selected based on its being designed and manufactured to be shipped with minimal packaging. Soil excavated during construction activities would be stockpiled for construction and landscaping uses, while woody debris from land-clearing activities could also be chipped or mulched on site and used for landscaping. New materials, such as asphalt and concrete, would not be expected to generate significant waste because they are produced in the needed quantities and can be recycled if the material or its placement does not meet specifications. Additional MSW diversion measures, including recycling of office waste, beverage containers, cardboard, plastics, and scrap metal would further limit any potential adverse impacts on landfill capacity.

Construction, renovation, and demolition activities associated with the Whiteman AFB Alternative would generate C&D debris. Additionally, MSW would be generated as a result of new personnel assigned to the base. As discussed in Section 3.11.1.2.2 (Hazardous Materials and Hazardous and Solid Wastes, Affected Environment, Region of Influence, Whiteman AFB), during the 1-year period of October 2020 to September 2021, Whiteman AFB disposed to the landfill approximately 1,726 tons of solid waste. Under this alternative, the total number of personnel (including dependents) would

increase by 1,021 individuals (see 19,408 versus 20,429) or approximately 5 percent. As a rough approximation, it is assumed the quantity of MSW would similarly increase. This means that an additional 86 tons of MSW would be generated annually, for a total of 1,812 tons. Table 3.11-9 shows total tons of MSW and C&D debris associated with this alternative. Note: Construction activities at Whiteman AFB would occur over multiple years, further limiting the quantity of debris generated at any one time.

Table 3.11-9. Total Solid Waste Disposed of From the Whiteman AFB Alternative

Action	Total Square Feet ^(a)	C&D Generation Factor ^(b) (lb/sf)	C&D Tons
New Construction	582,333	4.34	1,264
Minor Renovation (Re-Use)	1,832,478	4.34	3,976
Major Renovation (Add/Alter)	224,635	11.32	1,271
Demolition	85,001	158	6,715
C&D Debris Total (Tons) ^(c)			13,226
Annual MSW Total (Tons) ^(d)			1,812
Solid Waste Total (Tons)			15,038

Key: AFB = Air Force Base; C&D = construction and demolition; lb = pound; MSW = municipal solid waste; sf = square feet
Notes:

- Total does not include square footage associated with construction of pavements, aprons, ramps, and parking areas, as construction of these are assumed not to generate significant quantities of C&D debris.
- Source: (EPA, 2003)
- Construction activities at Whiteman AFB would occur over multiple years, further limiting the quantity of debris generated at any one time.
- Total assumes an approximate 5 percent increase over current MSW generation quantity, based on the number of additional personnel at the installation.

From October 2020 to September 2021, Whiteman AFB generated 2,625 tons of C&D debris of which 391 tons (14 percent) was landfilled (Hudson, 2023). As discussed in Section 3.11.1.2.2 (Hazardous Materials and Hazardous and Solid Wastes, Affected Environment, Region of Influence, Whiteman AFB), the landfill had approximately 3,946,099 tons of waste in place with a capacity of 9,933,643 cubic yards. The combined quantity of C&D debris and MSW generated at Whiteman AFB would represent approximately less than 1 percent of current waste in place. At its current disposal capacity, the landfill is permitted to operate approximately another 30 years.

Implementation of appropriate waste recycling, diversion and management measures would further minimize the quantity of MSW and C&D debris generated. Based on the results of the analyses, the Whiteman AFB Alternative would not result in significant impacts to solid wastes or landfill capacity.

3.11.2.3.4 Weapons Generation Facility

There would be no potential impacts associated with hazardous materials, hazardous wastes, toxic substances, ERP sites, and solid wastes for the North WGF Site or South WGF Site Subalternatives not previously discussed under the Commonalities section or Section 3.11.2.3.3 (Hazardous Materials and Hazardous and Solid Wastes, Environmental Consequences, Whiteman AFB Alternative, Facilities and Infrastructure).

Closure of the existing EOD Range under the North WGF Alternative would require EOD clearance and potential mitigative actions such as hazardous materials disposal and contaminated soil removal.

3.11.2.3.5 Reasonably Foreseeable Future Actions and Environmental Trends

Construction of projects under the Whiteman AFB Alternative, in combination with reasonably foreseeable future actions listed in Table 3.1-2, would result in contributions of MSW and C&D debris to regional landfills. As standard practice for proposed projects, C&D waste would be diverted from the landfill to the greatest extent possible through reuse or recycling. Waste would either be segregated and recycled at a certified facility or disposed of (for mixed or nonsegregated waste) at a certified recycling facility.

As result of the Whiteman AFB Alternative, 15,038 tons of solid waste would be disposed of at the Show-Me Regional Landfill. The combined quantity of C&D debris and MSW generated at Whiteman AFB from October 2020 to September 2021 was comprised of 1,726 tons of solid waste and 391 tons of C&D debris. At its current disposal capacity, the landfill is permitted to operate until at least 2051. Solid waste from the Whiteman AFB Alternative would be generated over multiple years, further limiting any potential impacts. For reasonably foreseeable future actions, construction of the Airfield Surface Drainage Corrections and the Arnold Gate Relocation would be addressed under separate and specific environmental reviews. Because landfill capacity is anticipated to be sufficient for the combined demand of the reasonably foreseeable future actions, as well as projects under the Whiteman AFB Alternative, impacts on solid waste facilities would be less than significant.

There would be no significant impacts associated with management of hazardous materials, toxic substances, hazardous wastes, or ERP sites. These would continue to be managed according to established procedures.

3.11.2.3.6 Proposed Resource-Specific Mitigations and Management Actions to Reduce the Potential for Environmental Impacts

There is a potential that construction sites could be impacted by PFOS/PFOA or other contaminants (e.g., fuels, solvents). If construction would require soil removal/disposal, then characterization and disposal would be conducted in accordance with DAF policy and guidance. Contaminated soils may be addressed on site or disposed of in an appropriate landfill. Closure of the existing EOD Range under the North WGF Alternative would require EOD clearance and potential mitigative actions such as hazardous material disposal or contaminated soil removal. No mitigation measures or additional management actions other than those described in the Commonalities section would be necessary to reduce impacts to below significant levels for hazardous materials and hazardous and solid waste as no significant impacts are anticipated.

3.12 HEALTH AND SAFETY

3.12.1 Health and Safety, Affected Environment

3.12.1.1 Description of Resource

Health and safety considers activities, occurrences, or operations that have the potential to affect the safety, well-being, or health of members of the public. A safe environment is one in which there is no, or optimally reduced, potential for death, serious bodily injury or illness, or property damage. The primary goal is to identify and prevent potential accidents or impacts on the general public.

The health and safety resource area addresses flight safety, including the potential for aircraft mishaps. Additionally, this resource area evaluates hazards related to day-to-day operations, primarily construction activities, and considers whether associated procedures are designed to minimize hazards to workers and are completed in accordance with required safety standards. Finally, this resource area evaluates potential impacts associated with munitions storage and explosive safety and whether proposed safety buffers, known as QD arcs, would be sufficient to mitigate any explosive hazards.

A variety of DAF regulations govern the various aspects of safety. For example, policies related to flight safety include AFI 91-202 (revised April 15, 2021), *U.S. Air Force Mishap Prevention Program*, and DoD Instruction 6055.07, *Mishap Notification, Investigation, Reporting, and Record Keeping*. These policies detail procedures for mishap prevention, notification, investigation, reporting, and record keeping. AFMAN 91-201 (revised March 9, 2022), *Explosives Safety Standards*, addresses explosives safety and defines safety distances (i.e., QD arcs) to be maintained between explosive storage areas and other types of facilities.

Workplace safety regulations are typically addressed under the 29 CFR 1960 series, Occupational Safety and Health Administration (OSHA) standards; however, OSHA standards do not always apply to military-unique workplaces, operations, equipment, and systems. According to DoD policy, OSHA applies insofar as is possible, practicable, and consistent with military requirements. Applicable OSHA requirements are reflected in AFI 91-301, *Air Force Occupational and Environmental Safety, Fire Protection, and Health* (AFOSH), and DAFMAN 91-203(91-203), *Air Force Occupational Safety, Fire and Health Standards*.

Note: The health and safety analysis does not evaluate potential impacts from existing airfield CZs and APZs, as these would not change as a result of the Proposed Action (these zones delineate areas around an airfield where an aircraft mishap is most likely). The B-21 would likely be smaller in size than the existing B-1 and B-2, while operational profiles and number of sorties would not significantly change from current conditions; consequently, the potential for aircraft/bird strikes would also not significantly change. Therefore, the health and safety analysis does not evaluate impacts associated with bird/wildlife-aircraft strikes.

Commonalities

The following elements of health and safety are common to both Dyess AFB and Whiteman AFB.

Flight Safety and Mishap Prevention

Flight safety is based on the physical risks associated with aircraft flight. Military aircraft fly in accordance with FAA Regulations Part 91, General Operating and Flight Rules, which govern such things as operating near other aircraft, right-of-way rules, aircraft speed, and minimum safe altitudes. These rules include the use of testing and training flight areas, arrival and departure routes, and airspace restrictions as appropriate to help control air operations.

There is no generally recognized threshold of flight safety that defines acceptable or unacceptable conditions. Instead, the focus of airspace managers is to reduce risks through numerous measures. These include, but are not limited to, providing and disseminating information to airspace users, setting appropriate standards for equipment performance and maintenance, defining rules governing the use of airspace, and assigning appropriate and well-defined responsibilities to the users and managers of the airspace.

The DAF values safety and professionalism and has adopted many measures to promote aviation safety. All personnel are provided continuous safety training throughout their career with the DAF. Specifically, all DAF pilots use state-of-the-art simulators for training purposes that include all facets of flight operations and comprehensive emergency (such as mechanical failure or bird strike) response procedures that minimize the mishap risks associated with pilot error. Maintenance crews are also highly trained to perform preventative maintenance actions, maintenance repairs, diagnostic testing of the repair, and flight safety inspections on each aircraft in accordance with DAF regulations.

The primary safety concern regarding military aircraft operations is the potential for aircraft mishaps to occur. Mishaps may be caused by mid-air collisions with other aircraft or objects, weather, mechanical failures, pilot error, etc. Although mishap rates from previous years cannot predict future mishap rates, reviewing mishap historical data is helpful in providing perspective. Aircraft mishaps are categorized based on the extent of property damage, loss of life, or disability they cause. The military services define four categories of aircraft mishaps (A to D), with “Class A” mishaps defined as the most serious. Class A mishaps are classified as resulting in a total property damage of \$2 million or more, a fatality, or permanent total disability. Due to the potential for impact severity, only Class A mishaps are discussed in this section.

For in-flight emergencies, military pilots are trained take all appropriate emergency measures, including avoiding populated areas, if possible. If a mishap does occur, there are well-established emergency response procedures currently in-place. Each installation maintains emergency and mishap response plans to guide responses to aircraft accidents. These plans assign responsibilities and prescribe functional activities necessary to react to mishaps, whether on- or off-station. Additionally, highly trained

maintenance crews perform inspections on each aircraft in accordance with DoD regulations, and maintenance activities are monitored to ensure that aircraft are equipped to safely withstand the rigors of operational and training events. When these measures are implemented, risks are minimized, even though they can never be eliminated.

In the unlikely event of an aircraft emergency or mishap, installations maintain emergency and mishap response plans to guide responses to aircraft accidents. These plans assign responsibilities and prescribe functional activities necessary to react to mishaps, whether on- or off-base. Response would normally occur in two phases. The initial response focuses on rescue, evacuation, fire suppression, safety, elimination of explosive devices, securing the area, and other actions immediately necessary to prevent loss of life or further property damage. The second phase is the mishap investigation, which involves an array of organizations whose participation would be governed by the circumstances associated with the mishap and actions required to be performed (DoD, 2018). Installations also maintain mutual aid agreements with local fire departments, which detail each party's responsibility when responding to a mishap. The installations also conduct annual training drills, where emergency personnel are instructed on proper response procedures. These drills may include participation of emergency response agencies from the local community.

After all required investigations and related actions on a mishap site are complete, the aircraft would be removed from the mishap site. Installation personnel accomplishes cleanup of the site or contracts to an outside agency to accomplish the cleanup. Overall, the purpose of response planning is to:

- Save lives, property, and material by timely and correct response to mishaps
- Quickly and accurately report mishaps to higher Headquarters
- Investigate the mishap to preclude the recurrence of the same or a similar mishap

Explosives Safety

Both installation store and maintain a range of munitions required for performance of their mission. All explosives handling operations must undergo risk assessments that analyze hazards associated with transporting, storing, disposing of, handling or firing ammunition and explosive materials. These risk assessments may range from examining the relationship between a potential explosion site and an exposed site to determine what effect one has on the other in the event of an accidental explosion, to ascertaining the worst credible event ramifications of an explosives handling mishap. All explosives storage and handling operations are documented in a site-specific Explosive Site Plan (ESP). These ESPs must contain all the information needed for the reviewer to determine if the explosives safety requirements of AFMAN 91-201 are met. ESPs may include documentation such as detailed drawings, engineering analyses, risk assessments, commanders' risk acceptances, etc., to verify compliance with explosives safety requirements.

At both installations, munitions storage areas are located away from the main cantonment area. The installations have established QD arcs (i.e., safety buffers) around the munitions storage areas that limit the types of development allowed to maintain personnel safety and to minimize the potential for damage to other facilities. QD arcs are also established around the aircraft parking areas on the main ramp. Aircraft undergoing hot-pit refueling or undergoing end-of-runway or arm/de-arm operations are categorized as being in transportation mode and are exempt from QD criteria; however, separation distances to exposed sources must still be considered. For example, in their respective Master Aircraft Parking Plans, the installations may implement compensatory measures that address which buildings need to be evacuated when munitions are loaded on certain areas of the flightline.

Construction Safety

Daily operations and maintenance operations at both installations are performed in accordance with applicable DAF safety regulations, DAF technical guidance, and the standards stipulated in AFOSH requirements. C&D activities are common and have associated inherent risks such as chemical (e.g., asbestos, lead, hazardous materials) and physical (e.g., noise propagation, falling, electrocution, collisions with equipment) sources.

Companies and individuals contracted to perform construction activities on DAF installations are responsible for adhering to OSHA requirements to mitigate these hazards. Industrial hygiene programs address exposure to hazardous materials, use of personal protective equipment, and the availability and use of safety data sheets, the latter of which are also the responsibility of construction contractors to provide to workers. Federal civilian and military personnel that have a need to enter areas under construction must adhere to OSHA and AFOSH requirements, as well as applicable industrial hygiene programs. Individuals tasked to operate and maintain equipment, such as power generators, are responsible for following all applicable technical guidance, as well as adhering to established OSHA and DAF safety guidelines.

3.12.1.2 Region of Influence

The ROI for health and safety include the installation boundaries, with an emphasis on areas used for munitions storage or where construction activities would occur, as well as any adjacent off-base areas (i.e., public lands, military training areas, MOAs) that potentially would be affected by safety issues related to the Proposed Action.

3.12.1.2.1 Dyess AFB

Flight Safety and Mishap Prevention

Dyess AFB has been operating the B-1 aircraft for over 30 years, and there have been three Class A mishaps associated with Dyess AFB aircraft. One mishap involved a collision with a pelican, one involved a short circuit in the aircraft's electrical system, and one was due to pilot error. As discussed under the common elements, the DAF

implements numerous procedures to minimize the potential for aircraft mishaps and has implemented procedures for emergency response in case a mishap does occur.

Explosives Safety

At Dyess AFB, the existing munitions storage area is located on the northeast portion of the installation as shown in Figure 3.12-1. QD arcs are also established around the aircraft parking areas on the main ramp. As discussed under the Commonalities section, all munitions are handled and stored in accordance with DAF explosive safety directives and all munitions maintenance is carried out by trained, qualified personnel using DAF-approved technical procedures.

3.12.1.2.2 Whiteman AFB

Flight Safety and Mishap Prevention

There have been two flight related Class A mishaps and one ground fire accident associated with B-2 bomber aircraft. The first occurred in Guam in 2008 when an aircraft crashed while taking off from the base. A second aircraft was damaged in Guam when involved in a fire. The last Class A mishap happened in September 2021 at Whiteman AFB. The cause of this mishap was mechanical failure leading to an emergency landing (Tirpak, 2021). As discussed under the common elements, the DAF implements numerous procedures to minimize the potential for aircraft mishaps and has implemented procedures for emergency response in case a mishap does occur.

Explosives Safety

Explosives safety QD arcs are implemented for the weapons storage area, located on the eastern portion of the installation, that extend outwards for several hundred feet (see Figure 3.12-2). QD arcs are also established around the aircraft parking areas and hangars, as well as around areas of the airfield where aircraft may be temporarily parked. As discussed under the common elements, all munitions are handled and stored in accordance with DAF explosive safety directives and all munitions maintenance is carried out by trained, qualified personnel using DAF-approved technical procedures.

3.12.1.2.3 Airspace and Range Utilization

The affected environment for flight safety and mishap risks would be the same as under those discussed for Dyess AFB for Lancer, Brownwood, Bronco, and Pecos MOAs and Willie-Roscoe ATCAA; and Whiteman AFB for Ada, Truman, and Lindbergh MOAs, Ozark ATCAA, and Smoky Hill Range. Airspace and range utilization associated with the Proposed Action would have no impact on the affected environment for explosive or construction safety; consequently, these are not discussed further.

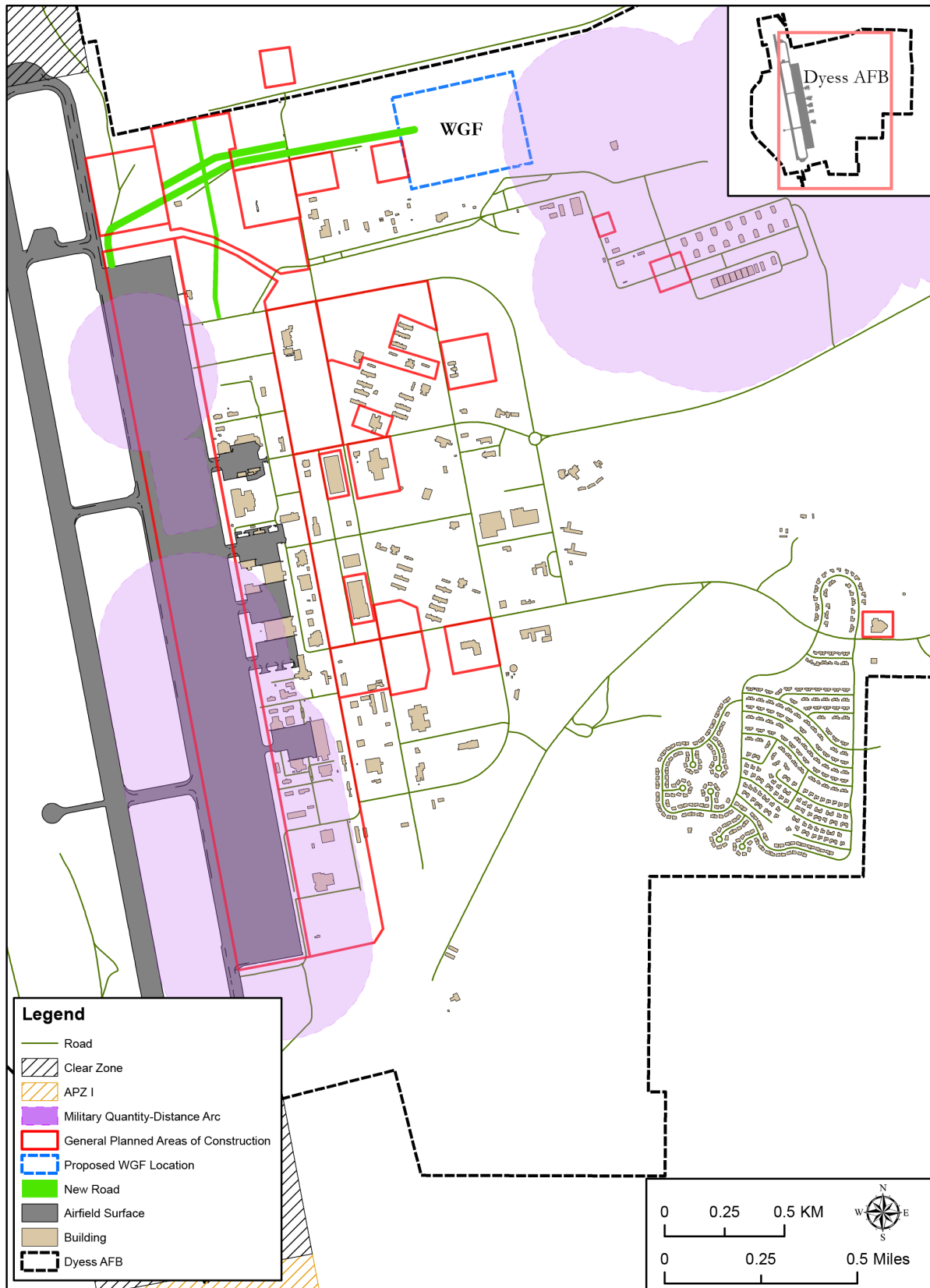


Figure 3.12-1. Established Quantity-Distance Arcs at Dyess AFB

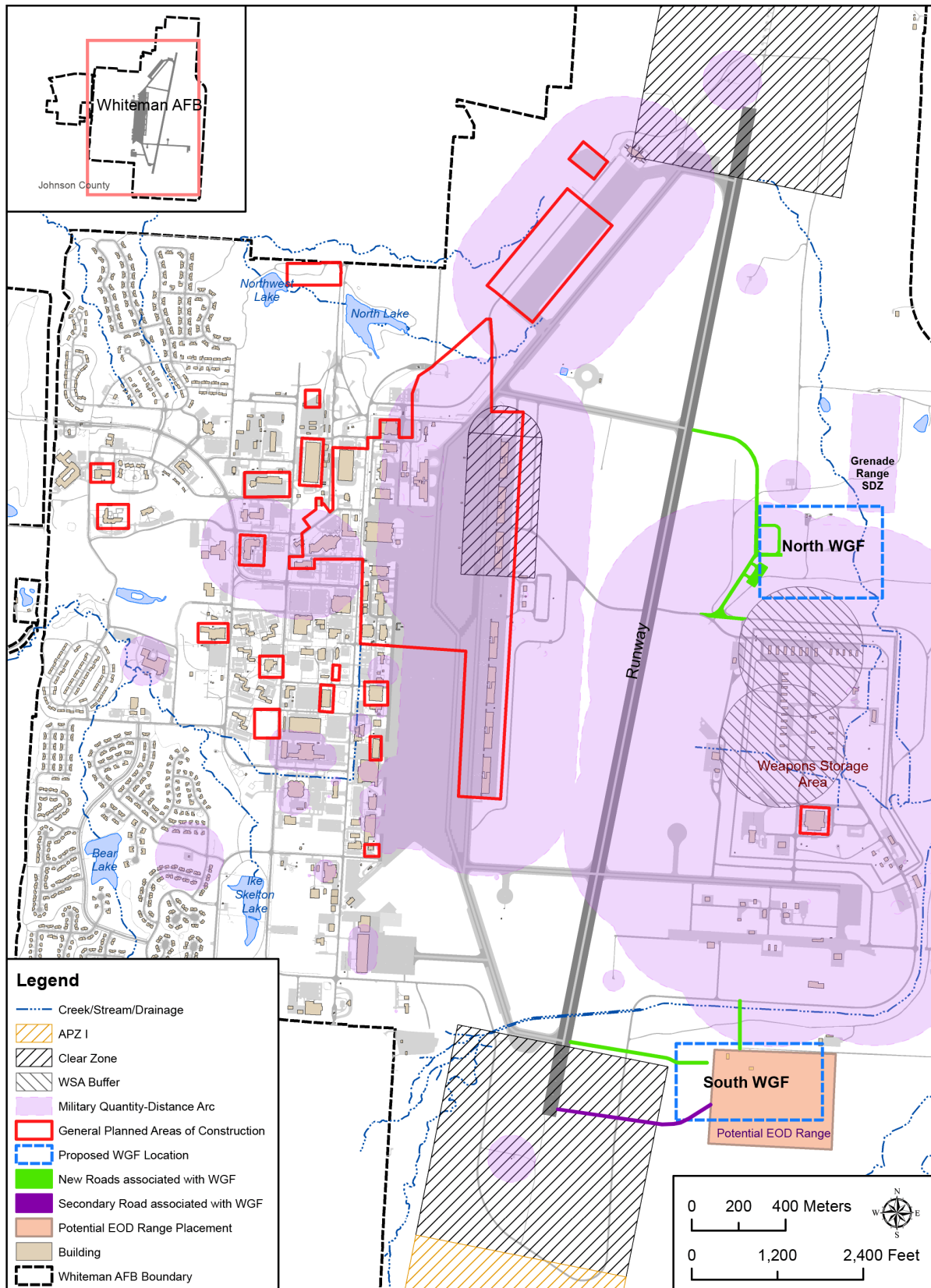


Figure 3.12-2. Established Quantity-Distance Arcs at Whiteman AFB

3.12.1.3 Analysis Methodology

In the analyses, issues that have a potential to affect safety are evaluated relative to the degree to which the activity increases or decreases safety risks to military personnel, the public, and property. For example, the analyses evaluate whether buildings would fall within munitions safety buffers (i.e., QD arcs). Likewise, the potential for a change in the number of aircraft Class A mishaps from flight operations are evaluated by comparing aircraft types and sorties against aircraft-specific aircraft mishap rates.

3.12.2 Health and Safety, Environmental Consequences

Commonalities

The following potential environmental consequences for health and safety are common to the Dyess AFB Alternative and the Whiteman AFB Alternative. Potential impacts to health and safety from airfield operations and airspace and range utilization would be associated with flight safety and mishap prevention.

There would be no unique operations (e.g., use of extremely hazardous substances) posing specific health and safety impacts to new personnel from implementation of this alternative. All actions would be accomplished by technically qualified personnel and would be conducted in accordance with applicable DAF safety requirements, approved technical data, and AFOSH standards. Therefore, changes in personnel associated with the Proposed Action are not discussed further in this section.

Flight Safety and Mishap Prevention

The DAF calculates Class A mishap rates for each type of aircraft in the inventory. Mishaps rates are computed based on the number of mishaps per 100,000 flying hours. (Note: Combat losses due to enemy action are excluded from mishap statistics.) The B-21 has not yet entered service. From an operational and design standpoint, the B-21 would most closely align with the existing B-2 “Spirit” stealth bomber. That is, the B-21 would likely employ operational profiles not unlike the B-2’s, though, overall dimensions appear to indicate a smaller overall bomber form when compared to the B-2. Because this would be a new aircraft, mishap rates are not available; consequently, historical mishap rates for the B-2A are used in the analysis.

Through 2021, the B-2 logged a total of 154,558 flying hours (it began flying operations in 1990) with two recorded Class A flight mishaps and one ground-based fire resulting in a loss of aircraft. This equates to a lifetime mishap rate of 1.2 or approximately one mishap approximately every 154,558 flying hours (DAF, 2021i). Proposed air operations at both installations would comprise approximately 95 sorties per month (6,840 sorties per year). With an estimated sortie length of approximately 2 hours, this would equate to 13,680 hours of annual operations.

This analysis makes only a statistical prediction regarding the frequency of mishaps and may not represent real-world conditions. Current aircraft flight safety policies and

procedures (as described in Section 3.12.1.1, Health and Safety, Description of Resource) are designed to ensure that the potential for aircraft mishaps is reduced to the lowest possible level. These safety policies and procedures would continue under all alternatives. If a mishap was to occur, there are well-established procedures for responding to aircraft mishaps on DAF and non-DAF property (see Section 3.12.1.1, Health and Safety, Description of Resource, for more information).

As discussed in Section 3.11.2 (Hazardous Materials and Hazardous and Solid Wastes, Environmental Consequences, Commonalities, Hazardous Materials Management), the B-21 is primarily comprised of advanced composite materials. When these materials burn, as may be the case in a mishap-related fire, they may give off fumes containing toxic constituents; consequently, appropriate personal protective equipment, such as adequate respirators, would be required by response personnel. Note: Health and safety impacts related to the use of composite materials are discussed in Section 3.11.2 (Hazardous Materials and Hazardous and Solid Wastes, Environmental Consequences, Commonalities, Hazardous Materials Management).

During mishap prevention training, the DAF would communicate any requirements to local fire department personnel regarding the need for specific response procedures and/or protective equipment. Any such requirements would also be implemented (as necessary) when removing and disposing of any mishap-related debris or associated contaminated soils. No significant impacts to flight safety would occur under any of the alternatives with continued implementation of established and new mishaps prevention procedures. Therefore, airfield operations and airspace and range utilization are not discussed further in the analyses below.

Construction Safety

Safety as it relates to construction activities associated with facilities and infrastructure and the WGF are discussed below. Explosive safety would be unique for each location and is discussed individually under each alternative.

Companies and individuals contracted to perform construction activities on DAF installations would be responsible for adhering to OSHA requirements to mitigate all hazards. Industrial hygiene programs would be implemented to address exposure to hazardous materials, use of personal protective equipment, and the availability and use of safety data sheets. Federal civilian and military personnel that have a need to enter areas under construction would adhere to OSHA and AFOSH requirements, as well as applicable industrial hygiene programs. Individuals tasked to operate and maintain equipment, such as power generators, would be responsible for following all applicable technical guidance, as well as adhering to established OSHA and DAF safety guidelines. All actions would be accomplished by technically qualified personnel and would be conducted in accordance with applicable DAF safety requirements, approved technical data, and AFOSH standards; consequently, no significant impacts would occur.

3.12.2.1 No Action Alternative Consequences

3.12.2.1.1 No Action at Dyess AFB

Under the No Action Alternative, Dyess AFB would continue current operations using the B-1 aircraft. All actions would be accomplished by technically qualified personnel and would be conducted in accordance with applicable DAF safety requirements, approved technical data, and AFOSH standards; consequently, no significant impacts would occur. Construction activities at Dyess AFB identified in Table 3.1-1 contribute to baseline conditions at the base however ongoing health and safety requirements would be followed. Aircraft flight safety policies and procedures (as described in Section 3.12.1.1, Health and Safety, Description of Resource) would be followed for the Air Force Reserve F-35A operations in Lancer and Brownwood MOAs to ensure that the potential for aircraft mishaps would be reduced to the lowest possible level. If a mishap was to occur, there are well-established procedures for responding to aircraft mishaps on DAF and non-DAF property (see Section 3.12.1.1, Health and Safety, Description of Resource, for more information). Therefore, and no additional health and safety impacts would occur under baseline conditions.

3.12.2.1.2 No Action at Whiteman AFB

Under the No Action Alternative, Whiteman AFB would continue current operations using the B-2 aircraft. All actions would be accomplished by technically qualified personnel and would be conducted in accordance with applicable DAF safety requirements, approved technical data, and AFOSH standards; consequently, no significant impacts would occur. Construction activities at Whiteman AFB identified in Table 3.1-1 contribute to baseline conditions at the base however ongoing health and safety requirements would be followed and no additional impacts would occur.

3.12.2.2 Dyess AFB Alternative

3.12.2.2.1 Facilities and Infrastructure

Explosives Safety

Under this alternative, QD arcs for aircraft parking would move from the south end of the parking apron to the north end. Additionally, general planned areas of construction located near the center and north portions of the flightline would fall within existing QD arcs (Figure 3.12-1).

Proposed structures in these areas would undergo an explosive safety review to ensure occupancy and land uses would be compatible with these locations. Based on that review, Dyess AFB may implement compensatory measures, such as identifying which buildings need to be evacuated when munitions are loaded on certain areas of the flightline. As part of this process, existing explosive safety plans (e.g., ESPs or Aircraft

Parking Plans) would be updated accordingly. With implementation of these measures, there would be no adverse impacts related to explosive safety.

3.12.2.2.2 Weapons Generation Facility

Explosives Safety

The footprint for the WGF would fall within the existing QD arcs at the munitions storage area. It would also overlap a portion of the northernmost planned area of construction (Figure 3.12-1). The WGF would be used to maintain nuclear ordnance carried on the B-21. This ordnance contains nuclear components as well as components employing small quantities of conventional explosives. These facilities have been used to support the DAF's nuclear program throughout its history. The WGF would be purpose built to ensure that nuclear material and conventional explosives would be stored separately. Additionally, building design (i.e., reinforced concrete construction, interior layout, blast-resistant walls), combined with dedicated explosive safety and fire suppression systems, would eliminate any risk to the public. The facility would also be subject to the ESP process to ensure that appropriate QD arcs are established, and adjoining land uses are compatible; consequently, there would be no adverse impacts related to explosives safety.

3.12.2.2.3 Reasonably Foreseeable Future Actions and Environmental Trends

Flight, ground, and munitions safety associated with B-21 operations are not expected to have any additional effects in conjunction with the Dyess AFB Main Parking Apron Repair (Table 3.1-2). Planned structures would undergo explosive safety reviews to ensure occupancy and land uses would be compatible with all locations. As part of this process, existing explosive safety plans (e.g., ESPs or Aircraft Parking Plans) would be updated as required.

Potential short-term minor impacts to contractor health and safety may occur from implementation of the Dyess AFB Main Parking Apron Repair. However, construction safety and environmental health effects would not be significant, because risks to workers, potential for off-site dispersion of contaminants, and future exposure to residual on-site contamination would be small and confined to the immediate project site. All actions would be performed in accordance with AFOSH directives and OSHA regulations; no impacts would occur. Regional demolition and construction would be required to adhere to OSHA regulations.

3.12.2.2.4 Proposed Resource-Specific Mitigations and Management Actions to Reduce the Potential for Environmental Impacts

No mitigations would be necessary to implement the Dyess AFB Alternative.

3.12.2.3 Whiteman AFB Alternative (Preferred Alternative)

3.12.2.3.1 Facilities and Infrastructure

Explosives Safety

General planned areas of construction would be located within existing QD arcs at the weapons storage area, near the center of the flightline, to the east and west of the flightline, and near the north end of the runway (Figure 3.12-2). Proposed structures in these areas would undergo an explosives safety review to ensure occupancy and land uses would be compatible with these locations. Based on that review, Whiteman AFB may implement compensatory measures, such as identifying which buildings need to be evacuated when munitions are loaded on certain areas of the flightline. As part of this process, existing explosives safety plans (e.g., ESPs or Aircraft Parking Plans) would be updated accordingly. With implementation of these measures, there would be no adverse impacts related to explosives safety.

3.12.2.3.2 North and South Weapons Generation Facility Subalternatives

Explosives Safety

The footprint for the North WGF Site Subalternative (Preferred Subalternative) would fall within existing QD arcs (Figure 3.12-2). However, under this subalternative, the existing EOD would be relocated (Figure 3.12-2), thereby removing the current QD arcs at the proposed North WGF site. The South WGF Site Subalternative is located outside of existing QD arcs. Regardless of the subalternative selected, the WGF would be purpose-built to store B-21 ordnance and would employ dedicated explosives safety and fire suppression systems to eliminate any risk to the public. The facility would also be subject to the ESP process to ensure that appropriate QD arcs are established, and adjoining land uses are compatible; consequently, there would be no adverse impacts related to explosives safety. Operations for the existing EOD (under the South WGF Subalternative) or the new EOD location (under the North WGF Subalternative) would adhere to all safety, operations, training, and other applicable guidelines within AFMAN 32-3001 EOD Program.

3.12.2.3.3 Reasonably Foreseeable Future Actions and Environmental Trends

As with Dyess AFB, flight, ground, and munitions safety associated with B-21 operations are not expected to have any additional effects in conjunction with the Airfield Surface Drainage Corrections and the Arnold Gate Relocation at Whiteman AFB (Table 3.1-2). Planned structures would undergo explosive safety reviews to ensure occupancy and land uses would be compatible with all locations. As part of this process, existing explosive safety plans (e.g., ESPs or Aircraft Parking Plans) would be updated as required.

Potential short-term minor impacts to contractor health and safety may occur from implementation of the Airfield Surface Drainage Corrections and the Arnold Gate Relocation. However, construction safety and environmental health effects would not be significant, because risks to workers, potential for off-site dispersion of contaminants, and

future exposure to residual on-site contamination would be small and confined to the immediate project site. All actions would be performed in accordance with AFOSH directives and OSHA regulations; no impacts would occur. Regional demolition and construction would be required to adhere to OSHA regulations.

3.12.2.3.4 Proposed Resource-Specific Mitigations and Management Actions to Reduce the Potential for Environmental Impacts

No mitigations would be necessary to implement the Whiteman AFB Alternative.

3.13 TRANSPORTATION

3.13.1 Transportation, Affected Environment

3.13.1.1 Description of Resource

Transportation resources consist of the infrastructure components required for movement of people, materials, and goods. In this EIS, transportation infrastructure refers to the public roadways and associated features (e.g., intersections, roundabouts, entry/exit points) that provide access to Dyess AFB and Whiteman AFB, as well as the road network and associated features within the installation boundaries. Transportation may be evaluated qualitatively and quantitatively. Qualitative descriptors refer to travel conditions as they are perceived by travelers using the transportation system and may include factors such as perceived congestion, ease of use, comfort level, and safety concerns. Quantitative descriptors include measures such as average or peak traffic volume of a roadway segment and delay time measured in seconds.

Volume-to-capacity ratio and level of service (LOS) are two commonly used quantitative or semi-quantitative indicators of transportation efficiency. Volume refers to the actual number of vehicles passing a point on a roadway during a specified time period. Capacity is the maximum number of vehicles that can reasonably be expected to traverse a point during a given time period. LOS is a measure used to indicate the efficiency or ease at which a roadway or other transportation component is operating from the perspective of a traveler.

LOS may be determined for flowing roadway traffic, intersections, and other components such as roadway merge and exit points. Typically, six levels are defined and assigned a letter designation from A to F, with LOS A representing the best operating conditions and LOS F representing the worst. LOS for roadway segments is a measure of operational conditions in terms of travel time, speed, delay, and freedom to maneuver within the traffic stream. LOS A typically represents optimal free-flow conditions where individual users are virtually unaffected by others in the traffic stream, while LOS F represents forced-flow or breakdown conditions where traffic volume exceeds the roadway capacity. Qualitative and quantitative indicators used to define LOS designations typically differ among various roadway types (freeways, multi-lane highways, secondary roads, etc.).

LOS at intersections is typically determined by the delay time experienced at the intersection and may also incorporate other factors such as the ability to traverse an intersection in one traffic signal cycle. Intersection LOS is influenced by factors such as peak hour traffic volume, traffic composition (e.g., percent commercial vehicles), roadway configuration (e.g., number of travel lanes and turn lanes), and signal timing. The federal *Highway Capacity Manual* defines LOS for signalized and unsignalized intersections as shown in Table 3.13-1.

Table 3.13-1. Level of Service Designations for Intersections

Level of Service	Average Vehicle Delay (Signalized Intersection)	Average Vehicle Delay (Unsignalized Intersection)
A	Less than 10 Seconds	Less than 10 Seconds
B	10–20 Seconds	10–15 Seconds
C	20–35 Seconds	15–25 Seconds
D	35–55 Seconds	25–35 Seconds
E	55–80 Seconds	35–50 Seconds
F	Greater than 80 Seconds	Greater than 50 Seconds

Source: (Dyess AFB, 2018c)

Regional transportation planning entities may designate minimum acceptable LOS standards based on operational conditions such as the type of roadway, time of day (peak versus non-peak traffic) and setting (urban versus rural). Standards are typically designated for the design year, which is defined as 20 years after construction completion. Desirable and minimum LOS standards identified by the states of Texas and Missouri are provided in Table 3.13-2 and Table 3.13-3, respectively.

Table 3.13-2. Traffic Level of Service Standards in Texas

Transportation Component	Minimum Acceptable Level of Service
Urban Streets and Auxiliary Facilities	B
Urban Streets in Heavily Developed Areas	D
Multi-Lane Rural Highways and Auxiliary Facilities	B
Urban Freeways	C
Urban Freeways in Heavily Developed Areas	D
Rural Freeways	B
Rural Freeways – Auxiliary Facilities	C

Source: (Texas DOT, 2018)

Table 3.13-3. Traffic Level of Service Standards in Missouri

Desired Minimum Level of Service – All Routes (Major and Minor)			
Rural		Urban	
Peak-Hour Traffic	Off-Peak Traffic	Peak-Hour Traffic	Off-Peak Traffic
D	C	E	D

Source: (Missouri DOT, 2006)

3.13.1.2 Region of Influence

The ROI for transportation consists of the local roadway network within the boundaries of alternative MOB 2 locations (Dyess AFB and Whiteman AFB), as well as the surrounding

regional roadway network providing access to the MOB or otherwise potentially affected by the Proposed Action. Airfield operations would not affect transportation on either installation or at adjacent off-base areas. Road closures due to aircraft operations or ordnance handling are not anticipated. Therefore, airfield operations are not carried forward in this section. Additionally, airspace and range utilization would not affect transportation at any of the MOAs or ATCAAs associated with Dyess AFB or Whiteman AFB. Therefore, these training and operating areas are not carried forward in Section 3.13 (Transportation).

3.13.1.2.1 Dyess AFB

Vehicular traffic patterns on Dyess AFB primarily radiate off Arnold Boulevard, which becomes Avenue B at the intersection with 5th Avenue (Dyess AFB, 2018a). Arnold Boulevard/Avenue B supports a large portion of the on-base traffic volume, as most vehicles enter and exit the installation via this roadway. Secondary and tertiary roads serve the remainder of the installation. The most frequently used are 2nd Street, 3rd Street, and 4th Street, which intersect with Avenue B and run approximately north-south through most of the developed portion of the base. Avenue C, Avenue D, and Avenue E run parallel to and south of Avenue B.

Overall, the road system on Dyess AFB is considered to function adequately and to efficiently connect all areas of the installation (Dyess AFB, 2018a). However, congestion is noted on Arnold Boulevard during peak morning hours, where vehicles entering the base may back up due to main gate capacity (Dyess AFB, 2014; Dyess AFB, 2018d). Military Drive connects Arnold Boulevard to the Tye Gate on the north side of the installation and extends into the city of Tye, where it becomes Air Base Road. Commercial traffic is intended to access the base through the north gate via Arnold Boulevard and Military Drive, although commercial vehicles sometimes use Air Base Road instead (Dyess AFB, 2018d). The road network on and immediately adjacent to Dyess AFB is shown in Figure 3.13-1.

A traffic engineering study conducted on Dyess AFB analyzed conditions at 15 intersections under existing and potential future operations (Dyess AFB, 2018c). The study evaluated LOS, which included qualitative (e.g., congestion) and quantitative (delays measured in seconds per vehicle) factors. Under existing conditions, LOS was considered adequate (level C or better) for 11 of the intersections and poor for one or more components of the remaining intersections. Intersections with inadequate LOS are identified in Table 3.13-4. The study notes that traffic volume is relatively low at the intersections with poor service levels, and that signal light installation is therefore not warranted. However, roundabouts were recommended at two locations: Avenue B/3rd Street and Avenue D/5th Street.

Table 3.13-4. Inadequate Intersection Level of Service on Dyess AFB

Intersection	Inadequate Component	Level of Service
Avenue B and 3rd Street	Southbound Through Movement/Right Turn, Morning Peak and Mid-Day	D
Avenue B and 4th Street	Northbound and Southbound Left Turn During Morning Peak	D
Avenue D and 4th Street	Northbound and Southbound Left Turn, Southbound Through Movement/Right Turn, During Morning Peak	E (Northbound Left) F (Southbound Left) D (Southbound Through/Right)
Avenue D and 5th Street	Southbound Left Turn During Afternoon Peak	F

Source: (Dyess AFB, 2018c)

Key: AFB = Air Force Base

U.S. Interstate 20 (I-20) is the major off-base traffic artery in the Abilene area near Dyess AFB. Other U.S. highways in the vicinity include U.S. Highway (US-) 83/84 and US-277. Dub Wright Boulevard, a four-lane north-south road, provides base access from 7th Street and numerous other roadways to the east of Dyess AFB. An off-base encroachment report prepared in 2014 concluded that these roads provide adequate capacity and are generally not considered congested (Dyess AFB, 2014). However, metropolitan transportation plans prepared in 2015 and 2021 identified several roadway segments in the vicinity of Dyess AFB, including segments of I-20, US-83/84, US-277, and Arnold Boulevard/Dub Wright Boulevard, as experiencing current or future congestion at various days and times (Abilene Metropolitan Planning Organization, 2015; Abilene Metropolitan Planning Organization, 2021a). Population growth and associated retail commercial development in southwest Abilene has resulted in traffic congestion in this area, particularly along Southwest Drive near US-83/84 (Abilene Metropolitan Planning Organization, 2010). An off-base privatized military housing area (Quail Hollow Family Housing) was established slightly west of this highly developed area, near the intersection of US-277 and Rebecca Lane. Farm-to-Market Road 707, which connects Tye and Caps, lies immediately west of the base. The road network in the region near Dyess AFB is shown in Figure 3.13-2. Estimated average daily traffic counts for roads in the vicinity of Dyess AFB are shown in Table 3.13-5.

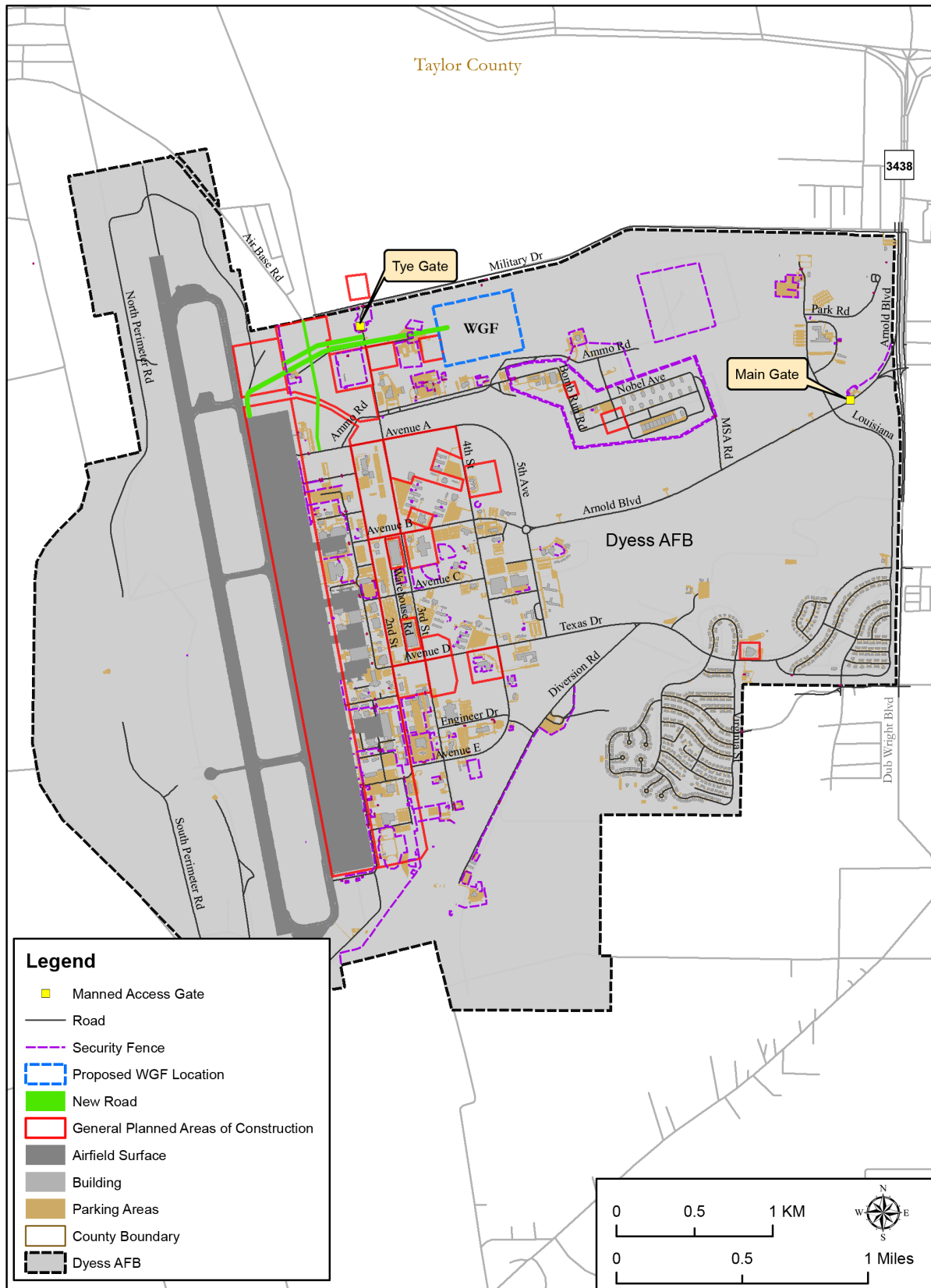


Figure 3.13-1. Road Network on Dyess AFB

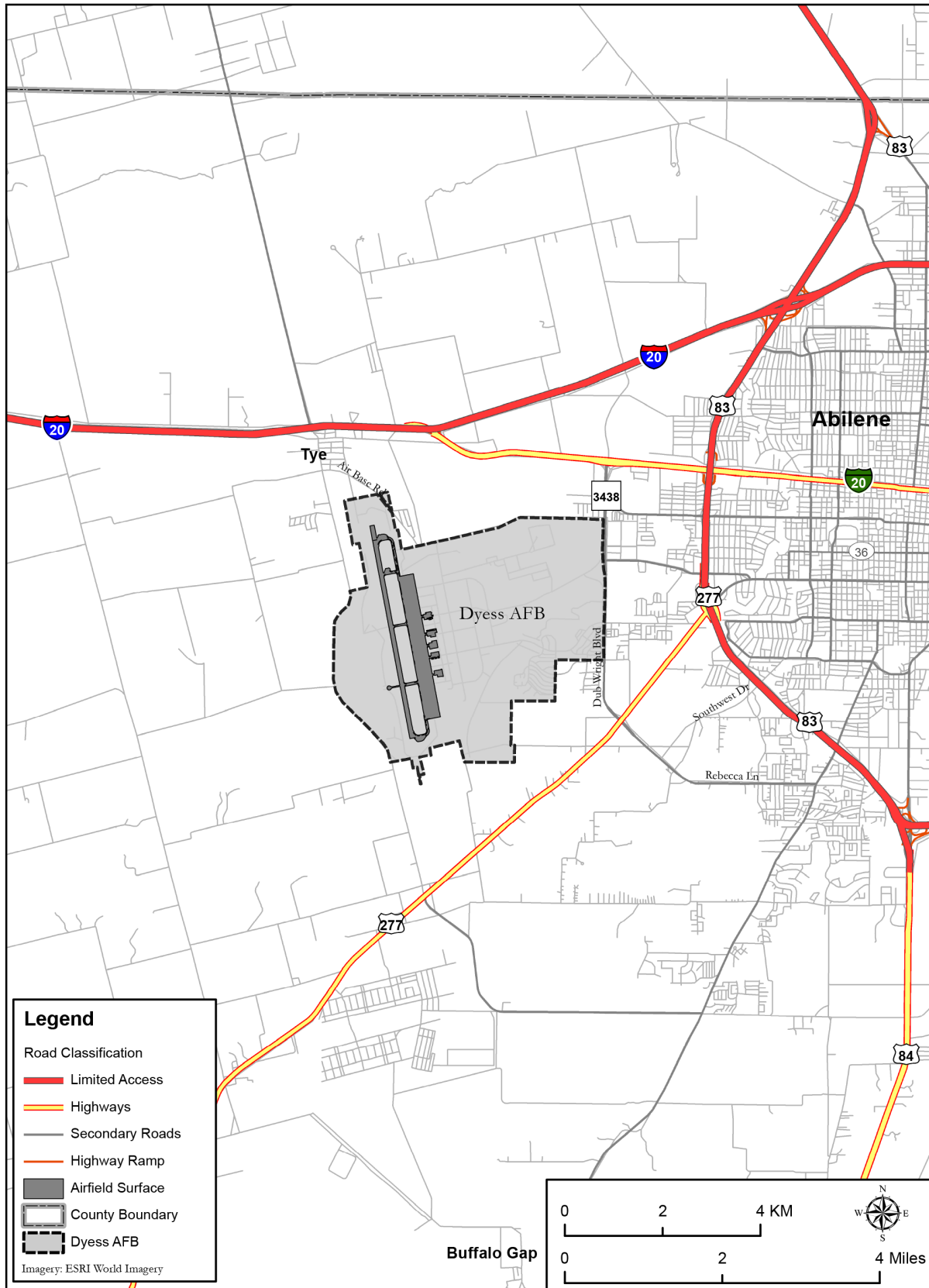


Figure 3.13-2. Highway and Road Network Near Dyess AFB

Table 3.13-5. Approximate Average Daily Traffic Count Near Dyess AFB

Road/Road Segment	Approximate Average Traffic Count (Vehicles per Day)
I-20 West of Dyess AFB	25,000
I-20 Near the City of Tye	30,000
I-20 East of U.S. Highway 84 Interchange	23,000
U.S. Highway 84 Near I-20	12,000
Farm-to-Market Road 707	1,800
Texas Avenue Near Dub Wright Boulevard	3,600
Texas Avenue Near Highway 277	9,000
Arnold Boulevard North of Dyess AFB Entrance	6,800
Dub Wright Boulevard	11,000

Sources: (Texas DOT, 2016; Texas DOT, 2020; Abilene Metropolitan Planning Organization, 2022; Texas DOT, 2023a)

Key: AFB = Air Force Base; I-20 = U.S. Interstate 20; U.S. = United States

3.13.1.2.2 Whiteman AFB

The primary entrance onto Whiteman AFB is through the Spirit (Main) Gate (Whiteman AFB, 2015b), which is located on Spirit Boulevard in the western portion of the installation. Spirit Gate is located near the intersection with Missouri Route 23, which divides the installation property. Secondary gates include the Arnold Gate and LeMay Gate. Arnold Gate is located on the north side of the installation along Highway J (also called Highway J23 and South State Street locally) and is used for access to and from Knob Noster. LeMay Gate, located to the south near Highway D, is used on a limited basis and is the contractor and commercial delivery gate. Generally, the gates' capacity is considered sufficient under existing conditions. Combined demand for the three gates (vehicles per hour) is about 82 percent of the peak hour processing rate. However, during peak hour and heightened security conditions, traffic at Spirit Gate causes delays on Missouri Highway 23 and Spirit Boulevard. The primary vehicular routes on the installation include Spirit Boulevard, Mitchell Avenue, Vandenberg Avenue, Arnold Avenue, Perimeter Road, 8th Street, and 10th Street. Ellsworth Lane is an example of the collector roads that supplement the main arterial network. Secondary roads such as Gray Lane, Langley Drive, and Kelly Road provide access to on-base services and housing. Traffic capacity is considered adequate. The roadway network becomes increasingly more compact and structured on a grid in the eastern portion of the installation, which supports administrative and community services functions. Potential short-, mid-, and long-range projects associated with the base's transportation network, which include moving or upgrading the base's gates, are identified in the IDP (Whiteman AFB, 2015b). The road network on and immediately adjacent to Whiteman AFB is shown in Figure 3.13-3.

The area around Whiteman AFB is primarily rural and is characterized by large undeveloped areas with dispersed areas of mostly low-density residential and commercial development (U.S. DOT and Missouri DOT, 2006; Whiteman AFB, 2014b). The city of Knob Noster lies immediately north of the base. Other nearby incorporated cities include Warrensburg to the west and Sedalia to the east. Kansas City is approximately 70 miles northwest.

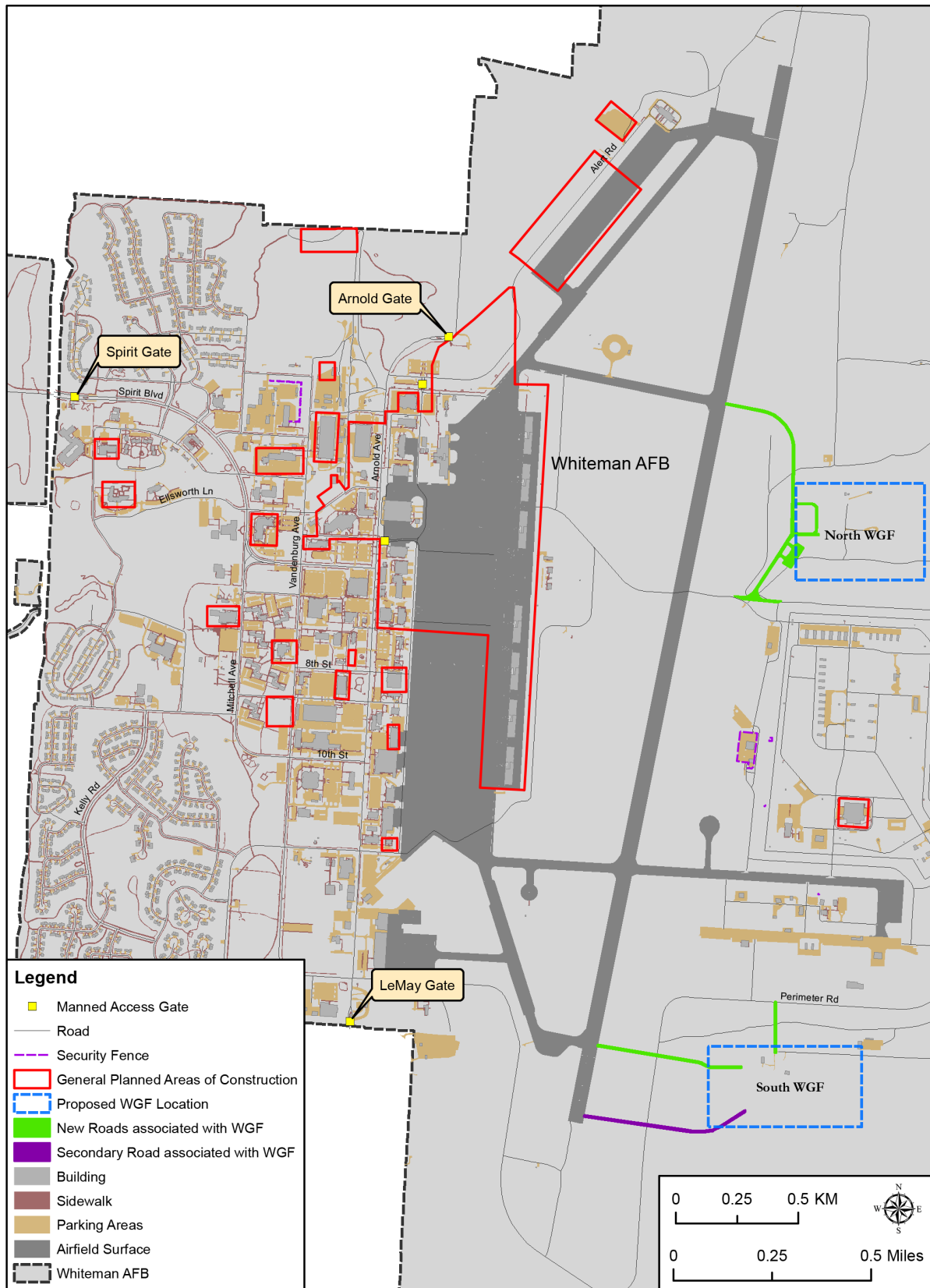


Figure 3.13-3. Road Network on Whiteman AFB

Major regional transportation systems near Whiteman AFB include U.S. Interstate 70 (I-70), U.S. Highway 50, U.S. Highway 65, and Missouri Highway 23. I-70, located about 17 miles north of the base, is the major east/west connection across Missouri and provides base access via U.S. Highway 65 and Missouri Highways 13, 23, and 127. U.S. Highway 50, located about 2 miles north of the base, is the main east/west connection between Kansas City, Warrensburg, and Sedalia. Missouri Highway 23 provides primary access to Whiteman AFB via the Spirit Gate and connects the installation to U.S. Highway 50. The regional transportation system is in generally good condition and provides adequate access to the base (Whiteman AFB, 2008b). The road network in the region near Whiteman AFB is shown in Figure 3.13-4. Estimated average daily traffic counts for roads in the vicinity of Whiteman AFB are shown in Table 3.13-6. The approximate number of work commuters in Warrensburg, Knob Noster, and Sedalia is shown in Table 3.13-7.

Table 3.13-6. Approximate Average Daily Traffic Count Near Whiteman AFB

Road/Road Segment	Approximate Average Traffic Count (Vehicles per day)
I-70 North of Whiteman AFB	Over 20,000
U.S. Highway 50 Near Whiteman AFB	10,000 – 19,999
Missouri Highway 23 Adjacent to Whiteman AFB	5,000 – 9,999
Missouri Highway 23 North and South of Whiteman AFB	1,250 – 2,499
State Highway D Near Whiteman AFB	500 – 849
U.S. Highway 65 Near Sedalia	5,000 – 9,999

Source: (Missouri DOT, 2022b)

Key: AFB = Air Force Base; I-70 = U.S. Interstate 70; U.S. = United States

Table 3.13-7. Approximate Number of Work Commuters in Cities Near Whiteman AFB

	Approximate Number of Work Commuters	Percent of Commuters Who Drive Alone (Non-Carpool)
Warrensburg	9,608	81
Knob Noster	1,585	90
Sedalia	8,970	86

Sources: (Missouri DOT, 2023; Knob Noster Transportation Department, 2023; Sedalia Transportation Department, 2023)

Key: AFB = Air Force Base

3.13.1.3 Analysis Methodology

Potential impacts on transportation were assessed with respect to changes in on-base and off-base traffic operations. For the Proposed Action, potential effects to on-base operations were evaluated in the context of construction/demolition/infrastructure improvement activities, short-term and long-term traffic re-routing, congestion, and road closure, and short-term and long-term changes in traffic volume. Potential effects to off-base operations considered short-term and long-term changes in traffic patterns and volume. Potential impacts would be considered adverse if the Proposed Action would likely result in disruption of existing traffic operations, decreased corridor or intersection LOS, or roadways operating at or above their full design capacity.

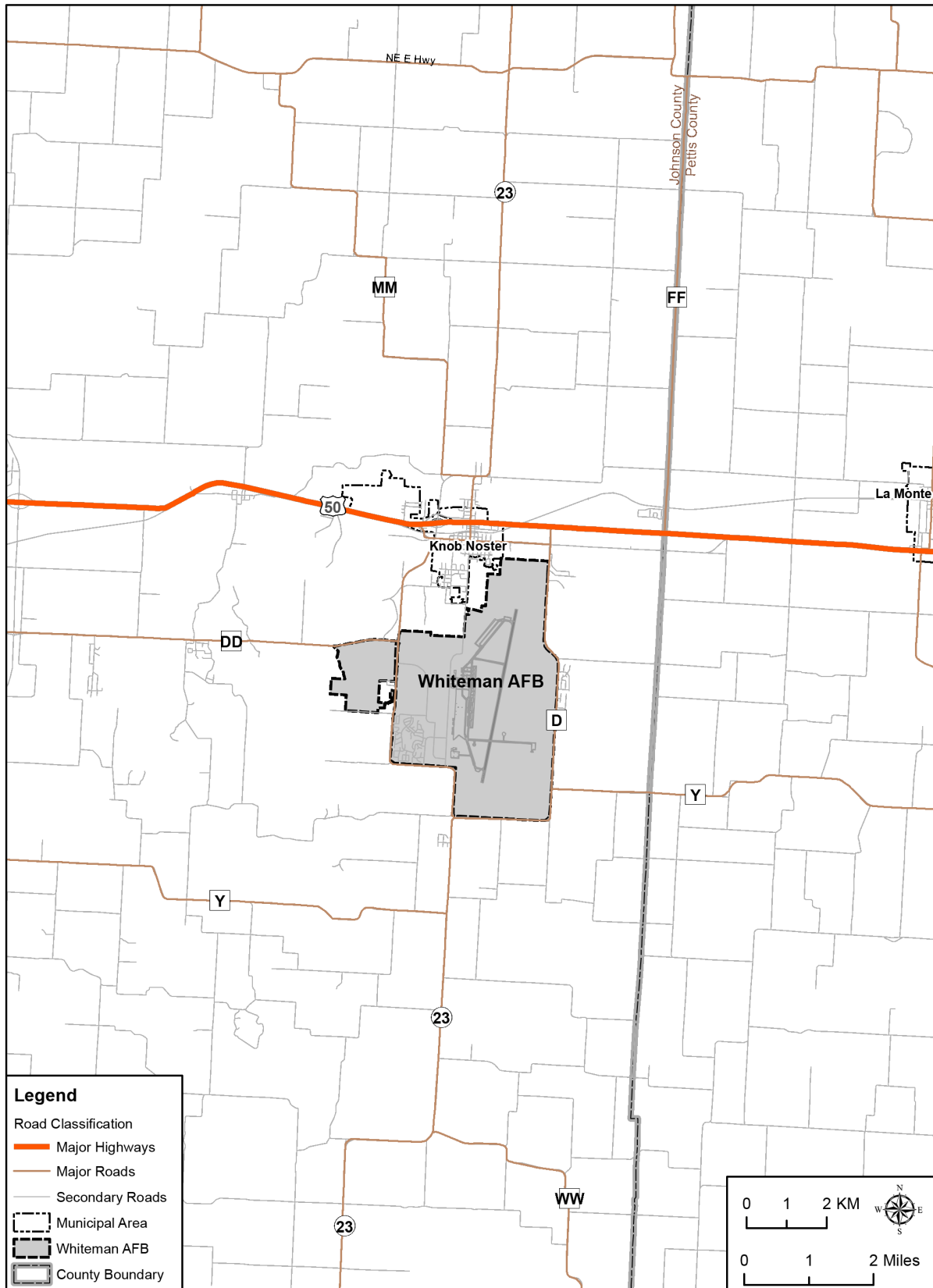


Figure 3.13-4. Highway and Road Network Near Whiteman AFB

3.13.2 Transportation, Environmental Consequences

3.13.2.1 No Action Alternative Consequences

3.13.2.1.1 No Action at Dyess AFB

Under the No Action Alternative, the B-21 would not be based at Dyess AFB and there would be no associated personnel changes or construction, demolition, or renovation activities. Traffic operations on and outside the base that are not associated with the B-21 beddown or the baseline projects identified in Table 3.1-1 would continue as described in Section 3.13.1.2.1 (Transportation, Affected Environment, Region of Influence, Dyess AFB). The on-base road system would generally continue to function adequately, with most non-commercial operators entering from Arnold Boulevard/Avenue B and using secondary streets and avenues to access various portions of the base. A small number of intersections would continue to operate at poor service levels, but relatively few vehicles would be affected at these areas per day.

Baseline development and infrastructure activities within the installation boundary, including electrical distribution system upgrades, dormitory construction and renovation, community center complex development, and security forces conversion (Table 3.1-1), could potentially require reduced travel speeds near project areas, road-shoulder closures, and lane closures. Commercial vehicles associated with the projects would be operated on the base, potentially increasing traffic volume and congestion. However, the effects would be short term and would affect relatively small portions of the base at any given time. Establishment of the new dormitory and community center complex would not likely change traffic flow patterns on the base noticeably. Overall, there would be no long-term impacts to the on-base transportation system.

The 2014 ICEMAP indicates that future housing and administrative facilities could result in further development of the area between 3rd Street and 4th Street, north and south of Arnold Boulevard/Avenue B (Dyess AFB, 2014). These actions would increase traffic volume at adjacent road segments and intersections. The base's IDP discusses additional potential future development and construction projects. Some of the potential projects would involve changes to roads, such as adding bike lanes and pedestrian crossing locations. Other future transportation-specific projects could potentially be implemented as well. For example, a traffic study conducted on the base (Dyess AFB, 2018c) recommended numerous projects to improve traffic flow and address compliance issues related to the Federal Highway Administration's Manual on Uniform Traffic Control Devices. Recommendations included a wide variety of projects such as repainting road markings, adding/replacing road signs, repairing sidewalks and pedestrian crossings, and installing roundabouts. Note that any future transportation-related projects on Dyess AFB would be subject to project-specific environmental review under the EIAP.

Activities associated with road shoulders, sidewalks, parking lots, and buildings or other facilities could involve closure of the shoulder, which would likely slow traffic and could increase the potential for minor accidents. Activities such as painting would likely involve

lane closure, which could cause some degree of traffic congestion and increased potential for crashes, particularly during peak flow periods. Shoulder and lane closures could amplify issues at intersections with existing poor service levels due to an overall decrease in traffic flow efficiency.

Relatively major projects such as roundabout installation could require lane or street segment closures, resulting in traffic rerouting, congestion, and increased travel time. The effects of some of the actions could therefore increase traffic volume at some road segments and result in reduced service levels. However, the effects would generally be short term, and most would affect relatively small portions of the base. It is expected that unaffected roads could reasonably accommodate rerouted traffic and that overall impacts to traffic operations would not be significant. An exception would be activities requiring lane closures near the main gate that would result in substantially increased wait time to enter or exit the base. In these cases, it is expected that project planning would include measures to minimize the effects.

Completion of projects designed to improve traffic operations would result in long-term beneficial impacts to the transportation system. Population growth of base personnel would likely be minor in the foreseeable future and would not affect on-base traffic operations.

Under the No Action Alternative, off-base traffic operations would also continue as described in Section 3.13.1.2.1 (Transportation, Affected Environment, Region of Influence, Dyess AFB). I-20 and other highways and secondary roads in the vicinity of Dyess AFB would continue to function adequately at times, but substantial traffic congestion would likely be experienced at some highways (e.g., US-83/84, Dub Wright Boulevard) during peak hours. Traffic congestion would continue to occur at times on Air Base Road between Dyess AFB and Tye.

There are no known adverse changes to traffic flow patterns resulting from the recently completed ATEMS/CTE schools and Dyess Elementary School. New school construction activities at multiple locations under the Wylie ISD bond program would potentially cause delays on roads adjacent to and near the sites, including US-277 and US-83/84 south and southeast of Dyess AFB. These actions could cause increased traffic volume and congestion. However, the effects would be short term and would cease after completion of the projects. Establishment of the schools could result in small changes in residence patterns and associated traffic operations, and slightly altered traffic flow patterns near the facilities. However, the schools would be distributed throughout the district, which extends from west of Caps to Potosi (southeast of Abilene). The contribution to traffic volume near Dyess AFB would likely be undetectable.

Overall regional population growth would not likely affect traffic operations substantially. As described in Section 3.6 (Socioeconomics), population growth for Taylor County is projected to be only 0.9 percent per year between 2010 and 2025. Growth was projected to be 5 and 12 percent for Abilene and Tye, respectively, between 2010 and 2030 (Dyess AFB, 2018a). The projected Abilene growth rate is considered essentially stagnant, although the southwest portion of the city nearest Dyess AFB would likely experience

continued development and associated congestion. Data compiled in 2014 indicated that relatively few new addresses occurred immediately adjacent to the installation (Abilene Metropolitan Planning Organization, 2015). Northwest Abilene, including the city of Tye, is expected to experience little urban growth, with the possible exception of neighborhoods located north of Dyess AFB (Abilene Metropolitan Planning Organization, 2010). Although growth is projected for Tye, the baseline population level is low and residential growth is expected to be slow and incremental, resulting in little impact on the Abilene transportation system.

Various off-base transportation improvement projects through the year 2040 are being evaluated by the City of Abilene and the Texas DOT, including projects involving roadways near Dyess AFB (Abilene Metropolitan Planning Organization, 2015; Abilene Metropolitan Planning Organization, 2021a; Abilene Metropolitan Planning Organization, 2021b; Texas DOT, 2023b). The potential projects include a wide variety of activities such as bridge replacement, road widening, routine maintenance, and installing signaling and drainage, among many others. In the context of traffic operations, impacts resulting from components of the various projects could range from relatively minor (e.g., shoulder closure or reduced speed limits) to major (e.g., lane closures on I-20 or principal highways). Major projects could result in decreased LOS of some roadway segments and auxiliary features (exits, intersections) due to decreased capacity, increased congestion and travel time, and safety issues. Many projects would be short-term, but activities such as bridge replacement and road widening could impact traffic operations for an extended time.

It is expected that project planning would include measures to minimize adverse effects to the extent feasible. Completion of projects designed to improve operations would result in long-term beneficial impacts to the regional transportation system.

In summary, there would be no significant impacts to the on-base transportation system under the No Action Alternative. Off-base traffic operations would continue to be affected by existing congestion, population growth, and transportation improvement projects, but activities associated with Dyess AFB would not contribute significantly to these issues.

3.13.2.1.2 No Action at Whiteman AFB

Under the No Action Alternative, the B-21 would not be based at Whiteman AFB, and there would be no associated personnel changes or construction, demolition, or renovation activities. Traffic operations on and outside the base that are not associated with the B-21 beddown or the baseline projects identified in Table 3.1-1) would continue as described in Section 3.13.1.2.2 (Transportation, Affected Environment, Region of Influence, Whiteman AFB). The on-base road system would continue to function adequately, and traffic congestion would generally not be expected.

Baseline development and infrastructure activities within the installation boundary (Table 3.1-1) could affect traffic operations. Relocation of the LeMay Gate and related C&D actions could cause increased traffic congestion and delays near the gate, but the effects would be short term. It is expected that traffic would be routed around construction

areas to the extent feasible. Traffic conditions near the gate would improve after completion of the action. On-base construction projects and water main replacement could require reduced travel speeds near project areas, road-shoulder closures, and lane closures. Commercial vehicles associated with the projects would be operated on the base, increasing traffic volume and congestion. However, the effects would generally be short term and would affect relatively small portions of the base at any given time. Airfield pavement repairs would not affect overall traffic flow on the installation because the project site is located in an area of relatively low traffic volume.

Additional construction, maintenance, and transportation improvement projects that are not associated with the B-21 beddown or baseline projects would continue to be evaluated and implemented as appropriate. Potential facility development projects, airfield development projects, and projects associated with the base's transportation network are identified in the IDP (Whiteman AFB, 2015b). Transportation-specific projects include street and stormwater drain maintenance and repairs, gate reconstruction, and constructing an acceleration lane outside the Spirit Gate. Activities such as street repairs could involve closure of the shoulder, which would likely slow traffic and could increase the potential for minor accidents. Other activities (e.g., lane construction) could involve lane closure or street segment closure, which could cause traffic congestion, traffic rerouting, increased travel time, and increased potential for crashes, particularly during peak flow periods. The effects of some of the actions could therefore potentially increase traffic volume at some road segments, result in reduced service levels. However, the effects would generally be short-term, and most would affect relatively small portions of the base. An exception would be activities requiring lane closures near the Spirit Gate, which could result in substantially increased wait time to enter or exit the base. In these cases, it is expected that project planning would include measures to minimize the effects. Overall, it is expected that unaffected roads could reasonably accommodate rerouted traffic and that overall impacts to traffic operations would not be significant. Completion of projects designed to improve traffic operations would result in long-term beneficial impacts. Note that any future transportation-related projects on Whiteman AFB would be subject to project-specific environmental review under the EIAP.

Off-base roadway and bridge construction and repair actions undertaken by the Missouri DOT (Table 3.1-1) would likely cause some level of traffic congestion and delays near the affected sites, particularly if lane closures or traffic rerouting were required. The effects would be short term (generally one year or less in duration) and would cease after completion of construction activities. The projects would have a long-term beneficial impact on traffic operations.

Population growth of base personnel would likely be minor in the foreseeable future and would not affect on-base traffic operations. Under the No Action Alternative, off-base traffic operations would also continue as described in Section 3.13.1.2.2 (Transportation, Affected Environment, Region of Influence, Whiteman AFB). In general, transportation systems may potentially be affected by regional population growth and associated effects on traffic flow (e.g., increased congestion). Missouri's overall population growth rate was

only about 0.5 percent from 2001 to 2010, and about 0.3 percent from 2011 to 2016 (Missouri DOT, 2018). The projected growth rate through 2040 is below 0.3 percent. However, population growth in the Kansas City metropolitan planning area specifically is projected to be greater, with population increases occurring primarily in suburban areas and adjacent rural areas. The population of Johnson County increased by about 2.7 percent between 2010 and 2020, while Pettis County increased by about 1.9 percent (Pioneer Trails Regional Planning Commission, 2022). Estimates of potential population growth from 2015 to 2030 are about 10 percent for both counties. The population growth rate of Knob Noster has been about 0.3 percent annually since 2010 (World Population Review, 2023). Refer to Section 3.6 (Socioeconomics) for additional information on potential population growth in the region.

Various off-base transportation improvement projects are ongoing or are being evaluated by the Missouri DOT in the vicinity of Whiteman AFB, including roadway resurfacing, lane additions, bridge improvement and replacement, and other improvements (Missouri DOT, 2022a). Impacts resulting from components of the various projects could range from relatively minor (e.g., shoulder closure or reduced speed limits) to major (e.g., lane closures or traffic rerouting). Major projects could result in decreased LOS of some roadway segments and auxiliary features. Many projects would be short term, but some activities could impact traffic operations for an extended time. It is expected that project planning would include measures to minimize adverse effects to the extent feasible. Completion of projects designed to improve operations would result in long-term beneficial impacts to the regional transportation system.

In summary, there would be no significant impacts to the on-base transportation system under the No Action Alternative. Off-base traffic operations would continue to be affected by existing congestion, population growth, and transportation improvement projects, but activities associated with Whiteman AFB would not contribute significantly to these issues.

3.13.2.2 Dyess AFB Alternative

3.13.2.2.1 Personnel

An increase in personnel associated with the B-21 beddown would result in additional vehicle use and related impacts to on-base traffic operations. The specific number of additional vehicles that would be operated on the installation is unknown but may be estimated based on an end-state increase of 695 active military personnel (excluding spouses and children), which represents an increase of approximately 15 percent over baseline conditions (Table 2.3-1). There could potentially be a similar increase in general on-base traffic volume during typical work hours.

The overall on-base road system currently functions adequately, and existing capacity of some road segments would likely accommodate the increased usage without substantial decrease in LOS. However, in at least some areas, higher traffic volume could increase traffic congestion and decrease road segment or intersection service levels and could

possibly cause some segments to operate near capacity. The potential for such effects is greater for segments and intersections that currently operate at low LOS. For example, intersection LOS at Avenue D and 4th Street is low during morning peak hours, likely due in part to drivers accessing the Child Development Center, and a personnel increase would result in more traffic near this facility.

The increased traffic volume would increase on-base congestion near the gates. The potential for impacts could be decreased by implementing the base's goal of compact and mixed use development, which is intended to encourage walking and other alternative modes of transportation (Dyess AFB, 2018a), and by implementing recommendations in the base's JLUS related to roadway capacity (Dyess AFB, 2018d). Recommendations include investigating methods to reduce congestion at the main gate, implementing staggered work shifts, and promoting alternative transportation (e.g., walking, bicycling, carpooling).

Increased personnel would also affect off-base traffic operations, including commuter traffic during peak hours, due to higher volume and potentially increased congestion. The number of vehicles that would be added to the existing traffic volume is unknown but may be notionally evaluated based on personnel demographics. It is assumed that 53.8 percent of additional military personnel would be married. Applying this percentage to the net increase in personnel (end-state) results in 277 unaccompanied and 322 married personnel. Unaccompanied personnel could contribute one vehicle to existing traffic volume at any given time. Information on vehicle use indicates that there are about two vehicles per U.S. household on average, although the number varies depending on the number and age of dependents (U.S. DOT, 2019). Therefore, for purposes of estimating changes to traffic operations, it is assumed that married personnel and their dependents could contribute two vehicles. With these factors combined, there could theoretically be a maximum end-state addition of 921 vehicles to the regional transportation system. However, the actual number of additional vehicles operated at any given time would probably be less. There would not necessarily be two vehicles associated with all additional married personnel, and it is very unlikely that all vehicles in every household would be operated simultaneously. In addition, new personnel that live on base would probably use services on the installation (e.g., community services, commercial businesses, and medical facilities) part of the time, decreasing the amount of off-base traffic volume.

Most new personnel living off base would likely reside in western or southwestern Abilene, including the Quail Hollow family housing area, while a smaller number could reside in other parts of Abilene, the city of Tye, or other communities. Therefore, although vehicle operation would potentially increase traffic throughout the Abilene region, the increase would likely be concentrated in and near the western part of the city. Some road segments in this area currently experience substantial congestion during peak hours. Areas near the base with notable congestion include Arnold Boulevard/Dub Wright Boulevard near the main gate, and Air Base Road between Dyess AFB and Tye. Existing traffic volume is approximately 23,000 to 30,000 vehicles per day on I-20 near the installation and is 6,800 and 11,000 vehicles per day on Arnold Boulevard and Dub Wright

Boulevard, respectively. In this context, increased vehicle operation associated with the beddown would probably cause minor to moderate effects on I-20 and other regional roadways, although there could at times be noticeably increased traffic volume and decreased service levels on highways and other components (e.g., intersections) near the base.

Overall, vehicles would generally be operated in different areas of the ROI at various times and would not necessarily be concentrated in any given location. However, there would be an increase in traffic volume concentrated near the base gates during peak commute hours. Assuming that 78.2 percent of new active-duty personnel (end-state) would live off base (see Section 3.6, Socioeconomics) and commute to work daily, there could be a maximum of 468 additional vehicles accessing and leaving the installation during peak hours, primarily through the main gate but also including the Tye Gate. The increase would potentially cause an increase in congestion and queuing near these points.

In summary, a personnel increase would affect on-base and off-base traffic operations differently at various locations. Impacts would potentially be noticeable in areas of concentrated operation, such as near the base gates, but would likely be less than significant overall. Management actions would decrease the magnitude of impacts.

3.13.2.2.2 Facilities and Infrastructure

On-base transportation components potentially affected by construction, demolition, and renovation activities mostly occur near the airfield in areas categorized as airfield pavement, aircraft operations and maintenance, and industrial. However, other portions of the installation, primarily including areas between 2nd Street and 4th Street, would also be affected. Activities could potentially result in shoulder, lane, or road segment closures, traffic rerouting, and reduced travel speeds. These effects could cause traffic congestion and reduced service levels, particularly during peak flow periods, and increase traffic volume on otherwise unaffected road segments. These effects could also amplify issues at intersections with existing poor service levels. However, the effects would be temporary and would cease with completion of facility and infrastructure projects. Unaffected roads could potentially accommodate rerouted traffic, and LOS would not likely be affected substantially on most parts of the base. Facilities and infrastructure projects could affect roads near the Dyess AFB Fire Department. Therefore, it is recommended that project planning include measures to ensure that response to fires, injuries, and other emergencies (e.g., fuel spills, ordnance handling issues) would not be hindered by road conditions or new road configuration.

Facilities and infrastructure projects would require delivery and removal of materials and debris, as well as base access by construction crews. Commercial vehicles would access the base at the commercial gate (Tye Gate), while crews could access the base by any gate. As a result, there would be a small increase in off-base traffic on Military Drive, Arnold Boulevard, and Dub Wright Boulevard. Areas between the commercial gate and Tye, and on Arnold Boulevard near the main gate, experience congestion during peak hours currently. Although increased use would contribute to existing congestion, the

number of vehicles involved would be relatively small, and activities would potentially occur throughout the workday (not restricted to peak hours). In addition, the effects would be temporary and would cease with completion of the projects. It is expected that heavy equipment would be kept on the installation for the duration of activities.

Overall, there would be no significant impacts due to facilities and infrastructure placement.

3.13.2.2.3 Weapons Generation Facility

On-base transportation components potentially affected by construction of the WGF and associated new road would mostly be limited to the area between Military Drive and Ammo Road. This section of the base is remote from the “downtown” Dyess area and is less heavily used in general, although a nearby segment of 3rd Street is used frequently during morning peak hour (Dyess AFB, 2018c).

Activities could result in shoulder, lane, or road segment closures, traffic rerouting, and reduced travel speeds. These effects could reduce service levels and increase traffic volume on unaffected road segments, potentially amplifying issues at intersections with existing poor service levels. The effects would be temporary and would not result in substantially reduced LOS. Unaffected roads could likely accommodate rerouted traffic. Impacts would cease with completion of construction. Activities would require delivery and removal of materials, as well as base access by construction crews, which would cause a small increase in off-base traffic on Military Drive and Arnold Boulevard due to use of the commercial gate. Although increased use would contribute to existing congestion, the number of vehicles would be small, and the effects would be temporary. Construction and operation of the new road would occur in open space and industrial areas where traffic would typically be light and would have a negligible effect on traffic in other portions of the installation.

Overall, there would be no significant impacts due to construction of the WGF and connecting road.

3.13.2.2.4 Snapshot

Overlap of B-1 and B-21 operations would result in a temporary increase of 196 active military, civilian, and contractor personnel (not including dependents), compared to the end-state associated with the B-21 beddown (see Table 2.3-1). There would be a temporary corresponding increase in on-base and off-base traffic in the ROI. Increased traffic volume would potentially affect LOS on the base and in western Abilene. The number of personnel associated with the overlap would initially be about 8 percent of the new personnel arriving at the base due to the beddown and would decrease as B-1 operations were phased out. Additional traffic caused by the overlap could be noticeable on base and in adjacent areas but would not likely affect LOS substantially in the context of overall personnel numbers.

3.13.2.2.5 Reasonably Foreseeable Future Actions and Environmental Trends

Effects on transportation consist of the combined potential effects resulting from the Dyess AFB Alternative and applicable reasonably foreseeable future actions and environmental trends described in Table 3.1-2. Potential effects would be associated with changes in traffic patterns and volume due to construction projects, and operation of additional commuter vehicles. Parking apron repair activities could potentially cause reduced travel speed near the project area, and commercial vehicles associated with the activities could cause increased traffic volume and congestion on the installation, which would contribute to similar impacts potentially resulting from the B-21 beddown. However, the effects would be short-term and would affect a small portion of the base at any given time. Additional personnel associated with the B-21 beddown would result in increased commuter vehicle operations on and in the vicinity of Dyess AFB, increasing GHG emissions in the area. As discussed in Section 3.4 (Air Quality), the increase would only represent about 0.10 percent of the current annual GHG emissions under the baseline condition. Commuters would transfer from other geographic locations to Dyess AFB. Because climate change is a global problem, it is important to note that the increase in GHG emissions in the Dyess AFB ROI could potentially be offset on a macro scale by a decrease of similar magnitude in other areas. However, climate change is a global issue and current information does not support determining the global significance of local or regional emissions of GHGs from a particular action. The Dyess AFB Alternative would not have significant impacts on transportation when combined with reasonably foreseeable future actions and environmental trends.

3.13.2.2.6 Proposed Resource-Specific Mitigations and Management Actions to Reduce the Potential for Environmental Impacts

- During construction, demolition, and renovation activities, consider scheduling commercial deliveries outside peak traffic hours and requiring all construction crews to use the commercial gate. This action would reduce the effects of commercial traffic on transportation operations and LOS on and near the base during construction, demolition, and renovation activities.
- During project planning, include measures to ensure proper emergency response ability is maintained during construction activities and after project completion. This action would eliminate the potential for construction, demolition, and renovation activities, as well as operation of new roadways, to negatively affect emergency services on the base.

3.13.2.3 Whiteman AFB Alternative (Preferred Alternative)

3.13.2.3.1 Personnel

An increase in personnel associated with the B-21 beddown would result in additional vehicle use and related impacts to on-base traffic operations. The specific number of additional vehicles that would be operated on the installation is unknown but may be estimated based on an end-state increase of 777 active military personnel, which represents

an increase of approximately 12 percent over baseline conditions (Table 2.4-1). There could theoretically be a similar increase in on-base traffic volume during typical work hours.

The overall on-base road system currently functions adequately, and existing capacity of some road segments could potentially accommodate the increased usage without substantial decrease in LOS. However, it is possible that in some areas the traffic volume would increase congestion and decrease service levels and could cause some road segments to operate closer to capacity. The increased traffic volume could potentially cause on-base congestion near the base's gates (particularly the Spirit Gate). The potential for impacts could be decreased by implementing recommendations in the base's Entry Control Facility Transportation Engineering Assessment (Whiteman AFB, 2015b). Recommendations include realigning roads, improving pedestrian systems, and upgrading or moving the base's gates. Note that modernization of the LeMay Gate is addressed in the No Action Alternative (Section 3.13.2.1.2, Transportation, Environmental Consequences, No Action at Whiteman AFB) and relocation of the Arnold Gate is addressed below in the Reasonably Foreseeable Actions & Environmental Trends (Section 3.13.2.3.5, Transportation, Environmental Consequences, Whiteman AFB Alternative, Reasonably Foreseeable Actions & Environmental Trends).

Off-base traffic operations could also be impacted. The number of vehicles that would be added to the existing traffic volume is unknown but may be notionally evaluated based on the assumption that 53.8 percent of additional military personnel would be married. Applying this percentage to the net increase in personnel (end-state) results in 214 unaccompanied and 250 married personnel. Unaccompanied personnel could contribute one vehicle to existing traffic volume at any given time. As discussed for the Dyess AFB Alternative, it is assumed that married personnel and their dependents could contribute two vehicles to the existing volume. With these factors combined, there could be a theoretical maximum end-state addition of 714 vehicles to the regional transportation system, although the actual number of additional vehicles operated at any given time would probably be less. In addition, new personnel that live on base would use services on the installation part of the time, decreasing the amount of off-base traffic volume. Most new personnel living off base would probably reside in Knob Noster or other nearby cities (e.g., Warrensburg, La Monte, Sedalia). Most future growth in Knob Noster is expected to occur north and west of the city (Whiteman AFB, 2015a). Although vehicle operation would potentially increase traffic throughout the region, the increase would mostly be concentrated in these areas. Increased traffic volume could lead to congestion and reduced LOS. Existing traffic volume is over 20,000 vehicles per day on I-70 near the base; from 10,000 to 20,000 vehicles per day on Highway 50; and from 500 to 10,000 vehicles per day on other area roadways. The number of work commuters in Warrensburg, Knob Noster, and Sedalia is about 9,600, 1,600, and 9,000, respectively. In this context, increased vehicle operation associated with the beddown would probably have minor to moderate effects on I-70, Highway 50, and most other roadways in the region. However, the beddown could cause a noticeable increase in traffic volume and decreased service levels near Knob Noster and in other areas near the base (e.g., Highway D near Whiteman AFB).

Overall, vehicles would generally be operated in different areas of the ROI at various times and would not necessarily be concentrated in any given location. However, there would be an increase in traffic volume concentrated near the base gates during peak commute hours. Assuming 67.4 percent of new active-duty personnel would live off base (see Section 3.6, Socioeconomics) and commute to work daily, there could be a maximum of 313 additional vehicles accessing and leaving the installation during peak hours. Analysis in the Whiteman AFB IDP indicates that the base's three gates currently process approximately 82 percent of peak hour capacity and could accommodate about 315 total additional vehicles (Whiteman AFB, 2015b). Therefore, although additional commuters associated with the beddown could potentially cause increased congestion and queuing near the Spirit Gate, impacts would not likely be significant.

In summary, a personnel increase would affect on-base and off-base traffic operations differently at various locations. Impacts would potentially be noticeable in areas of concentrated operation, such as near the base gates, but would likely be less than significant overall. Management actions would decrease the magnitude of impacts.

3.13.2.3.2 Facilities and Infrastructure

On-base transportation components potentially affected by facility and infrastructure projects mostly occur near the airfield in areas categorized as aircraft operations and maintenance, and industrial. However, some projects would also occur in other developed portions of the base, primarily between Arnold Avenue and Mitchell Avenue. In general, activities could potentially result in shoulder, lane, or road segment closures, traffic rerouting, and reduced travel speeds. These effects could cause traffic congestion and reduced service levels, particularly during peak flow periods, and increase traffic volume on otherwise unaffected road segments. These effects could amplify issues at intersections with existing poor service levels. However, the effects would be temporary and would cease with completion of facility and infrastructure projects. Unaffected roads could potentially accommodate rerouted traffic, and LOS would not likely be affected substantially on most parts of the base. Facilities and infrastructure projects could affect roads near the Whiteman AFB Fire Department. Therefore, it is recommended that project planning include measures to ensure that response to emergencies would not be hindered by road conditions.

There would be an increase in off-base traffic during project activities due to delivery and removal of materials and base access by construction crews. Commercial vehicles would generally use the LeMay Gate, while crews could use any gate. The activities would result in a small increase in traffic volumes on Highway 23, Highway J, and potentially other roadways near the base. Although traffic volume would increase, the number of vehicles involved would be small and would not likely affect roadway or intersection LOS substantially. Any effects would be temporary. It is anticipated that heavy equipment would be kept on the installation for the duration of activities.

Overall, there would be no significant impacts due to facilities and infrastructure placement.

3.13.2.3.3 Weapons Generation Facility

Both the North and South WGF Sites are located near the existing weapons storage site, remote from the cantonment area, and there are no nearby roadways providing regular base entry or exit. Therefore, traffic volume is expected to be low, and construction activities would have only minor direct effects on the base transportation system with little effect on LOS. Commercial traffic related to construction of the WGF, and access roads could cause congestion and reduced traffic flow, but the effects would be temporary and relatively minor. It is recommended that project planning include measures to ensure that emergency response would not be hindered by road conditions or new road configuration. Delivery and removal of materials and debris, as well as base access by construction crews, would cause a small increase in off-base traffic on Highway 23, Highway J, and potentially other roadways such as Highway D. However, the number of vehicles entering and exiting the base would be small, and any effects would be temporary. Impacts due to traffic congestion or reduced LOS would not be expected. Construction and operation of the new roads would occur in open space and industrial areas where traffic would typically be light and would have a negligible effect on traffic in other portions of the installation. Overall, there would be no significant impacts due to construction of either the North or South WGF Sites WGF.

3.13.2.3.4 Snapshot

Overlap of B-2 and B-21 operations would result in a temporary increase of 208 active military, civilian, and contractor personnel (not including dependents) compared to the end-state associated with the B-21 beddown (see Table 2.4-1). There would be a temporary corresponding increase in on-base and off-base traffic in the ROI. Increased traffic volume would potentially affect LOS on the base, in Knob Noster, and in other nearby cities (e.g., Warrensburg and Sedalia). The number of personnel associated with the overlap would initially be about 8 percent of the new personnel arriving at the base due to the beddown and would decrease as B-2 operations were phased out. Additional traffic caused by the overlap could be noticeable on base and in adjacent areas but would not likely affect LOS substantially in the context of the overall personnel numbers.

3.13.2.3.5 Reasonably Foreseeable Future Actions and Environmental Trends

Effects on transportation consist of the combined potential effects resulting from the Whiteman AFB Alternative and applicable reasonably foreseeable future actions and environmental trends described in Table 3.1-2. Potential effects would be associated with changes in traffic patterns and volume due to construction projects, and operation of additional commuter vehicles.

Surface drainage corrections would not affect overall traffic flow on the installation because the project sites are located in areas of relatively low traffic volume. Commercial vehicles associated with the drainage correction activities could cause increased traffic volume and congestion on the installation, which would contribute to similar impacts potentially resulting from the B-21 beddown. However, the effects would be short-term and would affect a small portion of the base at any given time. Relocation of the Arnold Gate, guardhouse, parking lot, and static display, as well as related road and fence construction, could affect traffic

operations near the gate and in the southern portion of Knob Noster due to road or lane closures, traffic rerouting, and lower operational speed. On-base and off-base traffic congestion and lowered LOS could occur near the existing and new gate sites. Such effects would be temporary and would cease after activities were completed. It is expected that project planning would include measures to minimize adverse effects on traffic operations. Depending on the location of project components relative to existing roadways, construction of the new gate and related features could potentially occur with minimal effects on existing traffic operations. Additional personnel associated with the B-21 beddown would result in increased commuter vehicle operations on and in the vicinity of Whiteman AFB, increasing GHG emissions in the area. As discussed in Section 3.4 (Air Quality), the increase would represent about 0.20 percent of the current annual GHG emissions under the baseline condition. Commuters would transfer from other geographic locations to Whiteman AFB. Because climate change is a global problem, it is important to note that the increase in GHG emissions in the Whiteman AFB ROI could potentially be offset on a macro scale by a decrease of similar magnitude in other areas. However, climate change is a global issue and current information does not support determining the global significance of local or regional emissions of GHGs from a particular action. The Whiteman AFB Alternative would not have significant impacts on transportation when combined with reasonably foreseeable future actions and environmental trends.

3.13.2.3.6 Proposed Resource-Specific Mitigations and Management Actions to Reduce the Potential for Environmental Impacts

- If necessary, identify measures to decrease on-base and off-base traffic congestion and queuing during relocation of the Arnold Gate and construction of associated components. This action would reduce the effects on LOS, both on base and off base, that could potentially result from relocation and construction activities.
- During construction, demolition, and renovation activities, consider scheduling commercial deliveries outside peak traffic hours and requiring all construction crews to use the commercial gate. This action would reduce the effects of commercial traffic on transportation operations and LOS on and near the base during construction, demolition, and renovation activities.
- During project planning, include measures to ensure proper emergency response ability is maintained during construction activities and after project completion. This action would eliminate the potential for construction, demolition, and renovation activities, as well as operation of new roadways, to negatively affect emergency services on the base.

3.14 UTILITIES AND INFRASTRUCTURE

3.14.1 Utilities and Infrastructure, Affected Environment

3.14.1.1 Description of Resource

The utilities described and analyzed for potential impacts resulting from the beddown of the B-21 MOB 2 include potable water, wastewater, electricity, and natural gas. The description of each utility focuses on the existing infrastructure, current utility use, and any pre-defined capacity or limitations as set forth in permits or regulations.

Potable Water

Potable water is safe to consume because it either comes from an uncontaminated aquifer (an underground layer of porous rock containing water) or it has been pre-treated to eliminate contaminants that would potentially cause illness in humans.

Wastewater

Wastewater is water that has been used and contains dissolved or suspended waste materials. The waste materials include a wide variety of pollutants such as human excreta, food waste, soaps, detergents, and other cleaning materials. Before the wastewater can be released into waterways, it is treated at wastewater treatment plants to get rid of the pollutants.

Electricity

Electricity is a form of energy typically supplied to homes and businesses by the electric power industry. Electricity is distributed by aboveground or underground wires to supply power to resources such as lighting, heating, air conditioning, and machinery. Electricity is commonly measured in kilowatt hours.

Natural Gas

Natural gas is a non-renewable hydrocarbon found in deep underground rock formations. It is often used as a source of energy for heating and cooking, as well as electricity generation. Consumption of natural gas is typically measured in cubic feet.

3.14.1.2 Region of Influence

The ROI for utilities consists of the areas within and adjacent to the installations that may be directly or indirectly affected by components of the Proposed Action (e.g., construction activities, utilities consumption). Off-base areas could be affected if, for example, local

utilities supplying service to either base were impacted by increased usage from the Proposed Action.

Airfield operations and airspace and range utilization would not directly impact utilities or infrastructure under any of the MOAs or ATCAAs associated with the Dyess AFB and Whiteman AFB Alternatives and therefore are not discussed further.

3.14.1.2.1 Dyess AFB

Potable Water

Potable water is supplied to Dyess AFB by the City of Abilene. There are no aquifers of regional significance in the area; therefore, the primary source of potable water is Fort Phantom Hill Lake, with the O.H. Ivie Reservoir and Hubbard Creek Lake as alternate sources. Dyess AFB has a contract with the City of Abilene to receive up to 5 million gallons per day (MGD) (Dyess AFB, 2018a); however, the maximum capacity that can be supplied to the base is 416,000 gpd. The capacity is limited by system design rather than permits; the water mains on base consist of 6- to 12-inch diameter pipes, where the city line is actually 16 inches in diameter (Ford et al., 2019). Based on annual water usage for CY 2022 (131,840,320 gallons), average daily usage at the installation is approximately 361,206 gallons, leaving sufficient capacity for growth (Lau, 2023). If more capacity is needed in the future, the base could increase the size of the water lines (Ford et al., 2019).

On-base water storage totals 1.28 million gallons and consists of a 500,000-gallon elevated tank and two smaller, ground-level storage tanks (25,000-gallon clear well tank and 755,000-gallon ground storage tank). Non-potable water is used for hangar fire protection and irrigation and is stored in individual tanks and in retention ponds, respectively (Dyess AFB, 2018a).

The potable water system main lines extend throughout most of the main cantonment area and flightline area; however, the system does not currently serve Avenue A (the northern portion of 5th Avenue) and the portion of 4th Avenue located north of the Temporary Lodging Facility (Figure 3.14-1). Any new construction in these areas would require extension of the potable water system (Dyess AFB, 2018a).

A major water main replacement project has been completed to replace the original 1957 asbestos-cement pipe. A water tower renovation project has also been recently accomplished. These efforts will improve water use on the base (Dyess AFB, 2018a; Downing, 2020).

Wastewater

Domestic and industrial wastewater at Dyess AFB is discharged to the City of Abilene's Hamby Wastewater Treatment Plant in Hamby, Texas; there are no septic systems in use on the installation. The wastewater system is a gravity collection system and covers most of the main cantonment area and flightline area, with a central main running from west to east across the installation. As with the potable water system, however, some northern

portions of the installation (Avenue A, the northern portion of 5th Avenue, and the portion of 4th Avenue located north of the Temporary Lodging Facility) have minimal coverage (Figure 3.14-1). Dyess AFB is permitted to discharge 3 MGD but typically discharges 0.3 to 1.8 MGD (Dyess AFB, 2018a).

Electricity

Electricity is supplied to Dyess AFB by American Electric Power via two 69-kilovolt (kV) feeders that serve three on-base substations. Electrical system capacity at Dyess AFB is 40.43 megavolt amperes (mVA) (Dyess AFB, 2018a), or approximately 354 million kilowatt-hours (kWh). Systematic improvements to the grid structure have been made within the last 20 years to include conversion of more than 20,000 light fixtures to light-emitting diodes in FY 2020 through FY 2022, to include airfield ramp lights (Ford et al., 2019; Denslow, 2022; Lau, 2023). As a result of improvements, electricity usage has been trending downward over the past 5 years, with a peak annual usage of 64,130,400 kWh (approximately 7 mVA) in FY 2018 to 55,053,600 kWh (approximately 6 mVA) in FY 2021 (Denslow, 2022). These energy efficient improvements have led to a capacity that would allow for future growth. Some areas of the base (along Avenue A—between 3rd Avenue and 4th Avenue, and the north portion of 5th Avenue) are not serviced by a primary line and would require extension of the primary electrical system (Figure 3.14-1) (Dyess AFB, 2018a).

There is a current project to repair the base electrical distribution system as part of the Energy Savings Performance Contract (Dyess AFB, 2020b; Ford et al., 2019). Additionally, upgrades to the Charlie substation have recently been completed and has a minimum 4-megawatt (MW) capacity, further increasing capacity for future growth (Lau, 2023).

Natural Gas

Natural gas is provided and distributed throughout Dyess AFB by Atmos Energy Corporation via more than 47 miles of recently upgraded polyethylene transmission lines. Areas not serviced by a natural gas main include the area along Avenue A (between 3rd Avenue and 4th Avenue), the north portion of 5th Avenue, and along Avenue E. Access to natural gas in these areas would require extension of the natural gas distribution system (Figure 3.14-1). As of 2018, natural gas capacity at Dyess AFB is 3,000,000 cubic feet per day (expressed as 3,000 MCF, where MCF equals thousands of cubic feet per day) (Dyess AFB, 2018a). The average consumption rate from FY 2018 to FY 2022 was only 458 MCF per day, leaving approximately 85 percent capacity available (Lau, 2023).

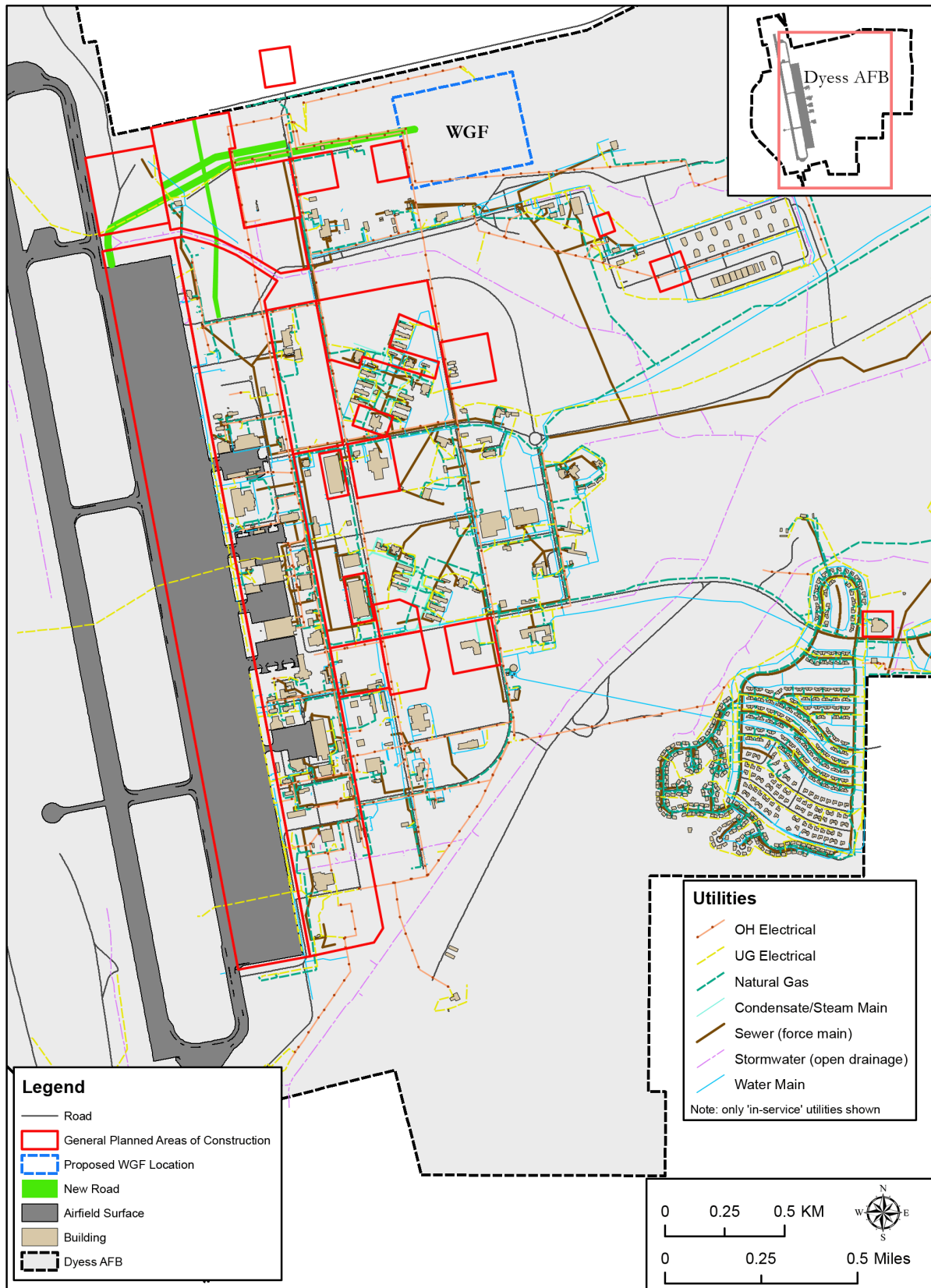


Figure 3.14-1. Dyess AFB Utilities

3.14.1.2.2 Whiteman AFB

Potable Water

Potable water is supplied to Whiteman AFB from the Whiteman AFB Water Treatment Plant, which obtains its water from the Ozark Aquifer via nine ground water wells located on base (Whiteman AFB, 2020b). The water distribution system runs throughout all areas of the base and portions of the flightline (Figure 3.14-2). Approximately 9,000 linear feet of cast iron water main lines are being replaced (Whiteman AFB, 2022a).

According to Whiteman AFB's IDP, the base has an overall water supply system capacity of 2.6 MGD (Whiteman AFB, 2015b). The Major Water Use Report shows that water well production for Whiteman AFB in 2022 was 198,019,900 gallons, with only 542,520 gallons used daily (MDNR, 2023); this equates to only 27 percent of the water supply capacity being used, leaving sufficient capacity for growth.

Wastewater

Domestic and industrial wastewater at Whiteman AFB is treated at an on-base Waste Water Treatment Plant (WWTP). The WWTP has been issued a Missouri State Operating Permit (MO-0029378) to discharge effluent via an outfall into Brewer Branch Creek. All treated effluent from the WWTP is either discharged to the permitted outfall (#001) or to the golf course for land application (Whiteman AFB, 2020c). The wastewater system covers all areas of the base (Figure 3.14-2). Whiteman AFB is permitted to discharge 2.19 MGD, but only discharges about 0.55 MGD, only using approximately 25 percent of the capacity (MDNR, 2017).

Electricity

Electricity is supplied to Whiteman AFB by Evergy (previously Kansas City Power and Light) via two separate feeds (Sedalia and Warrensburg) from two 30-MW substations (Whiteman AFB, 2015b). Energy consumption data provided for FY 2018 through FY 2022 shows an annual average usage of 82.9 million kWh (Whiteman AFB, 2021d; Allen, 2023). The IDP shows that Whiteman AFB has an electrical distribution system capacity of approximately 526 million kWh annually, leaving about 84 percent capacity for growth (Whiteman AFB, 2015b). In addition, a 10 MW Combined Heat and Power Plant will be constructed in close proximity to the existing main substation. The new plant would be able to service the entire base (Whiteman AFB, 2022a).

Natural Gas

Natural gas is provided and distributed throughout Whiteman AFB by Missouri Gas Co. through approximately 174,000 linear feet of distribution lines (Whiteman AFB, 2015b). Natural gas is primarily used for heating facilities and water at Whiteman AFB. Energy consumption data provided for FY 2018 through FY 2022 shows an annual average consumption rate of 374,015 MCF or 1,025 MCF per day (Whiteman AFB, 2021d; Allen, 2023). Natural gas capacity at Whiteman AFB is 26,050 MCF per day, leaving approximately 96 percent capacity available for growth (Whiteman AFB, 2015b).

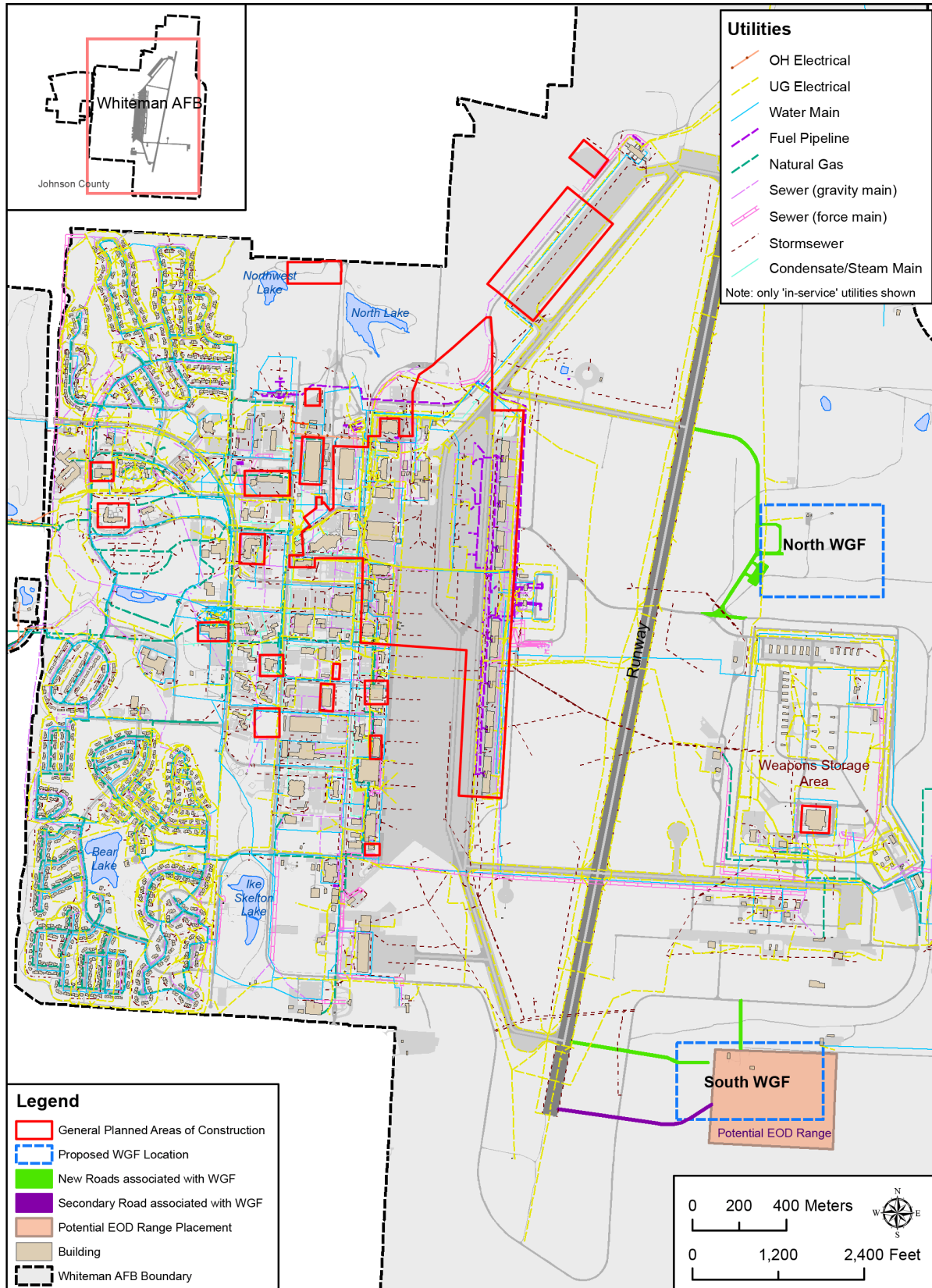


Figure 3.14-2. Whiteman AFB Utilities

3.14.1.3 Analysis Methodology

In general, analysis of impacts to utilities and infrastructure is conducted by comparing the amount of the utility currently being used, regulatory limitations on consumption, and how implementation of each alternative would affect those factors.

Potable Water

The methodology used to estimate potable water use is based on the number of personnel expected to be affiliated with the B-21 mission. Estimated potable water use is determined by calculating the percent increase in personnel at each base and comparing that against the total percent capacity available for each potable water system. The increase in personnel at each base is determined by adding the number of personnel associated with the Proposed Action (5,610) to the baseline numbers for each base (11,862 at Dyess AFB and 19,408 at Whiteman AFB), and then subtracting the number of personnel associated with the B-1 mission and B-2 mission at each base, respectively. Table 2.3-1 and Table 2.4-1 provide the end-state personnel numbers for Dyess AFB and Whiteman AFB, respectively, which includes the addition of B-21 personnel and projected decrease of B-1 and B-2 personnel. The resulting net increase of personnel at Dyess AFB and Whiteman AFB would be 1,318 (11 percent) and 1,021 (5 percent), respectively.

Wastewater

The methodology used to estimate wastewater rates pertaining to the B-21 mission is based on general wastewater quantity guidance found in *Civil Engineering Reference Manual for the PE Exam* (Lindeburg, 1999). According to this guidance, approximately 70 to 80 percent of a domestic/industrial water supply for a community is discharged as wastewater, either to a sanitary or storm sewer system (Lindeburg, 1999). To be conservative, wastewater discharge estimates for both Dyess AFB and Whiteman AFB are calculated using the assumption that 80 percent of the estimated potable water usage associated with the Proposed Action at each base will be discharged to the respective wastewater treatment system. It is important to note that the overall wastewater discharge rate for a facility usually represents a combination of sources; water other than sanitary can flow into the system from surface runoff, cross connections between storm and sanitary sewers, ground water, and other miscellaneous sources. This analysis focuses only on the increase in wastewater directly related to the increase in potable water usage.

The estimated rates of wastewater discharge are then compared to the permitted wastewater treatment system capacity for each base to determine if each system would be sufficient to support the estimated increase in wastewater discharge. If the amount of wastewater estimated causes the permitted capacity to be exceeded, potentially adverse wastewater discharge impacts could result. To accommodate the additional wastewater and achieve discharge standards, permit adjustments coordinated with the provider could be made.

In addition to the water supplied to the base daily, there is also on-base water storage that can contribute to the wastewater rate.

Electricity and Natural Gas

The context and intensity for the proposed B-21 mission is used to quantify potential consequences upon electricity and natural gas resources. Current consumption of electricity was compared to the capacity to generate electricity at both Dyess and Whiteman AFB. The natural gas infrastructure capability was considered by comparing the current capacity at each base against the current level of natural gas consumed. A large amount of excess natural gas capacity currently exists at both bases.

3.14.2 Utilities and Infrastructure, Environmental Consequences

3.14.2.1 No Action Alternative Consequences

3.14.2.1.1 No Action at Dyess AFB

Under the No Action Alternative, the B-21 would not beddown at Dyess AFB and would not require the use of existing utilities or the establishment of new utilities in areas on base currently without utilities. The existing conditions discussed in Section 3.14.1.2 (Utilities and Infrastructure, Affected Environment, Region of Influence) describe the current state of utilities, which would continue under the No Action Alternative.

Potable Water

The average potable water usage rate at Dyess AFB over the past 5 years has shown a slight decrease, with a maximum average of 515,000 gpd in CY 2018 to a minimum average of 361,000 gpd in both CY 2021 and CY 2022 (Denslow, 2022; Lau, 2023). Assuming this trend in the usage rate would continue, ongoing C&D activities, including the new Community Center Complex, are not expected to significantly increase usage rates or reduce current capacity. Therefore, annual water usage is not anticipated to increase under the No Action Alternative and remaining capacity is expected to continue at approximately 88 percent. Additionally, the water main replacement and water tower renovation projects would further improve water use on the base.

Wastewater

Based on the assumption that the potable water usage rate would remain steady under the No Action Alternative, wastewater usage would also be expected to remain the same. There would be no anticipated increases in annual wastewater discharge that would exceed the current permitted capacity under the No Action Alternative.

Electricity and Natural Gas

According to historical facility metering data, annual average demands for electricity have decreased from FY 2017 to FY 2021 on Dyess AFB (Denslow, 2022). Assuming this trend would continue, ongoing C&D activities, including the new Community Center Complex, are not expected to significantly increase usage rates or exceed the capacity of the electrical distribution system. Therefore, remaining electrical capacity is expected to remain around 84 percent under the No Action Alternative. Additionally, ongoing

repairs to the base electrical distribution system and upgrades to the Charlie substation would further increase capacity.

Based on data provided for potable water usage (Denslow, 2022; Lau, 2023), there does not appear to be a significant increase in personnel at Dyess AFB over the past 5 years. Population is not expected to increase with respect to ongoing C&D activities, including the new Community Center Complex. Since population is expected to remain steady, natural gas usage would also be expected to stay the same under the No Action Alternative. Therefore, remaining natural gas capacity is expected to remain at approximately 85 percent under the No Action Alternative.

3.14.2.1.2 No Action at Whiteman AFB

Under the No Action Alternative, the B-21 would not be beddown at Whiteman AFB, and therefore, would not require the use of existing utilities. The existing conditions discussed in Section 3.14.1.2 (Utilities and Infrastructure, Affected Environment, Region of Influence) describe the current state of utilities, which would continue under the No Action Alternative.

Potable Water

The average potable water usage rate at Whiteman AFB between FY 2018 and FY 2022 has shown a slight decrease, with a maximum average of 519,000 gpd in FY 2020 to a minimum average of 477,000 gpd in FY 2018 (Whiteman AFB, 2021d). Assuming this usage rate would remain steady, there would be no anticipated increase in the annual water usage under the No Action Alternative.

Wastewater

Based on the assumption that the potable water usage rate would not increase under the No Action Alternative, wastewater usage would also be expected to remain steady. There would be no anticipated increase in annual wastewater discharge under the No Action Alternative.

Electricity and Natural Gas

According to historical energy consumption data, annual average demands for electricity have remained steady from FY 2018 to FY 2022 on Whiteman AFB (Whiteman AFB, 2021d). Assuming this trend would continue, there would be no expected increases in electricity usage under the No Action Alternative and remaining capacity would continue at approximately 84 percent. Additionally, the construction of the 10 MW Combined Heat and Power Plant would provide additional capacity to the base, resulting in positive impacts.

Natural gas usage has increased 16 percent over the 5-year span of FY 2018 to FY 2022 (343,427 MCF to 399,227 MCF), with the largest increase occurring between FY 2020 and FY 2021 (14 percent, 356,783 MCF to 415,009 MCF). However, usage decreased between FY 2021 and FY 2022 by 4 percent. Assuming this trend would continue, a slight decrease in natural gas usage would be expected under the No Action Alternative;

however, natural gas capacity at Whiteman AFB is 26,050 MCF per day, leaving approximately 96 percent capacity for growth.

3.14.2.2 Dyess AFB Alternative

The Proposed Action to beddown the B-21 MOB 2 at Dyess AFB would result in a 11 percent increase in personnel (see Table 2.3-1). For this reason, utility usage would be expected to increase based on the proposed changes. The existing conditions discussed in Section 3.14.1.2 (Utilities and Infrastructure, Affected Environment, Region of Influence) describe the current state of utilities, which serve as the baseline for the analysis under the Proposed Action.

3.14.2.2.1 Personnel

Potable Water

Potable water usage and capacity is based on personnel; an explanation of potable water estimates is provided in Section 3.5.1.3 (Utilities and Infrastructure, Affected Environment, Analysis Methodology, Potable Water). As discussed in Section 3.14.1.2.1 (Utilities and Infrastructure, Affected Environment, Region of Influence, Dyess AFB), Dyess AFB currently uses 131,840,000 gallons of water annually, approximately 361,200 gpd. Based on projected personnel increase associated with the B-21 MOB 2 beddown and the current estimated daily usage, water usage would be expected to increase to approximately 401,340 gpd or 146 million gallons per year.

The current water supply capacity at Dyess AFB is more than sufficient to support the increased growth associated with the B-21 MOB 2 beddown (see Section 3.14.1.2.1, Utilities and Infrastructure, Affected Environment, Region of Influence, Dyess AFB). Because the additional potable water requirements would not exceed the contracted limits of 5 MGD or system design capacity of 416,000 gpd, it is expected that there would be no adverse impacts on the potable water system as a result of the Dyess AFB Proposed Action.

Wastewater

For this analysis, wastewater rates are proportional to water supply, which is determined based on personnel. An explanation of wastewater estimates is provided in Section 3.5.1.3 (Utilities and Infrastructure, Affected Environment, Analysis Methodology, Wastewater). As discussed in Section 3.14.1.2.1 (Utilities and Infrastructure, Affected Environment, Region of Influence, Dyess AFB), Dyess AFB currently discharges between 0.3 and 1.8 MGD of wastewater. Based on the methodology described in Section 3.14.1.3 (Utilities and Infrastructure, Affected Environment, Analysis Methodology), 80 percent of the current estimated potable water supply is 288,800 gpd. The difference between the calculated wastewater rate associated with the potable water supply and the total wastewater discharge rate received by the municipal collection system is an estimated 11,000 gallons to 1.5 MGD.

Based on the projected increase in water usage associated with the B-21 MOB 2 beddown (401,100 gpd), wastewater rates specifically associated with the increased potable water supply would be estimated at 320,880 gpd. To determine the total wastewater discharge rate (to include other potential wastewater sources), the 320,880 gallons is added to the calculated difference (11,000 gallons to 1.5 MGD), resulting in an estimated rate that remains between 0.3 to 1.8 MGD. The current permitted wastewater discharge capacity allowed by the receiving wastewater treatment plant is 3 MGD; therefore, there would be sufficient capacity to support the increased growth associated with the B-21 MOB 2 beddown (see Section 3.14.1.2.1, Utilities and Infrastructure, Affected Environment, Region of Influence, Dyess AFB). Because the additional wastewater discharge requirements would not exceed the permit limits of 3 MGD, it is expected that there would be no adverse impacts on the wastewater system as a result of the Dyess AFB Alternative.

Electricity and Natural Gas

Based on the current average usage (see Section 3.14.1.2.1, Utilities and Infrastructure, Affected Environment, Region of Influence, Dyess AFB) and the number of personnel under the No Action Alternative, it is estimated that each person uses approximately 0.0005 mVA, or 2,800 kWh. Under the Proposed Action, it is estimated that the base would support an additional 1,318 personnel (Table 2.3-1), which would equate to an additional 0.659 mVA, or 2.9 million kWh, of usage. As a result, total average usage of electricity under the Proposed Action would be estimated at 7 mVA (58.9 million kWh), which approximately 16 percent of the electrical system capacity of 40.43 mVA (354 million kWh). The base electrical distribution system repairs and recent upgrades to the Charlie substation would further increase capacity; therefore, there would be no adverse impacts on the electrical system as a result of the Dyess AFB Alternative.

Based on FY 2022 usage, it is estimated that each person at Dyess AFB uses 0.04 MCF of natural gas per day on average for a total of 448 MCF per day. The increase of personnel under the Proposed Action would increase the natural gas requirement by an estimated 60 MCF per day, for a total usage of 508 MCF per day. As described in Section 3.14.1.2.1 (Utilities and Infrastructure, Affected Environment, Region of Influence, Dyess AFB), there is ample capacity for the increase in natural gas usage under the Proposed Action (3,000 MCF per day). There would be no adverse impacts on the natural gas supply at Dyess AFB.

3.14.2.2.2 Facilities and Infrastructure

There would be a number of new facilities constructed to support the B-21 MOB 2 beddown at Dyess AFB. See Table 2.3-4 for a list of the facilities proposed for C&D under the Proposed Action. Impacts to utilities have been calculated based on personnel numbers and are addressed in Section 3.14.2.2.1 (Utilities and Infrastructure, Environmental Consequences, Dyess AFB Alternative, Personnel) above.

3.14.2.2.3 Weapons Generation Facility

Construction of the WGF would have minimal impact on utilities usage at Dyess AFB. As addressed in Section 3.14.2.2.1 (Utilities and Infrastructure, Environmental Consequences, Dyess AFB Alternative, Personnel) and Section 3.14.2.2.2 (Utilities and Infrastructure, Environmental Consequences, Dyess AFB Alternative, Facilities and Infrastructure), there is ample available capacity in regard to potable water, wastewater, electricity, and natural gas systems at Dyess AFB. As depicted in (Figure 3.14-1), extension of the natural gas, potable water, and wastewater systems may be required for the proposed WGF location; however, extensions of these systems would not impact overall capacity. There would be no adverse impacts anticipated in relation to utilities as a result of the WGF construction.

3.14.2.2.4 Snapshot

Under the snapshot scenario, the number of personnel located at Dyess AFB would increase over the No Action Alternative by 1,747 persons (see Table 2.3-1). Under this scenario, the potential impacts associated with this snapshot analysis would be similar to those presented in Section 3.14.2.2.1 (Utilities and Infrastructure, Environmental Consequences, Dyess AFB Alternative, Personnel). During the transition, there would be a slight, but temporary, increase in personnel (429 persons) over the end-state Proposed Action. The temporary increase would be minute (approximately 3 percent) when compared to the available utility capacity described under the current baseline conditions (see Section 3.14.1.2.1, Utilities and Infrastructure, Affected Environment, Region of Influence, Dyess AFB).

3.14.2.2.5 Reasonably Foreseeable Actions and Environmental Trends

There are no reasonably foreseeable actions that would impact utility usage or capacity under the Dyess AFB Alternative. With regard to environmental trends, climate change and potential population growth could increase the demand on utilities. However, all utilities at Dyess AFB have over 80 percent remaining capacity and would be able to support increases in usage for the foreseeable future.

3.14.2.2.6 Proposed Resource-Specific Mitigations and Management Actions to Reduce the Potential for Environmental Impacts

No utilities and infrastructure mitigations are proposed specific to the B-21 MOB 2 beddown at Dyess AFB.

3.14.2.3 Whiteman AFB Alternative (Preferred Alternative)

The Proposed Action to beddown the B-21 MOB at Whiteman AFB would result in a 5 percent increase in personnel (Table 2.4-1). For this reason, utility usage would be expected to increase based on the proposed changes. The existing conditions discussed in Section 3.14.1.2 (Utilities and Infrastructure, Affected Environment, Region of

Influence) describe the current state of utilities, which serve as the baseline for the analysis under the Proposed Action.

3.14.2.3.1 Personnel

Potable Water

Potable water usage and capacity is based on personnel; an explanation of potable water estimates is provided in Section 3.14.1.3 (Utilities and Infrastructure, Affected Environment, Analysis Methodology, Potable Water). As discussed in Section 3.14.1.2.2 (Utilities and Infrastructure, Affected Environment, Region of Influence, Whiteman AFB), Whiteman AFB currently uses approximately 542,520 gpd on average, which is an estimated 198 million gallons per year. Based on the projected personnel increase associated with the B-21 MOB 2 beddown and the current estimated daily usage, water usage would be expected to increase to approximately 571,000 gpd or 208 million gallons per year.

The current water supply capacity at Whiteman AFB is more than sufficient to support the increased growth associated with the B-21 MOB 2 beddown (see Section 3.14.1.2.2, Utilities and Infrastructure, Affected Environment, Region of Influence, Whiteman AFB). Because the additional potable water requirements would not exceed the water supply capacity of 949 million gallons per year, it is expected that there would be no adverse impacts on the potable water system as a result of the Whiteman AFB Alternative.

Wastewater

For this analysis, wastewater rates are proportional to water supply, which is determined based on personnel; an explanation of wastewater estimates is provided in Section 3.14.1.3 (Utilities and Infrastructure, Affected Environment, Analysis Methodology, Wastewater). As discussed in Section 3.14.1.2.2 (Utilities and Infrastructure, Affected Environment, Region of Influence, Whiteman AFB), Whiteman AFB currently discharges approximately 0.55 MGD of wastewater. Based on the methodology described in Section 3.14.1.3 (Utilities and Infrastructure, Affected Environment, Analysis Methodology), 80 percent of the current estimated potable water supply is 424,000 gpd. The difference between the calculated wastewater rate associated with the potable water supply and the total wastewater discharge rate received by the wastewater treatment facility is 126,000 gpd.

Based on the projected increase in water usage associated with the B-21 MOB 2 beddown (571,000 gpd), estimated wastewater rates specifically associated with the increased potable water supply would be approximately 456,800 gpd. To determine the total wastewater discharge rate (to include other potential wastewater sources), the 456,800 gallons is added to the calculated difference (126,000 gpd) for an estimated rate of 582,800 gpd. The current permitted wastewater discharge capacity allowed by the receiving wastewater treatment plant is 2.19 MGD; therefore, there would be sufficient capacity to support the increased growth associated with the B-21 MOB 2 beddown (see Section 3.14.1.2.2, Utilities and Infrastructure, Affected Environment, Region of Influence, Whiteman AFB). Because the additional wastewater discharge requirements would not

exceed the permit limits of 2.19 MGD, it is expected that there would be no adverse impacts on the wastewater system as a result of the Whiteman AFB Alternative.

Electricity and Natural Gas

Based on the current average usage (see Section 3.14.1.2.2, Utilities and Infrastructure, Affected Environment, Region of Influence, Whiteman AFB) and the number of personnel under the No Action Alternative, it is estimated that each person uses approximately 4,290 kWh per year. Under the Proposed Action, it is estimated that the base would support an additional 1,021 personnel (Table 2.4-1), which would equate to an additional 4.4 million kWh annually. As a result, total average usage of electricity under the Proposed Action would be estimated at 87.6 million kWh (or 27 percent capacity), leaving 73 percent capacity available for ongoing construction activities and additional growth under the Whiteman AFB Alternative. Additionally, the construction of the 10 MW Combined Heat and Power Plant would provide additional capacity to the base, resulting in positive impacts.

Using the same method for calculating natural gas usage and based on FY 2020 energy consumption (Whiteman AFB, 2021d), it is estimated that each person uses 0.05 MCF per day on average. Based on the increase of personnel under the Proposed Action, the natural gas requirement would increase by an estimated 58 MCF per day, for a total usage of 1,151 MCF per day. Although there are some ongoing construction activities occurring at Whiteman AFB, as described in Section 3.14.1.2.2 (Utilities and Infrastructure, Affected Environment, Region of Influence, Whiteman AFB), there is ample capacity for the increase in natural gas usage under the Proposed Action (approximately 24,899 MCF per day). Therefore, there would be no adverse impacts on the natural gas supply at Whiteman AFB.

3.14.2.3.2 Facilities and Infrastructure

There would be a number of new facilities constructed to support the B-21 MOB 2 beddown at Whiteman AFB. See Table 2.4-4 for a list of the facilities proposed for C&D under the Proposed Action. Impacts to utilities have been calculated based on personnel numbers and are addressed in Section 3.14.2.3.1 (Utilities and Infrastructure, Environmental Consequences, Whiteman AFB Alternative, Personnel) above.

3.14.2.3.3 Weapons Generation Facility

Construction of the WGF at either the North or South WGF site would have minimal impact on utilities usage at Whiteman AFB. As addressed in Section 3.14.2.3.1 (Utilities and Infrastructure, Environmental Consequences, Whiteman AFB Alternative, Personnel) and Section 3.14.2.3.2 (Utilities and Infrastructure, Environmental Consequences, Whiteman AFB Alternative, Facilities and Infrastructure), there is ample available capacity in regard to potable water, wastewater, electricity, and natural gas systems. However, selection of either site may require extension of the natural gas, potable water, and wastewater systems. See Figure 3.14-2 for depiction of the utility lines in relation to the proposed site. There would be no adverse impacts anticipated in relation to utilities as a result of the WGF construction.

3.14.2.3.4 Snapshot

Under the snapshot scenario, the number of personnel located at Whiteman AFB would increase over the No Action Alternative by 1,480 persons (see Table 2.4-1). Under this scenario, the potential impacts associated with this snapshot analysis would be similar to those presented in Section 3.14.2.3 (Utilities and Infrastructure, Environmental Consequences, Whiteman AFB Alternative). During the transition, there would be a slight, but temporary, increase in personnel (459 persons) over the end-state Proposed Action. The temporary increase would be minute (approximately 2 percent) when compared to the available utility capacity described under the current conditions (see Section 3.14.1.2.2, Utilities and Infrastructure, Affected Environment, Region of Influence, Whiteman AFB).

3.14.2.3.5 Reasonably Foreseeable Actions and Environmental Trends

There are no reasonably foreseeable actions that would impact utility usage or capacity under the Whiteman AFB Alternative. With regard to environmental trends, climate change and potential population growth could increase the demand on utilities. However, all utilities at Whiteman AFB have over 70 percent remaining capacity and would be able to support increases in usage for the foreseeable future.

3.14.2.3.6 Proposed Resource-Specific Mitigations and Management Actions to Reduce the Potential for Environmental Impacts

No utility and infrastructure mitigations are proposed specific to the B-21 MOB 2 beddown at Whiteman AFB.

This page is intentionally blank.

4. SUBMITTED ALTERNATIVES, INFORMATION, AND ANALYSES

4.1 INTRODUCTION

NEPA and the DAF's implementing regulations require the lead agency (in this case, the DAF) to seek public participation throughout the environmental impact analysis process. While public comments can be submitted throughout the EIS process, the DAF conducted a public scoping period from March 27 to May 10, 2023 (see Section 4.2, Public Scoping Summary) and a Draft EIS review period from November 9, 2023, through January 5, 2024 (see Section 4.3, Draft EIS Review Period Summary). Public comments were submitted at public scoping meetings and hearings, and via the project website, e-mail, or standard mail. To capture the public concerns regarding the B-21 MOB 2 EIS, the DAF reviewed each comment letter for content. Key issues identified in substantive comments were identified, summarized, and categorized by topic.

Substantive comments are those comments that help shape the EIS alternatives and analyses. Non-substantive comments, which include comments "voting" for or against an alternative, were not considered in the EIS. Since some commenters did not provide substantive comments and other commenters may have addressed more than one issue, the number of comments does not necessarily equal the number of comment letters received. Additionally, some individual issues may be categorized under multiple topics to ensure that comments were considered for all relevant topic areas.

4.2 PUBLIC SCOPING SUMMARY

"Scoping" identifies potential issues and alternatives early in the NEPA development process. The DAF filed a Notice of Intent (NOI) to prepare an EIS and host public scoping meetings. The NOI was published in the Federal Register on March 27, 2023 (88 Federal Register 18128) (see Appendix A, Public Involvement). Additionally, the DAF notified in writing local, state, and federal agencies and tribes of the intent to prepare an EIS and host public scoping meetings. In Volume 2 of the B-21 MOB 2 EIS, Section A.2 (Mailing Lists) provides a list of these contacts and Section A.3 (Scoping Letter) provides a copy of the letters mailed.

The DAF held six scoping meetings in 2023: virtual meetings on April 11 and 13; in Missouri on April 18 and 20; and in Texas on April 25 and 27. Public meeting notifications were also published in the *Abilene News Reporter* on March 26, April 9, April 16, and April 23, 2023; the *Warrensburg Star-Journal* on March 31 and April 14, 2023; the *Sedalia Democrat* on April 1 and April 15, 2023; the *Native Sun News* on March 29 and April 12, 2023; and the *Indian Country Today* on March 30 and April 13, 2023.

In addition to the scoping meetings, the DAF published all public scoping meeting materials on the project website at www.B21EIS.com on March 23, 2023. Scoping materials included an 8-page brochure, 12 large informational displays, 4 small

informational displays, the scoping presentation, community flyer, and a mail-in comment form. Scoping comments could be submitted via the public website or by mail by May 10, 2023, to be included in the Draft EIS. In addition to providing information on how to provide scoping comments, the scoping materials also provided interested persons with an overview of the following:

- NEPA
- The environmental resources being studied in the EIS
- The background of the project
- The purpose of and need for the Proposed Action
- The elements of the Proposed Action
- The Dyess AFB Alternative
- The Whiteman AFB Alternative
- The No Action Alternative
- The anticipated milestone schedule

A total of 19 individuals, tribes, organizations, and agencies submitted comments during the scoping period. Five substantive comments were received during the scoping period and are summarized by resource topic below. Copies of letters with substantive comments are included in Section A.4 (Public Scoping Substantive Comment Letters) of Volume 2 of the B-21 MOB 2 EIS.

4.2.1 Substantive Scoping Comments Summary

Description of Proposed Action and Alternatives

One commenter asked if the proximity of Dyess AFB to the Abilene Regional Airport is given consideration and weight related to the distance to the nearest air carrier airport to Whiteman with regards to quality of life for airmen/officers traveling, and more carbon emissions traveling to a distant airport.

Another commenter raised concerns with regard to the potential ability for aircraft to be seen on Google maps and asked if the DAF could utilize some kind of concealment or covering to hide the number of aircraft stationed at either base.

Biological Resources

The TPWD recommended reviewing the most current list of rare, threatened, and endangered species for Taylor County, Texas, and evaluating potential impacts from the proposed project activities to rare, threatened, and endangered species in the EIS.

Socioeconomics

One comment provided a list of housing statistics in the Abilene area for consideration.

4.3 DRAFT EIS REVIEW PERIOD SUMMARY

The DAF published a Notice of Availability in the Federal Register on November 9, 2023 (88 Federal Register 77308) (see Appendix A, Public Involvement) announcing the availability of the Draft EIS for review and public hearings. Additionally, the DAF notified in writing local, state, and federal agencies and tribes of the availability of the Draft EIS and host public hearings. In Volume 2 of the B-21 MOB 2 EIS, Section A.2 (Mailing Lists) provides a list of these contacts and Section A.5 (Draft EIS Notification Letter) provides a copy of the letter mailed.

The DAF held six public hearings in 2023: in Missouri on November 28 and 30; in Texas on December 5 and 7; and virtual hearings on December 12 and 14. Public hearing notifications were also published in the *Abilene News Reporter* on November 12, 19, and 26 and December 3, 2023; the *Warrensburg Star-Journal* on November 10 and 24, 2023; the *Sedalia Democrat* on November 11 and 25, 2023; the *Native Sun News* on November 15 and 29, 2023; and the *Indian Country Today* on November 16 and 30, 2023.

In addition to the public hearings, the DAF published all public hearing materials on the project website at www.B21EIS.com on October 30, 2023. Hearing materials included a 16-page brochure, 14 large informational displays, 4 small informational displays, the hearing presentation, community flyer, and a mail-in comment form. Comments on the Draft EIS could be submitted via the public website or by mail by January 5, 2024, to be included in the Final EIS. In addition to providing information on how to provide comments on the Draft EIS, the hearing materials also provided interested persons with an overview of the following:

- NEPA
- The background of the project
- The purpose of and need for the Proposed Action
- The elements of the Proposed Action
- The No Action Alternative
- The Dyess AFB Alternative
- The Whiteman AFB Alternative
- The No Action Alternative
- The environmental resources analyzed in the EIS
- Resource impact summaries for Noise; Air Quality; Cultural Resources; Hazardous Materials and Hazardous and Solid Waste; Environmental Justice; Socioeconomics; Airspace Use and Management; and Physical Resources
- The anticipated milestone schedule

A total of 25 individuals, tribes, organizations, and agencies submitted comments during the Draft EIS review period. Thirteen substantive comments were received and are summarized by resource topic below. Additionally, there were two comment letters requesting revisions to the mailing list. Remaining comment letters expressed support for either the Dyess AFB Alternative or the Whiteman AFB Alternative. Copies of letters

with substantive comments and the DAF responses are included in Section A.6 (Draft EIS Substantive Comments and DAF Responses) of Volume 2 of the B-21 MOB 2 EIS.

4.3.1 Substantive Draft EIS Comments Summary

Proposed Action and Alternatives

One commenter asked about the beddown timeline should Whiteman AFB be selected for MOB 2, as well as the effect on personnel associated with the B-2. Another commenter similarly asked how long the project would take.

Noise

One commenter stated that the comparison of impacts, in particular noise, were inconsistent between the alternatives since Dyess AFB would replace B-1s with about an equal number of B-21s and Whiteman AFB would replace B-2s with double the number of B-21s. Therefore, noise impacts at Dyess AFB would decrease (and pollutants remain about the same) while Whiteman AFB, with double the aircraft would have higher noise and pollutants.

Socioeconomics

One commenter raised concerns regarding potential economic hardships in the communities, particularly on elderly populations, surrounding Whiteman AFB with respect to expanding schools, increased road usage, property taxes, levy taxes, etc. Another commenter asked about the jobs that the beddown would provide for the area; however, it was unclear which installation was being referenced.

Biological Resources

EPA (Region 6) recommended reseeding as soon as possible after construction and using native seed mixes representative of the disturbed vegetation community, as well as coordinating with the USDA Natural NRCS for assistance in defining the correct mix for the area.

EPA also noted that Section 4.11 does not include information (i.e., permit coverage requirements, stormwater pollution prevention plan, overall earth-disturbance, etc.) to address 40 CFR 122.26(b)(15)(i) compliance requirements under the CWA Section 402 NPDES regulations, including discharges of stormwater from construction activities and construction support activities (e.g., borrow pits, staging areas, material storage areas, etc.).

Additionally, EPA requested that the Final EIS include discussion demonstrating coordination with TCEQ providing assurances the NPDES permitting requirements will be satisfied as required.

Cultural Resources

The Texas Historical Commission/SHPO indicated there was insufficient documentation during the initial consultation process and that more information is needed with regard to

above-ground resources, as there are known historic resources in the APE and historic-age resources that will need to be identified and evaluated for listing in the NRHP.

Physical Resources

One commenter recommended that the 500-year flood areas be depicted on the maps for both installations.

Hazardous Materials and Hazardous and Solid Wastes

EPA (Region 6) asked for clarification on whether AFFFs containing PFAS are still being used at Dyess AFB.

Transportation

One commenter raised concerns regarding traffic at Highway DD and Highway 23 outside of Whiteman AFB and the ability of emergency vehicles to get through. Another commenter asked questions regarding “CR 707” near Dyess AFB and whether there would be any upgrades, traffic, or congestion.

This page is intentionally blank.

5. REFERENCES

- 184th Wing. (2022). *Smoky Hill ANG Range: Information about the Military Operations Area Airspace*. Retrieved from 184th Wing Air National Guard: <https://www.184iw.ang.af.mil/About-Us/Missions/Smoky-Hill-ANG-Range-Expansion/>. January 5.
- 509th CES. (2018). *Extinguishing safely: Base facilities to receive firefighting chemical upgrade*. Retrieved from <https://www.whiteman.af.mil/News/Article/1598730/extinguishing-safely-base-facilities-to-receive-firefighting-chemical-upgrade/>. August 10.
- Abilene ISD. (2022). *The LIFT Year 2: More Students, More Opportunities*. Retrieved from Abilene Independent School District: <https://www.abileneisd.org/aisdnews/2022/10/18/the-lift-year-2-more-students-more-opportunities/>. October 18.
- Abilene ISD News. (2019). *'The Lift' to House CTE/ATEMS*. Retrieved March 25, 2020, from AbileneISD - Connect, Lead, Succeed: <https://www.abileneisd.org/aisdnews/2019/10/09/the-lift-to-house-cte-atems/>. October 9.
- Abilene Metropolitan Planning Organization. (2010). *Metropolitan Transportation Plan 2010-2035*. Abilene Metropolitan Planning Organization.
- Abilene Metropolitan Planning Organization. (2015). *Metropolitan Transportation Plan Fiscal Years 2015-2040*. Abilene Metropolitan Planning Organization.
- Abilene Metropolitan Planning Organization. (2021a). *2045 Metropolitan Transportation Plan*. Abilene Metropolitan Planning Organization.
- Abilene Metropolitan Planning Organization. (2021b). *Transportation Improvement Program Fiscal Years 2021-2024*. Abilene Metropolitan Planning Organization.
- Abilene Metropolitan Planning Organization. (2022). *Traffic Counts*. Retrieved January 3, 2022, from Abilene Metropolitan Planning Organization: <https://abilene.maps.arcgis.com/apps/webappviewer/index.html?id=6caa8aef63534d6bb1f799c094efdd0b>.
- ACHP. (2006a). *Department of Defense Unaccompanied Personnel Housing Program Comment*. Advisory Council on Historic Preservation. August 18.

- ACHP. (2006b). *Department of Defense Program Comment For World War II and Cold War Era (1939 - 1974) Ammunition Storage Facilities*. Advisory Council on Historic Preservation. August 18.
- AFCEC. (2020a). *Final 2020 Land Use Control Site Inspection Report for Multiple Sites, Dyess Air Force Base, Texas*. December 2020. Air Force Civil Engineer Center.
- AFCEC. (2020b). *Whiteman Air Force Base, Missouri LF003, LF011, LF013, LF034, and LF042 Compliance and Optimization Report*. U.S. Air Force, Air Force Civil Engineer Center, Texas. June.
- AISD. (2019). *Abilene Independent School District 2018 Bond Oversight Committee Meeting Agenda*. December 13, 2019. Retrieved from <https://www.abileneisd.org/wp-content/uploads/2020/02/Bond-Oversight-Webpage-December-13-2019.pdf>.
- Allen, J. (2023). Electronic mail regarding utility usage at Whiteman AFB from J. Allen at Whiteman AFB to Leidos. January 25.
- ANG Readiness Center and Smoky Hill ANG Range. (2007). *A Natural Features Inventory of the Smoky Hill Range, Kansas*. Air National Guard Readiness Center and Smoky Hill Air National Guard Range.
- ANSI. (2009). *Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools*. Melville, NY: American National Standards Institute, Standards Secretariat, Acoustical Society of America.
- Audubon. (2020a). *Central Flyway*. Retrieved from audubon.org: <https://www.audubon.org/central-flyway>.
- Audubon. (2020b). *Audubon Guide to North American Birds Golden Eagle Aquila chrysaetos*. Retrieved from audubon.org: <https://www.audubon.org/field-guide/bird/golden-eagle>.
- Bureau of Economic Analysis. (2022a). *CAEMP25N Total Full-Time and Part-Time Employment by NAICS Industry*. (Data, Bureau of Economic Analysis Regional; Area, Query for Abilene Metropolitan Statistical Area) Retrieved from <https://apps.bea.gov/iTablecore/data/app/Downloads>.
- Bureau of Economic Analysis. (2022b). *Total Full-Time and Part-Time Employment by NAICS Industry*. Retrieved from CAEMP25N Total Full-Time and Part-Time Employment by NAICS Industry: Query for Missouri State, Johnson County, and Pettis County for 2010 and 2021: <https://apps.bea.gov/iTable/>

- CEQ. (1986). *Memorandum to Agencies: Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations*. Council on Environmental Quality, Executive Office of the President. Vol. 46 Federal Register, pg 18026 (March 23, 1981). As amended (1986).
- CEQ. (2023). *National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions and Climate Change*. Council on Environmental Quality. Issued Jan. 9, 2023. Retrieved from https://ceq.doe.gov/guidance/ceq_guidance_nepa-ghg.html.
- CH2M Hill. (2003). *Draft Final Remedial Investigation Report, Site DP-32 Hospital Incinerator, Site SS-40, Spill Site, Site SS-41, Dry Pond Site, Site SS-44, TCE Spill Site*. Whiteman Air Force Base, Environmental Restoration Program.
- CHABA. (1977). *Guidelines for Preparing Environmental Impact Statements on Noise - Report of Working Group 69 on Evaluation of Environmental Impact of Noise*. Committee on Hearing, Bioacoustics, and Biomechanics; Assembly of Behavioral and Social Sciences; National Research Council. Washington, DC: National Academy of Sciences.
- Chapman et al. (2002). Chapman, S.S., Omernik, J.M., Griffith, G.E., Schroeder, W.A., Nigh, T.A., and Wilton, T.F. Ecoregions of Iowa and Missouri (color poster with map, descriptive text, summary tables). Reston, Virginia: U.S. Geological Survey.
- City of Abilene. (2023). *Water Utilities*. Retrieved February 21, 2023, from City of Abilene, Texas: <https://www.abilenetx.gov/401/Water-Utilities>.
- Cox. (2023). Personal communication between Conner Cox, USFWS (Natural Resource Program Manager, Dyess AFB) and Sarah Rauch (Senior Ecologist, Leidos). RE: Tricolored Bats at Dyess AFB. May 24.
- DAF. (2000). *Realistic Bomber Training Initiative, Final Environmental Impact Statement, Volume I*. Department of the Air Force in cooperation with the Federal Aviation Administration. Retrieved from <https://www.b21eis.com/drafteis/Realistic%20Bomber%20Training%20EIS.pdf>.
- DAF. (2004). *Final Lead Management Plan*. U.S. Air Force, Dyess AFB, Texas. December.
- DAF. (2006). *New Mexico Training Range Initiative Environmental Impact Statement*. Department of the Air Force.

- DAF. (2007). *AFSOC Assets Beddown at Cannon Air Force Base, New Mexico*. Cannon AFB, New Mexico.
- DAF. (2010). *Final Environmental Assessment for the Military Family Housing Privatization Initiative Whiteman Air Force Base, Missouri*. March.
- DAF. (2016a). *Hazardous Waste Management Plan for Dyess AFB*. U.S. Air Force, 7 CES/CEIE, Dyess AFB, Texas. April.
- DAF. (2016b). *Final Five-Year Review Dyess Air Force Base*. U.S. Air Force, Air Education Training Command. September.
- DAF. (2017). *Integrated Cultural Resources Management Plan, Dyess Air Force Base, Texas*. U.S. Air Force, Global Strike Command.
- DAF. (2018). *Dyess AFB Hazardous Material Planning and Emergency Response (EPA One Plan)*. U.S. Air Force, Air Force Civil Engineer Center. April.
- DAF. (2019a). *Final Site Inspection Report Dyess Air Force Base, Abilene, TX - Site Inspection of Aqueous Film Forming Foam (AFFF) Release Areas Environmental Programs Worldwide*. U.S. Air Force, Air Force Civil Engineer Center, Texas. April.
- DAF. (2019b). *Dyess AFB Asbestos Management Plan*. U.S. Air Force, Dyess AFB, Texas. Revised July 2019.
- DAF. (2020a). *F-35A Operational Beddown - Air Force Reserve Command Environmental Impact Statement*. Air Force Reserve Command. Department of the Air Force.
- DAF. (2020b). *Final Environmental Impact Statement for F-35A Wing Beddown at Tyndall AFB and MQ-1 Beddown at Tyndall AFB or Vandenberg AFB*. Department of the Air Force.
- DAF. (2020c). *Guide for Environmental Justice Analysis under the Environmental Impact Analysis Process (EIAP)*. Department of the Air Force.
- DAF. (2020d). *Hazardous Waste Management Plan for Whiteman AFB*. U.S. Air Force, Whiteman Air Force Base, Missouri. May.
- DAF. (2020e). *Asbestos Survey Data for Buildings at Dyess AFB (MS Excel spreadsheets)*. Dyess AFB, Texas: U.S. Air Force.

- DAF. (2020f). *Spill Prevention, Control, and Countermeasure Plan, Whiteman AFB, Missouri*.
- DAF. (2020g). Active ERP Sites (Environmental Restoration Program) at Whiteman AFB (Map). U.S. Air Force, Whiteman AFB, Missouri. January.
- DAF. (2021a). *Air Emissions Guide for Stationary Sources*. San Antonio, TX: Department of the Air Force, Air Force Civil Engineer Center.
- DAF. (2021b). *Air Emissions Guide for Air Force Mobile Sources*. San Antonio, TX: Department of the Air Force, Air Force Civil Engineer Center.
- DAF. (2021c). *Air Emissions Guide for Air Force Transitory Sources*. San Antonio, TX: Department of the Air Force, Air Force Civil Engineer Center.
- DAF. (2021d). *B-21 MOB 2/3 Aircraft Ops Data Validation Package for Dyess AFB Baseline Operations*. Provided by Lt Col Daniel Knerl, October 19, 2021.
- DAF. (2021e). *B-21 Main Operating Base 1 (MOB 1) Beddown at Dyess AFB, Texas or Ellsworth AFB, South Dakota Final Environmental Impact Statement*.
- DAF. (2021f). *Integrated Cultural Resources Management Plan, Whiteman Air Force Base*. U.S. Air Force.
- DAF. (2021g). Dyess AFB Hazardous Waste Generation Data - Provided via email from Patricia Hudson 13 Jan 2022.
- DAF. (2021h). FY21 1st to 4th Quarter Hazardous and Solid Waste Generation Summary (MS Excel spreadsheets [4]). Dyess AFB.
- DAF. (2021i). *Historical mishap data for B-2 aircraft*. U.S. Air Force Safety Center. Retrieved from <https://www.safety.af.mil/Portals/71/documents/Aviation/Aircraft%20Statistics/b-2.pdf>.
- DAF. (2023). *Air Force Air Quality Environmental Impact Analysis Process (EIAP) Guide, Volume II - Quantitative Assessment, Insignificance Indicators*. San Antonio, TX: Department of the Air Force, Air Force Civil Engineer Center.
- Daniel, R. E., & Edmond, B. S. (2017). *Atlas of Missouri Amphibians and Reptiles for 2017*. Retrieved from <https://webapps.fhsu.edu/kshep/bibFiles/21554.pdf>.
- Denslow, G. (2022). E-mail Correspondence Regarding Water and Electricity Usage at Dyess AFB.

- Department of Energy. (2009). *ESPC Success Story, Dyess Air Force Base, Dyess, Texas, Water Conservation and Green Energy*.
- DoD. (2018). *DoD Instruction (DoDI) 6055.07, Mishap Notification, Investigation, Reporting, and Record Keeping*. Department of Defense.
- DoD. (2020). *2020 Demographics Profile of the Military Community*. Department of Defense. Retrieved from <https://download.militaryonesource.mil/12038/MOS/Reports/2020-demographics-report.pdf>.
- DoD. (2022a). *2022 National Defense Strategy of the United States of America, Including the 2022 Nuclear Posture Review and the 2022 Missile Defense Review*. U.S. Department of Defense.
- DoD. (2022b). *2021 Demographics Profile of the Military Community*. Department of Defense. Retrieved February 2023, from <https://download.militaryonesource.mil/12038/MOS/Reports/2021-demographics-report.pdf>.
- Donaldson, K. (2022). Personal communication, January 12, between Leidos (Sarah Rauch) and Whiteman AFB (Keith Donaldson, Whiteman AFB Natural Resource Manager) on January 12, 2022. Subject: BASH Management and State-listed Species at Whiteman AFB.
- Donaldson, K. (2023). Personal communication, January 30, between Keith Donaldson (Biological Scientist, Whiteman AFB) and Sarah Rauch (Biologist, Leidos). *RE: Observations of Special Status Species at Whiteman AFB*.
- Downing, T. (2020). Personal communication from Tommy Downing (7 CES/CENPP) at Dyess AFB to Leidos regarding the status of the water main, dormitory, and Community Center Complex projects at Dyess AFB. U.S. Air Force. June 2020.
- Dyess AFB. (2014). *Installation Complex Encroachment Management Action Plan, Volume II: Reference Book, Dyess AFB*. Dyess Air Force Base.
- Dyess AFB. (2015). *Air Installation Compatible Use Zone Study*. Dyess Air Force Base.
- Dyess AFB. (2017). *Environmental Assessment for Installation Development at Dyess AFB, Texas*. Dyess AFB, Texas.
- Dyess AFB. (2018a). *Dyess Air Force Base Installation Development Plan - Updated January 2018*. Dyess Air Force Base.

- Dyess AFB. (2018b). *Stormwater Pollution Prevention Plan, TPDES General Permit TXR050000*.
- Dyess AFB. (2018c). *Comprehensive Traffic Engineering Study*. Dyess Air Force Base.
- Dyess AFB. (2018d). *Joint Land Use Study*. Dyess Air Force Base.
- Dyess AFB. (2019). *Bird Aircraft Strike Hazard (BASH) Plan*. Dyess Air Force Base.
- Dyess AFB. (2020a). *Economic Impact Statement Fiscal Year 2020*. Dyess AFB, TX: 7th Comptroller Squadron.
- Dyess AFB. (2020b). Dyess Current Projects. Spreadsheet provided by Tommy Downing (7 CES/CENPP).
- Dyess AFB. (2021a). *Economic Impact Statement (EIS) Fiscal Year 2021*. 7th Comptroller Squadron Financial Management Analysis Dyess Air Force Base, Texas.
- Dyess AFB. (2021b). *Dyess Air Force Base Mission Sustainment Risk Report*. Dyess Air Force Base.
- Dyess AFB. (2022a). *Dyess Child Development Center increases capacity, builds partnerships with local colleges*. Retrieved from Dyess Air Force Base: <https://www.dyess.af.mil/News/Features/Article/3218105/dyess-child-development-center-increases-capacity-builds-partnerships-with-loc/>. November 14.
- Dyess AFB. (2022b). *Integrated Natural Resources Management Plan (2022-2027)*. Abilene, Texas: Dyess Air Force Base, 7 CES/CEIE.
- Dyess Family Homes. (2022). *Neighborhoods*. Retrieved January 4, 2022, from <https://www.dyessfamilyhomes.com/neighborhoods.aspx>.
- EPA. (1974). *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare With An Adequate Margin of Safety*. U.S. Environmental Protection Agency.
- EPA. (2003). *Estimating 2003 Building-Related Construction and Demolition Materials Amounts*. United States Environmental Protection Agency.
- EPA. (2004). *Wetlands Overview*. U.S. Environmental Protection Agency.

- EPA. (2009). *Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act*. EPA 841-B-09-001.
- EPA. (2021a). *2017 National Emissions Inventory (NEI) Data*. Retrieved October 10, 2019, from U.S. Environmental Protection Agency Air Emissions Inventories: <https://www.epa.gov/air-emissions-inventories/2017-national-emissions-inventory-nei-data#dataq>. October 26.
- EPA. (2021b). *Level III and IV Ecoregions by State*. Retrieved from United States Environmental Protection Agency: <https://www.epa.gov/eco-research/level-iii-and-iv-ecoregions-state>. March 22.
- EPA. (2022a). *Ecoregion Download Files by State - Region 6*. Retrieved from U.S. Environmental Protection Agency: <https://www.epa.gov/eco-research/ecoregion-download-files-state-region-6#pane-41>. July 26.
- EPA. (2022b). *National Menu of Best Management Practices (BMPs) for Stormwater*. Retrieved March 19, 2020, from U.S. Environmental Protection Agency: <https://www.epa.gov/npdes/national-menu-best-management-practices-bmps-stormwater#post>.
- EPA. (2022c). *Project and Landfill Data by State*. Retrieved from United States Environmental Protection Agency: <https://www.epa.gov/lmop/project-and-landfill-data-state>. January 25.
- EPA. (2023a). *Texas Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants*. Retrieved from U.S. Environmental Protection Agency, Green Book: https://www3.epa.gov/airquality/greenbook/anayo_tx.html. March 31.
- EPA. (2023b). *New Mexico Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants*. Retrieved from https://www3.epa.gov/airquality/greenbook/anayo_nm.html. March 31.
- EPA. (2023c). *Missouri Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants*. Retrieved from U.S. Environmental Protection Agency, Green Book: https://www3.epa.gov/airquality/greenbook/anayo_mo.html. March 31.
- EPA. (2023d). *Kansas Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants*. United States Environmental Protection Agency, Green Book. Retrieved from https://www3.epa.gov/airquality/greenbook/anayo_ks.html

- EPA. (2023e). *Green Book – Select a State*. United States Environmental Protection Agency, Green Book. Retrieved from <https://www3.epa.gov/airquality/greenbook/astate.html>.
- Evarts, B., & Stein, G. P. (2020). *US Fire Department Profile-2018 Supporting Tables*. National Fire Protection Association.
- Federal Emergency Management Agency. (2015). Guidelines for Implementing Executive Order 11988, Floodplain Management, and Executive Order 13690, Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input. Retrieved from Department of Homeland Security, Federal Emergency Management Agency: https://www.fema.gov/sites/default/files/documents/fema_implementing-guidelines-EO11988-13690_10082015.pdf. October 8.
- Federal Emergency Management Agency. (2018). *Benefits of Natural Floodplains*. Retrieved from Federal Emergency Management Agency: <https://www.fema.gov/benefits-natural-floodplains>. October 17.
- FHWA. (2006). *Roadway Construction Noise Model User's Manual*. Retrieved December 21, 2016, from U.S. Department of Transportation: https://www.fhwa.dot.gov/environment/noise/construction_noise/rcnm/.
- Ford et al. (2019). Ford, J., Copeland, M., Wilburn, J., & Denston, T. Personal communication with Dyess AFB Utilities points of contact during Dyess AFB Site Visit. November 14.
- Gersh, A. (2019). *Abilene ISD announces new facility housing ATEMS and CTE schools will be called 'The LIFT'*. October 9, 2019. Retrieved from KTXS12 ABC: <https://ktxs.com/news/local/abilene-isd-announces-new-facility-housing-atems-and-cte-schools-will-be-called-the-lift>.
- Griffith et al. (2004). Griffith, G.E., Bryce, S.A., Omernik, J.M., Comstock, J.A., Rogers, A.C., Harrison, B. Hatch, S.L., and Bezanson, D. *Ecoregions of Texas*. Reston, Virginia: U.S. Geological Survey.
- Griffith et al. (2006). Griffith, G.E., Omernik, J.M., McGraw, M.M., Jacobi, G.Z., Canavan, C.M., Schrader, T.S., Mercer, D., Hill, R., and Moran, B.C. *Ecoregions of New Mexico*. Reston, Virginia: U.S. Geological Survey.
- Grothaus, R. (2011). Personal communication with Mr. Ray Grothaus (Manager, BFI Landfill, Abilene, TX) regarding capacity and life expectancy of the landfill. April 2.

- Haywood, N. A., & Russell, K. A. (1995). *Final Report Cultural Resources Survey at Dyess Air Force Base, Abilene, Taylor County, Texas*. Cincinnati: 3D/Environmental.
- Hudson, P. (2023). Email Communication from Patricia Hudson to Amy Sands regarding Hazardous and Solid Wastes. *Re: no change in ERP status, Hazardous or Solid Wastes at Dyess. January 24.*
- iNaturalist. (2022). *Mammals of Missouri*. Retrieved from iNaturalist: <https://www.inaturalist.org/guides/3798>. January 14.
- iNaturalist. (2023). *Reptiles of Texas*. Retrieved June 20, 2023, from iNaturalist: https://www.inaturalist.org/check_lists/76862-Reptiles-of-Texas.
- IPCC. (2023). *AR6 Synthesis Report: Climate Change 2023*. Interlaken, Switzerland: Intergovernmental Panel on Climate Change.
- Jensen, W. (2019). *Renderings of new Dyess Elementary unveiled, includes runway leading to front doors*. Retrieved March 25, 2020, from KTXS12 ABC: <https://ktxs.com/news/abilene/renderings-of-new-dyess-elementary-unveiled-includes-runway-leading-to-front-doors>.
- KDWP. (2022). *Golden Eagle*. Retrieved from Kansas Department of Wildlife & Parks: <https://ksoutdoors.com/Services/Threatened-and-Endangered-Wildlife/All-Threatened-and-Endangered-Species/Golden-Eagle>.
- Klepeis, N., Nelson, W., Ott, W., Robinson, J., Tsang, A., Switzer, P., . . . Engelman, W. (2001). The National Human Activity Pattern Survey (NHAPS): a resource for assessing exposure to environmental pollutants. *Journal of Exposure Science & Environmental Epidemiology*, 11(3), 231-252.
- Knob Noster Transportation Department. (2023). *Knob Noster Transportation Statistics*. Retrieved February 9, 2023, from <https://www.countyoffice.org/knob-noster-transportation-department-knob-noster-mo-bbb/>.
- Kramer, M. (2018). *The Most Valuable Real Estate Statistic You're Not Using*. Retrieved from Texas Realtors: <https://www.texasrealestate.com/members/>.
- Landrum and Brown Team. (2013). *Seattle-Tacoma International Airport. Part 150 Noise Compatibility Study. Chapter 4, Land Use Analysis*. Landrum and Brown Team.

- Lau, R. (2023). E-mail correspondence January 24 regarding utilities usage at Dyess AFB.
- Laurence, D. (2023). Personal communication between David E. Laurence, P.G. (Environmental Section Chief, Dyess AFB) and Sarah Rauch (Biologist, Leidos). *RE: Observations of Special Status Species at Dyess AFB. January 26.*
- Lindeburg, M. R. (1999). *Civil Engineering Reference Manual for the PE Exam*. Professional Publications; Seventh Edition.
- Long, D. (2021). Whiteman AFB Hazardous Waste Numbers (email). Provided by Whiteman AFB, Missouri.
- Ludlow, B., & Sixsmith, K. (1999). Long-term Effects of Military Jet Aircraft Noise Exposure during Childhood on Hearing Threshold Levels. *Noise and Health*, 2(5), 33–39.
- Madole et al. (1991). R. F., Ferring, C. R., Guccione, M. J., Hall, S. A., Johnson, W. C., & Sorenson, C. J. *Quaternary geology of the Osage Plains and Interior Highlands*. Quaternary Nonglacial Geology, Roger B. Morrison.
- MBS. (2022). *Missouri Birds*. Retrieved from Missouri Birding Society: <https://mobirds.org/Birds/>. January 14.
- McLean, S. L. (2020). Personal communication (email) between Scott McLean, Associate Superintendent of Operations, Abilene Independent School District, and Heather Stepp, Leidos. April 2.
- MDC. (2009). *Missouri's Raptors*. Retrieved from Missouri Department of Conservation: <https://mdc.mo.gov/magazines/conservationist/2009-01/missouris-raptors>.
- MDC. (2022a). *Missouri Endangered Species*. Retrieved from Missouri Department of Conservation: <https://mdc.mo.gov/field-guide/statuses?status=994>.
- MDC. (2022b). *Northern Harrier*. Retrieved from Missouri Department of Conservation: <https://mdc.mo.gov/discover-nature/field-guide/northern-harrier>. January 13.
- MDC. (2022c). *Bald Eagle*. Retrieved from Missouri Department of Conservation: <https://mdc.mo.gov/discover-nature/field-guide/bald-eagle>.
- MDC. (2023). *Missouri Fish and Wildlife Information System (MOFWIS)*. Retrieved from Missouri Department of Conservation MDOnline: https://mdc12.mdc.mo.gov/applications/mofwis/Mofwis_Search1.aspx.

- MDNR. (2017). State of Missouri Department of Natural Resources Missouri State Operating Permit (Permit No. MO-0029378).
- MDNR. (2023). *Major Water Use Information System - Major Water Use Report Date: 01/13/2023*. Missouri Department of Natural Resources.
- Missouri Department of Elementary and Secondary Education. (2021). Retrieved from Find Districts, Charters, and Schools for Comparison: <https://apps.dese.mo.gov/MCDS/SchoolComparison.aspx>. December 3.
- Missouri Department of Elementary and Secondary Education. (2022). *District List*. Retrieved from January 6.
- Missouri DOT. (2006). *Practical Design*. Missouri Department of Transportation.
- Missouri DOT. (2018). *2018 Long Range Transportation Plan Update: Technical Memorandum*. Missouri Department of Transportation.
- Missouri DOT. (2022a). *Statewide Transportation Improvement Program*. Missouri Department of Transportation.
- Missouri DOT. (2022b). *Traffic Volume Maps*. Retrieved February 9, 2023, from Missouri Department of Transportation: <https://www.modot.org/traffic-volume-maps>.
- Missouri DOT. (2023). *Warrensburg Transportation Statistics*. Retrieved February 9, 2023, from Missouri Department of Transportation in Warrensburg: <https://www.countyoffice.org/missouri-department-of-transportation-warrensburg-mo-be8/>.
- Missouri Office of Administration Division of Budget & Planning. (2023). *2000 to 2030 Projections: Total Populations for All Counties*. Retrieved from 2000 to 2030 Projections Office of Administration: <https://oa.mo.gov/budget-planning/demographic-information/population-projections/2000-2030-projections>.
- NASA. (1976). *Concorde Noise-Induced Building Vibrations for Sully Plantation, Chantilly, Virginia*. Hampton, VA: National Aeronautics and Space Administration Langley Research Center.
- NASA. (1978). *Concorde Noise-Induced Building Vibrations, John F. Kennedy International Airport, Report Number 2*. Hampton, VA: National Aeronautics and Space Administration Langley Research Center.

- National Park Service. (2015). *Ozark Reptiles*. Retrieved from U.S. National Park Service: <https://www.nps.gov/ozar/learn/nature/reptiles.htm>.
- National Park Service. (2020). *National Register of Historic Places Map*. Retrieved from <https://www.nps.gov/maps/full.html?mapId=7ad17cc9-b808-4ff8-a2f9-a99909164466>. March 3.
- National Park Service. (2023). *National Register of Historic Places Map*. Retrieved from <https://www.nps.gov/maps/full.html?mapId=7ad17cc9-b808-4ff8-a2f9-a99909164466>. March 3.
- National Research Council/National Academy of Sciences. (1977). *Guidelines for Preparing Environmental Impact Statements on Noise, Report of Working Group 69, Evaluation of Environmental Impact of Noise*. Washington, DC: National Academy of Sciences.
- NatureServe. (2021a). *Juniperus ashei Southeast Great Plains Ruderal Forest Alliance*. Retrieved from NatureServe Explorer: https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.899191/Juniperus_ashei_Southeast_Great_Plains_Ruderal_Forest_Alliance.
- NatureServe. (2021b). *Little Bluestem - Sideoats Grama Central Plains Grassland Alliance*. Retrieved from NatureServe Explorer: https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.900093/Schizachyrium_scoparium_-_Bouteloua_curtipendula_Central_Plains_Grassland_Alliance.
- NatureServe. (2022). *Texas Fatmucket Lampsilis bracteata*. Retrieved from NatureServe Explorer: https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.1148359/Lampsilis_bracteata.
- Nelson, J. P. (2003). *Meta-Analysis of Airport Noise and Hedonic Property Values: Problems and Prospects*. Department of Economics, Pennsylvania State University.
- New Mexico Game and Fish. (1996). *Wildlife Notes - Bald Eagle*. Retrieved from <http://www.wildlife.state.nm.us/download/education/conservation/wildlife-notes/birds/bald-eagle.pdf>.
- NMACP. (n.d.). *Golden Eagle (Aquila chrysaetos)*. Retrieved from New Mexico Avian Conservation Partners: <http://avianconservationpartners-nm.org/wp-content/uploads/2017/01/Golden-Eagle.pdf>.

- NRC. (2022). *Final Environmental Impact Statement for the License Renewal of the Columbia Fuel Fabrication Facility in Richland County, South Carolina*. U.S. Nuclear Regulatory Commission Office of Nuclear Material Safety and Safeguards. NUREG-2248. Retrieved from <https://www.nrc.gov/docs/ML2220/ML22201A131.pdf>.
- NRCS. (2022a). *Web Soil Survey*. Retrieved from Natural Resources Conservation Service: <https://websoilsurvey.sc.egov.usda.gov/>. January 4.
- NRCS. (2022b). *Updated T and K Factors*. Retrieved from Natural Resources Conservation Service: https://www.nrcs.usda.gov/wps/PA_NRCSCconsumption/download?cid=stelprdb1262856&ext=pdf. January 3.
- NRCS. (2022c). *Web Soil Survey*. Retrieved from Natural Resources Conservation Service: <https://websoilsurvey.sc.egov.usda.gov/>. February 21.
- NRCS. (2023). *Web Soil Survey*. Retrieved February 17, 2023, from Natural Resource Conservation Service: <https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>.
- OSHA. (2020). *OSHA Technical Manual, Chapter III, Section 1, Polymer Matrix Materials: Advanced Composites*. Occupational Health and Safety Administration. Retrieved from https://www.osha.gov/dts/osta/otm/otm_iii/otm_iii_1.html#t%20iii:1_1.
- Parker, P. L., & King, T. F. (1990). *National Register Bulletin 38: Guidelines for Evaluating and Documenting Traditional Cultural Properties*. Washington D.C.: U.S. Department of the Interior, National Park Service.
- Parkhill. (2021). *Dyess Elementary School Officially Takes Flight*. Retrieved from Parkhill: https://parkhill.com/insights/dyess_elementary_school_officially_takes_flight/. September 9.
- Pioneer Trails Regional Planning Commission. (2022). *Regional Transportation Plan*. Pioneer Trails Regional Planning Commission.
- Powell, J. F. (1989). *Cultural Resources in the Proposed Peacekeeper Rail Garrison Facilities, Dyess Air Force Base, Taylor County, Texas*. Austin: Texas Archaeological Research Laboratory, University of Texas at Austin.

- Realtor.com. (2023a). *Pettis County, MO Housing Market*. Retrieved from https://www.realtor.com/realestateandhomes-search/Pettis-County_MO/overview.
- Realtor.com. (2023b). *Johnson County, MO Housing Market*. Retrieved from Realtor.Com: https://www.realtor.com/realestateandhomes-search/Johnson-County_MO/overview.
- Rhodes, E. (2020). Personal communication between Mr. Edward Rhodes (Manager, Abilene Environmental Landfill) and Luis Diaz (Leidos) regarding landfill operations and life expectancy. March.
- Sedalia Transportation Department. (2023). *Sedalia Transportation Statistics*. Retrieved February 9, 2023, from Sedalia Transportation Department: <https://www.countyoffice.org/sedalia-transportation-department-sedalia-mo-bde/>.
- Takacs, P. (2021). Personal Communication between Paul Takacs (AFCEC) and Amy Sands (Leidos) via email, April 6.
- Takacs, P. (2022). Email Communication B21 MOB 2 EIS - ERP update (Takacs AFCEC) to (Amy Sands, Leidos), March 2.
- TAMU. (2023). *Housing Report for Abilene*. Retrieved from Texas A&M University Texas Real Estate Research Center: <https://www.recenter.tamu.edu/research/housing-reports/#!/MSA/Abilene>. January.
- TCEQ. (2022a). *Impaired Surface Water near Dyess AFB*. Retrieved from Texas Commission on Environmental Quality: <https://tceq.maps.arcgis.com/apps/webappviewer/index.html?id=b0ab6bac411a49189106064b70bbe778>. June 4.
- TCEQ. (2022b). *Municipal Solid Waste in Texas: A Year in Review. 2021 Data Summary and Analysis*. Texas Commission on Environmental Quality.
- TEA. (2020). *Snapshot 2020: District Detail Search; Query for School Districts in Taylor County, Jones County, and Callahan County*. Retrieved from Texas Education Agency: <https://rptsvr1.tea.texas.gov/perfreport/snapshot/2020/district.srch.html>.
- TEA. (2022). *2021-2022 Student Enrollment Statewide Totals by County*. Retrieved from Texas Education Agency: https://rptsvr1.tea.texas.gov/cgi/sas/broker?_service=marykay&_program=adhoc.addispatch.sas&major=st&minor=e&charsln=120&linespg=60&loop=1&countyke

y=NO&oldnew=new&_debug=0&endyear=22&selsumm=so&key=TYPE+HERE&grouping=g+&format=W.

Texas Breeding Bird Atlas. (2007). *Golden Eagle*. Retrieved from The Texas Breeding Bird Atlas (TBBA): <https://txtbba.tamu.edu/species-accounts/golden-eagle/>.

Texas Demographic Center. (2022a). *Texas Populations Projections Program, Vintage 2022 Population Projections (Latest Projections)*. Retrieved from County Projection 1.0 Migration Scenario: <https://demographics.texas.gov/data/tpepp/Projections/#2022prj>.

Texas Demographic Center. (2022b). *Texas Population Projections Program*. Retrieved from Vintage 2022 Population Projections, State Projection 1.0 Migration Scenario: <https://demographics.texas.gov/data/tpepp/Projections/#2022prj>.

Texas Department of State Health Services. (2019). *Primary Care Physicians, 2019*. Retrieved from Texas Health and Human Services: <https://dshs.texas.gov/chs/hprc/tables/2019/PC19.aspx>. October 22.

Texas DOT. (2003). *Airport Compatibility Guidelines*. Texas Department of Transportation, Aviation Division.

Texas DOT. (2016). *Corridor Study of I-20 in Abilene*. Abilene Region. Texas Department of Transportation.

Texas DOT. (2018). *Roadway Design Manual*. Texas Department of Transportation.

Texas DOT. (2020). *Estimated Average Daily Traffic Count*. Texas Department of Transportation, Abilene Region. Retrieved from <https://www.txdot.gov/inside-txdot/district/abilene.html>.

Texas DOT. (2023a). *Traffic count maps*. Retrieved February 9, 2023, from Texas Department of Transportation: <https://www.txdot.gov/data-maps/traffic-count-maps.html>.

Texas DOT. (2023b). *Projects and Studies - Abilene*. Retrieved February 10, 2023, from Texas Department of Transportation: <https://www.txdot.gov/projects/projects-studies/abilene.html>.

Texas Historical Commission. (2020). *Texas Historic Sites Atlas GIS Map Data*. Retrieved from <https://atlas.thc.state.tx.us/Data/GISData>. March 3.

- Texas Water Development Board. (2019). *Groundwater Management Report 19-01, Groundwater Conditions in the Cross Timbers Aquifer*.
- Texas Water Development Board. (2020). *Lake Fort Phantom Hill (Brazos River Basin)*. Retrieved from http://www.twdb.texas.gov/surfacewater/rivers/reservoirs/fort_phantom_hill/index.asp. March 25.
- Texas Water Development Board. (2023). *Texas Aquifers*. Retrieved February 17, 2023, from <http://www.twdb.texas.gov/groundwater/aquifer/index.asp>.
- Tirpak, J. (2021). *B-2 Crashes at Whiteman; No Injuries, But Status of Operations Withheld*. Retrieved from <https://www.airforcemag.com/b-2-crash-whiteman-no-injuries-status-of-operations-withheld/>. September 16.
- TPWD. (1984). *The Vegetation Types of Texas*. Austin, TX: Texas Parks and Wildlife Department - Wildlife Division.
- TPWD. (2020). *Bald Eagle (Haliaeetus leucocephalus)*. Retrieved from Texas Parks & Wildlife: <https://tpwd.texas.gov/huntwild/wild/species/baldeagle/>.
- TPWD. (2021). *Annotated County Lists of Rare Species*. Retrieved from Texas Parks & Wildlife: <https://tpwd.texas.gov/gis/rtest/>.
- TPWD. (2022a). *Piping Plover (Charadrius melodus)*. Retrieved January 19, 2022, from Texas Parks and Wildlife: <https://tpwd.texas.gov/huntwild/wild/species/piplover/>.
- TPWD. (2022b). *Texas Ecoregions*. Retrieved from Texas Parks and Wildlife Department: <https://tpwd.texas.gov/education/hunter-education/online-course/wildlife-conservation/texas-ecoregions>.
- TPWD. (2022c). *Rolling Plains Ecological Region*. Retrieved January 17, 2022, from Texas Parks and Wildlife Department: https://tpwd.texas.gov/landwater/land/habitats/cross_timbers/ecoregions/rolling_plains.phtml#:~:text=Bobwhites%2C%20scaled%20quail%2C%20mourning%20doves,are%20found%20in%20this%20region.
- TPWD. (2023). *Tricolored Bat (Perimyotis subflavus)*. Retrieved from Texas Parks and Wildlife Department: <https://tpwd.texas.gov/huntwild/wild/species/easpiip/>. May 23.
- TPWD. (n.d.). *Texas Horned Lizard Watch*. Retrieved from Texas Parks and Wildlife: https://tpwd.texas.gov/publications/pwdpubs/media/pwd_bk_w7000_0038.pdf.

- U.S. Census Bureau. (2021a). *American Community Survey Demographic and Housing Estimates: 2017-2021 ACS 5-Year Estimates*. Retrieved from U.S. Census Bureau: <https://data.census.gov/cedsci/table?q=United%20States>.
- U.S. Census Bureau. (2021b). *Selected Economic Characteristics. 2021 American Community Survey 5-Year Estimates*. Retrieved from U.S. Census Bureau, 2017-2021 American Community Survey 5-Year Estimates: https://data.census.gov/table?q=selected+economic+characteristics&g=0100000US_0400000US29,48_0500000US29101,29159,48059,48253,48441_310XX00US10180&tid=ACSDP5Y2021.DP03.
- U.S. Census Bureau. (2021c). *Selected Housing Characteristics*. Retrieved from U.S. Census Bureau, 2017-2021 American Community Survey 5-Year Estimates: https://data.census.gov/table?q=selected+economic+characteristics&g=0100000US_0400000US29,48_0500000US29101,29159,48059,48253,48441_310XX00US10180&tid=ACSDP5Y2021.DP04.
- U.S. Census Bureau. (2021d). *2021: American Community Survey 5-Year Estimates Detailed Table B17021*. Retrieved from U.S. Census Bureau, Explore Census Data: <https://data.census.gov/cedsci/table?q=B17021&hidePreview=false&tid=ACSDT5Y2018.B17021&vintage=2021>.
- U.S. Census Bureau. (2021e). *2021: American Community Survey 5-Year Estimates Data Profiles Table DP05*. Retrieved from U.S. Census Bureau: <https://data.census.gov/cedsci/table?d=ACS%205-Year%20Estimates%20Data%20Profiles&table=DP05&tid=ACSDP5Y2021.DP05&hidePreview=true>.
- U.S. Census Bureau. (2022a). *Quickfacts: Texas, Taylor County, Callahan County, Jones County*. Retrieved from <https://www.census.gov/quickfacts/fact/table/taylorcountytexas,jonescountytexas,callahancountytexas,TX/PST045222>.
- U.S. Census Bureau. (2022b). *QuickFacts: Missouri, Johnson County, Pettis County, United States*. Retrieved from <https://www.census.gov/quickfacts/fact/table/MO,pettiscountymissouri,johnsoncountymissouri,US/PST045221>.
- U.S. Department of Justice. (2020). *2020 Crime in the United States: Table 80: Texas Full-Time Law Enforcement Employees by Metropolitan and Nonmetropolitan*

- Counties, 2018*. Retrieved from Federal Bureau of Investigation, Uniform Crime Reporting: <https://crime-data-explorer.app.cloud.gov/pages/downloads>.
- U.S. DOT. (2019). *Status of the Nation's Highways, Bridges, and Transit*. Policy and Government Affairs. U.S. Department of Transportation. Retrieved from <https://www.fhwa.dot.gov/policy/23cpr/chap3.cfm>.
- U.S. DOT and Missouri DOT. (2006). *Interstate 70 Corridor Tier 2 Environmental Assessment*. U.S. Department of Transportation and Missouri Department of Transportation.
- U.S. Geological Survey. (2023a). *Dictionary of Water Terms*. Retrieved February 16, 2023, from USGS: Water Science School: https://www.usgs.gov/special-topic/water-science-school/science/dictionary-water-terms?qt-science_center_objects=0#G. January 21.
- U.S. Geological Survey. (2023b). *USGS Water Mission Area NSDI Node*, Data Published 1946. Retrieved from Physiographic divisions of the conterminous U. S.: <https://water.usgs.gov/GIS/metadata/usgswrd/XML/physio.xml#stdorder>. March 17.
- U.S. Global Change Research Program. (2018). *Fourth National Climate Assessment - Volume II - Impacts, Risks, and Adaptation in the United States*.
- Undersecretary of Defense for Acquisition Technology and Logistics. (2009). *Methodology for Assessing Hearing Loss Risk and Impacts in DoD Environmental Impact Analysis*.
- United Nations. (1985). Chapter 3 - Elements of Topography. In *Irrigation Water Management: Training Manual No. 1 - Introduction to Irrigation*. Brouwer, C., Goffeau, A., & Heibloem, M. Retrieved from Irrigation Water Management: Training Manual No. 1 - Introduction to Irrigation: <http://www.fao.org/3/r4082e/r4082e04.htm>. March 16.
- URS. (2016). *Final Basewide Five-Year Reviews at Multiple Sites, Whiteman Air Force Base*. Air Force Civil Engineer Center and Whiteman Air Force Base.
- USACE. (1987). *Wetlands Delineation Manual*. U.S. Army Corps of Engineers.
- USACE. (2018). *Final Site Inspection Report of Aqueous Film Forming Foam Areas at Whiteman Air Force Base Johnson County, Missouri*.

USACE. (2023a). *Memorandum for Record: US Army Corps of Engineers (Corps) Pre-2015 Regulatory Regime Approved Jurisdictional Determination in Light of Sackett v. EPA, 143 S. Ct. 1322 (2023) , 1NWK-2023-00333, MFR 1 of 1*. U.S. Army Corps of Engineers, Kansas City District.

USACE. (2023b). *Letter from USACE to Mr. Tunch Orsoy, XCEL Engineering on behalf of Whiteman AFB, dated November 2, 2023, providing approved Jurisdictional Determination*. U.S. Army Corps of Engineers, Kansas City Division.

USDA. (1980). *Soil Survey of Johnson County, Missouri*. U.S. Department of Agriculture.

USFWS. (2005). *Red Knot - Calidris canutus rufa - Fact Sheet*. Retrieved from U.S. Fish and Wildlife Service:
<https://www.fws.gov/migratorybirds/pdf/education/educational-activities/Redknotfactsheet.pdf>.

USFWS. (2015). *Bald and Golden Eagle Information*. Retrieved from U.S. Fish and Wildlife Service: <https://www.fws.gov/birds/management/managed-species/bald-and-golden-eagle-information.php>.

USFWS. (2017). *Critical Habitat: What is it?* Retrieved March 6, 2023, from U.S. Fish and Wildlife Service: <https://www.fws.gov/sites/default/files/documents/critical-habitat-fact-sheet.pdf>. March 1.

USFWS. (2019a). *Pollinators -Monarch Butterfly*. Retrieved from U.S. Fish and Wildlife Service:
https://www.fws.gov/pollinators/features/Monarch_Butterfly.html#:~:text=The%20lower%20slopes%20of%20valleys,areas%20during%20the%20breeding%20season.&text=Monarchs%20need%20nighttime%20roosting%20sites,nonnative%20deciduous%20and%20evergreen%20trees.

USFWS. (2019b). *Mead's milkweed*. Retrieved from USFWS Midwest Region Endangered Species:
<https://www.fws.gov/midwest/endangered/plants/meads/index.html#:~:text=Mead's%20milkweed%20is%20a%20perennial,southern%20Iowa%20and%20northwest%20Indiana>.

USFWS. (2019c). *Indiana Bat*. Retrieved from USFWS Midwest Region Endangered Species:
<https://www.fws.gov/midwest/endangered/mammals/inba/index.html#:~:text=Indi>

ana%20bats%20are%20quite%20small,%2C%20occasionally%2C%20in%20abandoned%20mines.

USFWS. (2019d). *Gray Bat*. Retrieved from USFWS Midwest Region Endangered Species: https://www.fws.gov/midwest/endangered/mammals/grbat_fc.html.

USFWS. (2020a). *Sharpnose Shiner and Smalleye Shiner Information*. Retrieved from U.S. Fish and Wildlife Service Arlington Ecological Services Field Office: <https://www.fws.gov/southwest/es/arlingtontexas/shiner.htm>.

USFWS. (2020b). *Northern Long-eared Bat*. Retrieved from USFWS Midwest Region Endangered Species: <https://www.fws.gov/Midwest/Endangered/mammals/nleb/index.html>.

USFWS. (2021). *Birds of Conservation Concern 2021 List*. U.S. Fish and Wildlife Service.

USFWS. (2022). *USFWS Range-wide Indiana Bat and Northern Long-eared Bat Survey Guidelines*. U.S. Fish and Wildlife Service.

USFWS. (2023a). *Information for Planning and Consultation Official Species List*. Retrieved from U.S. Fish and Wildlife Service: <https://ecos.fws.gov/ipac/>.

USFWS. (2023b). *Information for Planning and Consultation: IPaC Resource Lists (for counties under the airspace)*. Retrieved from U.S. Fish and Wildlife Service: <https://www.fws.gov/ipac/>.

USFWS. (2023c). *Official Species List*. Retrieved from U.S. Fish and Wildlife Service Information for Planning and Consultation: <https://ecos.fws.gov/ipac/>.

Varley, C. (2020). Personal communication with Dr. Catharine Varley (Program Manager, AFCEC/CZRX) regarding PFAS contamination. May 29.

Washington University. (2020). *Missouri's Natural Heritage*. Retrieved from Frogs and Toads of Missouri: <https://sites.wustl.edu/monh/frogs-and-toads-of-missouri/>.

Washington University in St. Louis. (2022a). *2014-2015 Missouri Healthcare Provider Counts for Johnson County*. Retrieved from Institute for Public Health: <https://publichealth.wustl.edu/items/missouri-healthcare-provider-counts/>.

Washington University in St. Louis. (2022b). *2014-2015 Missouri Healthcare Provider Counts for Pettis County*. Retrieved from <https://publichealth.wustl.edu/items/missouri-healthcare-provider-counts/>.

Whiteman AFB. (2008a). *Whiteman Air Force Base Joint Land Use Study*. Whiteman Air Force Base, Missouri.

Whiteman AFB. (2008b). *Capital Improvements Program Environmental Assessment*. Whiteman Air Force Base.

Whiteman AFB. (2014a). *Whiteman Air Force Base & Cannon Range Installation Complex Encroachment Management Action Plan, Volume 1*. Whiteman Air Force Base.

Whiteman AFB. (2014b). *Whiteman Air Force Base & Cannon Range Installation Complex Encroachment Management Action Plan, Volume 2*. Whiteman Air Force Base.

Whiteman AFB. (2014c). *2014 Baswide Five Year Review Whiteman Air Force Base, Missouri*. Whiteman Air Force Base.

Whiteman AFB. (2015a). *Air Installation Compatible Use Zone (AICUZ) Study*. Whiteman Air Force Base.

Whiteman AFB. (2015b). *Installation Development Plan*. Whiteman Air Force Base.

Whiteman AFB. (2016a). *Installation Pest Management Plan*.

Whiteman AFB. (2016b). *Whiteman AFB Design Guide*. Whiteman Air Force Base.

Whiteman AFB. (2018). *Forest Health Inventory and Management Recommendation Plan*. Whiteman AFB.

Whiteman AFB. (2020a). *Stormwater Pollution Prevention Plan*. U.S. Air Force.

Whiteman AFB. (2020b). *Whiteman Air Force Base 2020 Annual Water Quality Report (Consumer Confidence Report)*.

Whiteman AFB. (2020c). *Stormwater Pollution Prevention Plan Addendum for MO-00029378 (Final WWTP)*. Whiteman Air Force Base.

Whiteman AFB. (2021a). *Whiteman Air Force Base Economic Impact Report Fiscal Year 2021*.

Whiteman AFB. (2021b). *Integrated Natural Resource Management Plan for Whiteman Air Force Base*.

Whiteman AFB. (2021c). *2021 Annual Water Quality Report*. Retrieved from https://www.whiteman.af.mil/Portals/53/2021%20Consumer%20Confidence%20Report_TJ%20edits_1.pdf.

Whiteman AFB. (2021d). Whiteman AFB Total Consumption Energy Spreadsheet, provided by Jack Allen. April 2021.

Whiteman AFB. (2022a). Whiteman Current-Future Program Project List. PDF file provided by Mr. Colton Dietrich (509 CES/CENP). January 27.

Whiteman AFB. (2022b). *509 BW BASH Plan 91-15*. Whiteman Air Force Base.

World Population Review. (2023). *Knob Noster, Missouri Population 2021*. Retrieved February 10, 2023, from <https://worldpopulationreview.com/us-cities/knob-noster-mo-population>.

WWF. (2022). *Central and Southern mixed grasslands*. Retrieved from World Wildlife Fund: <https://www.worldwildlife.org/ecoregions/na0803>.

Wyle. (n.d.). *Noise Basics and the Effect of Aviation Noise on the Environment*. Wyle Laboratories.

Wylie ISD. (2019a). *Bond 2019: Bond Proposal*. Retrieved from Wylie ISD Unified for Excellence: <https://www.wylieisd.net/Page/14121>.

Wylie ISD. (2019b). *Bond 2019 March 2020 Update Summary*. Retrieved from Wylie ISD Unified for Excellence: <https://www.wylieisd.net/Page/14121>.

XCEL Engineering. (2023). *Final Wetland Surveys to Support the Proposed B-21 Beddown Action at Whiteman Air Force Base, Missouri*. Department of the Air Force, Global Strike Command, Whiteman Air Force Base, Missouri.

This page is intentionally blank

6. LIST OF PREPARERS AND CONTRIBUTORS

Henry McLaurine, Sr. NEPA Project Manager, Leidos
Project Manager; Environmental Impact Statement development
M.S., Biology, Stephen F. Austin State University, 1994
B.S., Environmental Science 1991
Years of Experience: 30

Kevin Akstulewicz, Sr. Principal Environmental Scientist, Leidos
Quality Assurance
B.S., Environmental Science & Policy, University of West Florida, 1999
Years of Experience: 24

Amy Sands, NEPA Planning Specialist, Leidos
Deputy Project Manager; Technical Specialist
M.A.S., Environmental Policy and Management, University of Denver, 2007
B.S., Environmental Science, University of North Carolina at Wilmington, 2002
Years of Experience: 21

Amanda C. Robydek, Certified Senior Ecologist, Environmental Scientist, Leidos
Technical Specialist
B.S., Environmental Science, University of Florida, 2002
Years of Experience: 16

Brad Boykin, Environmental Scientist, Leidos
Air Quality; Noise; Airspace
M.S., Biotechnology, Texas A&M University, College Station, 2004
B.S., Biomedical Science, Texas A&M University, College Station, 2002
Years of Experience: 17

Ronald R. Combs, Environmental Scientist, Leidos
Land Use; Transportation; Physical Resources
M.S., Biology, University of West Florida, 2006
B.S., Biology, San Diego State University, 2000
B.S., Business Administration, Logistics/Transportation, University of Tennessee, 1990
B.S., Business Administration, Marketing, University of Tennessee, 1987
Years of Experience: 21

Micah Downing, Ph.D., Chief Scientist, Blue Ridge Research and Consulting, LLC
Noise Analysis and Noise Modeling
Ph.D., Mechanical Engineering, Georgia Institute of Technology, 1993
M.S., Aeronautics, George Washington University, 1988
B.S., Physics, Davidson College, 1986
Years of Experience: 33

Jason M. Koralewski, Environmental Scientist, Leidos
Cultural Resources; Hazardous Materials and Solid Wastes; Health and Safety
M.A., Anthropology, The Ohio State University, 2002
M.L.S., Liberal Arts, spec. in Archaeology, The University of Toledo, 2000
B.A., Anthropology, The University of Toledo, 1996
Register of Professional Archaeologists
Years of Experience: 28

Benjamin Manning, M.S., Senior Engineer, Blue Ridge Research and Consulting, LLC
Noise Analysis and Noise Modeling
M.S., Mechanical Engineering, Duke University, 2006
B.S., Mechanical Engineering, Georgia Institute of Technology, 2003
Years of Experience: 17

Pamela McCarty, Environmental Analyst, Leidos
Socioeconomics
M.S., Industrial and Systems Engineering, University of Florida, 2011
M.A., Applied Economics, University of Central Florida, 2004
B.S., Business Administration, University of Central Florida, 2002
Years of Experience: 17

Michael Nation, GIS Analyst, Leidos
Maps and GIS Analysis
B.S., Environmental Science, University of West Florida, 2000
Years of Experience: 21

Sarah Bresnan Rauch, Conservation Ecologist, Leidos
Biological Resources
B.S., Plant Biology Environmental Science and Ecology, Arizona State University, 2010
Years of Experience: 18

Heather M. Stepp, Environmental Scientist, Leidos
Utilities and Infrastructure
B.S., Environmental Engineering Technology, Shawnee State University, 1998
Years of Experience: 27

Brian Tutterow, Environmental Scientist, Leidos
Environmental Justice
B.A., Biology, Southern Illinois University at Edwardsville, 1997
Years of Experience: 26

Tara Utsey, Senior Publications Specialist, Leidos
Document Production Manager
B.A., Liberal Arts, DePaul University, Chicago, 2002
Years of Experience: 30

Jennifer Wallin, Senior Environmental Scientist
References Manager
M.S., Environmental Toxicology, Clemson University, 1997
B.S., Biology, Pacific Lutheran University, 1995
Years of Experience: 25

Jessica Welsh, Editing Specialist, Leidos
Editor
B.A., Journalism, The College of New Jersey, 2000
Years of Experience: 24

Olivia R. West, Senior Environmental Engineer, GEO Consultants
Physical Resources
Ph.D., Civil Engineering, Massachusetts Institute of Technology, 1991
M.S., Civil Engineering, Massachusetts Institute of Technology, 1988
M.S., Civil Engineering, University of the Philippines, 1985
B.S., Civil Engineering, University of the Philippines, 1983
Years of Experience: 33

This page is intentionally blank.