



# **B-21 Main Operating Base 1 (MOB 1) Beddown at Dyess AFB, Texas or Ellsworth AFB, South Dakota**

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**Draft  
Environmental Impact Statement  
August 2020**



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## PRIVACY ADVISORY

The Draft EIS is provided for public comment in accordance with the National Environmental Policy Act (NEPA), the President's Council on Environmental Quality (CEQ) NEPA Regulations (40 Code of Federal Regulations [CFR] 1500–1508), and 32 CFR 989, Environmental Impact Analysis Process (EIAP).

The EIAP 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 your 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 will be 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 will be disclosed. Personal home addresses and phone numbers will not be published in the Final EIS.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 Draft EIS is available on the website at [www.B21EIS.com](http://www.B21EIS.com).

Comments on the scope of the proposal or Draft EIS analysis can be submitted at that website or, alternatively, mailed to:

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ATTN: B-21 EIS  
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Gulf Breeze, Florida 32563

Please direct any requests for information or other inquiries to:  
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Ellsworth AFB Public Affairs, (605) 385-5056 or after hours (605) 391-7436,  
28bw.public.affairs@us.af.mil

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## COVER SHEET

1  
2 **a. Responsible Agency:** U.S. Air Force

3 **b. Cooperating Agencies:** None.

4 **c. Proposals and Actions:** This Draft Environmental Impact Statement (EIS) describes the  
5 potential consequences to the human environment from the proposed implementation of the B-21  
6 Main Operating Base (MOB) 1 beddown, which includes B-21 Operational Squadrons, a B-21  
7 Formal Training Unit (FTU), and a Weapons Generation Facility (WGF).

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

11 **e. Designation:** Draft Environmental Impact Statement

12 **f. Abstract:** This EIS has been prepared in accordance with the National Environmental Policy  
13 Act (NEPA) to analyze the potential environmental consequences of the B-21 MOB 1 Beddown.  
14 The Department of Defense (DoD) is developing a new bomber aircraft, the B-21 "Raider," which  
15 will eventually replace existing B-1 and B-2 bomber aircraft. The beddown of the B-21 will take  
16 place through a series of three MOBs, referred to as MOB 1, MOB 2, and MOB 3. In this EIS, the  
17 U.S. Air Force (USAF) is evaluating the proposed MOB 1 beddown of the B-21. Decision-making  
18 associated with MOBs 2 and 3 will occur after a decision is made regarding MOB 1 and will be  
19 the subject of separate analysis in accordance with NEPA.

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

28 This EIS evaluates alternatives that would support deterrence capabilities by basing the B-21 at  
29 an installation that can support USAF Global Strike Command's MOB 1 mission and can support  
30 training of crewmembers and personnel in the operation and maintenance of the B-21 aircraft in  
31 an appropriate geographic location that can provide sufficient airfield, facilities, infrastructure, and  
32 airspace to support the B-21 training and operations. The USAF developed a detailed screening  
33 process (see Section 2.2, Alternatives Development, of the EIS) to identify the alternatives carried  
34 forward in the analysis that meet the selection standards developed for each of the operational  
35 requirements summarized above and in the EIS. Three alternatives are included in the EIS, as  
36 discussed in Sections 2.4 (Dyess AFB Alternative) through 2.6 (No Action Alternative), which  
37 include the following:

- 38
- 39 • Dyess AFB Alternative
  - 40 • Ellsworth AFB Alternative, including two subalternatives: North WGF Site Subalternative  
41 and South WGF Site Subalternative
  - 42 • No Action Alternative

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

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**Draft**

**Environmental Impact Statement for  
B-21 Main Operating Base 1 (MOB 1) Beddown at  
Dyess AFB, Texas or Ellsworth AFB, South Dakota**

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## ACRONYMS AND ABBREVIATIONS

<b>28 BW</b>	28th Bomb Wing
<b>7 BW</b>	7th Bomb Wing
<b>7 CES</b>	7th Civil Engineering Squadron
<b>ACAM</b>	Air Conformity Applicability Model
<b>ACHP</b>	Advisory Council on Historic Preservation
<b>ACM</b>	asbestos-containing materials
<b>AFB</b>	Air Force Base
<b>AFFF</b>	aqueous film forming foam
<b>AFI</b>	Air Force Instruction
<b>AFOSH</b>	Air Force Occupational and Environmental Safety, Fire Protection, and Health
<b>AFPC</b>	Air Force Personnel Center
<b>AFRC</b>	Air Force Reserve Command
<b>AGE</b>	Aerospace Ground Equipment
<b>AGL</b>	above ground level
<b>AICUZ</b>	Air Installation Compatible Use Zone
<b>AISD</b>	Abilene Independent School District
<b>AMU</b>	Aircraft Maintenance Unit
<b>ANG</b>	Air National Guard
<b>ANSI</b>	American National Standards Institute
<b>APE</b>	Area of Potential Effects
<b>APZ</b>	accident potential zone
<b>ATC</b>	Air Traffic Control
<b>ATCAA</b>	Air Traffic Control Assigned Airspace
<b>ATEMS</b>	Academy of Technology, Engineering, Mathematics and Science
<b>BASH</b>	bird/wildlife-aircraft strike hazard
<b>BCC</b>	Birds of Conservation Concern
<b>BCR</b>	Bird Conservation Region
<b>BG</b>	Block Group
<b>BGEPA</b>	Bald and Golden Eagle Protection Act
<b>BMP</b>	best management practice
<b>BOS</b>	Base Operating Support
<b>BW/SEF</b>	Bomb Wing/Flight Safety
<b>C&amp;D</b>	construction and demolition
<b>CEQ</b>	Council on Environmental Quality
<b>CERCLA</b>	Comprehensive Environmental Response, Compensation, and Liability Act
<b>CES</b>	Civil Engineering Squadron
<b>CFR</b>	Code of Federal Regulations
<b>CH<sub>4</sub></b>	methane
<b>CIP</b>	Capital Improvement Plan
<b>CISD</b>	Consolidated Independent School District
<b>CO</b>	carbon monoxide
<b>CO<sub>2</sub></b>	carbon dioxide
<b>CO<sub>2e</sub></b>	carbon dioxide equivalent
<b>COA</b>	Course of Action
<b>COC</b>	Community of Comparison



<b>CT</b>	Census Tract
<b>CTE</b>	Career and Technical Education
<b>CZ</b>	clear zone
<b>D</b>	Not shown to avoid disclosure of confidential information but included in total
<b>dB</b>	decibels
<b>dBA</b>	A-weighted decibels
<b>DNL</b>	day-night average sound level
<b>DoD</b>	Department of Defense
<b>DOT</b>	Department of Transportation
<b>DRMO</b>	Defense Reutilization Marketing Office
<b>EIAP</b>	Environmental Impact Analysis Process
<b>EIS</b>	Environmental Impact Statement
<b>EO</b>	Executive Order
<b>EOD</b>	Explosive Ordnance Disposal
<b>EPA</b>	U.S. Environmental Protection Agency
<b>ERP</b>	Environmental Restoration Program
<b>ESA</b>	Endangered Species Act
<b>ESP</b>	Explosive Site Plan
<b>FAA</b>	Federal Aviation Administration
<b>FMS</b>	Field Maintenance Shop
<b>FPPA</b>	Farmland Protection Policy Act
<b>FPTA</b>	Fire Protection Training Area
<b>FTE</b>	full-time employee
<b>FTU</b>	Formal Training Unit
<b>FY</b>	fiscal year
<b>GAO</b>	Government Accounting Office
<b>GHG</b>	greenhouse gas
<b>GIS</b>	geographic information system
<b>GW</b>	groundwater
<b>GWP</b>	global warming potential
<b>HA</b>	Health Advisory
<b>HABS</b>	Historic American Building Survey
<b>HAER</b>	Historic American Engineering Record
<b>HAZMART</b>	Hazardous Materials Pharmacy
<b>I-20</b>	U.S. Interstate 20
<b>I-90</b>	U.S. Interstate 90
<b>IAP</b>	Initial Accumulation Point
<b>ICEMAP</b>	Installation Complex Encroachment Management Action Plan
<b>ICRMP</b>	Integrated Cultural Resources Management Plan
<b>ID</b>	identification code
<b>IDP</b>	Installation Development Plan
<b>IFR</b>	instrument flight rules
<b>IICEP</b>	Interagency/Intergovernmental Coordination for Environmental Planning
<b>INRMP</b>	Integrated Natural Resources Management Plan
<b>IPaC</b>	Information for Planning and Consultation
<b>IPCC</b>	Intergovernmental Panel on Climate Change
<b>ISD</b>	Independent School District
<b>JLUS</b>	Joint Land Use Study

<b>JO</b>	Joint Order
<b>kV</b>	kilovolt
<b>L<sub>10</sub></b>	loudest 10 percent noise level
<b>lb</b>	pounds
<b>LBP</b>	lead-based paint
<b>L<sub>dn</sub></b>	day-night average sound level (symbol)
<b>L<sub>dnmr</sub></b>	onset-rate adjusted monthly day-night average sound level
<b>L<sub>eq</sub></b>	equivalent sound level
<b>L<sub>eq(8h)</sub></b>	8-hour equivalent sound level
<b>L<sub>max</sub></b>	maximum sound level
<b>LEED®</b>	Leadership in Energy and Environmental Design®
<b>LOS</b>	level of service
<b>LRS</b>	Long Range Strike
<b>LTM</b>	Long Term Management
<b>LUC</b>	land use control
<b>µg/L</b>	micrograms per liter
<b>MBTA</b>	Migratory Bird Treaty Act
<b>MCF</b>	thousands of cubic feet per day
<b>MGD</b>	million gallons per day
<b>MILCON</b>	Military Construction
<b>MOA</b>	Military Operating Area
<b>MOB</b>	Main Operating Base
<b>MRTFB</b>	Major Range and Test Facility Base
<b>MS4</b>	Municipal Separate Storm Sewer System
<b>MSA</b>	Metropolitan Statistical Area
<b>MSL</b>	mean sea level
<b>MSW</b>	municipal solid waste
<b>MT</b>	Montana
<b>MTR</b>	Military Training Route
<b>mVA</b>	megavolt amperes
<b>N<sub>2</sub>O</b>	nitrous oxide
<b>NAAQS</b>	National Ambient Air Quality Standards
<b>NASA</b>	National Aeronautics and Space Administration
<b>ND</b>	North Dakota
<b>NEI</b>	National Emissions Inventory
<b>NEPA</b>	National Environmental Policy Act
<b>NESHAP</b>	National Emission Standards for Hazardous Air Pollutants
<b>NHL</b>	National Historic Landmark
<b>NHPA</b>	National Historic Preservation Act
<b>NLR</b>	noise level reduction
<b>NM</b>	New Mexico
<b>No.</b>	Number
<b>NOI</b>	Notice of Intent
<b>NO<sub>x</sub></b>	nitrogen oxides
<b>NRHP</b>	National Register of Historic Places
<b>NSA</b>	Noise Sensitive Area
<b>NSR</b>	New Source Review
<b>Ops</b>	Operations

<b>OSHA</b>	Occupational Safety and Health Administration
<b>OU</b>	Operable Unit
<b>OWS</b>	oil/water separator
<b>PCL</b>	Protective Concentration Level
<b>PFAS</b>	per- and polyfluoroalkyl substances
<b>PFBS</b>	perfluorobutanesulfonic acid
<b>PFOA</b>	perfluorooctanoic acid
<b>PFOS</b>	perfluorooctane sulfonate
<b>PFSA</b>	perfluoroalkyl carboxylates, sulfonate
<b>PHL</b>	potential hearing loss
<b>PM<sub>10</sub></b>	particulate matter with a diameter of less than or equal to 10 microns
<b>PM<sub>2.5</sub></b>	particulate matter with a diameter of less than or equal to 2.5 microns
<b>POL</b>	petroleum, oil, and lubricant
<b>POV</b>	Privately Owned Vehicle
<b>PR-</b>	Powder River (Military Operating Area) (e.g., PR-1, PR-2, etc.)
<b>PRIDE Hangar</b>	Professional Results in Daily Efforts Hangar
<b>PRTC</b>	Powder River Training Complex
<b>PSD</b>	Prevention of Significant Deterioration
<b>QD</b>	quantity-distance
<b>RCAS</b>	Rapid City Area School
<b>RCRA</b>	Resource Conservation and Recovery Act
<b>ROD</b>	Record of Decision
<b>ROI</b>	region of influence
<b>RRS</b>	Risk Reduction Standard
<b>RSL</b>	Regional Screening Level
<b>SD</b>	South Dakota
<b>SDDENR</b>	South Dakota Department of Environment and Natural Resources
<b>SDGFP</b>	South Dakota Game, Fish, and Parks
<b>SEL</b>	sound exposure level
<b>SEL<sub>max</sub></b>	maximum sound exposure level
<b>sf</b>	square feet
<b>SGCN</b>	Species of Greatest Conservation Need
<b>SHPO</b>	State Historic Preservation Officer
<b>SO<sub>2</sub></b>	sulfur dioxide
<b>SOP</b>	Standard Operating Procedure
<b>SO<sub>x</sub></b>	sulfur oxides
<b>SPCC</b>	Spill Prevention, Control, and Countermeasures
<b>SUA</b>	Special Use Airspace
<b>SWMU</b>	Solid Waste Management Unit
<b>SWPPP</b>	Storm Water Pollution Prevention Plan
<b>TCEQ</b>	Texas Commission on Environmental Quality
<b>TCP</b>	traditional cultural property
<b>TPDES</b>	Texas Pollutant Discharge Elimination System
<b>TPWD</b>	Texas Parks and Wildlife Department
<b>TRRP</b>	Texas Risk Reduction Program
<b>TX</b>	Texas
<b>U.S.</b>	United States
<b>US-277</b>	U.S. Highway 277

<b>US-83/84</b>	U.S. Highway 83/84
<b>USACE</b>	U.S. Army Corps of Engineers
<b>USAF</b>	U.S. Air Force
<b>U.S.C.</b>	United States Code
<b>USDA</b>	U.S. Department of Agriculture
<b>USDA-WS</b>	U.S. Department of Agriculture Wildlife Services
<b>USFWS</b>	U.S. Fish and Wildlife Service
<b>UST</b>	underground storage tank
<b>VFR</b>	visual flight rules
<b>VOC</b>	volatile organic compound
<b>WGF</b>	Weapons Generation Facility
<b>WY</b>	Wyoming

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## 1. PURPOSE OF AND NEED FOR ACTION

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### 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 three Main Operating Bases (MOBs), referred to as MOB 1, MOB 2, and MOB 3. In this Environmental Impact Statement (EIS), the United States (U.S.) Air Force (USAF) is evaluating the proposed MOB 1 beddown of the B-21, which includes B-21 Operational Squadrons, a B-21 Formal Training Unit (FTU), and a Weapons Generation Facility (WGF). Decision-making associated with MOBs 2 and 3 will occur after a decision is made regarding MOB 1 and will be the subject of separate analysis in accordance with the National Environmental Policy Act (NEPA).

Through the USAF’s Strategic Basing Process (Air Force Instruction [AFI] 10-503, *Strategic Basing*), the USAF determined the three MOB locations would be Dyess Air Force Base (AFB) in Texas, Ellsworth AFB in South Dakota, and Whiteman AFB in Missouri. Subsequently, the Secretary of the Air Force announced that the preferred strategic basing alternative for MOB 1 would be Ellsworth AFB. In accordance with NEPA, the USAF also identified Dyess AFB as a reasonable alternative to the MOB 1 beddown analyzed in this EIS. Refer to Section 2.2.1 (Screening Criteria Process for MOB 1) for details on how the USAF chose Dyess AFB and Ellsworth AFB to be the alternative locations for MOB 1.

The EIS is being developed in compliance with NEPA (42 United States Code [U.S.C.] 4321 et seq.), which requires federal agencies to complete an EIS for any proposal that may significantly affect the quality of the human environment. In addition, the USAF is evaluating how the proposed basing action might be affected by or impact other federal and state regulatory and planning processes.

Recognizing other stakeholders may have concerns over potential impacts, the USAF has initiated and will continue to dialogue with the appropriate state agencies, as well as local counties, towns, and cities that may be impacted by the implementation of the basing action. The USAF has also begun and will continue conducting government-to-government consultation with federally recognized tribes potentially affected by the Proposed Action.

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### 1.2 BACKGROUND

On October 27, 2015, the USAF announced that Northrop Grumman Corporation was awarded the contract for Engineering and Manufacturing Development and early production for the Long Range Strike Bomber. The Secretary of the Air Force announced that the new bomber would be called the B-21 “Raider,” in honor of the Doolittle Raiders

1 of World War II. The USAF completed the Weapon System Critical Design Review in  
2 November 2018. The initial test aircraft is being manufactured.

3 The B-21 will operate under the direction of the USAF Global Strike Command. The B-21  
4 will have both conventional and nuclear roles and will be capable of penetrating and  
5 surviving in advanced air defense environments. It is projected to enter service in the  
6 2020s, and the USAF intends to have at least 100 B-21 aircraft built.

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### 7 **1.3 PURPOSE OF AND NEED FOR ACTION**

8 As stated in the 2018 National Defense Strategy, the global security environment is  
9 “characterized by overt challenges to the free and open international order and the  
10 re-emergence of long-term, strategic competition between nations” (DoD, 2018a). The  
11 threats we face as a nation are increasingly transregional, multi-domain, and  
12 multi-functional. These threats frequently do not comply with international rules of law.  
13 They include ever-expanding, rapidly developing technologies of hostile state and non-  
14 state actors. Thus, the USAF must deter its adversaries, assure its allies, and be  
15 prepared to support operations that protect the homeland, respond to aggression with  
16 overlapping timelines, wage a global counter-terrorism campaign in cooperation with our  
17 allies and partners, and improve our ability to respond to emerging threats. Our  
18 adversaries must be aware that our weapons are reliable and will achieve the desired  
19 result regardless of enemy countermeasures.

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#### 20 **1.3.1 Purpose of the Proposed Action**

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

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#### 26 **1.3.2 Need for the Proposed Action**

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

34 Therefore, the need for the Proposed Action is to support deterrence capabilities by  
35 basing the B-21 at an installation that can support USAF Global Strike Command’s  
36 MOB 1 mission. The B-21 will provide the only stealth bomber capability and capacity  
37 needed to deter, and if necessary, defeat our adversaries in an era of renewed great

1 power competition. The installation will support training of crewmembers and personnel  
2 in the operation and maintenance of the B-21 aircraft in an appropriate geographic  
3 location that can provide sufficient airfield, facilities, infrastructure, and airspace to  
4 support the B-21 training and operations.

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## 5 **1.4 ENVIRONMENTAL IMPACT ANALYSIS PROCESS**

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### 6 **1.4.1 Requirements**

7 Congress enacted NEPA to establish a national policy for the protection of the  
8 environment. It requires federal agencies to assess the environmental consequences of  
9 a proposed action and alternatives systematically as part of the decision-making process.  
10 The intent of NEPA is to protect, restore, or enhance the environment through well  
11 informed decisions by federal decision makers. In the case of this EIS, the Secretary of  
12 the Air Force will be the final decision maker.

13 The Council on Environmental Quality (CEQ) was established under NEPA, 42 U.S.C.  
14 4341 et seq., to implement and oversee federal policy in this process. In 1978, the CEQ  
15 issued regulations implementing the NEPA process codified at 40 Code of Federal  
16 Regulations (CFR) 1500–1508. The USAF Environmental Impact Analysis Process  
17 (EIAP) for meeting CEQ requirements is accomplished via procedures as promulgated at  
18 32 CFR 989 and in conformance with the CEQ regulations. This EIS has been prepared  
19 in accordance with NEPA, CEQ regulations, and the USAF EIAP. Those regulations  
20 outline the responsibilities of federal agencies and provide specific procedures for  
21 preparing EISs to comply with NEPA.

22 In this EIS, the USAF has done its best to accurately predict potential impacts and  
23 anticipate future conditions using the best available information and tools at the time of  
24 analysis.

25 This NEPA analysis identifies environmental permits, potential specific mitigation  
26 measures, and management actions to prevent or minimize environmental impacts, if  
27 needed. It is anticipated that a mitigation plan will be developed in accordance with  
28 32 CFR 989.22(d). The mitigation plan will address potential specific mitigations and  
29 management actions that the USAF proponents could implement.

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### 30 **1.4.2 Summary of Public Scoping Process**

31 NEPA and the USAF's implementing regulations require the lead agency (in this case,  
32 the USAF) to seek public participation throughout the EIAP. "Scoping" identifies potential  
33 issues and alternatives early in the NEPA development process. The USAF filed a Notice  
34 of Intent (NOI) to prepare an EIS and host public scoping meetings. The NOI was  
35 published in the Federal Register on March 6, 2020. Additionally, the USAF sent written  
36 notification to local, state, and federal agencies and tribes of the intent to prepare an EIS

1 and host public scoping meetings. Appendix A, Public Involvement, provides a list of  
2 these contacts.

3 As a direct result of the National Emergency declared by the President on Friday,  
4 March 13, 2020, in response to the coronavirus (COVID-19) pandemic in the United  
5 States and the Center for Disease Control's recommendations for social distancing and  
6 avoiding large public gatherings, the USAF canceled the six previously scheduled scoping  
7 meetings that were set to occur in South Dakota and Texas from March 31, 2020, to  
8 April 9, 2020, as listed in the original NOI that was published on March 6, 2020 (Federal  
9 Register, Volume 85, Number [No.] 45, 13148). An amended NOI, announcing the  
10 cancellation of in-person scoping meetings due to COVID-19, was subsequently  
11 published in the Federal Register on March 24, 2020 (Federal Register, Volume 85, No.  
12 57, 16619). The USAF also sent written updates about the public meeting cancellation  
13 to previously notified local, state, and federal agencies and tribes. Public meeting  
14 cancellation notifications were also published in the *Rapid City Journal* on March 28,  
15 2020, the *Native Sun Times* on April 1, 2020, the *Original Briefs* on March 27, 2020, the  
16 *Indian Country Today* on March 26, 2020, the *Black Hills Pioneer* on March 28, 2020, and  
17 the *Abilene Reporter News* on March 29, 2020.

18 In lieu of the in-person scoping meetings, the USAF published all public scoping meeting  
19 materials on the project website ([www.B21EIS.com](http://www.B21EIS.com)) on March 27, 2020, and extended  
20 the public commenting deadline to May 9, 2020. For those without access to the website,  
21 a request for a mailed hardcopy package of scoping materials could be submitted to  
22 Ellsworth AFB and Dyess AFB Public Affairs offices, as provided in all public notices.  
23 Scoping materials included an eight-page brochure, 11 large informational displays,  
24 4 small informational displays, the scoping presentation, and a mail-in comment form.  
25 Scoping comments could be submitted via the public website or by mail. In addition to  
26 providing information on how to provide scoping comments, the scoping materials also  
27 provided interested persons with an overview of the following:

- 28 • The NEPA/EIS process
- 29 • The anticipated EIS timeline and pertinent timeframes for public input
- 30 • The environmental resources being studied in the EIS
- 31 • The background of the project
- 32 • The elements of the B-21 MOB 1 beddown
- 33 • The purpose of and need for the Proposed Action
- 34 • The criteria used to select Dyess AFB and Ellsworth AFB
- 35 • The commonalities between the proposed alternatives
- 36 • The elements/scope of the proposed alternatives
- 37 • The No Action Alternative



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### 1.4.2.1 Summary of Concerns Raised in the Public Scoping Process and Public Comment Period

During the public scoping period, public comments were submitted to the USAF via the website and e-mail. A total of 22 members of the public, tribes, and government agencies submitted comments during the scoping period. Concerns were related to:

- Ground-disturbing activities impacting cultural/historic areas
- Using credible scientific data for the analysis
- Implementing reclamation of all surface resource disturbances as soon as feasible
- Utilizing the latest state-listed threatened and endangered species lists
- Installing appropriate erosion and sediment control measures
- Obtaining proper permits
- Avoiding impact to tributaries, creeks, wetlands, and lakes
- Considering impacts to national park units and areas of national importance

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### 1.4.3 Draft EIS Review Process

Public comments are being solicited on this Draft EIS. In providing for the opportunity to comment on the Draft EIS, the USAF is requesting that comments be substantive in nature. Generally, substantive comments are regarded as those specific comments that challenge the analysis, methodologies, or information in the Draft EIS as being factually inaccurate or analytically inadequate; that identify impacts not analyzed or develop and evaluate reasonable alternatives or feasible mitigations not considered by the USAF; or that offer specific information that may have a bearing on the decision, such as differences in interpretations of significance, scientific, or technical conclusions, or cause changes or revisions in a proposed action. Nonsubstantive comments, which do not require a USAF response, are generally considered those comments that are nonspecific, express a conclusion or opinion about a proposed action, agree or disagree with the proposals, vote for or against a proposal itself or some aspect of it, state a position for or against a particular alternative, or otherwise state a personal preference or opinion.

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## 2. DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

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### 2.1 PROPOSED ACTION

To meet the underlying purpose and need, the Proposed Action is for the USAF to implement the beddown of the B-21 MOB 1. This beddown would include establishing B-21 Operations Squadrons and a B-21 FTU, 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 1 beddown of the B-21 and evaluates impacts where training and operational activities would occur.

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### 2.2 ALTERNATIVES DEVELOPMENT

NEPA and its implementing regulations require the USAF 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, 2010). The following subsections describe the process that the USAF used to identify reasonable alternatives for consideration in this EIS.

As the location where the B-21 aircraft would be primarily located, the MOB 1 alternatives considered in this EIS are Dyess AFB (Texas) or Ellsworth AFB (South Dakota). As described in Section 1.1 (Introduction), Whiteman AFB (Missouri) was also identified as a potential host for the new B-21 aircraft. The Secretary of the Air Force has announced the preferred basing location as Ellsworth AFB and Dyess AFB as a reasonable alternative. Whiteman AFB is a candidate for subsequent MOB 2 and/or MOB 3 beddowns because B-2 operations would need to continue there for the near-term, foreseeable future to maintain continuous deterrence capabilities as the B-21 comes into service.

This EIS focuses on locating MOB 1 at only Dyess AFB or Ellsworth AFB. Any basing actions proposed to take place at Whiteman AFB would be addressed in a separate NEPA analysis and documentation.

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#### 2.2.1 Screening Criteria Process for MOB 1

The USAF used a three-phased screening process to identify reasonable alternatives for MOB 1 locations. Phase 1 of the process consisted of developing and applying initial screening criteria for the new B-21 mission. Phase 2 involved reviewing the current Global Strike Command mission at each base. Phase 3 incorporated assessments of the

- 1 missions that will be replaced by the B-21 mission, including an appropriate time-phased
- 2 reduction of B-1 and B-2 aircraft.

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### 3 **2.2.1.1 Identification of Enterprise Bases and Objective Screening Criteria**

4 The USAF uses the Strategic Basing Process outlined in AFI 10-503, *Strategic Basing*,  
5 to select locations to base USAF missions. The process begins by identifying all the  
6 bases that could reasonably support a given mission. The USAF then evaluates that  
7 “enterprise of bases” using objective criteria to screen for the top candidate bases. The  
8 relevant Major Command then leads site surveys at each candidate location to determine  
9 initial beddown plans and to estimate required costs. The Strategic Basing Executive  
10 Steering Group oversees the process and reports findings to the Secretary of the Air  
11 Force and Chief of Staff of the Air Force. The process was mandated by the Secretary  
12 of the Air Force to ensure that basing decisions basing decisions are made using a  
13 standardized, repeatable, transparent, and deliberate process.

14 The B-21 basing strategy was a deliberate process to minimize mission impact, maximize  
15 facility reuse, and minimize cost. Therefore, the “enterprise of bases” was limited to  
16 current Air Force Global Strike Command bomber bases (Barksdale, Dyess, Ellsworth,  
17 Minot, and Whiteman AFBs) (Figure 2.2-1). All non-bomber bases were eliminated due  
18 to their limited runway length, ramp and hangar deficiencies, and insufficient concrete  
19 strength for bomber operations, which make them incapable of supporting the B-21  
20 mission.

21 The objective screening criteria included essential requirements needed to base and  
22 operate the B-21 Raider at a given location. Requirements to support the B-21 Raider  
23 include sufficient runway length with adequate concrete strength and certain ramp and  
24 hangar dimensions. In addition, the USAF determined that the B-52 fleet would continue  
25 to operate well into the middle of the 21st century. Continuing the B-52 mission beyond  
26 2050 leaves both Barksdale and Minot AFBs with insufficient capacity for the additional  
27 B-21 mission. Additionally, splitting up the B-52s to various other bomber bases would  
28 incur excessive costs and would cause operational risks and impacts, which goes against  
29 the strategy of using current infrastructure and minimizing impacts to current missions.  
30 The USAF’s choice not to break up the B-52 fleet is based, in part, on a 2018 Government  
31 Accounting Office (GAO) determination that when the USAF organizes its airframe fleets  
32 (e.g., the F-22) into small wings and squadrons, it causes less-efficient operations than  
33 when fleet aircraft are based in larger groups (GAO, 2018).

34 These facts, combined with the application of the objective screening criteria, identified  
35 the following candidate bases: Dyess, Ellsworth, and Whiteman AFBs.

---

### 36 **2.2.1.2 Site Survey Criteria**

37 The USAF then assessed the ongoing Global Strike Command missions at each of the  
38 three locations against site survey criteria derived from the objective screening criteria,  
39 along with military judgement and experience, to determine an initial beddown plan at  
40 each location and to estimate required costs.

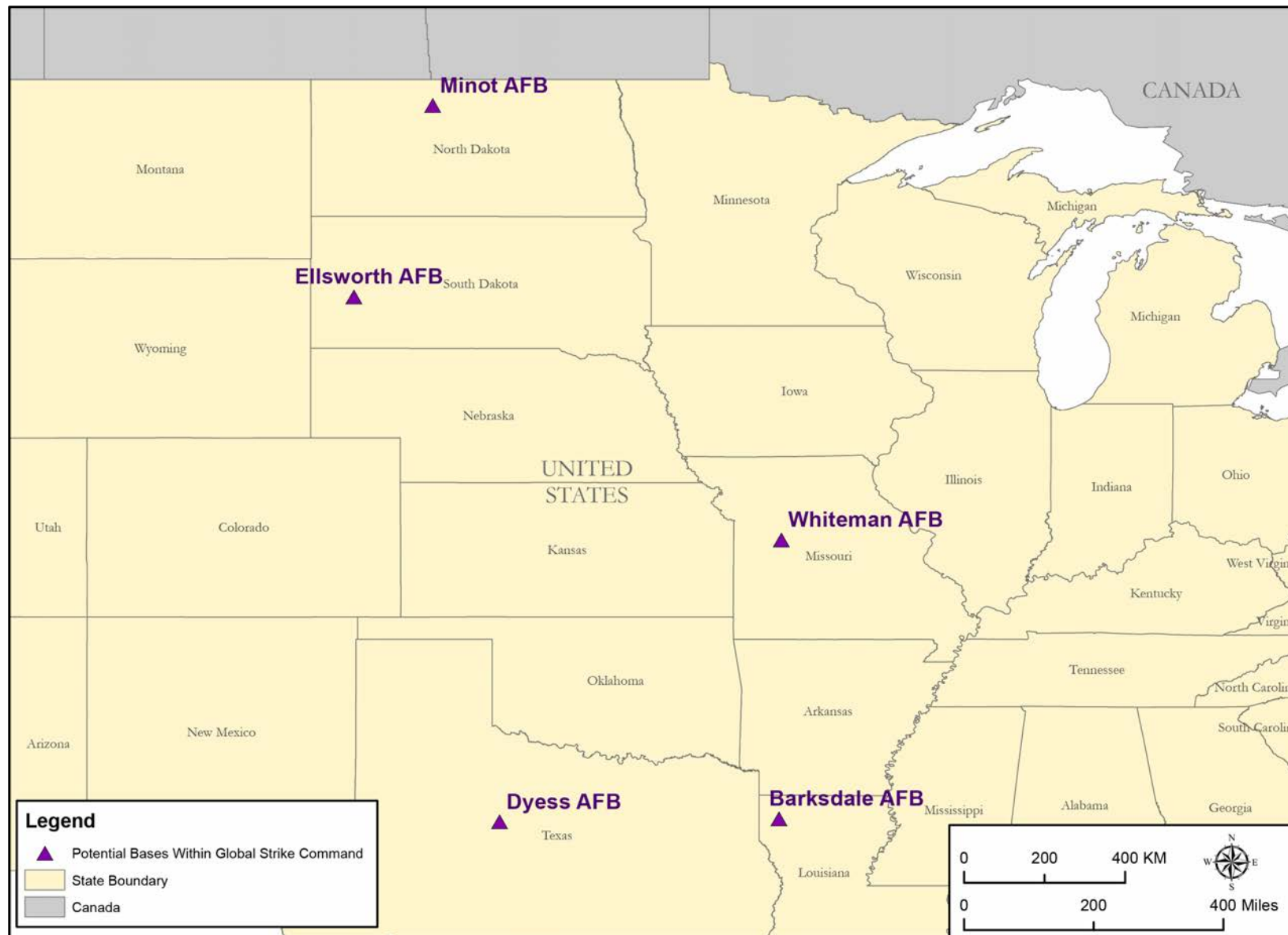


Figure 2.2-1. Possible Basing Locations Identified by Initial Screening Criteria (Phase I)

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### 2.2.1.3 Time-Phased Aircraft Drawdown Criteria

The USAF next determined the timing involved in phasing out the Global Strike Command missions that will be replaced by the B-21 mission. The USAF determined that the aging B-1 fleet would be the first bomber aircraft to transition into retirement and replaced by the B-21. As B-1 missions are phased out at a given bomber base, it would be more readily available to receive new B-21 aircraft and thus better suited as the potential location for the first main operating base (MOB 1).

Current missions were also assessed to ensure that impacts to overall Global Strike Command tactical readiness would not occur from phasing in B-21 aircraft at each base. The USAF determined that adding the B-21 mission to Whiteman AFB while the B-2 mission was still supported there would jeopardize tactical mission readiness. Currently, the B-2 mission includes the employment of nuclear weapons. These nuclear weapons will be transitioned to the B-21. However, this transition will be time-phased, depending on B-21 production rates and integration into the USAF's bomber structure and aircraft inventory. To ensure an uninterrupted deterrent related to the United States' nuclear capabilities, the USAF determined that this transfer should occur after the initial beddown of MOB 1 and that Whiteman AFB will not be considered as a potential alternative for MOB 1 because the B-2 program will remain active at Whiteman AFB until a MOB 1 for the B-21 is established.

The two remaining locations for consideration as candidate bases for MOB 1 were Dyess AFB and Ellsworth AFB, which are carried forward for detailed analysis as alternatives in this EIS.

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### 2.2.2 Screening Criteria for Base Infrastructure Development

While candidate bases Dyess AFB and Ellsworth AFB currently host B-1 missions, the support they each provide for their respective B-1 mission is unique. In an effort to use existing infrastructure in the most effective way at each candidate base, the basing planners developed additional screening criteria for each location to ensure a consistent approach in further refining potential alternatives. Applying this final screening criteria created distinct, site-specific alternatives for infrastructure and facilities at each candidate base.

The USAF's operational, safety, and airfield planning specialists evaluated each base's airfield planning criteria against B-21 aircraft requirements to identify infrastructure and facility needs. The airfield planning criteria used to evaluate each candidate base were:

- Operational readiness
- Site constraints
- Existing infrastructure evaluation

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### 2.2.2.1 Operational Readiness

Operational readiness is the ability to accommodate all mission requirements that minimizes risks so missions can be performed efficiently. The following factors were considered when determining operational readiness criteria for the B-21 mission:

- Being near training airspace and ranges where bombers currently operate
- Being near aerial refueling capability
- Operational security concerns, including strategies to prevent potential adversaries from discovering critical operations-related data
- Time-sensitive requirements, accounting for various time-sensitive B-21 mission requirements, to include round-the-clock airfield availability
- Terminal areas, which are high-traffic areas of controlled airspace surrounding a USAF base (runways, ramp space, auxiliary ground equipment, etc.)

The distance from a training airspace or aerial refueling capabilities can be measured directly, whereas the USAF must use its military judgement and experience to evaluate requirements such as operational security and time sensitivity. For evaluation of terminal areas, the USAF considered the airspace directly related to airfield operations (e.g., takeoffs, landings, low approaches, touch-and-go landings, and instrument departures/arrivals).

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### 2.2.2.2 Siting Constraints (Operational and Environmental)

The USAF analyzed the candidate bases for obstructions, built up areas, neighboring airports, topography, and soil conditions (DoD, 2006a: Unified Facilities Criteria 3-260-01). 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 Ellsworth AFB. At Dyess AFB, site constraints include floodplains and Environmental Restoration Program (ERP) sites. Planners at Ellsworth AFB identified wetland conditions that would present site constraints.

The USAF 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 (AFI 32-7063). The CZ starts at the end of the runway and extends outward 3,000 feet in length and is 3,000 feet wide. It has the highest incident of accidents of the three zones. APZ I extends from the CZ by an additional 5,000 feet by 3,000 feet, and APZ II extends from APZ I by an additional 7,000 feet by 3,000 feet, with the potential for an accident decreasing in each subsequent area.

The USAF uses Air Force Handbook 32-7084, *Air Installation Compatible Use Zones (AICUZ) Program Manager's Guide*, to implement AFI 32-7063. The USAF adopted a policy of acquiring property rights to areas designated as CZs due to the high accident

1 potential. For homes and structures currently in those areas, the USAF AICUZ program  
2 already applies.

3 In addition to CZ considerations, explosives-safety arcs were utilized to help develop  
4 siting alternatives.

---

### 5 **2.2.2.3 Existing Infrastructure Evaluation**

6 As stated in Section 2.2.1 (Screening Criteria Process for MOB 1), the B-21 basing  
7 decision strategy was a deliberate process to minimize mission impact, maximize facility  
8 reuse, and minimize cost. The USAF considered whether selection of a candidate base  
9 would unreasonably impact existing missions or create unreasonable cost associated  
10 with establishing new infrastructure.

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### 11 **2.2.3 Alternatives Considered But Eliminated From Detailed Analysis**

12 As outlined Section 2.2.1 (Screening Criteria Process for MOB 1), all continental United  
13 States non-bomber active duty bases were eliminated for consideration as well as Minot  
14 AFB, Barksdale AFB, and Whiteman AFB.

---

## 15 **2.3 COMMONALITIES**

16 The Proposed Action includes common elements that the B-21 would bring to, or require  
17 at, both candidate bases that would make them operationally ready. These commonalities  
18 are associated with personnel, airfield operations, airspace and range utilization, and the  
19 WGF.

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### 20 **2.3.1 Personnel**

21 The B-21 mission would include initial training, transition/conversion training,  
22 refresher/requalification training, and instructor training. Students entering the B-21  
23 program would be graduates of undergraduate aviator and maintainer training programs.  
24 Pilots and maintainers entering the program from another aircraft platform would go  
25 through a transitional training program, which would provide the requisite skills to meet  
26 the mission-qualified pilot or mission-qualified maintainer graduation criteria.

27 The full B-21 mission personnel complement required to execute the proposed mission  
28 would include pilot instructors, maintenance instructors, and contractor support  
29 personnel. Based on manpower reports, the USAF estimates that the B-21 MOB 1  
30 mission would require approximately 3,500 military personnel. Precise dependents  
31 demographic data for the B-21 program are not known. Therefore, to obtain the ratio of  
32 USAF active duty members to family members for this EIS, the USAF reviewed the *2018*  
33 *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 USAF personnel (DoD, 2018b). The USAF estimates total dependents associated with the B-21 MOB 1 beddown to be approximately 4,200. Additionally, the USAF also assumed that 55 percent of personnel are married, based on marital status statistics for USAF active duty members in that report (DoD, 2018b). The number of children are then calculated by subtracting the number of spouses from the total number of dependents. Table 2.3-1 presents the estimated maximum number of personnel associated with establishing the B-21 mission at the MOB 1 installation, which would be 7,700 total individuals. The B-21 MOB 1 proposal would eventually displace the personnel and aircraft associated with the B-1 mission. The eventual reduction of B-1 personnel associated with the Proposed Action would be 3,747 at Dyess AFB and 4,553 at Ellsworth AFB. Therefore, the analysis of potential impacts from changes in end-state populations at each MOB 1 location (Table 2.3-1) considers both the incoming B-21 mission and personnel as well as the retiring B-1 mission and associated personnel. Chapter 3 (Affected Environment and Environmental Consequences) provides a more detailed breakout of personnel changes in Table 3.0-1 and Table 3.0-2.

**Table 2.3-1. Personnel Associated With the Incoming B-21 Mission and End-State Personnel**

Personnel	Number of Individuals for B-21 Mission under the Proposed Action	End-State Personnel at Dyess AFB	End-State Personnel at Ellsworth AFB
Military	3,500	6,014	4,860
Civilian	NA	665	930
Contractor	NA	NA	139
Spouses <sup>1</sup>	1,925	3,674	3,261
Children <sup>2</sup>	2,275	3,745	4,553
<b>Total</b>	<b>7,700</b>	<b>14,098</b>	<b>13,743</b>

Notes:

1. Based on statistics in the 2018 Demographics Profile of the Military Community (DoD, 2018b), 55 percent of the Air Force is married.
2. The number of children was estimated by assuming there are 1.2 dependents for each military family. The number of married Air Force personnel was multiplied by 1.2 to get the total number of dependents (4,200). The number of spouses was subtracted from the total dependents to obtain the estimated number of children.

### 2.3.2 Airfield Operations

The annual estimated number of total aircraft operations is approximately 9,120 per year for all the squadrons (Operations and FTU), based on 94.5 sorties per month. Twenty percent of all sorties would be conducted between 10:00 p.m. and 7:00 a.m.

On average, approximately 3.15 sorties would be conducted per day, of which approximately 50 percent would be flown by students within the FTU and the other 50 percent by the Operations Squadrons. Of the total sorties per year, at least 3 percent additional flights may be required for re-fly requirements, whereby students conduct additional work as a result of not completing a particular flight/mission profile. In addition, approximately 3 percent of the total sorties is captured in the proposed number of sorties for continuation training and cost of business. Continuation training is associated with

1 maintaining instructor training currency, while cost of business addresses instructor  
2 proficiency, ferry flights, maintenance checks, etc., associated with the day-to-day training  
3 requirements.

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### 4 **2.3.3 Airspace and Range Utilization**

5 This EIS also addresses the B-21 training mission (Figure 2.3-1). Similar to other  
6 bombers, the B-21 can adequately train in Class A airspace using Federal Aviation  
7 Administration (FAA)-filed flight plans. However, training in Military Operating Areas  
8 (MOAs) and Air Traffic Control Assigned Airspaces (ATCAAs) provide additional flexibility  
9 and integration opportunities. For any military aircraft flying out of Ellsworth AFB, the  
10 Powder River Training Complex (PRTC) airspace is the most cost-effective and  
11 convenient training area. Other Class A airspace and Major Range and Test Facility  
12 Bases (MRTFBs) would be used on an as-needed basis. For military aircraft flying out of  
13 Dyess AFB, the Lancer MOA and the Pecos MOA and all associated ATCAAs are the  
14 most cost-effective and convenient training areas to use. Dyess AFB-based aircraft  
15 would utilize PRTC and the Brownwood MOA as supplemental training airspaces.

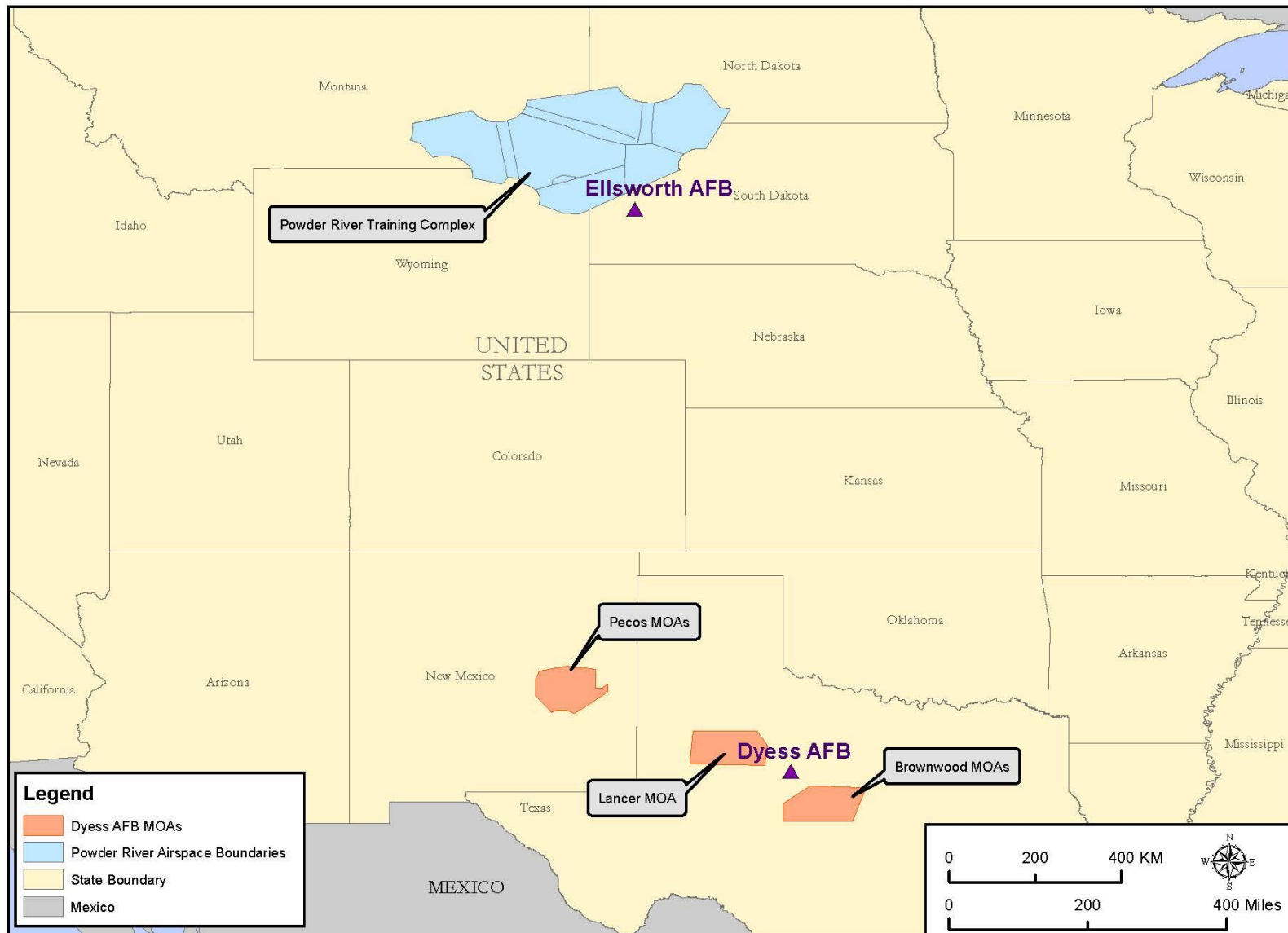
16 There are no plans to modify any of the airspace listed above as a result of the Proposed  
17 Action. PRTC-related B-21 air operations would adhere to the legal descriptions for the  
18 PRTC MOAs published in the National Flight Data Digest (effective date: September 17,  
19 2015). This airspace was analyzed in the USAF's 2014 *Final EIS for the Powder River  
20 Training Complex, Ellsworth Air Force Base, and South Dakota* (the "2014 PRTC EIS")  
21 Record of Decision (ROD) (signed on January 16, 2015) (USAF, 2015) and the FAA ROD  
22 (signed on March 24, 2015) (FAA, 2015).

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### 23 **2.3.4 Weapons Generation Facility**

24 The WGF is a facility that is unique and would require new construction at the selected  
25 base. The WGF will provide a safe and secure location for the storage of USAF nuclear  
26 munitions. The WGF will require a construction footprint of approximately 35 acres, with  
27 an approximately 52,000-square-foot building as well as an additional 17,000-square-foot  
28 munitions maintenance building. The USAF will implement construction and operations  
29 in a manner consistent with AFI 20-110, *Nuclear Weapons-Related Materiel  
30 Management*. Due to national security implications, the details regarding the  
31 infrastructure associated with the WGF is not releasable. It should be noted that the  
32 munitions storage areas for each of the candidate bases have adequate capacity for  
33 conventional USAF assets. The WGF provides a consolidated facility within a single,  
34 controlled site that accommodates maintenance, storage, and support functions under  
35 one roof to provide enhanced operations and security measures for the entire  
36 mission. The configuration of the facility allows for efficient movements of all assets in  
37 various configurations, which improves both the safety and security associated with  
38 mission requirements.

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AFB = Air Force Base; MOA = Military Operating Area

Figure 2.3-1. Range and Airspace Boundaries

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## 2.4 DYESS AFB ALTERNATIVE

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### 2.4.1 Background

Dyess AFB is located in Taylor County in west central Texas within the incorporated limits of the City of Abilene (Figure 2.4-1). The installation encompasses approximately 5,424 acres of land and hosts three runways (Dyess AFB, 2016). 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.

Originally established and operated as Abilene Army Air Base in 1942, Dyess AFB has hosted a variety of missions and aircraft types throughout its history. Currently at Dyess AFB, the 7th Bomb Wing (7 BW) 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 USAF Global Strike Command. 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 1 at Dyess AFB, which includes all common elements described above in Section 2.3 (Commonalities) plus the construction of the facilities, infrastructure, and the WGF as described in Sections 2.4.2 (Facilities and Infrastructure) and 2.4.3 (Weapons Generation Facility) below.

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### 2.4.2 Facilities and Infrastructure

As outlined in Section 2.2.1 (Screening Criteria Process for MOB 1), USAF planners applied screening criteria that included leveraging facilities and infrastructure at each base individually, factoring base-specific site constraints, to maximize facility reuse and minimize cost. This selection process uses the strengths of each base to optimize the B-21 beddown strategy. Using this process, USAF planners developed three Courses of Action (COAs) for the B-21 beddown at Dyess AFB.

The general construction footprints for each of these COAs are shown in Figure 2.4-2. There are some overlapping footprints in Figure 2.4-2 where proposed facility and infrastructure projects are the same for all three COAs.

The facilities and infrastructure projects included in COA 1 would occur along the northern end of the parking apron. COA 2 projects would be located along the middle section of the parking apron currently used by the 317th Airlift Wing for C-130J operations and associated flightline maintenance support.

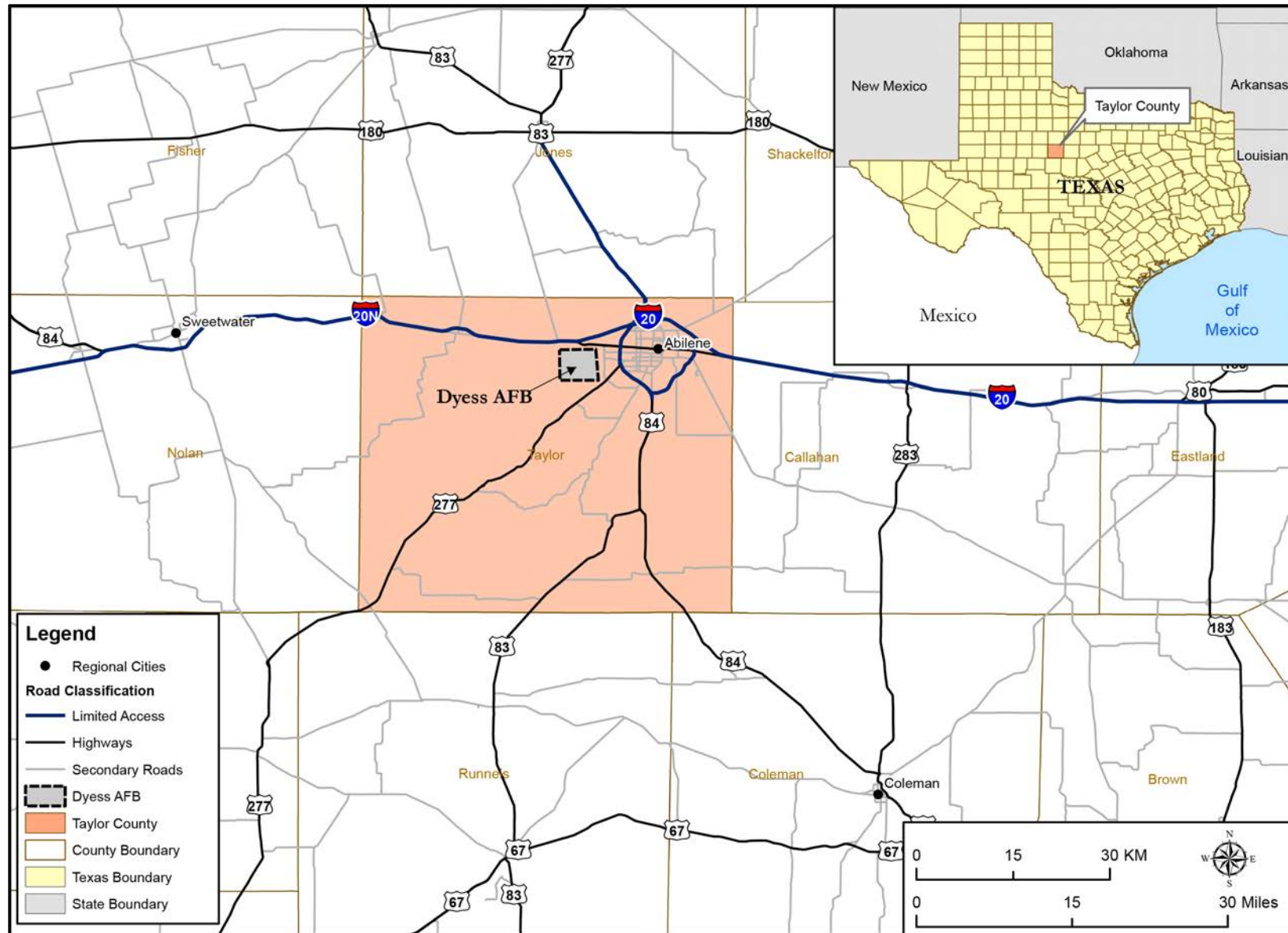
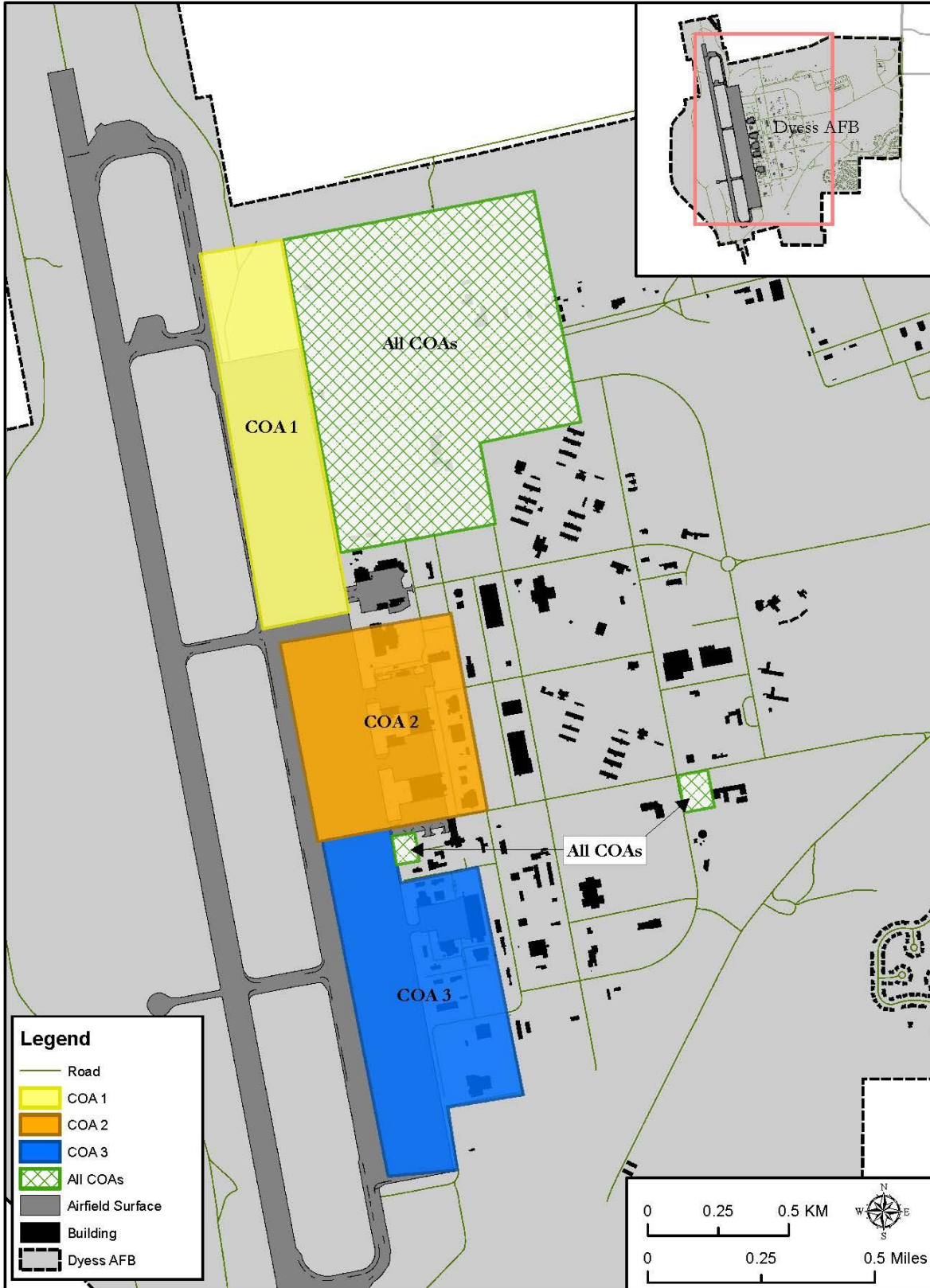


Figure 2.4-1. Dyess AFB Location



1  
2

Figure 2.4-2. Dyess Courses of Action (COAs) Evaluated for MOB 1

1 Implementation of COA 2 for the B-21 MOB 1 beddown would disrupt this critical mission  
 2 associated with the 317th Airlift Wing. Therefore, the USAF eliminated COA 2 from  
 3 consideration for MOB 1.

4 COA 3 projects would be located at the southern end of the parking apron where current  
 5 B-1 operations occur. Even though the B-21 will eventually replace B-1 bombers,  
 6 implementing COA 3 would interrupt current B-1 critical missions. Consequently, the  
 7 USAF also eliminated COA 3 from consideration for MOB 1. As shown in Figure 2.4-2,  
 8 the construction footprint associated with COA 1 consolidates all facilities and  
 9 infrastructure projects needed to support the B-21 into one main area on the base. This  
 10 configuration provides an efficient solution for establishing the necessary infrastructure  
 11 and facilities required to support MOB 1 operational functions. Furthermore,  
 12 implementation of COA 1 would not interfere with other ongoing missions at Dyess AFB.  
 13 As a result, the USAF carried forward COA 1 as part of the Dyess AFB Alternative.

14 The facilities and infrastructure projects associated with COA 1 are shown in Table 2.4-1  
 15 and would be constructed to establish the B-21 MOB 1 at Dyess AFB.

**Table 2.4-1. Facilities and Infrastructure for the Dyess AFB Alternative**

Facility	Size (square feet)	Status
Low Observable Facility	87,000	New
Fire Pump House	3,000	New
Central Maintenance Hangar Apron	235,000	New
Airfield Operations Facility	12,845	New
Fuels Support (Administrative, Lab)	6,342	New
Fuel Truck Parking Area	120,000	New
Fuel Truck Maintenance Facility	7,703	New
Long Range Strike Cargo/Terminal	5,972	New
Network Infrastructure Upgrade	50,000	New
Formal Training Unit (FTU) Operations (Ops)/Aircraft Maintenance Unit (AMU) (co- located)	50,000	New
General Maintenance (1 bay)	34,776	New
General Maintenance (1 bay)	34,776	New
Simulation Facility	20,000	New
Field Training Detachment	26,000	New
Mission Planning Cell	35,000	New
Squadron Ops/AMU 1	120,000	New
Overhead Mission Generation Shelters	18,000	New
Phase Dock (2 bays)	87,000	New
Northern Maintenance Hangar Apron	190,000	New
Parts Store	11,000	New
Warehouse SAP and Cold Storage	10,000	New
Measurements Hangar (1 bay)	60,000	New
Weapons Load Training	37,258	New
Southern Maintenance Hangar Apron	210,000	New
Fuel Cell (1 bay)	34,776	New
Fuel Cell (1 bay)	34,776	New
Armament Shop	54,993	New
1 Bay Wash Rack	34,776	New
1 Bay Wash Rack	34,776	New

**Table 2.4-1. Facilities and Infrastructure for the Dyess AFB Alternative**

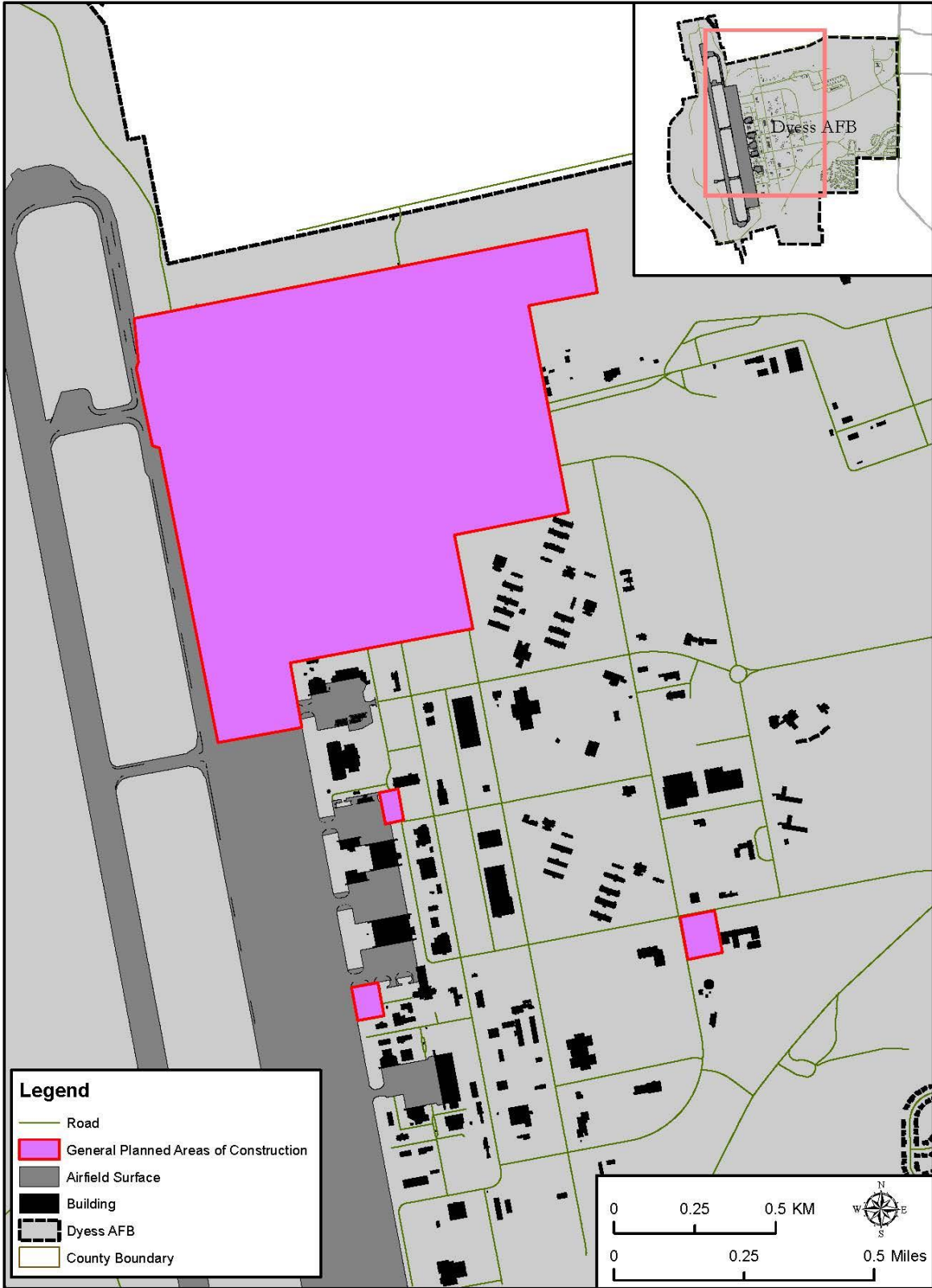
Facility	Size (square feet)	Status
Alert Facility	19,000	New
Alert Ramp	825,000	New
Aerospace Ground Equipment (AGE)	15,000	New
AGE Refueling	3,000	New
Squadron Ops 2	113,000	New
Privately Owned Vehicle Parking	16,000	New
Simulation Facility Phase II	20,000	New
Base Operating Support (BOS) – Dormitory	62,000	New
BOS – Child Development Center	10,000	Renovation
BOS – Fitness Center	15,000	Renovation
BOS – Dining Facility	4,000	Renovation
Avionics	18,000	New
AGE	10,000	Renovation
BOS – Command Post	7,000	Renovation
Alert Support Facilities	10,000	New
Engine Run Up Areas/Test Areas	630	New
Engine Shop	20,000	New
HAZMART (Hazardous Materials Pharmacy)	2,000	New
Building 4112	5,972	Demolition
Building 4119	3,382	Demolition
Building 4170	7,703	Demolition
Building 4111	7,089	Demolition
Building 9001	12,840	Demolition
1 Bay Wash Rack	34,776	Demolition

1 Due to operational security concerns, the specific locations of the facilities included in  
2 Table 2.4-1 cannot be illustrated. However, USAF planners evaluated land use limitations  
3 and identified the general planned area of construction, or construction footprint, shown  
4 in Figure 2.4-3. The resulting general planned areas of construction correspond to the  
5 COA 1 footprint shown in Figure 2.4-2. Construction associated with each of these  
6 facilities and infrastructure projects included in COA 1 would allow both initial operational  
7 flying and flight training activities associated with both the Operations and FTU  
8 squadrons.

### 9 **2.4.3 Weapons Generation Facility**

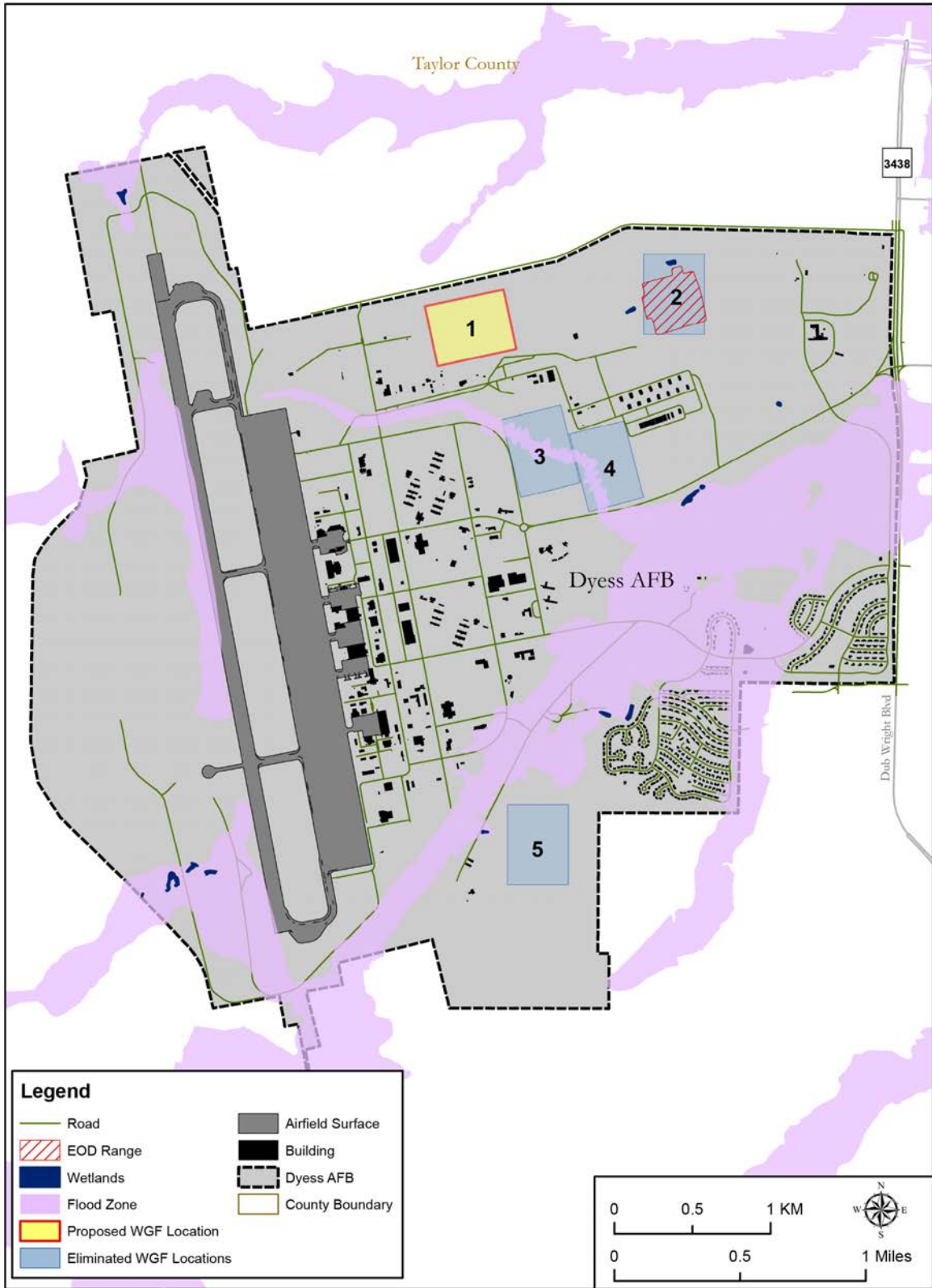
10 USAF planners identified five locations at Dyess AFB as possible sites for the WGF  
11 (Figure 2.4-4). Four locations were eliminated due to the presence of one or more  
12 negative site evaluation criteria discussed in Section 2.2.2 (Screening Criteria for Base  
13 Infrastructure Development). As shown on Figure 2.4-4, Location 2 was eliminated  
14 because it occurs at an existing Explosive Ordnance Disposal range where the presence  
15 of unexploded ordnance is possible and would require closure studies and necessitate  
16 construction of a new range at an undisturbed site. Locations 3 and 4 were eliminated  
17 because flood zones run across both sites. Location 5 was eliminated based on a  
18 combination of operational readiness concerns, including nearness to the airfield. The  
19 remaining proposed location satisfies all evaluation criteria that are unique to the WGF  
20 and is depicted as Location 1 on Figure 2.4-4.





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



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**Figure 2.4-4. Weapons Generation Facility (WGF) Planned Areas of Construction – Dyess AFB Alternative**

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## 2.5 ELLSWORTH AFB ALTERNATIVE

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### 2.5.1 Background

Ellsworth AFB consists of approximately 5,415 acres in Meade and Pennington Counties in southwestern South Dakota, 7 miles northeast of Rapid City (see Figure 2.5-1). The City of Box Elder borders the installation to the south.

The 28th Bomb Wing (28 BW) is the host unit to Ellsworth AFB and is aligned with the 8th Air Force under USAF Global Strike Command. The 28 BW is the other B-1 strategic bomber wing in the USAF, along with the 7 BW at Dyess AFB. It is responsible for training and equipping combat-ready forces for the application of conventional airpower worldwide. The primary tenants of Ellsworth AFB include the 372nd Training Squadron, the 89th Attack Squadron, the Air Force Financial Services Center, and the Air Force Office of Special Investigations Detachment 816. Currently, the B-1 is the only aircraft that operates out of Ellsworth AFB.

The Ellsworth AFB Alternative would establish MOB 1 at Ellsworth AFB, which includes all common elements described above in Section 2.3 (Commonalities). The siting of facilities, infrastructure, and the WGF on Ellsworth AFB, as described in Section 2.5.2 (Facilities and Infrastructure) and Section 2.5.3 (Weapons Generation Facility), presented the USAF with a scenario where multiple solutions have been identified for establishing MOB 1 at Ellsworth AFB. As a result, two subalternatives are associated with the Ellsworth AFB Alternative, described in Sections 2.5.4 (North WGF Site Subalternative at Ellsworth AFB) and 2.5.5 (South WGF Site Subalternative at Ellsworth AFB).

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### 2.5.2 Facilities and Infrastructure

As outlined in Section 2.2.1 (Screening Criteria Process for MOB 1), USAF planners applied screening criteria at each base individually, considering base-specific site constraints, to maximize facility reuse and minimize cost. This selection process uses the strengths of each base to optimize the B-21 beddown strategy. Using this process, USAF planners developed three COAs for the B-21 beddown at Ellsworth AFB.

The general construction footprints for each of these COAs are shown in Figure 2.5-2. There are some overlapping footprints in Figure 2.5-2 where proposed facility and infrastructure projects are the same for all three COAs.

The facilities and infrastructure projects for COA 1 would occur along the southern end of the runway. Implementation of COA 1 would re-use much of the existing infrastructure associated with the south docks, but would require maintenance operations to be split across the base. Additionally, existing infrastructure would need significant renovation and substantial pavement additions to areas associated with COA 1. Because of the cost and split maintenance operations, the USAF determined that COA 1 would not be a reasonable solution for supporting B-21 MOB 1 operations. As shown in Figure 2.5-2, facilities and infrastructure projects included in COAs 2 and 3 would be located along the north end of the runway. While COA 2 and COA 3 would be located near where current

1 B-1 operations occur, neither COA would interrupt the B-1 mission. COA 2 and COA 3  
 2 have overlapping construction footprints, but COA 3 is a variation on the use of the same  
 3 infrastructure as COA 2. After engineering review, the USAF determined that  
 4 implementing a combination of COA 2 and COA 3 would be more efficient than COA 3 in  
 5 meeting B-21 MOB 1 operations. As a result, the USAF carried forward the combination  
 6 of COA 2 and COA 3, hereinafter referred to as the revised COA 2.

7 The facilities and infrastructure projects associated with the revised COA 2 listed in  
 8 Table 2.5-1 would be implemented to establish the B-21 MOB 1 at Ellsworth AFB. Similar  
 9 to the Dyess AFB Alternative, due to operational security concerns, the exact locations of  
 10 the facilities included in Table 2.5-1 cannot be illustrated. However, Figure 2.5-3 shows  
 11 where USAF planners evaluated land use limitations and identified a general planned  
 12 area of construction, or construction footprint. The general planned areas of construction  
 13 correspond to the revised COA 2 footprint shown in Figure 2.5-2.

**Table 2.5-1. Facilities and Infrastructure for the Ellsworth AFB Alternative**

Facility	Size (square feet)	Building Type
Low Observable Facility	95,691	New
Aerospace Ground Equipment (AGE) Refueling	268,000	New
Pavement associated with 60 Row	268,000	New
Demolition associated with 60 Row	109,632	Demolition
Field Training Detachment	57,333	New
Formal Training Unit (FTU) Operations/Aircraft Maintenance Unit	93,263	New
Mission Planning Complex	47,117	New
Operations 1	4,000	Re-Use
Parts (B-1) Reno	29,165	Re-Use
AGE and Corrosion/Paint/Crane	124,694	Re-Use
Wash/Maintenance Hangar (2 bays)	56,810	New
Overhead Mission Generation Shelters (30 total)	600,000	New
Pavement	307,000	New
Simulator Building Phase 1	26,340	Add/Alter
Radio Frequency Facility (1 bay)	67,000	New
Weapons Load Training	46,624	Re-Use
Fire Pump House	3,000	New
Armament Shop	26,316 <sup>a</sup>	Re-Use
Pavement	105,000	New
Parts and Prop (B-21) Reno	40,249	Re-Use
Privately Owned Vehicle (POV) Parking	732	New
Simulator Building Phase 2	30,304	Re-Use
Weapons Load Training	46,624	Re-Use
Fuel Cell	32,094	Re-Use
Fuel Cell	28,885	Re-Use
Phase Hangar (2 bays)	54,935 <sup>b</sup>	Re-Use
Pavement	1,211,000	New
POV Parking	244	New
Alert Facility and Ramp	131,897 <sup>c</sup>	Re-Use
Alert Apron	510,088	New
Maintenance Hangar	30,729	Re-Use
Maintenance Hangar	30,776	Re-Use
Weapons Load Training	36,437	Re-Use

**Table 2.5-1. Facilities and Infrastructure for the Ellsworth AFB Alternative**

Facility	Size (square feet)	Building Type
Operations 2	4,000	Re-Use (B7270)
Pavement	845,000	Re-Use
Base Operating Support (BOS) – Dormitories (2)	170,000 <sup>d</sup>	New
BOS – Youth Center/Childhood Development Center	48,450	New
BOS – Ballfields	243,320 <sup>e</sup>	New
Combat Arms Training and Maintenance	30,000	New
Fire Station #2	23,000	New
HAZMART (Hazardous Materials Pharmacy)	16,500	Add/Alter
Rushmore Center Upgrades	66,985	Re-Use
Contractor Laydown Areas/Batch Plant	67,000	New
Supply Warehouse (replace B7510)	40,000	New

Notes:

a. Includes additional storage space

b. Total square footage for two bays

c. Includes facility and apron

d. Total square footage for two dormitories, based on 198 occupants in each

e. Assumes two football fields, one baseball field, and a 10 percent buffer area around the fields

### 2.5.3 Weapons Generation Facility

USAF planners identified six possible locations at Ellsworth AFB for the WGF (see Figure 2.5-4). After applying the screening criteria (see Section 2.2.2, Screening Criteria for Base Infrastructure Development), USAF planners eliminated four locations. Locations 2 and 3 were eliminated because they did not adequately satisfy operational readiness requirements because they were considered to be too far away from the runway and the alert apron to accommodate time-sensitive mission requirements. Location 4 was eliminated due to its proximity to wetlands, and Location 6 was eliminated due to unfavorable topography that would result in construction complications. Therefore, Locations 1 and 5 were selected as proposed locations because they satisfied the site evaluation criteria unique to the WGF.

### 2.5.4 North WGF Site Subalternative at Ellsworth AFB

In addition to the commonalities described in Section 2.3 (Commonalities), the North WGF Site Subalternative consists of constructing the WGF at a location on Ellsworth AFB hereafter referred to as the North WGF Site (Location 1 on Figure 2.5-4). The North WGF Site is located at the north end of the runway, which facilitates operational readiness requirements for the B-21 mission.

### 2.5.5 South WGF Site Subalternative at Ellsworth AFB

In addition to the commonalities described in Section 2.3 (Commonalities), the South WGF Site Subalternative consists of constructing the WGF at a location referred to as the South WGF Site (Location 5 on Figure 2.5-4). The South WGF Site occurs in a flat area adjacent to the alert apron on the south side of the base. Similar to the North WGF Site, this location meets operational readiness requirements for the B-21 mission and does not contain any other site constraint features, such as uneven topography or wetlands.

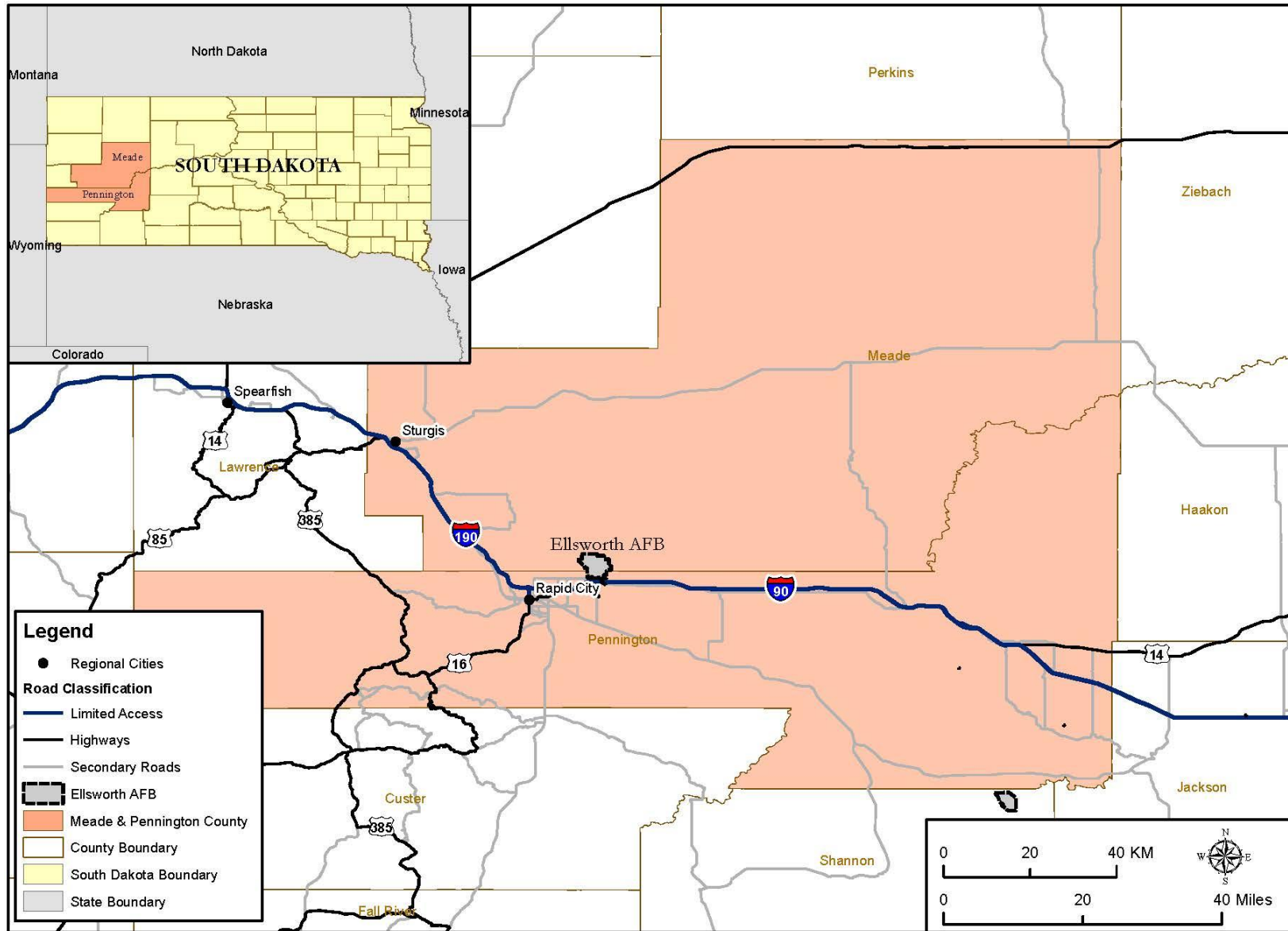
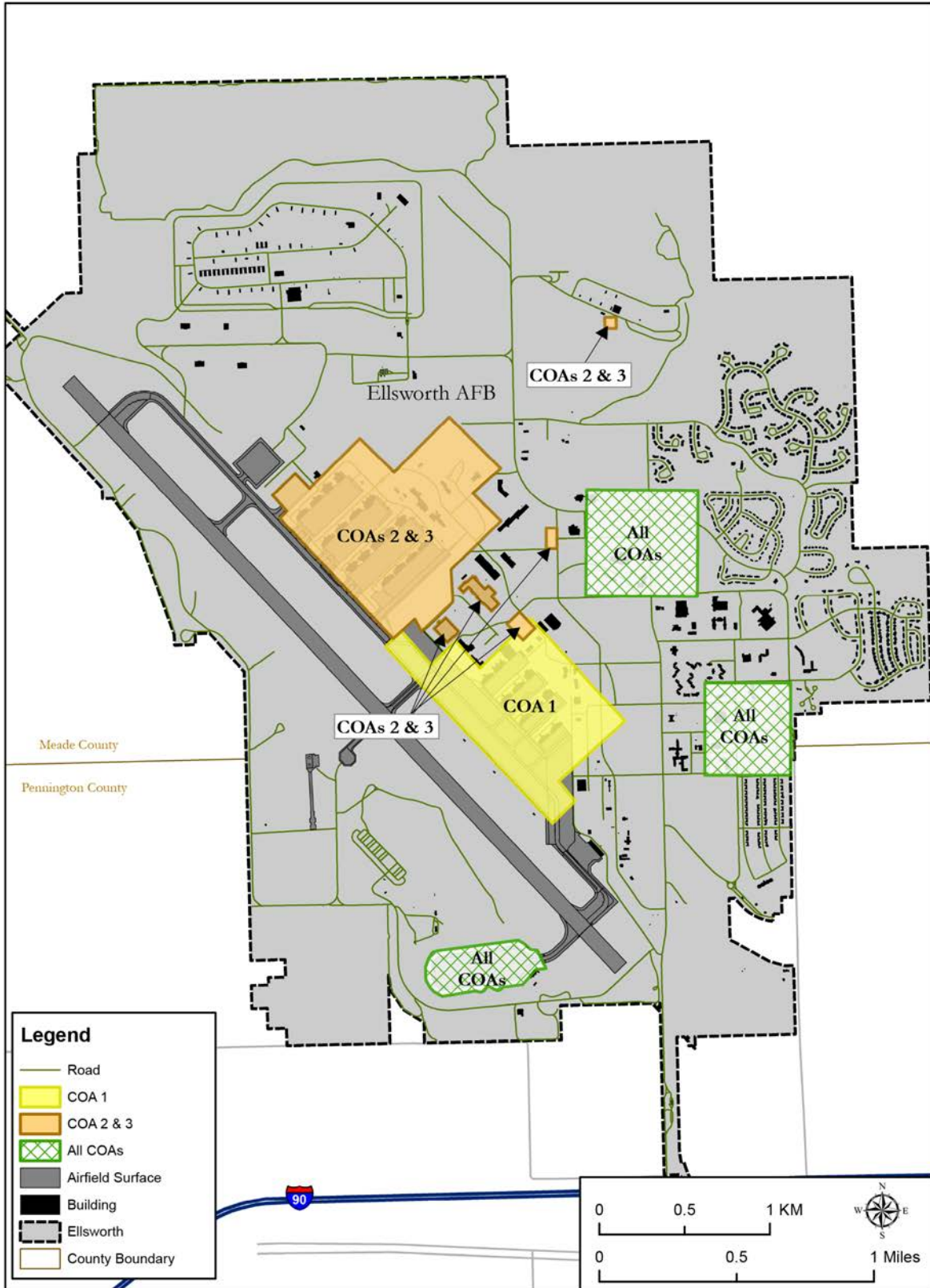
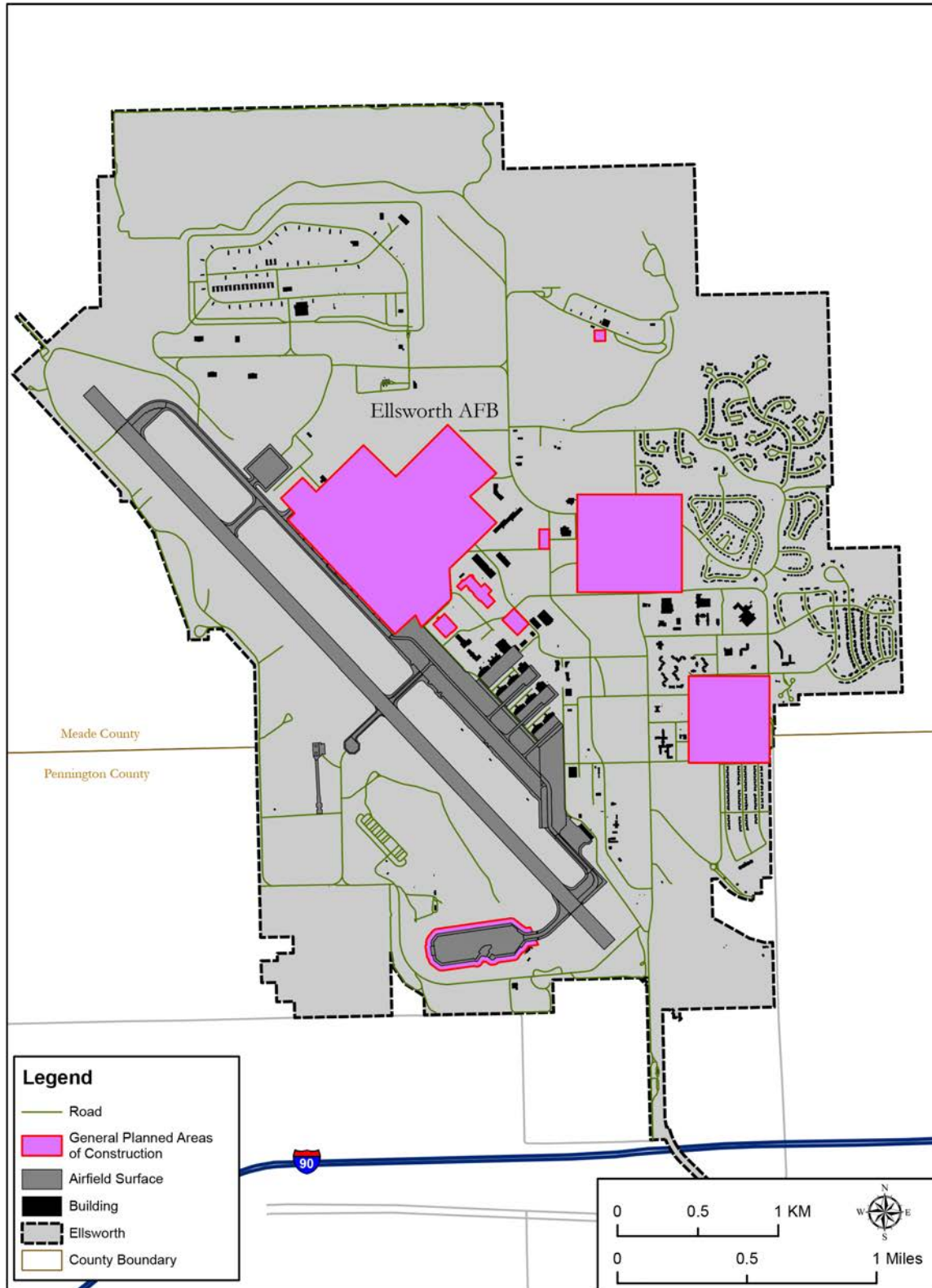


Figure 2.5-1. Ellsworth AFB Location



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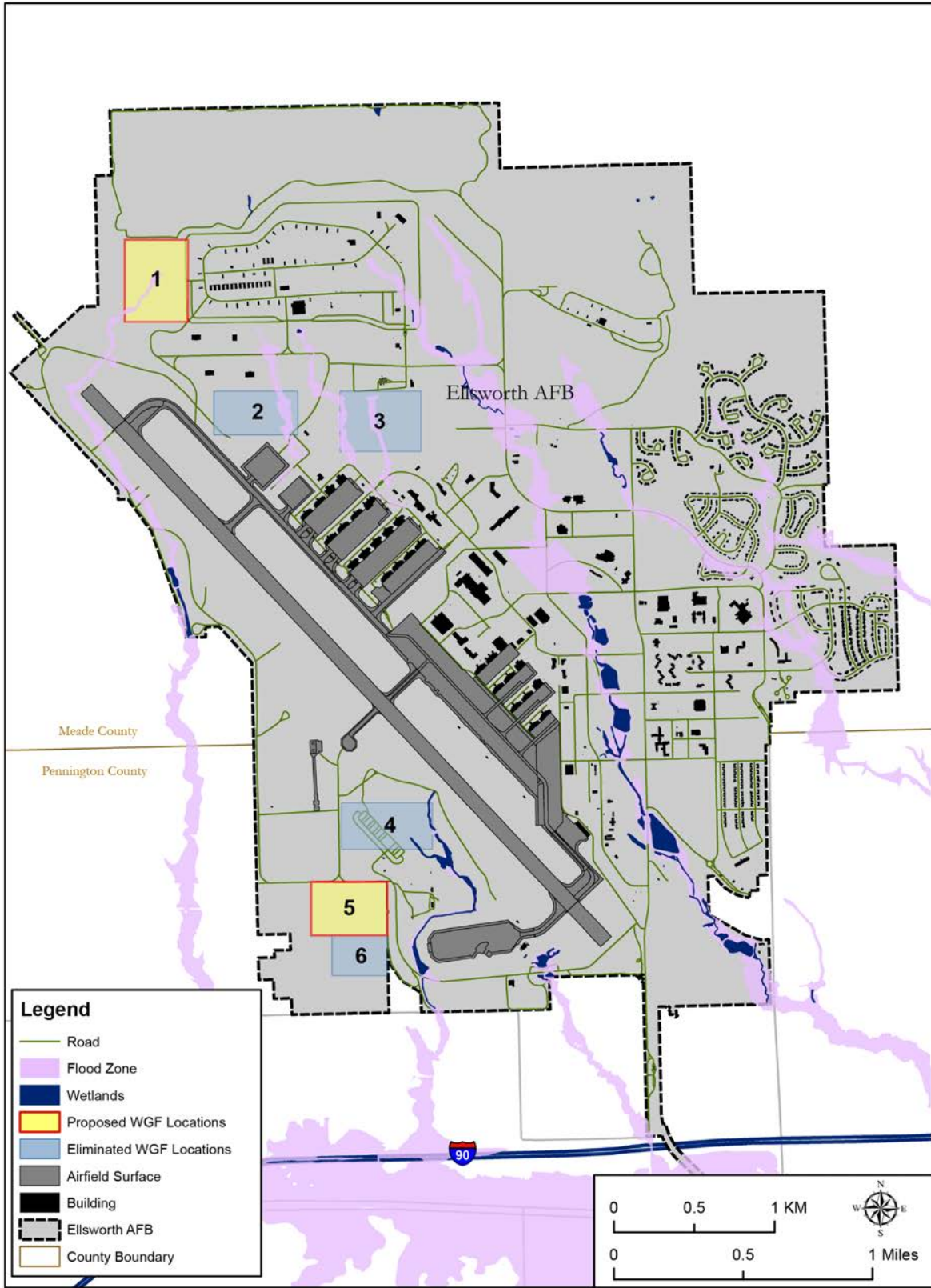
Figure 2.5-2. Ellsworth Courses of Action (COAs) Evaluated for MOB 1



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**Figure 2.5-3. Facilities and Infrastructure Planned Areas of Construction – Ellsworth AFB Alternative**





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**Figure 2.5-4. Weapons Generation Facility (WGF) Planned Areas of Construction – Ellsworth AFB Alternative**

## 1    **2.6    NO ACTION ALTERNATIVE**

2    The CEQ regulations (40 CFR 1502.14(d)) require the alternatives analysis in an EIS to  
3    “include the alternative of no action.” Under the No Action Alternative, the B-21 would not  
4    be based at either Dyess AFB or Ellsworth AFB. However, the B-21 program is a major  
5    DoD initiative to ensure that the U.S. nuclear triad, consisting of land-, submarine-, and  
6    aircraft-launched nuclear weapons, is and remains effective. The B-21 program will be  
7    implemented whether or not the No Action Alternative is selected. If the No Action  
8    Alternative was selected due to unforeseen issues, the USAF would re-evaluate their  
9    B-21 phasing approach, using the strategic basing process, and implement the basing at  
10   another, undetermined location. Under the No Action Alternative, the B-1 mission would  
11   continue at both Dyess AFB and Ellsworth AFB until the USAF conducted their re-  
12   evaluation of the B-21 phasing approach.

13   Implementation of the No Action Alternative is not likely, but analysis of this alternative  
14   provides a baseline against which decision makers can compare the magnitude of  
15   potential environmental effects resulting from the action alternatives.

16   In this EIS, under the No Action Alternative, the B-21 would not be beddown at either  
17   Dyess AFB or Ellsworth AFB. This would mean that each alternative installation would  
18   continue their individual missions at current levels that are used as the baseline for the  
19   analysis. The following sections provide descriptions of the activities associated with the  
20   No Action Alternative, categorized by (1) personnel, (2) airfield operations, (3) airspace  
21   and range utilization, and (4) facilities.

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### 22   **2.6.1    No Action Alternative at Dyess AFB**

#### 23    *Personnel*

24   Table 2.6-1 lists the total number of active military and civilian personnel and dependents  
25   associated with the No Action Alternative at Dyess AFB, which includes the total number  
26   of dependents of 5,111 persons (Dyess AFB, 2018a). Since the actual numbers of  
27   children and spouses are not provided in the *Economic Impact Statement for Dyess AFB*  
28   (2018a), this EIS extrapolates these numbers from the total number of dependents by  
29   assuming that 55 percent of the active military and civilian personnel are married. The  
30   remaining number of total dependents are counted as children.

31   Personnel supporting current B-1 operations at Dyess AFB are also presented in  
32   Table 2.6-1. The ratios of spouses and children to active military and civilian personnel  
33   were calculated and used to estimate the number of dependents specifically associated  
34   with B-1 mission personnel. Under the No Action Alternative, personnel associated with  
35   the B-1 mission would stay at Dyess AFB and these numbers are already incorporated in  
36   the total number of personnel.

**Table 2.6-1. No Action Alternative at Dyess AFB – Personnel**

Personnel <sup>a</sup>	Total Number of Individuals	Number of B-1 Mission Individuals
Active Military	4,369	1,855
Civilian <sup>b</sup>	665	NA
Contractor	NA	NA
Spouses	2,769 <sup>c</sup>	1,020 <sup>d</sup>
Children	2,342 <sup>c</sup>	872 <sup>d</sup>
<b>Total</b>	<b>10,145</b>	<b>3,747</b>

Source: (Dyess AFB, 2018a)

NA = not available

Notes:

a. Does not include private businesses on base (Branch Banks/Credit Union) or retirees

b. Includes appropriated and non-appropriated fund civilians

c. Numbers of spouses and children were extrapolated from the total dependent number of 5,111, assuming 55 percent of military and civilian personnel are married and the remaining dependents are children.

d. The number of spouses and children at Dyess AFB associated with the B-1 mission was derived by calculating the ratio of actual dependents to total active military and civilian personnel. This resulted in ratios of 0.55 spouses and 0.47 children per active military personnel. These ratios were multiplied by 1,855 to obtain numbers of spouses and children associated with the B-1 mission at Dyess AFB.

## 1 **Airfield Operations**

2 Table 2.6-2 presents the number of air operations that would occur under the No Action  
3 Alternative at Dyess AFB.

4

**Table 2.6-2. No Action Alternative at Dyess AFB – Airfield Operations**

Aircraft Type	Airfield Operations
B-1	9,720
C-130J	36,400
Transient Aircraft	2,820
<b>Total</b>	<b>48,940</b>

Source: (Dyess AFB, 2019)

Note: Operation counts are based on pilot estimates for fiscal year 2019.

Due to the numerous different types of aircraft that use Dyess AFB for transient activities, the T-38 was selected as a surrogate for air quality and noise modeling because the T-38 represents the highest percentage of transient aircraft activities at Dyess AFB.

## 5 **Airspace and Range Utilization**

6 Airspace and range utilization for the No Action Alternative at Dyess AFB would continue  
7 to include PRTC, the Nevada Test and Training Range, and the Utah Test and Training  
8 Range for supersonic training activities, as well as additional training in the airspace above  
9 the Brownwood MOA, Lancer MOA, and the Pecos MOA (Figure 2.3-1) and their  
10 associated ATCAAs.

## 11 **Facilities**

12 There would be no construction associated with the No Action Alternative at Dyess AFB.  
13 However, there would be annually planned demolition, construction, and maintenance  
14 activities, which is reflected in the cumulative impacts section.

## 2.6.2 No Action Alternative at Ellsworth AFB

### Personnel

Table 2.6-3 lists the total number of active military, civilian, and contractor personnel and dependents associated with the No Action Alternative at Ellsworth AFB, which includes the total number of dependents of 6,331 persons (Ellsworth AFB, 2016a). Since the actual numbers of children and spouses are not provided in the *Economic Impact Analysis for Ellsworth AFB* (Ellsworth AFB, 2016a), this EIS extrapolates these numbers from the total number of dependents by assuming that 55 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-1 operations at Ellsworth AFB are also presented in Table 2.6-3. 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-1 mission personnel. Under the No Action Alternative, personnel associated with the B-1 mission would stay at Ellsworth AFB and these numbers are already incorporated in the total number of personnel.

**Table 2.6-3. No Action Alternative at Ellsworth AFB – Personnel**

Personnel <sup>a</sup>	Total Number of Individuals	Number of B-1 Mission Individuals
Active Military	3,196	1,836
Civilian <sup>b</sup>	930	NA
Contractor	139	NA
Spouses	2,346 <sup>c</sup>	1,010 <sup>d</sup>
Children	3,985 <sup>c</sup>	1,707 <sup>d</sup>
<b>Total</b>	<b>10,596</b>	<b>4,553</b>

Source: (Ellsworth AFB, 2016a)

Notes:

a. Does not include private businesses on base (branch banks/credit union): 26 personnel

b. Includes appropriated and non-appropriated fund civilians

c. Numbers of spouses and children were extrapolated from the total dependent number of 6,331, assuming 55 percent of military, civilian, and contractor personnel are married and the remaining dependents are children.

d. The number of spouses and children at Ellsworth AFB associated with the B-1 mission was derived by calculating the ratio of actual dependents to total active military, civilian, and contractor personnel. This resulted in ratios of 0.55 spouses and 0.93 children per active military personnel. These ratios were multiplied by 1,836 to obtain numbers of spouses and children associated with the B-1 mission at Ellsworth AFB.

### Airfield Operations

Table 2.6-4 presents the number of airfield operations that would occur under the No Action Alternative at Ellsworth AFB.

**Table 2.6-4. No Action Alternative at Ellsworth AFB – Airfield Operations**

Aircraft Type	Airfield Operations
B-1	8,256
Transient	654
<b>Total</b>	<b>8,910</b>

Source: (Ellsworth AFB, 2019)

Note: Operation counts are based on projected fiscal year 2020 annual sorties. Transient aircraft at Ellsworth AFB include C-130J, T-38, F/A-18E/F, C-12, KC-135, P-8A, and H-60.

## 1 *Airspace and Range Utilization*

2 Until the completion of the time-phased drawdown of existing B-1 aircraft, range utilization  
3 for the No Action Alternative at Ellsworth AFB would continue to include PRTC, the  
4 Nevada Test and Training Range, and the Utah Test and Training Range for supersonic  
5 training activities.

## 6 *Facilities*

7 There would be no new construction associated with the No Action Alternative at  
8 Ellsworth AFB. However, there would be annually planned demolition, construction, and  
9 maintenance activities, which is reflected in the cumulative impacts section.

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## 10 **2.7 REGULATORY COMPLIANCE**

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### 11 **2.7.1 Other Regulations and Permit Requirements**

12 This EIS has been prepared in compliance with NEPA; other federal statutes, such as the  
13 Clean Air Act and the Clean Water Act; Executive Orders (EOs); and applicable state  
14 statutes and regulations. A list of permits and certifications was compiled and reviewed  
15 during the EIS process. Table 2.7-1 summarizes these applicable federal, state, and local  
16 permits/regulations and the potential for change to the permits due to implementing the  
17 proposed beddown or an alternative at each candidate base.

**Table 2.7-1. Applicable Federal, State, and Local Permits/Regulations**

Resource Area	Permits/Regulations	Dyess AFB Potential Changes	Ellsworth AFB Potential Changes
Air Quality	Clean Air Act, Title V Air Operating Permit	Although permit status is not likely to be affected, it would be prudent to review equipment (e.g., boilers) and operations at the proposed facilities to ensure there are no required amendments to the existing Synthetic Minor Source Air Operating Permit (RN 100218858, Permit 1377 for Dyess and Permit No. 28.9904-02 for Ellsworth).	
Environmental Justice	Executive Order (EO) 12898, <i>Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations</i> (1994)	None	
	EO 13045, <i>Protection of Children from Environmental Health Risks and Safety Risks</i> (1997)	None	

**Table 2.7-1. Applicable Federal, State, and Local Permits/Regulations**

<b>Resource Area</b>	<b>Permits/Regulations</b>	<b>Dyess AFB Potential Changes</b>	<b>Ellsworth AFB Potential Changes</b>
Biological Resources	U.S. Fish and Wildlife Service-issued depredation permits, updated annually  Ellsworth AFB: State-issued resident wildlife depredation permit and a federal bird banding permit	None	
Cultural Resources	National Historic Preservation Act (NHPA)	No permits required. Section 106 consultation with the State Historic Preservation Officer (SHPO) and Tribes will occur as needed.	No permits required. NHPA (54 United States Code 306108) consultation with the SHPO and Tribes will be conducted to determine effects and mitigate any adverse effects to historic properties associated with construction activities.
Physical Resources	Dyess AFB: Texas Pollutant Discharge Elimination System (TPDES) General Permit TXR05000; Municipal Separate Storm Sewer System (MS4) Permit TXR040000.  Ellsworth AFB: Surface Water Discharge Permit SD0000281	The Storm Water Pollution Prevention Plan (SWPPP) for each base would need to be revised to include changes to the stormwater management system, drainage pathways, and base operations after establishment of the B-21 Main Operating Base (MOB).	
	Dyess AFB: Construction General Permit TXR150000  Ellsworth AFB: Construction General Permit SDR100000	Construction projects would result in land disturbance greater than 1 acre and would require coverage under the state's Construction General Permit.	
	Dyess AFB: Floodplain development permit from Taylor County  Ellsworth AFB: Floodplain development permit from Meade County	The base may need to obtain a floodplain development permit from Taylor County for Dyess AFB or Meade County for Ellsworth AFB if B-21 facilities are to be constructed within floodplain areas.	

**Table 2.7-1. Applicable Federal, State, and Local Permits/Regulations**

Resource Area	Permits/Regulations	Dyess AFB Potential Changes	Ellsworth AFB Potential Changes
	40 Code of Federal Regulations (CFR) 112: Oil Pollution Prevention	The Spill Prevention, Control, and Countermeasures (SPCC) Plan for each base would need to be revised to include petroleum, oil, and lubricant (POL) tanks added as part of the B-21 MOB 1.	
	40 CFR 280: Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks (UST)	If new underground storage tanks are installed as part of the B-21 MOB 1, design and operation of the tanks must adhere to the requirements specified in this regulation.	
	State Storage Tank Programs	New POL tanks installed as part of the B-21 MOB 1 must be registered with the applicable state.	
	Section 438 of the Energy Independence and Security Act	Stormwater management controls would conform with Section 438 of the Energy Independence and Security Act.	None
Hazardous Materials and Hazardous and Solid Wastes	Texas: Texas Administrative Code, Title 25, Part 1, Chapter 295, Subchapter C (asbestos) and Subchapter I (lead-based paint)	Asbestos and lead-based paint abatement during construction and/or renovation activities would be subject to notification and other requirements.	
	South Dakota: Administrative Rules of South Dakota 74:31 and 74:36:08 (asbestos), Sections 402a and 404 of the Toxic Substances Control Act, Title IV (lead-based paint)		
	Department of Defense and State (South Dakota Department of Environment and Natural Resources) Memorandum of Agreement Cooperative Agreement	Ellsworth AFB has a Federal Facility Agreement that provides information on how contamination at Environmental Restoration Program (ERP) sites are addressed by USAF, federal, and state regulators.	

1 **2.8 ENVIRONMENTAL COMPARISON OF ALTERNATIVES**

2 Table 2.8-1 provides a summary of the environmental consequences of the B-21  
 3 beddown construction activities, grouped by resource area, associated with each  
 4 alternative. It also shows the No Action condition for each resource. Table 2.8-2 provides  
 5 a similar summary for B-21 flight training activities.

**Table 2.8-1. Environmental Consequences of B-21 MOB 1 Construction by Alternative**

Resource Area	Dyess AFB Alternative	Ellsworth AFB Alternative	No Action Alternative
Airspace Use and Management	Airspace would not be affected by construction activities.		
Noise	Facilities and infrastructure C&D activities would result in temporary, localized increases in noise levels. However, the installation and surrounding area is exposed to frequent loud aircraft operations noise and ground vehicle traffic noise under baseline conditions. Additionally, demolition and construction 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 annoying, but would not be significant.		Under the No Action Alternative, there would be no additional construction and no associated noise impacts.
Air Quality	Air quality impacts from construction/demolition/renovation activities would be minor and temporary. Particulate matter impacts could be reduced through the use of BMPs, such as spraying with water and covering of haul loads. Additionally, construction would likely be phased, which would serve to further minimize impacts over the length of the construction timeframe.		Under the No Action Alternative, there would be no additional construction and thus there would be no adverse impacts to regional air quality.
Land Use	All on-base development activities associated with the B-21 beddown would be conducted in accordance with installation land use planning procedures and requirements. There would be no change to existing land use designations. Any 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 would result from implementation of either alternative.		Under the No Action Alternative, the B-21 beddown would not take place at Dyess AFB or Ellsworth AFB and there would be no associated construction, demolition, or renovation activities. On-base development would continue to adhere to existing land use planning procedures and requirements. Any future development projects would be subject to project-specific environmental review. There would be no significant impacts.
Socioeconomics	New construction, demolition, and modifications to facilities and infrastructure 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.		Under the No Action Alternative, the B-21 beddown would not take place at Dyess AFB or Ellsworth AFB and there would be no construction, demolition, or renovation activities required.



**Table 2.8-1. Environmental Consequences of B-21 MOB 1 Construction by Alternative**

Resource Area	Dyess AFB Alternative	Ellsworth AFB Alternative	No Action Alternative
Environmental Justice	No impacts to environmental justice or sensitive populations would occur because all construction activities would occur within installation boundaries and noise would be intermittent and temporary.		
Biological Resources	Activities associated with construction, renovation, and demolition projects would occur in previously developed, turf, or landscaped areas. 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 area, with frequent elevated noise levels. No significant impacts to vegetation, wildlife, or special status would result from implementation of either alternative.		Under the No Action Alternative, the B-21 beddown would not take place at Dyess AFB or Ellsworth AFB, and there would be no associated construction, demolition, or renovation activities. On-base biological resources would continue to be managed through each of the installation's BASH and Integrated Natural Resource Management programs.
Cultural Resources	Construction would not directly impact any historic properties at Dyess AFB.	Three NRHP-eligible buildings, Buildings 7258, 7260, and 7262, are within the proposed construction limits and would be demolished, resulting in an adverse effect. The USAF initiated consultation with the South Dakota SHPO and the ACHP to resolve this adverse effect. The South Dakota SHPO concurred that the demolition of these buildings would result in an adverse effect, and ACHP declined to participate in the Section 106 consultation process (Appendix F, Cultural Resources). Building 7504 (PRIDE Hangar), located just outside the proposed construction limits, would be modified, but this would result in no adverse effect (the SHPO concurred February 4, 2020). Based on recommendations from the South Dakota SHPO, the South WGF Site Subalternative location	Under the No Action Alternative, no historic properties would be affected and the bases would continue to manage cultural resources in accordance with their ICRMPs.

**Table 2.8-1. Environmental Consequences of B-21 MOB 1 Construction by Alternative**

Resource Area	Dyess AFB Alternative	Ellsworth AFB Alternative	No Action Alternative
		requires an Archaeological Survey for Section 106 compliance. The Final EIS will include the findings of the Archaeological Survey and results of the Section 106 consultation.	
Physical Resources	<p>There would be low potential for soil erosion from land disturbance during construction, due to flat topography. The CES Environmental Group reviews all projects and requires erosion and sediment control measures be implemented for construction projects. Coverage under a construction general permit would be required for land disturbances greater than 1 acre. The SWPPP includes BMPs for erosion and sediment control.</p> <p>Increased runoff associated with increased impervious surfaces can be addressed through design of stormwater conveyances using established engineering standards. Increased runoff can be managed by stormwater features that treat, store, and promote infiltration of stormwater before it can impact surface waters. Stormwater management controls would be implemented in accordance with requirements in Section 438 of the Energy Independence and Security Act.</p>	<p>There would be moderate to high soil erosion potential in areas with moderate to steep topography. The base recognizes the presence of erosion-prone areas and has included erosion and sediment control measures for moderate to steep slopes in the base SWPPP. Coverage under a construction general permit would be required for land disturbance greater than 1 acre.</p> <p>Increased runoff associated with increased impervious surfaces can be addressed through design of stormwater conveyances using established engineering standards. Increased runoff can be managed by stormwater features that treat, store, and promote infiltration of stormwater before it can impact surface waters. Stormwater management controls would be implemented in accordance with requirements in Section 438 of the Energy Independence and Security Act.</p> <p>Buildings should be sited to avoid 100-year floodplains. Two of the</p>	<p>Under the No Action Alternative, there would be no impacts on physical resources from activities associated with implementation of the Proposed Action. However, demolition, construction, and maintenance would continue as part of normal operations and development; these activities may affect physical resources but would be controlled by sediment and erosion control requirements in the SWPPP for each base, as well as the construction general permit requirements, if construction involves areas greater than 1 acre.</p> <p>Overall, no significant impacts would be expected under this alternative.</p>

**Table 2.8-1. Environmental Consequences of B-21 MOB 1 Construction by Alternative**

Resource Area	Dyess AFB Alternative	Ellsworth AFB Alternative	No Action Alternative
	<p>Buildings should be sited to avoid the 100-year floodplain, which is present in a limited area within the planned primary area of construction. The existing aircraft parking apron would need to be expanded, impacting a portion of the Northern Diversion Ditch and approximately 2 acres of floodplain delineated within the ditch (an already disturbed environment). The proposed extension of the ramp to the north would require extending the existing 10-foot by 10-foot concrete box culvert that runs west to east under the main runway, maintaining similar flow capacity and discharging to the existing lined culvert of the diversion ditch. The hydrological properties of the floodplain would not be impacted. If the Dyess AFB Alternative is chosen, a Finding of No Practicable Alternative (FONPA) will be included in the Record of Decision.</p> <p>B-21 operations would not result in impacts to water quality if personnel adhere to operational requirements specified in the SWPPP, SPCC Plan, and requirements specified by the base Hazardous Material Management and Hazardous Waste Disposal Programs.</p> <p>Additional POL use and storage associated with the B-21 MOB would increase the potential for</p>	<p>planned construction areas and the planned North WGF site include 100-year floodplains. If this subalternative is selected and the floodplain area at the North WGF Site cannot be avoided, the USAF would prepare a FONPA and include it in the Record of Decision.</p> <p>B-21 operations would not result in impacts to water quality if personnel adhere to operational requirements specified in the SWPPP, SPCC Plan, and requirements specified by the base Hazardous Material Management and Hazardous Waste Disposal Programs. It is particularly important that personnel recover aircraft deicing residuals from aprons as soon as practicable.</p> <p>Additional POL use and storage associated with the B-21 MOB would increase the potential for spills, but this potential would be reduced through the application of industry standards in designing the POL storage facilities and adherence to the base SPCC Plan.</p> <p>Overall, no significant impacts would be expected under this alternative with implementation of erosion control measures in areas with moderate to steep topography, and with proper design of facilities in the 100-year floodplain that would prevent filling of or obstructions to the flood control channel.</p>	

**Table 2.8-1. Environmental Consequences of B-21 MOB 1 Construction by Alternative**

Resource Area	Dyess AFB Alternative	Ellsworth AFB Alternative	No Action Alternative
	<p>spills, but this potential would be reduced through the application of industry standards in designing the POL storage facilities and adherence to the base SPCC Plan.</p> <p>Overall, no significant impacts would be expected under this alternative.</p>		
Hazardous Materials and Hazardous and Solid Waste	<p>Hazardous Materials Management – No significant impacts related to hazardous materials would occur with implementation of established management procedures.</p> <p>Toxic Substances and Hazardous Wastes – Management of ACM and LBP generated during redevelopment 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&amp;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>		<p>Under the No Action Alternative, 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. Ongoing activities related to the management of ERP sites would continue. As such, implementation of the No Action Alternative would not result in significant impacts.</p>
Health and Safety	<p>Explosives Safety – Proposed structures within existing QD arcs would undergo an explosive safety review to ensure occupancy and land uses would be compatible with these locations. As required, the installation may implement compensatory measures, such as identifying which buildings need to be evacuated when munitions are loaded on certain areas of the flightline. Additionally, the WGF would be purpose-built to ensure that nuclear material and conventional explosives would be stored separately. Building design, combined with dedicated explosive safety and fire suppression systems, would eliminate any risk to the public. As part of this</p>		<p>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 operations. All actions would be accomplished by technically qualified personnel and would be conducted in accordance</p>

**Table 2.8-1. Environmental Consequences of B-21 MOB 1 Construction by Alternative**

Resource Area	Dyess AFB Alternative	Ellsworth AFB Alternative	No Action Alternative
	<p>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.</p> <p>Construction Safety – Ground operations and construction activities would continue to be conducted using the same safety processes and procedures as under current operations. All actions would be accomplished by technically qualified personnel and would be conducted in accordance with applicable USAF safety requirements, approved technical data, and AFOSH standards; consequently, no significant impacts would occur.</p>		<p>with applicable USAF safety requirements, approved technical data, and AFOSH standards; consequently, no significant impacts would occur.</p>
Transportation	<p>Construction, renovation, and demolition projects could potentially result in 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, as well as base access by construction crews, would result in a small increase in off-base traffic. However, the number of vehicles involved would be small, and activities would potentially occur throughout the work day. The effects of these actions would be temporary and would cease with completion of the projects. No significant impacts would result from implementation of either alternative.</p>		<p>Under the No Action Alternative, the B-21 beddown would not take place at Dyess AFB or Ellsworth AFB, and there would be no associated construction, demolition, or renovation activities. Transportation projects not associated with the B-21 beddown would continue with a project-specific environmental review. Traffic operations on and outside the bases would continue as under existing conditions. The on-base road system at Dyess AFB would continue to function adequately, with the exception of a few intersections. Traffic in areas adjacent to the base would continue to function adequately at times, but substantial traffic congestion would likely be experienced on some roads during peak hours. The on-base road system at Ellsworth AFB would continue to function adequately, with little traffic congestion. Traffic in areas adjacent to the base would generally continue to function adequately, but</p>

**Table 2.8-1. Environmental Consequences of B-21 MOB 1 Construction by Alternative**

Resource Area	Dyess AFB Alternative	Ellsworth AFB Alternative	No Action Alternative
			some intersections would likely operate at poor service levels. Although off-base transportation service levels would be low at some times and locations, activities at Dyess AFB and Ellsworth AFB would have little effect on operations, and impacts would be less than significant.
Utilities and Infrastructure	Utility usage would not exceed any permitted/allowed usage capacity limits. There would be no significant impacts on utilities.		Under the No Action Alternative, utility usage under would continue to be well below permitted/allowed capacity limits. There would be no significant impacts.

ACM = asbestos-containing materials; AFB = Air Force Base; AFOSH = Air Force Occupational and Environmental Safety, Fire Protection, and Health; APZ = accident potential zone ; BASH = bird/wildlife-aircraft strike hazard; BMP = best management practice; C&D = construction and demolition; CES = Civil Engineering Squadron; EIS = Environmental Impact Statement; ERP = Environmental Restoration Program; ESP = Explosive Site Plan; ICRMP = Integrated Cultural Resources Management Plan; LBP = lead-based paint; LOS = level of service ; MOB 1 = Main Operating Base 1; MSW = municipal solid waste; NRHP = National Register of Historic Places; PFAS = per- and polyfluoroalkyl substances; POL = petroleum, oil, and lubricant; QD = quantity-distance; ROI = region of influence; SHPO = State Historic Preservation Officer; SPCC = Spill Prevention, Control, and Countermeasures; SWPPP = Storm Water Pollution Prevention Plan; USAF = U.S. Air Force; WGF = Weapons Generation Facility

**Table 2.8-2. Environmental Consequences of B-21 Flight Training at MOB 1 by Alternative**

Resource Area	Dyess AFB Alternative	Ellsworth AFB Alternative	No Action Alternative
Airspace Use and Management	Air operations (takeoffs, landings, and closed patterns) at Dyess AFB would decrease by 1.12 percent from baseline levels. Flight operations would decrease across all SUAs with the exception of the Pecos MOA, which would increase by approximately 15 percent; this could lead to increased congestion and/or scheduling impacts. However, because the B-21 would tend to use higher airbands, airspace would not likely be adversely impacted. Furthermore, 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 decreased by nearly 18 percent, could be utilized more extensively to alleviate any strains in the Pecos MOA.	Flight operations would increase by up to 15.8 percent at Ellsworth AFB. Total flight operations at PRTC would increase by 41.1 percent. This could lead to increased congestion and/or scheduling impacts. However, because the B-21 would tend to use higher airbands, airspace would not likely be adversely impacted. Additionally, as the program develops SUA usage and distribution may be adapted to better accommodate the B-21 training mission.	Under the No Action Alternative, there would be no changes to operations or airspace use. The USAF would continue to adhere to the legal descriptions for the PRTC MOAs published in the National Flight Data Digest (effective date: September 17, 2015).
Noise	Under the Dyess AFB Alternative, 4,355 acres and an estimated 496 persons could be exposed to noise levels exceeding 65 dB DNL near Dyess AFB. Overall, this is a decrease of 7,142 acres and 923 persons from the No Action Alternative. Because the B-21 is projected to be generally quieter and tends to fly higher than the B-1, the noise in the area and the number of acres and people impacted would decrease overall as a result of implementing the Proposed Action at Dyess AFB. Noise levels beneath the SUAs would decrease or remain the same, and there would be no adverse impacts.	Under the Ellsworth AFB Alternative, 1,610 acres and an estimated 358 persons could be exposed to noise levels exceeding 65 dB DNL near Ellsworth AFB. This represents a decrease of 4,224 acres and 1,627 persons from the No Action Alternative. Because the B-21 is projected to be generally quieter and tends to fly higher than the B-1, the noise in the area and the number of acres and people impacted would decrease overall, as a result of implementing the Proposed Action at Ellsworth AFB. Noise levels beneath PRTC would decrease or remain the	Under the No Action Alternative, there would be no changes to operations, and noise levels would remain at baseline levels.

**Table 2.8-2. Environmental Consequences of B-21 Flight Training at MOB 1 by Alternative**

Resource Area	Dyess AFB Alternative	Ellsworth AFB Alternative	No Action Alternative
		same, and there would be no adverse impacts.	
Air Quality	Under the Dyess AFB Alternative, air emissions at Dyess AFB due to increased personnel and training operations would increase from the ROI baseline. However, emissions of all criteria pollutants other than CO would increase by less than 3.5%. CO emissions would decrease under the Dyess AFB Alternative. B-21 flight operations in the SUAs would typically occur higher than the B-1 currently, so emissions in the SUAs would decrease or remain nominal. Therefore, there would be no adverse impacts to regional air quality.	Under the Ellsworth AFB Alternative, air emissions at Ellsworth AFB due to increased personnel and training operations would decrease from the ROI baseline for all criteria pollutants except for NO <sub>x</sub> emissions, which would increase by approximately 1.6%. The B-21 would typically fly higher than the B-1 currently, so emissions in the PRTC would decrease for all criteria pollutants. Therefore, there would be no adverse impacts to regional air quality.	Under the No Action Alternative, there would be no changes to operations and the emissions would remain at baseline levels. Regional air quality would not be adversely impacted.
Land Use	The on-base and off-base noise zones associated with aircraft 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 airspace for either alternative would decrease or remain the same relative to existing conditions, and there would be no significant impacts due to airspace and range utilization.		The B-21 beddown would not take place at Dyess AFB or Ellsworth AFB, and there would be no change to existing noise zones or APZs resulting from aircraft operations. Incompatible land use would continue, but impacts would be less than significant due to the relatively small area affected. There are no known USAF initiatives that would result in ground-disturbing activities that would cause changes to land use under the PRTC, Lancer MOA, Brownwood MOA, or Pecos MOA airspace. Aircraft operations would continue at current levels because the B-21 MOB 1 beddown would not occur.
Socioeconomics	There would be a total end state of 14,098 active military, civilians,	There would be a total end state of 13,743 active military, civilians,	Under the No Action Alternative, there would be no personnel



**Table 2.8-2. Environmental Consequences of B-21 Flight Training at MOB 1 by Alternative**

Resource Area	Dyess AFB Alternative	Ellsworth AFB Alternative	No Action Alternative
	<p>contractors, and dependents under this alternative, which equates to approximately 3,953 more people in the ROI than under the No Action Alternative.</p> <p>There would be a total of 7,419 dependents at the end state, which is approximately 2,308 more than under the No Action Alternative. Of the 7,419 dependents, approximately 1,951 would be children of school age (5 to 18 years old), a change of 727 from the No Action Alternative, and would be enrolled in the Abilene ISD within the ROI.</p> <p>An end state of 6,014 active military and 665 civilian USAF employees would have a direct impact of 6,679 jobs. Direct jobs would have an impact of 2,232 indirect jobs, with a value of \$84,874,718; this would be approximately 1,645 more direct jobs, 477 indirect jobs, and a \$19,945,461 value from indirect jobs compared to the No Action Alternative.</p> <p>An end state of 6,014 active military personnel would result in approximately 1,347 personnel on base and 4,667 personnel off base, with a total demand for 4,282 housing units; this would be an increase of 1,170 units above what would be demanded under the No Action Alternative.</p> <p>There would be greater demand for public service professionals in the</p>	<p>contractors, and dependents under this alternative, which equates to approximately 3,147 more people in the ROI than under the No Action Alternative.</p> <p>There would be a total of 7,795 dependents at the end state, which is approximately 1,464 more than under the No Action Alternative. Of the 7,795 dependents, approximately 2,358 would be children of school age (5 to 18 years old), a change of 284 from the No Action Alternative, and would be enrolled in the local school districts within the ROI.</p> <p>An end state of 4,860 active military and 930 civilian USAF employees would have a direct impact of 5,790 jobs. Direct jobs would have an impact of 2,110 indirect jobs, with a value of \$86,518,200; this would be approximately 1,664 more direct jobs, 582 indirect jobs, and \$23,878,400 value from indirect jobs compared to the No Action Alternative.</p> <p>An end state of 4,860 active military personnel would result in approximately 1,638 personnel on base and 3,222 personnel off base, with a total demand for 2,956 houses; this would be an increase of 1,011 units above what would be</p>	<p>changes. Under this alternative, population, employment, housing, education, and public services in the ROI would continue to follow existing trends and grow at average annual growth rates similar to those experienced over the last several years.</p>

**Table 2.8-2. Environmental Consequences of B-21 Flight Training at MOB 1 by Alternative**

Resource Area	Dyess AFB Alternative	Ellsworth AFB Alternative	No Action Alternative
	<p>Abilene MSA ROI. For example, to keep the level of service similar to the national average, approximately 22 medical professionals, 26 career firefighters, 85 volunteer firefighters, and 39 law enforcement personnel may be required to support the incoming 14,098 personnel and dependents associated with the Dyess AFB Alternative. This would represent an estimated change of 6 medical professionals, 7 career firefighters, 24 volunteer firefighters, and 11 law enforcement personnel. A greater number of public service professionals may be required during construction activities.</p>	<p>demand under the No Action Alternative.</p> <p>There would be greater demand for public service professionals in Meade and Pennington Counties. For example, to keep the level of service similar to the national average, approximately 22 medical professionals, 25 career firefighters, 83 volunteer firefighters, and 38 law enforcement personnel may be required to support the incoming 13,743 personnel and dependents associated with the Ellsworth AFB Alternative. This would represent an estimated change of 5 medical professionals, 6 career firefighters, 19 volunteer firefighters, and 9 law enforcement personnel. A greater number of public service professionals may be required during construction activities.</p>	
Environmental Justice	<p>Implementation of the Dyess AFB Alternative would result in a 65 percent decrease in total residents exposed to noise levels greater than 65 dB once all B-21 aircraft have replaced the B-1, and a 39 percent decrease during the Dyess AFB Alternative Snapshot Scenario.</p> <p>Environmental justice and sensitive populations exposed to noise levels greater than 65 dB would also decrease. Minority and low-income residents would decrease by 63 and 73 percent, respectively; youth and elderly</p>	<p>Implementation of the Ellsworth AFB Alternative would result in an 82 percent decrease in total residents exposed to noise once all B-21 aircraft have replaced the B-1, and a 51 percent decrease during the Ellsworth AFB Alternative Snapshot Scenario.</p> <p>Environmental justice and sensitive populations exposed to noise levels greater than 65 dB would also decrease. Minority and low-income residents would decrease by 86 and 82 percent, respectively; youth and</p>	<p>Under the No Action Alternative, residents within the ROI would continue to be exposed to noise levels described under the No Action Alternative at Dyess AFB and Ellsworth AFB.</p>

**Table 2.8-2. Environmental Consequences of B-21 Flight Training at MOB 1 by Alternative**

Resource Area	Dyess AFB Alternative	Ellsworth AFB Alternative	No Action Alternative
	<p>residents would decrease by 70 and 66 percent, respectively, under the Dyess AFB Alternative. Under the Dyess AFB Alternative Snapshot Scenario, minority and low-income residents would decrease by 38 and 44 percent, respectively; youth and elderly residents would decrease by 39 and 37 percent, respectively.</p> <p>Therefore, positive impacts to environmental justice and sensitive populations would occur, due to decreased noise levels in the ROI.</p>	<p>elderly residents would decrease by 83 and 81 percent, respectively, under the Ellsworth AFB Alternative. Under the Ellsworth AFB Alternative Snapshot Scenario, minority and low-income residents would decrease by 52 and 43 percent, respectively; youth and elderly residents would decrease by 48 and 52 percent, respectively.</p> <p>Therefore, positive impacts to environmental justice and sensitive populations would occur, due to decreased noise levels in the ROI.</p>	
Biological Resources	<p>Under the Dyess AFB Alternative, the annual estimated number of total aircraft operations would vary by airspace. Decreases in air operations would occur at Dyess AFB, PRTC, Lancer MOA, and Brownwood MOA. An increase in air operations would occur at the Pecos MOA, potentially increasing bird/wildlife-aircraft strikes. Adherence to the existing BASH program and the USFWS-issued Depredation Permit conditions would 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 air operations associated with the B-21 would adhere to the limitations established in the USAF's PRTC EIS ROD (USAF, 2015) and the FAA ROD (FAA, 2015).</p>	<p>Under the Ellsworth AFB Alternative, the annual estimated number of total aircraft operations would increase. Any increase in operations would potentially increase the potential for bird/wildlife aircraft strikes. Adherence to the existing BASH program and the USFWS-issued Depredation Permit conditions would minimize the risk of bird-aircraft strikes at Ellsworth AFB, including those for migratory birds (including BCC) and special status species birds, to negligible levels. The air operations associated with the B-21 would adhere to the limitations established in the USAF's PRTC EIS ROD (USAF, 2015) and the FAA ROD (FAA, 2015).</p> <p>Noise levels would decrease from the baseline conditions analyzed under the No Action Alternative.</p>	<p>Under the No Action Alternative, aircraft operations and airspace use under current operational parameters would continue at baseline levels, because the B-21 MOB 1 beddown would not occur.</p>

**Table 2.8-2. Environmental Consequences of B-21 Flight Training at MOB 1 by Alternative**

Resource Area	Dyess AFB Alternative	Ellsworth AFB Alternative	No Action Alternative
	<p>Noise levels would decrease from the baseline conditions analyzed under the No Action Alternative. Because the B-21 is projected to be generally quieter and tends to fly higher than the B-1, the noise in the area, the number of acres, and wildlife exposed would decrease overall, as a result of establishing the B-21 MOB 1 beddown at Dyess AFB.</p> <p>No significant impacts to noise-sensitive wildlife, special status species, migratory birds (including BCC), and bald or golden eagles within the training airspace and ranges would occur under the Dyess AFB Alternative.</p>	<p>Because the B-21 is projected to be generally quieter and tends to fly higher than the B-1, the noise in the area, the number of acres, and wildlife exposed would decrease overall, as a result of establishing the B-21 MOB 1 beddown at Ellsworth AFB.</p> <p>No significant impacts to noise-sensitive wildlife, special status species, migratory birds (including BCC), and bald or golden eagles would occur under the Ellsworth AFB Alternative.</p>	
Cultural Resources	<p>Because the B-21 is projected to be generally quieter than the B-1, noise levels received by historic properties at either base would be less than current levels. Because the B-21 tends to fly higher than the B-1, noise in the airspace associated with each alternative would be the same or less than the No Action Alternative, and no adverse impacts due to noise are expected. The PRTC Programmatic Agreement is currently being renewed and will address aircraft operations.</p>		<p>Under the No Action Alternative, operations would continue in accordance with existing procedures and the PRTC Programmatic Agreement is currently being renewed and will address aircraft operations.</p>
Physical Resources	<p>Water resources 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 and volume of hazardous waste generated are not expected to change under any alternative. With continued implementation of hazardous material and hazardous waste management actions, as well as spill prevention and response plans, significant impacts would not be expected under either alternative.</p>		<p>Under the No Action Alternative, normal operations at each base may affect physical resources. However, impacts would not be significant.</p>
Hazardous Materials and Hazardous and Solid Wastes	<p>There would be no potential impacts to hazardous materials and hazardous wastes under any alternative.</p>		
Health and Safety	<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</p>		<p>Under the No Action Alternative, the installations would continue current operations using the B-1 aircraft.</p>

**Table 2.8-2. Environmental Consequences of B-21 Flight Training at MOB 1 by Alternative**

Resource Area	Dyess AFB Alternative	Ellsworth AFB Alternative	No Action Alternative
	to the lowest possible level. These safety policies and procedures would continue under this alternative. If a mishap was to occur, there are well-established procedures for responding to aircraft mishaps on USAF and non-USAF property.		Established procedures would continue for flight safety and mishap prevention and for weapons safety.
Transportation	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 significantly 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. Without mitigation measures, additional personnel would potentially cause a significant increase in congestion and queuing near installation gates.		Under the No Action Alternative, the B-21 beddown would not take place at Dyess AFB or Ellsworth AFB, and there would be no personnel changes or associated effects to traffic operations on or adjacent to the installations. There would be no significant impacts.
Utilities and Infrastructure	Utility usage would not exceed any permitted/allowed usage capacity limits. There would be no significant impacts on utilities.		Under the No Action Alternative, utility usage would continue to be well below permitted/allowed capacity limits. There would be no significant impacts.

% = percent; AFB = Air Force Base; APZ = accident potential zone; BASH = bird/wildlife-aircraft strike hazard; BCC = Birds of Conservation Concern; BMP = best management practice; CO = carbon monoxide; dB = decibel; DNL = day-night average sound level; EIS = Environmental Impact Statement; FAA = Federal Aviation Administration; ISD = Independent School District; MOA = Military Operating Area; MOB 1 = Main Operating Base 1; MSA = Metropolitan Statistical Area; NO<sub>x</sub> = nitrogen oxides; PRTC = Powder River Training Complex; ROD = Record of Decision; ROI = region of influence; SEL = sound exposure level; SPCC = Spill Prevention, Control, and Countermeasures; SUA = Special Use Airspace; USAF = U.S. Air Force; USFWS = U.S. Fish and Wildlife Service

## 2.9 MITIGATION

Specified mitigation measures have been identified and will be carried forward, to the extent practicable, in implementing the selected alternative and will be defined in the Record of Decision. Chapter 3 (Environmental Consequences) includes and analyzes mitigations for impacts identified or required by regulation or agency guidance for each affected resource.

### 2.9.1 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 1508.20) 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

A mitigation plan will be developed in accordance with 32 CFR 989.22(d) to address specific mitigations selected in the Record of Decision. The mitigation plan, for example, will also include a Storm Water Pollution Prevention Plan (SWPPP) and a Spill Prevention, Control, and Countermeasures (SPCC) Plan or updates to these plans specific to the alternative selected. These plans are in addition to and complement any permits that may be issued to implement mission actions at the chosen alternative.

NEPA imposes a continuing duty to supplement (40 CFR 1502.9(c)) 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(c)(1)(ii)). The USAF is responsible for monitoring the predictions (e.g., impact, mitigations) made in its completed NEPA documentation (40 CFR 1505.3, 1505.2(c)). If substantial changes are recognized that are relevant to environmental concerns or that bear on a proposed action or its impacts, the USAF would reevaluate for potential impacts related to those changes.

1 **2.9.2 Proposed Resource-Specific Mitigations and Management Actions to Reduce the Potential for**  
 2 **Environmental Impacts**

**Table 2.9-1. Proposed Resource-Specific Mitigations and Management Actions to Reduce the Potential for Environmental Impacts**

Resource Area	Dyess AFB Alternative	Ellsworth AFB Alternative
Noise	Based on the noise analysis in this EIS, no mitigations would be necessary. However, the USAF is responsible for monitoring the predictions (e.g., impact, mitigations) made in its completed NEPA documentation (40 CFR 1505.3, 1505.2(c)). If substantial changes are recognized that are relevant to environmental concerns or that bear on a proposed action or its impacts, the USAF will 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 USAF monitoring.	
Air Quality	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.	
Socioeconomics	The USAF would work with the local community to assist in any way possible with the planning for the increased population and increased requirements for support.	
Cultural Resources	No mitigations would be necessary.	Appropriate mitigation for the demolition of Buildings 7258, 7260, and 7262, and any other adverse effects at Ellsworth AFB is being established through consultation with the South Dakota SHPO and other stakeholders and will be formalized in an agreement document as required by Section 106 of the NHPA.
Physical Resources	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 as soon as possible to contain and prevent off-site migration of sediment or eroded soils from the project areas.  Site drainage around the new facilities should be designed to manage the anticipated increase in runoff from increased impervious surfaces through properly	Construction-related impacts on soil and surface water quality can be reduced through implementation of erosion and sediment control measures. If possible, buildings should be sited in areas with moderate slopes and avoid disturbing areas with steep slopes, specifically at the North WGF site.  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 onsite before it can affect downstream water bodies (EPA, 2020a).

**Table 2.9-1. Proposed Resource-Specific Mitigations and Management Actions to Reduce the Potential for Environmental Impacts**

Resource Area	Dyess AFB Alternative	Ellsworth AFB Alternative
	<p>sized stormwater conveyance structures and incorporating stormwater management features such as porous pavements and infiltration basins that treat, store, and infiltrate runoff onsite before it can affect downstream water bodies (EPA, 2020a). Building sites should be located to avoid the 100-year floodplain areas, if possible.</p>	<p>Facilities and structures where military operations would involve handling of hazardous chemicals or fueling operations would be best placed where spill control valves serve as physical barriers that could prevent releases from flowing into the ponds and offsite streams.</p> <p>Building sites should be located to avoid the 100-year floodplain areas. These areas are present at the North WGF site and in two planned construction areas but are limited in areal extent and could be easily avoided.</p>
Hazardous Materials and Solid Wastes	<p>There is a potential that construction sites could be impacted by PFOS/PFOA or other contaminants (e.g., fuels, solvents). The base will comply with Air Force Guidance Memorandum 2019-32-01, <i>AFFF-Related Waste Management Guidance</i>, to manage waste streams containing PFOS/PFOA. If construction would require soil removal/disposal, then characterization and disposal would be conducted in accordance with USAF policy and guidance (Air Force Guidance Memorandum 2019-32-01). Contaminated soils may be addressed on site or disposed of in an appropriate landfill. No other 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.</p>	
Transportation	<p>During construction, demolition, and renovation activities, consider scheduling commercial deliveries outside peak traffic hours and requiring all construction crews to use the commercial gate.</p> <p>During project planning, include measures to ensure proper emergency response ability is maintained during construction activities and after project completion.</p>	



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### 2.9.3 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.
- Historical structures would be demolished at Ellsworth AFB.

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## 3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

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### 3.0 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.

Traditionally, Chapter 3 of an EIS would present the affected environment and Chapter 4 would outline the environmental consequences. This EIS combines the affected environment and environmental consequences for each environmental resource together in Chapter 3.

Additionally, as noted in Section 2.6 (No Action Alternative), the No Action Alternative for this EIS represents baseline conditions for each potentially affected resource, except for the baseline for land use, which is defined in Section 3.4.1.3 (Land Use, Analysis Methodology). 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.

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.

The "Proposed Resource-Specific Mitigations and Management Actions to Reduce the Potential for Environmental Impacts" sections identify potential mitigations or management actions that the proponent could implement to minimize or offset potential adverse impacts.

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 to B-21 aircraft operations over time, an approximation, or "snapshot" scenario was developed. This "snapshot" assumes there will be a period of time when there would be a temporary overlap of B-1 and B-21 operations and that personnel levels would be 10 percent higher and flight operations would be 20 percent above those expected at the end state of the Proposed Action, as illustrated in Table 3.0-1, Table 3.0-2, and Table 3.0-3. (The "end state" reflects the point in time when all B-21s are in place and all B-1s have been removed.)

**Table 3.0-1. Summary of Personnel at Dyess AFB with Snapshot Scenario**

Personnel <sup>a</sup>	No Action Alternative Individuals	B-1 Mission Individuals	B-21 Mission Individuals	Snapshot Analysis <sup>g</sup>			End State Personnel	End State Change Over No Action
				10% B-1 Individuals	B-21 + 10% B-1 Individuals	Total Snapshot		
Active Military	4,369	1,855	3,500	186	3,686	6,200	6,014	1,645
Civilian <sup>b</sup>	665	NA	NA	NA	NA	665	665	0
Contractor	NA	NA	NA	NA	200 <sup>h</sup>	200 <sup>h</sup>	NA	NA
Spouses	2,769 <sup>c</sup>	1,020 <sup>d</sup>	1,925 <sup>e</sup>	102	2,027	3,776	3,674	905
Children	2,342 <sup>c</sup>	872 <sup>d</sup>	2,275 <sup>f</sup>	87	2,362	3,832	3,745	1,403
<b>Total</b>	<b>10,145</b>	<b>3,747</b>	<b>7,700</b>	<b>375</b>	<b>8,275</b>	<b>14,673</b>	<b>14,098</b>	<b>3,953 (39%)</b>

Source: (Dyess AFB, 2018a)

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

Notes:

a. Does not include private businesses on base (branch banks/credit union) or retirees

b. Includes appropriated and non-appropriated fund civilians

c. Numbers of spouses and children were extrapolated from the total dependent number of 5,111, assuming 55 percent of military and civilian personnel are married and the remaining dependents are children.

d. The number of spouses and children at Dyess AFB associated with the B-1 mission was derived by calculating the ratio of actual dependents to total active military and civilian personnel. This resulted in ratios of 0.55 spouses and 0.47 children per active military personnel. These ratios were multiplied by 1,855 to obtain numbers of spouses and children associated with the B-1 mission at Dyess AFB.

e. Based on statistics in the 2018 Demographics Profile of the Military Community (DoD, 2018b), 55 percent of the Air Force is married. The number of spouses was calculated by multiplying B-21 active military personnel by 55 percent.

f. Based on statistics in the 2018 Demographics Profile of the Military Community (DoD, 2018b), there are 1.2 dependents for each active duty Air Force member, for a total of 4,200 dependents for the B-21 mission. The number of children was estimated by subtracting the number of spouses (1,925) from the total dependents (4,200).

g. Snapshot analysis considers overlap between B-21 and B-1 transition. 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.

h. Dependents were not calculated for temporary contractors (200 personnel) associated with supporting the B-21 and B-1 transition depicted in the snapshot analysis.

**Table 3.0-2. Summary of Personnel at Ellsworth AFB with Snapshot Scenario**

Personnel <sup>a</sup>	No Action Alternative Individuals	B-1 Mission Individuals	B-21 Mission Individuals	Snapshot Analysis <sup>g</sup>			End State Personnel	End State Change Over No Action
				10% B-1 Individuals	B-21 + 10% B-1 Individuals	Total Snapshot		
Active Military	3,196	1,836	3,500	184	3,684	5,044	4,860	1,664
Civilian <sup>b</sup>	930	NA	NA	NA	NA	930	930	0
Contractor	139	NA	NA	NA	200 <sup>h</sup>	339 <sup>h</sup>	139	0
Spouses	2,346 <sup>c</sup>	1,010 <sup>d</sup>	1,925 <sup>e</sup>	101	2,026	3,362	3,261	915
Children	3,985 <sup>c</sup>	1,707 <sup>d</sup>	2,275 <sup>f</sup>	172	2,447	4,724	4,553	568
<b>Total</b>	<b>10,596</b>	<b>4,553</b>	<b>7,700</b>	<b>457</b>	<b>8,357</b>	<b>14,398</b>	<b>13,743</b>	<b>3,147 (30%)</b>

Source: (Ellsworth AFB, 2016a)

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

Notes:

a. Does not include private businesses on base (branch banks/credit union): 26 personnel

b. Includes appropriated and non-appropriated fund civilians

c. Numbers of spouses and children were extrapolated from the total dependent number of 6,331, assuming 55 percent of military, civilian, and contractor personnel are married and the remaining dependents are children.

d. The number of spouses and children at Ellsworth AFB associated with the B-1 mission was derived by calculating the ratio of actual dependents to total active military, civilian, and contractor personnel. This resulted in ratios of 0.55 spouses and 0.93 children per active military personnel. These ratios were multiplied by 1,836 to obtain numbers of spouses and children associated with the B-1 mission at Ellsworth AFB.

e. Based on statistics in the 2018 Demographics Profile of the Military Community (DoD, 2018b), 55 percent of the Air Force is married. The number of spouses was calculated by multiplying B-21 active military personnel by 55 percent.

f. Based on statistics in the 2018 Demographics Profile of the Military Community (DoD, 2018b), there are 1.2 dependents for each active duty Air Force member, for a total of 4,200 dependents for the B-21 mission. The number of children was estimated by subtracting the number of spouses (1,925) from the total dependents (4,200).

g. Snapshot analysis considers overlap between B-21 and B-1 transition. 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.

h. Dependents were not calculated for temporary contractors (200 personnel) associated with supporting the B-21 and B-1 transition depicted in the snapshot analysis.

**Table 3.0-3. Summary of Operations at Both Bases with Snapshot Scenario**

Airfield/Airspace	No Action <sup>a</sup> Alternative	Proposed Action <sup>b</sup>	Airfield Operations Change from No Action Alternative	Snapshot <sup>c</sup>	Snapshot Change from No Action Alternative
<b>Dyess AFB Alternative</b>					
Dyess AFB Airfield	48,940	48,394	-546	50,327	1,387
PRTC	2,778	2,760	-18	2,834	56
Brownwood MOA	2,467	2,454	-13	2,461	-6
Lancer MOA	1,376	1,132	-244	1,301	-75
Pecos MOA	2,425	2,781	356	2,799	374
<b>Ellsworth AFB Alternative</b>					
Ellsworth AFB Airfield	8,910	10,318	1,408	11,860	2,950
PRTC	2,778	3,921	1,143	4,203	1,425

## Notes:

a. Current flight operations data provided and validated by Dyess AFB personnel, HAF/SAF, and the Air Force Civil Engineer Center.

b. 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.

c. 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.

1 In the analysis of anticipated impacts, the USAF has done its best to accurately predict  
2 potential impacts and anticipate future conditions using the best available information and  
3 tools for the EIS analysis, including the “snapshot” scenario. As a new aircraft under  
4 development, B-21 data for noise, air quality, and safety analyses for the B-21 are  
5 currently incomplete or unavailable. The CEQ regulations implementing NEPA recognize  
6 that such a situation may occur. Agencies manage such situations in accordance with 40  
7 CFR 1502.22, *Incomplete or Unavailable Information*, which provides the following  
8 guidance:

9 “When an agency is evaluating reasonably foreseeable significant adverse  
10 effects on the human environment in an Environmental Impact Statement, and  
11 there is incomplete or unavailable information, the agency shall always make  
12 clear that such information is lacking.

13 (a) If the incomplete information relevant to reasonably foreseeable significant  
14 adverse impacts is essential to a reasoned choice among alternatives, and the  
15 overall costs of obtaining it are not exorbitant, the agency shall include the  
16 information in the Environmental Impact Statement.

17 (b) If the information relevant to reasonably foreseeable significant adverse  
18 impacts cannot be obtained because the overall costs of obtaining it are  
19 exorbitant, or the means to obtain it are not known, the agency shall include  
20 within the Environmental Impact Statement the following:

- 21 1. A statement that such information is incomplete or unavailable;
- 22 2. A statement of the relevance of the incomplete or unavailable information to  
23 evaluating reasonably foreseeable significant adverse impacts on the human  
24 environment;
- 25 3. A summary of existing credible scientific evidence which is relevant to  
26 evaluating the reasonably foreseeable significant adverse impacts on the  
27 human environment; and
- 28 4. The agency’s evaluation of such impacts based upon theoretical approaches  
29 or research methods generally accepted in the scientific community. For the  
30 purposes of this Section, “reasonably foreseeable” includes impacts which have  
31 catastrophic consequences, even if their probability of occurrence is low,  
32 provided that the analysis of the impacts is supported by credible scientific  
33 evidence, is not based on pure conjecture, and is within the rule of reason.”

34 As indicated above, data for the B-21 aircraft that are necessary to model the aircraft’s  
35 noise, air quality, and safety impacts are currently unavailable. While the costs to obtain  
36 complete data for these purposes are not exorbitant, those data cannot be obtained at  
37 this time due to limitations on aircraft testing during its early developmental stage, the  
38 need for analyses during normal (versus developmental) flying conditions, and the time  
39 required to develop a flight safety record (40 CFR 1502.22(b) and 1502.22(b)(1)). The  
40 data and factors used in this analysis are presented in the body of this EIS for each  
41 alternative and further detailed in Appendix C for air quality issues.

1 Some environmental resources would not be affected by overlapping B-1 and B-21  
 2 operations. Only the resources that would be impacted by overlapping B-1 and B-21  
 3 operations present potential impacts for the “snapshot” scenario. Table 3.0-4 below  
 4 indicates whether a given resource area section includes a “snapshot” analysis.

5 **Table 3.0-4. Snapshot Analysis – Affected Resources**

EIS Section	Resource Area	Snapshot Analysis Included	
		Personnel	Operations
Section 3.1	Airspace	No	Yes
Section 3.2	Noise	No	Yes
Section 3.3	Air Quality	Yes	Yes
Section 3.4	Land Use	No	No
Section 3.5	Socioeconomics	Yes	No
Section 3.6	Environmental Justice	No	Yes
Section 3.7	Biological Resources	No	No
Section 3.8	Cultural Resources	No	No
Section 3.9	Physical Resources	No	No
Section 3.10	Hazardous Materials and Hazardous and Solid Wastes	No	No
Section 3.11	Health and Safety	No	No
Section 3.12	Transportation	Yes	No
Section 3.13	Utilities and Infrastructure	Yes	No

## 6 **3.1 AIRSPACE**

### 7 **3.1.1 Airspace, Affected Environment**

#### 8 **3.1.1.1 Description of Resource**

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

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



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

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

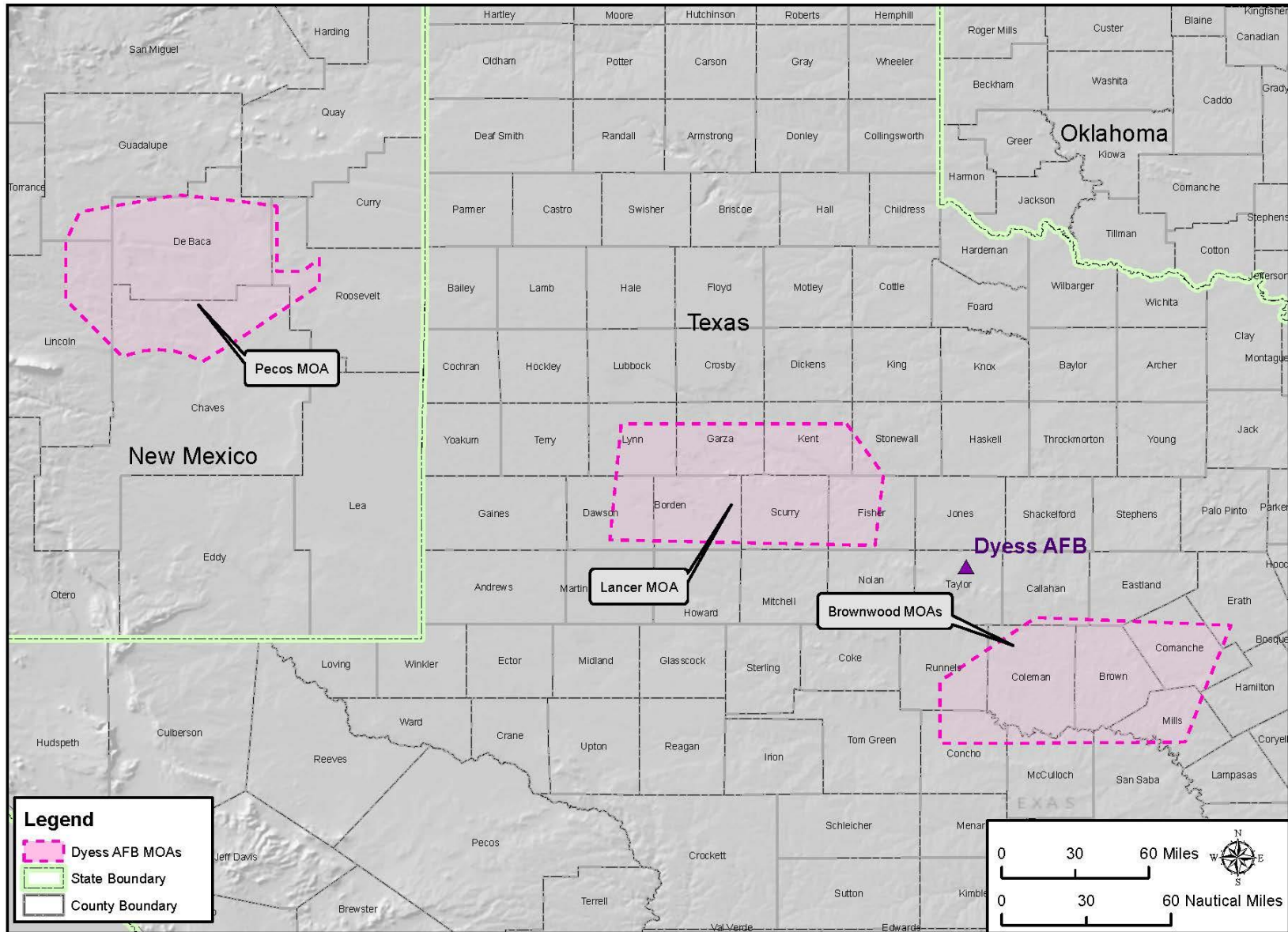
16 The USAF maintains a cooperative, working relationship with FAA in all facets of aviation  
17 and aviation safety, from coordinating at the Headquarters FAA level through the Policy  
18 Board on Federal Aviation out of the Pentagon to regional representation at the USAF  
19 base level. Military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

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### 30 **3.1.1.2 Region of Influence**

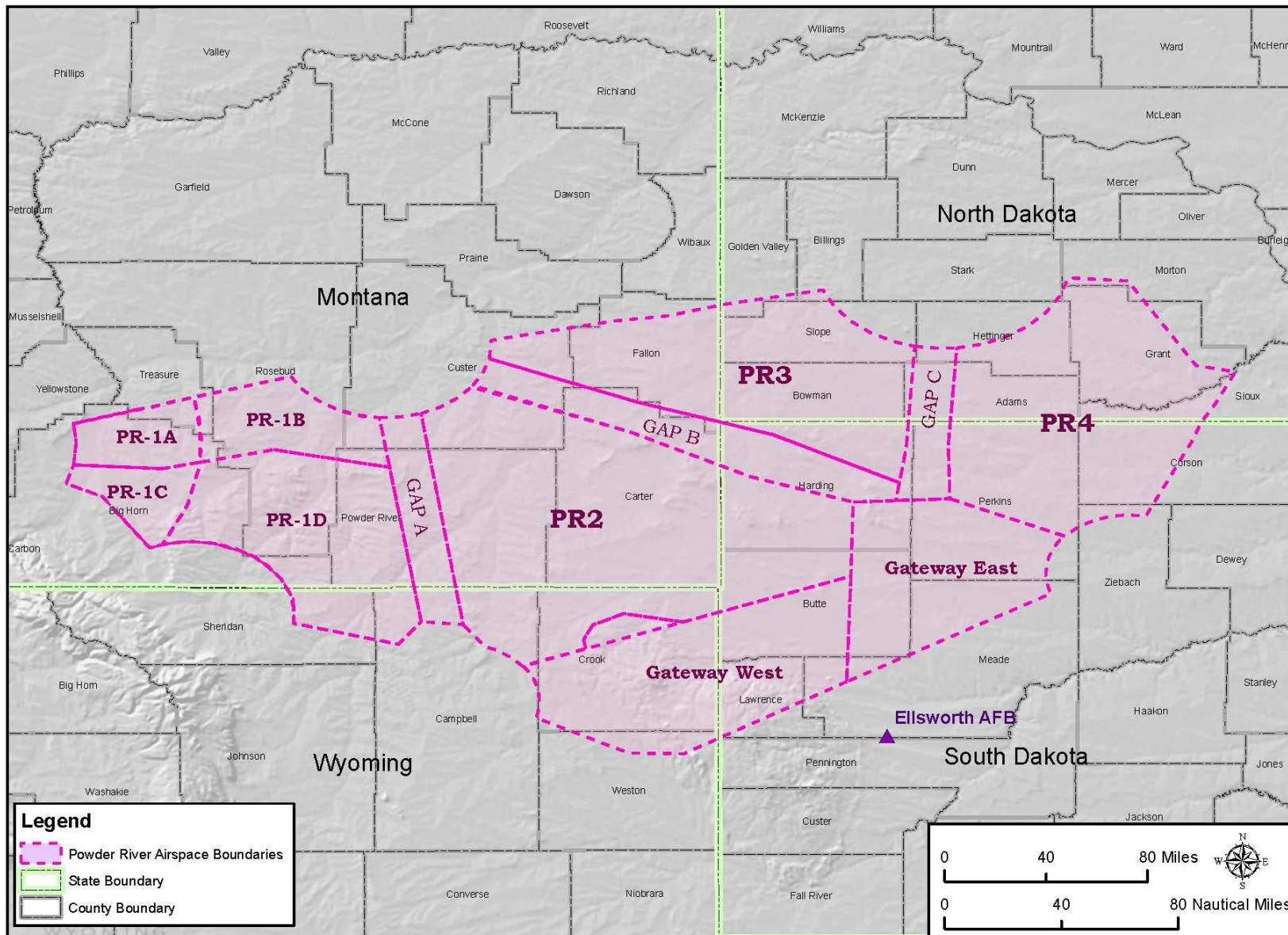
#### 31 **3.1.1.2.1 Dyess AFB**

32 For military aircraft flying out of Dyess AFB, the Lancer MOA and the Pecos MOAs and  
33 all associated ATCAAs are the most cost-effective and convenient training areas to  
34 use. Dyess AFB-based aircraft would utilize PRTC and the Brownwood MOA as  
35 supplemental training airspaces. Figure 3.1-1 shows the airspace associated with the  
36 three MOAs that would be used by the B-21 if Dyess AFB is selected as the location for  
37 MOB 1. The airspace associated with PRTC, which includes all associated MOAs and  
38 ATCAAs, was described in the 2014 PRTC EIS and its associated ROD (USAF, 2014a;  
39 USAF, 2015) and is shown in Figure 3.1-2. All PRTC-related B-21 air operations would  
40 adhere to the legal descriptions for the PRTC MOAs published in the National Flight Data  
41 Digest (effective date: September 17, 2015). The 2014 PRTC EIS and associated RODs  
42 selected the alternative called “Modified Alternative A,” which adjusted the MOAs to  
43 consist of Powder River 1 (PR-1), PR-2, PR-3, and PR-4 as shown in Figure 3.1-2.



1  
2

Figure 3.1-1. Brownwood, Lancer, and Pecos MOA Airspace



1  
2

Figure 3.1-2. Powder River Training Complex Airspace

1 Numerous federal airways, jet routes, and civil aviation airports occur within the affected  
2 environment. Ranchers, crop dusters, and other local VFR pilots may operate at lower  
3 altitudes equivalent to those of Military Training Routes (MTRs). FAA charts, publications,  
4 and procedures provide the means for VFR pilots to plan for and safely transit an MTR.  
5 Neither FAA nor the state maintains records of the amount of VFR flight activity by civil  
6 aviation in the area. It is known, however, that ranchers, cloud seeding pilots, and other  
7 local VFR pilots frequently fly in these areas. ATC procedures, charting of MTRs for pilot  
8 awareness, pilot compliance with FAA flight procedures, and required see-and-avoid  
9 techniques collectively make MTR use compatible with civil aviation activities.

10 Airfields ranging from regional county airports to small airstrips on ranches are located  
11 within the affected environment.

### 12 **3.1.1.2.2 Ellsworth AFB**

13 If Ellsworth AFB is selected as the MOB 1 location, PRTC airspace would be the primary  
14 training area for aircraft operations (Figure 3.1-2). PRTC airspace is described in the  
15 2014 PRTC EIS and associated ROD (USAF, 2014a; USAF, 2015). The 2014 PRTC EIS  
16 and associated RODs selected the alternative called “Modified Alternative A,” which  
17 adjusted the MOAs to consist of PR-1, PR-2, PR-3, and PR-4 as shown in Figure 3.1-2.  
18 Consequently, all PRTC-related B-21 air operations would adhere to the legal  
19 descriptions for the PRTC MOAs published in the National Flight Data Digest (effective  
20 date: September 17, 2015).

21 Several small public airports and private airfields are located under the PRTC airspace,  
22 with larger airports on the periphery of the airspace. Air travel can be the most practical  
23 means of transport for remote areas in southeastern Montana, the western Dakotas, and  
24 northeastern Wyoming. Emergency transport operations use the airspace for the medical  
25 evacuation of patients to regional medical centers from remote areas. Rapid delivery of  
26 machinery parts and personnel can be critical during harvesting periods or other industrial  
27 operations. Multiple public and private airfields ranging from regional county airports to  
28 small airstrips on ranches are located within the affected environment, and larger airports  
29 are located on the periphery of the direct ROI.

30 The MOAs and ATCAAs associated with the PRTC airspace are developed, coordinated,  
31 used, and managed in accordance with Letters of Agreement between the 28 BW and  
32 Salt Lake City, and Denver Air Route Traffic Control Centers. For the PRTC airspace,  
33 the Letter of Agreement defines responsibilities and outlines procedures for aircraft  
34 operations, ATC operations, and utilization of airspace for which the 28 BW is the  
35 scheduling authority. Such Letters of Agreement are supplementary to the procedures in  
36 the FAA Joint Order (JO) 7110.65Y, *Air Traffic Control*, and JO 7610.4V, *Special*  
37 *Operations*. Currently, B-1s operate within all airspace units associated with the existing  
38 complex.

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### 1 **3.1.1.3 Analysis Methodology**

2 As previously mentioned in Section 2.3.3 (Airspace and Range Utilization) and Section  
3 3.1.1.2 (Airspace, Region of Influence), none of the proposed alternatives would involve  
4 physical changes (external boundaries, dimensions, altitudes, etc.) to any airspace area  
5 currently proposed for use by the B-21.

6 Although additional airspace is not required, certain airspace may be utilized more  
7 extensively, while use of other airspace units may decrease. Therefore, the use of the  
8 current airspace would likely be adjusted. The result could potentially change noise  
9 levels, patterns, and dispersal due to changes in aircraft operations. See the noise  
10 analysis in Section 3.2 (Noise) for more details on potential noise impacts due to aircraft  
11 operation. Both civilian and military airfields share the regional airspace, both under and  
12 in the vicinity of the ROI airspace, and therefore, efficient management and safety are  
13 crucial. Mismanagement could result in the unavailability of the airspace, which could  
14 threaten military missions and impede civilian flight access to regional airports, potentially  
15 affecting recreational flight, agricultural operations, tourism, and other regional business.

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## 16 **3.1.2 Airspace, Environmental Consequences**

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### 17 **3.1.2.1 No Action Alternative Consequences**

#### 18 **3.1.2.1.1 No Action at Dyess AFB**

19 Under the No Action Alternative, existing airspace would not be modified and aircraft  
20 operations would be consistent with current activities. Under the No Action Alternative,  
21 an estimated 46,120 B-1 and C-130 annual flight operations occur, including departures,  
22 arrivals, and VFR and IFR patterns. Additional transient operations raise the annual  
23 operations to 48,940 for modeling purposes. The No Action Alternative at Dyess AFB  
24 would not contribute to air traffic controller workload or congestion in the airspace areas.  
25 B-1s at Dyess AFB would continue to use the Lancer MOA as the primary location for  
26 training and would also continue to utilize Brownwood and Pecos MOAs and their  
27 associated ATCAAs as well as PRTC for a portion of their operations. Under the baseline  
28 No Action Alternative, 2,778 annual operations are conducted in PRTC airspace,  
29 including operations from Dyess AFB. There are currently 2,467 annual operations  
30 including Dyess AFB aircraft in the Brownwood MOA annually. Under the baseline  
31 condition, there are 1,376 total aircraft operations in the Lancer MOA and 2,425 in the  
32 Pecos MOA. These operations include Dyess AFB aircraft, as well as aircraft associated  
33 with other nearby installations (e.g., Sheppard AFB T-38s) and transient aircraft. Airspace  
34 utilization would be comparable to current conditions; therefore, there would be no  
35 increase in airspace utilization as a result of the No Action Alternative.

#### 36 **3.1.2.1.2 No Action at Ellsworth AFB**

37 Under the No Action Alternative, existing airspace would not be modified and aircraft  
38 operations would be consistent with current activities. Under the No Action Alternative,

1 an estimated 8,910 annual flight operations occur, including departures, arrivals, and VFR  
2 and IFR patterns. The No Action Alternative at Ellsworth AFB would not contribute to  
3 either air traffic controller workload or congestion in the airspace areas. B-1s at Ellsworth  
4 AFB would continue to use PRTC as the primary location for training. Under the baseline  
5 No Action Alternative, 2,778 annual operations are conducted in PRTC airspace,  
6 including operations from Ellsworth AFB. Airspace utilization would be comparable to  
7 current conditions; therefore, there would be no increase in airspace utilization as a result  
8 of the No Action Alternative.

---

### 9 **3.1.2.2 Dyess AFB Alternative**

#### 10 **3.1.2.2.1 Airfield Operations**

11 Existing airspace around the Dyess AFB airfield would not be modified under the  
12 Proposed Action. While there would be no airspace modifications, the way in which the  
13 airspace is utilized may change slightly with respect to flight profiles, patterns, etc. Under  
14 the Proposed Action at Dyess AFB, the total number of air operations (takeoffs, landings,  
15 and closed patterns) would decrease from the No Action Alternative baseline by  
16 546 operations annually, or 1.12 percent. This decrease in operations is due to the  
17 drawdown of the B-1 operations, which would not be replaced one-for-one by B-21  
18 operations. See Table 3.0-3 for a comparison of the total flight operations at the  
19 installations and in the SUA under the No Action Alternative, Proposed Action, and  
20 Snapshot Scenarios.

21 This 1.12 percent decrease in total operations is not likely to impact airspace use, ATC,  
22 or scheduling at Dyess AFB.

#### 23 **3.1.2.2.2 Airspace and Range Utilization**

##### 24 **Powder River Training Complex**

25 As mentioned previously, the existing airspace at PRTC (as depicted in Figure 3.1-2)  
26 would not be modified under the Dyess AFB Alternative. Although airspace modifications  
27 are not required, certain airspace may be utilized more extensively, while use of other  
28 airspace units may decrease. Therefore, the use of the current airspace would likely  
29 change. The total number of annual flight operations at PRTC would decrease by  
30 18 operations annually, or 0.65 percent from the No Action Alternative baseline.

31 This 0.65 percent decrease in total operations is not likely to impact airspace use, ATC,  
32 or scheduling at PRTC.

##### 33 **Lancer MOA**

34 Although airspace modifications are not required, certain airspace may be utilized more  
35 extensively, while use of other airspace units may decrease. Therefore, the use of the  
36 current airspace would likely change. The total number of annual flight operations in the  
37 Lancer MOA would decrease by 244 operations annually, or 17.73 percent from the No  
38 Action Alternative baseline.

1 Congestion and use would decrease under the Dyess AFB Alternative. This decrease in  
2 total operations would not be likely to adversely impact airspace use, ATC, or scheduling  
3 in the Lancer MOA.

#### 4 **Brownwood MOA**

5 Although airspace modifications are not required, certain airspace may be utilized more  
6 extensively, while use of other airspace units may decrease. Therefore, the use of the  
7 current airspace would likely change. The total number of annual flight operations in the  
8 Brownwood MOA would decrease by 13 operations annually, or 0.53 percent from the No  
9 Action Alternative baseline.

10 This 0.53 percent decrease in total operations is not likely to impact airspace use, ATC,  
11 or scheduling in the Brownwood MOA.

#### 12 **Pecos MOA**

13 Although airspace modifications are not required, certain airspace may be utilized more  
14 extensively, while use of other airspace units may decrease. Therefore, the use of the  
15 current airspace would likely change. The total number of annual flight operations in the  
16 Pecos MOA would increase by 356 operations annually, or 14.68 percent from the No  
17 Action Alternative baseline.

18 Although a flight operations increase of 14.68 percent in the Pecos MOA may contribute  
19 to increased airspace congestion and/or scheduling conflicts, it is important to note that  
20 airspace usage and MOA distribution was projected to support the 9th Bomb Squadron  
21 currently. However, local training may also take place on an IFR track. Further, as the  
22 program develops, MOA usage and distribution may be adapted to better accommodate  
23 the B-21 training mission. For instance, because operations would decrease by nearly  
24 18 percent in the Lancer MOA, it could be utilized more extensively to alleviate any strains  
25 in the Pecos MOA. Therefore, the change in total operations associated with the Dyess  
26 AFB Alternative would not be likely to adversely impact airspace use, ATC, or scheduling  
27 in the Pecos MOA.

#### 28 **3.1.2.2.3 Snapshot**

29 Under the Snapshot Scenario at Dyess AFB, existing airspace at Dyess AFB would not  
30 be affected. Any changes would, again, be limited to how the airspace is used. Under  
31 the Snapshot Scenario at Dyess AFB, the total number of air operations (takeoffs,  
32 landings, and closed patterns) would increase from the No Action Alternative baseline by  
33 1,387 operations annually, or 2.83 percent (see Table 3.0-3).

34 This minimal change in total operations would not be likely to adversely impact airspace  
35 use, ATC, or scheduling at Dyess AFB. Further, this would be a temporary situation,  
36 potentially occurring during the transition period as the B-1s are being drawn down and  
37 the B-21 is bedded down.

38 Under the Snapshot Scenario for the Dyess AFB Alternative, the existing airspace at  
39 PRTC and in the Brownwood, Lancer, and Pecos MOAs would not be affected or altered.

1 The total number of annual flight operations at PRTC would increase by 56 operations  
2 annually, or 2.02 percent from the No Action Alternative baseline. Annual operations at  
3 Brownwood and Lancer MOAs would decrease by 6 and 75 annual operations,  
4 respectively (0.24 and 5.45 percent). Operations in Pecos MOA would increase by  
5 374 annual operations. That would represent a 15.42 percent increase from the No Action  
6 Alternative baseline.

7 Although a flight operations increase of 15.42 percent in the Pecos MOA may contribute  
8 to increased airspace congestion and/or scheduling conflicts, it is important to note that  
9 airspace usage and MOA distribution would continue to support the 9th Bomb  
10 Squadron. However, local training may also take place on an IFR track. Further, as the  
11 program develops, MOA usage and distribution may be adapted to better accommodate  
12 the B-21 training mission. For instance, the Lancer MOA, where operations would  
13 decrease by nearly 18 percent, could be utilized more extensively to alleviate any strains  
14 in the Pecos MOA. Therefore, this level of change in total operations would not be likely  
15 to adversely impact airspace use, ATC, or scheduling at PRTC or in the Lancer,  
16 Brownwood, or Pecos MOAs.

#### 17 **3.1.2.2.4 Proposed Resource-Specific Mitigations and Management Actions to** 18 **Reduce the Potential for Environmental Impacts**

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

---

### 20 **3.1.2.3 Ellsworth AFB Alternative**

#### 21 **3.1.2.3.1 Airfield Operations**

22 Existing airspace around the Ellsworth AFB airfield would not be modified under the  
23 Ellsworth AFB Alternative. Additional airspace would not be required, but the way in  
24 which the airspace is used may change slightly with respect to flight profiles, patterns,  
25 etc. Under the Ellsworth AFB Alternative, the total number of air operations (takeoffs,  
26 landings, and closed patterns) at Ellsworth AFB would increase from the No Action  
27 Alternative baseline by 1,408 operations annually, or 15.8 percent. However, local  
28 training may also take place on an IFR track. Further, as the program develops, MOA  
29 usage and distribution may be adapted to better accommodate the B-21 training mission.

30 This change in total operations would not be likely to adversely impact airspace use, ATC,  
31 or scheduling at Ellsworth AFB. See Table 3.0-3 for a comparison of the total flight  
32 operations at the installations and in the SUA under the No Action Alternative, Proposed  
33 Action, and Snapshot Scenarios.

#### 34 **3.1.2.3.2 Airspace and Range Utilization**

35 As mentioned previously, the existing airspace at PRTC would not be modified under the  
36 Ellsworth AFB Alternative. Additional airspace is not required, but certain airspace may  
37 be used more extensively, while use of other airspace units may decrease. Therefore,  
38 the use of the current airspace would likely be modified. For example, the B-21 would  
39 generally operate at higher altitudes than the B-1 operates currently. The total number of



1 annual flight operations at PRTC would increase by 1,143 operations annually, or  
2 41.1 percent from the No Action Alternative baseline. Although this increase is  
3 substantial, because the B-21 would be typically flying in altitude bands that are currently  
4 under-utilized, adverse impacts on airspace congestion or scheduling are unlikely.  
5 Further, the majority of B-21 flight operations in PRTC would take place in PR-2. Flight  
6 operations would decrease in PR-1, PR-3, and PR-4. The USAF's PRTC EIS ROD  
7 (USAF, 2015) and the FAA ROD (FAA, 2015) mandate a 12 percent reduction in B-1  
8 operations in PR-1, PR-3, and PR-4. Because the B-1 operations would not increase and  
9 would cease entirely in the end-state, this ROD requirement would continue to be met.

10 Implementation of B-21 operations at PRTC under the Ellsworth AFB Alternative would  
11 impact air traffic controller workload and would contribute to increased congestion for  
12 military and civilian aircraft across the region. However, existing policies and procedures  
13 would enable ATC and schedulers to continue to coordinate operations such that this  
14 change in total operations would not be likely to adversely impact airspace use, ATC, or  
15 scheduling at PRTC.

#### 16 **3.1.2.3.3 Snapshot**

17 Under the Snapshot Scenario at Ellsworth AFB, existing airspace at Ellsworth AFB would  
18 not be adversely affected, and changes would be limited to how the airspace is used.  
19 Under the Snapshot Scenario at Ellsworth AFB, the total number of air operations  
20 (takeoffs, landings, and closed patterns) would increase from the No Action Alternative  
21 baseline by 1,387 operations annually, or 2.83 percent (see Table 3.0-3). This minimal  
22 change in total operations would not be likely to adversely impact airspace use, ATC, or  
23 scheduling at Ellsworth AFB. Further, this would be a temporary situation only potentially  
24 occurring during the transition period as the B-1s are being drawn down and the B-21 is  
25 bedded down.

26 Under the Snapshot Scenario at Ellsworth AFB, the existing airspace at PRTC would not  
27 be altered. The total number of annual flight operations at PRTC would increase by  
28 1,425 operations annually, or 51.30 percent from the No Action Alternative baseline.  
29 Although this increase is substantial, because the B-21 would be typically flying in altitude  
30 bands that are currently under-utilized, adverse impacts on airspace congestion or  
31 scheduling are unlikely.

32 Further, existing policies and procedures would enable ATC and schedulers to continue  
33 to coordinate operations such that this change in total operations would not be likely to  
34 adversely impact airspace use, ATC, or scheduling at PRTC. Additionally, as the program  
35 develops, SUA usage and distribution may be adapted to better accommodate the B-21  
36 training mission.

#### 37 **3.1.2.3.4 Proposed Resource-Specific Mitigations and Management Actions to** 38 **Reduce the Potential for Environmental Impacts**

39 No mitigations would be necessary to implement the Ellsworth AFB Alternative.

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## 1    **3.2    NOISE**

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### 2    **3.2.1    Noise, Affected Environment**

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#### 3    **3.2.1.1    Description of Resource**

4    Noise is defined as unwanted sound. Potential noise impacts are dependent on  
5    characteristics of the noise such as sound level, pitch, and duration. Noise impacts are  
6    also strongly influenced by characteristics of the noise receiver (i.e., persons, animals, or  
7    objects that hear or are affected by noise). Noise analysis considers potential impacts  
8    that could result in annoyance, speech interference, sleep disturbance, human health  
9    effects (auditory and nonauditory), wildlife impacts, and structural damage. Additional  
10    discussion of specific noise effects on other affected resources can be found in Section  
11    3.5 (Socioeconomics), Section 3.6 (Environmental Justice), Section 3.7 (Biological  
12    Resources), and Section 3.8 (Cultural Resources). Appendix B (Noise) presents  
13    information on noise metrics and describes methods used to model aircraft noise levels.

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#### 14    **3.2.1.2    Region of Influence**

##### 15    **3.2.1.2.1    Dyess AFB**

16    The ROI for noise includes Dyess AFB, and the areas surrounding the installation, as well  
17    as land areas included within the airspace units where B-21 flight operations and training  
18    would occur. Noise environments in the vicinity of Dyess AFB are dominated by aircraft  
19    noise. Other noise sources on the installation include ground vehicles, ongoing  
20    construction activities, and machinery. The area surrounding Dyess AFB is primarily  
21    rural/agricultural to the west, north, and south. There are a few small communities such  
22    as Tye, Merkel, Caps, and Buffalo Gap in those areas, and the city of Abilene to the east  
23    of Dyess AFB is the largest community that could potentially experience noise impacts  
24    associated with the Proposed Action.

##### 25    **3.2.1.2.2    Ellsworth AFB**

26    The ROI for noise includes Ellsworth AFB, and the areas surrounding the installation, as  
27    well as land areas included within the airspace units where B-21 flight operations and  
28    training would occur. Noise environments in the vicinity of Ellsworth AFB are dominated  
29    by aircraft noise. Other noise sources on the installation include ground vehicles, ongoing  
30    construction activities, and machinery. The area surrounding Ellsworth AFB is primarily  
31    rural/agricultural. The small communities of Box Elder and Ashland Heights are to the  
32    south and west of the installation, respectively. The largest community near Ellsworth  
33    AFB is Rapid City approximately 5 miles to the southwest of the base.

1 **3.2.1.2.3 Powder River Training Complex**

2 The ROI for PRTC includes the lands under and near the PRTC MOAs/ATCAAs. This  
 3 includes several counties in North and South Dakota, Montana, and Wyoming  
 4 (Figure 2.3-1). The area under PRTC airspace is primarily rural/agricultural, but several  
 5 communities occur beneath the airspace. Ellsworth AFB has established avoidance  
 6 areas under the Powder River MOAs to reduce noise and overflight above communities,  
 7 ranches, and other noise-sensitive locations.

8 **3.2.1.2.4 Lancer MOA**

9 The Lancer MOA ROI includes portions of eight counties in west Texas. The area  
 10 beneath Lancer MOA is primarily rural/agricultural, but some small communities, such as  
 11 Snyder and Lamesa, are situated beneath the airspace.

12 **3.2.1.2.5 Brownwood MOA**

13 The Brownwood MOA ROI includes all of Brown County and parts of seven other counties  
 14 in midwest Texas. The area beneath Brownwood MOA is primarily rural/agricultural. The  
 15 city of Brownwood and several smaller communities, such as Coleman, Comanche, and  
 16 Cross Plains, are situated beneath the airspace.

17 **3.2.1.2.6 Pecos MOA**

18 The Pecos MOA ROI includes parts of five counties in eastern New Mexico. The area  
 19 beneath the Pecos MOA is almost entirely open space with the exception of Fort Sumner  
 20 in De Baca County. Fort Sumner is a small village consisting primarily of agricultural  
 21 areas.

22 **3.2.1.3 Analysis Methodology**

23 AFI 32-7070, *Air Force Noise Program*, provides the overall framework for computing  
 24 noise levels associated with aircraft operations within SUAs and in the vicinity of military  
 25 airfields.

26 The primary effect of aircraft noise on exposed communities is one of annoyance,  
 27 including activity interference, which includes speech interference and sleep disturbance.  
 28 Noise annoyance is defined by the U.S. Environmental Protection Agency (EPA) as any  
 29 negative, subjective reaction on the part of an individual or group (EPA, 1974). The best  
 30 available method for predicting community annoyance response to aircraft noise is the  
 31 updated Schultz curve (sometimes called the “Air Force Curve”) (Table 3.2-1).

32 **Table 3.2-1. 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

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

1 There are several commonly recognized average noise level thresholds that are based  
2 on expected community reaction.

3 Because both the duration and frequency of noise events also play a role in determining  
4 overall noise impact, several metrics are used that account for these factors. Each metric  
5 discussed below is used in the assessment of noise impacts in this EIS. A more thorough  
6 explanation of these metrics can be found in Appendix B (Noise).

- 7 • A-weighted decibel (dBA) sound level measurements reflect the frequencies to  
8 which human hearing is most sensitive. Noise levels in this EIS can be assumed  
9 to be A-weighted unless a different weighting is specified.
- 10 • Day-night average sound level (DNL [symbol -  $L_{dn}$ ]) represents aircraft noise level  
11 averaged over a 24-hour period with a 10-decibel (dB) adjustment to flights  
12 occurring between 10:00 p.m. and 7:00 a.m. to account for the added intrusiveness  
13 of noise during these hours.
- 14 • Sound exposure level (SEL) accounts for both the maximum sound level and the  
15 length of time a sound lasts.
- 16 • Equivalent sound level ( $L_{eq}$ ) represents aircraft noise level averaged over a  
17 specified time period. This analysis uses a 1-hour  $L_{eq}$  to quantify expected noise  
18 levels in each of the hours of a school day (i.e., each 1-hour increment between  
19 7:00 a.m. and 4:00 p.m.).
- 20 • Maximum sound level ( $L_{max}$ ) is the highest sound level measured (using time  
21 integration of either 1/8 second or 1 second) during a noise event.  $L_{max}$  decreases  
22 as altitude or distance from the observer increases and varies according to the  
23 type of aircraft, airspeed, and power setting.
- 24 • Onset-rate adjusted monthly day-night average sound level ( $L_{dnmr}$ ) is the measure  
25 used for subsonic aircraft noise in military airspace (ranges, MTRs, or MOAs).

## 26 Noise Modeling

27 The NOISEFILE database contains measured reference noise data for each aircraft.  
28 NOISEFILE is used by the noise modeling software MR\_NMAP and NOISEMAP to  
29 predict noise levels. Operational data were collected from pilots, air traffic controllers,  
30 aircraft maintainers, range operators, and other sources in accordance with standard data  
31 collection procedures. Since the B-21 is a new airframe and validated noise source data  
32 is not yet available, B-2A noise source data was used in modeling. This is expected to  
33 result in a conservative noise estimate. In general, the B-21 is anticipated to produce  
34 less noise than the B-1 and to result in an overall noise decrease.

35 The operational data were put into computerized noise models to generate estimates of  
36 noise levels. The noise models described below were applied as appropriate for each  
37 type of noise. Table 3.0-3 provides a summary of the total number of flight operations  
38 that were modeled under the No Action Alternative, Proposed Action (Dyess and  
39 Ellsworth Alternatives), and the Snapshot Scenarios for each alternative. The Dyess AFB  
40 and Ellsworth AFB Alternatives represent the end-state after all B-1 operations have been

1 phased out and the full complement of B-21 aircraft has been beddown and made  
2 operational.

### 3 **Subsonic Noise**

4 The NOISEMAP suite of computer programs was used for computing subsonic aircraft  
5 noise in the vicinity of Dyess AFB and Ellsworth AFB. Aircraft noise levels in the vicinity  
6 of these installations were calculated and are presented using the DNL metric. Noise  
7 contours were used to calculate the area (in acres) and approximate population impacted  
8 by various noise levels. There is an amount of unavoidable uncertainty associated with  
9 estimates of population impacted by elevated noise levels. The method used to estimate  
10 number of persons affected is subject to some error. Off-installation residents were  
11 estimated by summing the populations of census blocks on land not owned by the USAF  
12 that were affected by noise contours. Where census blocks were split by a noise contour  
13 line, population within the noise contour was assumed to be proportional to the  
14 percentage of the census block located within the noise contour interval. While this  
15 assumption is not always correct, the results would not be expected to be biased in favor  
16 of either more or less population being included in the estimate.

17 The MOA and Range NOISEMAP (MR\_NMAP) suite of computer programs was used for  
18 computing subsonic aircraft noise underneath PRTC and Brownwood, Lancer, and Pecos  
19 MOAs. Noise levels from aircraft operations beneath military airspace units were  
20 calculated using the  $L_{dnmr}$  metric.

### 21 **Classroom Learning**

22 Good acoustical qualities are essential in classrooms in which speech communication is  
23 an important part of the learning process. Excessive background noise interferes with  
24 speech communication and thus presents an acoustical barrier to learning. The American  
25 National Standards Institute's (ANSI's) Acoustical Performance Criteria, Design  
26 Requirements, and Guidelines for Schools provides "acoustical performance criteria,  
27 design requirements, and design guidelines for new school classrooms and other learning  
28 spaces" (ANSI, 2009). While this standard is not a requirement to be followed by school  
29 systems, it is applicable as a design guideline to new construction, as well as renovations  
30 of existing facilities, and is recommended to achieve a high degree of speech intelligibility  
31 in learning spaces. Because this ANSI standard was not finalized until 2009, it should not  
32 be expected that all schools constructed or renovated before that date would necessarily  
33 meet the recommended criteria.

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

## 1 **Construction Noise**

2 Construction noise was evaluated using Roadway Construction Noise Model version 1.1,  
3 the U.S. Department of Transportation (DOT)/Federal Highway Administration's standard  
4 model for the prediction of construction noise (U.S. DOT, 2016). The Roadway  
5 Construction Noise Model has the capability to model types of construction equipment  
6 that would be expected to be the dominant construction-related noise sources associated  
7 with this aspect of the Proposed Action. All construction noise analyses assumed that a  
8 standard set of construction equipment would be used. Construction noise is expected  
9 to be limited to normal working hours (7:00 a.m. to 5:00 p.m.). Construction noise impacts  
10 are quantified using the metrics  $L_{max}$  and  $L_{10}$  (loudest 10 percent noise level) as calculated  
11 based on distance from a given receptor.

## 12 **Potential Hearing Loss**

13 Potential hearing loss (PHL) as a noise impact is introduced in this section, and a detailed  
14 description of PHL is provided in Appendix B (Noise).

15 DoD policy requires that hearing loss risk be estimated for the at risk population, defined  
16 as the population exposed to DNL greater than or equal to 80 dB (DoD, 2009).  
17 Specifically, DoD components are directed to "use the 80 Day-Night A-Weighted (DNL)  
18 noise contour to identify populations at the most risk of potential hearing loss" (DoD,  
19 2009). This does not preclude populations outside the 80 dB DNL contour (i.e., at lower  
20 exposure levels) from being at some degree of risk of hearing loss. However, the estimate  
21 should be restricted to populations within this contour area, including residents of on-base  
22 housing. The exposure of DoD employees in the area already defined as the hazardous  
23 noise are not included in this analysis because they already fall under the occupational  
24 noise regulations and would be evaluated using the appropriate DoD component  
25 regulations for occupational noise exposure.

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## 26 **3.2.2 Noise, Environmental Consequences**

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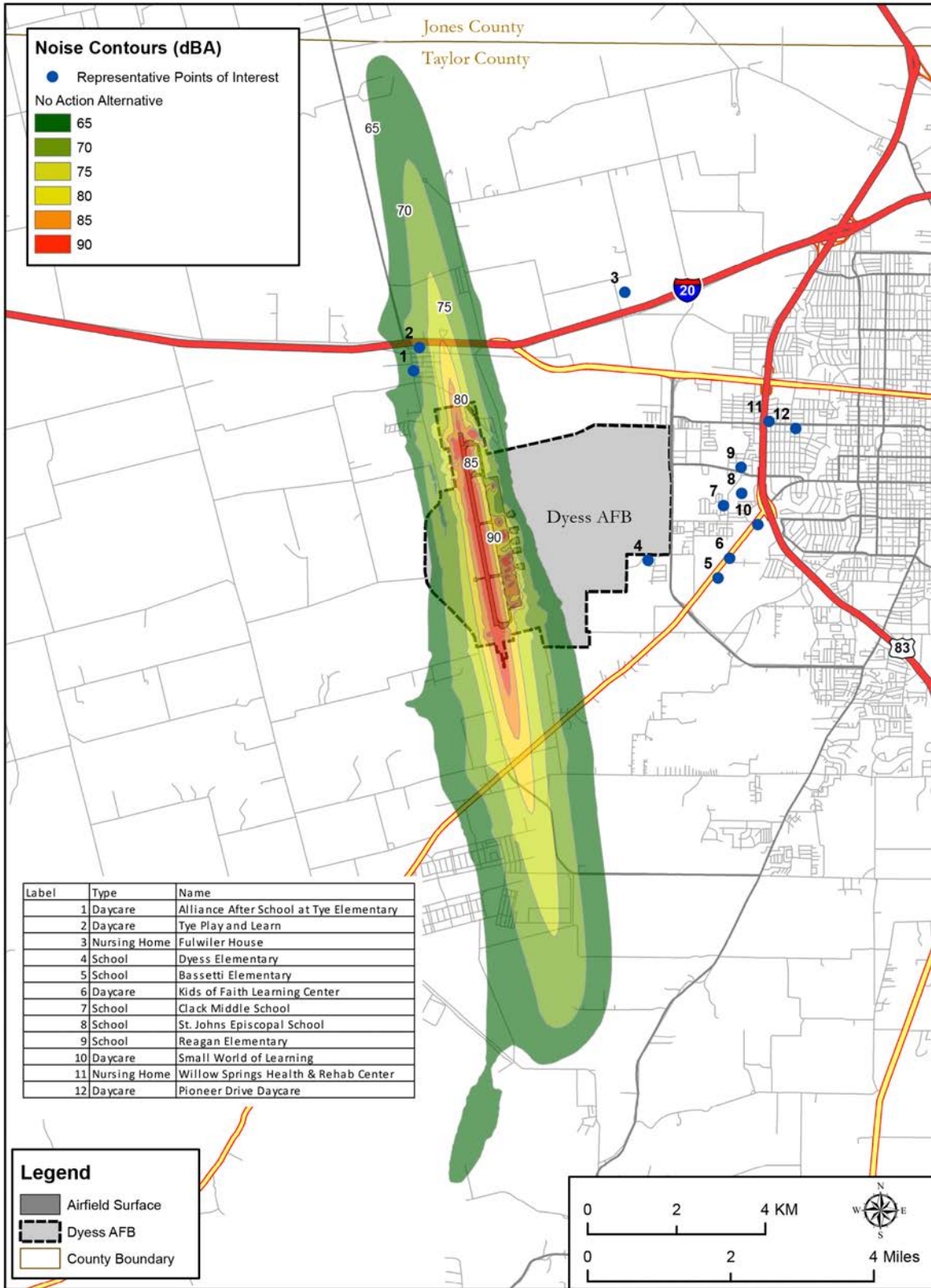
### 27 **3.2.2.1 No Action Alternative Consequences**

#### 28 **3.2.2.1.1 No Action at Dyess AFB**

### 29 **Aircraft Noise**

30 Noise modeling was conducted to reflect current baseline aircraft operations under the  
31 No Action Alternative at Dyess AFB. Noise contours in the vicinity of Dyess AFB under  
32 the No Action Alternative are depicted in Figure 3.2-1, which also indicates the locations  
33 of representative noise-sensitive points of interest under the No Action Alternative at  
34 Dyess AFB using the DNL metric. Acreage, population, and residential parcels affected  
35 by DNL noise contours associated with all aircraft Dyess AFB under the No Action  
36 Alternative are shown in Table 3.2-2.

37 Under the No Action Alternative, 11,497 acres and an estimated 1,419 persons could be  
38 exposed to noise levels exceeding 65 dB DNL near Dyess AFB.



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**Figure 3.2-1. Noise Contours at Dyess AFB Under the No Action Alternative**

**Table 3.2-2. Acreage and Population Affected by Elevated Noise Levels Under the No Action Alternative at Dyess AFB**

Noise Level (dB DNL)	Acres Off-Installation	Off-Installation Population <sup>1</sup>
65–69	6,052	700
70–74	3,341	448
75–79	1,431	180
80–84	476	64
>85	197	27
<b>Total</b>	<b>11,497</b>	<b>1,419</b>

> = greater than; AFB = Air Force Base; dB = decibel; DNL = day-night average sound level

Note:

1. Population estimates were made based on 2014–2018 ACS 5-Year Estimates data (U.S. Census Bureau, 2018a). The number of persons currently residing in affected areas may differ from what has been stated.

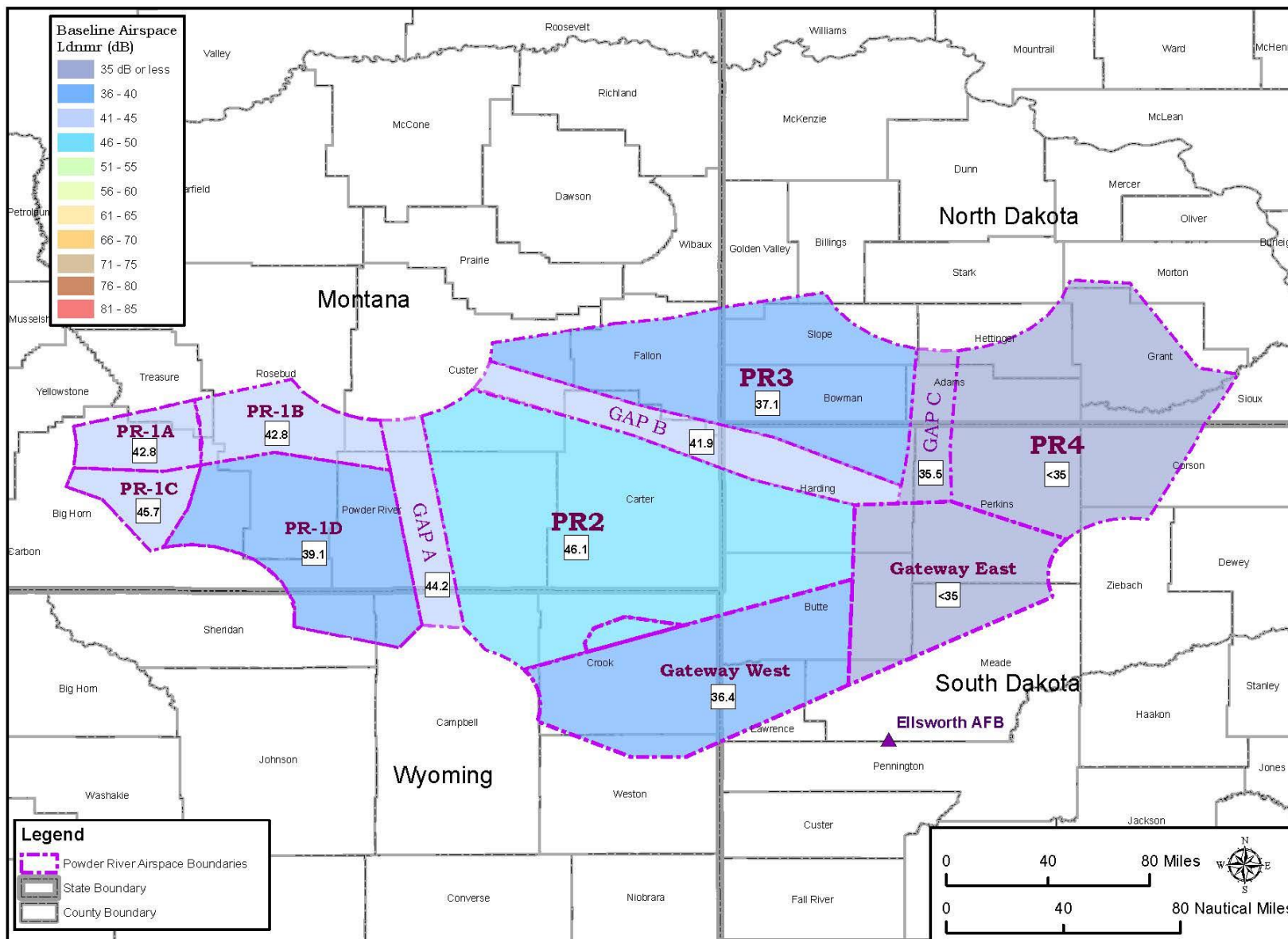
Analysis was also conducted to look at the baseline aircraft noise in the SUAs used by each installation for training. Baseline noise levels in PRTC were calculated for all aircraft including the B-1 and all other transient aircraft. Transient aircraft include the F-16C, B-52, and KC-135R. The percentage of these transient operations are significantly less than B-1 operations (approximately 30 percent of the total operations in PRTC). Noise levels range from less than 35 dB DNL to 46.1 dB DNL across PRTC (Figure 3.2-2). These levels are well below the 65 dB DNL level that would potentially impact land use, so there would be no adverse impacts associated with noise beneath the PRTC airspace under the No Action Alternative. Likewise, baseline noise levels beneath the Brownwood, Pecos, and Lancer MOAs (less than 35, 55.9, and 43.4 dB DNL, respectively) would also remain well below the 65 dB DNL level (Figure 3.2-3).

### Sound Exposure Level (SEL) at Representative Noise-Sensitive Receptors

Table 3.2-3 describes aircraft noise levels at representative noise-sensitive points of interest under the No Action Alternative at Dyess AFB using the DNL metric, which reflects noise over the course of an entire day, and the SEL metric, which reflects the noise generated by a single overflight event. Locations of points are shown in Figure 3.2-1. 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. 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.

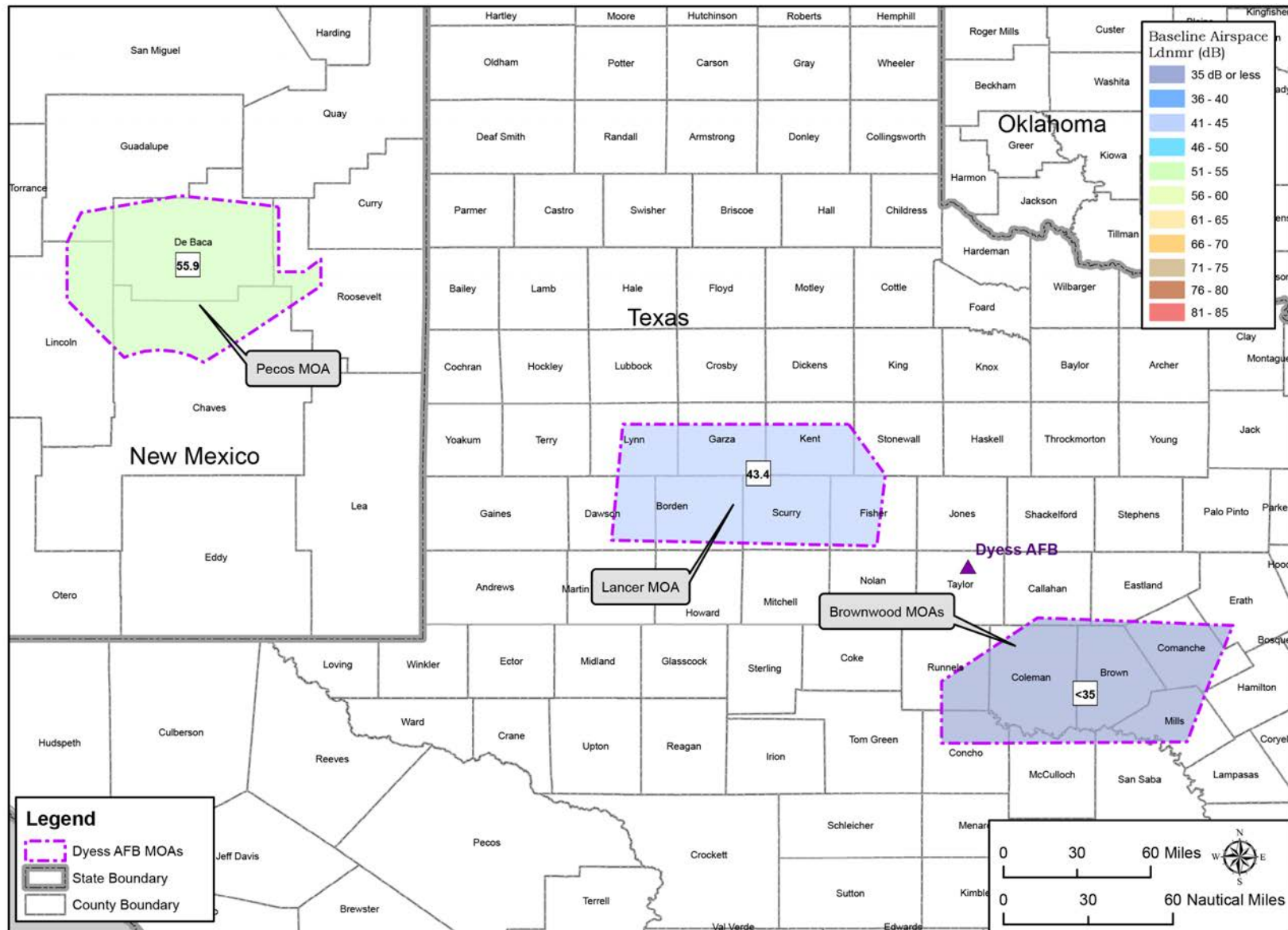
Under the No Action Alternative at Dyess AFB, the points of interest north of Dyess AFB would continue to experience DNL of up to 72 dB. Individual overflight noise levels (i.e., SEL) could reach up to 117 dB. These maximum SEL noise levels are attributable to B-1 operations at Dyess AFB.





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Figure 3.2-2. Airspace Noise at PRTC Under the No Action Alternative



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**Figure 3.2-3. Airspace Noise at Brownwood, Lancer, and Pecos MOAs Under the No Action Alternative**

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**Table 3.2-3. Noise Impacts at Representative Points of Interest Under the No Action Alternative at Dyess AFB**

ID	General Description	Type	No Action Alternative	
			DNL (dB)	Maximum SEL (dB)
01	Alliance After School at Tye Elementary	Daycare	68	114
02	Tye Play and Learn	Daycare	72	117
03	Fulwiler House	Nursing Home	49	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	43	86
09	Reagan Elementary	School	42	86
10	Small World of Learning	Daycare	43	88
11	Willow Springs Health & Rehab Center	Nursing Home	47	95
12	Pioneer Drive Daycare	Daycare	46	95

AFB= Air Force Base; dB = decibel; 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.

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**Equivalent Sound Level (Leq) and Number of Noise Events Analysis at Representative Points of Interest**

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Table 3.2-4 lists the outdoor and indoor estimated 8-hour Leq values under the No Action Alternative during a typical school day (7:00 a.m. to 4:00 p.m., Monday through Friday) at points of interest near Dyess AFB. Schools at which the maximum estimated indoor Leq exceeds 40 dB may not meet the 2009 ANSI guidance for at least a portion of 1 hour during a typical school day. The table also shows the number of events during an average school day at or above an indoor maximum (single event) sound level of 50 dB. For example, an individual attending after-school daycare at Alliance After-School at Tye Elementary (01) would typically experience as many as three disruptive events per hour with the windows open and one per hour with windows closed under the No Action Alternative.

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Under the baseline No Action Alternative, two of the representative schools were expected to exceed the recommended noise guidelines. The two schools/daycares in the town of Tye north of Dyess AFB would potentially be impacted.

18  
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Noise impacts on property values are discussed in Section 3.5 (Socioeconomics) and Section 3.6 (Environmental Justice). Impacts on noise-sensitive land use types (e.g., residential areas) are discussed in Section 3.4 (Land Use).

1 **Table 3.2-4. Hourly  $L_{eq}$  Noise Levels During the School Day at Representative Points of**  
 2 **Interest Near Dyess AFB Under the No Action Alternative**

Point of Interest		Outdoor $L_{eq(8h)}$ (dB)	Indoor			
			Windows Open		Windows Closed	
ID	Description		$L_{eq(8h)}$ (dB)	Events per Hour	$L_{eq(8h)}$ (dB)	Events per Hour
01	Alliance After School at Tye Elementary	66	51	3	41	1
02	Tye Play and Learn	70	55	3	45	2
03	Fulwiler House	47	<40	-	<40	-
04	Dyess Elementary	52	<40	1	<40	-
05	Bassetti Elementary	46	<40	-	<40	-
06	Kids of Faith Learning Center	44	<40	-	<40	-
07	Clark Middle School	42	<40	-	<40	-
08	St. John's Episcopal School	41	<40	-	<40	-
09	Reagan Elementary	41	<40	-	<40	-
10	Small World of Learning	42	<40	-	<40	-
11	Willow Springs Health & Rehab Center	45	<40	-	<40	-
12	Pioneer Drive Daycare	45	<40	-	<40	-
Number of Sites with More than 1 Intrusive Event per Hour				2		1
Lowest Number of Intrusive Events per Hour if More than 1				3		2
Highest Number of Intrusive Events per Hour if More than 1				3		2

< = less than; AFB = Air Force Base; ANSI = American National Standards Institute; dB = decibel; ID = identification code;  $L_{eq(8h)}$  = 8-hour equivalent sound level

Notes:

1. Assumes 15 dB and 25 dB of Noise Level Reductions for windows open and closed, respectively.
2. Schools that meet the 2009 ANSI standard of less than 40 dB  $L_{eq}$  are listed as having an  $L_{eq}$  of <40 dB.
3. 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.

### 3 Construction Noise

4 Under the No Action Alternative, there are no proposed construction, demolition, or  
 5 renovation projects. However, there may be several ongoing construction efforts  
 6 occurring on the base. The *Environmental Assessment for Installation Development at*  
 7 *Dyess, AFB* (USAF, 2017b) evaluated impacts from proposed planned projects for the  
 8 near future at Dyess AFB. Projects would result in temporary, minor noise increases  
 9 resulting from construction and demolition (C&D) activities.

10 As an example, the Federal Highway Administration's Roadway Construction Noise  
 11 Model was used to calculate the noise levels at various distances from a typical  
 12 construction site. Equipment included a backhoe, bulldozer, ground compactor,  
 13 generators, pickup trucks, and pneumatic tools. The analysis assumed that a standard  
 14 set of construction equipment would be used in all construction projects and would run  
 15 for approximately 40 percent of the workday. Resulting noise levels at various receptor

1 distances from the construction site are listed in Table 3.2-5. At distances greater than  
 2 600 feet from the construction site, noise levels drop below the 65 dBA level, and  
 3 annoyance is likely to be minimal.

4 Ongoing various C&D activities would result in temporary, localized increases in noise  
 5 levels that could be disruptive and annoying. However, the installation and surrounding  
 6 area is exposed to frequent loud aircraft operations noise and ground vehicle traffic noise  
 7 under baseline conditions. Additionally, demolition and construction activities would be  
 8 conducted during normal business hours. In this context, the temporary and localized  
 9 noise generated by C&D activities on the installation could be disruptive and annoying  
 10 but would not be significant.

11 **Table 3.2-5. Construction Noise Level Expected from a Typical Construction Site**

Distance to Receptor (feet)	L <sub>max</sub> (dBA)	L <sub>10</sub> (dBA)
100	79.2	82.5
200	74.6	78.2
300	69.6	73.0
400	67.1	70.5
500	65.2	68.3
600	63.6	67.0

dBA = A-weighted decibel; L<sub>10</sub> = loudest 10 percent noise level; L<sub>max</sub> = maximum sound level

## 12 **Potential Hearing Loss**

13 PHL under the No Action Alternative was assessed using the methodology described  
 14 above and in greater detail in Appendix B (Noise). Using census data calculation, there  
 15 are approximately 91 people off-base who are exposed to 80 dB DNL or higher under the  
 16 No Action Alternative at Dyess AFB.

### 17 **3.2.2.1.2 No Action at Ellsworth AFB**

#### 18 **Aircraft Noise**

19 Noise modeling was conducted to reflect current baseline aircraft operations under the  
 20 No Action Alternative at Ellsworth AFB. Noise contours in the vicinity of Ellsworth AFB  
 21 under the No Action Alternative are depicted in Figure 3.2-4. Acreage, population, and  
 22 residential parcels affected by DNL noise contours associated with all aircraft Ellsworth  
 23 AFB under the No Action Alternative are shown in Table 3.2-6.

24 Under the No Action Alternative, 5,834 acres and an estimated 1,985 persons could be  
 25 exposed to noise levels exceeding 65 dB DNL near Ellsworth AFB.

26 Under the No Action Alternative at Ellsworth AFB, airspace noise would be as shown in  
 27 Figure 3.2-2. Noise levels range from less than 35 dB DNL to 46.1 dB DNL across PRTC  
 28 (Figure 3.2-2). These levels are well below the 65 dB DNL level that would potentially  
 29 impact land use, so there would be no adverse impacts associated with noise beneath  
 30 the PRTC airspace under the No Action Alternative.

**Table 3.2-6. Acreage and Population Affected by Elevated Noise Levels Under the No Action Alternative at Ellsworth AFB**

Noise Level (dB DNL)	Acres Off-Installation	Off-Installation Population <sup>1</sup>
65–69	4,088	1,313
70–74	1,219	391
75–79	432	190
80–84	77	78
>85	18	13
<b>Total</b>	<b>5,834</b>	<b>1,985</b>

> = greater than; AFB = Air Force Base; dB = decibel; DNL = day-night average sound level  
Notes:

1. Population estimates were made based on 2014–2018 ACS 5-Year Estimates data (U.S. Census Bureau, 2018a). The number of persons currently residing in affected areas may differ from what has been stated.

### Sound Exposure Level (SEL) at Representative Noise-Sensitive Receptors

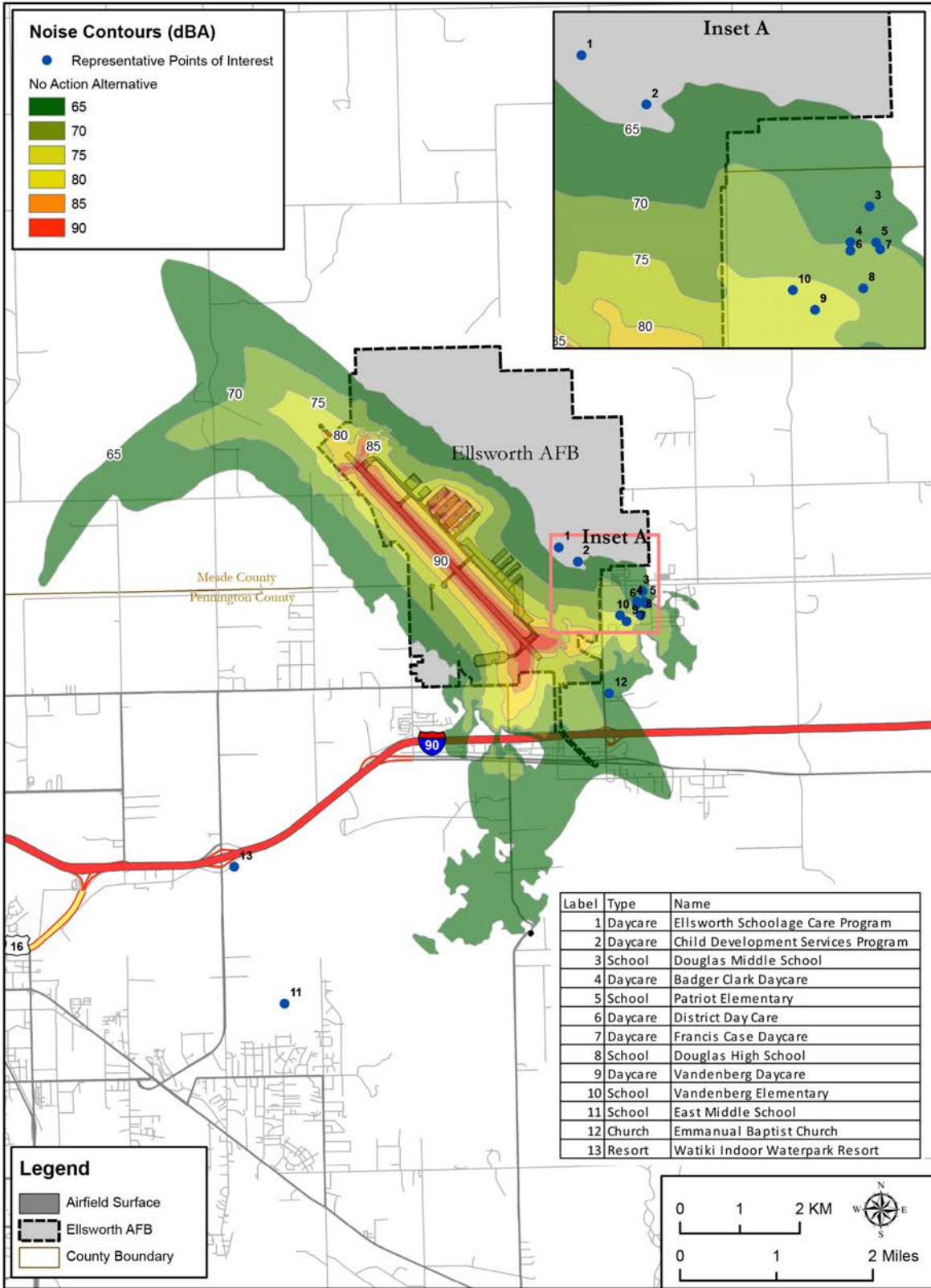
Table 3.2-7 describes aircraft noise levels at representative noise-sensitive points of interest under the No Action Alternative at Ellsworth AFB using the DNL metric, which reflects noise over the course of an entire day, and the SEL metric, which reflects the noise generated by a single overflight event. Locations of points are shown in Figure 3.2-4. 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. 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 3.2-7. Noise Impacts at Representative Points of Interest Under the No Action Alternative at Ellsworth AFB**

ID	General Description	Type	No Action Alternative	
			DNL (dB)	Maximum SEL (dB)
01	Ellsworth Schoolage Care Program	Daycare	63	107
02	Child Development Services Program	Daycare	64	107
03	Douglas Middle School	School	67	111
04	Badger Clark Daycare	Daycare	70	114
05	Patriot Elementary	School	70	115
06	District Day Care	Daycare	71	116
07	Francis Case Daycare	Daycare	71	115
08	Douglas High School	School	74	119
09	Vandenberg Daycare	Daycare	77	123
10	Vandenberg Elementary	School	77	122
11	East Middle School	School	53	96
12	Emmanuel Baptist Church	Church	67	115
13	WaTiki Indoor Waterpark Resort	Resort	54	100

AFB = Air Force Base; dB = decibel; 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.



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**Figure 3.2-4. Noise Contours at Ellsworth AFB Under the No Action Alternative**

## 1 Equivalent Sound Level ( $L_{eq}$ ) at Representative Points of Interest

2 Table 3.2-8 lists the outdoor and indoor estimated 8-hour  $L_{eq}$  values under the No Action  
3 Alternative during a typical school day (7:00 a.m. to 4:00 p.m., Monday through Friday) at  
4 points of interest near Ellsworth AFB. Schools at which the maximum estimated indoor  
5  $L_{eq}$  exceeds 40 dB may not meet the 2009 ANSI guidance for at least a portion of 1 hour  
6 during a typical school day. The table also shows the number of events during an average  
7 school day at or above an indoor maximum (single event) sound level of 50 dB. For  
8 example, an individual attending after-school daycare at Ellsworth Schoolage Care  
9 Program (01) would typically experience one disruptive event per hour with the windows  
10 open and one per hour with windows closed under the No Action Alternative.

11 Under the baseline No Action Alternative, all five representative schools are expected to  
12 exceed the recommended noise guidelines. Additionally, the six daycares used as  
13 representative points of interest would exceed the recommended noise guidelines as well.

14 Noise impacts on property values are discussed in Section 3.5 (Socioeconomics) and  
15 Section 3.6 (Environmental Justice). Impacts on noise-sensitive land use types (e.g.,  
16 residential areas) are discussed in Section 3.4 (Land Use).

**Table 3.2-8. Indoor Classroom Learning Disruption at Representative Points of Interest Near Ellsworth AFB Under the No Action Alternative**

Point of Interest		Outdoor $L_{eq(8h)}$ (dB)	Indoor			
ID	Description		Windows Open		Windows Closed	
			$L_{eq(8h)}$ (dB)	Events per Hour	$L_{eq(8h)}$ (dB)	Events per Hour
01	Ellsworth Schoolage Care Program	64	49	1	<40	1
02	Child Development Services Program	65	50	1	<40	1
03	Douglas Middle School	68	53	1	43	1
04	Badger Clark Daycare	71	56	1	46	1
05	Patriot Elementary	71	56	1	46	1
06	District Day Care	72	57	1	47	1
07	Francis Case Daycare	72	57	1	47	1
08	Douglas High School	75	60	1	50	1
09	Vandenberg Daycare	79	64	1	54	1
10	Vandenberg Elementary	78	63	1	53	1
11	East Middle School	53	<40	1	<40	-
12	Emmanuel Baptist Church	68	53	1	43	1
13	WaTiki Indoor Waterpark Resort	55	<40	1	<40	-
Number of Sites with More than 1 Intrusive Event per Hour				0		0
Lowest Number of Intrusive Events per Hour if More than 1				0		0
Highest Number of Intrusive Events per Hour if More than 1				1		1

< = less than; AFB = Air Force Base; ANSI = American National Standards Institute; dB = decibel; ID = identification code;  $L_{eq(8h)}$  = 8-hour equivalent sound level

Notes:

1. Indoor  $L_{eq}$  is assumed to be 25 decibels 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.
2. Schools that meet the 2009 ANSI standard of less than 40 dB  $L_{eq}$  are listed as having an  $L_{eq}$  of <40 dB.
3. 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.



## 1 **Construction Noise**

2 The ambient noise environment around Ellsworth AFB is affected mainly by aircraft  
3 operations and vehicle traffic. Noise from aircraft operations dominates the ambient  
4 environment throughout Ellsworth AFB due to 28 BW and transient operations. While no  
5 construction projects are proposed under the No Action Alternative, there are likely to be  
6 other construction, demolition, and/or renovation projects occurring at Ellsworth AFB as  
7 part of other actions. See Table 3.2-5 above for typical C&D noise levels at various  
8 distances from the project site. Again, at distances greater than 600 feet, noise levels  
9 would be below 65 dB DNL and would not be likely to significantly impact public  
10 annoyance.

11 Ongoing various C&D activities would result in temporary, localized increases in noise  
12 levels that could be disruptive and annoying. However, the installation and surrounding  
13 area is exposed to frequent loud aircraft operations noise and ground vehicle traffic noise  
14 under baseline conditions. Additionally, demolition and construction activities would be  
15 conducted during normal business hours. In this context, the temporary and localized  
16 noise generated by C&D activities on the installation could be disruptive and annoying  
17 but would not be significant.

## 18 **Potential Hearing Loss**

19 PHL under the No Action Alternative was assessed using the methodology described in  
20 Appendix B (Noise). No individuals in the vicinity of Ellsworth AFB would be exposed to  
21 aircraft noise 80 dB DNL or greater under the No Action Alternative.

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### 22 **3.2.2.2 Dyess AFB Alternative**

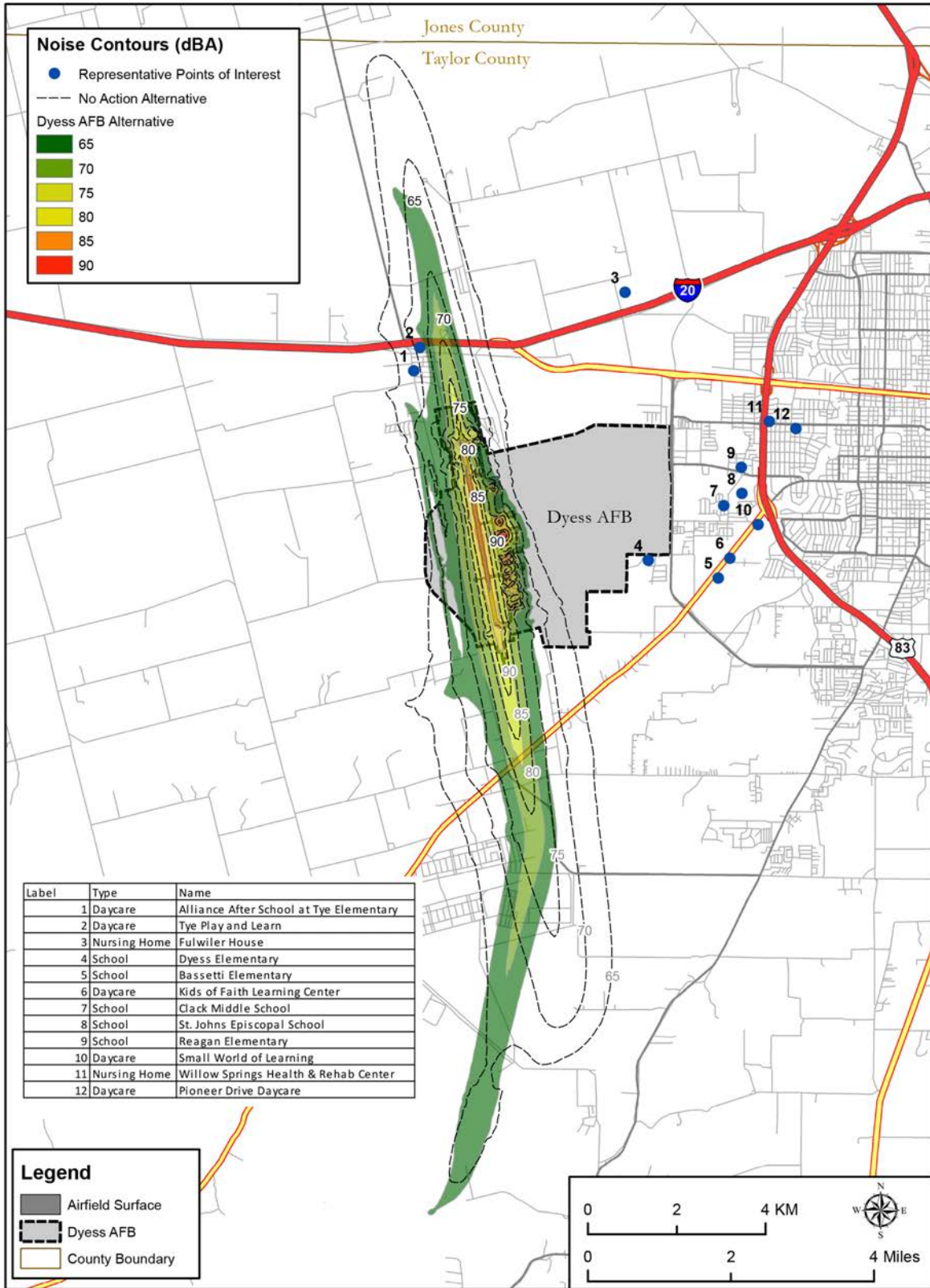
#### 23 **3.2.2.2.1 Personnel**

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

#### 28 **3.2.2.2.2 Airfield Operations**

29 Figure 3.2-5 depicts noise contours in the vicinity of Dyess AFB under the Dyess AFB  
30 Alternative compared with the No Action Alternative. Acreage, population, and residential  
31 parcels affected by DNL noise contours associated with all aircraft under the Dyess AFB  
32 Alternative are shown in Table 3.2-9.

33 Under the Dyess AFB Alternative, 4,355 acres and an estimated 496 persons could be  
34 exposed to noise levels exceeding 65 dB DNL near Dyess AFB. This is a decrease of  
35 7,142 acres and 923 persons overall from the No Action Alternative. The change in noise  
36 level is attributable both to reduction in flight operations and to the fact that the B-21 is  
37 projected to be generally quieter than the B-1.



1  
2 **Figure 3.2-5. Noise Contours at Dyess AFB Under the Dyess AFB Alternative Compared**  
3 **with No Action Alternative**

**Table 3.2-9. Acreage and Population Affected by Elevated Noise Levels Under the Dyess AFB Alternative**

Noise Level (dB DNL)	Acres Off-Installation	No Action Alternative Acres Off-Installation	Change from No Action Acres Off-Installation	Off-Installation Population <sup>1</sup>	No Action Off-Installation Population <sup>1</sup>	Change from No Action Off-Installation Population
65–69	3,222	6,052	-2,830	341	700	-359
70–74	925	3,341	-2,416	126	448	-322
75–79	207	1,431	-1,224	29	180	-151
80–84	0	476	-476	0	64	-64
>85	0	197	-197	0	27	-27
<b>Total</b>	<b>4,355</b>	<b>11,497</b>	<b>-7,142</b>	<b>496</b>	<b>1,419</b>	<b>-923</b>

> = greater than; - = minus; AFB = Air Force Base; dB = decibel; DNL = day-night average sound level

Notes:

1. Population estimates were made based on 2014–2018 ACS 5-Year Estimates data (U.S. Census Bureau, 2018a). The number of persons currently residing in affected areas may differ from what has been stated.

### Sound Exposure Level (SEL) at Representative Noise-Sensitive Receptors

Table 3.2-10 describes aircraft noise levels at representative noise-sensitive points of interest under the Dyess AFB Alternative using the DNL metric, which reflects noise over the course of an entire day, and the SEL metric, which reflects the noise generated by a single overflight event. Locations of points are shown in Figure 3.2-5. 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. 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.

Under the Dyess AFB Alternative, the points of interest north of Dyess AFB would continue to experience DNL of up to 64 dB. Individual overflight noise levels (i.e., SEL) could still reach up to 117 dB. However, the noise levels at all representative points would decrease from the baseline as described under the No Action Alternative and presented above in Table 3.2-10. Similarly, the maximum SEL ( $SEL_{max}$ ) would decrease at all the representative points by up to 16 dB.

**Table 3.2-10. Noise Impacts at Representative Points of Interest Under the Dyess AFB Alternative**

Point of Interest		DNL (dBA)			Maximum 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	62	-6	114	108	-6

**Table 3.2-10. Noise Impacts at Representative Points of Interest Under the Dyess AFB Alternative**

Point of Interest		DNL (dBA)			Maximum SEL (dBA)		
ID	Description	No Action	Dyess AFB Alternative	Change from No Action	No Action	Dyess AFB Alternative	Change from No Action
02	Tye Play and Learn	72	64	-8	117	110	-7
03	Fulwiler House	49	40	-9	93	87	-6
04	Dyess Elementary	54	45	-9	98	87	-11
05	Bassetti Elementary	47	39	-8	89	82	-7
06	Kids of Faith Learning Center	45	37	-8	88	81	-7
07	Clark Middle School	44	37	-7	87	79	-8
08	St. John's Episcopal School	43	35	-8	86	82	-4
09	Reagan Elementary	42	35	-7	86	83	-3
10	Small World of Learning	43	35	-8	88	81	-7
11	Willow Springs Health & Rehab Center	47	34	-13	95	79	-16
12	Pioneer Drive Daycare	46	33	-13	95	80	-15

- = minus; AFB = Air Force Base; dBA = A-weighted decibel; 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.

## 1 **Equivalent Sound Level ( $L_{eq}$ ) and Number of Noise Events Analysis at** 2 **Representative Points of Interest**

3 Table 3.2-11 lists the outdoor and indoor estimated 8-hour  $L_{eq}$  values under the Dyess  
4 AFB Alternative during a typical school day (7:00 a.m. to 4:00 p.m., Monday through  
5 Friday) at points of interest near Dyess AFB. Schools at which the maximum estimated  
6 indoor  $L_{eq}$  exceeds 40 dB may not meet the 2009 ANSI guidance for at least a portion of  
7 1 hour during a typical school day. The table also shows the number of events during an  
8 average school day at or above an indoor maximum (single event) sound level of 50 dB.  
9 For example, an individual attending after-school daycare at Alliance After School at Tye  
10 Elementary (01) would typically experience as many as three disruptive events per hour  
11 with the windows open and no events per hour with windows closed under the Dyess AFB  
12 Alternative (a decrease of one event per hour from the baseline with windows closed).

13 Noise impacts on property values are discussed in Section 3.5 (Socioeconomics) and  
14 Section 3.6 (Environmental Justice). Impacts on noise-sensitive land use types (e.g.,  
15 residential areas) are discussed in Section 3.4 (Land Use).

16 Under the Dyess AFB Alternative, the two representative schools in Tye to the north of  
17 Dyess AFB were expected to continue to exceed the recommended noise guidelines.

**Table 3.2-11. Hourly  $L_{eq}$  Noise Levels During the School Day at Representative Points of Interest Near Dyess AFB Under the Dyess AFB Alternative**

Point of Interest		Dyess AFB Alternative					Change from No Action				
		Outdoor $L_{eq(8h)}$ (dB)	Indoor				Outdoor $L_{eq(8h)}$ (dB)	Indoor			
			Windows Open		Windows Closed			Windows Open		Windows Closed	
ID	Description	$L_{eq(8h)}$ (dB)	$L_{eq(8h)}$ (dB)	Events per Hour	$L_{eq(8h)}$ (dB)	Events per Hour	$L_{eq(8h)}$ (dB)	$L_{eq(8h)}$ (dB)	Events per Hour	$L_{eq(8h)}$ (dB)	Events per Hour
01	Alliance After School at Tye Elementary	57	42	3	<40	-	-10	-10	-	-10	-1
02	Tye Play and Learn	58	43	3	<40	2	-12	-12	-	-12	-
03	Fulwiler House	<40	<40	-	<40	-	-11	-11	-	-11	-
04	Dyess Elementary	42	<40	-	<40	-	-11	-11	-1	-11	-
05	Bassetti Elementary	<40	<40	-	<40	-	-10	-10	-	-10	-
06	Kids of Faith Learning Center	<40	<40	-	<40	-	-10	-10	-	-10	-
07	Clark Middle School	<40	<40	-	<40	-	-9	-9	-	-9	-
08	St. John's Episcopal School	<40	<40	-	<40	-	-9	-9	-	-9	-
09	Reagan Elementary	<40	<40	-	<40	-	-9	-9	-	-9	-
10	Small World of Learning	<40	<40	-	<40	-	-10	-10	-	-10	-
11	Willow Springs Health & Rehab Center	<40	<40	-	<40	-	-16	-16	-	-16	-
12	Pioneer Drive Daycare	<40	<40	-	<40	-	-16	-16	-	-16	-
Number of Sites with More than 1 Intrusive Event per Hour				2		1			-		-
Lowest Number of Intrusive Events per Hour if More than 1				3		2			0		0
Highest Number of Intrusive Events per Hour if More than 1				3		2			0		0

< = less than; - = none; AFB = Air Force Base; ANSI = American National Standards Institute; dB = decibel; ID = identification code;  $L_{eq(8h)}$  = 8-hour equivalent sound level

Notes:

- Assumes 15 dB and 25 dB of noise level reductions for windows open and closed, respectively.
- Schools that meet the 2009 ANSI standard of less than 40 dB  $L_{eq}$  are listed as having an  $L_{eq}$  of <40 dB.
- 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.

## 1 **Potential Hearing Loss**

2 PHL under the Dyess AFB Alternative was assessed using the methodology described in  
3 Appendix B (Noise). According to census data, it is estimated that no individuals in the  
4 vicinity of Dyess AFB would be exposed to aircraft noise 80 dB DNL or greater under the  
5 Dyess AFB Alternative. This is a decrease from the estimated 91 individuals potentially  
6 impacted under the No Action Alternative.

### 7 **3.2.2.2.3 Airspace and Range Utilization**

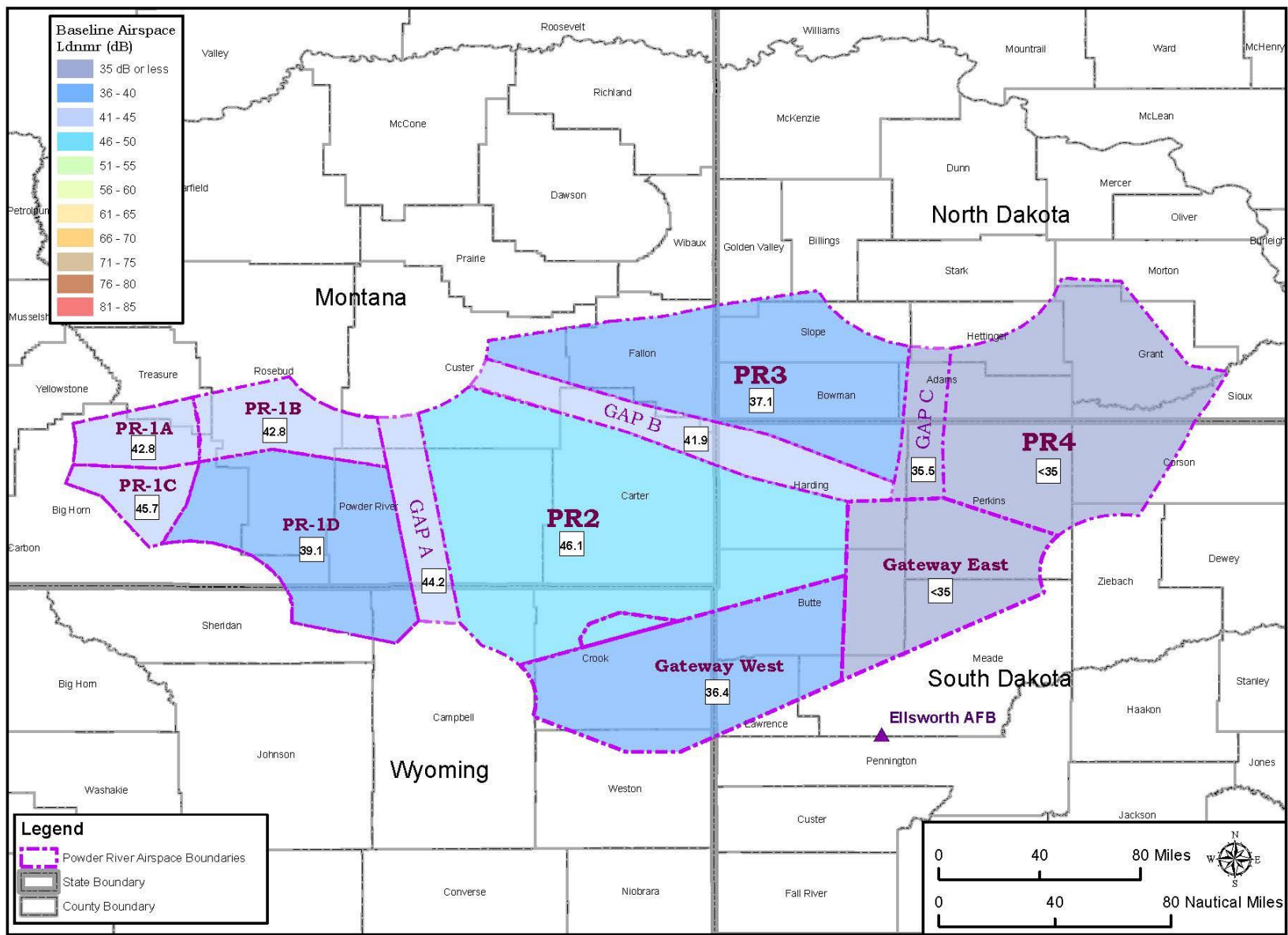
8 Table 3.2-12 shows the noise levels in PRTC and the Lancer, Pecos, and Brownwood  
9 MOAs under the No Action Alternative and the Dyess AFB Alternative as well as the net  
10 change. Under the Dyess AFB Alternative, noise in PRTC would remain below 46.1 dB,  
11 and noise beneath Lancer and Pecos MOAs would decrease, the noise level in the  
12 Brownwood MOA would remain below 35 dB, and noise levels in all areas of PRTC would  
13 remain the same. Figure 3.2-6 shows the noise in PRTC under the Dyess AFB  
14 Alternative, and Figure 3.2-7 shows the noise in the Lancer, Brownwood, and Pecos  
15 MOAs. The following sections discuss the change from the No Action Alternative in each  
16 SUA/MOA. Because the B-21 is projected to be generally quieter and tends to fly higher  
17 than the B-1, the noise in all the airspace areas would decrease or remain the same  
18 overall as a result of implementing the Dyess AFB Alternative.

19 There would be no adverse impacts to noise beneath the SUAs under the Dyess AFB  
20 Alternative.

21 **Table 3.2-12. Dyess AFB Alternative Airspace Noise**

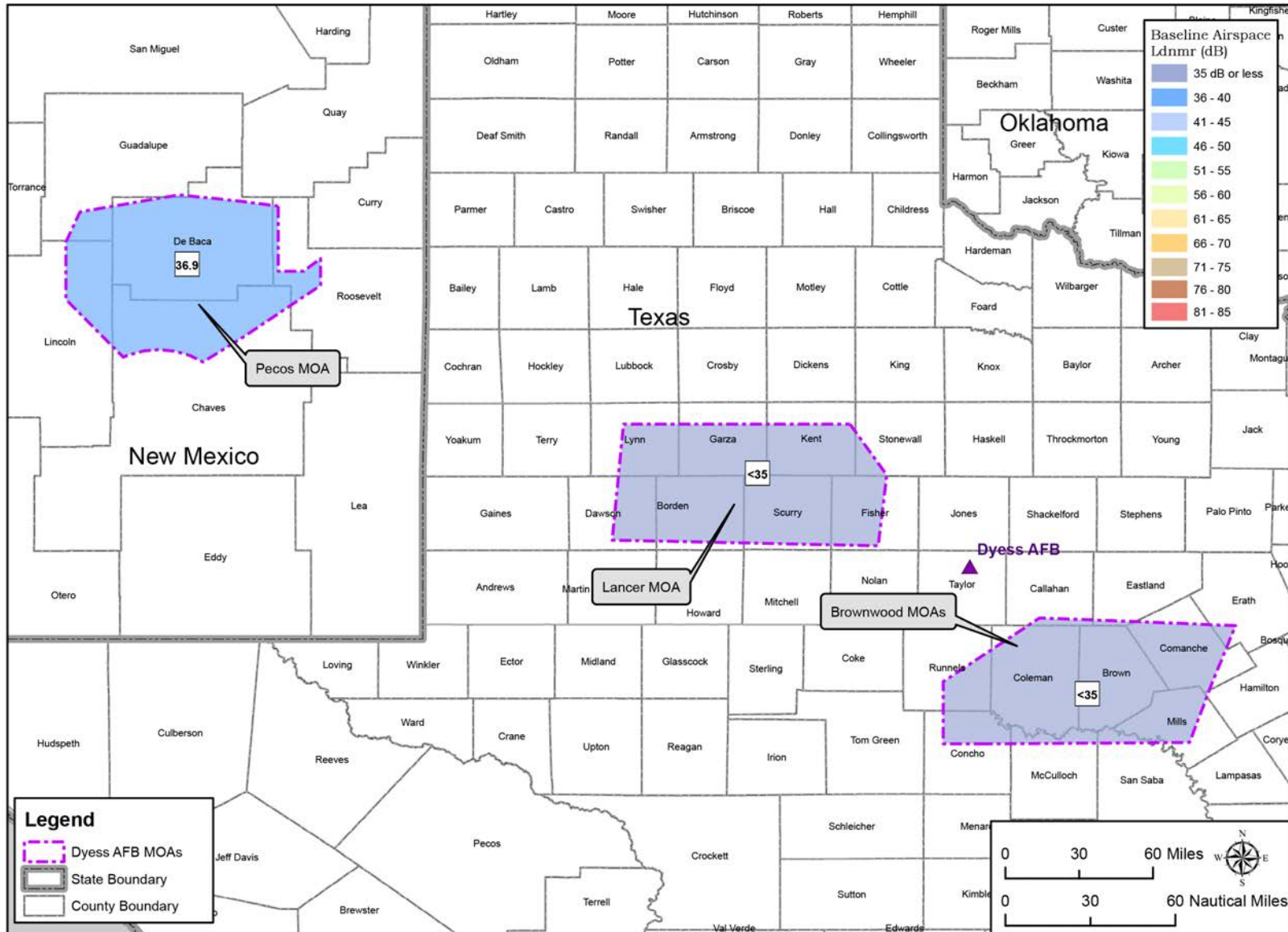
Location	Special Use Airspace	No Action Alternative (dB)	Air Operations Dyess (dB)	Change from No Action Alternative (dB)
MOAs	Lancer	43.4	<35	-8.4
	Pecos	55.9	36.9	-19
	Brownwood	<35	<35	0
PRTC	Gap A	44.2	44.2	0
	Gap B	41.9	41.9	0
	Gap C	35.5	35.5	0
	Gateway East	<35	<35	0
	Gateway West	36.4	36.4	0
	Powder River 1A	42.8	42.8	0
	Powder River 1B	42.8	42.8	0
	Powder River 1C	45.7	45.7	0
	Powder River 1D	39.1	39.1	0
	Powder River 2	46.1	46.1	0
	Powder River 3	37.1	37.1	0
	Powder River 4	<35	<35	0

< = less than; - = minus; AFB = Air Force Base; dB = decibel; MOA = Military Operating Area; PRTC = Powder River Training Complex



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Figure 3.2-6. PRTC Noise Under the Dyess AFB Alternative



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**Figure 3.2-7. Airspace Noise at Brownwood, Lancer, and Pecos MOAs Under the Dyess AFB Alternative**



### 3.2.2.2.4 Facilities and Infrastructure

Facilities and infrastructure C&D activities would result in temporary, localized increases in noise levels as discussed above and in Table 3.2-5 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, demolition and construction 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 annoying but would not be significant.

### 3.2.2.2.5 Weapons Generation Facility

WGF C&D activities would generate typical construction noise as shown in Table 3.2-5, 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 adversely affect noise at Dyess AFB.

### 3.2.2.2.6 Snapshot

#### Airfield Operations

Noise contours in the vicinity of Dyess AFB under the Dyess AFB Snapshot Scenario are depicted in Figure 3.2-8. Acreage, population, and residential parcels affected by DNL noise contours associated with all aircraft under the Dyess AFB Snapshot Scenario are shown in Table 3.2-13.

Under the Dyess AFB Snapshot Scenario, 7,243 acres and an estimated 869 persons could be exposed to noise levels exceeding 65 dB DNL near Dyess AFB. This represents a decrease of 4,254 acres and 550 persons from the No Action Alternative. The change in noise level is attributable to the fact that the B-21 is projected to be generally quieter than the B-1.

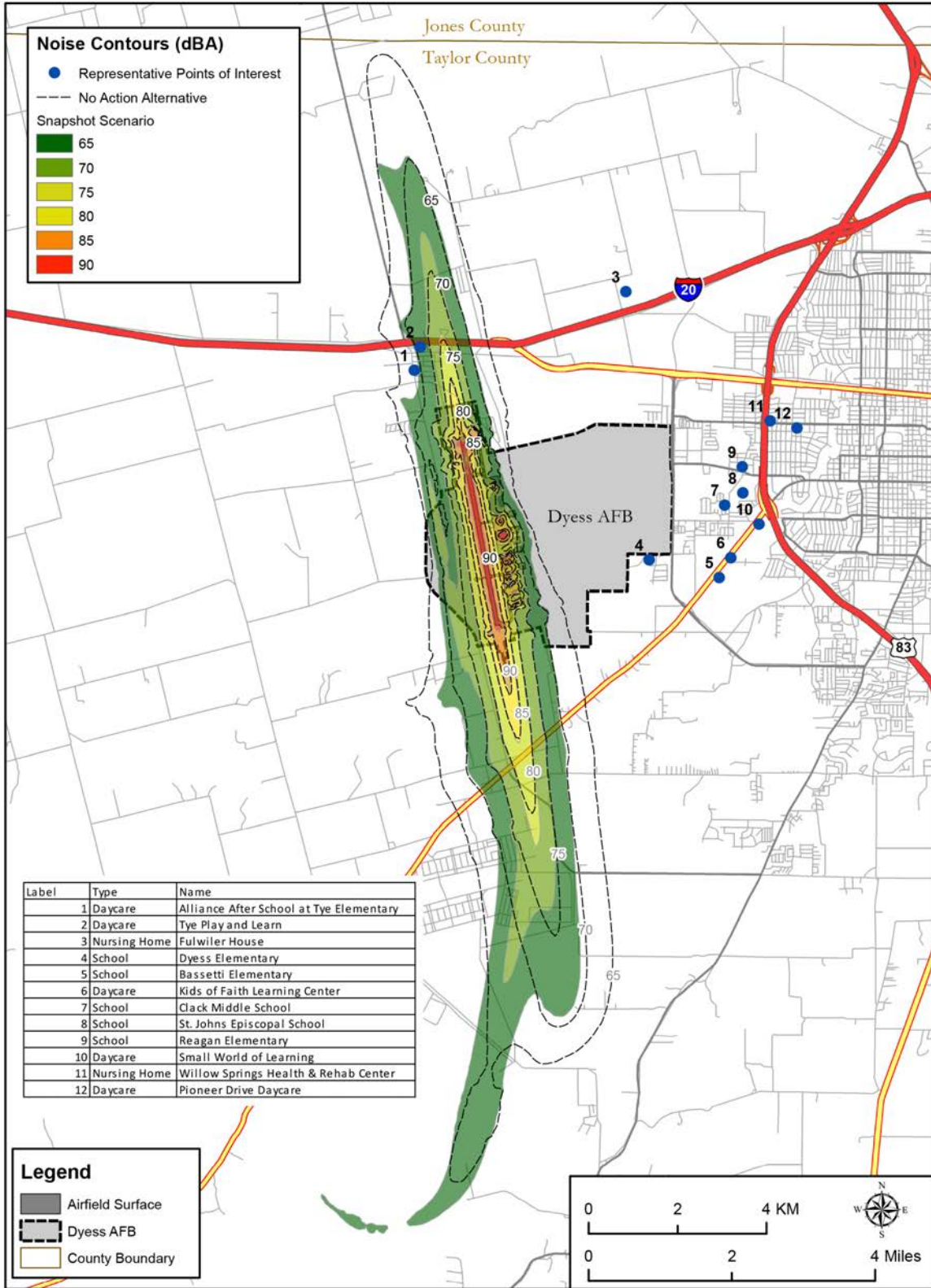
**Table 3.2-13. Acreage and Population Affected by Elevated Noise Levels Under the Snapshot Scenario at Dyess AFB**

Noise Level (dB DNL)	Acres Off-Installation	No Action Alternative Acres Off-Installation	Change from No Action Acres Off-Installation	Off-Installation Population <sup>1</sup>	No Action Off-Installation Population <sup>1</sup>	Change from No Action Off-Installation Population
65–69	4,762	6,052	-1,290	557	700	-143
70–74	1,751	3,341	-1,590	213	448	-235
75–79	550	1,431	-881	74	180	-106
80–84	153	476	-323	21	64	-43
>85	27	197	-170	4	27	-23
<b>Total</b>	<b>7,243</b>	<b>11,497</b>	<b>-4,254</b>	<b>869</b>	<b>1,419</b>	<b>-550</b>

> = greater than; - = minus; AFB = Air Force Base; dB = decibel; DNL = day-night average sound level

Notes:

1. Population estimates were made based on 2014–2018 ACS 5-Year Estimates data (U.S. Census Bureau, 2018a). The number of persons currently residing in affected areas may differ from what has been stated.



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**Figure 3.2-8. Noise Contours at Dyess AFB Under the Snapshot Scenario Compared with the No Action Alternative**

## 1 Sound Exposure Level (SEL) at Representative Noise-Sensitive Receptors

2 Table 3.2-14 describes aircraft noise levels at representative noise-sensitive points of  
3 interest under the Snapshot Scenario at Dyess AFB using the DNL metric, which reflects  
4 noise over the course of an entire day, and the SEL metric, which reflects the noise  
5 generated by a single overflight event. Locations of points are shown in Figure 3.2-8.

6 Under the Snapshot Scenario at Dyess AFB, the points of interest north of Dyess AFB  
7 would continue to experience DNL of up to 67 dB. Individual overflight noise levels (i.e.,  
8 SEL) could still reach up to 117 dB. However, the DNL noise levels at all representative  
9 points would decrease from the No Action Alternative baseline under the Snapshot.  
10 However, the SEL<sub>max</sub> would remain the same at all the representative points.

**Table 3.2-14. Noise Impacts at Representative Points of Interest Under the Snapshot Scenario at Dyess AFB**

Point of Interest		DNL (dBA)			Maximum SEL (dBA)		
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	-
02	Tye Play and Learn	72	67	-5	117	117	-
03	Fulwiler House	49	44	-5	93	93	-
04	Dyess Elementary	54	49	-5	98	98	-
05	Bassetti Elementary	47	42	-5	89	89	-
06	Kids of Faith Learning Center	45	41	-4	88	88	-
07	Clark Middle School	44	40	-4	87	87	-
08	St. John's Episcopal School	43	38	-5	86	86	-
09	Reagan Elementary	42	38	-4	86	86	-
10	Small World of Learning	43	38	-5	88	88	-
11	Willow Springs Health & Rehab Center	47	40	-7	95	95	-
12	Pioneer Drive Daycare	46	40	-6	95	95	-

- = none/minus; AFB = Air Force Base; dBA = A-weighted decibel; 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.

## 11 Equivalent Sound Level (L<sub>eq</sub>) and Number of Noise Events Analysis at 12 Representative Points of Interest

13 Table 3.2-15 lists the outdoor and indoor estimated 8-hour L<sub>eq</sub> values under the Dyess  
14 AFB Snapshot Scenario during a typical school day (7:00 a.m. to 4:00 p.m., Monday  
15 through Friday) at points of interest near Dyess AFB. The table also shows the number  
16 of events during an average school day at or above an indoor maximum (single event)  
17 sound level of 50 dB. For example, an individual attending after-school daycare at

1 Alliance After School at Tye Elementary (01) would typically experience as many as three  
 2 disruptive events per hour with the windows open and one event per hour with windows  
 3 closed under the Proposed Action. That is no change in the number of events per hour  
 4 from the baseline with windows either open or closed.

5 Under the Dyess AFB Snapshot Scenario, the two representative schools in Tye to the  
 6 north of Dyess AFB are expected to continue to exceed the recommended noise  
 7 guidelines with windows open.

**Table 3.2-15. Hourly  $L_{eq}$  Noise Levels During the School Day at Representative Points of Interest Near Dyess AFB Under the Snapshot Scenario**

Point of Interest		Dyess AFB Snapshot Scenario					Change from No Action				
		Outdoor $L_{eq(8h)}$ (dB)	Indoor				Outdoor $L_{eq(8h)}$ (dB)	Indoor			
			Windows Open		Windows Closed			Windows Open		Windows Closed	
ID	Description	$L_{eq(8h)}$ (dB)	$L_{eq(8h)}$ (dB)	Events per Hour	$L_{eq(8h)}$ (dB)	Events per Hour	$L_{eq(8h)}$ (dB)	Events per Hour	$L_{eq(8h)}$ (dB)	Events per Hour	
01	Alliance After School at Tye Elementary	57	42	3	<40	-	-10	-10	-	-10	-1
02	Tye Play and Learn	58	43	3	<40	2	-12	-12	-	-12	-
03	Fulwiler House	<40	<40	-	<40	-	-11	-11	-	-11	-
04	Dyess Elementary	42	<40	-	<40	-	-11	-11	-1	-11	-
05	Bassetti Elementary	<40	<40	-	<40	-	-10	-10	-	-10	-
06	Kids of Faith Learning Center	<40	<40	-	<40	-	-10	-10	-	-10	-
07	Clark Middle School	<40	<40	-	<40	-	-9	-9	-	-9	-
08	St. John's Episcopal School	<40	<40	-	<40	-	-9	-9	-	-9	-
09	Reagan Elementary	<40	<40	-	<40	-	-9	-9	-	-9	-
10	Small World of Learning	<40	<40	-	<40	-	-10	-10	-	-10	-
11	Willow Springs Health & Rehab Center	<40	<40	-	<40	-	-16	-16	-	-16	-
12	Pioneer Drive Daycare	<40	<40	-	<40	-	-16	-16	-	-16	-
Number of Sites with More than 1 Intrusive Event per Hour				2		1			-		-
Lowest Number of Intrusive Events per Hour if More than 1				3		2			0		0
Highest Number of Intrusive Events per Hour if More than 1				3		2			0		0

< = less than; - = none/minus; AFB = Air Force Base; ANSI = American National Standards Institute; dB = decibel; ID = identification code;

$L_{eq(8h)}$  = 8-hour equivalent sound level

Notes:

1. Assumes 15 dB and 25 dB of noise level reductions for windows open and closed, respectively.

2. Schools that meet the 2009 ANSI standard of less than 40 dB  $L_{eq}$  are listed as having an  $L_{eq}$  of <40 dB.

3. 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.

## 1 **Airspace and Range Utilization**

2 Table 3.2-16 lists the noise levels under the Dyess AFB Snapshot Scenario. Noise levels  
 3 would remain below 46.1 dB  $L_{dnmr}$  and no adverse impacts to noise would be expected.  
 4 Noise in the Lancer MOA would decrease from the No Action Alternative, but would be  
 5 slightly higher than the end-state. The noise level would still be only 36.6 dB  $L_{dnmr}$ . Noise  
 6 in the Brownwood MOA would remain below 35 dB  $L_{dnmr}$ . Noise in the Pecos MOA would  
 7 decrease from the No Action Alternative, but would be higher than the end-state. The  
 8 noise level would still be only 49.2 dB  $L_{dnmr}$  in the Pecos MOA. No adverse impacts would  
 9 be expected in any of the airspace areas under the snapshot conditions.

**Table 3.2-16. Dyess AFB Snapshot Scenario Airspace Noise**

Location	Special Use Airspace	No Action Alternative (dB)	Dyess AFB Alternative (dB)	Dyess AFB Snapshot (dB)	Change from No Action Alternative (dB)
MOA	Lancer	43.4	<35	36.6	-6.8
	Pecos	55.9	36.9	49.2	-6.7
	Brownwood	<35	<35	<35	0
PRTC	Gap A	44.2	44.2	44.2	0
	Gap B	41.9	41.9	41.9	0
	Gap C	35.5	35.5	35.5	0
	Gateway East	<35	<35	<35	0
	Gateway West	36.4	36.4	36.4	0
	Powder River 1A	42.8	42.8	42.8	0
	Powder River 1B	42.8	42.8	42.8	0
	Powder River 1C	45.7	45.7	45.7	0
	Powder River 1D	39.1	39.1	39.1	0
	Powder River 2	46.1	46.1	46.1	0
	Powder River 3	37.1	37.1	37.1	0
	Powder River 4	<35	<35	<35	0

< = less than; - = minus; AFB = Air Force Base; MOA = Military Operating Area; dB = decibel; PRTC = Powder River Training Complex

### 10 **3.2.2.2.7 Proposed Resource-Specific Mitigations and Management Actions to** 11 **Reduce the Potential for Environmental Impacts**

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

### 3.2.2.3 Ellsworth AFB Alternative

#### 3.2.2.3.1 Personnel

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

#### 3.2.2.3.2 Airfield Operations

Noise contours in the vicinity of Ellsworth AFB under the Ellsworth AFB Alternative are depicted in Figure 3.2-9 compared with the No Action Alternative. Acreage, population, and residential parcels affected by DNL noise contours associated with all aircraft under the Ellsworth AFB Alternative are shown in Table 3.2-17.

Under the Ellsworth AFB Alternative, 1,610 acres and an estimated 358 persons could be exposed to noise levels exceeding 65 dB DNL near Ellsworth AFB. This represents a decrease of 4,224 acres and 1,627 persons from the No Action Alternative. The change in noise level is attributable to the fact that the B-21 is projected to be generally quieter than the B-1.

**Table 3.2-17. Acreage and Population Affected by Elevated Noise Levels Under the Ellsworth AFB Alternative**

Noise Level (dB DNL)	Acres Off-Installation	No Action Alternative Acres Off-Installation	Change from No Action Acres Off-Installation	Off-Installation Population <sup>1</sup>	No Action Off-Installation Population <sup>1</sup>	Change from No Action Off-Installation Population
65–69	1,302	4,088	-2,786	340	1,313	-973
70–74	308	1,219	-911	18	391	-373
75–79	0	432	-432	0	190	-190
80–84	0	77	-77	0	78	-78
>85	0	18	-18	0	13	-13
<b>Total</b>	<b>1,610</b>	<b>5,834</b>	<b>-4,224</b>	<b>358</b>	<b>1,985</b>	<b>-1,627</b>

> = greater than; - = minus; AFB = Air Force Base; dB = decibel; DNL = day-night average sound level

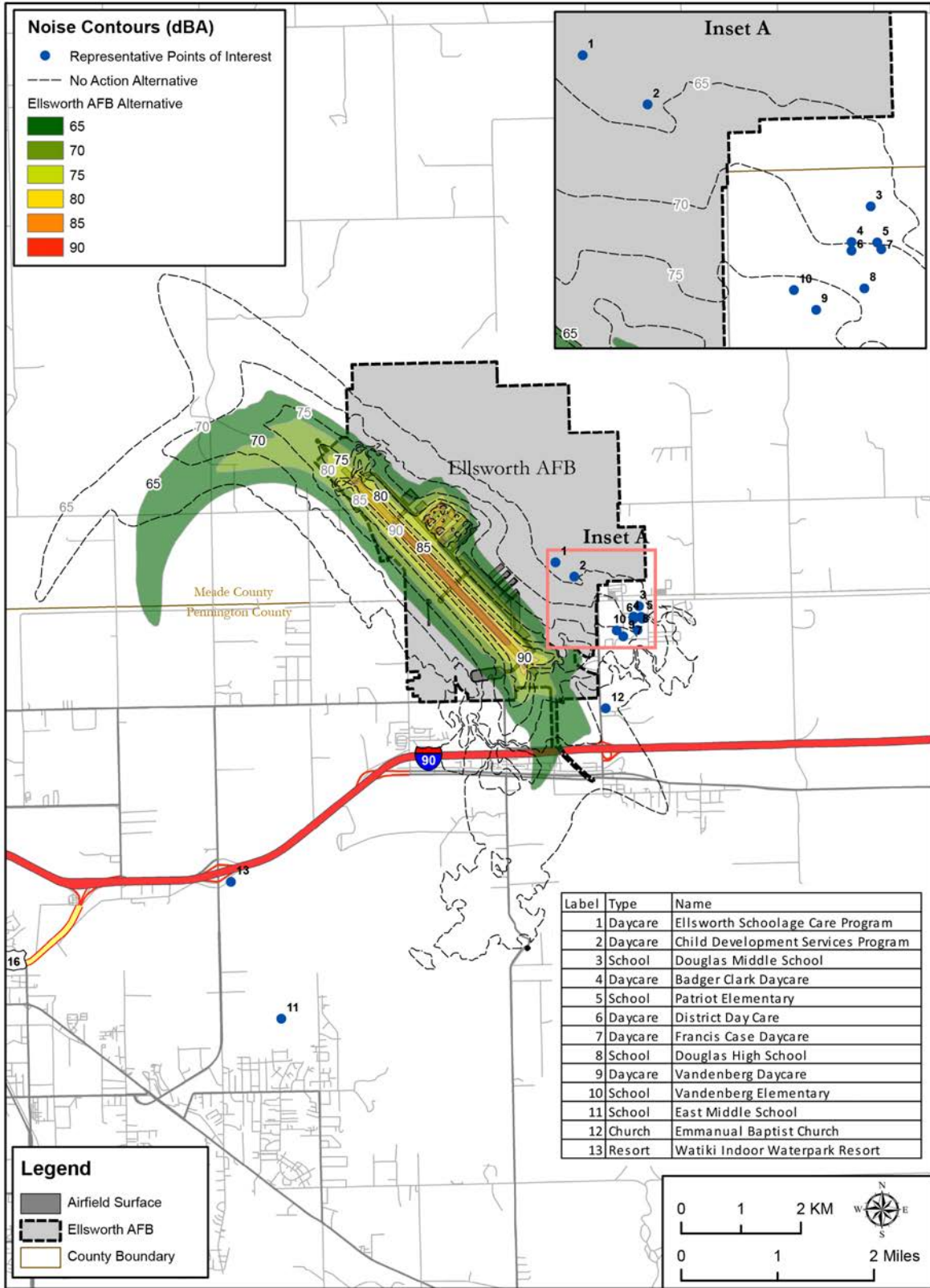
Notes:

1. Population estimates were made based on 2014–2018 ACS 5-Year Estimates data (U.S. Census Bureau, 2018a). The number of persons currently residing in affected areas may differ from what has been stated.

### Sound Exposure Level (SEL) at Representative Noise-Sensitive Receptors

Table 3.2-18 describes aircraft noise levels at representative noise-sensitive points of interest under the Ellsworth AFB Alternative using the DNL metric, which reflects noise over the course of an entire day, and the SEL metric, which reflects the noise generated by a single overflight event. Locations of points are shown in Figure 3.2-9.

Under the Ellsworth AFB Alternative, the points of interest near Ellsworth AFB would decrease to a DNL of up to 59 dB. Individual overflight noise levels (i.e., SEL) could still reach up to 111 dB. However, the DNL noise levels at all representative points would decrease from the No Action Alternative baseline. The SEL<sub>max</sub> would also decrease at all the representative points.



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**Figure 3.2-9. Noise Contours at Ellsworth AFB Under the Ellsworth AFB Alternative Compared with the No Action Alternative**

**Table 3.2-18. Noise Impacts at Representative Points of Interest Under the Ellsworth AFB Alternative**

Point of Interest		DNL (dBA)			Maximum SEL (dBA)		
ID	Description	No Action	Ellsworth AFB Alternative	Change from No Action	No Action	Ellsworth AFB Alternative	Change from No Action
01	Ellsworth Schoolage Care Program	63	55	-8	107	104	-3
02	Child Development Services Program	64	54	-10	107	103	-4
03	Douglas Middle School	67	51	-16	111	101	-10
04	Badger Clark Daycare	70	53	-17	114	101	-13
05	Patriot Elementary	70	52	-18	115	101	-14
06	District Day Care	71	53	-18	116	101	-15
07	Francis Case Daycare	71	52	-19	115	101	-14
08	Douglas High School	74	55	-19	119	102	-17
09	Vandenberg Daycare	77	58	-19	123	105	-18
10	Vandenberg Elementary	77	57	-20	122	105	-17
11	East Middle School	53	48	-5	96	87	-9
12	Emmanuel Baptist Church	67	59	-8	115	111	-4
13	WaTiki Indoor Waterpark Resort	54	44	-10	100	84	-16

- = minus; AFB = Air Force Base; dBA = A-weighted decibel; 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.

## 1 Equivalent Sound Level ( $L_{eq}$ ) and Number of Noise Events Analysis at 2 Representative Points of Interest

3 Table 3.2-19 lists the outdoor and indoor estimated 8-hour  $L_{eq}$  values under the Ellsworth  
4 AFB Alternative during a typical school day (7:00 a.m. to 4:00 p.m., Monday through  
5 Friday) at points of interest near Ellsworth AFB. The table also shows the number of  
6 events during an average school day at or above an indoor maximum (single event) sound  
7 level of 50 dB. For example, an individual attending after-school daycare at Ellsworth  
8 Schoolage Care Program (01) would typically experience only up to one disruptive event  
9 per hour with the windows open and one event per hour with windows closed under the  
10 Ellsworth AFB Alternative. That is no change in the number of events per hour from the  
11 baseline with windows either open or closed.

12 Under the Ellsworth AFB Alternative, the DNL levels would be expected to decrease at  
13 every representative point, and the number of events would decrease slightly at most  
14 points. However, Vandenberg Daycare, Vandenberg Elementary, and Emmanuel Baptist  
15 Church would continue to have DNL noise levels exceeding the recommended 40 dB  
16 level with windows open.



**Table 3.2-19. Hourly  $L_{eq}$  Noise Levels During the School Day at Representative Points of Interest Near Ellsworth AFB Under the Ellsworth AFB Alternative**

Point of Interest		Ellsworth AFB Alternative					Change from No Action				
		Outdoor $L_{eq(8h)}$ (dB)	Indoor				Outdoor $L_{eq(8h)}$ (dB)	Indoor			
			Windows Open		Windows Closed			Windows Open		Windows Closed	
ID	Description	$L_{eq(8h)}$ (dB)	$L_{eq(8h)}$ (dB)	Events per Hour	$L_{eq(8h)}$ (dB)	Events per Hour	$L_{eq(8h)}$ (dB)	Events per Hour	$L_{eq(8h)}$ (dB)	Events per Hour	
01	Ellsworth Schoolage Care Program	52	<40	1	<40	-	-12	-12	-	-12	-1
02	Child Development Services Program	52	<40	1	<40	-	-13	-13	-	-13	-1
03	Douglas Middle School	50	<40	1	<40	-	-18	-18	-	-18	-1
04	Badger Clark Daycare	52	<40	1	<40	-	-19	-19	-	-19	-1
05	Patriot Elementary	52	<40	1	<40	-	-19	-19	-	-19	-1
06	District Day Care	53	<40	1	<40	-	-19	-19	-	-19	-1
07	Francis Case Daycare	52	<40	1	<40	-	-20	-20	-	-20	-1
08	Douglas High School	55	40	1	<40	-	-20	-20	-	-20	-1
09	Vandenberg Daycare	58	43	1	<40	-	-21	-21	-	-21	-1
10	Vandenberg Elementary	58	43	1	<40	-	-20	-20	-	-20	-1
11	East Middle School	41	<40	-	<40	-	-12	-12	-1	-12	-
12	Emmanuel Baptist Church	58	43	1	<40	-	-11	-11	-	-11	-1
13	WaTiki Indoor Waterpark Resort	<40	<40	-	<40	-	-17	-17	-1	-17	-
Number of Sites with More than 1 Intrusive Event per Hour				-		-			-		-
Lowest Number of Intrusive Events per Hour if More than 1				2		2			0		0
Highest Number of Intrusive Events per Hour if More than 1				-		-			0		0

< = less than; - = none/minus; AFB = Air Force Base; ANSI = American National Standards Institute; dB = decibel; ID = identification code;  $L_{eq(8h)}$  = 8-hour equivalent sound level

Notes:

- Assumes 15 dB and 25 dB of noise level reductions for windows open and closed, respectively.
- Schools that meet the 2009 ANSI standard of less than 40 dB  $L_{eq}$  are listed as having an  $L_{eq}$  of <40 dB.
- 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.

## 1 Potential Hearing Loss

- PHL under the Ellsworth AFB Alternative was assessed using the methodology described in Appendix B (Noise). According to census data, no individuals in the vicinity of Ellsworth AFB would be exposed to aircraft noise 80 dB DNL or greater.

### 1 **3.2.2.3.3 Airspace and Range Utilization**

2 Table 3.2-20 shows the noise levels in PRTC and under the No Action Alternative and  
 3 the Ellsworth AFB Alternative as well as the net change. Under the Ellsworth AFB  
 4 Alternative, noise levels at PRTC would decrease or remain below 35 dB  $L_{dnmr}$  across the  
 5 boardFigure 3.2-6. Because the B-21 is projected to be generally quieter and tends to fly  
 6 higher than the B-1, the noise in PRTC would decrease overall as a result of implementing  
 7 the Proposed Action at Ellsworth AFB.

8 **Table 3.2-20. Ellsworth AFB Alternative Airspace Noise**

Location	Special Use Airspace	No Action Alternative (dB)	Ellsworth AFB Alternative (dB)	Change from No Action Alternative (dB)
PRTC	Gap A	44.2	38.9	-5.3
	Gap B	41.9	36.5	-5.4
	Gap C	35.5	<35	-0.5
	Gateway East	<35	<35	0
	Gateway West	36.4	<35	-1.4
	Powder River 1A	42.8	35.8	-7
	Powder River 1B	42.8	37.1	-5.7
	Powder River 1C	45.7	42.0	-3.7
	Powder River 1D	39.1	<35	-4.1
	Powder River 2	46.1	<35	-11.1
	Powder River 3	37.1	<35	-2.1
Powder River 4	<35	<35	0	

< = less than; - = minus; AFB = Air Force Base; dB = decibel; PRTC = Powder River Training Complex

### 9 **3.2.2.3.4 Facilities and Infrastructure**

10 As discussed above and in Table 3.2-5, facilities and infrastructure C&D activities would  
 11 result in temporary, localized increases in noise levels that could be disruptive and  
 12 annoying. However, the installation and surrounding area is exposed to frequent, loud  
 13 aircraft operations noise and ground vehicle traffic noise under baseline conditions.  
 14 Additionally, demolition and construction activities would be conducted during normal  
 15 business hours. In this context, the temporary and localized noise generated by C&D  
 16 activities on the installation could be disruptive and annoying but would not be significant.

### 17 **3.2.2.3.5 Weapons Generation Facility**

#### 18 **North WGF Site Subalternative**

19 North WGF Site C&D activities would generate typical construction noise as shown in  
 20 Table 3.2-5, which would decrease proportionally as the distance from the noise source  
 21 to the receptor increases. Noise impacts would be temporary and minor and would not  
 22 adversely affect noise at Ellsworth AFB.

## 1 South WGF Site Subalternative

2 South WGF Site C&D activities would generate typical construction noise as shown in  
3 Table 3.2-5, which would decrease proportionally as the distance from the noise source  
4 to the receptor increases. The South WGF Site is closer to the residential community of  
5 Box Elder, but is still over 1,000 feet away from the nearest residence. Therefore, noise  
6 levels would be below 65 dB, and annoyance would still be minor and temporary and  
7 would not adversely affect noise on or outside Ellsworth AFB.

### 8 3.2.2.3.6 Snapshot

#### 9 Airfield Operations

10 Noise contours in the vicinity of Ellsworth AFB under the Ellsworth AFB Snapshot  
11 Scenario are depicted in Figure 3.2-10. Acreage, population, and residential parcels  
12 affected by DNL noise contours associated with all aircraft under the Snapshot Scenario  
13 are shown in Table 3.2-21.

14 Under the Ellsworth AFB Snapshot Scenario, 2,880 acres and an estimated 978 persons  
15 could be exposed to noise levels exceeding 65 dB DNL near Ellsworth AFB. This  
16 represents a decrease of 2,954 acres and 1,007 persons from the No Action Alternative.  
17 The change in noise level is attributable to the fact that the B-21 is projected to be  
18 generally quieter than the B-1.

19 **Table 3.2-21. Acreage and Population Affected by Elevated Noise Levels Under the**  
20 **Snapshot Scenario at Ellsworth AFB**

Noise Level (dB DNL)	Acres Off-Installation	No Action Alternative Acres Off-Installation	Change from No Action Acres Off-Installation	Off-Installation Population <sup>1</sup>	No Action Off-Installation Population <sup>1</sup>	Change from No Action Off-Installation Population
65–69	2,033	4,088	-2,055	706	1,313	-607
70–74	753	1,219	-466	215	391	-176
75–79	84	432	-348	52	190	-138
80–84	10	77	-67	5	78	-73
>85	0	18	-18	0	13	-13
<b>Total</b>	<b>2,880</b>	<b>5,834</b>	<b>-2,954</b>	<b>978</b>	<b>1,985</b>	<b>-1,007</b>

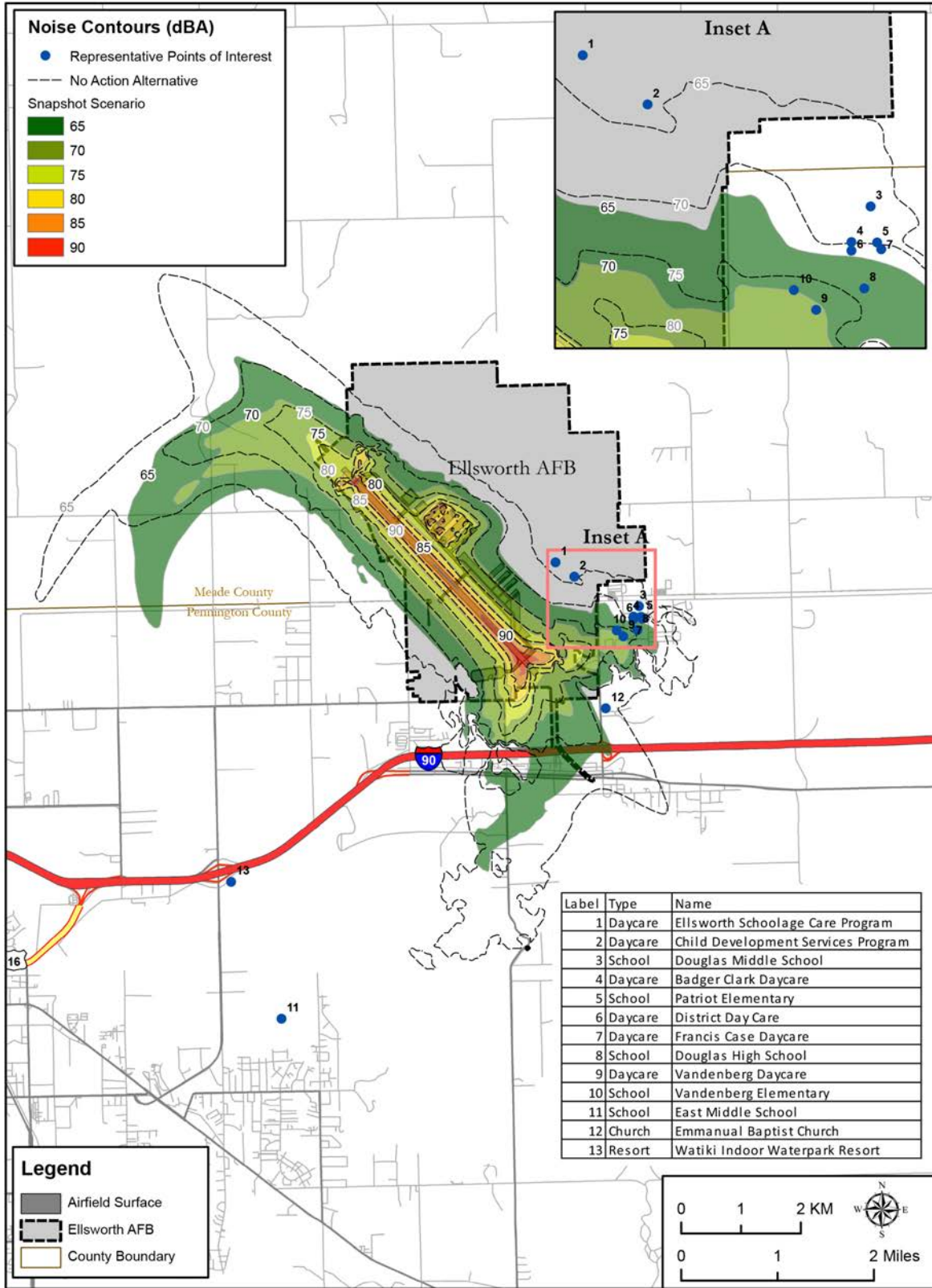
> = greater than; - = minus; AFB = Air Force Base; dB = decibel; DNL = day-night average sound level

Notes:

1. Population estimates were made based on 2014–2018 ACS 5-Year Estimates data (U.S. Census Bureau, 2018a). The number of persons currently residing in affected areas may differ from what has been stated.

## 21 Sound Exposure Level (SEL) at Representative Noise-Sensitive Receptors

22 Table 3.2-22 describes aircraft noise levels at representative noise-sensitive points of  
23 interest under the Snapshot Scenario at Ellsworth AFB using the DNL metric, which  
24 reflects noise over the course of an entire day, and the SEL metric, which reflects the  
25 noise generated by a single overflight event. Locations of points are shown in  
26 Figure 3.2-10.



1  
2 **Figure 3.2-10. Noise Contours at Ellsworth AFB Under the Snapshot Scenario Compared**  
3 **with the No Action Alternative**

Under the Snapshot Scenario at Ellsworth AFB, the points of interest near Ellsworth AFB would continue to experience DNL of up to 71 dB. Individual overflight noise levels (i.e., SEL) could still reach up to 123 dB. However, the DNL noise levels at all representative points would decrease from the No Action Alternative baseline. The SEL<sub>max</sub> would remain the same at all the representative points.

**Table 3.2-22. Noise Impacts at Representative Points of Interest Under the Snapshot Scenario at Ellsworth AFB**

Point of Interest		DNL (dBA)			Maximum SEL (dBA)		
ID	Description	No Action	Ellsworth AFB Snapshot	Change from No Action	No Action	Ellsworth AFB Snapshot	Change from No Action
01	Ellsworth Schoolage Care Program	63	59	-4	107	107	-
02	Child Development Services Program	64	59	-5	107	107	-
03	Douglas Middle School	67	60	-7	111	111	-
04	Badger Clark Daycare	70	63	-7	114	114	-
05	Patriot Elementary	70	63	-7	115	115	-
06	District Day Care	71	64	-7	116	116	-
07	Francis Case Daycare	71	64	-7	115	115	-
08	Douglas High School	74	67	-7	119	119	-
09	Vandenberg Daycare	77	71	-6	123	123	-
10	Vandenberg Elementary	77	70	-7	122	122	-
11	East Middle School	53	50	-3	96	96	-
12	Emmanuel Baptist Church	67	63	-4	115	115	-
13	WaTiki Indoor Waterpark Resort	54	49	-5	100	100	-

- = none/minus; AFB= Air Force Base; dBA = A-weighted decibel; 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.

### Equivalent Sound Level ( $L_{eq}$ ) and Number of Noise Events Analysis at Representative Points of Interest

Table 3.2-23 lists the outdoor and indoor estimated 8-hour  $L_{eq}$  values under the Snapshot Scenario during a typical school day (7:00 a.m. to 4:00 p.m., Monday through Friday) at points of interest near Ellsworth AFB. The table also shows the number of events during an average school day at or above an indoor maximum (single event) sound level of 50 dB. For example, an individual attending after-school daycare at Ellsworth Schoolage Care Program (01) would typically experience only up to one disruptive event per hour with the windows open and one event per hour with windows closed under the Snapshot Scenario. That is no change in the number of events per hour from the baseline with windows either open or closed.

**Table 3.2-23. Hourly  $L_{eq}$  Noise Levels During the School Day at Representative Points of Interest Near Ellsworth AFB Under the Snapshot Scenario**

Point of Interest		Ellsworth AFB Snapshot Scenario					Change from No Action				
		Outdoor $L_{eq(8h)}$ (dB)	Indoor				Outdoor $L_{eq(8h)}$ (dB)	Indoor			
			Windows Open		Windows Closed			Windows Open		Windows Closed	
ID	Description	$L_{eq(8h)}$ (dB)	$L_{eq(8h)}$ (dB)	Events per Hour	$L_{eq(8h)}$ (dB)	Events per Hour	$L_{eq(8h)}$ (dB)	Events per Hour	$L_{eq(8h)}$ (dB)	Events per Hour	
01	Ellsworth Schoolage Care Program	58	43	1	<40	1	-6	-6	-	-6	-
02	Child Development Services Program	59	44	1	<40	1	-6	-6	-	-6	-
03	Douglas Middle School	61	46	1	<40	-	-7	-7	-	-7	-1
04	Badger Clark Daycare	64	49	1	<40	-	-7	-7	-	-7	-1
05	Patriot Elementary	64	49	1	<40	-	-7	-7	-	-7	-1
06	District Day Care	66	51	1	41	-	-7	-7	-	-7	-1
07	Francis Case Daycare	65	50	1	40	-	-7	-7	-	-7	-1
08	Douglas High School	69	54	1	44	-	-7	-7	-	-7	-1
09	Vandenberg Daycare	72	57	1	47	1	-7	-7	-	-7	-
10	Vandenberg Elementary	71	56	1	46	1	-7	-7	-	-7	-
11	East Middle School	47	<40	-	<40	-	-6	-6	-1	-6	-
12	Emmanuel Baptist Church	63	48	1	<40	-	-6	-6	-	-6	-1
13	WaTiki Indoor Waterpark Resort	49	<40	-	<40	-	-7	-7	-1	-7	-
Number of Sites with More than 1 Intrusive Event per Hour				-		-			-		-
Lowest Number of Intrusive Events per Hour if More than 1				-		-			0		0
Highest Number of Intrusive Events per Hour if More than 1				-		-			0		0

< = less than; - = none/minus; AFB = Air Force Base; ANSI = American National Standards Institute; dB = decibel; ID = identification code;

$L_{eq(8h)}$  = 8-hour equivalent sound level

Note:

1. Assumes 15 dB and 25 dB of noise level reductions for windows open and closed, respectively.
2. Schools that meet the 2009 ANSI standard of less than 40 dB  $L_{eq}$  are listed as having an  $L_{eq}$  of <40 dB.
3. 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.

1 Under the Ellsworth AFB Snapshot Scenario, the DNL levels would be expected to  
 2 decrease at every representative point, and the number of events would decrease slightly  
 3 at several points. However, most points would continue to have DNL noise levels  
 4 exceeding the recommended 40 dB level with windows open.

### 5 **Airspace and Range Utilization**

6 Under the Ellsworth AFB Snapshot Scenario, noise levels at PRTC would decrease from  
 7 No Action Alternative levels or remain below 35 dB  $L_{dnmr}$  across the board (Table 3.2-24).  
 8 Noise levels under the Snapshot Scenario would be slightly higher than under the  
 9 Ellsworth AFB Alternative end-state but would be below 43.0 dB in the entire PRTC.

10 **Table 3.2-24. Ellsworth AFB Snapshot Scenario Airspace Noise**

Location	Special Use Airspace	No Action Alternative (dB)	Ellsworth AFB Alternative (dB)	Ellsworth AFB Snapshot (dB)	Change from No Action Alternative (dB)
PRTC	Gap A	44.2	38.9	40.6	-3.6
	Gap B	41.9	36.5	38.2	-3.7
	Gap C	35.5	<35	35	-0.5
	Gateway East	<35	<35	<35	0
	Gateway West	36.4	<35	35	-1.4
	Powder River 1A	42.8	35.8	38.4	-4.4
	Powder River 1B	42.8	37.1	39.0	-3.8
	Powder River 1C	45.7	42.0	43.0	-2.7
	Powder River 1D	39.1	<35	35.5	-3.6
	Powder River 2	46.1	<35	39.8	-6.3
	Powder River 3	37.1	<35	35	-2.1
	Powder River 4	<35	<35	<35	0

< = less than; - = minus; dB = decibel; AFB = Air Force Base; PRTC = Powder River Training Complex

### 11 **3.2.2.3.7 Proposed Resource-Specific Mitigations and Management Actions to** 12 **Reduce the Potential for Environmental Impacts**

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

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## 1    **3.3    AIR QUALITY**

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### 2    **3.3.1    Air Quality, Affected Environment**

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

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#### 8    **3.3.1.1    Description of Resource**

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

13    The baseline standards for pollutant concentrations are the National Ambient Air Quality  
14    Standards (NAAQS) and state air quality standards established under the Clean Air Act  
15    of 1990. These standards represent the maximum allowable atmospheric concentration  
16    that may occur and still protect public health and welfare. The NAAQS provide both short-  
17    and long-term standards for the following criteria pollutants: carbon monoxide, nitrogen  
18    dioxide, sulfur dioxide, particulate matter with a diameter of less than or equal to  
19    10 microns (PM<sub>10</sub>) or 2.5 microns (PM<sub>2.5</sub>), ozone, and lead.

20    Under the Clean Air Act, it is the responsibility of the individual states to achieve and  
21    maintain the NAAQS. To accomplish this, states use the EPA-required State  
22    Implementation Plan. A State Implementation Plan identifies goals, strategies,  
23    schedules, and enforcement actions designed to reduce the level of pollutants in the air  
24    and bring the state into compliance with the NAAQS.

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

33    The Proposed Action would occur primarily in one of two separate geographic regions  
34    surrounding Dyess AFB, Texas, or Ellsworth AFB, South Dakota. However, aircraft  
35    training operations would take place in SUA overlying parts of North and South Dakota,  
36    Montana, Wyoming, Texas, and New Mexico.



1 Within the Texas project region, the Texas Commission on Environmental Quality  
 2 (TCEQ), Office of Air, has adopted the NAAQS to regulate air pollutant levels within the  
 3 state. In South Dakota, the South Dakota Department of Environment and Natural  
 4 Resources (SDDENR) is the responsible regulatory organization, and has also adopted  
 5 the national standards. The national and state ambient air quality standards are shown in  
 6 Appendix C (Air Quality).

## 7 Prevention of Significant Deterioration

8 The Clean Air Act established Prevention of Significant Deterioration (PSD) regulations  
 9 to protect the air quality in regions that already meet the NAAQS. The major requirement  
 10 of the PSD regulations is that the air quality impacts from new or modified PSD sources  
 11 in combination with impacts from other PSD sources must not exceed the maximum  
 12 allowable incremental increases for nitrogen dioxide, PM<sub>10</sub>, or sulfur dioxide, as identified  
 13 in Table 3.3-1.

14 **Table 3.3-1. Maximum Allowable Pollutant Concentration Increases Under PSD**  
 15 **Regulations**

Pollutant	Averaging Time	PSD Increments (µg/m <sup>3</sup> )	
		Class I	Class II
Nitrogen dioxide	Annual	2.5	25
PM <sub>10</sub>	Annual	4	17
	24-hour	8	30
Sulfur dioxide	Annual	2	20
	24-hour	5	91
	3-hour	25	512

µg/m<sup>3</sup> = micrograms per cubic meter; PM<sub>10</sub> = particulate matter with a diameter of less than or equal to 10 microns; PSD = Prevention of Significant Deterioration

16 Certain national parks, monuments, and wilderness areas have been identified as Class  
 17 I areas, where any appreciable deterioration in air quality is considered significant. Class  
 18 II areas are those where moderate, well-controlled growth could be permitted. There are  
 19 no PSD Class I areas within 100 miles of Dyess AFB. Badlands National Park and Wind  
 20 Cave National Park are each located approximately 37 miles from Ellsworth AFB to the  
 21 southeast and southwest, respectively.

## 22 GHG Emissions/Baseline

23 Greenhouse gases (GHGs) are gases that trap heat in the atmosphere; the accumulation  
 24 of these gases in the atmosphere has been attributed to the regulation of Earth's  
 25 temperature. It is "extremely likely" that more than half of the observed increase in global  
 26 average surface temperature from 1951 to 2010 was caused by the anthropogenic  
 27 increase in GHG concentrations and other anthropogenic forcings together. The best  
 28 estimate of the human-induced contribution to warming is similar to the observed warming  
 29 over this period (IPCC, 2013).

30 Any GHG analysis contained in this document was prepared in accordance with the USAF  
 31 Air Quality EIAP guidance. The six primary GHGs as defined by the EPA under Section  
 32 202(a) of the Clean Air Act by rulemaking (see Endangerment and Cause or Contribute  
 33 Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act, 74 Federal

1 Register 66,495–66,546, December 15, 2009) are carbon dioxide (CO<sub>2</sub>), methane, nitrous  
 2 oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Each GHG has an  
 3 estimated global warming potential (GWP), which is a function of its atmospheric lifetime  
 4 and its ability to absorb and radiate infrared energy emitted from the Earth’s surface. The  
 5 GWP allows GHGs to be compared with each other by converting the GHG quantity into  
 6 the common unit “carbon dioxide equivalent” (CO<sub>2</sub>e). Hydrofluorocarbons,  
 7 perfluorocarbons, and sulfur hexafluoride are produced in relatively very small  
 8 quantities and most often by very specific niche industries such as electronic component  
 9 manufacture. Additionally, the EPA’s National Emissions Inventory (NEI) database only  
 10 tracks the most abundant GHGs (CO<sub>2</sub>, nitrous oxide, and methane). Therefore, analysis  
 11 focuses on these three primary GHGs represented as CO<sub>2</sub>e based on their GWP.

### 12 3.3.1.2 Region of Influence

#### 13 3.3.1.2.1 Dyess AFB

14 Dyess AFB is located in Taylor County, therefore that is the ROI. According to EPA,  
 15 Taylor County is in attainment for all criteria pollutants (EPA, 2019a), and a conformity  
 16 determination would not be required.

17 Emissions that would be generated under the Proposed Action were compared with  
 18 Taylor County emissions obtained from EPA’s 2017 NEI. NEI data are the latest  
 19 available; these are presented in Table 3.3-2. The county data include emissions  
 20 amounts from point sources, area sources, and mobile sources. *Point sources* are  
 21 stationary sources that can be identified by name and location. *Area sources* are point  
 22 sources from which emissions are too low to track individually, such as a home or small  
 23 office building, or a diffuse stationary source, such as wildfires or agricultural tilling.  
 24 *Mobile sources* are any kind of vehicle or equipment with gasoline or diesel engine, an  
 25 airplane, or a ship. Two types of mobile sources are considered: on-road and nonroad.  
 26 On-road sources consist of vehicles such as cars, light trucks, heavy trucks, buses,  
 27 engines, and motorcycles. Nonroad sources are aircraft, locomotives, diesel and  
 28 gasoline boats and ships, personal watercraft, lawn and garden equipment, agricultural  
 29 and construction equipment, and recreational vehicles (EPA, 2020b).

30 **Table 3.3-2. Baseline Criteria Pollutant Emissions Inventory for**  
 31 **Taylor County, Texas**

County	Criteria Pollutant (tons/year)					
	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	VOC
Taylor	14,298	4,626	6,598	1,250	50	8,477

Source: (EPA, 2020b)

CO = carbon monoxide; NO<sub>x</sub> = nitrogen oxides; PM<sub>10</sub> and PM<sub>2.5</sub> = particulate matter with a diameter of less than or equal to 10 microns and 2.5 microns, respectively; SO<sub>2</sub> = sulfur dioxide; VOC = volatile organic compound

### 32 GHG Emissions/Baseline

33 Baseline GHG emissions for Taylor County, obtained from EPA’s 2017 NEI, are  
 34 summarized in Table 3.3-3.

**Table 3.3-3. Baseline Greenhouse Gas Emissions Inventory  
Taylor County, Texas**

County	Greenhouse Gas (tons/year)			
	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e
Taylor	1,234,529	138	18	1,243,235

Source: (EPA, 2020b)

CH<sub>4</sub> = methane; CO<sub>2</sub> = carbon dioxide; CO<sub>2</sub>e = carbon dioxide equivalent; N<sub>2</sub>O = nitrous oxide

### 3.3.1.2.2 Ellsworth AFB

Ellsworth AFB is located in Meade and Pennington Counties, South Dakota. Meade and Pennington Counties, like all of South Dakota, are also in attainment for all pollutants (EPA, 2019b), and a conformity determination would not be required.

Emissions that would be generated under the Proposed Action were compared with Pennington and Meade Counties' emissions obtained from EPA's 2017 NEI. NEI data are the latest available; these are presented in Table 3.3-4.

**Table 3.3-4. Baseline Criteria Pollutant Emissions Inventory for  
Pennington and Meade Counties, South Dakota**

County	Criteria Pollutant (tons/year)					
	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	VOC
Pennington	35,754	5,734	7,717	2,706	579	23,789
Meade	7,705	2,789	5,484	1,149	36	9,650
<b>Total ROI</b>	<b>43,459</b>	<b>8,523</b>	<b>13,201</b>	<b>3,856</b>	<b>614</b>	<b>33,439</b>

Source: (EPA, 2020b)

CO = carbon monoxide; NO<sub>x</sub> = nitrogen oxides; PM<sub>10</sub> and PM<sub>2.5</sub> = particulate matter with a diameter of less than or equal to 10 microns and 2.5 microns, respectively; ROI = region of influence; SO<sub>2</sub> = sulfur dioxide; VOC = volatile organic compound

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

Baseline GHG emissions for Pennington and Meade Counties, obtained from EPA's 2017 NEI, are summarized in Table 3.3-5.

**Table 3.3-5. Baseline Greenhouse Gas Emissions Inventory  
Pennington and Meade Counties, South Dakota**

County	Greenhouse Gas (tons/year)			
	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e
Pennington	1,932,808	2,416	33	2,003,045
Meade	257,839	66	6	261,269
<b>Total ROI</b>	<b>2,190,647</b>	<b>2,483</b>	<b>39</b>	<b>2,264,313</b>

Source: (EPA, 2020b)

CH<sub>4</sub> = methane; CO<sub>2</sub> = carbon dioxide; CO<sub>2</sub>e = carbon dioxide equivalent; ROI = region of influence; N<sub>2</sub>O = nitrous oxide

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

### 3.3.1.2.3 Powder River Training Complex

PRTC airspace covers all or part of 10 counties in North Dakota, 8 in South Dakota, 7 in Montana, and 4 in Wyoming. These counties and their respective baseline (2017 NEI) annual air emissions are provided below in Table 3.3-6. The entire states of North and South Dakota are in attainment for all criteria pollutants, so General Conformity is not applicable to any of the counties in those states. All counties in the PRTC ROI over Montana are in attainment for all pollutants, except for Rosebud County, part of which is in moderate nonattainment for PM<sub>10</sub> (1987 standard) (EPA, 2020c).

1 The Lame Deer nonattainment area in Rosebud County does fall below PRTC airspace;  
 2 therefore, a General Conformity applicability evaluation is required for Rosebud County,  
 3 Montana. However, a General Conformity applicability assessment was performed as  
 4 part of the 2014 PRTC EIS (USAF, 2014a), and it was determined that emissions would  
 5 fall below the *de minimis* levels. Therefore, the current activities under the No Action  
 6 Alternative are presumed to conform as well.

7 In Wyoming, Campbell and Crook Counties are in attainment for all pollutants. A portion of  
 8 Sheridan County, Wyoming, was previously in nonattainment for PM<sub>10</sub> (1987 standard), but  
 9 was redesignated to maintenance in May 2018 after achieving attainment (EPA, 2020d).  
 10 However, the Sheridan maintenance area falls outside the PRTC ROI, so a General  
 11 Conformity applicability evaluation is not required for Sheridan County (EPA, 2020e).

12 **Table 3.3-6. Baseline Criteria Pollutant and Greenhouse Gas Emissions Inventory for**  
 13 **Powder River Training Complex**

State	County	Criteria Pollutants (tons/year)						Greenhouse Gases (tons/year)			
		CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	VOC	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2e</sub>
ND	Adams	1,512	974	4,349	835	46	2,000	55,766	6	1	56,096
	Billings	2,252	1,463	2,279	418	496	6,602	101,075	37	1	102,160
	Bowman	2,502	1,446	3,831	707	200	9,068	65,848	15	1	66,500
	Grant	2,613	1,236	3,879	797	32	3,077	76,295	38	1	77,474
	Golden Valley	1,758	1,064	1,991	406	35	2,952	59,821	17	1	60,409
	Hettinger	2,219	1,080	4,614	917	52	2,353	82,190	22	1	83,001
	Morton	10,671	5,763	9,593	2,088	3,920	5,487	1,742,055	259	25	1,755,851
	Slope	1,788	961	2,460	483	194	2,682	48,476	20	0	49,043
	Stark	7,383	4,261	8,686	1,562	3,307	8,622	494,164	35	6	496,774
	Sioux	1,596	962	3,250	569	149	2,328	54,246	6	1	54,581
SD	Butte	3,838	1,765	3,106	585	15	4,914	97,991	22	3	99,418
	Corson	2,772	1,742	3,226	664	4	4,485	61,939	19	1	62,654
	Harding	2,519	1,668	2,055	405	12	6,497	48,206	7	0	48,526
	Lawrence	16,730	1,250	4,007	1,524	139	16,242	360,916	583	6	377,195
	Meade	7,705	2,789	5,484	1,149	36	9,650	257,839	66	6	261,269
	Pennington	35,754	5,734	7,717	2,706	579	23,789	1,932,808	2,416	33	2,003,045
	Perkins	3,513	1,953	3,999	757	6	5,353	118,265	8	2	119,034
	Ziebach	1,970	1,239	2,313	467	2	4,040	36,844	10	0	37,180
MT	Big Horn	42,906	5,184	18,507	5,353	438	19,638	856,435	1,705	9	901,797
	Carter	3,471	1,975	4,180	747	8	6,541	54,222	34	1	55,313
	Custer	34,154	3,768	7,605	3,375	315	14,953	603,590	1,467	4	641,432
	Fallon	2,781	1,894	3,146	558	88	9,928	36,724	3	1	37,081
	Powder River	6,076	2,230	5,436	1,043	52	8,431	112,438	148	1	116,362
	Treasure	2,052	1,158	1,160	244	3	2,809	52,772	11	1	53,408
	Rosebud	164,525	18,883	26,695	16,299	10,447	47,744	17,417,446	9,341	263	17,729,306
WY	Campbell	27,732	29,935	103,213	13,038	31,985	31,985	11,782,279	4,599	190	11,953,931
	Crook	31,213	3,737	12,314	3,639	366	17,367	564,579	1,331	4	599,043
	Sheridan	18,361	3,019	10,504	2,369	147	13,207	512,907	628	7	530,760
	Weston	7,028	3,067	7,621	7,621	53	7,426	308,832	234	4	315,833
	<b>ROI Total</b>	<b>449,392</b>	<b>112,200</b>	<b>277,220</b>	<b>71,323</b>	<b>53,123</b>	<b>300,170</b>	<b>37,996,969</b>	<b>23,086</b>	<b>572</b>	<b>38,744,478</b>

Source: (EPA, 2020b)

CO = carbon monoxide; CO<sub>2</sub> = carbon dioxide; CO<sub>2e</sub> = carbon dioxide equivalent; CH<sub>4</sub> = methane; MT = Montana; N<sub>2</sub>O = nitrous oxide; ND = North Dakota; NO<sub>x</sub> = nitrogen oxides; PM<sub>10</sub> and PM<sub>2.5</sub> = particulate matter with a diameter of less than or equal to 10 microns and 2.5 microns, respectively; ROI = region of influence; SD = South Dakota; SO<sub>2</sub> = sulfur dioxide; VOC = volatile organic compound; WY = Wyoming

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

### 3.3.1.2.4 Lancer MOA

Lancer MOA airspace covers all or part of eight counties in Texas. These counties and their respective baseline (2017 NEI) annual air emissions are provided below in Table 3.3-7. All the counties under Lancer MOA airspace are in attainment for all criteria pollutants, so General Conformity is not applicable (EPA, 2020f).

**Table 3.3-7. Baseline Criteria Pollutant and Greenhouse Gas Emissions Inventory for Lancer MOA**

State	County	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	VOC	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2e</sub>
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
	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
	<b>ROI Total</b>	<b>23,896</b>	<b>13,129</b>	<b>30,158</b>	<b>5,560</b>	<b>211</b>	<b>53,098</b>	<b>1,881,976</b>	<b>1,846</b>	<b>9</b>	<b>1,930,871</b>

Source: (EPA, 2020b)

CH<sub>4</sub> = methane; CO = carbon monoxide; CO<sub>2</sub> = carbon dioxide; CO<sub>2e</sub> = carbon dioxide equivalent; MOA = Military Operating Area; N<sub>2</sub>O = nitrous oxide; NO<sub>x</sub> = nitrogen oxides; PM<sub>10</sub> and PM<sub>2.5</sub> = particulate matter with a diameter of less than or equal to 10 microns and 2.5 microns, respectively; ROI = region of influence; SO<sub>2</sub> = sulfur dioxide; TX = Texas; VOC = volatile organic compound

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

### 3.3.1.2.5 Brownwood MOA

Brownwood MOA airspace covers all or part of 12 counties in Texas. These counties and their respective baseline (2017 NEI) annual air emissions are provided below in Table 3.3-8. All the counties under Brownwood MOA airspace are in attainment for all criteria pollutants, so General Conformity is not applicable (EPA, 2020f).

**Table 3.3-8. Baseline Criteria Pollutant and Greenhouse Gas Emissions Inventory for Brownwood MOA**

State	County	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	VOC	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2e</sub>
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
	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
	<b>ROI Total</b>	<b>59,616</b>	<b>20,416</b>	<b>38,545</b>	<b>7,762</b>	<b>253</b>	<b>75,908</b>	<b>3,139,417</b>	<b>971</b>	<b>27</b>	<b>3,171,677</b>

Source: (EPA, 2020b)

CH<sub>4</sub> = methane; CO = carbon monoxide; CO<sub>2</sub> = carbon dioxide; CO<sub>2e</sub> = carbon dioxide equivalent; MOA = Military Operating Area; N<sub>2</sub>O = nitrous oxide; NO<sub>x</sub> = nitrogen oxides; PM<sub>10</sub> and PM<sub>2.5</sub> = particulate matter with a diameter of less than or equal to 10 microns and 2.5 microns, respectively; ROI = region of influence; SO<sub>2</sub> = sulfur dioxide; TX = Texas; VOC = volatile organic compound

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

### 3.3.1.2.6 Pecos MOA

Pecos MOA airspace covers all or part of five counties in New Mexico. These counties and their respective baseline (2017 NEI) annual air emissions are provided below in Table 3.3-9. All the counties under Pecos MOA airspace are in attainment for all criteria pollutants, so General Conformity is not applicable (EPA, 2020g).

**Table 3.3-9. Baseline Criteria Pollutant and Greenhouse Gas Emissions Inventory for Pecos MOA**

State	County	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	VOC	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> 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
	<b>ROI Total</b>	<b>47,059</b>	<b>18,687</b>	<b>20,505</b>	<b>3,632</b>	<b>157</b>	<b>82,366</b>	<b>1,434,650</b>	<b>298</b>	<b>27</b>	<b>1,450,075</b>

Source: (EPA, 2020b)

CH<sub>4</sub> = methane; CO = carbon monoxide; CO<sub>2</sub> = carbon dioxide; CO<sub>2</sub>e = carbon dioxide equivalent; MOA = Military Operating Area; N<sub>2</sub>O = nitrous oxide; NM = New Mexico; NO<sub>x</sub> = nitrogen oxides; PM<sub>10</sub> and PM<sub>2.5</sub> = particulate matter with a diameter of less than or equal to 10 microns and 2.5 microns, respectively; SO<sub>2</sub> = sulfur dioxide; VOC = volatile organic compound

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

### 3.3.1.3 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 South Dakota State Implementation Plans specify a mixing height; therefore, the default 3,000-foot above ground level (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 order to evaluate air emissions and their impact on the overall ROI, the emissions associated with the Proposed Action activities were compared with the total emissions on a pollutant-by-pollutant basis for the ROI's 2017 NEI data, which is the most recent version that has been finalized. Potential impacts to air quality are evaluated with respect to the extent, context, and intensity of the impact in relation to relevant regulations, guidelines, and scientific documentation. The CEQ defines significance in terms of context and intensity in 40 CFR 1508.27. This requires the significance of the action to be analyzed with respect to the setting of a proposed action and based relative to the severity of the impact. The CEQ NEPA regulations (40 CFR 1508.27[b]) provide 10 key factors to consider in determining an impact's intensity. To provide a more conservative analysis, the two counties were selected as the ROI instead of the EPA-designated Air Quality Control Region, which is a much larger area.

1 The Air Conformity Applicability Model (ACAM) Version 5.0.16 was utilized to provide a  
2 level of consistency with respect to emissions factors and calculations. The ACAM  
3 provides estimated air emissions from proposed federal actions in areas designated as  
4 nonattainment and/or maintenance for each specific criteria and precursor pollutant as  
5 defined in the NAAQS. ACAM was utilized to calculate construction emissions. Emission  
6 factors for aircraft were also obtained from ACAM. Equations and emission factors can  
7 be found in Appendix C (Air Quality). However, it should be noted that since the B-21 is  
8 a new airframe and validated emissions factors are not yet available, ACAM emissions  
9 factors for the B-2A were used in air quality calculations.

10 GHGs were included in the analysis. The primary source of CO<sub>2</sub> emissions would be fuel  
11 combustion from aircraft emissions during training activities. On June 26, 2019, the CEQ  
12 released a new Draft *National Environmental Policy Act Guidance on Consideration of*  
13 *Greenhouse Gas Emissions* (CEQ, 2019). On July 24, 2019, the public comment period  
14 was extended to August 26, 2019, and the guidance has yet to be made final. This  
15 guidance reinforced many of the principles outlined in the rescinded 2009 guidance.  
16 However, this guidance does not include a recommended threshold for consideration  
17 similar to the 25,000 metric tons recommended previously, and instead relies on the “rule  
18 of reason” and recommends quantification of GHG emissions as a proxy for climate  
19 change effects. As such, this document quantifies GHG emissions associated with the  
20 Proposed Action and provides the regional air basin baseline GHG annual emissions (per  
21 the 2017 NEI) for context and comparison. Additional information regarding calculations  
22 for GHG is provided in Appendix C (Air Quality).

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

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### 27 **3.3.2 Air Quality, Environmental Consequences**

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#### 28 **3.3.2.1 No Action Alternative Consequences**

##### 29 **3.3.2.1.1 No Action at Dyess AFB**

###### 30 **Personnel**

31 Under the No Action Alternative, there would be no change to the numbers or types of  
32 personnel at Dyess AFB. Emissions associated with worker commutes, home heating,  
33 etc. would remain at current historical levels. Taylor County would remain in attainment  
34 for all pollutants, and no adverse impacts to air quality would be anticipated. In order to  
35 provide a baseline for comparison to the Proposed Action, ACAM 5.0.16 was used to  
36 estimate annual emissions associated with personnel commutes at Dyess AFB  
37 (Table 3.3-10).

1 **Table 3.3-10. Personnel Emissions at Dyess AFB Under the No Action Alternative**

Source	Pollutants (tons/year)						
	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>x</sub>	VOC	CO <sub>2e</sub>
Dyess AFB Personnel Emissions (No Action)	121.37	8.79	0.22	0.19	0.08	10.30	11,109
ROI Baseline <sup>1</sup>	14,298	4,626	6,598	1,250	50.29	8,477	1,243,235
<b>Percentage of ROI</b>	<b>0.85%</b>	<b>0.19%</b>	<b>0.00%</b>	<b>0.02%</b>	<b>0.16%</b>	<b>0.12%</b>	<b>0.89%</b>

Source: (EPA, 2020b)

% = percent; AFB = Air Force Base; CO = carbon monoxide; CO<sub>2e</sub> = carbon dioxide equivalent; NO<sub>x</sub> = nitrogen oxides; PM<sub>10</sub> or PM<sub>2.5</sub> = particulate matter with a diameter less than or equal to 10 or 2.5 microns, respectively; ROI = region of influence; SO<sub>x</sub> = sulfur oxides; VOC = volatile organic compound

Note:

1. The ROI for Dyess AFB emissions is Taylor County, Texas. See Table 3.3-2 and Table 3.3-3.

## 2 Airfield Operations

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

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

11 Operational activities under the No Action Alternative would not increase from activities  
12 that presently occur in this area. Therefore, operational air quality impacts associated  
13 with the No Action Alternative were calculated based on historical operational activity to  
14 provide a baseline for the installation. These emissions are based on the current aircraft  
15 flight operations occurring below the 3,000-foot AGL mixing layer for all aircraft at Dyess  
16 AFB. Because Dyess AFB has historically had numerous transient aircraft and these are  
17 likely to change frequently, the airframe that has historically had the most operations at  
18 Dyess AFB (the T-38) was selected as the representative surrogate airframe for all  
19 transient flight operations at Dyess AFB. The number of T-38 operations at Dyess AFB  
20 is a result of proximity and use of Dyess AFB for transient training operations out of nearby  
21 Sheppard AFB. Annual emissions associated with flight operations at Dyess AFB are  
22 provided in Table 3.3-11.

23 **Table 3.3-11. Annual Aircraft Emissions Under the No Action Alternative at Dyess AFB**

Source	Pollutants (tons/year)						
	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>x</sub>	VOC	CO <sub>2e</sub>
Dyess AFB Aircraft Emissions (No Action)	268.54	268.39	45.82	31.58	29.27	50.07	88,475
ROI Baseline <sup>1</sup>	14,298	4,626	6,598	1,250	50.2947	8,477	1,243,235
<b>Percentage of ROI</b>	<b>1.88%</b>	<b>5.80%</b>	<b>0.69%</b>	<b>2.53%</b>	<b>58.20%</b>	<b>0.59%</b>	<b>7.12%</b>

Source: (EPA, 2020b)

% = percent; AFB = Air Force Base; CO = carbon monoxide; CO<sub>2e</sub> = carbon dioxide equivalent; NO<sub>x</sub> = nitrogen oxides; PM<sub>10</sub> or PM<sub>2.5</sub> = particulate matter with a diameter less than or equal to 10 or 2.5 microns, respectively; ROI = region of influence; SO<sub>x</sub> = sulfur oxides; VOC = volatile organic compound

Note:

1. The ROI for Dyess AFB emissions is Taylor County, Texas. See Table 3.3-2 and Table 3.3-3.



1 **Airspace and Range Utilization**

2 Analyses were also conducted to assess the annual air emissions of criteria pollutants  
 3 and GHGs occurring below 3,000 feet AGL within the various training airspace regions  
 4 (Table 3.3-12 through Table 3.3-14). There are no flight operations that occur below the  
 5 3,000-foot AGL mixing layer in the Brownwood MOA. Therefore, there is no impact or  
 6 contribution to the regional air quality beneath the Brownwood MOA under the No Action  
 7 Alternative.

8 **Table 3.3-12. Annual Aircraft Emissions in PRTC Under the No Action Alternative**

Source	Pollutants (tons/year)						
	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>x</sub>	VOC	CO <sub>2e</sub>
PRTC Aircraft Emissions (No Action)	9.04	87.55	10.12	6.11	6.23	0.60	18,820
ROI Baseline <sup>1</sup>	449,392	112,200	277,220	71,323	53,123	300,170	38,744,478
<b>Percentage of ROI</b>	<b>0.00%</b>	<b>0.08%</b>	<b>0.00%</b>	<b>0.01%</b>	<b>0.01%</b>	<b>0.00%</b>	<b>0.05%</b>

Source: (EPA, 2020b)  
 % = percent; AFB = Air Force Base; CO = carbon monoxide; CO<sub>2e</sub> = carbon dioxide equivalent; NO<sub>x</sub> = nitrogen oxides; PRTC = Powder River Training Complex; PM<sub>10</sub> or PM<sub>2.5</sub> = particulate matter with a diameter less than or equal to 10 or 2.5 microns, respectively; ROI = region of influence; SO<sub>x</sub> = sulfur oxides; VOC = volatile organic compound  
 Note:

1. The ROI for PRTC emissions includes portions of 29 counties across four states. See Table 3.3-6.

9 **Table 3.3-13. Annual Aircraft Emissions in Lancer MOA Under the No Action Alternative**

Source	Pollutants (tons/year)						
	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>x</sub>	VOC	CO <sub>2e</sub>
Lancer MOA Emissions (No Action)	2.21	2.56	0.34	0.24	0.19	0.08	589
ROI Baseline <sup>1</sup>	23,896	13,129	30,158	5,560	211	53,098	1,930,871
<b>Percentage of ROI</b>	<b>0.01%</b>	<b>0.02%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.09%</b>	<b>0.00%</b>	<b>0.03%</b>

Source: (EPA, 2020b)  
 % = percent; AFB = Air Force Base; CO = carbon monoxide; CO<sub>2e</sub> = carbon dioxide equivalent; MOA = Military Operating Area; NO<sub>x</sub> = nitrogen oxides; PM<sub>10</sub> or PM<sub>2.5</sub> = particulate matter with a diameter less than or equal to 10 or 2.5 microns, respectively; ROI = region of influence; SO<sub>x</sub> = sulfur oxides; VOC = volatile organic compound  
 Note:

1. The ROI for Lancer MOA emissions includes portions of eight counties in Texas. See Table 3.3-7.

10 **Table 3.3-14. Annual Aircraft Emissions in Pecos MOA Under the No Action Alternative**

Source	Pollutants (tons/year)						
	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>x</sub>	VOC	CO <sub>2e</sub>
Pecos MOA Emissions (No Action)	155.09	371.83	101.43	99.86	19.65	12.81	147,894
ROI Baseline <sup>1</sup>	47,059	18,687	20,505	3,632	156.67	82,366	1,450,075
<b>Percentage of ROI</b>	<b>0.33%</b>	<b>1.99%</b>	<b>0.49%</b>	<b>2.75%</b>	<b>12.54%</b>	<b>0.02%</b>	<b>10.20%</b>

Source: (EPA, 2020b)  
 % = percent; AFB = Air Force Base; CO = carbon monoxide; CO<sub>2e</sub> = carbon dioxide equivalent; MOA = Military Operating Area; NO<sub>x</sub> = nitrogen oxides; PM<sub>10</sub> or PM<sub>2.5</sub> = particulate matter with a diameter less than or equal to 10 or 2.5 microns, respectively; ROI = region of influence; SO<sub>x</sub> = sulfur oxides; VOC = volatile organic compound  
 Note:

1. The ROI for Pecos MOA emissions includes portions of five counties in New Mexico. See Table 3.3-9.

## 1 Facilities and Infrastructure

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

## 11 Summary of No Action at Dyess AFB

12 Table 3.3-15 shows the estimated annual emissions under the No Action Alternative, or  
13 baseline conditions. Emissions associated with the No Action Alternative are minimal for  
14 all criteria pollutants but sulfur oxides. However, it is important to note that these activities  
15 have been ongoing at Dyess AFB for many years and have not adversely impacted the  
16 air quality of the region. Taylor County continues to be in attainment with the NAAQS for  
17 all criteria pollutants, including sulfur oxides. GHG emissions in the region (approximately  
18 1 million tons annually for Taylor County) are trivial in the context of the nearly 6.7 trillion  
19 metric tons CO<sub>2</sub>e emitted annually in the United States (EPA, 2020h) and approximately  
20 49 gigatonnes CO<sub>2</sub>e worldwide (IPCC, 2014). Therefore, there would be no adverse  
21 impacts to regional air quality under the No Action Alternative at Dyess AFB.

22 **Table 3.3-15. Summary of No Action Alternative Emissions at Dyess AFB**

Source	Pollutants (tons/year)						
	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>x</sub>	VOC	CO <sub>2</sub> e
Dyess AFB Personnel Emissions (No Action)	121.37	8.79	0.22	0.19	0.08	10.30	11,109
Dyess AFB Aircraft Emissions (No Action)	268.54	268.39	45.82	31.58	29.27	50.07	88,475
Total Dyess AFB No Action Alternative Emissions	389.91	277.18	46.04	31.77	29.35	60.37	99,584
ROI Baseline <sup>1</sup>	14,298	4,626	6,598	1,250	50.30	8,477	1,243,235
<b>Percentage of ROI</b>	<b>2.73%</b>	<b>5.99%</b>	<b>0.70%</b>	<b>2.54%</b>	<b>58.36%</b>	<b>0.71%</b>	<b>8.01%</b>

Source: (EPA, 2020b)

% = percent; AFB = Air Force Base; CO = carbon monoxide; CO<sub>2</sub>e = carbon dioxide equivalent; NO<sub>x</sub> = nitrogen oxides; PM<sub>10</sub> or PM<sub>2.5</sub> = particulate matter with a diameter less than or equal to 10 or 2.5 microns, respectively; ROI = region of influence; SO<sub>x</sub> = sulfur oxides; VOC = volatile organic compound

Note:

1. The ROI for Dyess AFB emissions is Taylor County, Texas. See Table 3.3-2 and Table 3.3-3.

1 **3.3.2.1.2 No Action at Ellsworth AFB**

2 **Personnel**

3 Under the No Action Alternative, there would be no change to the numbers or types of  
 4 personnel at Ellsworth AFB. Emissions associated with worker commutes, home heating,  
 5 etc. would remain at current historical levels. Meade and Pennington Counties would  
 6 remain in attainment for all pollutants, and no adverse impacts to air quality would be  
 7 anticipated. To provide a baseline for comparison with the Proposed Action, ACAM  
 8 5.0.16 was used to estimate annual emissions associated with personnel commutes at  
 9 Ellsworth AFB (Table 3.3-16).

10 **Table 3.3-16. Personnel Emissions at Ellsworth AFB Under the No Action Alternative**

Source	Pollutants (tons/year)						
	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>x</sub>	VOC	CO <sub>2e</sub>
Ellsworth AFB Personnel Emissions (No Action)	115.61	8.96	0.30	0.26	0.06	10.22	9,068
ROI Baseline <sup>1</sup>	43,459	8,523	13,201	3,856	614.18	33,439	2,264,313
<b>Percentage of ROI</b>	<b>0.27%</b>	<b>0.11%</b>	<b>0.00%</b>	<b>0.01%</b>	<b>0.01%</b>	<b>0.03%</b>	<b>0.40%</b>

Source: (EPA, 2020b)

% = percent; AFB = Air Force Base; CO = carbon monoxide; CO<sub>2e</sub> = carbon dioxide equivalent; NO<sub>x</sub> = nitrogen oxides; PM<sub>10</sub> or PM<sub>2.5</sub> = particulate matter with a diameter less than or equal to 10 or 2.5 microns, respectively; ROI = region of influence; SO<sub>x</sub> = sulfur oxides; VOC = volatile organic compound

Note:

1. The ROI for Ellsworth AFB emissions includes Meade and Pennington Counties in South Dakota. See Table 3.3-4 and Table 3.3-5.

11 **Airfield Operations**

12 Under the No Action Alternative at Ellsworth AFB, there would continue to be annual  
 13 emissions associated with flight operations. Similar to the approach used for air quality  
 14 analysis for the Dyess AFB Alternative, historical air operations activities at Ellsworth AFB  
 15 were used to create a baseline. Because the number of transient aircraft at Ellsworth AFB  
 16 is much lower than at Dyess AFB, no surrogate was required and actual aircraft emission  
 17 factors were used for transients at Ellsworth AFB. Annual emissions associated with flight  
 18 operations at Ellsworth AFB are provided in Table 3.3-17.

19 **Table 3.3-17. Annual Aircraft Emissions Under the No Action Alternative at Ellsworth AFB**

Source	Pollutants (tons/year)						
	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>x</sub>	VOC	CO <sub>2e</sub>
Ellsworth AFB Aircraft Emissions (No Action)	220.84	191.32	49.46	35.48	21.11	4.27	63,813
ROI Baseline <sup>1</sup>	43,459	8,523	13,201	3,856	614.18	33,439	2,264,313
<b>Percentage of ROI</b>	<b>0.51%</b>	<b>2.24%</b>	<b>0.37%</b>	<b>0.92%</b>	<b>3.44%</b>	<b>0.01%</b>	<b>2.82%</b>

Source: (EPA, 2020b)

% = percent; AFB = Air Force Base; CO = carbon monoxide; CO<sub>2e</sub> = carbon dioxide equivalent; NO<sub>x</sub> = nitrogen oxides; PM<sub>10</sub> or PM<sub>2.5</sub> = particulate matter with a diameter less than or equal to 10 or 2.5 microns, respectively; ROI = region of influence; SO<sub>x</sub> = sulfur oxides; VOC = volatile organic compound

Note:

1. The ROI for Ellsworth AFB emissions includes Meade and Pennington Counties in South Dakota. See Table 3.3-4 and Table 3.3-5.

## 1 **Airspace and Range Utilization**

2 Under the No Action Alternative, annual emissions of criteria pollutants and GHGs at  
3 PRTC are shown in Table 3.3-18.

4 **Table 3.3-18. Annual Aircraft Emissions in PRTC Under the No Action Alternative**

Source	Pollutants (tons/year)						
	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>x</sub>	VOC	CO <sub>2e</sub>
PRTC Aircraft Emissions (No Action)	9.04	87.55	10.12	6.11	6.23	0.60	18,820
ROI Baseline <sup>1</sup>	449,392	112,200	277,220	71,323	53,123	300,170	38,744,478
<b>Percentage of ROI</b>	<b>0.00%</b>	<b>0.08%</b>	<b>0.00%</b>	<b>0.01%</b>	<b>0.01%</b>	<b>0.00%</b>	<b>0.05%</b>

Source: (EPA, 2020b)

% = percent; AFB = Air Force Base; CO = carbon monoxide; CO<sub>2e</sub> = carbon dioxide equivalent; NO<sub>x</sub> = nitrogen oxides; PM<sub>10</sub> or PM<sub>2.5</sub> = particulate matter with a diameter less than or equal to 10 or 2.5 microns, respectively; PRTC = Powder River Training Complex; ROI = region of influence; SO<sub>x</sub> = sulfur oxides; VOC = volatile organic compound

Note:

1. The ROI for PRTC emissions includes portions of 29 counties across four states. See Table 3.3-6.

## 5 **Facilities and Infrastructure**

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

## 15 **Summary of No Action at Ellsworth AFB**

16 Table 3.3-19 shows the estimated annual emissions under the No Action Alternative, or  
17 baseline conditions. Emissions associated with the No Action Alternative are minimal for  
18 all criteria pollutants. It is also worth noting that these activities have been ongoing at  
19 Ellsworth AFB for many years and have not adversely impacted the air quality of the  
20 region. Pennington and Meade Counties continue to be in attainment with the NAAQS  
21 for all criteria pollutants. GHG emissions in the region (approximately 2.3 million tons  
22 annually for Meade and Pennington Counties combined) are trivial in the context of the  
23 nearly 6.7 trillion metric tons CO<sub>2e</sub> emitted annually in the United States (EPA, 2020h)  
24 and approximately 49 gigatonnes CO<sub>2e</sub> worldwide (IPCC, 2014). Therefore, there would  
25 be no adverse impacts to regional air quality under the No Action Alternative at Ellsworth  
26 AFB.

**Table 3.3-19. Summary of No Action Alternative Emissions at Ellsworth AFB**

Source	Pollutants (tons/year)						
	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>x</sub>	VOC	CO <sub>2e</sub>
Ellsworth AFB Personnel Emissions (No Action)	115.61	8.96	0.30	0.26	0.06	10.22	9,068
Ellsworth AFB Aircraft Emissions (No Action)	220.84	191.32	49.46	35.48	21.11	4.27	63,813
Total Ellsworth AFB No Action Alternative Emissions	336.45	200.28	49.76	35.74	21.17	14.49	72,881
ROI Baseline <sup>1</sup>	43,459	8,523	13,201	3,856	614	33,439	2,264,313
<b>Percentage of ROI</b>	<b>0.77%</b>	<b>2.35%</b>	<b>0.38%</b>	<b>0.93%</b>	<b>3.45%</b>	<b>0.04%</b>	<b>3.22%</b>

Source: (EPA, 2020b)

% = percent; AFB = Air Force Base; CO = carbon monoxide; CO<sub>2e</sub> = carbon dioxide equivalent; NO<sub>x</sub> = nitrogen oxides; PM<sub>10</sub> or PM<sub>2.5</sub> = particulate matter with a diameter less than or equal to 10 or 2.5 microns, respectively; ROI = region of influence; SO<sub>x</sub> = sulfur oxides; VOC = volatile organic compound

Note:

1. The ROI for Ellsworth AFB emissions includes Meade and Pennington Counties in South Dakota. See Table 3.3-4 and Table 3.3-5.

### 3.3.2.2 Dyess AFB Alternative

#### 3.3.2.2.1 Personnel

Under the Dyess AFB Alternative, it was estimated that the B-21 program would require approximately 3,500 military personnel (Table 2.3-1). ACAM estimates the potential air emissions introduced to the region by personnel commuter vehicles. Table 3.3-20 shows the potential emissions associated with the end-state personnel under the Dyess AFB Alternative compared with the baseline emissions, 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 3.3-20. Personnel Emissions with the Dyess AFB Alternative**

Source	Pollutants (tons/year)						
	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>x</sub>	VOC	CO <sub>2e</sub>
Dyess AFB Alternative Personnel Emissions	161.03	11.66	0.29	0.25	0.10	13.67	14,740
Dyess AFB No Action Alternative Personnel Emissions	121.37	8.79	0.22	0.19	0.08	10.30	11,109
Change from No Action Alternative	39.66	2.87	0.07	0.06	0.02	3.37	3,630
ROI Baseline <sup>1</sup>	14,298	4,626	6,598	1,250	50	8,477	1,243,235
<b>Net Change as Percentage of ROI</b>	<b>0.28%</b>	<b>0.06%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.04%</b>	<b>0.04%</b>	<b>0.29%</b>

Source: (EPA, 2020b)

% = percent; AFB = Air Force Base; CO = carbon monoxide; CO<sub>2e</sub> = carbon dioxide equivalent; NO<sub>x</sub> = nitrogen oxides; PM<sub>10</sub> or PM<sub>2.5</sub> = particulate matter with a diameter less than or equal to 10 or 2.5 microns, respectively; ROI = region of influence; SO<sub>x</sub> = sulfur oxides; VOC = volatile organic compound

Note:

1. The ROI for Dyess AFB emissions is Taylor County, Texas. See Table 3.3-2 and Table 3.3-3.

#### 3.3.2.2.2 Airfield Operations

Under the Dyess AFB Alternative, B-1 aircraft would be phased out and replaced by B-21 aircraft. Table 3.3-21 shows the potential change (increase or decrease) in criteria pollutant and GHG emissions associated with the Dyess AFB Alternative from the No Action Alternative and the ROI baseline. Emissions of the following criteria pollutants

1 nitrogen oxides, PM<sub>10</sub>, PM<sub>2.5</sub>, and sulfur oxides would increase by a nominal 3.52 percent,  
 2 0.15 percent, 1.13 percent, and 2.66 percent, respectively, from the baseline levels per  
 3 year as illustrated in Table 3.3-2.

4 **Table 3.3-21. Air Operations Emissions with the Dyess AFB Alternative**

Source	Pollutants (tons/year)						
	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>x</sub>	VOC	CO <sub>2e</sub>
Dyess AFB Alternative Aircraft Emissions	191.56	431.35	55.59	45.75	30.61	48.26	92,527
Dyess AFB No Action Alternative Aircraft Emissions	268.54	268.39	45.82	31.58	29.27	50.07	88,475
Change from No Action Alternative	-76.97	162.96	9.77	14.17	1.34	-1.80	4,053
ROI Baseline <sup>1</sup>	14,298	4,626	6,598	1,250	50.30	8,477	1,243,235
<b>Net Change as Percentage of ROI</b>	<b>-0.54%</b>	<b>3.52%</b>	<b>0.15%</b>	<b>1.13%</b>	<b>2.66%</b>	<b>-0.02%</b>	<b>0.33%</b>

Source: (EPA, 2020b)

% = percent; - = minus; AFB = Air Force Base; CO = carbon monoxide; CO<sub>2e</sub> = carbon dioxide equivalent; NO<sub>x</sub> = nitrogen oxides; PM<sub>10</sub> or PM<sub>2.5</sub> = particulate matter with a diameter less than or equal to 10 or 2.5 microns, respectively; ROI = region of influence; SO<sub>x</sub> = sulfur oxides; VOC = volatile organic compound

Note:

1. The ROI for Dyess AFB emissions is Taylor County, Texas. See Table 3.3-2 and Table 3.3-3.

### 5 3.3.2.2.3 Airspace and Range Utilization

#### 6 Powder River Training Complex

7 Table 3.3-22 shows the change in criteria pollutant and GHG emissions associated with  
 8 aircraft operations occurring below the 3,000-foot AGL mixing layer within PRTC  
 9 compared to the ROI No Action Alternative baseline emissions.

10 **Table 3.3-22. PRTC Air Operations Emissions with the Dyess AFB Alternative**

Source	Pollutants (tons/year)						
	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>x</sub>	VOC	CO <sub>2e</sub>
Dyess AFB Alternative PRTC Emissions	5.25	31.31	2.75	0.85	1.54	0.07	4,649
No Action Alternative PRTC Emissions	9.04	87.55	10.12	6.11	6.23	0.60	18,820
Change from No Action Alternative Emissions	-3.80	-56.24	-7.36	-5.26	-4.69	-0.53	-14,171
ROI Baseline <sup>1</sup>	449,392	112,200	277,220	71,323	53,123	300,170	38,744,478
<b>Net Change as Percentage of ROI</b>	<b>0.00%</b>	<b>-0.05%</b>	<b>0.00%</b>	<b>-0.01%</b>	<b>-0.01%</b>	<b>0.00%</b>	<b>-0.04%</b>

Source: (EPA, 2020b)

% = percent; - = minus; AFB = Air Force Base; CO = carbon monoxide; CO<sub>2e</sub> = carbon dioxide equivalent; NO<sub>x</sub> = nitrogen oxides; PM<sub>10</sub> or PM<sub>2.5</sub> = particulate matter with a diameter less than or equal to 10 or 2.5 microns, respectively; PRTC = Powder River Training Complex; ROI = region of influence; SO<sub>x</sub> = sulfur oxides; VOC = volatile organic compound

Note:

1. The ROI for PRTC emissions includes portions of 29 counties across four states. See Table 3.3-6.

11 Emissions associated with the Dyess AFB Alternative represents a net decrease from No  
 12 Action Alternative levels for all criteria pollutants, which are presumed to continue to meet  
 13 General Conformity requirements, based on the 2014 PRTC EIS's determination that *de*

1 *minimis* levels would not be exceeded (USAF, 2014a); therefore, a General Conformity  
2 determination would not be required.

### 3 **Lancer MOA**

4 Under the Dyess AFB Alternative, there would be no emissions below the 3,000-foot AGL  
5 mixing layer. Therefore, emissions would decrease by the quantities shown in Section  
6 3.3.2.1.1 (Air Quality, No Action at Dyess AFB) (Table 3.3-13).

### 7 **Brownwood MOA**

8 There would not be any operations in the Brownwood MOA occurring below the  
9 3,000-foot AGL mixing layer. Therefore, there would not be any impact to the regional air  
10 quality from B-21 flight operations in the Brownwood MOA.

### 11 **Pecos MOA**

12 Table 3.3-23 shows the change in criteria pollutant and GHG emissions associated with  
13 aircraft operations occurring below the 3,000-foot AGL mixing layer within the Pecos MOA  
14 under the Dyess AFB Alternative compared with the No Action Alternative baseline  
15 emissions.

16 **Table 3.3-23. Pecos MOA Air Operations Emissions with the Dyess AFB Alternative**

Source	Pollutants (tons/year)						
	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>x</sub>	VOC	CO <sub>2e</sub>
Dyess AFB Alternative Pecos MOA Emissions	141.20	364.73	100.32	98.98	19.17	12.34	146,437
No Action Alternative Pecos MOA Emissions	155.09	371.83	101.43	99.86	19.65	12.81	147,894
Change from No Action Alternative Emissions	-13.89	-7.10	-1.11	-0.88	-0.48	-0.47	-1,457
ROI Baseline <sup>1</sup>	47,059	18,687	20,505	3,632	156.67	82,366	1,450,075
<b>Net Change as Percentage of ROI</b>	<b>-0.03%</b>	<b>-0.04%</b>	<b>-0.01%</b>	<b>-0.02%</b>	<b>-0.31%</b>	<b>0.00%</b>	<b>-0.10%</b>

Source: (EPA, 2020b)

% = percent; - = minus; AFB = Air Force Base; CO = carbon monoxide; CO<sub>2e</sub> = carbon dioxide equivalent; MOA = Military Operating Area; NO<sub>x</sub> = nitrogen oxides; PM<sub>10</sub> or PM<sub>2.5</sub> = particulate matter with a diameter less than or equal to 10 or 2.5 microns, respectively; ROI = region of influence; SO<sub>x</sub> = sulfur oxides; VOC = volatile organic compound

Note:

1. The ROI for Pecos MOA emissions includes portions of five counties in New Mexico. See Table 3.3-9.

### 17 **3.3.2.2.4 Facilities and Infrastructure**

18 Under the Dyess AFB Alternative, there would be a number of new facilities constructed  
19 to support the B-21 mission (Table 2.4-1). ACAM 5.0.16 was used to calculate the  
20 emissions associated with construction, demolition, and renovation activities under the  
21 Dyess AFB Alternative (Table 3.3-24).

1 Emissions associated with facilities construction, demolition, and renovation would be  
 2 minor and temporary, and there would be no adverse impacts associated with these  
 3 activities under the Dyess AFB Alternative. Additionally, construction would likely be  
 4 phased, which would serve to further minimize impacts over the length of the construction  
 5 timeframe. PM<sub>10</sub> emissions could be further reduced by implementation of standard  
 6 construction best management practices (BMPs) such as watering and/or covering of  
 7 piles, loads, and temporary access roads. Facilities operations in the end-state would not  
 8 be likely to impact Dyess AFB's status as a synthetic minor source, as restrictions would  
 9 remain in place. However, should their permit require updating or revision, Dyess AFB  
 10 would comply with all TCEQ requirements.

11 **Table 3.3-24. Facilities and Infrastructure Emissions with the Dyess AFB Alternative**

Source	Pollutants (tons/year)						
	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>x</sub>	VOC	CO <sub>2e</sub>
Dyess AFB Alternative Construction/Demolition/Renovation	16.64	22.16	684.36	0.86	0.06	36.05	5,886
ROI Baseline <sup>1</sup>	14,298	4,626	6,598	1,250	50.30	8,477	1,243,235
<b>Percentage of ROI</b>	<b>0.12%</b>	<b>0.48%</b>	<b>10.37%</b>	<b>0.07%</b>	<b>0.12%</b>	<b>0.43%</b>	<b>0.47%</b>

Source: (EPA, 2020b)

% = percent; AFB = Air Force Base; CO = carbon monoxide; CO<sub>2e</sub> = carbon dioxide equivalent; NO<sub>x</sub> = nitrogen oxides; PM<sub>10</sub> or PM<sub>2.5</sub> = particulate matter with a diameter less than or equal to 10 or 2.5 microns, respectively; ROI = region of influence; SO<sub>x</sub> = sulfur oxides; VOC = volatile organic compound

Note:

1. The ROI for Dyess AFB emissions is Taylor County, Texas. See Table 3.3-2 and Table 3.3-3.

### 12 3.3.2.2.5 Weapons Generation Facility

13 Construction of the WGF would generate criteria pollutants and GHGs from the  
 14 combustion of fossil fuels in construction equipment and worker commutes. Table 3.3-25  
 15 shows emissions from WGF construction at Dyess AFB compared with the ROI baseline.  
 16 Emissions would be minor and temporary, representing less than 0.2 percent of the ROI  
 17 annual emissions baseline. No adverse impacts to regional air quality would be  
 18 anticipated.

19 **Table 3.3-25. Weapons Generation Facility Construction Emissions with the**  
 20 **Dyess AFB Alternative**

Source	Pollutants (tons/year)						
	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>x</sub>	VOC	CO <sub>2e</sub>
Dyess AFB Alternative WGF Construction Emissions	3.92	3.69	12.57	0.15	0.01	1.20	944
ROI Baseline <sup>1</sup>	14,298	4,626	6,598	1,250	50.30	8,477	1,243,235
<b>Percentage of ROI</b>	<b>0.03%</b>	<b>0.08%</b>	<b>0.19%</b>	<b>0.01%</b>	<b>0.02%</b>	<b>0.01%</b>	<b>0.08%</b>

Source: (EPA, 2020b)

% = percent; AFB = Air Force Base; CO = carbon monoxide; CO<sub>2e</sub> = carbon dioxide equivalent; NO<sub>x</sub> = nitrogen oxides; PM<sub>10</sub> or PM<sub>2.5</sub> = particulate matter with a diameter less than or equal to 10 or 2.5 microns, respectively; ROI = region of influence; SO<sub>x</sub> = sulfur oxides; VOC = volatile organic compound

Note:

1. The ROI for Dyess AFB emissions is Taylor County, Texas. See Table 3.3-2 and Table 3.3-3.



## Summary of Dyess AFB Alternative Air Quality Environmental Consequences

Table 3.3-26 shows the estimated annual emissions under the Dyess AFB Alternative.

**Table 3.3-26. Summary of Dyess AFB Alternative Emissions**

Source	Pollutants (tons/year)						
	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>x</sub>	VOC	CO <sub>2e</sub>
Dyess AFB Alternative Personnel Emissions	161.03	11.66	0.29	0.25	0.10	13.67	14,740
Dyess AFB Alternative Aircraft Emissions	191.56	431.35	55.59	45.75	30.61	48.26	92,527
Dyess AFB Alternative Facilities Construction and Demolition Emissions	16.64	22.16	684.36	0.86	0.06	36.05	5,886
Dyess AFB Alternative WGF Construction Emissions	3.92	3.69	12.57	0.15	0.01	1.20	944
Total Dyess AFB Alternative Emissions	373.15	468.86	752.81	47.01	30.78	99.18	114,097
Total Dyess AFB No Action Alternative Emissions	389.91	277.18	46.04	31.77	29.35	60.37	99,584
Net Change from No Action Alternative	-16.76	191.68	706.77	15.24	1.43	38.81	14,514
ROI Baseline <sup>1</sup>	14,298	4,626	6,598	1,250	50.30	8,477	1,243,235
<b>Net Change as Percentage of ROI</b>	<b>-0.12%</b>	<b>4.14%</b>	<b>10.71%</b>	<b>1.22%</b>	<b>2.84%</b>	<b>0.46%</b>	<b>1.17%</b>

Source: (EPA, 2020b)

% = percent; - = minus; AFB = Air Force Base; CO = carbon monoxide; CO<sub>2e</sub> = carbon dioxide equivalent; NO<sub>x</sub> = nitrogen oxides; PM<sub>10</sub> or PM<sub>2.5</sub> = particulate matter with a diameter less than or equal to 10 or 2.5 microns, respectively; ROI = region of influence; SO<sub>x</sub> = sulfur oxides; VOC = volatile organic compound; WGF = Weapons Generation Facility

Note:

1. The ROI for Dyess AFB emissions is Taylor County, Texas. See Table 3.3-2 and Table 3.3-3.

### 3.3.2.2.6 Snapshot

#### Personnel

Under the Snapshot Scenario at Dyess AFB, it was estimated that the total number of personnel, including B-21 personnel (Table 2.3-1) and 10 percent of B-1 personnel, would be approximately 6,200 military personnel, 665 civilians, and 200 contractors.

Table 3.3-27 shows the potential emissions associated with the Snapshot Scenario, the net change from the No Action Alternative, and the change (increase/decrease) as compared with the ROI baseline annual emissions.

**Table 3.3-27. Personnel Emissions for the Snapshot Scenario with the Dyess AFB Alternative**

Source	Pollutants (tons/year)						
	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>x</sub>	VOC	CO <sub>2e</sub>
Dyess AFB Alternative Personnel Emissions (Snapshot)	165.52	11.98	0.30	0.26	0.10	14.05	15,150
Dyess AFB No Action Alternative Personnel Emissions	121.37	8.79	0.22	0.19	0.08	10.30	11,109
Change from No Action Alternative	44.15	3.20	0.08	0.07	0.03	3.75	4,041
ROI Baseline <sup>1</sup>	14,298	4,626	6,598	1,250	50.30	8,477	1,243,235
<b>Net Change as Percentage of ROI</b>	<b>0.31%</b>	<b>0.07%</b>	<b>0.00%</b>	<b>0.01%</b>	<b>0.06%</b>	<b>0.04%</b>	<b>0.33%</b>

Source: (EPA, 2020b)

% = percent; AFB = Air Force Base; CO = carbon monoxide; CO<sub>2e</sub> = carbon dioxide equivalent; NO<sub>x</sub> = nitrogen oxides; PM<sub>10</sub> or PM<sub>2.5</sub> = particulate matter with a diameter less than or equal to 10 or 2.5 microns, respectively; ROI = region of influence; SO<sub>x</sub> = sulfur oxides; VOC = volatile organic compound

Note:

1. The ROI for Dyess AFB emissions is Taylor County, Texas. See Table 3.3-2 and Table 3.3-3.

## 1 Airfield Operations

2 Table 3.3-28 shows the potential change (increase or decrease) in criteria pollutant and  
3 GHG emissions associated with the Dyess AFB Snapshot Scenario from the baseline.  
4 Emissions of all criteria pollutants would increase from the baseline levels except for  
5 carbon monoxide, which would decrease by 76.25 tons per year. The highest increase  
6 would be for sulfur oxides, which would increase by 18.67 percent over the ROI baseline  
7 for Taylor County.

**Table 3.3-28. Air Operations Emissions for the Snapshot Scenario with the Dyess AFB Alternative**

Source	Pollutants (tons/year)						
	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>x</sub>	VOC	CO <sub>2e</sub>
Dyess AFB Alternative Aircraft Emissions (Snapshot)	192.29	435.44	96.90	82.84	38.66	53.59	104,895
Dyess AFB No Action Alternative Aircraft Emissions	268.54	268.39	45.82	31.58	29.27	50.07	88,475
Change from No Action Alternative	-76.25	167.05	51.08	51.26	9.39	3.53	16,421
ROI Baseline <sup>1</sup>	14,298	4,626	6,598	1,250	50.30	8,477	1,243,235
<b>Net Change as Percentage of ROI</b>	<b>-0.53%</b>	<b>3.61%</b>	<b>0.77%</b>	<b>4.10%</b>	<b>18.67%</b>	<b>0.04%</b>	<b>1.32%</b>

Source: (EPA, 2020b)

% = percent; - = minus; AFB = Air Force Base; CO = carbon monoxide; CO<sub>2e</sub> = carbon dioxide equivalent; NO<sub>x</sub> = nitrogen oxides; PM<sub>10</sub> or PM<sub>2.5</sub> = particulate matter with a diameter less than or equal to 10 or 2.5 microns, respectively; ROI = region of influence; SO<sub>x</sub> = sulfur oxides; VOC = volatile organic compound

Note:

1. The ROI for Dyess AFB emissions is Taylor County, Texas. See Table 3.3-2 and Table 3.3-3.

## 1 Airspace and Range Utilization

### 2 Powder River Training Complex

3 Table 3.3-29 shows the change in criteria pollutant and GHG emissions associated with  
4 aircraft operations occurring below the 3,000-foot AGL mixing layer within PRTC airspace  
5 under the Snapshot Scenario compared with the ROI No Action Alternative baseline  
6 emissions. Since the B-21 would not fly below the mixing layer, emissions would decrease  
7 as B-1 operations are decreased.

8 **Table 3.3-29. PRTC Air Operations Emissions for the**  
9 **Snapshot Scenario with the Dyess AFB Alternative**

Source	Pollutants (tons/year)						
	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>x</sub>	VOC	CO <sub>2e</sub>
Dyess AFB Alternative PRTC Emissions (Snapshot)	6.01	42.56	4.23	1.91	2.48	0.17	7,483
No Action Alternative PRTC Emissions	9.04	87.55	10.12	6.11	6.23	0.60	18,820
Change from No Action Alternative	-3.04	-44.99	-5.89	-4.21	-3.75	-0.42	-11,337
ROI Baseline <sup>1</sup>	449,392	112,200	277,220	71,323	53,123	300,170	38,744,478
<b>Net Change as Percentage of ROI</b>	<b>0.00%</b>	<b>-0.04%</b>	<b>0.00%</b>	<b>-0.01%</b>	<b>-0.01%</b>	<b>0.00%</b>	<b>-0.03%</b>

Source: (EPA, 2020b)

% = percent; - = minus; AFB = Air Force Base; CO = carbon monoxide; CO<sub>2e</sub> = carbon dioxide equivalent; NO<sub>x</sub> = nitrogen oxides; PM<sub>10</sub> or PM<sub>2.5</sub> = particulate matter with a diameter less than or equal to 10 or 2.5 microns, respectively; PRTC = Powder River Training Complex; ROI = region of influence; SO<sub>x</sub> = sulfur oxides; VOC = volatile organic compound

Note:

1. The ROI for PRTC emissions includes portions of 29 counties across four states. See Table 3.3-6.

### 10 Lancer MOA

11 Under the Dyess AFB Snapshot Scenario, emissions below the 3,000-foot AGL mixing  
12 layer would decrease, since the B-21 would not fly below the mixing layer in the Lancer  
13 MOA. Therefore, emissions would decrease by the quantities shown below in  
14 Table 3.3-30.

**Table 3.3-30. Lancer MOA Air Operations Emissions for the**  
**Snapshot Scenario with the Dyess AFB Alternative**

Source	Pollutants (tons/year)						
	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>x</sub>	VOC	CO <sub>2e</sub>
Dyess AFB Alternative Lancer MOA Emissions (Snapshot)	0.44	0.51	0.07	0.05	0.04	0.02	118
No Action Alternative Lancer MOA Emissions	2.21	2.56	0.34	0.24	0.19	0.08	588.65
Change from No Action Alternative	-1.77	-2.05	-0.27	-0.19	-0.16	-0.06	-470.92
ROI Baseline <sup>1</sup>	23,896	13,129	30,158	5,560	211	53,098	1,930,871

**Table 3.3-30. Lancer MOA Air Operations Emissions for the Snapshot Scenario with the Dyess AFB Alternative**

Source	Pollutants (tons/year)						
	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>x</sub>	VOC	CO <sub>2e</sub>
<b>Net Change as Percentage of ROI</b>	<b>-0.01%</b>	<b>-0.02%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>-0.08%</b>	<b>0.00%</b>	<b>-0.02%</b>

Source: (EPA, 2020b)

% = percent; - = minus; AFB = Air Force Base; CO = carbon monoxide; CO<sub>2e</sub> = carbon dioxide equivalent; MOA = Military Operating Area; NO<sub>x</sub> = nitrogen oxides; PM<sub>10</sub> or PM<sub>2.5</sub> = particulate matter with a diameter less than or equal to 10 or 2.5 microns, respectively; ROI = region of influence; SO<sub>x</sub> = sulfur oxides; VOC = volatile organic compound

Note:

1. The ROI for the Lancer MOA includes portions of eight counties in Texas. See Table 3.3-7.

### 1 **Brownwood MOA**

2 There would not be any B-1 or B-21 operations in the Brownwood MOA occurring below  
3 the 3,000-foot AGL mixing layer under the Dyess AFB Snapshot Scenario. Therefore,  
4 there would not be any impact to the regional air quality from B-21 flight operations in the  
5 Brownwood MOA.

### 6 **Pecos MOA**

7 Under the Dyess AFB Snapshot Scenario, emissions below the 3,000-foot AGL mixing  
8 layer would decrease, since the B-21 would not fly below the mixing layer in the Pecos  
9 MOA. Therefore, emissions would decrease by the quantities shown below in  
10 Table 3.3-31.

**Table 3.3-31. Pecos MOA Air Operations Emissions for the Snapshot Scenario with the Dyess AFB Alternative**

Source	Pollutants (tons/year)						
	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>x</sub>	VOC	CO <sub>2e</sub>
Dyess AFB Alternative Pecos MOA Emissions (Snapshot)	141.20	364.73	100.32	98.98	19.17	12.34	146,437
No Action Alternative Pecos MOA Emissions	155.09	371.83	101.43	99.86	19.65	12.81	147,894
Change from No Action Alternative	-13.89	-7.10	-1.11	-0.88	-0.48	-0.47	-1,458
ROI Baseline <sup>1</sup>	47,059	18,687	20,505	3,632	156.67	82,366	1,450,075
<b>Net Change as Percentage of ROI</b>	<b>-0.03%</b>	<b>-0.04%</b>	<b>-0.01%</b>	<b>-0.02%</b>	<b>-0.31%</b>	<b>0.00%</b>	<b>-0.10%</b>

Source: (EPA, 2020b)

% = percent; - = minus; AFB = Air Force Base; CO = carbon monoxide; CO<sub>2e</sub> = carbon dioxide equivalent; MOA = Military Operating Area; NO<sub>x</sub> = nitrogen oxides; PM<sub>10</sub> or PM<sub>2.5</sub> = particulate matter with a diameter less than or equal to 10 or 2.5 microns, respectively; ROI = region of influence; SO<sub>x</sub> = sulfur oxides; VOC = volatile organic compound

Note:

1. The ROI for Pecos MOA emissions includes portions of five counties in New Mexico. See Table 3.3-9.

### 13 **Summary of Dyess AFB Snapshot Scenario**

14 Table 3.3-32 shows the estimated annual emissions under the Dyess AFB Snapshot  
15 Scenario.

**Table 3.3-32. Summary of Dyess AFB Snapshot Scenario Emissions**

Source	Pollutants (tons/year)						
	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>x</sub>	VOC	CO <sub>2e</sub>
Dyess AFB Alternative Personnel Emissions (Snapshot)	165.52	11.98	0.3	0.26	0.1	14.05	15,150
Dyess AFB Alternative Aircraft Emissions (Snapshot)	192.29	435.44	96.9	82.84	38.66	53.59	104,895
Dyess AFB Alternative Facilities Construction and Demolition Emissions	16.64	22.16	684.36	0.86	0.06	36.05	5,886
Dyess AFB Alternative WGF Construction Emissions	3.92	3.69	12.57	0.15	0.01	1.20	944
Total Dyess AFB Alternative Emissions (Snapshot)	378.37	473.27	794.13	84.11	38.83	104.89	126,875
Total Dyess AFB No Action Alternative Emissions	389.91	277.18	46.04	31.77	29.35	60.37	99,584
Net Change from No Action Alternative	-11.54	196.09	748.09	52.34	9.48	44.52	27,291
ROI Baseline <sup>1</sup>	14,298	4,626	6,598	1,250	50.30	8,477	1,243,235
<b>Net Change as Percentage of ROI</b>	<b>-0.08%</b>	<b>4.24%</b>	<b>11.34%</b>	<b>4.19%</b>	<b>18.85%</b>	<b>0.53%</b>	<b>2.20%</b>

Source: (EPA, 2020b)

% = percent; - = minus; AFB = Air Force Base; CO = carbon monoxide; CO<sub>2e</sub> = carbon dioxide equivalent; NO<sub>x</sub> = nitrogen oxides; PM<sub>10</sub> or PM<sub>2.5</sub> = particulate matter with a diameter less than or equal to 10 or 2.5 microns, respectively; ROI = region of influence; SO<sub>x</sub> = sulfur oxides; VOC = volatile organic compound; WGF = Weapons Generation Facility

Note:

1. The ROI for Dyess AFB emissions is Taylor County, Texas. See Table 3.3-2 and Table 3.3-3.

### 3.3.2.2.7 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.

### 3.3.2.3 Ellsworth AFB Alternative

#### 3.3.2.3.1 Personnel

It has been estimated that the B-21 program would require approximately 3,500 military personnel (Table 2.3-1). ACAM estimates the potential air emissions introduced to the Ellsworth AFB Alternative region by personnel commuter vehicles. Table 3.3-33 shows the potential emissions associated with additional B-21 personnel at Ellsworth 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 Ellsworth AFB's status as a synthetic minor source as restrictions would remain in place. However, should their

- 1 permit require updating or revision, Ellsworth AFB would comply with all SDDENR
- 2 requirements.

**Table 3.3-33. Personnel Emissions with the Ellsworth AFB Alternative**

Source	Pollutants (tons/year)						
	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>x</sub>	VOC	CO <sub>2e</sub>
Ellsworth AFB Alternative Personnel Emissions	160.71	12.45	0.41	0.36	0.09	14.21	12,606
Ellsworth AFB No Action Alternative Personnel Emissions	115.61	8.96	0.30	0.26	0.06	10.22	9,068
Change from No Action Alternative	45.11	3.50	0.12	0.10	0.03	3.99	3,538
ROI Baseline <sup>1</sup>	43,459	8,523	13,201	3,856	614	33,439	2,264,313
<b>Net Change as Percentage of ROI</b>	<b>0.10%</b>	<b>0.04%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.01%</b>	<b>0.16%</b>

Source: (EPA, 2020b)

% = percent; AFB = Air Force Base; CO = carbon monoxide; CO<sub>2e</sub> = carbon dioxide equivalent; NO<sub>x</sub> = nitrogen oxides; PM<sub>10</sub> or PM<sub>2.5</sub> = particulate matter with a diameter less than or equal to 10 or 2.5 microns, respectively; ROI = region of influence; SO<sub>x</sub> = sulfur oxides; VOC = volatile organic compound

Note:

1. The ROI for Ellsworth AFB emissions includes Meade and Pennington Counties in South Dakota. See Table 3.3-4 and Table 3.3-5.

### 3.3.2.3.2 Airfield Operations

- 4 Under the Ellsworth AFB Alternative, B-1 aircraft would be phased out and replaced by
- 5 B-21 aircraft. Table 3.3-34 shows the potential change (increase or decrease) in criteria
- 6 pollutant and GHG emissions associated with the Ellsworth AFB Alternative from the
- 7 baseline. Emissions of all criteria pollutants would decrease from the baseline levels
- 8 except for nitrogen oxides, which would increase by 131.55 tons per year. This represents
- 9 only 1.54 percent of the ROI baseline for Meade and Pennington Counties.

**Table 3.3-34. Air Operations Emissions with the Ellsworth AFB Alternative**

Source	Pollutants (tons/year)						
	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>x</sub>	VOC	CO <sub>2e</sub>
Ellsworth AFB Alternative Aircraft Emissions	144.57	322.87	42.60	31.20	20.07	2.56	60,682
Ellsworth AFB No Action Alternative Aircraft Emissions	220.84	191.32	49.46	35.48	21.11	4.27	63,813
Change from No Action Alternative	-76.27	131.55	-6.86	-4.28	-1.04	-1.72	-3,131
ROI Baseline <sup>1</sup>	43,459	8,523	13,201	3,856	614	33,439	2,264,313
<b>Net Change as Percentage of ROI</b>	<b>-0.18%</b>	<b>1.54%</b>	<b>-0.05%</b>	<b>-0.11%</b>	<b>-0.17%</b>	<b>-0.01%</b>	<b>-0.14%</b>

Source: (EPA, 2020b)

% = percent; - = minus; AFB = Air Force Base; CO = carbon monoxide; CO<sub>2e</sub> = carbon dioxide equivalent; NO<sub>x</sub> = nitrogen oxides; PM<sub>10</sub> or PM<sub>2.5</sub> = particulate matter with a diameter less than or equal to 10 or 2.5 microns, respectively; ROI = region of influence; SO<sub>x</sub> = sulfur oxides; VOC = volatile organic compound

Note:

1. The ROI for Ellsworth AFB emissions includes Meade and Pennington Counties in South Dakota. See Table 3.3-4 and Table 3.3-5.

### 3.3.2.3.3 Airspace and Range Utilization

Table 3.3-35 shows the change in criteria pollutant and GHG emissions associated with aircraft operations occurring below the 3,000-foot AGL mixing layer within PRTC compared to the ROI No Action Alternative baseline emissions.

**Table 3.3-35. PRTC Air Operations Emissions with the Ellsworth AFB Alternative**

Source	Pollutants (tons/year)						
	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>x</sub>	VOC	CO <sub>2e</sub>
Ellsworth AFB Alternative PRTC Emissions	5.25	31.31	2.75	0.85	1.54	0.07	4,649
No Action Alternative PRTC Emissions	9.04	87.55	10.12	6.11	6.23	0.60	18,820
Change from No Action Alternative	-3.80	-56.24	-7.36	-5.26	-4.69	-0.53	-14,171
ROI Baseline <sup>1</sup>	449,392	112,200	277,220	71,323	53,123	300,170	38,744,478
<b>Net Change as Percentage of ROI</b>	<b>0.00%</b>	<b>-0.05%</b>	<b>0.00%</b>	<b>-0.01%</b>	<b>-0.01%</b>	<b>0.00%</b>	<b>-0.04%</b>

Source: (EPA, 2020b)

% = percent; - = minus; AFB = Air Force Base; CO = carbon monoxide; CO<sub>2e</sub> = carbon dioxide equivalent; NO<sub>x</sub> = nitrogen oxides; PM<sub>10</sub> or PM<sub>2.5</sub> = particulate matter with a diameter less than or equal to 10 or 2.5 microns, respectively; PRTC = Powder River Training Complex; ROI = region of influence; SO<sub>x</sub> = sulfur oxides; VOC = volatile organic compound

Note:

1. The ROI for PRTC emissions includes portions of 29 counties among four states. See Table 3.3-6.

Emissions associated with the Ellsworth AFB Alternative represents a net decrease from No Action Alternative levels for all criteria pollutants, which is presumed to continue to meet General Conformity requirements, based on the determinations of the 2014 PRTC EIS (USAF, 2014a); therefore, a General Conformity determination would not be required.

### 3.3.2.3.4 Facilities and Infrastructure

Under the Ellsworth AFB Alternative, there would be a number of new facilities constructed to support the B-21 mission (Table 2.5-1). ACAM 5.0.16 was used to calculate the emissions associated with construction, demolition, and renovation activities under the Ellsworth AFB Alternative (Table 3.3-36).

**Table 3.3-36. Facilities and Infrastructure Emissions with the Ellsworth AFB Alternative**

Source	Pollutants (tons/year)						
	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>x</sub>	VOC	CO <sub>2e</sub>
Ellsworth AFB Alternative Construction/Demolition/Renovation	18.08	25.49	806.37	0.91	0.06	41.43	6,266
ROI Baseline <sup>1</sup>	43,459	8,523	13,201	3,856	614.18	33,439	2,264,313
<b>Percentage of ROI</b>	<b>0.04%</b>	<b>0.30%</b>	<b>6.11%</b>	<b>0.02%</b>	<b>0.01%</b>	<b>0.12%</b>	<b>0.28%</b>

Source: (EPA, 2020b)

% = percent; AFB = Air Force Base; CO = carbon monoxide; CO<sub>2e</sub> = carbon dioxide equivalent; NO<sub>x</sub> = nitrogen oxides; PM<sub>10</sub> or PM<sub>2.5</sub> = particulate matter with a diameter less than or equal to 10 or 2.5 microns, respectively; ROI = region of influence; SO<sub>x</sub> = sulfur oxides; VOC = volatile organic compound

Note:

1. The ROI for Ellsworth AFB emissions includes Meade and Pennington Counties in South Dakota. See Table 3.3-4 and Table 3.3-5.

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

### 6 **3.3.2.3.5 Weapons Generation Facility**

#### 7 **North WGF Site Subalternative**

8 Construction of the WGF at Ellsworth AFB would generate criteria pollutants and GHGs  
 9 from the combustion of fossil fuels in construction equipment and worker commutes.  
 10 Table 3.3-37 shows emissions from WGF construction at Ellsworth AFB compared with  
 11 the ROI baseline. Emissions would be minor and temporary, representing less than one-  
 12 tenth of 1 percent of the ROI annual emissions baseline for all criteria pollutants. No  
 13 adverse impacts to regional air quality would be anticipated.

14 **Table 3.3-37. Weapons Generation Facility Construction Emissions with the**  
 15 **Ellsworth AFB Alternative**

Source	Pollutants (tons/year)						
	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>x</sub>	VOC	CO <sub>2e</sub>
Ellsworth AFB Alternative WGF Construction Emissions	5.05	5.29	12.61	0.19	0.01	1.41	1,416
ROI Baseline <sup>1</sup>	43,459	8,523	13,201	3,856	614	33,439	2,264,313
<b>Percentage of ROI</b>	<b>0.01%</b>	<b>0.05%</b>	<b>0.08%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.06%</b>

Source: (EPA, 2020b)

% = percent; AFB = Air Force Base; CO = carbon monoxide; CO<sub>2e</sub> = carbon dioxide equivalent; NO<sub>x</sub> = nitrogen oxides; PM<sub>10</sub> or PM<sub>2.5</sub> = particulate matter with a diameter less than or equal to 10 or 2.5 microns, respectively; ROI = region of influence; SO<sub>x</sub> = sulfur oxides; VOC = volatile organic compound; WGF = Weapons Generation Facility

Note:

1. The ROI for Ellsworth AFB emissions includes Meade and Pennington Counties in South Dakota. See Table 3.3-4 and Table 3.3-5.

#### 16 **South WGF Site Subalternative**

17 The emissions associated with WGF construction under the South WGF Site  
 18 Subalternative are presented in Table 3.3-37 above. Emissions would be minor and  
 19 temporary, representing less than one-tenth of 1 percent of the ROI annual emissions  
 20 baseline for all criteria pollutants. No adverse impacts to regional air quality would be  
 21 anticipated.

### 22 **Summary of Ellsworth AFB Alternative Air Quality Environmental Consequences**

23 Table 3.3-38 shows the estimated annual emissions under the Ellsworth AFB Alternative.



**Table 3.3-38. Summary of Ellsworth AFB Alternative Emissions**

Source	Pollutants (tons/year)						
	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>x</sub>	VOC	CO <sub>2e</sub>
Ellsworth AFB Alternative Personnel Emissions	160.71	12.45	0.41	0.36	0.09	14.21	12,606
Ellsworth AFB Alternative Aircraft Emissions	144.57	322.87	42.6	31.2	20.07	2.56	60,682
Ellsworth AFB Alternative Facilities Construction and Demolition Emissions	18.08	25.49	806.37	0.91	0.06	41.43	6,266
Ellsworth AFB Alternative WGF Construction Emissions	5.05	5.29	12.61	0.19	0.01	1.41	1,416
Total Ellsworth AFB Alternative Emissions	328.41	366.10	861.99	32.66	20.23	59.61	80,970
Total Ellsworth AFB No Action Alternative Emissions	336.45	200.28	49.76	35.74	21.17	14.49	72,881
Net Change from No Action Alternative	-8.04	165.82	812.23	-3.08	-0.94	45.12	8,089
ROI Baseline <sup>1</sup>	43,459	8,523	13,201	3,856	614	33,439	2,264,313
<b>Net Change as Percentage of ROI</b>	<b>-0.02%</b>	<b>1.95%</b>	<b>6.15%</b>	<b>-0.08%</b>	<b>-0.15%</b>	<b>0.13%</b>	<b>0.36%</b>

Source: (EPA, 2020b)

% = percent; - = minus; AFB = Air Force Base; CO = carbon monoxide; CO<sub>2e</sub> = carbon dioxide equivalent; NO<sub>x</sub> = nitrogen oxides; PM<sub>10</sub> or PM<sub>2.5</sub> = particulate matter with a diameter less than or equal to 10 or 2.5 microns, respectively; ROI = region of influence; SO<sub>x</sub> = sulfur oxides; VOC = volatile organic compound; WGF = Weapons Generation Facility

Note:

1. The ROI for Ellsworth AFB emissions includes Meade and Pennington Counties in South Dakota. See Table 3.3-4 and Table 3.3-5.

### 1 3.3.2.3.6 Snapshot

#### 2 Personnel

3 It was estimated that the B-21 program would require approximately 3,500 military  
4 personnel (Table 2.3-1). Table 3.3-39 shows the potential emissions associated with  
5 additional B-21 personnel for the Snapshot Scenario at Ellsworth AFB, compared to the  
6 ROI baseline annual emissions.

7 **Table 3.3-39. Personnel Emissions for the**  
8 **Snapshot Scenario with the Ellsworth AFB Alternative**

Source	Pollutants (tons/year)						
	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>x</sub>	VOC	CO <sub>2e</sub>
Ellsworth AFB Alternative Personnel Emissions (Snapshot)	171.12	13.26	0.44	0.38	0.10	15.13	13,422
Ellsworth AFB No Action Alternative Personnel Emissions	115.61	8.96	0.30	0.26	0.06	10.22	9,068
Change from No Action Alternative	55.51	4.30	0.14	0.12	0.03	4.91	4,354
ROI Baseline <sup>1</sup>	43,459	8,523	13,201	3,856	614	33,439	2,264,313
<b>Net Change as Percentage of ROI</b>	<b>0.13%</b>	<b>0.05%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.01%</b>	<b>0.19%</b>

Source: (EPA, 2020b)

% = percent; AFB = Air Force Base; CO = carbon monoxide; CO<sub>2e</sub> = carbon dioxide equivalent; NO<sub>x</sub> = nitrogen oxides; PM<sub>10</sub> or PM<sub>2.5</sub> = particulate matter with a diameter less than or equal to 10 or 2.5 microns, respectively; ROI = region of influence; SO<sub>x</sub> = sulfur oxides; VOC = volatile organic compound

Note:

1. The ROI for Ellsworth AFB emissions includes Meade and Pennington Counties in South Dakota. See Table 3.3-4 and Table 3.3-5.

## 1 Airfield Operations

2 Table 3.3-40 shows the potential change (increase or decrease) in criteria pollutant and  
 3 GHG emissions associated with the Ellsworth AFB Snapshot Scenario from the baseline.  
 4 Emissions of carbon monoxide and volatile organic compounds would decrease slightly  
 5 and all other criteria pollutants would increase from the baseline levels. The greatest  
 6 increase would be for nitrogen oxides, which would increase by 169.81 tons per year. This  
 7 represents only 1.99 percent of the ROI baseline for Meade and Pennington Counties.

8 **Table 3.3-40. Air Operations Emissions for the**  
 9 **Snapshot Scenario with the Ellsworth AFB Alternative**

Source	Pollutants (tons/year)						
	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>x</sub>	VOC	CO <sub>2e</sub>
Ellsworth AFB Alternative Aircraft Emissions (Snapshot)	188.73	361.13	52.49	38.30	24.30	3.41	73,444
Ellsworth AFB No Action Alternative Aircraft Emissions	220.84	191.32	49.46	35.48	21.11	4.27	63,813
Change from No Action Alternative	-32.10	169.81	3.03	2.82	3.19	-0.86	9,631
ROI Baseline <sup>1</sup>	43,459	8,523	13,201	3,856	614	33,439	2,264,313
<b>Net Change as Percentage of ROI</b>	<b>-0.07%</b>	<b>1.99%</b>	<b>0.02%</b>	<b>0.07%</b>	<b>0.52%</b>	<b>0.00%</b>	<b>0.43%</b>

Source: (EPA, 2020b)

% = percent; - = minus; CO = carbon monoxide; CO<sub>2e</sub> = carbon dioxide equivalent; NO<sub>x</sub> = nitrogen oxides; PM<sub>10</sub> or PM<sub>2.5</sub> = particulate matter with a diameter less than or equal to 10 or 2.5 microns, respectively; ROI = region of influence; SO<sub>x</sub> = sulfur oxides; VOC = volatile organic compound

Note:

1. The ROI for Ellsworth AFB emissions includes Meade and Pennington Counties in South Dakota. See Table 3.3-4 and Table 3.3-5.

## 10 Airspace and Range Utilization

11 Table 3.3-41 shows the change in criteria pollutant and GHG emissions associated with  
 12 aircraft operations occurring below the 3,000-foot AGL mixing layer within PRTC airspace  
 13 under the Snapshot Scenario compared with the ROI No Action Alternative baseline  
 14 emissions. Since the B-21 would not fly below the mixing layer, emissions would decrease  
 15 as B-1 operations are decreased.

16 **Table 3.3-41. PRTC Air Operations Emissions for the**  
 17 **Snapshot Scenario with the Ellsworth AFB Alternative**

Source	Pollutants (tons/year)						
	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>x</sub>	VOC	CO <sub>2e</sub>
Ellsworth AFB Alternative PRTC Emissions (Snapshot)	6.01	42.56	4.23	1.91	2.48	0.17	7,483
No Action Alternative PRTC Emissions	9.04	87.55	10.12	6.11	6.23	0.60	18,820
Change from No Action Alternative	-3.04	-44.99	-5.89	-4.21	-3.75	-0.42	-11,337
ROI Baseline <sup>1</sup>	449,392	112,200	277,220	71,323	53,123	300,170	38,744,478
<b>Net Change as Percentage of ROI</b>	<b>0.00%</b>	<b>-0.04%</b>	<b>0.00%</b>	<b>-0.01%</b>	<b>-0.01%</b>	<b>0.00%</b>	<b>-0.03%</b>

Source: (EPA, 2020b)

% = percent; - = minus; AFB = Air Force Base; CO = carbon monoxide; CO<sub>2e</sub> = carbon dioxide equivalent; NO<sub>x</sub> = nitrogen oxides; PM<sub>10</sub> or PM<sub>2.5</sub> = particulate matter with a diameter less than or equal to 10 or 2.5 microns, respectively; PRTC = Powder River Training Complex; ROI = region of influence; SO<sub>x</sub> = sulfur oxides; VOC = volatile organic compound

Note:

1. The ROI for PRTC emissions includes portions of 29 counties across four states. See Table 3.3-6.

## Summary of Ellsworth AFB Snapshot Scenario

Table 3.3-42 shows the estimated annual emissions under the Ellsworth AFB Snapshot Scenario.

**Table 3.3-42. Summary of Ellsworth AFB Snapshot Scenario Emissions**

Source	Pollutants (tons/year)						
	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>x</sub>	VOC	CO <sub>2e</sub>
Ellsworth AFB Alternative Personnel Emissions (Snapshot)	171.12	13.26	0.44	0.38	0.1	15.13	13,422
Ellsworth AFB Alternative Aircraft Emissions (Snapshot)	188.73	361.13	52.49	38.3	24.3	3.41	73,444
Ellsworth AFB Alternative Facilities Construction and Demolition Emissions	18.08	25.49	806.37	0.91	0.06	41.43	6,266
Ellsworth AFB Alternative WGF Construction Emissions	5.05	5.29	12.61	0.19	0.01	1.41	1,416
Total Ellsworth AFB Alternative Emissions (Snapshot)	382.98	405.17	871.91	39.78	24.47	61.38	94,548
Total Ellsworth AFB No Action Alternative Emissions	336.45	200.28	49.76	35.74	21.17	14.49	72,881
Net Change from No Action Alternative	46.53	204.89	822.15	4.04	3.30	46.89	21,667
ROI Baseline <sup>1</sup>	43,459	8,523	13,201	3,856	614	33,439	2,264,313
<b>Net Change as Percentage of ROI</b>	<b>0.11%</b>	<b>2.40%</b>	<b>6.23%</b>	<b>0.10%</b>	<b>0.54%</b>	<b>0.14%</b>	<b>0.96%</b>

Source: (EPA, 2020b)

% = percent; - = minus; CO = carbon monoxide; CO<sub>2e</sub> = carbon dioxide equivalent; NO<sub>x</sub> = nitrogen oxides; PM<sub>10</sub> or PM<sub>2.5</sub> = particulate matter with a diameter less than or equal to 10 or 2.5 microns, respectively; ROI = region of influence; SO<sub>x</sub> = sulfur oxides; VOC = volatile organic compound

Note:

1. The ROI for Ellsworth AFB emissions includes Meade and Pennington Counties in South Dakota. See Table 3.3-4 and Table 3.3-5.

### 3.3.2.3.7 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 LAND USE

### 3.4.1 Land Use, Affected Environment

#### 3.4.1.1 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,

1 transportation, communication/utilities, military, public/institutional, and recreational. Land  
2 use also includes areas set aside for preservation or protection of natural resources or  
3 unique features. Management plans, policies, ordinances, zoning, and regulations  
4 determine the types of uses that are allowable or that protect specially designated or  
5 environmentally sensitive uses. Typically, the primary objectives of land use planning are  
6 to ensure managed growth and compatible uses relative to adjacent properties.

7 Land use adjacent to military installations that support aircraft operations is typically  
8 considered in terms of noise and accident potential. Aircraft noise zones, APZs, and  
9 height restrictions for nearby structures are usually identified in AICUZ studies prepared  
10 for such installations. The studies provide information on off-base land uses and identify  
11 uses that are compatible, incompatible, or conditionally compatible (may require noise  
12 attenuation measures) with noise and accident zones. Use zones included in this  
13 document consist of the CZ, APZ I, APZ II, and four noise zones.

14 The CZ, APZ I, and APZ II are zones classified by the military that are located immediately  
15 off the end of runways. These zones delineate areas with the highest potential for  
16 accidents based on historical accident data. The CZ, which is nearest the runway,  
17 presents a risk that is generally high enough for the DoD to acquire or control the land  
18 through purchase or easement. Although aircraft accident potential in APZs I and II does  
19 not warrant acquisition, land use planning and controls are strongly encouraged for  
20 protection of the public.

21 AICUZ noise zones are typically defined as 65 to 69 dB DNL, 70 to 74 dB DNL, 75 to  
22 79 dB DNL, and greater than 80 dB DNL. Noise levels may also be stated in dBA, which  
23 emphasizes the frequencies of best human hearing. Typically, there are no land use  
24 restrictions or planning recommendations in areas with noise levels below 65 dB DNL,  
25 but residential use is not recommended where noise levels are above 75 dB DNL. There  
26 is no general consensus on residential compatibility in areas with noise levels of 65 to  
27 74 dB DNL, but residential use is often not recommended (Dyess AFB, 2015). In the  
28 remainder of the Land Use section, unless stated otherwise, the term “accident zone”  
29 refers to the area encompassed by the CZ, APZ I, and APZ II, while the term “noise zone”  
30 refers to the area encompassed by noise levels of 65 dB DNL or greater.

31 Height restrictions for objects near military airfields prevent structures from creating a  
32 safety hazard (Dyess AFB, 2015; Ellsworth AFB, 2008). Aircraft approach and depart  
33 airfields along a diagonal line that increases in altitude with distance from the runway.  
34 Therefore, taller structures are generally permitted at increasing distance from an airfield.  
35 USAF obstruction criteria are contained in Unified Facilities Criteria 3-260-01 and are  
36 based in part on criteria provided in Federal Aviation Regulation Part 77, *Objects Affecting*  
37 *Navigable Airspace*. The criteria incorporate numerous planes and surfaces at various  
38 distances and altitudes from runways or other applicable areas such as drop zones and  
39 landing zones. Height criteria are used to develop imaginary surfaces, which define the  
40 three-dimensional airspace that is free of obstacles at and around airfields. Federal  
41 Aviation Regulation Part 77 provides guidance on submittal of FAA Form 7460-1, *Notice*  
42 *of Proposed Construction or Alteration*, which is used to notify FAA of construction or  
43 alteration of structures near imaginary surfaces. Although FAA establishes height criteria,  
44 it does not have the authority to prevent incompatible construction. Therefore, it is

1 important that state and local governments enforce height restrictions around military  
2 airfields. Imaginary surfaces are depicted in AICUZ studies prepared for each installation.

---

### 3 **3.4.1.2 Region of Influence**

4 The ROI for land use includes all existing areas within the alternative MOB 1 locations  
5 (Dyess AFB and Ellsworth AFB), as well as adjacent off-base land areas that would  
6 potentially be affected by noise and safety risks associated with B-21 operations. The  
7 ROI also includes all land areas under the airspace of the PRTC and the Brownwood,  
8 Lancer, and Pecos MOAs.

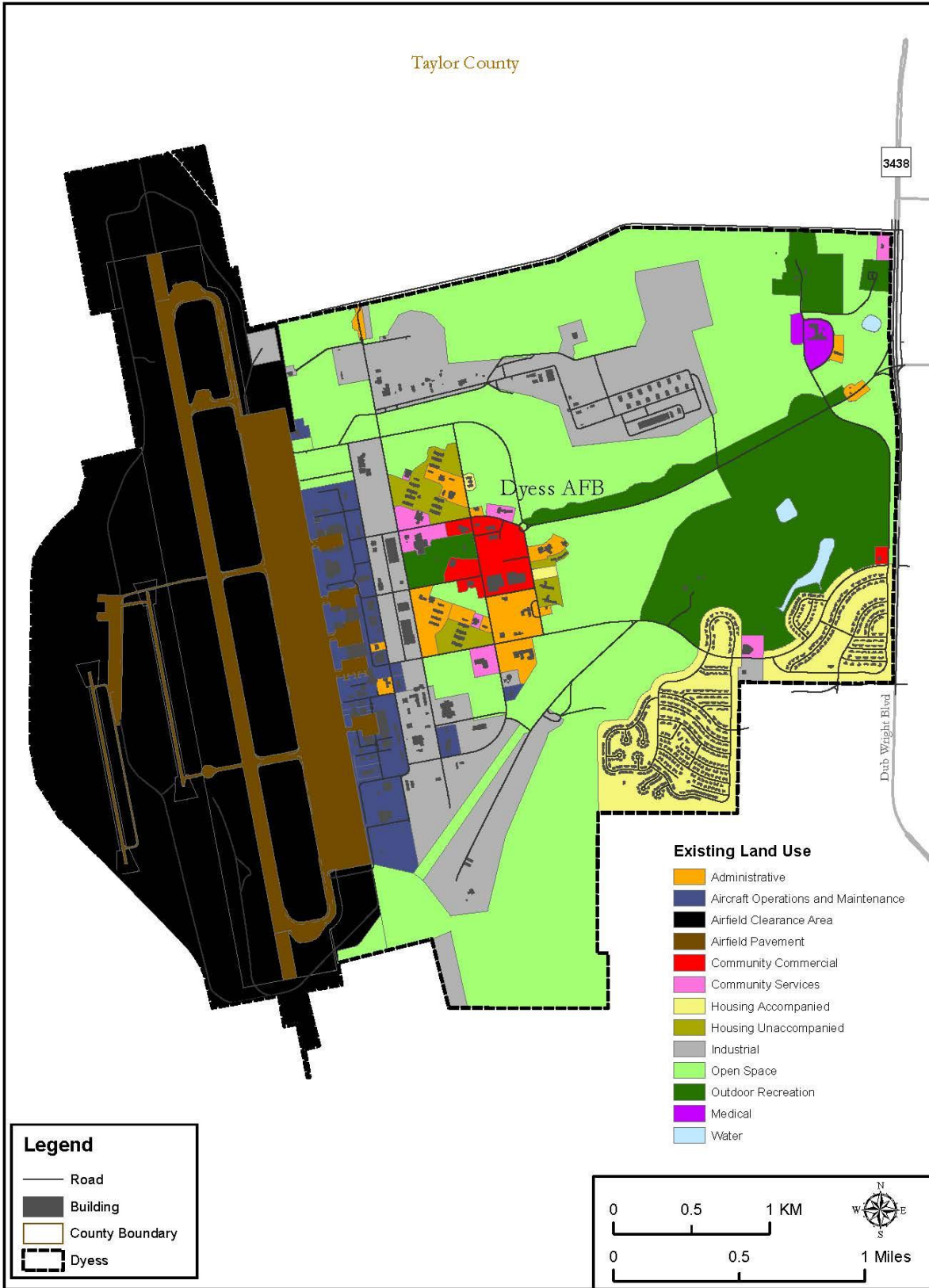
#### 9 **3.4.1.2.1 Dyess AFB**

##### 10 **On-Base Land Use**

11 Existing land use on Dyess AFB is described in the Installation Development Plan (IDP)  
12 (Dyess AFB, 2018b) and is shown on Figure 3.4-1. The area west of the flightline consists  
13 of airfield pavements, clearance areas, and open space. All routinely inhabited facilities  
14 occur east of the airfield. Existing land use follows a tiered pattern extending east from  
15 the aircraft parking apron. First tier land uses are directly related to aircraft operations  
16 and maintenance. Second tier facilities, which are mostly located between 2nd Street  
17 and 3rd Street, consist primarily of industrial and logistics functions. The third tier is a mix  
18 of land uses that include unaccompanied housing, temporary lodging, outdoor recreation,  
19 community service, administrative, and community commercial. Much of this tier forms  
20 “downtown” Dyess AFB. An area of mostly open space occurs at the south end of the  
21 installation. This area includes ERP sites, security forces and expeditionary training  
22 areas, and ecological restoration areas.

23 Some open space areas potentially affected by construction associated with the  
24 Proposed Action are designated as “prime farmland soils” under the Farmland Protection  
25 Policy Act (FPPA). The purpose of the FPPA is to minimize the extent to which federal  
26 actions contribute to unnecessary and irreversible conversion of farmland to  
27 nonagricultural uses. Prime farmland is defined as land that has the best combination of  
28 physical and chemical characteristics for producing food and other plant-based products.  
29 Acquisition or use of farmland by a federal agency for national defense purposes is  
30 exempt from the FPPA.

31 With the exception of clearance areas (e.g., safety arcs, APZs, and noise zones) and  
32 floodplains, development constraints are relatively minor on the base (Dyess AFB,  
33 2018b). The installation is divided into nine districts, based in part on land use patterns,  
34 for development planning purposes. Because previous land use decisions were made  
35 with the goal of maximizing aircraft mission effectiveness, future land use designations  
36 are expected to require only minor changes to accommodate potential growth. To  
37 minimize on-base sprawl and increase compact infill development, a growth boundary  
38 that incorporates the main cantonment area and flightline has been established. To the  
39 extent feasible, most new development is limited to areas within the boundary.



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Figure 3.4-1. Land Use on Dyess AFB

## 1 Off-Base Land Use

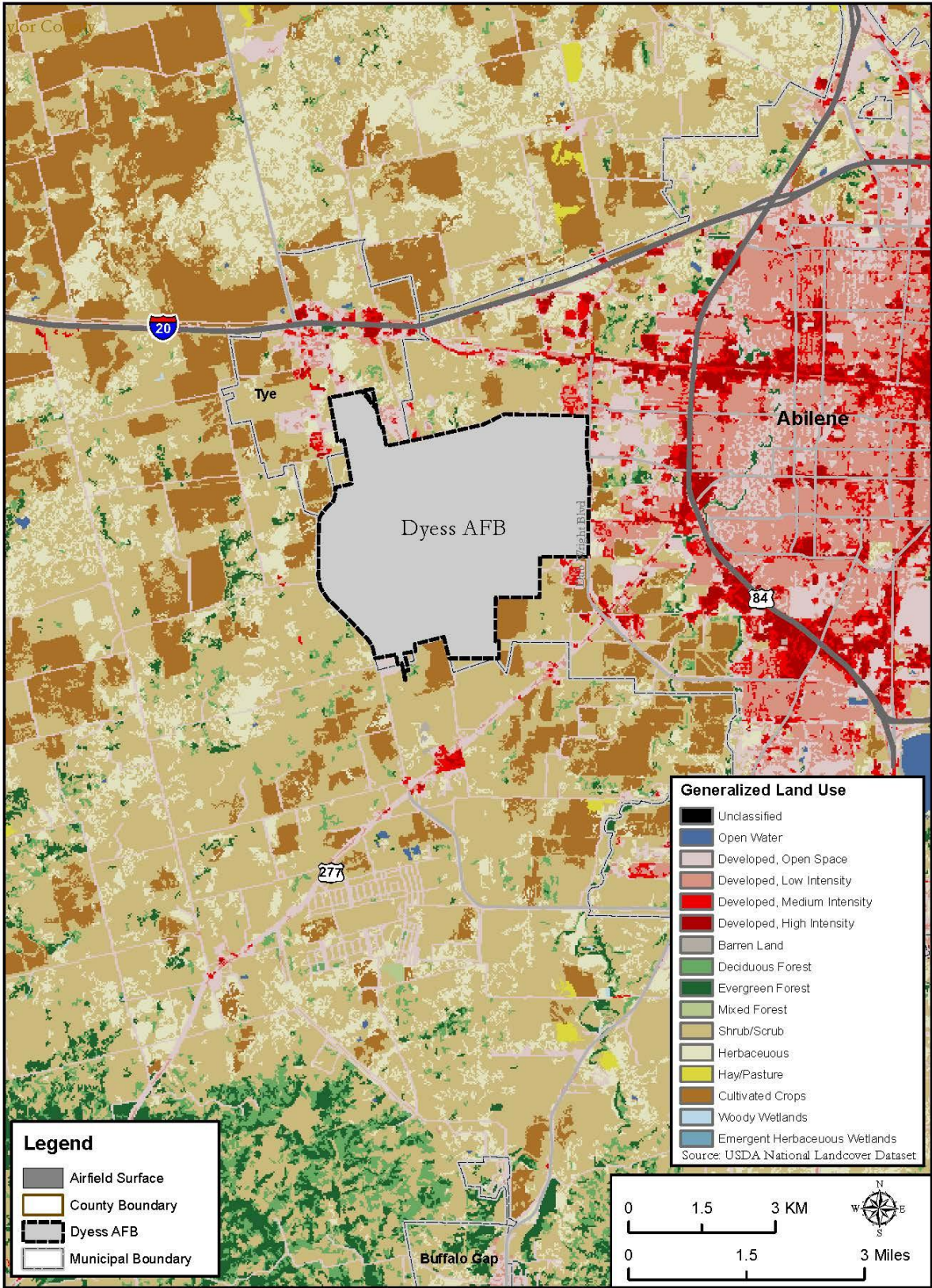
2 Dyess AFB is located in Taylor County, Texas, within the city limits of Abilene. The city of  
3 Tye is adjacent to the installation to the north. The community of Caps is located  
4 approximately 1.5 miles south. Off-base land use categories that potentially occur in these  
5 areas were defined in the 2015 Dyess AFB AICUZ Study (Dyess AFB, 2015) and include  
6 residential, commercial, industrial, public/quasi-public, recreational, and open space/low  
7 density. Definitions of these categories are provided in Appendix D (Land Use) of this  
8 EIS.

9 In the context of the AICUZ study definitions, land use in most areas adjacent to the base  
10 consists primarily of open space/low density, with a small amount of residential,  
11 commercial, and industrial. A mix of residential, commercial, industrial, and other uses  
12 occur in developed portions of Abilene, Tye, and Caps. A detailed description of off-base  
13 land use is provided in the 2015 AICUZ study's Section 4.1 through Section 4.4 and is  
14 summarized in Appendix D (Land Use) of this EIS. Current off-base land use is shown  
15 on Figure 3.4-2. Note that land use categories have been updated since publication of  
16 the 2015 AICUZ study. Definitions of the revised categories are provided in Appendix D  
17 (Land Use). In the context of current definitions, most adjacent land use outside of  
18 developed portions of Abilene consists of shrub/scrub, herbaceous, cultivated crops, and  
19 forest.

20 Off-base land use adjacent to Dyess AFB may potentially be affected by noise and safety  
21 issues associated with aircraft operations. Noise contours, CZs, and APZs extend in an  
22 approximately north-south axis along the primary runway centerline. The off-base area  
23 exposed to various noise levels (outside of CZs and APZs) and accident zones for each  
24 land use type, based on geographic information system (GIS) data available at the time,  
25 is provided in the 2015 AICUZ study's Section 4.3.

26 A total of 9,009 acres were associated with various noise zones, and a total of 1,688  
27 acres were associated with the accident zones (Dyess AFB, 2015, pp. 4-6). Approximately 96 percent of the noise zone area and  
28 87 percent of the accident zone area was identified as open space/low density use, with  
29 the remainder of each area consisting of a mix of residential, commercial, industrial, and  
30 public/quasi-public use. Detailed descriptions of the areas located within the noise zones  
31 and APZs are provided in the 2015 AICUZ study's Section 4.5, Section 4.2.3 of the  
32 Installation Complex Encroachment Management Action Plan (ICEMAP) (Dyess AFB,  
33 2014, pp. 4-9 & 4-12), and summarized in Appendix D (Land Use) of this EIS.

34  
35 Of the total land area encompassed by noise and APZs, a relatively small portion  
36 (163 acres) was considered incompatible based on guidelines presented in the 2015  
37 AICUZ study (Dyess AFB, 2015, pp. 4-12). Table 3.4-1 presents these off-base  
38 incompatible land use areas. Note that the 30 acres of noise zone/accident zone overlap  
39 are not included in the total, to prevent double counting of that area.



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Figure 3.4-2. Land Use Adjacent to Dyess AFB



**Table 3.4-1. Off-Base Incompatible Land Use Area Identified in the 2015 Dyess AICUZ Study**

Land Use Category	Incompatible Area (acres)		
	Noise (65 dB 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
<b>Total</b>	<b>152</b>	<b>41</b>	<b>30</b>

Source: (Dyess AFB, 2015)

APZ = accident potential zone; CZ = clear zone; dB = decibel; DNL = day-night average sound level

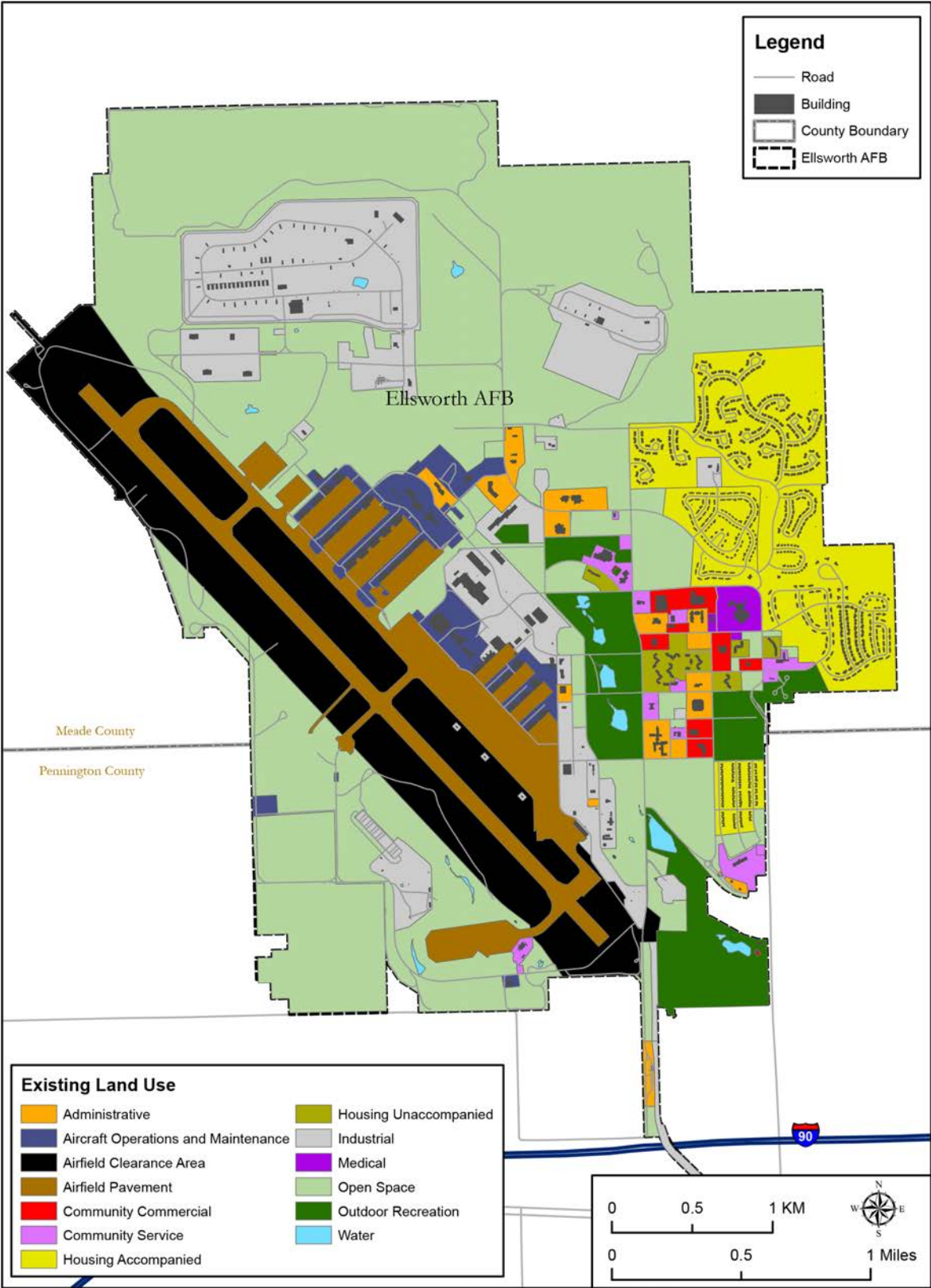
### 3.4.1.2.2 Ellsworth AFB

#### On-Base Land Use

Existing land use on Ellsworth AFB is described in the IDP (Ellsworth AFB, 2017) and is shown on Figure 3.4-3. The base's strategy of grouping compatible land uses and separating conflicting uses has resulted in an efficient consolidation of industrial and maintenance areas that avoid incompatibility with other uses. Land use on the installation is largely concentrated in the center portion, east of the runway. Land use adjacent to the airfield and parking apron includes mostly aircraft operations/maintenance and industrial. To the east of this area, in the developed cantonment area, land use is a mix of administrative, community commercial, community service, and unaccompanied housing. Accompanied housing is located farthest from the airfield. The northern section of the base is largely open space that supports munitions storage and weapons training. Land to the west of the runway is also mostly undeveloped but could support future operational/industrial uses. Areas of open space that are adjacent to and within developed areas provide opportunities for infill development.

Some open space areas potentially affected by construction associated with the Proposed Action are designated as "soils 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.

Development constraints are considered minor on Ellsworth AFB (Ellsworth AFB, 2017). The base is divided into four districts, based in part on land use patterns, for development planning purposes. The base's future land use plan provides guidance on installation development, including consideration of land use compatibility. A major emphasis of the installation's long-range development plan is to continue to consolidate land uses and co-locate similar functions.



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Figure 3.4-3. Land Use on Ellsworth AFB

## 1 Off-Base Land Use

2 Ellsworth AFB is located in Meade and Pennington Counties in southwestern South  
3 Dakota. The installation is adjacent to the city of Box Elder and is about 7 miles northeast  
4 of Rapid City. Off-base land use categories that potentially occur in these areas were  
5 defined in the 2008 Ellsworth AFB AICUZ study (Ellsworth AFB, 2008) and include  
6 residential, commercial, industrial, public/quasi-public, recreational, open space/low  
7 density, and transportation. Definitions of these categories are provided in Appendix D  
8 (Land Use) of this EIS.

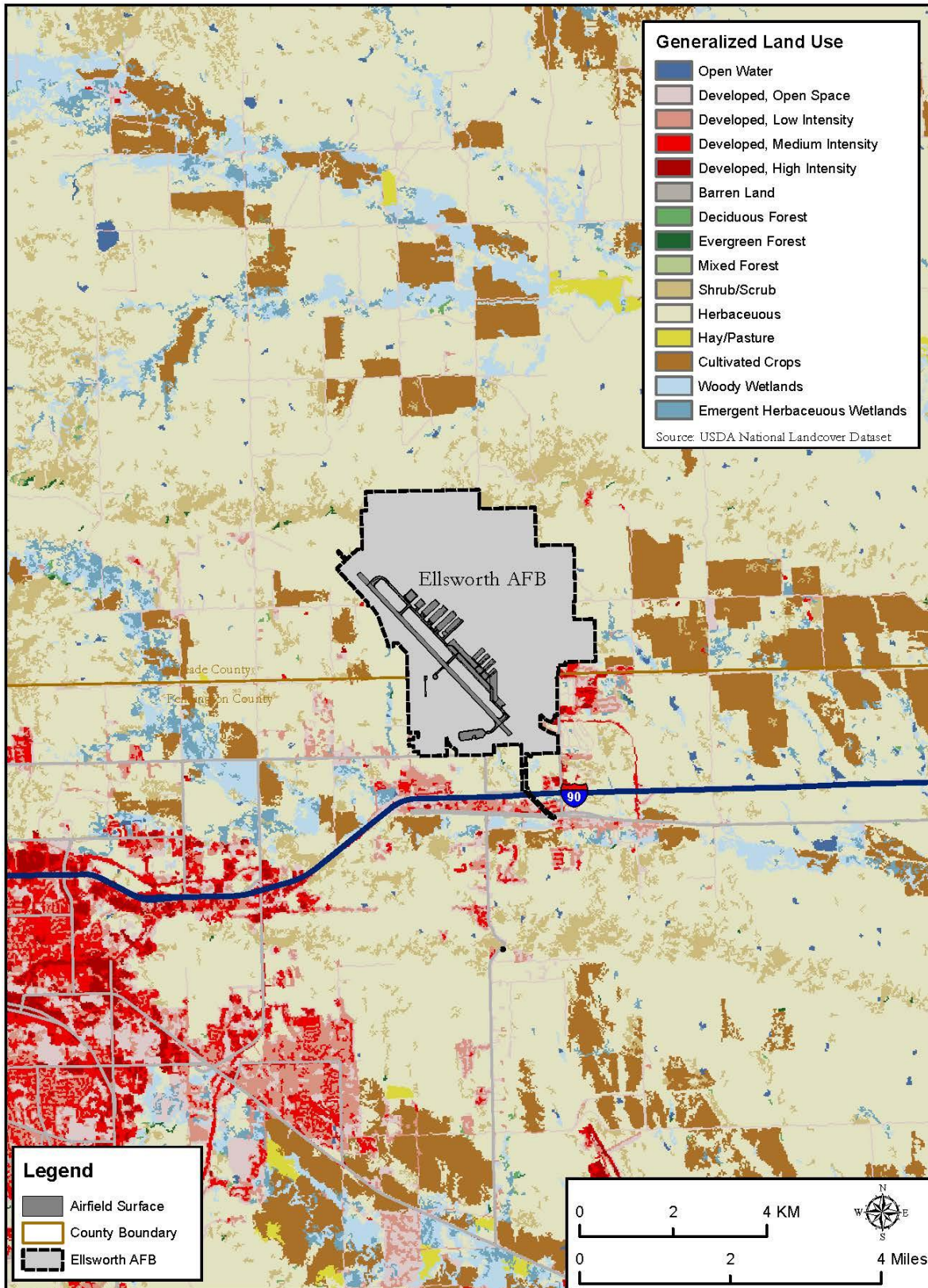
9 In the context of the AICUZ study definitions, land use adjacent to the base consists  
10 primarily of open space/low density, with a small amount of residential, commercial, and  
11 industrial. A mix of residential, commercial, industrial, and other uses occur in developed  
12 portions of Box Elder and Rapid City. A detailed description of off-base land use is  
13 provided in the 2008 AICUZ Study's Section 4.1 through Section 4.5 and is summarized  
14 in Appendix D (Land Use) of this EIS. Current off-base land use is shown on Figure 3.4-4).  
15 Note that land use categories have been updated since publication of the 2008 AICUZ  
16 study. Definitions of the revised categories are provided in Appendix D (Land Use). In  
17 the context of current definitions, most adjacent land use consists of herbaceous,  
18 shrub/scrub, cultivated crops, wetlands, and developed areas associated with Box Elder  
19 and Rapid City.

20 Off-base land use adjacent to Ellsworth AFB may potentially be affected by noise and  
21 safety issues associated with aircraft operations. Noise contours, CZs, and APZs extend  
22 approximately northwest and southeast along the runway centerline.

23 The off-base area exposed to various noise levels and accident zones for each land use  
24 type, based on GIS data available at the time, is provided in the 2008 AICUZ study. A  
25 total of 16,921 acres were associated with various noise zones (Ellsworth AFB, 2008, pp.  
26 4-4), and a total of 1,759 acres were associated with accident zones (Ellsworth AFB,  
27 2008, pp. 4-15). Approximately 86 percent of the noise zone area was identified as open  
28 space/low density use, while 9 percent was identified as residential. The remainder  
29 consisted of a mix of commercial, industrial, and public/semi-public, recreational, and  
30 transportation use.

31 Specific land use categories were not provided for the accident zones. Detailed  
32 descriptions of the areas located within noise zones and accident zones are provided in  
33 the 2008 AICUZ Study's Section 4.6 and summarized in Appendix D (Land Use) of this  
34 EIS.

35 Of the total land area encompassed by noise and APZs, a small portion (191 acres) was  
36 considered incompatible based on guidelines presented in the AICUZ study (Ellsworth  
37 AFB, 2008, pp. 4-13 & 4-15) (see Table 3.4-2 in this EIS). The 2008 AICUZ study provides  
38 the total number of acres considered incompatible due to noise zones and accident  
39 zones, but does not provide the specific land use categories associated with these zones.  
40 The State of South Dakota has taken steps to address the incompatible use within APZ I.



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Figure 3.4-4. Land Use Adjacent to Ellsworth AFB

**Table 3.4-2. Off-Base Incompatible Land Use Area Identified in the 2008 Ellsworth AICUZ Study**

Incompatibility Factor	Land Use Area Affected (acres)
65–69 dBA Noise Zone	0
70–74 dBA Noise Zone	0
75–79 dBA Noise Zone	135
80+ dBA Noise Zone	17
Clear Zone	0
Accident Potential Zone I	39*
Accident Potential Zone II	0

Source: (Ellsworth AFB, 2008)

+ = plus; dBA = A-weighted decibel

Note: \*Plans exist to remove the incompatible use in Accident Potential Zone I.

### 3.4.1.2.3 Airspace and Military Operating Areas

Land use under PRTC airspace is shown on Figure 3.4-5. Land use categories and areas are presented in Table 3.4-3. The PRTC airspace overlies at least a portion of 29 counties in four states.

**Table 3.4-3. Land Use Area Under the Powder River Training Complex and Military Operating Areas**

Land Use Category	Area Under the PRTC (square miles)	Area Under the Lancer MOA (square miles)	Area Under the Brownwood MOA (square miles)	Area Under the Pecos MOA (square miles)
Open Water	128	12	43	3
Developed, Open Space	323	139	240	14
Developed, Low Intensity	52	13	13	2
Developed, Medium Intensity	8	2	6	0.5
Developed, High Intensity	1	0.7	3	0.05
Barren Land	74	31	1	4
Deciduous Forest	66	6	115	0
Evergreen Forest	2,527	12	207	0.2
Mixed Forest	6	5	0.3	0
Shrub/Scrub	6,948	1,726	2,275	1,459
Herbaceous	19,271	1,387	883	2,674
Hay/Pasture	1,192	1	110	0.03
Cultivated Crops	3,236	931	309	18
Woody Wetlands	345	2	14	2
Emergent Herbaceous Wetlands	124	7	6	4
<b>Total</b>	<b>34,302</b>	<b>4,274</b>	<b>4,225</b>	<b>4,180</b>

About 80 percent of land under the airspace is privately held, with the remainder managed by federal entities (primarily the Bureau of Land Management and U.S. Fish and Wildlife Service [USFWS]) or consisting of Native American reservation (USAF, 2014a). Land use controls (LUCs) (e.g., zoning) are generally only used within incorporated cities. Land uses on Native American reservations are determined by tribal decisions.

1 As shown in Table 3.4-3, most land use consists of herbaceous, shrub/scrub, cultivated  
2 crops, and evergreen forest, and is primarily associated with rangeland and agriculture.  
3 Overall, cattle ranching, dispersed recreation and hunting, and other resource-productive  
4 uses are the predominant land uses. Numerous special use areas occur under PRTC  
5 airspace, including all or portions of various national parks, national forests, state parks,  
6 and national monuments.

7 Land use under the airspace of the Lancer MOA is shown on Figure 3.4-6. Most land use  
8 consists of shrub/scrub, herbaceous, and cultivated crops. Overall, the land area under  
9 the Lancer MOA airspace is characterized by large, sparsely inhabited areas with  
10 scattered, isolated towns, small communities, and homesteads (USAF, 2000). About  
11 86 percent of the land is privately held rangeland used for grazing livestock, with the  
12 remainder overseen by a variety of state and federal entities. Land use categories and  
13 areas are presented in Table 3.4-3.

14 Land use under the airspace of the Brownwood MOA is shown on Figure 3.4-6. Land use  
15 categories and areas are presented in Table 3.4-3. Most land consists of shrub/scrub and  
16 herbaceous, which is generally used for rangeland and agriculture. Due to the close  
17 proximity, overall land use conditions are probably similar to that of the Lancer MOA,  
18 where land under the airspace is characterized by large, sparsely inhabited areas with  
19 scattered, isolated towns, small communities, and homesteads. Compared to the Lancer  
20 MOA, there are larger forested and developed (open space) land areas.

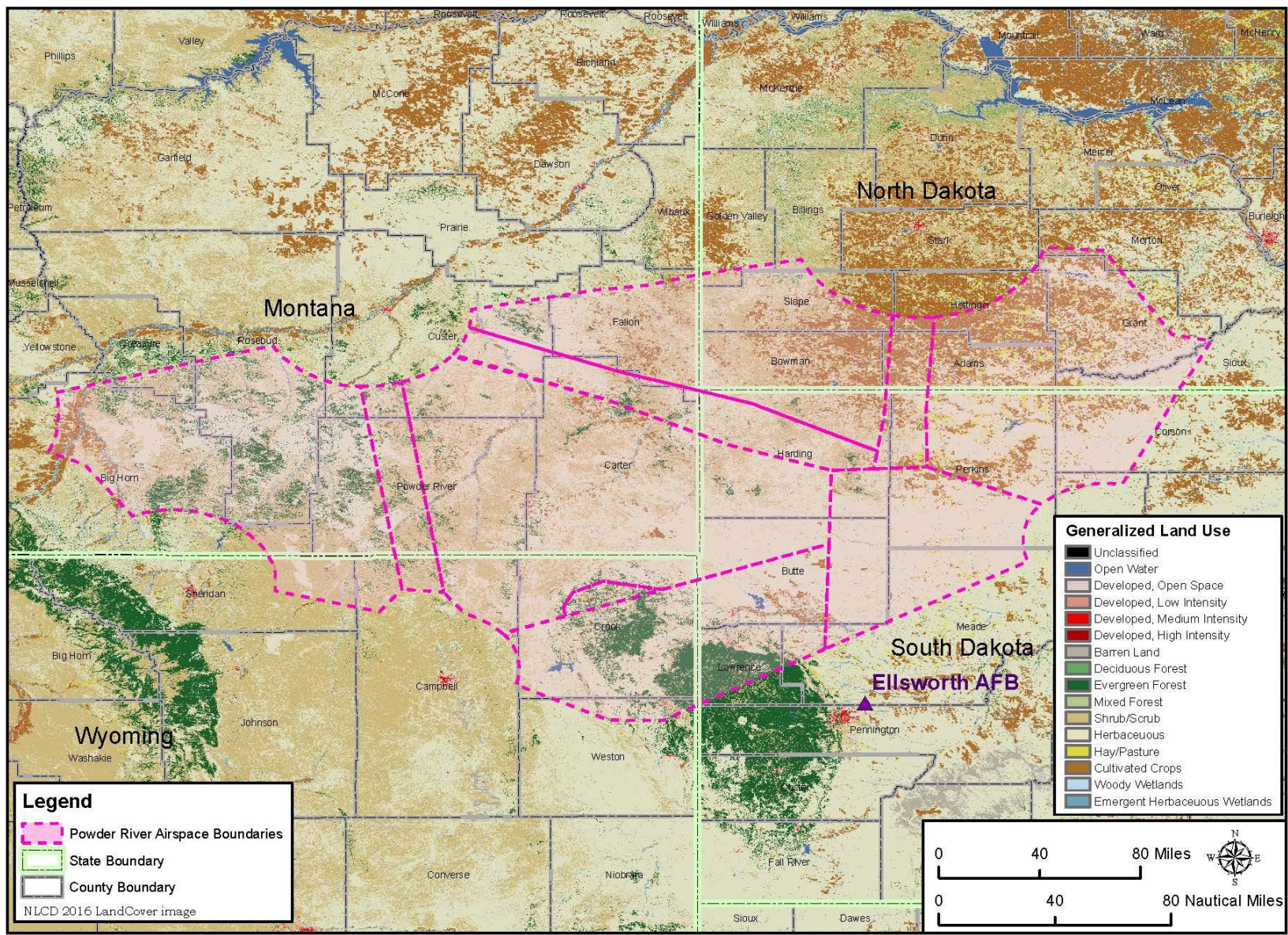
21 Land use under the airspace of the Pecos MOA is shown on Figure 3.4-6. Land use  
22 categories and areas are presented in Table 3.4-3. Nearly all land consists of herbaceous  
23 and shrub/scrub, which is generally used for rangeland and agriculture. About 78 percent  
24 of land under the airspace is privately held, with the remainder overseen by a variety of  
25 state, Native American, military, and other federal entities (USAF, 2006).

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### 26 **3.4.1.3 Analysis Methodology**

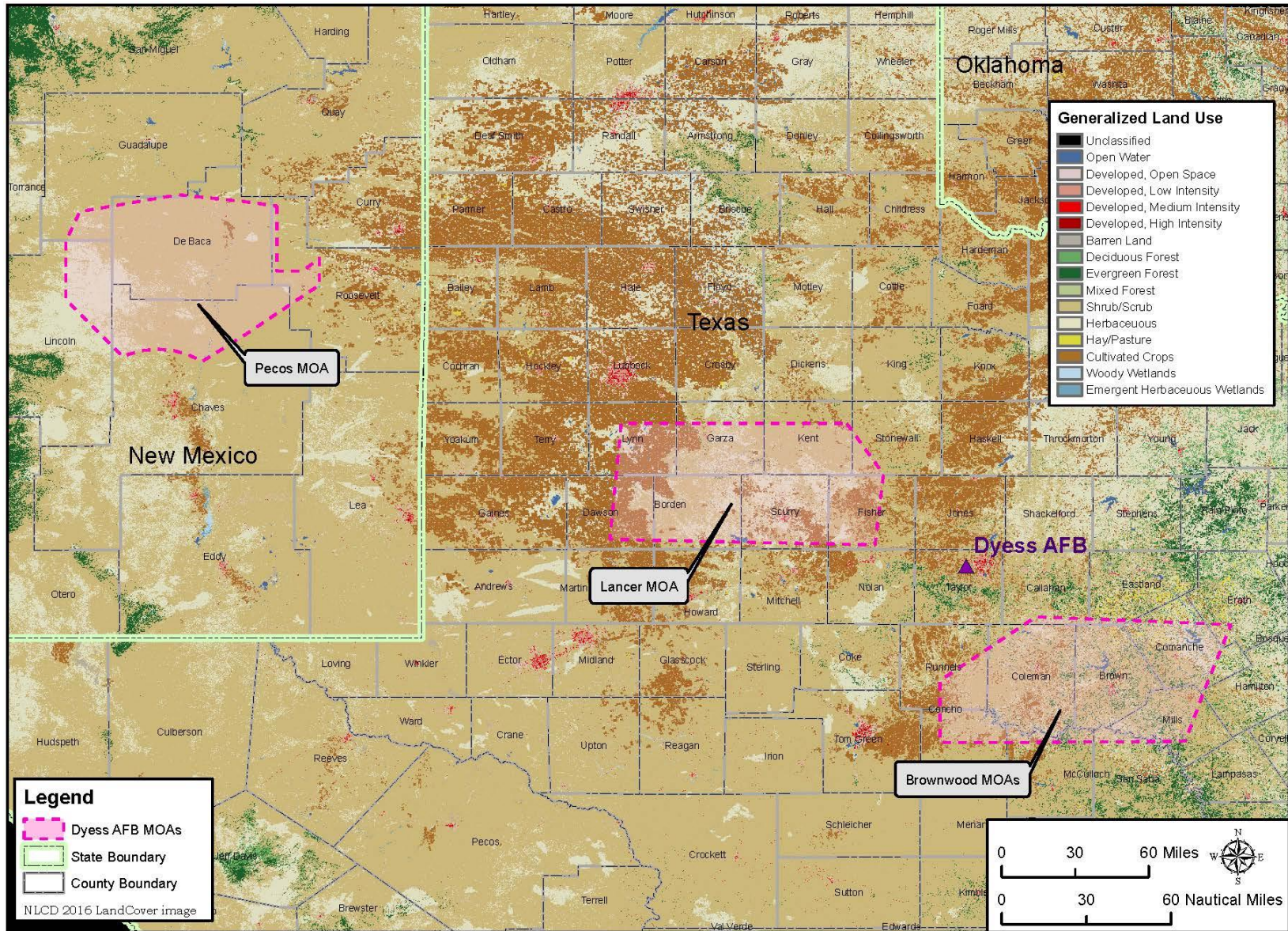
27 Potential on-base impacts at Dyess AFB and Ellsworth AFB were determined based on  
28 whether the Proposed Action would result in changes to land use compatibility due to  
29 facility and infrastructure placement or on-base noise levels. Potential impacts to off-base  
30 areas adjacent to Dyess AFB and Ellsworth AFB were determined based on whether  
31 changes in noise exposure or accident potential would affect land use compatibility.

32 As discussed in Section 3.4.1.2 (Land Use, Region of Influence), AICUZ studies prepared  
33 for Dyess AFB and Ellsworth AFB describe the off-base land use area affected by noise  
34 zones. However, for this EIS, noise modeling was conducted for current operations and  
35 the results are considered to represent baseline conditions under the No Action  
36 Alternative. Noise modeling was also conducted for the Proposed Action (i.e., the Dyess  
37 AFB Alternative and the Ellsworth AFB Alternative). Refer to Section 3.2 (Noise) for a  
38 detailed description of the modeling method.



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**Figure 3.4-5. Land Use Associated with the Powder River Training Complex**



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Figure 3.4-6. Land Use Associated with the Lancer, Brownwood, and Pecos MOAs



1 For analysis under the No Action Alternative, acreage associated with baseline noise  
 2 contours and accident zones is compared to acreages presented in the respective AICUZ  
 3 studies to determine the extent to which current operations affect on-base and off-base  
 4 land use relative to analyses conducted in 2015 (Dyess AFB) and 2008 (Ellsworth AFB).  
 5 Land use analysis for the Proposed Action compares potential changes to noise  
 6 exposure, APZs, and land use compatibility to baseline conditions presented under the  
 7 No Action Alternative.

8 There would be no development or associated potential changes to land use compatibility  
 9 at PRTC or the Lancer, Brownwood, or Pecos MOAs; therefore, impacts were evaluated  
 10 based on projected changes in noise levels under these airspace areas.

## 11 3.4.2 Land Use, Environmental Consequences

### 12 3.4.2.1 No Action Alternative Consequences

13 Under the No Action Alternative, the B-21 would not be beddown at either Dyess AFB or  
 14 Ellsworth AFB, and there would be no associated personnel changes; construction,  
 15 demolition, or renovation activities; or changes to existing noise and APZs resulting from  
 16 B-21 aircraft operations. On-base land use would continue to adhere to existing plans  
 17 and guidelines. Future development that is not associated with the B-21 beddown would  
 18 continue to be evaluated and implemented as appropriate. The IDPs prepared for each  
 19 base provide information on potential future development and construction projects. It is  
 20 anticipated that future development would occur in accordance with guidance in each  
 21 base's IDP, Joint Land Use Study (JLUS), AICUZ study, ICEMAP, and future land use  
 22 plan, as applicable, and adverse impacts would, therefore, not be expected. Note that  
 23 any future development projects would be subject to project-specific environmental  
 24 review under the EIAP. Potential impacts related to noise levels and APZs are discussed  
 25 in the following subsections.

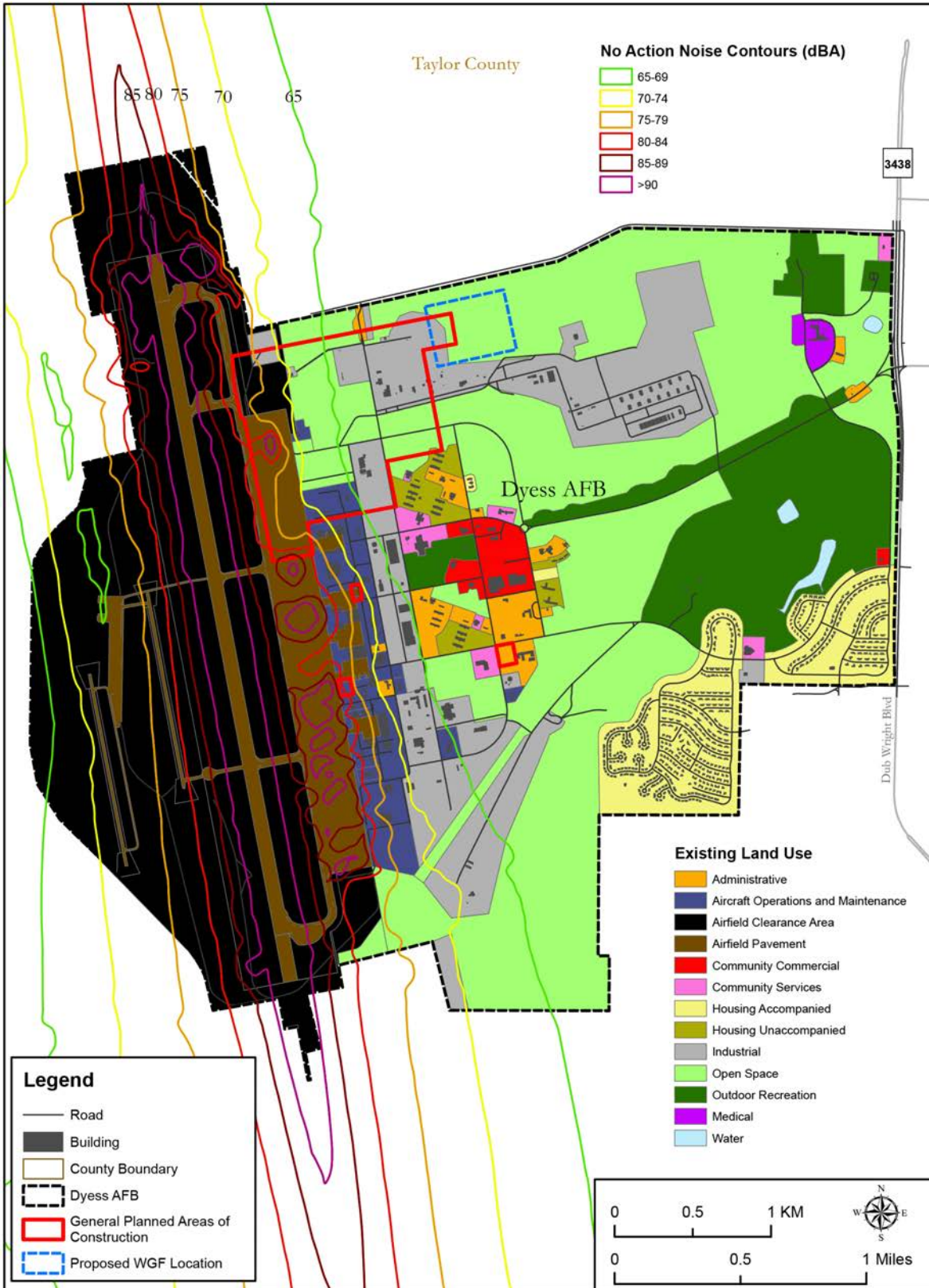
#### 26 3.4.2.1.1 No Action Alternative at Dyess AFB

27 On-base land use and noise contours under the No Action Alternative are shown on  
 28 Figure 3.4-7. The on-base land use area encompassed by each noise zone is shown in  
 29 Table 3.4-4.

30 **Table 3.4-4. On-Base Area Exposed to Noise Zones on Dyess AFB, No Action Alternative**

On-Base Land Use Category	On-Base Acres within Noise Zones (dB DNL)						Total
	65–69	70–74	75–79	80–84	85–89	>90	
Administrative	3	0.6	0	0	0	0	4
Airfield Operations/Maintenance	57	75	40	16	0.4	0	188
Airfield Pavement	2	68	72	79	87	147	455
Airfield Clearance Area	108	286	250	272	268	256	1,440
Industrial	151	41	1	0	0	0	192
Open Space	164	40	17	2	0	0	223
<b>Total</b>	<b>485</b>	<b>510</b>	<b>380</b>	<b>369</b>	<b>355</b>	<b>403</b>	<b>2,502</b>

> = greater than; AFB = Air Force Base; dB = decibel; DNL = day-night average sound level



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**Figure 3.4-7. On-Base Land Use and Noise Contours on Dyess AFB, No Action Alternative**

The on-base 65 dB DNL 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 dB DNL noise contour is almost entirely limited to the airfield and aircraft operations and maintenance functions along the flightline. The 80 dB DNL contour is mostly confined to the runway, ramps, and taxi areas, but also extends to some aircraft operations and maintenance functions as well. 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 dB DNL noise contour. There would be no significant impacts due to on-base noise levels under the No Action Alternative.

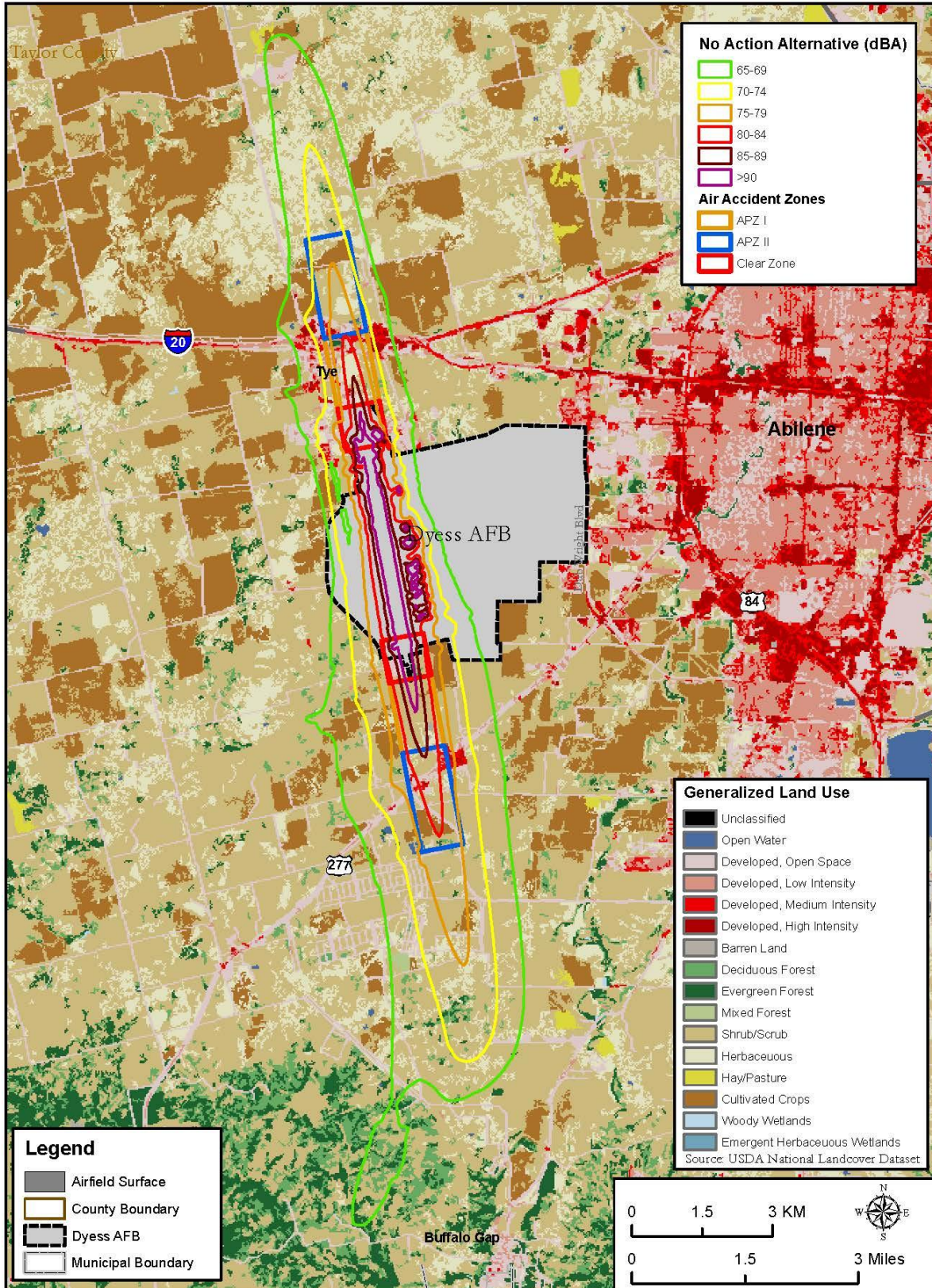
Off-base land use and noise contours under the No Action Alternative are shown on Figure 3.4-8. The off-base area encompassed by each noise zone is shown in Table 3.4-5. Approximately 96 percent of the land use associated with noise contours is undeveloped (e.g., shrub/scrub and herbaceous) or developed (open space). Exceptions include low and medium intensity developed areas in Tye and Caps that likely contain residential, commercial, and industrial functions.

**Table 3.4-5. 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 (dB DNL)						Total
	65-69	70-74	75-79	80-84	85-89	>90	
Open Water	9	10	7	0	0	0	26
Developed, Open Space	587	419	237	84	15	8	1,350
Developed, Low Intensity	83	75	30	11	1	0	200
Developed, Medium Intensity	72	64	53	9	0	0	198
Developed, High Intensity	34	23	6	4	0	0	67
Barren Land	0	0	0	11	2	0	13
Deciduous Forest	241	68	16	3	3	1	332
Evergreen Forest	107	28	10	1	1	0	147
Mixed Forest	29	0	0	0	0	0	29
Shrub/Scrub	3,656	1,883	801	266	112	33	6,751
Herbaceous	826	498	119	72	20	0	1,535
Cultivated Crops	407	273	152	15	1	0	848
Woody Wetlands	1	0	0	0	0	0	1
<b>Total</b>	<b>6,052</b>	<b>3,341</b>	<b>1,431</b>	<b>476</b>	<b>155</b>	<b>42</b>	<b>11,497</b>

> = greater than; AFB = Air Force Base; dB = decibel; DNL = day-night average sound level

The total off-base area shown in Table 3.4-5 is 2,488 acres more than the total area presented in the 2015 AICUZ study. However, the areas may not be directly comparable due to differences in 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 Landcover Dataset 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. There would be no significant impacts due to off-base noise levels under the No Action Alternative.



1  
2 **Figure 3.4-8. Off-Base Land Use, Noise Contours, and Accident Potential Zones Adjacent**  
3 **to Dyess AFB, No Action Alternative**

The off-base land use associated with APZs is shown on Figure 3.4-8, and the off-base area encompassed by each APZ is shown in Table 3.4-6. Most land use associated with APZs is undeveloped (e.g., shrub/scrub and herbaceous) and developed (open space). The total off-base area shown in Table 3.4-6 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. 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 2015 AICUZ, there is less area associated with developed land use (e.g., residential, commercial, industrial) under the No Action Alternative.

**Table 3.4-6. 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 Clear Zone and Accident Potential Zones			
	Clear Zone	Accident Potential Zone I	Accident Potential Zone II	Total
Barren Land	0	11	3	14
Cultivated Crops	1	8	132	141
Deciduous Forest	5	9	5	19
Developed, High Intensity	0	5	4	9
Developed, Low Intensity	0	30	27	57
Developed, Medium Intensity	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
<b>Total</b>	<b>112</b>	<b>688</b>	<b>965</b>	<b>1,765</b>

The area encompassed by noise zones and accident zones may be considered in the context of land use compatibility. As discussed in Section 3.4.1.2.1 (Land Use, Region of Influence, Dyess AFB) the 2015 AICUZ study identified the incompatible acreages shown in Table 3.4-1. 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 D, Land Use). Based on a comparison of the revised table and the noise and accident zone areas provided above, potentially incompatible use acreages under the No Action Alternative are shown in Table 3.4-7. A total of 207 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. 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 3.4-7. Notional Off-Base Incompatible Land Use Area near Dyess AFB, No Action Alternative**

Off-Base Land Use Category	Incompatible Area (Acres)			
	Noise (dB DNL)		Accident Potential	
	75-79	80+	CZ	APZ I
Developed, Open Space	0	103	0	0
Developed, Low Intensity	42	0	0	30
Developed, Medium Intensity	62	0	0	28
Developed, High Intensity	0	4	0	0
<b>Total</b>	<b>104</b>	<b>103</b>	<b>0</b>	<b>58</b>

+ = plus; AFB = Air Force Base; APZ = Accident Potential Zone; CZ = clear zone; dB = decibel; DNL = day-night average sound level

### Airspace and Range Utilization

Under the No Action Alternative, there are no known USAF initiatives that would result in ground-disturbing activities that would cause changes to land use under the PRTC, Lancer MOA, Brownwood MOA, or Pecos MOA airspace. Aircraft operations would continue at current levels because the B-21 MOB 1 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 aircraft operations at PRTC in the context of land use is provided in Section 4.8 of the 2014 PRTC EIS (USAF, 2014a). The USAF determined that operations would not restrict land use in PRTC, including placement of structures, and that potential impacts would only result from noise, safety issues, and the possibility of wildfires. Analysis of the preferred alternative in the 2014 PRTC EIS concluded that average noise levels would be below 65 dB DNL, which is the level associated with human annoyance, sleep disturbance, and interference with conversation (USAF, 2014a, pp. 4-110). Additionally, overflights have occurred under the PRTC and in other areas in the western United States for decades without disruption of ranching and other livestock land uses, indicating that military training and ranching are not inherently incompatible (USAF, 2014a, pp. 4-110).

Analysis of flight operations at the Lancer MOA is provided in Section 4.2 of the *Realistic Bomber Training Initiative EIS* (USAF, 2000). Analysis concluded that noise levels would be below 65 dB DNL (USAF, 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 (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 (pp. 4-69).

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. Under the No Action Alternative, average noise levels would be less than 65 dB 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* (USAF, 2006). Analysis concluded that noise levels would be below 65 dB DNL (USAF, 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 USAF 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).

Based on noise modeling of the current affected environment, noise levels under the airspace of the PRTC and MOAs are presented in Table 3.4-8.

**Table 3.4-8. Noise Levels Under PRTC and Military Operating Areas Airspace with the No Action Alternative**

Noise Level (dB DNL)			
Powder River Training Complex <sup>1</sup>	Lancer MOA	Brownwood MOA	Pecos MOA
<35 to 46.1	43.4	<35	55.9

< = less than; dB = decibel; DNL = day-night average sound level; MOA = Military Operating Area; PRTC = Powder River Training Complex

Notes:

1. Noise levels were determined for multiple areas within the Powder River Training Complex.

Refer to Section 3.2 (Noise) of this EIS for details of the modeling. With the exception of PRTC, noise levels are considered to be uniform across the operating areas. Noise levels below 65 dB DNL are not likely to cause significant public annoyance, including speech interference and sleep disturbance, or impact land use. Therefore, no adverse impacts to land use resulting from aircraft noise have been identified for PRTC, Lancer MOA, Brownwood MOA, and Pecos MOA, and there would be no significant impacts under the No Action Alternative at Dyess AFB.

#### **3.4.2.1.2 No Action Alternative at Ellsworth AFB**

On-base land use at Ellsworth AFB and noise contours under the No Action Alternative are shown on Figure 3.4-9. The on-base land use area encompassed by each noise zone is presented in Table 3.4-9.

**Table 3.4-9. On-Base Area Exposed to Noise Zones on Ellsworth AFB, No Action Alternative**

On-Base Land Use Category	On- Base Acres within Noise Zones (dB DNL)						Total
	65–69	70–74	75–79	80–84	85–89	>90	
Administrative	36	17	2	2	0	0	57
Airfield Operations/Maintenance	20	55	23	28	25	5	157
Airfield Clearance Area	0	0	55	255	185	141	636
Airfield Pavement	0.2	38	116	79	62	116	411
Community Commercial	11	1	0	0	0	0	12
Community Service	9	0	7	7	3	0	26
Housing – Accompanied	12	28	5	0	0	0	44
Industrial	144	109	52	12	6	7	330
Open Space	381	303	295	62	33	3	1,077
Outdoor Recreation	122	58	31	20	0	0	230
Water	10	2	7	1	0.2	0	21
<b>Total</b>	<b>744</b>	<b>611</b>	<b>593</b>	<b>466</b>	<b>314</b>	<b>271</b>	<b>2,999</b>

> = greater than; AFB = Air Force Base; dB = decibel; DNL = day-night average sound level

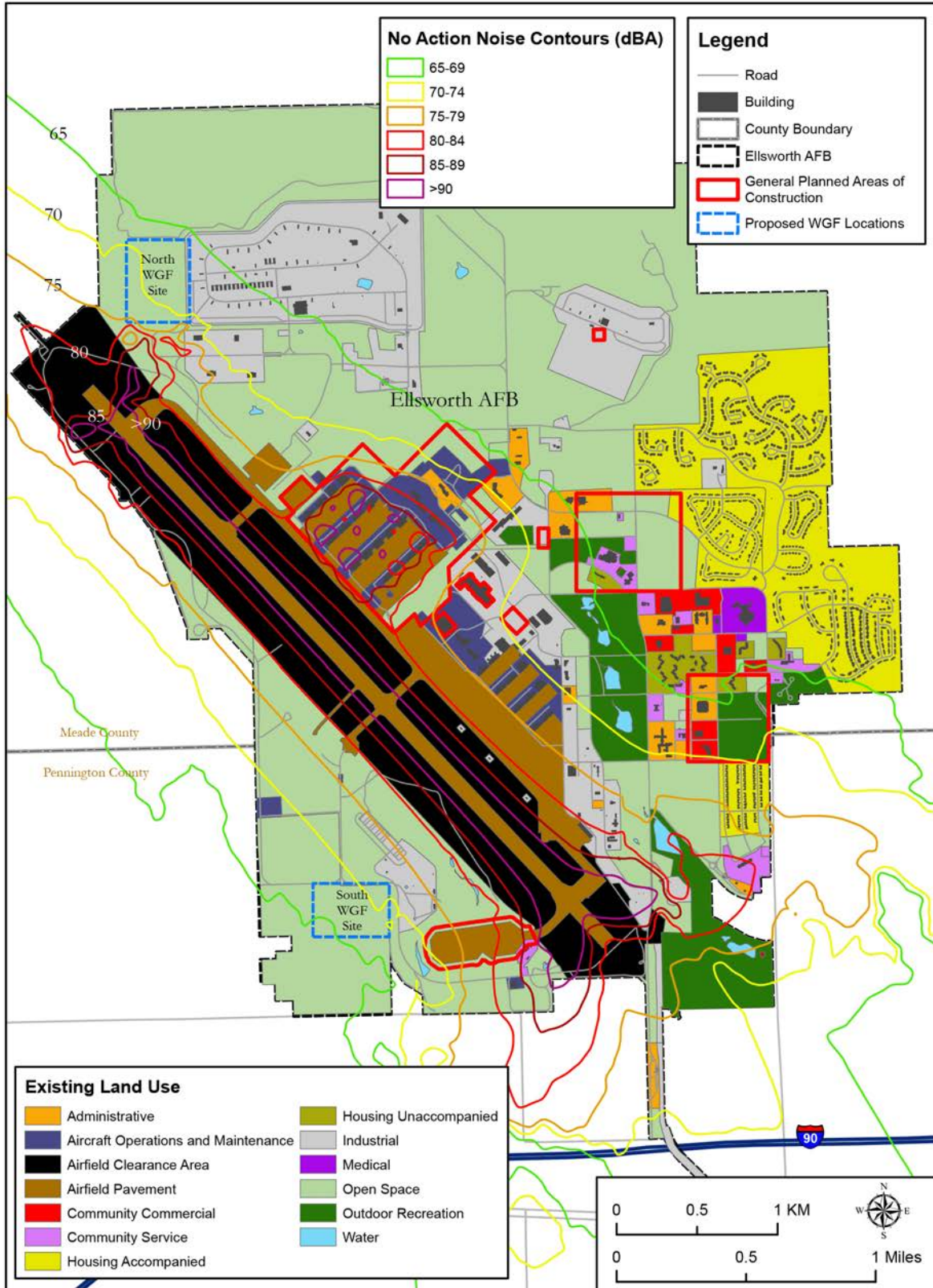
The on-base 65 dB DNL noise contour overlaps most land use categories, including airfield, aircraft operations and maintenance, industrial, open space, administrative, accompanied and unaccompanied housing, community service, and community commercial. These categories are considered to be either compatible or, in the case of housing (residential) and community service (public/quasi-public), conditionally compatible uses.

The 75 dB DNL noise contour is primarily limited to airfield and aircraft operations and maintenance functions, which are compatible, but also includes small areas of open space, recreation, administrative, community service, and accompanied housing functions. Some sensitive noise receptors (e.g., schools) are located within the 65 and 75 dB DNL noise contours. Noise levels of 75 to 79 dB DNL are compatible with open space, incompatible with residential and community service, and conditionally compatible with the remaining affected land uses.

The 80 dB DNL contour is mostly confined to the runway, ramps, and taxi areas, but also extends to some aircraft operations and maintenance, industrial, open space, recreation, administrative, and community service functions as well. The open space and (with attenuation measures) aircraft operations and maintenance areas are compatible uses. Noise attenuation is incorporated into building design in the flightline area. The remaining functions are either conditionally compatible (industrial) or incompatible use. There would be no significant impacts due to on-base noise levels under the No Action Alternative.

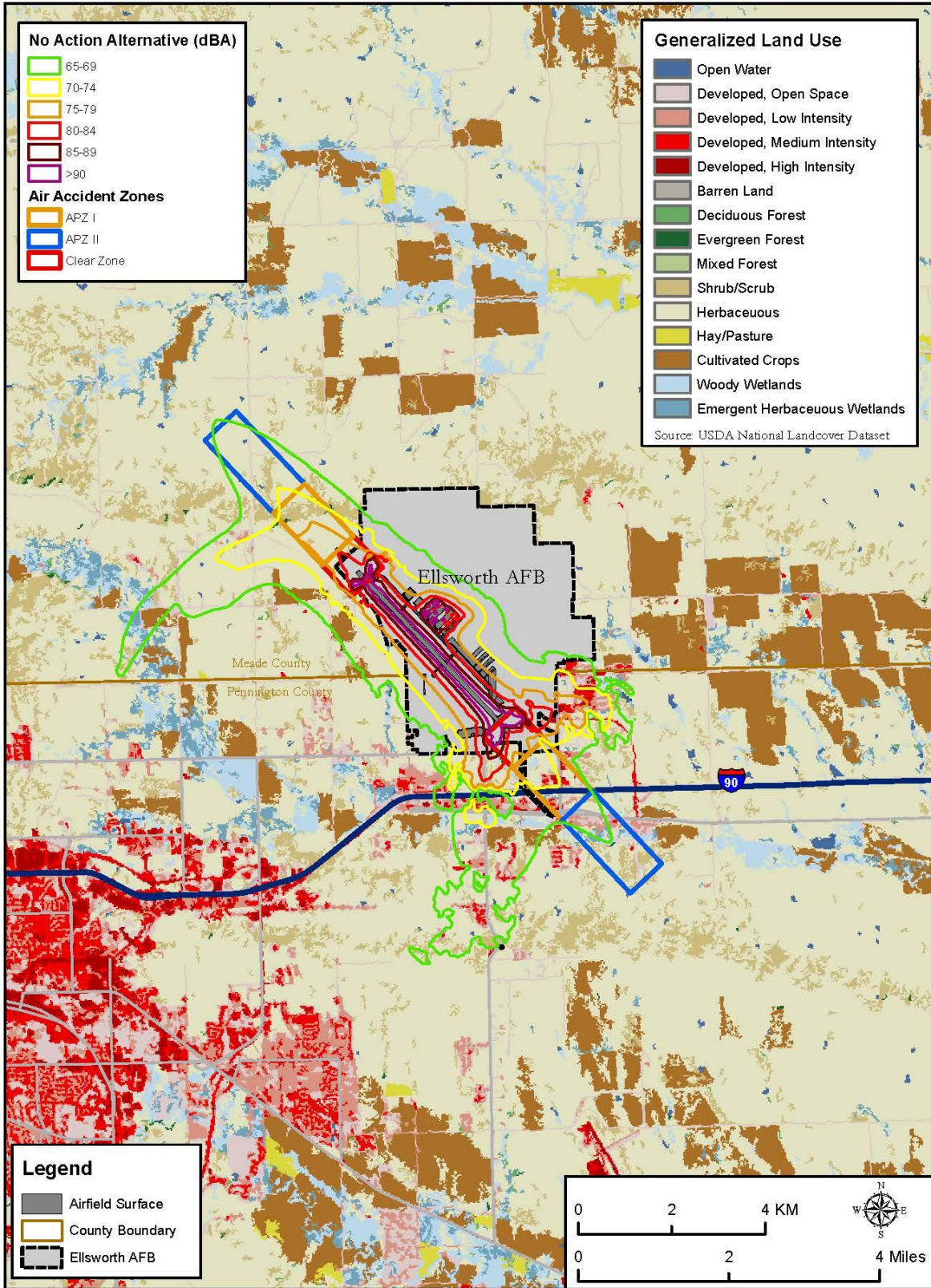
Off-base land use and noise contours under the No Action Alternative are shown on Figure 3.4-10. The off-base area encompassed by each noise zone is shown in Table 3.4-10. Approximately 88 percent of the land use associated with noise contours is undeveloped (e.g., shrub/scrub, herbaceous, and cultivated crops) or developed (open space). However, various areas of Box Elder contain low, medium, and high intensity developed land use.





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**Figure 3.4-9. On-Base Land Use and Noise Contours on Ellsworth AFB, No Action Alternative**



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**Figure 3.4-10. Off-Base Land Use, Noise Contours, and Accident Potential Zones Adjacent to Ellsworth AFB, No Action Alternative**

**Table 3.4-10. Off-Base Land Use Area Exposed to Noise Zones near Ellsworth AFB, No Action Alternative**

Off-Base Land Use Category	Off-Base Acres within Noise Zones (dB DNL)						Total
	65–69	70–74	75–79	80–84	85–89	>90	
Open Water	10	0	0	0	0	0	10
Developed, Open Space	407	97	24	11	0	0	539
Developed, Low Intensity	324	62	22	3	0	0	411
Developed, Medium Intensity	130	39	19	0	0	0	188
Developed, High Intensity	15	12	10	0	0	0	37
Barren Land	2	0	0	0	0	0	2
Evergreen Forest	2	6	0	1	0	0	9
Shrub/Scrub	367	89	18	13	5	1	493
Herbaceous	2,444	876	337	46	8	1	3,713
Cultivated Crops	240	8	0	0	0	0	247
Woody Wetlands	76	24	2	3	3	0	108
Emergent Herbaceous Wetlands	71	6	0	0	0	0	77
<b>Total</b>	<b>4,088</b>	<b>1,219</b>	<b>432</b>	<b>77</b>	<b>16</b>	<b>2</b>	<b>5,834</b>

> = greater than; dB = decibel; DNL = day-night average sound level

The total off-base area shown in Table 3.4-10 is substantially less than the total area presented in the 2008 Ellsworth AFB AICUZ study, which was 16,921 acres. 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. Off-base land use acreage in the 2008 AICUZ study was determined based on GIS datasets produced in 2001 and 2003, and for this EIS, the acreage for the No Action Alternative for Ellsworth AFB was calculated based on the 2016 USDA National Landcover Dataset. The percentage of land use categorized as open space/low density in the 2008 AICUZ study (86 percent) is very similar to the percentage categorized as undeveloped or developed (open space) under the No Action Alternative (89 percent), suggesting that there has been no substantial change in overall land use. There would be no significant impacts due to off-base noise levels under the No Action Alternative.

The off-base land use associated with APZs is shown on Figure 3.4-10, and the off-base area encompassed by each APZ is shown in Table 3.4-11. Most land use associated with APZs is undeveloped (e.g., shrub/scrub and herbaceous) and developed (open space and low intensity). The off-base area shown in Table 3.4-11 is the same as the area presented in the 2008 AICUZ study.

**Table 3.4-11. Off-Base Land Use Area Exposed to the Clear Zone and Accident Potential Zones at Ellsworth AFB, No Action Alternative**

Off-Base Land Use Category	Off-Base Acres within Clear Zone and Accident Potential Zones			Total
	Clear Zone	Accident Potential Zone I	Accident Potential Zone II	
Developed, High Intensity	0	10	0	10
Developed, Low Intensity	0	64	53	117
Developed, Medium Intensity	0	29	4	33
Developed, Open Space	1	36	84	120

**Table 3.4-11. Off-Base Land Use Area Exposed to the Clear Zone and Accident Potential Zones at Ellsworth AFB, No Action Alternative**

Off-Base Land Use Category	Off-Base Acres within Clear Zone and Accident Potential Zones			
	Clear Zone	Accident Potential Zone I	Accident Potential Zone II	Total
Emergent Herbaceous Wetlands	0	3	24	27
Evergreen Forest	0	3	2	5
Herbaceous	121	421	634	1,176
Open Water	0	0	3	3
Shrub/Scrub	8	88	138	234
Woody Wetlands	1	8	24	33
<b>Total</b>	<b>131</b>	<b>662</b>	<b>966</b>	<b>1,759</b>

1 The area encompassed by noise zones and accident zones may be considered in the  
 2 context of land use compatibility. Due to revised land use categories and definitions, the  
 3 compatibility table provided in the Ellsworth 2008 AICUZ study is not directly applicable  
 4 to analysis under the No Action Alternative. A revised compatibility table was developed  
 5 by comparing previous and updated land use definitions, as well as considering  
 6 compatibility guidance for commercial airports (Texas DOT, 2003; Landrum and Brown  
 7 Team, 2013) (see Appendix D, Land Use). Based on a comparison of the revised table  
 8 with the noise and accident zone areas provided above, potentially incompatible use  
 9 acreages are shown in Table 3.4-12. A total of 55 acres and 93 acres are associated with  
 10 noise and accident zones, respectively, while a total of 152 acres and 39 acres were  
 11 associated with these respective zones in the 2008 AICUZ study. Because of some  
 12 uncertainties associated with comparing land use definitions, as well as varying GIS  
 13 source data, differences in the acreages should be considered notional and for general  
 14 comparative purposes only. Although any incompatible land use is undesirable, the area  
 15 considered incompatible is small compared to the total land area associated with noise  
 16 and accident zones. Significant impacts would not be anticipated under the No Action  
 17 Alternative.

**Table 3.4-12. Notional Off-Base Incompatible Land Use Area near Ellsworth AFB, No Action Alternative**

Off-Base Land Use Category	Incompatible Area (Acres)			
	Noise (dB DNL)		Accident Potential	
	75-79	80+	CZ	APZ I
Developed, Open Space	0	11	0	0
Developed, Low Intensity	25	0	0	64
Developed, Medium Intensity	19	0	0	29
<b>Total</b>	<b>44</b>	<b>11</b>	<b>0</b>	<b>93</b>

+ = plus; APZ = Accident Potential Zone; CZ = clear zone; dB = decibel; DNL = day-night average sound level

## 20 Airspace and Range Utilization

21 Under the No Action Alternative at Ellsworth AFB, there are no known USAF initiatives  
 22 that would result in ground-disturbing activities under the PRTC airspace. Aircraft  
 23 operations would continue at current levels (2,778 annual operations) because the B-21  
 24 MOB 1 beddown would not occur.

1 Based on previous NEPA analysis, ongoing airspace use under current operational  
2 parameters would remain compatible with designated land uses. Analysis of aircraft  
3 operations at PRTC is provided in Section 4.8 of the 2014 PRTC EIS (USAF, 2014a). The  
4 USAF determined that operations would not restrict land use in PRTC, including  
5 placement of structures, and that potential impacts would only result from noise, safety  
6 issues, and the possibility of wildfires. Analysis of the preferred alternative concluded that  
7 average noise levels would be below 65 dB DNL, which is the level associated with human  
8 annoyance, sleep disturbance, and interference with conversation (USAF, 2014a,  
9 pp. 4-110). Additionally, overflights have occurred under the PRTC and in other areas in  
10 the western United States for decades without disruption of ranching and other livestock  
11 land uses, indicating that military training and ranching are not inherently incompatible  
12 (pp. 4-110). Therefore, baseline aircraft operations within PRTC would not have  
13 significant impacts to land use under the No Action Alternative at Ellsworth AFB.

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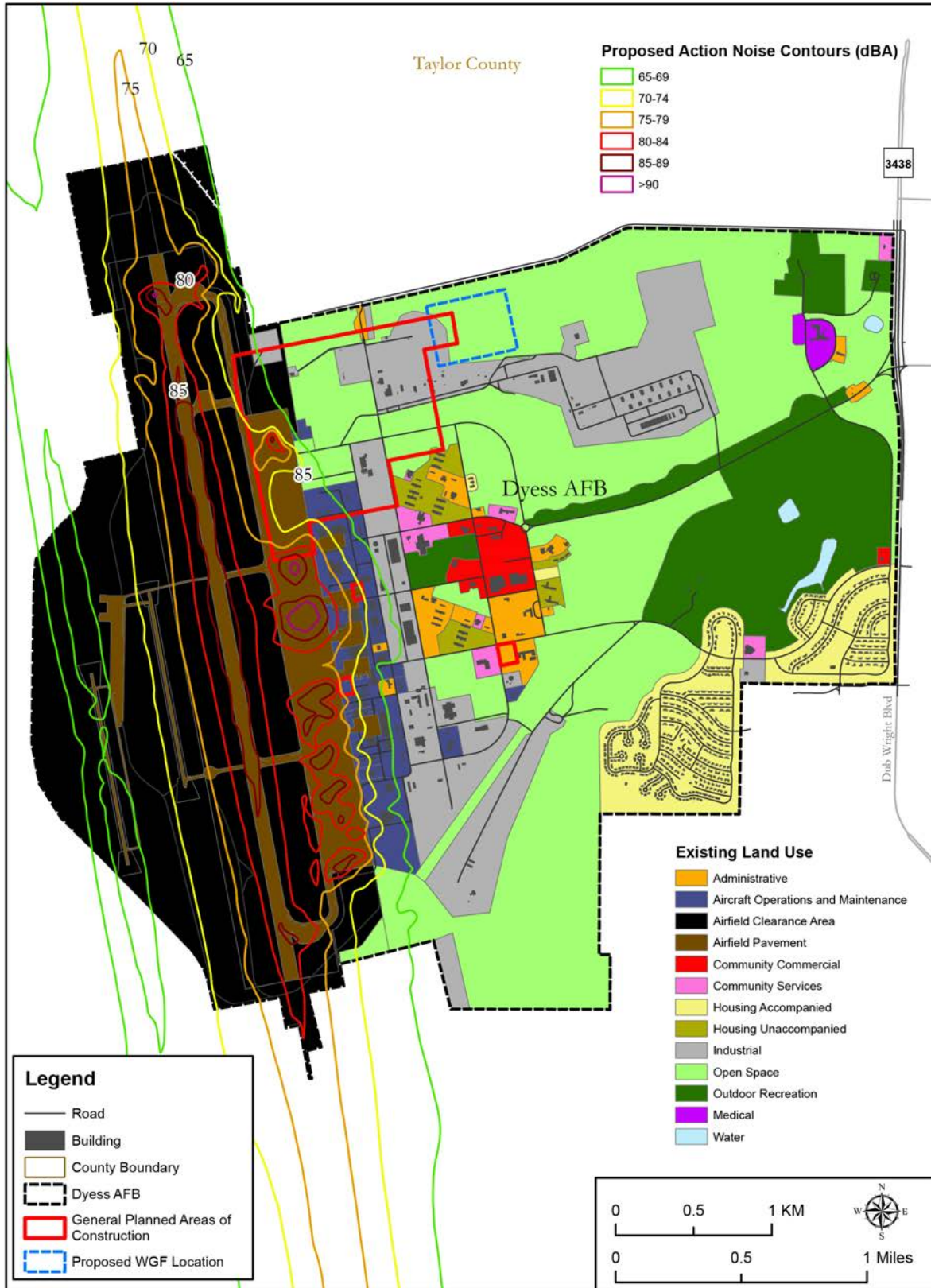
### 14 **3.4.2.2 Dyess AFB Alternative**

#### 15 **3.4.2.2.1 Personnel**

16 Under the Dyess AFB Alternative, there would be a net increase of 3,953 personnel,  
17 including dependents, and a resulting increase in demand for on-base and off-base  
18 housing and services. The increase in personnel could be accommodated by existing  
19 supply to some extent. However, some development could potentially occur. Any on-  
20 base development resulting from the beddown (e.g., community services, community  
21 commercial land use) would occur in accordance with the established tiering system and  
22 with guidance in the base's IDP, JLUS, AICUZ study, ICEMAP, and future land use plan.  
23 Incorporation of the installation's development strategies would prevent incompatible land  
24 uses. Potential increased demand for on-base housing is discussed in Section 3.5  
25 (Socioeconomics). It is expected that any adjacent off-base development associated with  
26 the beddown would occur with consideration of aircraft noise, APZs, height restrictions,  
27 and corresponding land use compatibility. The City of Abilene's land use and  
28 development strategies include establishment of land use standards near Dyess AFB  
29 (Dyess AFB, 2015). In addition, the City of Tye recognizes the noise zones and APZs of  
30 Dyess AFB as a development constraint. There would be no significant impacts due to a  
31 personnel increase under the Dyess AFB Alternative.

#### 32 **3.4.2.2.2 Airfield Operations**

33 On-base land use and noise contours under the Dyess AFB Alternative are shown on  
34 Figure 3.4-11. The on-base land use area encompassed by each noise zone is shown in  
35 Table 3.4-13. Compared to the No Action Alternative, the total overall on-base area  
36 encompassed by noise levels greater than 65 dB DNL would decrease by 561 acres  
37 (Table 3.4-14). All on-base land use would be compatible with the associated noise  
38 levels. Sensitive noise receptors would be located outside the 65 dB DNL noise contour.



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**Figure 3.4-11. On-Base Land Use and Noise Contours on Dyess AFB, Dyess AFB Alternative**

**Table 3.4-13. On-Base Area Exposed to Noise Zones at Dyess AFB, Dyess AFB Alternative**

On-Base Land Use Category	On-Base Acres within Noise Zones (dB DNL)						Total
	65–69	70–74	75–79	80–84	85–89	>90	
Administrative	2	0	0	0	0	0	2
Airfield Operations/Maintenance	90	39	11	3	0.1	0	143
Airfield Pavement	68	64	96	123	90	7	448
Airfield Clearance Area	389	359	365	170	13	0.07	1,296
Industrial	12	0	0	0	0	0	12
Open Space	36	4	0	0	0	0	40
<b>Total</b>	<b>597</b>	<b>466</b>	<b>472</b>	<b>296</b>	<b>103</b>	<b>7</b>	<b>1,941</b>

> = greater than; AFB = Air Force Base; dB = decibel; DNL = day-night average sound level

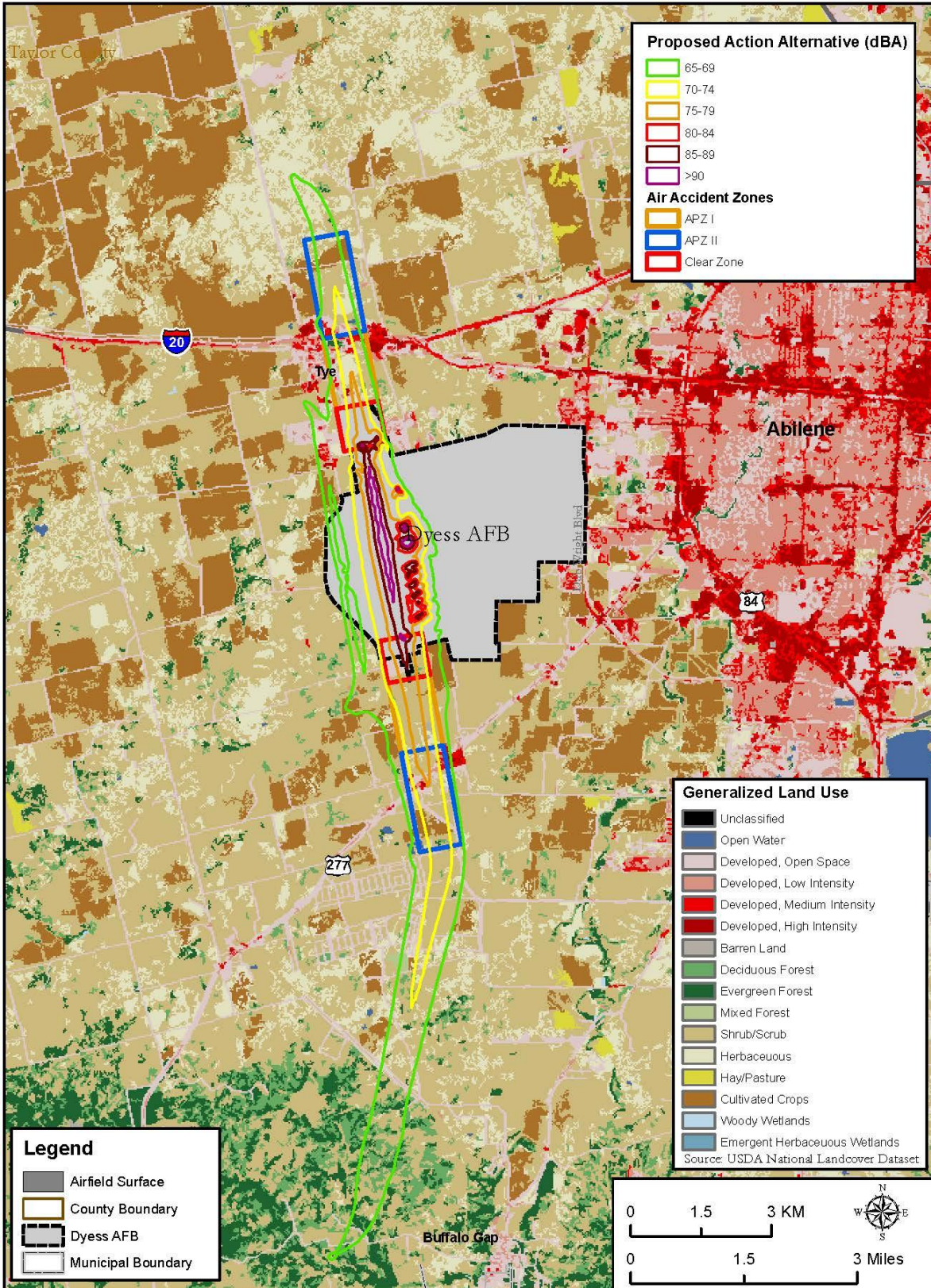
**Table 3.4-14. Comparison of Total On-Base Area Exposed to Noise Zones at Dyess AFB Under the No Action Alternative and the Dyess AFB Alternative**

Noise Zones (dB DNL)	On-Base Acres within Noise Zones		
	No Action Alternative	Dyess AFB Alternative	Change from No Action
65–69	485	597	112
70–74	510	466	-44
75–79	380	472	92
80–84	369	296	-73
85–89	355	103	-252
>90	403	7	-396
<b>Total</b>	<b>2,502</b>	<b>1,941</b>	<b>-561</b>

> = greater than; - = minus; AFB = Air Force Base; dB = decibel; DNL = day-night average sound level

Off-base land use and noise contours under the Dyess AFB Alternative are shown on Figure 3.4-12. The off-base land use area encompassed by each noise zone is shown in Table 3.4-15. Potentially incompatible land use area is shown in Table 3.4-17. 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 dB DNL would decrease by 7,140 acres (Table 3.4-16). There would be no off-base area, including any portion of Tye or Caps, exposed to noise levels above 80 dB DNL. The area of these communities encompassed by noise levels between 65 and 79 dB DNL would decrease substantially to just 1.4 acres (Table 3.4-17). The total area of off-base land use notionally considered incompatible with noise levels would decrease to 59.4 acres, resulting in an approximate 206-acre reduction from the No Action Alternative (Table 3.4-18). 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.



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**Figure 3.4-12. Off-Base Land Use, Noise Contours, and Accident Potential Zones Adjacent to Dyess AFB, Dyess AFB Alternative**



**Table 3.4-15. 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 (dB DNL)						Total
	65–69	70–74	75–79	80–84	85–89	>90	
Open Water	15	0	0	0	0	0	15
Developed, Open Space	403	156	25	0	0	0	584
Developed, Low Intensity	47	22	1	0	0	0	70
Developed, Medium Intensity	71	20	0.4	0	0	0	91
Developed, High Intensity	12	4	0	0	0	0	16
Barren Land	0	12	2	0	0	0	14
Deciduous Forest	213	14	3	0	0	0	230
Evergreen Forest	119	6	0.02	0	0	0	125
Mixed Forest	15	0	0	0	0	0	15
Shrub/Scrub	1,677	543	151	0	0	0	2,371
Herbaceous	390	109	24	0	0	0	523
Cultivated Crops	262	40	1	0	0	0	303
<b>Total</b>	<b>3,224</b>	<b>926</b>	<b>207</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4,357</b>

> = greater than; AFB = Air Force Base; dB = decibel; DNL = day-night average sound level

**Table 3.4-16. 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 (dB DNL)	Off-Base Acres within Noise Zones		
	No Action Alternative	Dyess AFB Alternative	Change from No Action
65–69	6,052	3,224	-2,828
70–74	3,341	926	-2,415
75–79	1,431	207	-1,224
80–84	476	0	-476
85–89	155	0	-155
>90	42	0	-42
<b>Total</b>	<b>11,497</b>	<b>4,357</b>	<b>-7,140</b>

> = greater than; - = minus; AFB = Air Force Base; dB = decibel; DNL = day-night average sound level

**Table 3.4-17. Notional Off-Base Incompatible Land Use Area with the Dyess AFB Alternative**

Off-Base Land Use Category	Off-Base Incompatible Area (Acres)			
	Noise (dB DNL)		Accident Potential	
	75–79	80+	CZ	APZ I
Developed, Open Space	0	0	0	0
Developed, Low Intensity	1	0	0	30
Developed, Medium Intensity	0.4	0	0	28
Developed, High Intensity	0	0	0	0
<b>Total</b>	<b>1.4</b>	<b>0</b>	<b>0</b>	<b>58</b>

+ = plus; AFB = Air Force Base; APZ = Accident Potential Zone; CZ = clear zone; dB = decibel; DNL = day-night average sound level

**Table 3.4-18. 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 dB DNL Noise Zone	104	1.4	-102.6
80+ dB DNL Noise Zone	103	0	-103
Clear Zone	0	0	0
Accident Potential Zone I	58	58	0
<b>Total</b>	<b>265</b>	<b>59.4</b>	<b>-205.6</b>

-- = minus; + = plus; AFB = Air Force Base; dB = decibel; DNL = day-night average sound level

### 3.4.2.2.3 Airspace and Range Utilization

There are no known USAF initiatives that would result in ground-disturbing activities that would affect land use under the PRTC, Lancer MOA, Brownwood MOA, or Pecos MOA airspace. 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 2014 PRTC EIS indicate there are no adverse impacts to land use due to aircraft operations in the Lancer MOA, Pecos MOA, and PRTC airspace (USAF, 2006; USAF, 2014a; USAF, 2000). Additionally, land use under the Brownwood MOA 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 3.2 (Noise), noise levels under the airspace of the PRTC and the Lancer, Brownwood, and Pecos MOAs (Table 3.4-19) would either decrease or remain the same relative to the No Action Alternative as discussed in Section 3.2.2.1.1 (Noise, No Action at Dyess AFB). Noise levels in all operating areas would be well below 65 dB DNL and would not adversely affect land use. There would be no significant impacts due to airspace and range utilization under the Dyess AFB Alternative.

**Table 3.4-19. Noise Levels Under PRTC and Military Operating Areas Airspace with the Dyess AFB Alternative**

Powder River Training Complex <sup>1</sup>	Noise Level (dB DNL)		
	Lancer MOA	Brownwood MOA	Pecos MOA
<35 to 46.1	<35	<35	36.9

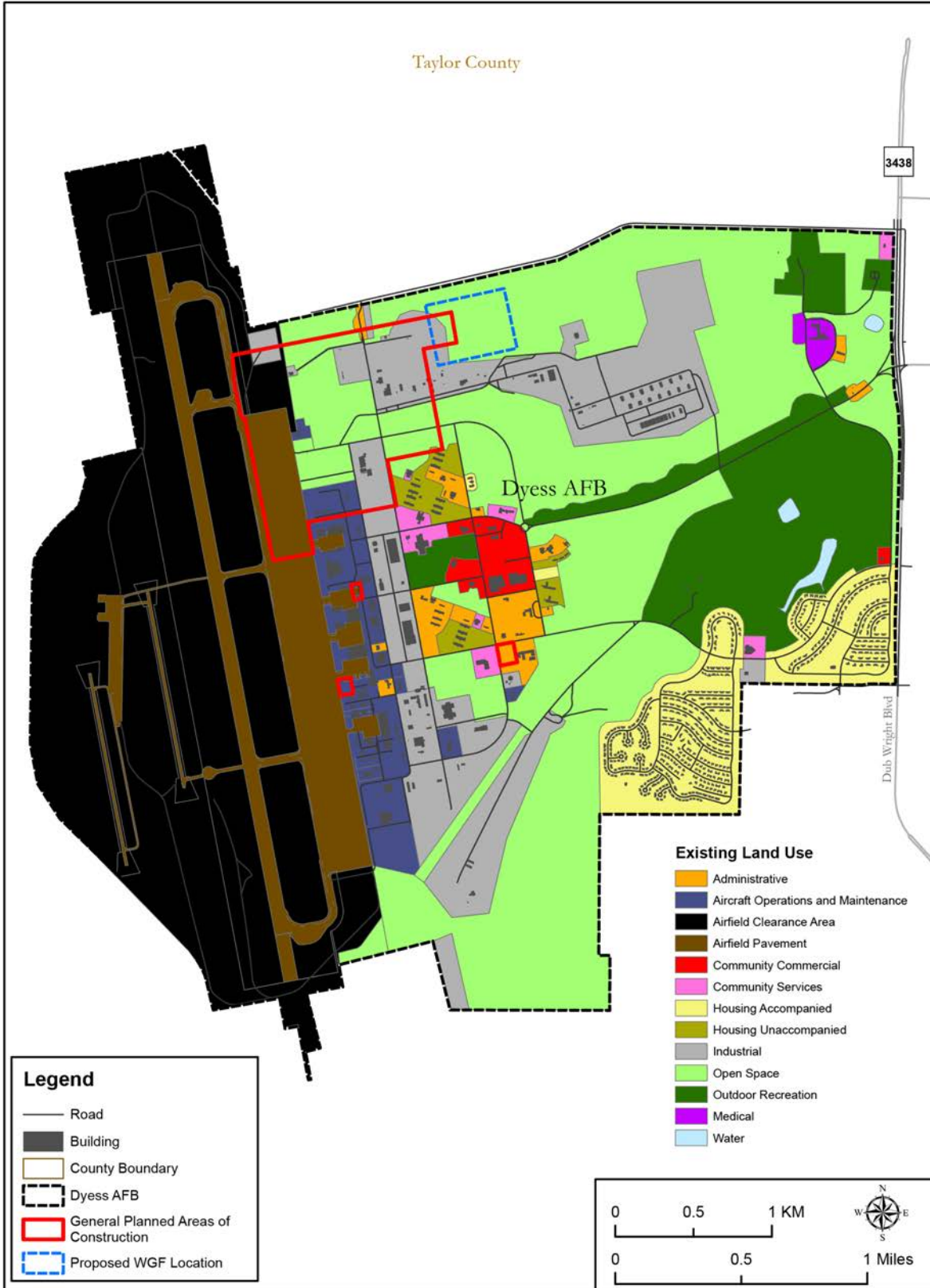
< = less than; AFB = Air Force Base; dB = decibel; DNL = day-night average sound level; MOA = Military Operating Area; PRTC = Powder River Training Complex

Notes:

1. Noise levels were determined for multiple areas within the Powder River Training Complex.

### 3.4.2.2.4 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 3.4-13). 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 as 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.



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**Figure 3.4-13. Land Use at the Facilities and Infrastructure Projects Locations for the Dyess AFB Alternative**

### 1 **3.4.2.2.5 Weapons Generation Facility**

2 Land use associated with the WGF consists of industrial and open space (Figure 3.4-13).  
3 The site is located in an area of generally compatible land use, near the existing munitions  
4 storage compound and explosives cargo area, and slightly overlapping the munitions  
5 storage quantity-distance (QD) safety arc. It is expected that WGF placement would be  
6 integrated with existing safety arcs, and that incompatible functions, if present, would be  
7 relocated outside of the WGF safety arc. No significant impacts to land use would be  
8 anticipated.

### 9 **3.4.2.2.6 Proposed Resource-Specific Mitigations and Management Actions to** 10 **Reduce the Potential for Environmental Impacts**

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

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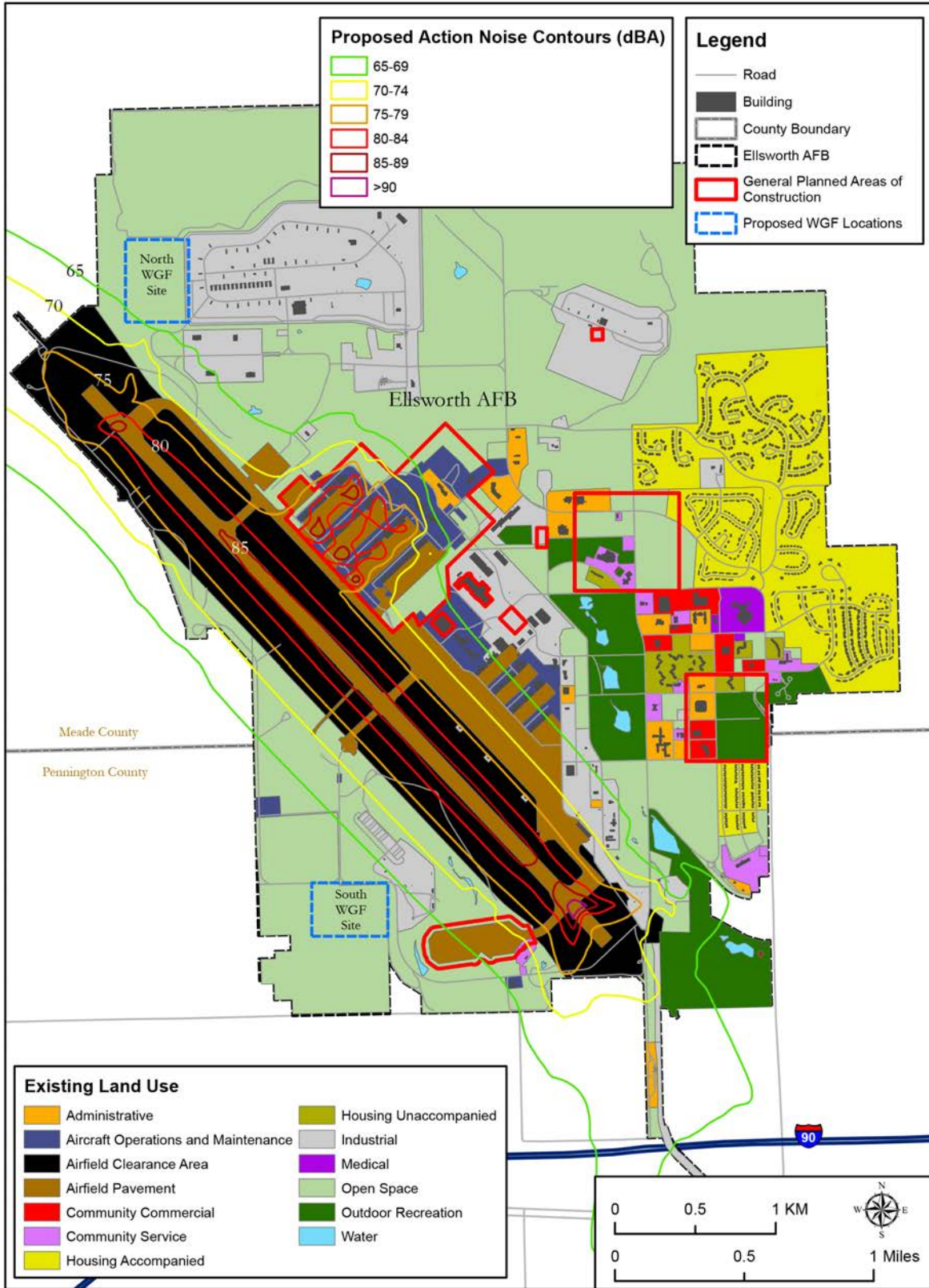
## 12 **3.4.2.3 Ellsworth AFB Alternative**

### 13 **3.4.2.3.1 Personnel**

14 Under the Proposed Action, there would be a net increase of 3,147 personnel at Ellsworth  
15 AFB, including dependents. Increased population would result in increased demand for  
16 on-base and off-base housing and services and could result in some new development.  
17 Any on-base development resulting from the beddown would occur in accordance with  
18 guidance in the base's IDP, JLUS, and AICUZ study, and incompatible land use would  
19 not be expected. Potential increased demand for on-base housing is discussed in Section  
20 3.5 (Socioeconomics). Adjacent off-base development associated with the beddown  
21 would likely occur with consideration of aircraft noise, APZs, height restrictions, and  
22 corresponding land use compatibility. The Box Elder Planning and Zoning Commission,  
23 the Pennington County Board of County Commissioners, and the Rapid City Planning  
24 Commission have enacted zoning ordinances that regulate land use adjacent to Ellsworth  
25 AFB. There would be no significant impacts due to a personnel increase under the  
26 Ellsworth AFB Alternative.

### 27 **3.4.2.3.2 Airfield Operations**

28 On-base land use and noise contours under the Ellsworth AFB Alternative are shown on  
29 Figure 3.4-14. The on-base land use area encompassed by each noise zone is shown in  
30 Table 3.4-20. Compared to the No Action Alternative, the total overall on-base area  
31 encompassed by noise levels greater than 65 dB DNL would decrease by 1,274 acres  
32 (Table 3.4-21). The 65 dB DNL noise contour would be limited to mostly airfield pavement,  
33 aircraft operations and maintenance, industrial, and open space uses. The 75 dB contour  
34 would not extend to any residential, community service, or administrative use areas.  
35 Sensitive noise receptors would be located outside the 65 dB DNL noise contour. All on-  
36 base land use would be compatible with the associated noise levels.



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**Figure 3.4-14. On-Base Land Use and Noise Contours on Ellsworth AFB, Ellsworth AFB Alternative**

1 **Table 3.4-20. On-Base Area Exposed to Noise Zones at Ellsworth AFB,**  
 2 **Ellsworth AFB Alternative**

On-Base Land Use Category	On-Base Acres within Noise Zones (dB DNL)						Total
	65-69	70-74	75-79	80-84	85-89	>90	
Administrative	8	0	0	0	0	0	8
Airfield Operations/Maintenance	46	19	26	9	0.1	0	100
Airfield Clearance Area	12	169	285	153	17	0.2	636
Airfield Pavement	83	118	55	61	73	1	391
Community Service	3	1	0	0	0	0	4
Industrial	79	17	3	0	0	0	99
Open Space	284	152	5	0	0	0	441
Outdoor Recreation	45	0	0	0	0	0	45
Water	0.3	1	0	0	0	0	1
<b>Total</b>	<b>560</b>	<b>477</b>	<b>374</b>	<b>223</b>	<b>90</b>	<b>1</b>	<b>1,725</b>

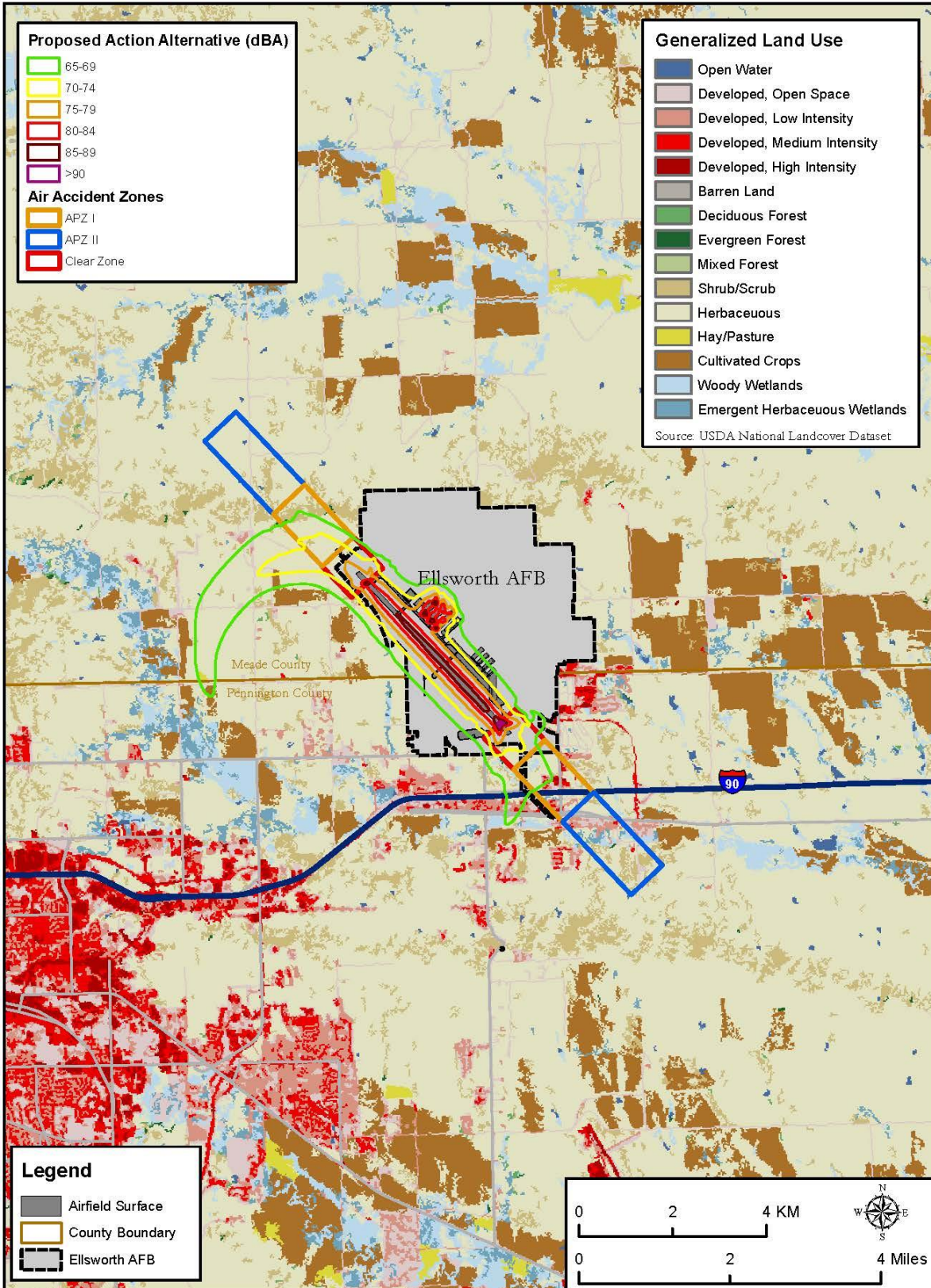
> = greater than; AFB = Air Force Base; dB = decibel; DNL = day-night average sound level

3 **Table 3.4-21. Comparison of Total On-Base Area Exposed to Noise Zones at Ellsworth**  
 4 **AFB Under the No Action Alternative and Ellsworth AFB Alternative**

Noise Zones (dB DNL)	On-Base Acres within Noise Zones			Change from No Action
	No Action Alternative	Ellsworth AFB Alternative		
65-69	744	560		-184
70-74	611	477		-134
75-79	593	374		-219
80-84	466	223		-243
85-89	314	90		-224
>90	271	1		-270
<b>Total</b>	<b>2,999</b>	<b>1,725</b>		<b>-1,274</b>

> = greater than; - = minus; AFB = Air Force Base; dB = decibel; DNL = day-night average sound level

5 Off-base land use and noise contours under the Ellsworth AFB Alternative are shown on  
 6 Figure 3.4-15. The off-base land use area encompassed by each noise zone is shown in  
 7 Table 3.4-22. Potentially incompatible off-base land use area is shown in Table 3.4-24.  
 8 Approximately 98 percent of off-base land use associated with the noise zones is  
 9 undeveloped (e.g., herbaceous and shrub/scrub) or developed/open space. Compared  
 10 to the No Action Alternative, the total off-base land area encompassed by noise levels  
 11 greater than 65 dB DNL would decrease by 4,224 acres (Table 3.4-23). There would be  
 12 no off-base area exposed to noise levels above 75 dB DNL. Very little area of Box Elder  
 13 would be exposed to noise levels greater than 65 dB DNL. There would be no off-base  
 14 land use area notionally considered incompatible with noise levels under the Ellsworth  
 15 AFB Alternative, which would eliminate all off-base incompatible land uses from noise  
 16 identified under the No Action Alternative (Table 3.4-25). However, there would be no  
 17 change in the area of incompatible use associated with accident zones because these  
 18 areas have fixed dimensions.



**Figure 3.4-15. Off-Base Land Use, Noise Contours, and Accident Potential Zones Adjacent to Ellsworth AFB, Ellsworth AFB Alternative**

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1 Due to the overall reduction in on-base and off-base noise levels, there would be no  
 2 adverse impacts to off-base land use resulting from the B-21 beddown under the  
 3 Ellsworth AFB Alternative. There would potentially be beneficial impacts in the context of  
 4 off-base land use compatibility in developed portions of Box Elder and other adjacent  
 5 communities.

6 **Table 3.4-22. Off-Base Land Use Area Exposed to Noise Zones Under the**  
 7 **Ellsworth AFB Alternative**

Off-Base Land Use Category	Off-Base Acres within Noise Zones (dB DNL)						Total
	65-69	70-74	75-79	80-84	85-89	>90	
Open Water	0.1	0	0	0	0	0	0.1
Developed, Open Space	68	7	0	0	0	0	75
Developed, Low Intensity	28	0	0	0	0	0	28
Developed, Medium Intensity	9	1	0	0	0	0	10
Evergreen Forest	2	0	0	0	0	0	2
Shrub/Scrub	49	10	0	0	0	0	59
Herbaceous	1,096	285	0	0	0	0	1,381
Pasture/Hay	9	0	0	0	0	0	9
Cultivated Crops	20	3	0	0	0	0	23
Woody Wetlands	19	2	0	0	0	0	21
Emergent Herbaceous Wetlands	2	0	0	0	0	0	2
<b>Total</b>	<b>1,302</b>	<b>308</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1,610</b>

> = greater than; AFB = Air Force Base; dB = decibel; DNL = day-night average sound level

8 **Table 3.4-23. Comparison of Total Off-Base Area Adjacent to Ellsworth AFB Exposed to**  
 9 **Noise Zones Under the No Action Alternative and the Ellsworth AFB Alternative**

Noise Zones (dB DNL)	Off-Base Acres within Noise Zones		
	No Action Alternative	Ellsworth AFB Alternative	Change from No Action
65-69	4,088	1,302	-2,786
70-74	1,219	308	-911
75-79	432	0	-432
80-84	77	0	-77
85-89	16	0	-16
>90	2	0	-2
<b>Total</b>	<b>5,834</b>	<b>1,610</b>	<b>-4,224</b>

> = greater than; - = minus; AFB = Air Force Base; dB = decibel; DNL = day-night average sound level

10 **Table 3.4-24. Notional Off-Base Incompatible Land Use Area with the**  
 11 **Ellsworth AFB Alternative**

Off-Base Land Use Category	Off-Base Incompatible Area (Acres)			
	Noise (dB DNL)		Accident Potential	
	75-79	80+	CZ	APZ I
Developed, Open Space	0	0	0	0
Developed, Low Intensity	0	0	0	64
Developed, Medium Intensity	0	0	0	29
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>93</b>

+ = plus; AFB = Air Force Base; APZ = Accident Potential Zone; CZ = clear zone; dB = decibel; DNL = day-night average sound level



**Table 3.4-25. Comparison of Total Off-Base Incompatible Land Use Area Under the No Action Alternative and Ellsworth AFB Alternative**

Incompatible Land Use Effector	Off-Base Incompatible Area (Acres)		
	No Action Alternative	Ellsworth AFB Alternative	Change from No Action
75–79 dB DNL Noise Zone	44	0	-44
80+ dB DNL Noise Zone	11	0	-11
Clear Zone	0	0	0
Accident Potential Zone I	93	93	0
<b>Total</b>	<b>148</b>	<b>93</b>	<b>-55</b>

- = minus; + = plus; AFB = Air Force Base; dB = decibel; DNL = day-night average sound level

### 3.4.2.3.3 Airspace and Range Utilization

Under the Ellsworth AFB Alternative, there are no known USAF initiatives that would result in ground-disturbing activities under PRTC airspace. As described for the No Action Alternative, the 2014 PRTC EIS indicates there are no adverse impacts to land use within PRTC due to aircraft operations under baseline conditions (USAF, 2014a). Based on the results of modeling described in Section 3.2 (Noise) of this B-21 EIS, noise levels under the airspace of PRTC would remain unchanged relative to the No Action Alternative, ranging from less than 35 to 46.1 dB DNL. The Lancer, Brownwood, and Pecos MOAs would not be utilized under the Ellsworth AFB Alternative. There would be no significant impacts due to airspace and range utilization under the Ellsworth AFB Alternative.

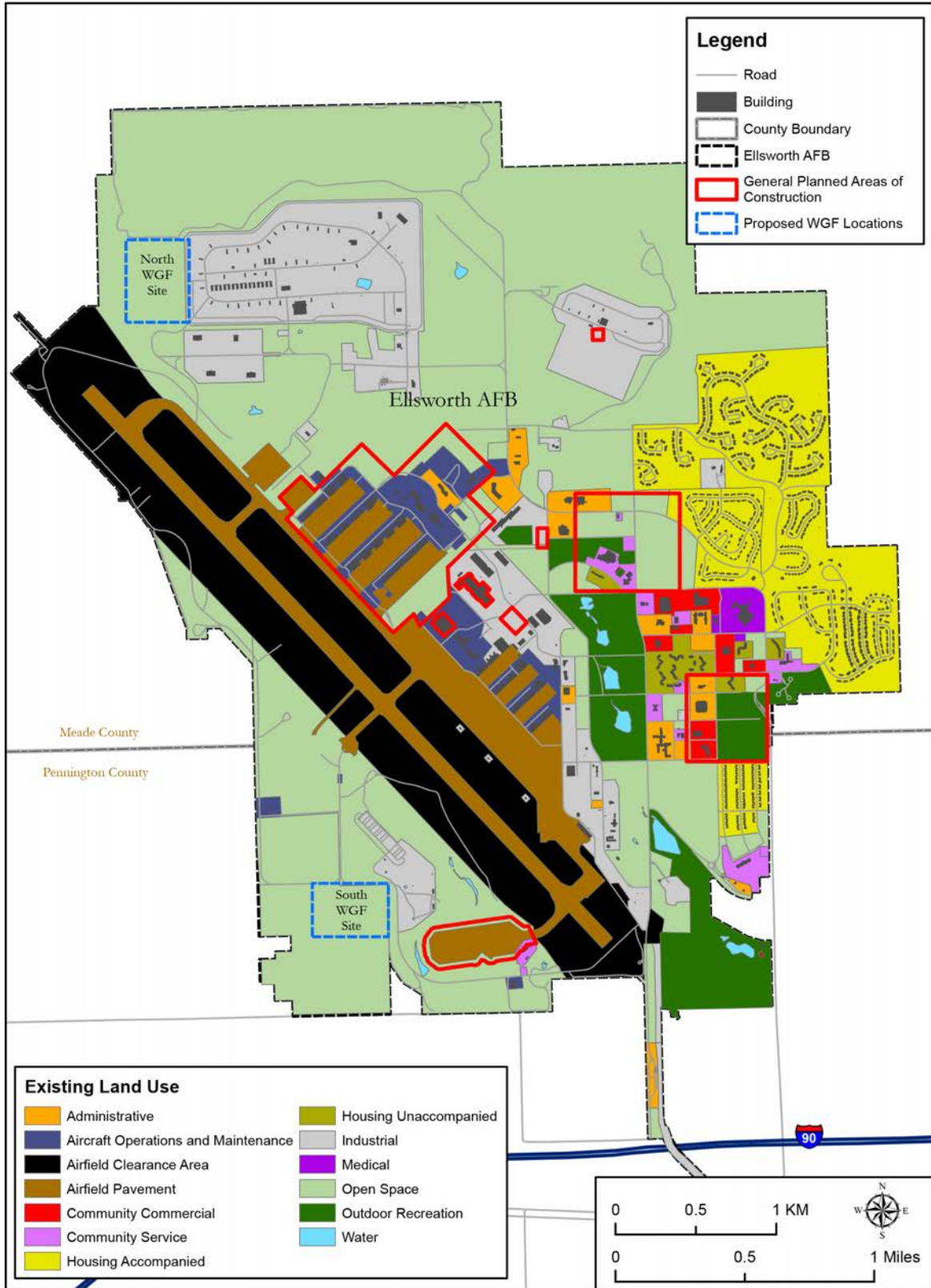
### 3.4.2.3.4 Facilities and Infrastructure

Most types of existing on-base land use would be associated with some portion of the facilities and infrastructure projects footprint, including airfield pavement, aircraft operations and maintenance, industrial, community commercial, community service, unaccompanied housing, administrative, outdoor recreation, and open space (Figure 3.4-16). 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 Ellsworth AFB Alternative.

### 3.4.2.3.5 Weapons Generation Facility

#### North WGF Site Subalternative

Land use associated with the North WGF Site consists of open space (Figure 3.4-16). The site is located in an area of compatible land use, within the existing munitions storage area QD arc and near the northern CZ. It is expected that WGF placement would be integrated with existing safety arcs and that incompatible functions, if present, would be relocated outside of the WGF arc. No significant impacts to land use would be anticipated.



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**Figure 3.4-16. On-Base Land Use at the Facilities and Infrastructure Projects Locations for the Ellsworth AFB Alternative**

## 1 **South WGF Site Subalternative**

2 Land use associated with the South WGF Site consists of open space (Figure 3.4-16).  
3 The site is located in an area of compatible land use, near the QD arc west of the airfield.  
4 It is expected that WGF placement would occur in accordance with existing and potential  
5 future safety arcs, and any incompatible functions would be relocated. No significant  
6 impacts to land use would be anticipated.

### 7 **3.4.2.3.6 Proposed Resource-Specific Mitigations and Management Actions to** 8 **Reduce the Potential for Environmental Impacts**

9 No mitigations would be necessary to implement the Ellsworth AFB Alternative.

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## 10 **3.5 SOCIOECONOMICS**

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### 11 **3.5.1 Socioeconomics, Affected Environment**

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#### 12 **3.5.1.1 Description of Resource**

13 Socioeconomic resources are defined as the basic attributes associated with human  
14 activities. Of particular interest are the population characteristics; economic factors  
15 including employment and income; and public services including schools, law  
16 enforcement, and emergency services. Actions that impact these socioeconomic  
17 indicators may have effects on other socioeconomic factors such as housing availability.

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#### 18 **3.5.1.2 Region of Influence**

19 The ROI for the socioeconomics analysis focuses on the area most affected by the action  
20 alternative. Dyess AFB is located immediately west of Abilene, Texas. The ROI for Dyess  
21 AFB is the Abilene Metropolitan Statistical Area, which includes Taylor, Jones, and  
22 Callahan Counties. Ellsworth AFB is located in Meade and Pennington Counties in South  
23 Dakota. The two counties comprise the ROI for Ellsworth AFB.

24 As described in Section 2.3.3 (Airspace and Range Utilization), for military aircraft flying  
25 out of Dyess AFB, the Lancer MOA and the Pecos MOA and all associated ATCAAs are  
26 the most cost-effective and convenient training areas to use. Dyess AFB-based aircraft  
27 would utilize PRTC and the Brownwood MOA as supplemental training airspaces. The  
28 primary training area for B-21 aircraft operating out of Ellsworth AFB would be PRTC.

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#### 29 **3.5.1.3 Analysis Methodology**

30 Potential impacts to the number and dollar value of indirect jobs created as a result of the  
31 B-21 beddown follow the method used for the respective Economic Impact Statements  
32 for Dyess AFB and Ellsworth AFB. The total number of indirect jobs created was

1 calculated by taking the total number of new USAF base jobs, by personnel type, and  
 2 multiplying the numbers by the multiplier reported in the respective base's Economic  
 3 Impact Statement (see Table 3.5-1). The sum of the indirect jobs was then multiplied by  
 4 the average annual pay for the local community as shown in Table 3.5-1.

5 Cost estimates for construction, demolition, and remodeling of facilities and infrastructure  
 6 are not yet available for purposes of quantitative analyses; as a result, a qualitative  
 7 assessment of the potential impacts associated with these activities is provided.

8 **Table 3.5-1. Numbers Used to Determine the Indirect Jobs and Dollar Value of Air Force**  
 9 **Personnel Associated with the B-21 MOB 1 Beddown**

Type of Personnel	Multiplier	
	Dyess AFB	Ellsworth AFB
Active Duty Military	0.29	0.35
Reserve/ANG/Trainees	0.13	0.15
Appropriated Fund Civilians	0.43	0.44
Other Civilians	0.43	0.44
Average Annual Pay for the Local Community	\$41,810 <sup>a</sup>	\$41,000 <sup>b</sup>

Source: (Dyess AFB, 2018a)

AFB = Air Force Base; ANG = Air National Guard; MOB = Main Operating Base

Notes:

a. Average annual pay for all occupations from the Metropolitan Area Occupational Employment and Wage Estimates Abilene, Texas, May 2018 (U.S. Bureau of Labor Statistics, 2019a).

b. Average annual pay for all occupations from the Metropolitan Area Occupational Employment and Wage Estimates for Rapid City, South Dakota, May 2018 (U.S. Bureau of Labor Statistics, 2019b)

10 Demand for housing is calculated by determining the total number of USAF personnel  
 11 and applying the percentages of active military personnel that live on base and off base,  
 12 as reported by the most recent Economic Impact Statement from each base. The Dyess  
 13 AFB Alternative and the Ellsworth AFB Alternative would include construction of new  
 14 dormitory facilities. It is assumed that the new units would be able to sustain the existing  
 15 distribution percentages. To determine the number of housing demanded by USAF  
 16 personnel residing off base, the number of incoming personnel was divided by 1.09 to  
 17 account for the percent of active military married to another active military. Percentages  
 18 are based on the most recent military demographics reported by the Air Force Personnel  
 19 Center (AFPC) in which approximately 9 percent (29,789) of the total USAF active duty  
 20 members (328,255) are reported to be married to another active duty member (AFPC,  
 21 2020).

22 For the purposes of the Snapshot Scenario analysis, the number of personnel residing  
 23 on base is expected to remain as calculated for the Dyess AFB Alternative and the  
 24 Ellsworth AFB Alternative with the remaining USAF personnel residing off base.

25 Changes in the frequency, number, duration, and type of military aircraft associated with  
 26 military bases near residential areas causes concern to some residents regarding the  
 27 potential impacts to property values and safety. Potential impacts to property values from  
 28 aircraft noise were assessed by reviewing available literature and comparing changes in  
 29 the population affected by noise levels of 65 dB DNL or greater, the threshold at which  
 30 residential land use is not compatible with that noise level.

1 To determine the impact on education resources in the ROI, the number of incoming  
2 school-aged children was based on the information provided in Table 2.3-1. Based on  
3 the most recent DoD demographic statistics (DoD, 2018b), it would be assumed that  
4 96.5 percent of all dependent children (ranging in ages of 0 to 22 years) would be between  
5 the ages of 0 to 18 and, of those, approximately 53.7 percent would be of school age (5 to  
6 18 years of age).

7 Changes in the demand for public services, such as law enforcement, fire emergency  
8 services and medical services associated with any in-migration or out-migration of people  
9 to the area under the alternatives were evaluated. These changes were determined  
10 based on the existing level of service or the number of professionals per capita.

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### 11 **3.5.2 Socioeconomics, Environmental Consequences**

12 This section presents the potential environmental consequences to socioeconomic  
13 resources under the alternatives. An impact common to all action alternatives is the  
14 potential impact to property values from aircraft noise. Aircraft noise is known to result in  
15 adverse health and environmental impacts that have the potential to result in shifts in  
16 population trends and density, decline in property values, decline in economic activity (i.e.  
17 agriculture), and safety concerns at education facilities and other noise sensitive areas.  
18 Noise levels of 65 dB DNL and greater associated with the B-21 aircraft would be less  
19 than the B-1 aircraft. As such and as indicated in Section 3.6.2 (Environmental Justice,  
20 Environmental Consequences), the number of people residing within the 65 dB DNL and  
21 greater noise contours would decrease under the Dyess AFB Alternative and the  
22 Ellsworth AFB Alternative compared to the No Action Alternative at each location.  
23 Therefore, the number of homes within noise levels that could potentially adversely  
24 impact property values would be less under each alternative compared to the No Action  
25 Alternative.

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#### 26 **3.5.2.1 No Action Alternative Consequences**

##### 27 **3.5.2.1.1 No Action at Dyess AFB**

28 Under the No Action Alternative, the B-21 would not be based at Dyess AFB and there  
29 would be no associated personnel changes or construction, demolition, or renovation  
30 activities.

31 Under this alternative, approximately 1,419 residents are affected by aircraft noise of  
32 65 dB DNL or greater in the ROI (see Table 3.6-3 in Section 3.6, Environmental Justice).

33 The most recent economic impact statement from Dyess AFB reported annual  
34 expenditures and contracts of over \$80.8 million. Construction, demolition, and  
35 renovation of facilities and infrastructure are a regular activity of an operational USAF  
36 base and contribute to the base's overall economic impact to the local region from the  
37 use of labor and supplies. Expenditures for facilities and infrastructure would continue to  
38 be required as facilities and infrastructure age and need to be replaced or upgraded.

## 1 Population

2 As of 2018, the population in the three-county ROI totaled 171,142 people. As shown in  
3 Table 3.5-2, Taylor County comprises the largest proportion of the population in the  
4 Abilene Metropolitan Statistical Area and is projected to experience the largest increase  
5 in population out of the three counties that comprise the Abilene Metropolitan Statistical  
6 Area.

7 **Table 3.5-2. Population Estimates and Projections for Dyess AFB Region of Influence**

Geographic Area	Census 2010	Estimated 2018	Projected 2025	Average Annual Change 2010–2018	Projected Average Annual Change 2018–2025
Callahan County	13,544	13,437	13,508	-0.1%	0.1%
Jones County	20,202	19,790	19,544	-0.3%	-0.2%
Taylor County	131,506	137,915	143,012	0.6%	0.5%
Abilene MSA (ROI)	165,252	171,142	176,064	0.4%	0.4%
State of Texas	25,145,561	28,716,123	32,204,920	1.7%	1.7%

Sources: (U.S. Census Bureau, 2010; U.S. Census Bureau, 2018a; Texas Demographic Center, 2018)

-- = minus; % = percent; AFB = Air Force Base; MSA = Metropolitan Statistical Area; ROI = region of influence

8 Table 3.5-3 presents the total number of military, dependents, and civilian employees  
9 supported by Dyess AFB. In addition to the 10,145 personnel at Dyess AFB, there are  
10 approximately 3,579 military retirees also supported by the base.

11 **Table 3.5-3. Personnel Estimates at Dyess AFB, Fiscal Year 2018**

Personnel <sup>1</sup>	Number of Individuals
Active Military	4,369
Civilian <sup>2</sup>	665
Contractor	NA
Spouses <sup>3</sup>	2,769
Children <sup>3</sup>	2,342
<b>Total</b>	<b>10,145</b>

Source: (Dyess AFB, 2018a)

AFB = Air Force Base; NA = not available

Notes:

1. Does not include private businesses on base (branch banks/credit union) or retirees
2. Includes appropriated and non-appropriated fund civilians
3. Numbers of spouses and children were extrapolated from the total dependent number of 5,111, assuming 55 percent of military and civilian personnel are married and the remaining dependents are children.

## 12 Economy, Employment, and Income

13 Dyess AFB has a major influence on the regional economy. As of FY18, the total annual  
14 economic impact of Dyess AFB to the local Abilene area was over \$532 million. The 2018  
15 *Economic Impact Statement for Dyess AFB* calculated payroll, expenditures and indirect  
16 jobs associated with the base (see Table 3.5-4) (Dyess AFB, 2018a).

17 In 2018, there were 105,026 jobs throughout the Abilene Metropolitan Statistical Area  
18 (Taylor, Jones, and Callahan Counties). This is approximately 8,217 more jobs than in  
19 2010, indicating a 1-percent average annual increase in the number of full-time and  
20 part-time jobs in the ROI (Bureau of Economic Analysis, 2019). Table 3.5-5 shows that

1 the largest employment sectors in terms of the number of jobs were the government and  
 2 government enterprises sector, the health care and social assistance sector, and the retail  
 3 trade sector.

4 Table 3.5-6 compares several economic characteristics in the Abilene Metropolitan  
 5 Statistical Area with the State of Texas and the nation.

6 **Table 3.5-4. Economic Impact of Dyess AFB, Fiscal Year 2018**

Category	Total
<b>Annual Payrolls By Classification</b>	
Appropriated Fund Military	\$251,100,487
Appropriated Fund Civilians	\$29,814,440
Non-Appropriated Fund, Contract, Civilians, and Private Business	\$10,932,013
Military Retirees	\$89,287,611
<b>Total Annual Payroll</b>	<b>\$381,134,551</b>
<b>Annual Expenditures</b>	
<b>Total Annual Expenditures and Contracts</b>	<b>\$86,337,341</b>
<b>Value of Indirect Jobs</b>	
Estimated Number of Indirect Jobs Created	1,574
Average Annual Pay for the Local Community	\$41,350
<b>Total Annual Dollar Value of Jobs Created</b>	<b>\$65,084,900</b>
<b>Total Economic Impact of Dyess AFB</b>	<b>\$532,556,792</b>

Source: (Dyess AFB, 2018a)

7 **Table 3.5-5. Total Full-Time and Part-Time Employment (Number of Jobs) by Industry in**  
 8 **the Abilene Metropolitan Statistical Area, 2018**

Industry	Total Number of Jobs	Percent of Total Employment
Forestry, Fishing, and related activities	NA	NA
Mining, quarrying, and oil and gas extraction	4,859	5%
Utilities	NA	NA
Construction	6,402	6%
Manufacturing	3,607	3%
Wholesale Trade	NA	NA
Retail Trade	10,928	10%
Transportation and Warehousing	2,903	3%
Information	D	NA
Finance and Insurance	6,066	6%
Real Estate and rental and leasing	3,677	4%
Professional, scientific, and technical services	3,924	4%
Management of companies and enterprises	NA	NA
Administrative and support and waste management and remediation services	NA	NA
Educational Services	3,086	3%
Health care and social assistance	12,476	12%
Arts, entertainment, and recreation	D	NA
Accommodation and food services	D	NA
Other Services	6,455	6%
Government and government enterprises	17,495	17%
<b>Total Employment</b>	<b>105,026</b>	<b>100%</b>

Source: (Bureau of Economic Analysis, 2019)

% = percent; D = Not shown to avoid disclosure of confidential information but included in total; NA = not available but included in total

1 **Table 3.5-6. Selected Economic Characteristics, Dyess AFB Region of Influence**

Geographic Area	Average Annual Unemployment Rate	Per Capita Income	Median Household Income	Percent of Population with Incomes Below Poverty Level
Taylor County	4.3%	\$26,469	\$50,818	15.6%
Jones County	3.9%	\$17,673	\$45,694	14.3%
Callahan County	3.3%	\$24,537	\$44,602	14.1%
Abilene MSA (ROI)	4.2%	\$25,284	\$49,945	15.3%
State of Texas	5.4%	\$30,143	\$59,570	15.5%
United States	5.9%	\$32,621	\$60,293	14.1%

Source: (U.S. Census Bureau, 2018b)

% = percent; AFB = Air Force Base; MSA = Metropolitan Statistical Area; ROI = region of influence

2 **Housing**

3 Approximately 22.4 percent (977 people) appropriated fund military personnel live on  
 4 base while the remaining 77.6 percent (3,392 people) live off base. As of FY18, there  
 5 were 11 dormitory facilities with 686 beds/rooms (Dyess AFB, 2018a). A Dormitory  
 6 Master Plan report is currently under revision, which would identify the unaccompanied  
 7 Airmen housing capacity (Dyess AFB, 2018b). Dyess Family Housing includes over 650  
 8 military family housing units. The housing units are located on base in seven  
 9 neighborhoods for officer and enlisted personnel (Dyess Family Homes, 2020). There  
 10 are also over 400 apartment, duplex, and townhome-style homes located off base in  
 11 Abilene within the Quail Hollow Family Housing for active duty members and civilians.

12 The communities that support the off-base personnel include the Abilene Metropolitan  
 13 Statistical Area, which comprises Taylor, Jones, and Callahan Counties, and portions of  
 14 Shackelford, Fisher, Nolan, Runnels, and Coleman Counties. Table 3.5-7 displays  
 15 several housing characteristics in the Abilene Metropolitan Statistical Area as of 2018.

16 **Table 3.5-7. 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
Taylor County	57,257	49,482	7,775	58.6%	41.4%	2.2%	\$119,100	\$912
Jones County	7,335	5,593	1,742	73.3%	26.7%	2.5%	\$75,400	\$713
Callahan County	6,667	5,319	1,348	82.8%	17.2%	0.9%	\$89,000	\$748
Total Abilene MSA (ROI)	71,259	60,394	10,865	62.1%	37.9%	2.1%	\$110,100	\$893

Source: (U.S. Census Bureau, 2018c)

% = percent; AFB = Air Force Base; MSA = Metropolitan Statistical Area; ROI = region of influence



The median price for a single-family home in January 2020 was \$179,938 representing a 22.45 percent year-over-year increase (Texas A & M University, 2020). During the same time, the months of inventory in the Abilene Metropolitan Statistical Area decreased from 3.4 months to 3.2 months (Texas A & M University, 2020). The 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 listing on the market. A market with months of inventory below 6 months is indicative of a seller's market (Kramer, 2018).

## Education

There are no public schools located on Dyess AFB. Dependents of USAF personnel would be expected to attend one of the schools in the ROI. Table 3.5-8 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 3.5-8. Schools, Dyess AFB Region of Influence**

County	School District	Number of Schools	Total Enrollment <sup>1</sup>	Total Teacher FTE <sup>2</sup>	Number of Students Per Teacher <sup>2,3</sup>
Taylor	Texas College Preparatory Academies	36	13,067	747	17
Taylor	Abilene ISD	29	16,760	1,109	15
Taylor	Merkel ISD	3	1,168	94	12
Taylor	Trent ISD	1	165	21	8
Taylor	Jim Ned CISD	4	1,216	93	13
Taylor	Wylie ISD	6	4,405	277	16
Jones	Anson ISD	3	771	68	11
Jones	Hamlin ISD	2	397	32	13
Jones	Hawley ISD	3	737	74	10
Jones	Leuders-Avoca ISD	2	106	16	7
Jones	Stamford ISD	3	670	57	12
Callahan	Baird ISD	3	305	35	9
Callahan	Clyde CISD	4	1433	112	13
Callahan	Cross Plains ISD	2	368	36	10
Callahan	Eula ISD	3	414	38	11
<b>Total ROI</b>		104	41,982	2,809	15

Source: (TEA, 2019)

AFB = Air Force Base; CISD = Consolidated Independent School District; FTE = full-time employee; ISD = Independent School District; ROI = region of influence

Notes:

1. Total enrollment during the 2018-2019 school year.

2. Rounded to nearest whole number.

3. Number of students per teacher is calculated by the total enrollment divided by the total full-time teachers in each district.

## 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

1 metrics. Changes in the population would affect the demand for these services as well  
2 as the ability to fund them.

3 In 2020, the national average of the number of active primary care physicians per 1,000  
4 population is estimated at 1.596. Active care physicians include physicians in general  
5 practice, family practice, obstetrics and gynecology, pediatrics, geriatrics and internal  
6 medicine (America's Health Rankings, 2020). As of 2017, the population-to-primary care  
7 physician ratio in Taylor County was 1,140:1; Jones County had a ratio of 3,330:1 and  
8 Callahan County had a ratio of 13,950:1. The state of Texas had a population-to-primary  
9 care physician ratio of 1,640:1 (County Health Rankings and Roadmaps, 2020).

10 The average number of officers per county agency in 2018 was 2.8 per 1,000 inhabitants,  
11 as reported to the Federal Bureau of Investigation's Uniform Crime Reporting Program  
12 (U.S. Department of Justice, 2018a). In 2018, there were 233 total law enforcement  
13 employees (officers and civilians) in Taylor County and 15 total law enforcement  
14 employees in Callahan County. Based on 2018 population estimates (as shown in  
15 Table 3.5-2), this equates to total law enforcement personnel per 1,000 residents of  
16 approximately 1.7 in Taylor County and 1.1 in Callahan County (U.S. Department of  
17 Justice, 2018b). Compared to other counties, Jones County had a high number of  
18 workers working as law enforcement. Law enforcement employees for Jones County  
19 totaled 177 law enforcement workers, including supervisors (Data USA, 2020).

20 A report on fire departments within the United States estimated the national average of  
21 career firefighters per 1,000 residents at 1.81, with the average number of volunteers per  
22 1,000 residents at 6.06 (Evarts and Stein, 2020). The ratios are not intended to provide  
23 a threshold or recommendation of personnel per residents, but rather identify conditions  
24 on average throughout the nation.

## 25 **Airspace and Range Utilization**

26 As stated in Section 2.3.3 (Airspace and Range Utilization), the Lancer MOA and the  
27 Pecos MOA airspace would be the primary training area for B-21 aircraft operations at  
28 Dyess AFB. Aircraft based at Dyess AFB would also utilize PRTC and the Brownwood  
29 MOA as supplemental training airspaces.

30 Socioeconomic impacts resulting from the use of the Lancer MOA are described in detail  
31 in the 2000 *Realistic Bomber Training Initiative EIS* (USAF, 2000). Potential impacts to  
32 economic pursuits and land values from the use of the Lancer MOA were addressed in  
33 the EIS (USAF, 2000, pp. 4-111). The *Realistic Bomber Training Initiative EIS* concluded  
34 that national and regional economic trends have substantially more impact than  
35 supersonic or subsonic overflights and would not affect the general economies of the  
36 communities (USAF, 2000, pp. 4-111). The EIS also determined that there was little to  
37 suggest that land values would be impacted since the random nature of operations and  
38 the wide altitude structure within the MOA made it unlikely that any one location would be  
39 repeatedly overflown (USAF, 2000). Overall, no significant adverse consequences to  
40 economic activities were identified from aircraft operations (USAF, 2000, pp. 4-113).  
41 Under the No Action Alternative, noise levels for the Lancer MOA would be 43.4 dB L<sub>dnmr</sub>  
42 and it is not anticipated that adverse socioeconomic effects would occur.

1 Potential socioeconomic impacts resulting from airspace use at the Pecos MOA are  
2 evaluated in the *New Mexico Training Range Initiative EIS* (USAF, 2006). The potential  
3 socioeconomic effects were evaluated for airspace use, noise conditions, and fire hazards  
4 in the affected area. The EIS determined that expanded airspace and low-altitude flights  
5 would not be expected to result in any significant impacts to humans, livestock, economic  
6 pursuits, or land values in the region (USAF, 2006, pp. 2-40). Noise levels in the Pecos  
7 MOA for the No Action Alternative would be 55.9 dB  $L_{dnmr}$ . Therefore, adverse  
8 socioeconomic impacts are not anticipated.

9 Noise levels in the Brownwood MOA would be less than 35 dB DNL (Section 3.2.2.1.1,  
10 No Action at Dyess AFB) which is less than the EPA level of 55 dB DNL below which no  
11 effects to public health and welfare would occur (EPA, 1974). In addition operations in  
12 the Brownwood MOA would decrease by 13 operations annually (see Section 3.1.2.2.2,  
13 Dyess AFB Alternative, Airspace and Range Utilization). Since noise levels would remain  
14 unchanged and operations are decreasing, no significant economic impacts would occur  
15 in the Brownwood MOA.

16 Socioeconomic impacts resulting from the use of PRTC are described in detail in the 2014  
17 PRTC EIS and associated ROD (USAF, 2014a). These impacts include property values,  
18 civil aviation, energy resource development, noise disturbances, and a risk of fire from  
19 chaff and flares.

20 Interviews conducted during the development of the 2014 PRTC EIS revealed that the  
21 existence of the Powder River A or B MOAs was not used in determining the value of a  
22 property. The complex nature of property valuation factors makes any estimation of the  
23 potential effects of airspace modifications on land values highly speculative. Ranching  
24 operations, communities, and private airports all exist and function under the existing  
25 Powder River MOAs. Other socioeconomic factors, such as business activity,  
26 employment, interest rates, and land scarcity (or availability) are much more likely to  
27 affect property values. Training flight activity associated with PRTC is not expected to  
28 affect the value of property under the airspace (USAF, 2014a, pp. 4-118).

29 As indicated in the 2014 PRTC EIS, civil aviation and public airports have the potential to  
30 be impacted as a result of communication requirements by private pilots. The extent of  
31 impacts would be dependent on scheduling, the duration of the ground holds, and the  
32 amount of time that the MOAs were active (USAF, 2014a, pp. 4-123). If all the airspace  
33 were activated, the airspace use and related activities associated with PRTC could result  
34 in delay, uncertainty, or other impacts. A change in airspace use for military training could  
35 be seen by civil airspace users as an adverse impact on the human, social, or economic  
36 resources of the region (USAF, 2014a, pp. 4-123).

37 Based on the 2014 PRTC EIS, no impacts to elevated ground structures, wind farms, oil  
38 and gas, or mining are expected (USAF, 2014a, pp. 4-128). Therefore, there are no  
39 anticipated impacts to energy resource development under PRTC.

40 As indicated in the 2014 PRTC EIS, the EPA has identified a DNL of 55 dB to be the level  
41 below which no effects on public health and welfare would occur (USAF, 2014a; EPA,  
42 1974). Noise levels in areas under the PRTC airspace are below this level. The relatively  
43 low acoustical effect is attributed to the dispersion of training flights into a large volume

1 of airspace (USAF, 2014a, pp. 4-125). Although noise is below the EPA-identified level,  
 2 the sudden and unexpected nature of infrequent, low-level or supersonic events during  
 3 low-flying exercises could cause surprise and annoyance. Due to the low population  
 4 density under PRTC low-level airspace and the infrequent number of annual events, the  
 5 2014 PRTC EIS concluded that it is highly unlikely that flight activity associated with PRTC  
 6 would result in significant social or economic impacts to the region. Under the No Action  
 7 Alternative, noise levels in PRTC would range from less than 35 to 46.1 dB L<sub>dnmr</sub>.  
 8 However, B-1 operations would be ongoing; therefore, there is still the potential for  
 9 impacts from low-level flights.

10 Another potential socioeconomic impact evaluated in the 2014 PRTC EIS was the  
 11 potential economic loss associated with a fire, particularly with flare use. There are  
 12 minimum deployment altitude restrictions of 2,000 feet AGL and no flare use during  
 13 extreme fire conditions. The USAF has established procedures for claims in the unlikely  
 14 event that a USAF-caused fire should occur and subsequently damage livestock or  
 15 infrastructure (USAF, 2014a, pp. 4-129).

### 16 3.5.2.1.2 No Action at Ellsworth AFB

17 Under the No Action Alternative, the B-21 would not be based at Ellsworth AFB and there  
 18 would be no associated personnel changes or construction, demolition, or renovation  
 19 activities. Under this alternative, approximately 1,985 residents are affected by aircraft  
 20 noise in the ROI (see Table 3.6-4 in Section 3.6, Environmental Justice).

21 The most recent economic impact statement from Ellsworth AFB reported annual  
 22 expenditures and contracts of over \$58.9 million. Construction, demolition, and  
 23 renovation of facilities and infrastructure are a regular activity of an operational USAF  
 24 base and contribute to the base's overall economic impact to the local region from the  
 25 use of labor and supplies. Expenditures for facilities and infrastructure would continue to  
 26 be required as facilities and infrastructure age and need to be replaced or upgraded.

## 27 Population

28 As of 2018, the population in the two-county ROI totaled 136,718 people. As shown in  
 29 Table 3.5-9, Pennington County comprises the largest proportion of the population in the  
 30 ROI and is projected to experience the largest increase in population out of the two  
 31 counties that comprise the ROI. Table 3.5-10 presents the total number of military,  
 32 dependents, and civilian employees supported by Ellsworth AFB.

33 **Table 3.5-9. Population Estimates and Projections for Ellsworth AFB Region of Influence**

Geographic Area	Census 2010	Estimated 2018	Projected 2025	Average Annual Change	
				2010–2018	2018–2025
Meade County	25,434	27,424	27,805	0.9%	0.2%
Pennington County	100,948	109,294	119,876	1.0%	1.3%
Total ROI	126,382	136,718	147,681	1.0%	1.1%
South Dakota	814,180	864,289	922,748	0.7%	0.9%

Source: (U.S. Census Bureau, 2010; U.S. Census Bureau, 2018a; South Dakota Department of Labor and Regulation, 2016)  
 % = percent; AFB = Air Force Base; ROI = region of influence

**Table 3.5-10. Personnel Estimates at Ellsworth AFB, Fiscal Year 2016**

Personnel <sup>1</sup>	Number of Individuals
Active Military	3,196
Civilian <sup>2</sup>	930
Contractor	139
Spouses <sup>3</sup>	2,346
Children <sup>3</sup>	3,985
<b>Total</b>	<b>10,596</b>

Source: (Ellsworth AFB, 2016a)

AFB = Air Force Base

Notes:

1. Does not include private businesses on base (branch banks/credit union) or retirees
2. Includes appropriated and non-appropriated fund civilians
3. Numbers of spouses and children were extrapolated from the total dependent number of 5,111, assuming 55 percent of military and civilian personnel are married and the remaining dependents are children.

## Economy, Employment, and Income

Ellsworth AFB has a major influence on the regional economy. As of FY16, the total annual economic impact of Ellsworth AFB to the local area was over \$359 million. The 2016 *Economic Impact Statement for Ellsworth AFB* calculated payroll, expenditures and indirect jobs associated with the base (see Table 3.5-11) (Ellsworth AFB, 2016a).

**Table 3.5-11. Economic Impact of Ellsworth AFB, Fiscal Year 2016**

Category	Total
<b>Annual Payrolls By Classification</b>	
Appropriated Fund Military	\$191,341,005
Appropriated Fund Civilians	\$34,207,504
Non-Appropriated Fund, Contract, Civilians, and Private Business	\$10,625,197
<b>Total Annual Payroll</b>	<b>\$236,173,707</b>
<b>Annual Expenditures</b>	
<b>Total Annual Expenditures and Contracts</b>	<b>\$58,971,998</b>
<b>Value of Indirect Jobs</b>	
Estimated Number of Indirect Jobs Created	1,601
Average Annual Pay for the Local Community	40,181
<b>Total Annual Dollar Value of Jobs Created</b>	<b>\$64,329,781</b>
<b>Total Economic Impact of Ellsworth AFB</b>	<b>\$359,475,486</b>

Source: (Ellsworth AFB, 2016a)

AFB = Air Force Base

Notes:

1. Values rounded to nearest whole number

In 2018, there were 93,844 jobs throughout the Ellsworth AFB ROI (Meade and Pennington Counties combined) approximately 8,909 more jobs than in 2010. This indicates a 1.25-percent average annual increase in the number of full-time and part-time jobs in the ROI (Bureau of Economic Analysis, 2019). As shown in Table 3.5-12, the largest employment sectors in terms of the number of jobs were the government and government enterprises sector, the health care and social assistance sector, and the retail trade sector.

Table 3.5-13 compares several economic characteristics in Meade and Pennington County with the state of South Dakota and the nation.

**Table 3.5-12. Total Full-Time and Part-Time Employment (Number of Jobs) by Industry in Meade County and Pennington County, 2018**

Industry	Total Number of Jobs			Percent of Total Employment in the ROI
	Meade County	Pennington County	Total ROI	
Forestry, Fishing, and related activities	NA	346	NA	NA
Mining, quarrying, and oil and gas extraction	NA	292	NA	NA
Utilities	NA	220	NA	NA
Construction	1,362	5,417	6,779	7.2
Manufacturing	403	2,792	3,195	3.4
Wholesale Trade	NA	2,342	NA	NA
Retail Trade	1,279	10,116	11,395	12.1
Transportation and Warehousing	526	1,995	2,521	2.7
Information	81	937	1,018	1.1
Finance and Insurance	527	4,353	4,880	5.2
Real Estate and rental and leasing	754	4,032	4,786	5.1
Professional, scientific, and technical services	NA	3,518	NA	NA
Management of companies and enterprises	NA	987	NA	NA
Administrative and support and waste management and remediation services	408	2,889	3,297	3.5
Educational Services	78	1,546	1,624	1.7
Health Care and Social Assistance	699	11,288	11,987	12.8
Arts, Entertainment, and Recreation	237	1,952	2,189	2.3
Accommodation and Food Services	973	8,493	9,466	10.1
Other Services	864	4,602	5,466	5.8
Government and Government Enterprises	3,101	11,930	15,031	16.0
<b>Total Employment</b>	<b>13,237</b>	<b>80,607</b>	<b>93,844</b>	<b>100.0</b>

Source: (Bureau of Economic Analysis, 2019)

NA = not available but included in total; ROI = region of influence

**1 Table 3.5-13. Selected Economic Characteristics, Ellsworth AFB Region of Influence**

Geographic Area	Average Annual Unemployment Rate	Per Capita Income	Median Household Income	Percent of Population with Incomes Below Poverty Level
Meade County	1.4%	\$28,654	\$59,218	7.4%
Pennington County	3.8%	\$30,518	\$55,024	13.4%
South Dakota	3.5%	\$29,801	\$56,499	13.6%
United States	5.9%	\$32,621	\$60,293	14.1%

Source: (U.S. Census Bureau, 2018b)

% = percent; AFB = Air Force Base

**2 Housing**

3 Approximately 33.7 percent (1,076 people) appropriated fund military personnel live on  
4 base while the remaining 66.3 percent (2,120 people) live off base. As of 2016, there  
5 were 435 on-base privatized housing units and 641 dorm rooms at Ellsworth AFB  
6 (Ellsworth AFB, 2016a). The communities that support the off-base personnel include  
7 the city of Box Elder, the unincorporated area of Ashland Heights, and Rapid City.  
8 Table 3.5-14 displays several housing characteristics in the two-county ROI.

1 **Table 3.5-14. Selected Housing Characteristics, Ellsworth 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
Meade County	11,931	10,912	1,019	73.8	26.2	1.9	\$180,500	\$860
Pennington County	48,151	43,598	4,553	68.8	31.2	0.8	\$179,900	\$824

Source: (U.S. Census Bureau, 2018c)  
AFB = Air Force Base

2 The Rapid City housing market, which includes Rapid City, Box Elder, Piedmont, Elk  
3 Creek and Nemo Road and Hermosa, is currently characterized by high demand, low  
4 inventory and rising prices. Strong demand for housing is attributed to the growth in the  
5 number of jobs and younger couples entering the market (U.S. News, 2019). As of March  
6 2020, the median value of a home in Rapid City was \$212,403, representing an increase  
7 of 5.0 percent from the previous year (Zillow, 2020a). The median rent in the city in March  
8 was approximately \$1,175 (Zillow, 2020a). The city of Box Elder also experienced an  
9 increase in the median value of homes over the past year. As of March 2020, the median  
10 home value in Box Elder was approximately \$229,632, representing an increase of  
11 3.9 percent over the previous year (Zillow, 2020b).

12 **Education**

13 There are no public schools located on Ellsworth AFB. Dependents of USAF personnel  
14 would be expected to attend one of the schools in the ROI. Table 3.5-15 lists the school  
15 districts within the two-county ROI, the total enrollment, full-time teachers employed, and  
16 the number of students per teacher for each district.

17 **Table 3.5-15. Schools, Ellsworth AFB Region of Influence**

County	School District <sup>1</sup>	Number of Schools	Total Enrollment <sup>2</sup>	Total Teacher FTE <sup>3</sup>	Number of Students Per Teacher <sup>3,4</sup>
Meade	Meade School District 46-1	12	2,877	200	14
Meade	Faith School District 46-2	4	177	15	12
Pennington	Douglas School District 51-1	5	2,927	184	16
Pennington	Hill City School District 51-2	3	457	34	14
Pennington	New Underwood School District 51-3	3	236	17	14
Pennington	Rapid City Area School District 51-4	25	13,832	859	16
Pennington	Wall School District 51-5	4	271	23	12
<b>Total ROI</b>		56	20,777	1,330	16

Source: (National Center for Education Statistics, 2019)  
AFB = Air Force Base; FTE = full-time employee

Notes:

1. Does not include Black Hills Special Services Cooperative in Meade County as there was 0 total enrollment during the 2018-2019 school year.
2. Total enrollment during the 2018-2019 school year.
3. Rounded to nearest whole number.
4. Number of students per teacher is calculated by the total enrollment divided by the total full-time teachers in each district.

1 The Rapid City Area School (RCAS) district is the second largest district in the state  
2 (RCAS, 2020a). The Rapid City Six Year Plan includes construction of a new elementary  
3 school and middle school and renovations to local elementary and high schools. District-  
4 wide renovations and upgrades are estimated to cost over \$12.5 million (RCAS, 2020b).  
5 Several long-term closures include Canyon Lake, Robbinsdale, Wilson, and Horace Mann  
6 (RCAS, 2020b). The student to teacher ratio in South Dakota schools is 14:1 (Public  
7 School Review, 2020).

## 8 **Public Services**

9 Public services include emergency, police, and medical services and are provided by the  
10 county and city governments in the ROI and other government agencies. Expenditures  
11 and revenues define the level of service that may be provided as well as specific service  
12 metrics. Changes in the population would affect the demand for these services as well  
13 as the ability to fund them.

14 In 2020, the national average of the number of active primary care physicians per 1,000  
15 population is estimated at 1.596. Active care physicians include physicians in general  
16 practice, family practice, obstetrics and gynecology, pediatrics, geriatrics and internal  
17 medicine (America's Health Rankings, 2020).

18 The average number of officers per county agency in 2018 was 2.8 per 1,000 inhabitants,  
19 as reported to the Federal Bureau of Investigation's Uniform Crime Reporting Program  
20 (U.S. Department of Justice, 2018a). In 2018, there were 50 total law enforcement  
21 employees (officers and civilians) in Meade County and 406 total law enforcement  
22 employees in Pennington. Based on the 2018 population estimates (as shown in  
23 Table 3.5-9), the estimated total law enforcement per 1,000 residents would equate to  
24 approximately 1.5 in Meade County and 3.7 in Pennington County (U.S. Department of  
25 Justice, 2018c).

26 A report on fire departments within the United States estimated the national average of  
27 career firefighters per 1,000 residents at 1.81, with the average number of volunteers per  
28 1,000 residents at 6.06 (Evarts and Stein, 2020). The ratios are not intended to provide  
29 a threshold or recommendation of personnel per residents, but rather identify conditions  
30 on average throughout the nation.

## 31 **Airspace and Range Utilization**

32 As stated in Section 2.3.3 (Airspace and Range Utilization), the PRTC airspace would be  
33 the primary training area for B-21 aircraft operations at Ellsworth AFB. Socioeconomic  
34 impacts resulting from the use of PRTC are described in detail in the 2014 PRTC EIS and  
35 associated ROD (USAF, 2014a). These impacts include property values, civil aviation,  
36 energy resource development, noise disturbances, and a risk of fire from chaff and flares.

37 Interviews conducted during the development of the 2014 PRTC EIS revealed that the  
38 existence of the Powder River A or B MOAs was not used in determining the value of a  
39 property. The complex nature of property valuation factors makes any estimation of the  
40 potential effects of airspace modifications on land values highly speculative. Ranching



1 operations, communities, and private airports all exist and function under the existing  
2 Powder River MOAs. Other socioeconomic factors, such as business activity,  
3 employment, interest rates, and land scarcity (or availability) are much more likely to  
4 affect property values than training airspace. Training flight activity associated with PRTC  
5 is not expected to affect the value of property under the airspace (USAF, 2014a, pp. 4-  
6 118).

7 As indicated in the 2014 PRTC EIS, civil aviation and public airports have the potential to  
8 be impacted as a result of communication requirements by private pilots. The extent of  
9 impacts would be dependent on scheduling, the duration of the ground holds, and the  
10 amount of time that the MOAs were active (USAF, 2014a, pp. 4-123). If all the airspace  
11 were activated, the airspace use and related activities associated with PRTC could result  
12 in delay, uncertainty, or other impacts. A change in airspace use for military training could  
13 be seen by civil airspace users as an adverse impact on the human, social, or economic  
14 resources of the region (pp. 4-123).

15 Based on the 2014 PRTC EIS, no impacts to elevated ground structures, wind farms, oil  
16 and gas, or mining are expected (USAF, 2014a, pp. 4-128). Therefore, there are no  
17 anticipated impacts to energy resource development under the PRTC airspace.

18 As indicated in the 2014 PRTC EIS, the EPA has identified a DNL of 55 dB to be the level  
19 below which no effects on public health and welfare would occur (USAF, 2014a; EPA,  
20 1974). Noise levels in areas under the PRTC are below this level. The relatively low  
21 acoustical effect is attributed to the dispersion of training flights into a large volume of  
22 airspace (USAF, 2014a, pp. 4-125). Although noise is below the EPA-identified level, the  
23 sudden and unexpected nature of infrequent, low-level or supersonic events during low-  
24 flying exercises could cause surprise and annoyance. Due to the low population density  
25 under the PRTC low-level airspace and the infrequent number of annual events, the 2014  
26 PRTC EIS concluded that it is highly unlikely that flight activity associated with PRTC  
27 would result in significant social or economic impacts to the region. Under the No Action  
28 Alternative, noise levels in PRTC would range from less than 35 to 46.1 dB  $L_{dnmr}$ .  
29 However, B-1 operations would be ongoing; therefore, there is still the potential for  
30 impacts from low-level flights.

31 Another potential socioeconomic impact evaluated in the 2014 PRTC EIS was the  
32 potential economic loss associated with a fire, particularly with flare use. There are  
33 minimum deployment altitude restrictions of 2,000 feet AGL and no flare use during  
34 extreme fire conditions. The USAF has established procedures for claims in the unlikely  
35 event that a USAF-caused fire should occur and subsequently damage livestock or  
36 infrastructure (USAF, 2014a, pp. 4-129).

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### 37 **3.5.2.2 Dyess AFB Alternative**

#### 38 **3.5.2.2.1 Personnel**

39 Table 3.5-16 presents the approximate end state of personnel for the Dyess AFB  
40 Alternative. Under this alternative, there would be an additional 1,645 military personnel  
41 at Dyess for a total end state of 6,014 active military personnel and 665 civilian personnel.

**Table 3.5-16. Personnel Estimates in the Region of Influence Under the Dyess AFB Alternative**

Personnel	Number of Individuals				
	No Action Alternative	B-1 Departing	B-21 Incoming	End State	Change
Active Military	4,369	1,855	3,500	6,014	1,645
Civilian	665	0	0	665	0
Contractor	0	0	0	0	0
Spouses	2,769	1,020	1,925	3,674	905
Children	2,342	872	2,275	3,745	1,403
<b>Total</b>	<b>10,145</b>	<b>3,747</b>	<b>7,700</b>	<b>14,098</b>	<b>3,953</b>

There would be approximately 4,200 dependents accompanying the 3,500 active military personnel associated with the B-21 beddown. Once the personnel and dependents associated with the B-1 aircraft depart, there would be a total change in the ROI population of 3,953 people (see Table 3.5-17). Additional personnel and dependents associated with this alternative would result in an increase in the average annual percentage growth rate to the region which is currently projected at 0.4 percent through 2025. 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 3.5-17. Population Estimates in the Region of Influence Under the Dyess AFB Alternative**

No Action Alternative (as of 2025)	End State (as of 2025)	Change in Population <sup>1</sup>
176,064	180,017	3,953

Note:

1. Based on the assumption that the 3,953 personnel and dependents associated with the Dyess AFB Alternative would arrive by 2025.

The increased employment and payroll of 1,645 new USAF jobs would be expected to have a positive, long-term economic impact on the regional economy. The direct employment of USAF 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 3.5-18. The total active duty and civilian personnel under the Dyess AFB Alternative would result in approximately 2,232 indirect jobs with an estimated total value of \$93,320,338.

**Table 3.5-18. Estimated Indirect Jobs and Value in the Region of Influence Under the Dyess AFB Alternative**

Type of Personnel	No Action Alternative	End State	Change
Active Military	4,369	6,014	1,645
Civilian	665	665	0
<b>Total Base Direct Jobs<sup>1</sup></b>	<b>5,034</b>	<b>6,679</b>	<b>1,645</b>
<b>Total Indirect Jobs</b>	<b>1,553</b>	<b>2,232</b>	<b>477</b>
<b>Value of Indirect Jobs</b>	<b>\$64,929,258</b>	<b>\$84,874,718</b>	<b>\$19,945,461</b>

Note:

1. Total base direct jobs include active military and civilian employed by the Air Force and does not include contractors.

1 There would be an increase in housing demand in the Abilene Metropolitan Statistical  
 2 Area as a result of the additional personnel. On base housing and dorms would be  
 3 expected to continue to accommodate 977 military personnel. Construction of a new  
 4 62,000 square foot dorm would be part of this alternative which would house enlisted  
 5 personnel on the base.

6 It is assumed that with the additional dormitory, the distribution of personnel living on base  
 7 and off base would be the same as under baseline conditions in which 22.4 percent of  
 8 active military members would reside on base and the remaining 77.6 percent active  
 9 military personnel would reside off base. Based on this assumption, approximately  
 10 1,347 military personnel would reside on base and 4,667 personnel would reside off base.  
 11 Taking into consideration the 9 percent of military personnel that are married to other  
 12 military personnel, there would be an estimated demand for 4,282 housing units  
 13 associated with an end state of 6,014 active military personnel. The number of homes in  
 14 the community to support off base military members would be approximately 1,170 more  
 15 than under the No Action Alternative. The estimated demand for housing associated with  
 16 the USAF personnel under this alternative is shown in Table 3.5-19.

17 **Table 3.5-19. Estimated Housing Units Demanded in the Region of Influence Under the**  
 18 **Dyess AFB Alternative**

Type of Personnel and Unit	No Action Alternative <sup>a</sup>	End State	Change
Active Military	4,369	6,014	1,645
Personnel On Base	977	1,347 <sup>b</sup>	370
Personnel Off Base	3,392	4,667	1,275
<b>Total Off-Base Housing Units Demanded<sup>c,d</sup></b>	<b>3,112</b>	<b>4,282</b>	<b>1,170</b>

Notes:

a. Based on actual personnel numbers living on base and off base as reported in Dyess AFB *Economic Impact Statement* in which 22.4 percent appropriated fund military live on base and 77.6 percent live off base (Dyess AFB, 2018a).

b. The construction of a new 62,000-square-foot dormitory as part of the Dyess AFB Alternative would be anticipated to result in additional rooms for active military personnel and the distribution of military personnel on- and off base would remain as under existing conditions in which 22.4 percent of active military reside on base and 77.6 percent of active military reside off base.

c. Takes into consideration 9 percent of the active military members married to another active military member (AFPC, 2020).

d. Does not take into consideration housing demanded from migration of population fulfilling indirect jobs created by the direct Air Force personnel.

19 The increased cost of housing and the availability of jobs would be expected to increase  
 20 the average number of people per household. Housing costs could continue to rise as  
 21 supply tries to catch up with demand before leveling off as new housing is constructed.  
 22 As indicated in Table 3.5-7, there are approximately 10,865 vacant housing units  
 23 throughout the three-county ROI (U.S. Census Bureau, 2018c). Any lack of affordable  
 24 homes in the interim may require homebuyers to expand their search to include areas  
 25 outside their desired location and price range.

26 Any direct, indirect, and induced employment (number of jobs) associated with  
 27 construction activities would likely require an in-migration of workers. Workers would be  
 28 anticipated to require lodging and housing during the term of their employment which  
 29 would last for the duration of the construction activity. It would be anticipated that once

1 the activity is complete, workers would leave the ROI. Therefore, the demand for housing  
2 would be even greater during construction activity in the short term.

3 The estimated total number of children dependents (ranging in ages of 0 to 22 years)  
4 associated with the Dyess AFB Alternative at the end state would be 3,745 children.  
5 Based on the assumptions described in Section 3.5.1.3 (Socioeconomics, Analysis  
6 Methodology), there would be an estimated end state of 1,940 school-aged children  
7 associated with USAF personnel assigned to Dyess AFB representing an additional 726  
8 school-aged students to school districts within the ROI compared to the No Action  
9 Alternative. Table 3.5-20 shows the estimated number of incoming students as a result  
10 of the beddown at Dyess AFB. A maximum of 49 teachers could potentially be required  
11 to maintain the average student to teacher ratio in the ROI of 15:1. Students would be of  
12 varying ages and would attend one of the many schools throughout the ROI. Additional  
13 students may result in larger class sizes and additional pressure on school resources and  
14 expenditures. However, additional students would also contribute to revenue generated.

15 **Table 3.5-20. Total School Age Children Enrolling in the Region of Influence Under the**  
16 **Dyess AFB Alternative**

Dependent Age Range	No Action Alternative	End State	Change
0 to 5 years	1,046	1,674	628
5 to 18 years (i.e., school age)	1,214	1,940	726
18 to 22 years	82	131	49
<b>Total Children Dependents</b>	<b>2,342</b>	<b>3,745</b>	<b>1,403</b>

17 A total end state of 14,098 personnel and dependents under this alternative would result  
18 an increase of 3,953 personnel and dependents compared to the No Action Alternative.  
19 The additional population would result in increased demand for public services such as  
20 police, fire, and medical services. Public service personnel would also be needed to  
21 support indirect workers and their families during construction. Public service personnel  
22 would compete with all others for housing in the ROI.

23 Table 3.5-21 shows the estimated maximum number of additional public service  
24 professionals that may be associated with the additional population to meet the existing  
25 national level of service average by personnel type. The level of service, such as  
26 response times, could potentially be impacted in the short run if there is a large influx of  
27 personnel in a short period of time but would adjust as more public service personnel jobs  
28 become available and positions are filled.

29 **Table 3.5-21. Estimated Number of Public Service Professionals in the Region of**  
30 **Influence Under the Dyess AFB Alternative**

Profession	Multiplier (per 1,000 capita)	No Action Alternative	End State	Change
Medical Professionals	1.59	16	22	6
Career Fire Fighters	1.81	18	26	7
Volunteer Fire Fighters	6.06	61	85	24
Law Enforcement	2.80	28	39	11

### 3.5.2.2.2 Airfield Operations

Under this alternative, approximately 496 people are estimated to reside within noise levels of 65 dB DNL or greater. This represents a decrease of 922 people residing within the 65 dB DNL and greater noise contours than the No Action Alternative in which an estimated 1,419 people reside within the 65 dB DNL and greater noise contours. As such, the number of homes whose property values are adversely impacted by aircraft noise would decrease under this alternative.

### 3.5.2.2.3 Airspace and Range Utilization

Socioeconomic resources in areas under airspace can be impacted by increased noise. However, noise levels in Lancer MOA would be less than 35 dB  $L_{dnmr}$  and the conclusions associated with the 2000 *Realistic Bomber Training Initiative EIS* (USAF, 2000) would continue to be valid. Additionally, as stated in Section 3.2.2(Noise, Environmental Consequences), noise levels in the Lancer MOA would be reduced by 8.4 dB  $L_{dnmr}$  from the No Action Alternative baseline.

Potential socioeconomic impacts resulting from airspace use at the Pecos MOA are evaluated in the *New Mexico Training Range Initiative EIS* (USAF, 2006). The EIS determined that expanded airspace and low-altitude flights would not be expected to result in any significant impacts to humans, livestock, economic pursuits, or land values in the region (USAF, 2006, pp. 2-40). Noise analysis did not exceed thresholds for adverse noise impacts (USAF, 2006). The *New Mexico Training Range Initiative EIS* used the EPA level of 55 dB (EPA, 1974) to determine potential impacts. Noise levels in the Pecos MOA would be 36.9 dB  $L_{dnmr}$  and the conclusions associated with the New Mexico Training Range Initiative EIS would continue to be valid. Additionally, as stated in Section 3.2.2(Noise, Environmental Consequences), noise levels in the Pecos MOA would be reduced by 19 dB  $L_{dnmr}$  from the No Action Alternative baseline.

Noise levels in the Brownwood MOA would be less than 35 dB DNL (Section 3.2.2.2.3, Noise, Dyess AFB Alternative, Airspace and Range Utilization), which is less than the EPA level of 55 dB DNL below which no effects to public health and welfare would occur (EPA, 1974). In addition, operations in the Brownwood MOA would decrease by 13 operations annually (see Section 3.1.2.2.2, Airspace, Airspace and Range Utilization). Since noise levels would remain unchanged and operations are decreasing, no significant economic impacts would occur in the Brownwood MOA.

Socioeconomic impacts resulting from the use of PRTC are described in detail in the 2014 PRTC EIS and associated ROD (USAF, 2014a). These impacts include property values, civil aviation, energy resource development, and noise disturbances.

As stated in Section 3.5.2.1.1 for the No Action Alternative, interviews conducted during the development of the 2014 PRTC EIS revealed that the existence of the Powder River A or B MOAs was not used in determining the value of a property. The complex nature of property valuation factors makes any estimation of the potential effects of airspace modifications on land values highly speculative. Ranching operations, communities, and private airports all exist and function under the existing Powder River MOAs. Other socioeconomic factors, such as business activity, employment, interest rates, and land

1 scarcity (or availability) are much more likely to affect property values than training  
2 airspace. Training flight activity under the PRTC is not expected to affect the value of  
3 property under the airspace (USAF, 2014a, pp. 4-118). However, if noise was used as a  
4 component to determine property values, the range of noise levels across the PRTC is  
5 35 to 46.1 dB  $L_{dnmr}$ , which is the same range as the No Action Alternative. In either case,  
6 noise levels are well below the EPA level of 55 dB DNL below which no effects to public  
7 health and welfare would occur (EPA, 1974).

8 Impacts associated with civil aviation and public airports described under the No Action  
9 Alternative would continue to occur under the Dyess AFB Alternative. As stated in the  
10 2014 PRTC EIS, the extent of impacts would be dependent on scheduling, the duration  
11 of the ground holds, and the amount of time that the MOAs were active (USAF, 2014a,  
12 pp. 4-123). If all the airspace were activated, the airspace use and related activities  
13 associated with the PRTC could result in delay, uncertainty, or other impacts. A change  
14 in airspace use for military training could be seen by civil airspace users as an adverse  
15 impact on the human, social, or economic resources of the region (USAF, 2014a, pp. 4-  
16 123). Annual operations within the PRTC for the Dyess AFB Alternative would be 2,760  
17 operations, which is 18 fewer operations than the No Action Alternative. Additionally,  
18 PRTC-related B-21 air operations would adhere to the legal descriptions for the PRTC  
19 MOAs published in the National Flight Data Digest (effective date: September 17, 2015).  
20 As a result, it is anticipated that civil aviation issues under the Dyess AFB Alternative  
21 would be minimal.

22 Since PRTC-related B-21 air operations would adhere to the legal descriptions for the  
23 PRTC MOAs published in the National Flight Data Digest (effective date: September 17,  
24 2015), it is anticipated that the conclusions from the 2014 PRTC EIS would remain valid.  
25 The 2014 PRTC EIS states, "No impacts to elevated ground structures, wind farms, oil  
26 and gas, or mining are expected," (USAF, 2014a, pp. 4-128). Consequently, there are no  
27 anticipated impacts to energy resource development under PRTC.

28 Noise levels in areas under the PRTC airspace range from less than 35 to 46.1 dB  $L_{dnmr}$ .  
29 As indicated in the 2014 PRTC EIS, the EPA has identified a DNL of 55 dB to be the level  
30 below which no effects on public health and welfare would occur (USAF, 2014a; EPA,  
31 1974). As the B-1 retires, low-level flights would be greatly reduced. Since the B-21  
32 generally would not fly at low altitudes, concerns regarding the sudden and unexpected  
33 nature of infrequent, low-level or supersonic events during low-flying exercises and  
34 associated surprise and annoyance impacts would be alleviated.

#### 35 **3.5.2.2.4 Facilities and Infrastructure**

36 New construction, demolition, and modifications to facilities and infrastructure would  
37 result in direct, indirect, and induced economic impacts in the ROI. Cost details regarding  
38 the facilities and infrastructure are not available at the time of this EIS. However, it would  
39 be anticipated that construction, demolition, and renovations for base facilities and  
40 infrastructure would result in near-term economic benefits to the ROI driven by an  
41 increase in construction spending. Construction-related impacts would last for the  
42 duration of the activities.

### 3.5.2.2.5 Weapons Generation Facility

Potential impacts to socioeconomic resources from the construction of the WGF would result in direct, indirect, and induced economic impacts in the ROI. Cost details regarding the facility and infrastructure are not available at the time of this EIS. However, it would be anticipated that construction 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.

### 3.5.2.2.6 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 but that would only be temporary until the transition is final.

There would be 14,673 USAF personnel (active duty and civilians), contractors, and dependents under this scenario, representing an increase of 4,528 people compared to the No Action Alternative at Dyess AFB. There would also be an increase of an estimated 2,497 dependents over baseline levels of which approximately 772 would be children of school age (i.e., 5 to 18 years old) entering the local area schools. 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 6,022 military and 665 civilian personnel jobs would create indirect and induced employment of an additional 531 jobs for a total additional value of \$22,200,692 compared to the No Action Alternative. However, this impact would also be temporary during the transition period. The 6,200 USAF military personnel associated with the Snapshot Scenario would result in approximately 4,853 military personnel residing off base and demand for 4,452 housing units, approximately 1,340 more housing units compared to under the No Action Alternative. Construction workers and secondary workers would also require housing and compete for affordable housing. There would be a demand for additional public service personnel throughout the Abilene Metropolitan Statistical Area, which may or may not require a temporary hire of additional public service personnel. For example, an additional 4,528 people to the population in the ROI may require up to an additional 7 medical professionals, 8 career firefighters, 27 volunteer firefighters, and 13 law enforcement professionals to keep the personnel per capita ratios similar to the existing national averages.

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

The USAF would work with the local community to assist in any way possible with the planning for increased population and increased requirements for support.

### 3.5.2.3 Ellsworth AFB Alternative

#### 3.5.2.3.1 Personnel

Table 3.5-22 presents the approximate end state of personnel for the Ellsworth AFB Alternative. Under this alternative, there would be an additional 1,664 military personnel at Ellsworth AFB for a total end state of 4,860 active military personnel, 930 civilian personnel, and 139 contractors.

**Table 3.5-22. Personnel Estimates in the Region of Influence Under the Ellsworth AFB Alternative**

Personnel	Number of Individuals				
	No Action Alternative	B-1 Departing	B-21 Incoming	End State	Change
Active Military	3,196	1,836	3,500	4,860	1,664
Civilian	930	0	0	930	0
Contractor	139	0	0	139	0
Spouses	2,346	1,010	1,925	3,261	915
Children	3,985	1,707	2,275	4,553	568
<b>Total</b>	<b>10,596</b>	<b>4,553</b>	<b>7,700</b>	<b>13,743</b>	<b>3,147</b>

There would be approximately 4,200 dependents accompanying the 3,500 active military personnel associated with the B-21 beddown. Once the personnel and dependents associated with the B-1 aircraft depart, there would be a total change in the ROI population of 3,147 people (see Table 3.5-23). Additional personnel and dependents associated with this alternative would result in an increase in the average annual percentage growth rate to the region which is currently projected at 1.1 percent through 2025. 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 3.5-23. Population Estimates in the Region of Influence Under the Ellsworth AFB Alternative**

No Action Alternative (as of 2025)	End State (as of 2025)	Change in Population <sup>1</sup>
147,681	150,828	3,147

Note:

1. Based on the assumption that the 3,147 personnel and dependents associated with the Ellsworth AFB Alternative would arrive by 2025.

The increased employment and payroll of 1,664 new USAF jobs would be expected to have a positive, long-term economic impact on the regional economy. The direct employment of USAF 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 3.5-24. The total active duty and civilian personnel under this alternative would result in approximately 2,110 indirect jobs with a total value of \$86,518,200.



**Table 3.5-24. Estimated Indirect Jobs and Value in the Region of Influence Under the Ellsworth AFB Alternative**

Type of Personnel	No Action Alternative	End State	Change
Active Military	3,196	4,860	1,664
Civilian	930	930	0
<b>Total Base Direct Jobs<sup>1</sup></b>	<b>4,126</b>	<b>5,790</b>	<b>1,664</b>
<b>Total Indirect Jobs</b>	<b>1,528</b>	<b>2,110</b>	<b>582</b>
<b>Value of Indirect Jobs</b>	<b>\$62,639,800</b>	<b>\$86,518,200</b>	<b>\$23,878,400</b>

Note:

1. Total base direct jobs include active military and civilian employed by the USAF and does not include contractors.

There would be an increase in housing demand in Meade and Pennington Counties as a result of the additional personnel. On base housing and dorms would be expected to continue to accommodate 1,076 military personnel. Construction of additional dormitories would be part of this alternative which would house enlisted personnel on the base. It is assumed that with the additional dormitories, the distribution of personnel living on base and off base would be the same as baseline conditions in which 33.7 percent of active military members would reside on base and the remaining 66.3 percent active military personnel would reside off base. Therefore, approximately 1,638 military personnel would reside on base and 3,222 personnel would reside off base. Taking into consideration the 9 percent of military personnel that are married to other military personnel, there would be demand for 2,956 housing units associated with an end state of 4,860 active military personnel. The number of homes in the community to support off base military members would be approximately 1,011 more than under the No Action Alternative.

The estimated demand for housing associated with the USAF personnel under this alternative is shown in Table 3.5-25.

**Table 3.5-25. Estimated Housing Units Demanded in the Region of Influence Under the Ellsworth AFB Alternative**

Type of Personnel and Unit	No Action Alternative <sup>1</sup>	End State	Change
Active Military	3,196	4,860	1,664
Personnel On Base <sup>2</sup>	1,076	1,638	562
Personnel Off Base	2,120	3,222	1,102
<b>Total Off-Base Housing Units Demanded<sup>3,4</sup></b>	<b>1,945</b>	<b>2,956</b>	<b>1,011</b>

Notes:

1. Based on actual personnel numbers living on base and off base as reported in Ellsworth AFB *Economic Impact Statement* in which 33.7 percent appropriated fund military live on base and 66.3 percent live off base (Ellsworth AFB, 2016a).

2. Construction of additional dormitories as part of the Ellsworth AFB Alternative would be anticipated to result in additional rooms for active military personnel and the distribution of military personnel on- and off base would remain as under existing conditions in which 33.7 percent of active military reside on base and 66.3 percent of active military reside off base.

3. Takes into consideration 9 percent of the active military members married to another active military member (AFPC, 2020).

4. Does not take into consideration housing demanded from migration of population fulfilling indirect jobs created by the direct Air Force personnel.

1 The increased cost of housing and the availability of jobs would be expected to increase  
 2 the average number of people per household. Housing costs could continue to rise as  
 3 supply tries to catch up with demand before leveling off as new housing is constructed.  
 4 As indicated in Table 3.5-14, there are approximately 5,572 vacant housing units  
 5 throughout the two-county ROI (U.S. Census Bureau, 2018c). Any lack of affordable  
 6 homes in the interim may require homebuyers to expand their search to include areas  
 7 outside their desired location and price range.

8 Any direct, indirect, and induced employment (number of jobs) associated with  
 9 construction activities would likely require an in-migration of workers. Workers would be  
 10 anticipated to require lodging and housing during the term of their employment which  
 11 would last for the duration of the construction activity. It would be anticipated that once  
 12 the activity is complete, workers would leave the ROI. Therefore, the demand for housing  
 13 would be even greater during construction activity in the short term.

14 The estimated total number of children dependents (ranging in ages of 0 to 22 years)  
 15 associated with the Ellsworth AFB Alternative at the end state would be 4,553 children.  
 16 Based on the assumptions described in Section 3.5.1.3 (Socioeconomics, Analysis  
 17 Methodology), there would be an estimated end state of 2,359 school-aged children  
 18 associated with USAF personnel assigned to Ellsworth AFB representing an additional  
 19 294 school-aged students to the surrounding school districts compared to the No Action  
 20 Alternative. Table 3.5-26 shows the estimated number of students that would be entering  
 21 the local school districts as a result of the beddown at Ellsworth AFB. A maximum of  
 22 18 teachers could potentially be required to maintain a student to teacher ratio of 16:1.  
 23 Students would be of varying ages and would attend one of the many schools throughout  
 24 the ROI. Additional students may result in larger class sizes and additional pressure on  
 25 school resources and expenditures. However, additional students would also contribute  
 26 to revenue generated.

27 **Table 3.5-26. Total School Age Children Enrolling in the Region of Influence Under the**  
 28 **Ellsworth AFB Alternative**

Dependent Age Range	No Action Alternative	End State	Change
0 to 5 years	1,781	2,035	254
5 to 18 years (i.e., school age)	2,065	2,359	294
18 to 22 years	139	159	20
<b>Total Children Dependents</b>	<b>3,985</b>	<b>4,553</b>	<b>568</b>

29 A total end state of 13,743 personnel and dependents under this alternative would result  
 30 in an increase of 3,147 personnel and dependents compared to the No Action Alternative.  
 31 The additional population would result in increased demand for public services such as  
 32 police, fire, and medical services. Public service personnel would also be needed to  
 33 support indirect workers and their families and during construction. Public service  
 34 personnel would compete with all others for housing in the ROI.

1 Table 3.5-27 shows the estimated number of public service professionals that may be  
 2 associated with the additional population to meet the existing national level of service  
 3 average by personnel type. The level of service, such as response times, could  
 4 potentially be impacted in the short run if there is a large influx of personnel in a short  
 5 period of time but would adjust as more public service personnel jobs become available  
 6 and positions are filled.

7 **Table 3.5-27. Estimated Number of Public Service Professionals in the Region of**  
 8 **Influence Under the Ellsworth AFB Alternative**

Profession	Multiplier (per 1,000 capita)	No Action Alternative	End State	Change
Medical Professionals	1.59	17	22	5
Career Fire Fighters	1.81	19	25	6
Volunteer Fire Fighters	6.06	64	83	19
Law Enforcement	2.80	30	38	9

### 9 3.5.2.3.2 Airfield Operations

10 Under this alternative, approximately 358 people are estimated to reside within noise  
 11 levels of 65 dB DNL or greater. This represents a decrease of 1,627 people residing  
 12 within the 65 dB DNL and greater noise contours than the No Action Alternative in which  
 13 an estimated 1,985 people reside within the 65 dB DNL and greater noise contours. As  
 14 such, there would be a less number of homes whose property values are adversely  
 15 impacted by aircraft noise under this alternative.

### 16 3.5.2.3.3 Airspace and Range Utilization

17 Socioeconomic impacts resulting from the use of PRTC are described in detail in the 2014  
 18 PRTC EIS and associated ROD (USAF, 2014a). These impacts include property values,  
 19 civil aviation, energy resource development, noise disturbances.

20 As stated in Section 3.5.2.1.2 (No Action at Ellsworth AFB), interviews conducted during  
 21 the development of the 2014 PRTC EIS revealed that the existence of the Powder River  
 22 A or B MOAs was not used in determining the value of a property. The complex nature  
 23 of property valuation factors makes any estimation of the potential effects of airspace  
 24 modifications on land values highly speculative. Ranching operations, communities, and  
 25 private airports all exist and function under the existing Powder River MOAs. Other  
 26 socioeconomic factors, such as business activity, employment, interest rates, and land  
 27 scarcity (or availability) are much more likely to affect property values than training  
 28 airspace. Training flight activity associated with PRTC is not expected to affect the value  
 29 of property under the airspace (USAF, 2014a, pp. 4-118). However, if noise was used as  
 30 a component to determine property values, the range of noise levels across the PRTC is  
 31 35 to 42 dB  $L_{dnmr}$ , which is less than the No Action Alternative. In either case, noise levels  
 32 are well below the EPA level of 55 dB DNL below which no effects to public health and  
 33 welfare would occur (EPA, 1974).

1 Impacts associated with civil aviation and public airports described under the No Action  
2 Alternative would continue to occur under the Ellsworth AFB Alternative. As stated in the  
3 2014 PRTC EIS, the extent of impacts would be dependent on scheduling, the duration  
4 of the ground holds, and the amount of time that the MOAs were active (USAF, 2014a,  
5 pp. 4-123). If all the airspace were activated, the airspace use and related activities  
6 associated with PRTC could result in delay, uncertainty, or other impacts. A change in  
7 airspace use for military training could be seen by civil airspace users as an adverse  
8 impact on the human, social, or economic resources of the region (USAF, 2014a, pp. 4-  
9 123). Annual operations within the PRTC for the Ellsworth AFB Alternative would be  
10 3,921 operations, which is 1,143 more operations than the No Action Alternative.  
11 Typically, civil aviation would be impacted by this level of increase; however, PRTC-  
12 related B-21 air operations would adhere to the legal descriptions for the PRTC MOAs  
13 published in the National Flight Data Digest (effective date: September 17, 2015). As a  
14 result, it is anticipated that civil aviation issues under the Ellsworth AFB Alternative would  
15 be minimal.

16 Noise levels in areas under the PRTC would range from less than 35 to 42 dB  $L_{dnmr}$ . As  
17 indicated in the 2014 PRTC EIS, the EPA has identified a DNL of 55 dB to be the level  
18 below which no effects on public health and welfare would occur (USAF, 2014a; EPA,  
19 1974). As the B-1 retires, low-level flights would be greatly reduced. Since the B-21  
20 generally would not fly at low altitudes, concerns regarding the sudden and unexpected  
21 nature of infrequent, low-level or supersonic events during low-flying exercises and  
22 associated surprise and annoyance impacts would be alleviated.

#### 23 **3.5.2.3.4 Facilities and Infrastructure**

24 New construction, demolition, and modifications to facilities and infrastructure would  
25 result in direct, indirect, and induced economic impacts in the ROI. Cost details regarding  
26 the facilities and infrastructure are not available at the time of this EIS. However, it would  
27 be anticipated that construction, demolition, and renovations for base facilities and  
28 infrastructure would result in near-term economic benefits to the ROI driven by an  
29 increase in construction spending. Construction-related impacts would last for the  
30 duration of the activities.

#### 31 **3.5.2.3.5 Weapons Generation Facility**

32 Potential impacts to socioeconomic resources from the construction of the WGF would  
33 result in direct, indirect, and induced economic impacts in the ROI. Cost details regarding  
34 the facility and infrastructure are not available at the time of this EIS. However, it would  
35 be anticipated that construction would result in near-term economic benefits to the ROI  
36 driven by an increase in construction spending. Construction-related impacts would last  
37 for the duration of the activities.

### 3.5.2.3.6 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 the area. Therefore, the number of people would be greater under this scenario than under the Ellsworth AFB Alternative resulting in greater potential impacts but that would only be temporary until the transition is final.

There would be 14,398 USAF personnel (active duty and civilians), contractors, and dependents under this scenario, representing an increase of 3,802 people compared to the No Action Alternative at Ellsworth AFB. There would also be an increase of an estimated 1,755 dependents over baseline levels of which approximately 383 would be children of school age (i.e., 5 to 18 years old) and would be enrolled in the local school districts within the ROI. 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 5,044 military and 930 civilian personnel jobs would create indirect and induced employment of an additional 647 jobs for a total additional value of \$26,535,200 compared to the No Action Alternative. However, this impact would also be temporary during the transition period. The 5,044 USAF military personnel under the Snapshot Scenario would result in approximately 3,406 military personnel residing off base and demand for 3,125 housing units, approximately 1,180 more housing units compared to under the No Action Alternative. Construction workers and secondary workers would also require housing and compete for affordable housing. There would be a demand for additional public service personnel throughout Meade and Pennington Counties which may or may not require a temporary hire of additional public service personnel. For example, an additional 3,786 people to the population in the ROI may require up to an additional 6 medical professionals, 7 career firefighters, 23 volunteer firefighters, and 11 law enforcement professionals to keep the personnel per capita ratios similar to the existing national averages. However, it would be anticipated that extended work hours and extra volunteer hours of existing personnel would cover the temporary peak in demand.

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

The USAF would work with the local community to assist in any way possible with the planning for the increased population and increased requirements for support.

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## 1    **3.6    ENVIRONMENTAL JUSTICE**

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### 2    **3.6.1    Environmental Justice, Affected Environment**

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#### 3    **3.6.1.1    Description of Resource**

4    Analysis of environmental justice and other sensitive receptors is conducted pursuant to  
5    EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and*  
6    *Low-Income Populations*, and EO 13045, *Protection of Children from Environmental*  
7    *Health Risks and Safety Risks*. Environmental justice addresses impacts to minority and  
8    low-income populations. If there is a potential for the Proposed Action to result in adverse  
9    impacts to resource areas that may affect human populations, analysis is conducted to  
10    determine whether environmental justice Communities of Comparison (COCs) would be  
11    disproportionately impacted. This analysis focuses on increased aircraft noise resulting  
12    from the Proposed Action as the primary impact to these populations. Noise from  
13    construction activities is not applicable because all construction would occur within  
14    installation boundaries and noise would be intermittent and temporary. Per USAF  
15    guidelines for environmental justice analysis, Census data (i.e., percentages of  
16    populations identifying themselves as minority, low-income, etc.) was used to determine  
17    potential impacts to these populations. The guidelines also address youth (under 18) and  
18    elderly (65 and older) as additional sensitive populations.

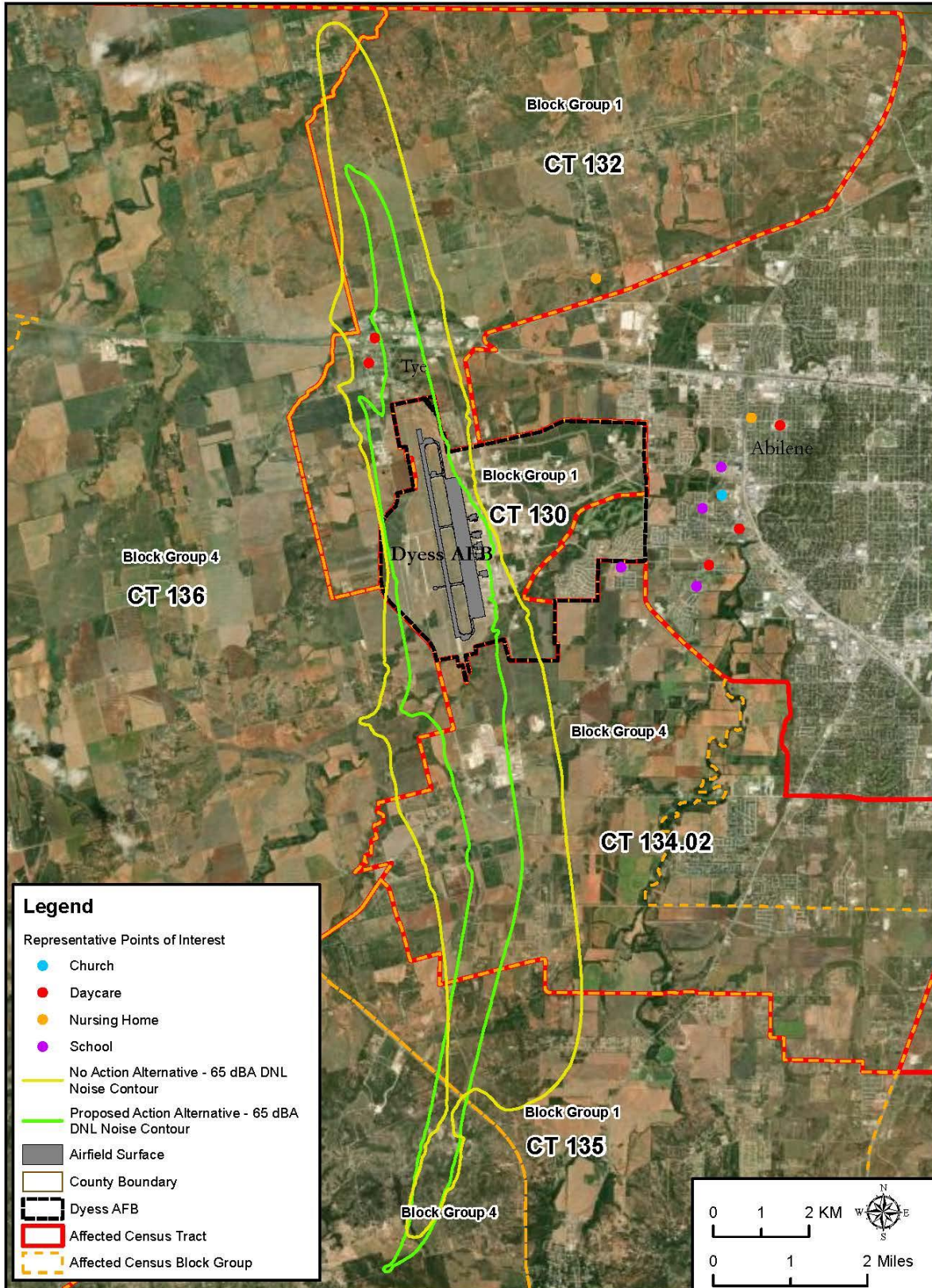
19    This analysis is completed to determine if implementation of the Proposed Action would  
20    result in disproportionate noise impacts to environmental justice populations (i.e., DNL of  
21    65 dB or greater).

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#### 22    **3.6.1.2    Region of Influence**

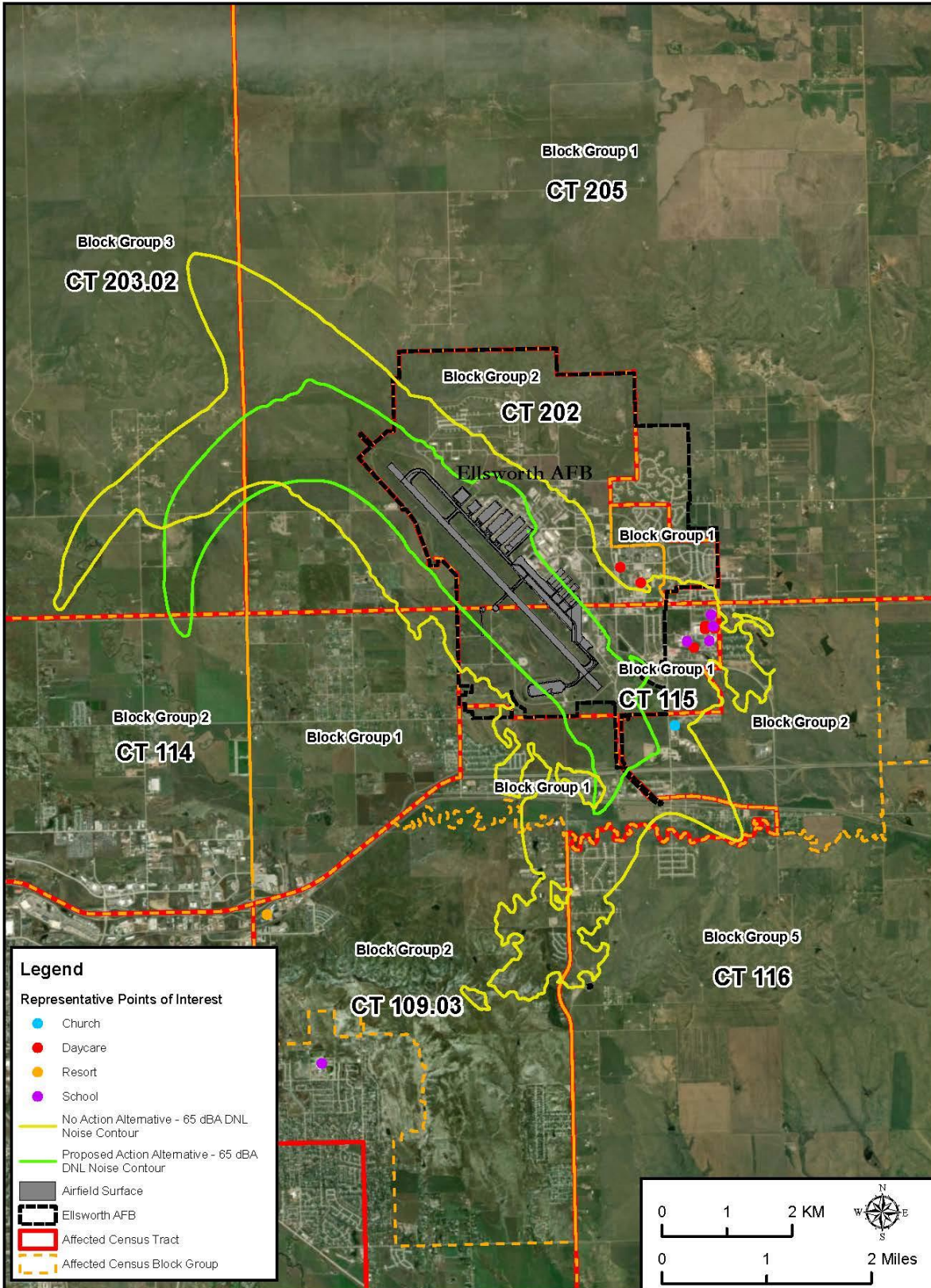
23    Environmental justice analysis overlays the 65 dB DNL contour on the census data  
24    polygons. The smallest census data segment that has the information necessary for  
25    analysis of potential impacts to environmental justice populations is used to determine  
26    potential impacts. The smallest group of census data which contain the needed  
27    information for this analysis is the census “block group.” Each block group that is partially  
28    or wholly encompassed by the 65 dB DNL contour is defined as an ROI. There could be  
29    few or many ROIs for a specific environmental justice analysis, depending on the extent  
30    of the noise contour and the size of the block groups. The next higher level of census  
31    data is the census tract. Each census tract contains a number of block groups (ROIs).

32    For Dyess AFB, there are five census tracts containing six block groups, which are  
33    partially or wholly exposed to DNL of 65 dB or greater under baseline conditions  
34    (Figure 3.6-1). For Ellsworth AFB, there are seven census tracts containing 11 block  
35    groups which are partially or wholly exposed to DNL of 65 dB or greater under baseline  
36    conditions (Figure 3.6-2).



1  
2  
3

**Figure 3.6-1. Dyess AFB Census Tracts and Block Groups Exposed to DNL of 65 dB or Greater Under Baseline and Proposed Action**



1  
2 **Figure 3.6-2. Ellsworth AFB Census Tracts and Block Groups Exposed to DNL of 65 dB**  
3 **or Greater Under Baseline and Proposed Action**



### 3.6.1.2.1 Dyess AFB

Table 3.6-1 provides baseline demographic conditions in Taylor County, where Dyess AFB is located. Also shown in Table 3.6-1 is the existing proportion of environmental justice populations in the four census tracts located in the ROI at Dyess AFB (Figure 3.6-1). The four census tracts compose the COC for the environmental justice analysis. As identified in Table 3.6-1, the COC has a lower proportion of minority and low-income populations than Taylor County, the state of Texas, or the nation.

Under baseline conditions, two child care facilities (Alliance After School at the former Tye Elementary School and Tye Play and Learn) are currently exposed to DNL of 65 dB or greater (Figure 3.2-1). Alliance After School is within the DNL contour of 65 to 69 dB and Tye Play and Learn is within the DNL contour of 70 to 74 dB. Rister Park is located within the DNL contour of 70 to 74 dB. No hospitals or libraries are exposed to DNL of 65 dB or greater under baseline conditions.

### 3.6.1.2.2 Ellsworth AFB

Table 3.6-2 provides baseline demographic conditions in Meade and Pennington Counties, where Ellsworth AFB is located. Also shown in Table 3.6-2 is the existing proportion of environmental justice populations in the seven census tracts located in the ROI at Ellsworth AFB (Figure 3.6-2). The seven census tracts are the COC for the environmental justice analysis. As identified in Table 3.6-2, the COC has a higher proportion of minority populations than Meade County or the State of South Dakota. The COC has a higher proportion of low-income populations than Meade County. Under baseline conditions, eight daycare facilities or schools are exposed to DNL of 65 dB or greater. Figure 3.2-4 identifies these schools and the location within the various noise contours. Exposure ranges from the Douglas Middle School, which is located in the DNL contour of 65 to 69 dB to the Vandenberg Elementary School, which is located in the DNL contour of 75 to 79 dB. No hospitals or off-base libraries are exposed to DNL of 65 dB or greater under baseline conditions. Boykin Park is partially located within the DNL contour of 65 to 69 dB.

### 3.6.1.2.3 Airspace and Range Utilization

As described in Section 2.3 (Commonalities), PRTC would be the primary training area for B-21 aircraft at Ellsworth AFB for aircraft operations. For Dyess AFB, the primary airspaces would be the Lancer and Pecos MOAs, as well as PRTC and the Brownwood MOA for supplemental training. PRTC-related B-21 air operations would adhere to the legal descriptions for the PRTC MOAs published in the National Flight Data Digest (effective date: September 17, 2015).

As described in the 2014 PRTC EIS and associated ROD (USAF, 2014a), four reservations (Northern Cheyenne, Crow, Standing Rock, and Cheyenne River Reservations) are located under PRTC airspace.

The alternative selected in the ROD for the 2014 PRTC EIS excludes overflights below 12,000 feet MSL over the Northern Cheyenne Reservation under portions of PR-1D. Therefore, disproportionately high and adverse impacts to minority persons on the Northern Cheyenne Reservation were not expected.

1

**Table 3.6-1. 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
Census Tract 130	1,101	0	550	54.94 <sup>a</sup>	0	0	0	0	0	0
Census Tract 132	1,954	1,954	497	25.4	360	18.4	495	25.3	314	16.1
Census Tract 134.02	8,245	8,075	2,977	36.1	800	9.9	2,731	33.1	1,258	15.3
Census Tract 135	7,972	7,972	919	11.52	441	5.53	2,071	25.97	1,317	16.52
Census Tract 136	4,934	4,851	833	16.9	590	12.2	1,207	24.5	939	19.0
<b>COC</b>	<b>24,206</b>	<b>22,852</b>	<b>5,776</b>	<b>23.86</b>	<b>2,191</b>	<b>9.59</b>	<b>6,504</b>	<b>26.87</b>	<b>3,828</b>	<b>15.81</b>
Taylor County	136,348	130,211	49,223	36.1	20,272	15.6	33,679	24.7	19,155	14.0
State of Texas	27,885,195	27,264,694	16,077,932	57.7	4,213,938	15.5	7,292,686	26.2	3,337,814	12.0
United States	322,903,030	314,943,184	125,720,853	39.0	44,257,979	14.1	73,553,240	22.8	49,238,581	15.2

Source: (U.S. Census Bureau, 2018d; U.S. Census Bureau, 2018e)

AFB = Air Force Base; COC = Community of Comparison; ROI = region of influence

Note:

a. Shading indicates a census tract where the ROI percentages for minority or low-income populations are higher than the COC.

1 **Table 3.6-2. Environmental Justice Communities and Sensitive Populations – Baseline Conditions (Ellsworth AFB)**

Geographic Unit	Total Population	Population for Whom Poverty is Determined	Minority		Low-Income		Youth		Elderly	
			Number	Percent	Number	Percent	Number	Percent	Number	Percent
Census Tract 109.03	9,286	9,275	1,377	14.82	843	9.08	2,662	28.66	866	9.32
Census Tract 114	7,833	7,668	2,142	27.34 <sup>a</sup>	1,294	16.87	2,062	26.32	1,277	16.3
Census Tract 115	821	821	450	54.81	216	26.30	461	56.15	29	3.53
Census Tract 116	7,823	7,757	1,190	15.21	428	5.51	1,950	24.92	934	11.93
Census Tract 202	1,390	851	499	35.89	124	14.57	346	24.89	0	0
Census Tract 203.02	5,884	5,819	344	5.84	383	6.58	1,290	21.92	962	16.34
Census Tract 205	4,635	4,613	743	16.03	272	5.89	1,122	24.2	337	7.27
<b>COC</b>	<b>37,672</b>	<b>36,804</b>	<b>6,745</b>	<b>17.90</b>	<b>3,560</b>	<b>9.67</b>	<b>9,893</b>	<b>26.26</b>	<b>4,405</b>	<b>11.69</b>
Meade County	27,424	26,595	3,358	12.2	1,979	7.4	6,517	23.8	18,279	16.7
Pennington County	109,294	106,509	21,591	19.8	14,222	13.4	25,597	23.4	3,870	14.1
State of South Dakota	864,289	834,921	153,479	17.8	113,144	13.6	213,066	24.7	136,808	15.8
United States	322,903,030	314,943,184	125,720,853	39.0	44,257,979	14.1	73,553,240	22.8	49,238,581	15.2

Source: (U.S. Census Bureau, 2018d; U.S. Census Bureau, 2018e)

AFB = Air Force Base; COC = Community of Comparison; ROI = region of influence

Note:

a. Shading indicates a census tract where the ROI percentages for minority or low-income populations are higher than the COC.

1 At any given location within the portions of the Crow Reservation under PR-1A, PR-1C,  
2 and PR-1D, there would be the potential for disproportionately high and adverse effects  
3 to minority populations from the uncertainty, startle effect, and noise produced by an  
4 estimated average of six to nine low-level overflights per year if adequate or acceptable  
5 mitigations were not applied. However, the mitigations identified and committed to in the  
6 2014 PRTC EIS ROD resulted in impacts that are not significant in the context of NEPA  
7 (USAF, 2014a). With respect to PRTC, neither alternative would result in  
8 disproportionately high and adverse human health or environmental effects in the context  
9 of environmental justice.

10 Evaluations of impacts related to environmental justice in the Lancer MOA were  
11 considered in the *Realistic Bomber Training Initiative EIS*. That EIS concluded, “no  
12 adverse impacts would occur because none of the proposed airspace exceeds a noise  
13 level over 65 DNL” (USAF, 2000). Since noise analysis in Section 3.2.2 (Noise,  
14 Environmental Consequences) indicates that neither the No Action Alternative (43.4 dB  
15  $L_{dnmr}$ ) nor the Dyess AFB Alternative (less than 35 dB  $L_{dnmr}$ ) would exceed 65 dB  $L_{dnmr}$ ,  
16 this conclusion would still apply.

17 Noise levels in the Brownwood MOA would be less than 35 dB  $L_{dnmr}$  (Section 3.2.2.1.1,  
18 Noise, No Action at Dyess AFB) which is less than the EPA level of 55 dB DNL below  
19 which no effects to public health and welfare would occur (EPA, 1974). Therefore, no  
20 impacts related to environmental justice are anticipated in the Brownwood MOA.

21 The *New Mexico Training Range Initiative EIS* evaluated the Pecos MOA and concluded  
22 that “no impacts related to environmental justice issues are anticipated” since the results  
23 of the noise analysis did not exceed thresholds for adverse noise impacts (USAF, 2006).  
24 The New Mexico Training Range Initiative EIS used the EPA level of 55 dB (EPA, 1974)  
25 to determine potential impacts. While noise analysis in Section 3.2.2 (Noise,  
26 Environmental Consequences) indicates that the No Action Alternative noise level is  
27 55.9 dB  $L_{dnmr}$ , the Dyess AFB Alternative noise levels would be 36.9 dB  $L_{dnmr}$ ; therefore,  
28 this conclusion still applies for the Dyess AFB Alternative.

29 No additional impacts to environmental justice or sensitive populations are anticipated  
30 from the use of PRTC or the Brownwood MOA, Lancer MOA, and Pecos MOA airspace  
31 and ranges by the B-21 aircraft, so those areas are not discussed in further detail in this  
32 section.

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### 33 **3.6.1.3 Analysis Methodology**

34 In order to identify disproportionate impacts from baseline or Proposed Action noise levels,  
35 a COC is needed. The COC is defined by summing the population in all the census tracts  
36 that contain any part of an ROI exposed to the 65 dB DNL contour. The percentages of  
37 minority and low-income residents are calculated for each ROI (i.e., block group). In  
38 accordance with the USAF guidelines for environmental justice analysis, if no adverse  
39 impacts are identified within the ROI, then there would be no potential for disproportionate  
40 impacts on environmental justice or sensitive populations (USAF, 2014b). If there is a  
41 potential for disproportionate impacts, the ROI and COC percentages are then compared.  
42 If the percentage of minorities or low-income residents in an ROI is equal to or greater than

1 the percentage of minorities or low-income residents in the COC, there is a disproportionate  
2 impact to the environmental justice population in that ROI (USAF, 2014b).

### 3 **3.6.2 Environmental Justice, Environmental Consequences**

#### 4 **3.6.2.1 No Action Alternative Consequences**

5 Under the No Action Alternative, the B-21 would not be beddown at either Dyess AFB or  
6 Ellsworth AFB. This would mean that each alternative installation would continue their  
7 individual missions at current levels, which is used as the baseline for the analysis.

##### 8 **3.6.2.1.1 No Action at Dyess AFB**

9 Under the No Action at Dyess AFB aircraft operations and the resulting noise levels would  
10 continue at existing levels. Table 3.6-3 identifies the number of environmental justice and  
11 sensitive populations currently impacted under the No Action Alternative.

12 **Table 3.6-3. Number of Residents Exposed to Aircraft Noise in the Region of Influence**  
13 **Under Existing Conditions (No Action – Dyess AFB)**

Average Noise Levels	Total Affected Off-Base Population	Minority	Low-Income	Youth	Elderly
65–69 dB	700	202	49	189	94
70–74 dB	448	142	28	122	60
75–79 dB	180	76	8	49	24
80–84 dB	64	28	2	17	8
85+ dB	27	12	1	8	3
<b>Total &gt;65 dB DNL<sup>1</sup></b>	<b>1,419</b>	<b>460</b>	<b>88</b>	<b>385</b>	<b>189</b>

Source: (U.S. Census Bureau, 2018d; U.S. Census Bureau, 2018e) Block group data used.

> = greater than; + = plus; AFB = Air Force Base; dB = decibel; DNL = day-night average sound level

Note:

1. During data analysis, numbers were rounded and then totaled.

##### 14 **3.6.2.1.2 No Action at Ellsworth AFB**

15 Under the No Action at Ellsworth AFB aircraft operations and the resulting noise levels  
16 would continue at existing levels. Table 3.6-4 identifies the number of environmental  
17 justice and sensitive populations currently impacted under the No Action Alternative.

18 **Table 3.6-4. Number of Residents Exposed to Aircraft Noise in the Region of Influence**  
19 **Under Existing Conditions (No Action – Ellsworth AFB)**

Average Noise Levels	Total Affected Off-Base Population	Minority	Low-Income	Youth	Elderly
65–69 dB	1,313	186	166	418	114
70–74 dB	391	75	59	136	28
75–79 dB	190	43	39	79	12
80–84 dB	78	10	15	29	6
85+ dB	13	4	3	6	1
<b>Total &gt;65 dB DNL<sup>1</sup></b>	<b>1,985</b>	<b>318</b>	<b>282</b>	<b>668</b>	<b>161</b>

Source: (U.S. Census Bureau, 2018d; U.S. Census Bureau, 2018e) Block group data used.

> = greater than; + = plus; AFB = Air Force Base; dB = decibel; DNL = day-night average sound level

Note:

1. During data analysis, numbers were rounded and then totaled.

### 3.6.2.2 Dyess AFB Alternative

The number of residents exposed to aircraft noise in the 65 dB DNL or greater contours would decrease under the Dyess AFB Alternative (Table 3.6-5). Under the No Action Alternative, a total of 1,419 residents are exposed to noise levels greater than 65 dB. This would decrease by 65 percent to 496 residents under the Dyess AFB Alternative. The number of minority and low-income residents exposed to noise levels greater than 65 dB would decrease by 63 and 73 percent, respectively, as compared to the No Action Alternative (Table 3.6-5). Table 3.6-6 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 dB would decrease by 70 and 66 percent, respectively (Table 3.6-7). Table 3.6-8 shows which census tracts have a higher percent of youth (under 18 years) and elderly (65 years and older) than the COC they are located within. Since the number of sensitive residents exposed to noise in the 65 dB 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 dB DNL or greater contour under the No Action Alternative. Both of these receptors are located outside of the 65 dB DNL contour (see Figure 3.2-5) under the Dyess AFB Alternative. Additionally, Rister Park, which was located within the 70 to 74 dB DNL contour under the No Action Alternative, would be located within the 65 to 69 dB DNL contour under the Dyess AFB Alternative.

#### 3.6.2.2.1 Snapshot

The number of residents exposed to aircraft noise in the 65 dB DNL or greater contours would decrease under the Snapshot Scenario at Dyess AFB (Table 3.6-9). Under the No Action, 1,419 residents are exposed to noise levels greater than 65 dB. This would decrease by 39 percent to 869 residents under the Snapshot Scenario at Dyess AFB (see Table 3.0-1). Additionally, the number of minority and low-income residents exposed to noise levels greater than 65 dB would decrease by 38 and 44 percent, respectively (Table 3.6-9). Table 3.6-10 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 dB would decrease by 39 and 37 percent, respectively, as compared to the No Action Alternative (Table 3.6-11). Table 3.6-12 shows which census tracts have a higher percent of youth (under 18 years) and elderly (65 years and older) than the COC they are located within.

**Table 3.6-5. 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 dB	700	341	-359	202	106	-96	49	20	-29
70–74 dB	448	126	-322	142	53	-89	28	3	-25
75–79 dB	180	29	-151	76	13	-63	8	1	-7
80–84 dB	64	0	-64	28	0	-28	2	0	-2
85+ dB	27	0	-27	12	0	-12	1	0	-1
<b>Total<sup>1</sup></b>	<b>1,419</b>	<b>496</b>	<b>-923</b>	<b>460</b>	<b>172</b>	<b>-288</b>	<b>88</b>	<b>24</b>	<b>-64</b>

Source: (U.S. Census Bureau, 2018d; U.S. Census Bureau, 2018e) Block group data used.

- = minus; + = plus; AFB = Air Force Base; dB = decibel; DNL = day-night average sound level

Note:

1. During data analysis, numbers were rounded and then totaled.

**Table 3.6-6. Environmental Justice Populations Exposed to Aircraft Noise by Block Group (Dyess AFB Alternative)**

County	Geographic Unit	Total Off Base Population Affected (65 dB DNL or greater)	Minority		Disproportionate Impact <sup>1</sup>	Population for Whom Poverty is Determined	Low-Income		Disproportionate Impact <sup>1</sup>
			Number	Percent			Number	Percent	
Taylor	BG 1, CT 130	4	2	49.95	No	0	0	0	No
Taylor	BG 1, CT 132	117	30	25	No	95	18	18.42	No
Taylor	BG 1, CT 135	105	16	15.26	No	105	4	3.83	No
Taylor	BG 4, CT 134.02	265	124	47	No	265	2	0.94	No
Taylor	BG 4, CT 135	2	1	2.68	No	2	1	2.52	No
Taylor	BG 4, CT 136	3	1	10	No	3	0	0	No

Source: (U.S. Census Bureau, 2018d; U.S. Census Bureau, 2018e)

AFB = Air Force Base; BG = Block Group; COC = Community of Comparison; CT = Census Tract; dB = decibel; DNL = day-night average sound level

Note:

1. Although census tracts (see Table 3.6-1) 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 3.6-5.

**Table 3.6-7. Sensitive Populations Exposed to Aircraft Noise Under the 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 dB	700	341	-359	189	92	-97	94	45	-49
70–74 dB	448	126	-322	122	35	-87	60	16	-44
75–79 dB	180	29	-151	49	8	-41	24	4	-20
80–84 dB	64	0	-64	17	0	-17	8	0	-8
85+ dB	27	0	-27	8	0	-8	3	0	-3
<b>Total</b>	<b>1,419</b>	<b>496</b>	<b>-923</b>	<b>385</b>	<b>135</b>	<b>-250</b>	<b>189</b>	<b>65</b>	<b>-124</b>

Source: (U.S. Census Bureau, 2018d; U.S. Census Bureau, 2018e) Block group data used.

- = minus; + = plus; AFB = Air Force Base; dB = decibel; DNL = day-night average sound level

Note:

1. During data analysis, numbers were rounded and then totaled.

**Table 3.6-8. Sensitive Populations Exposed to Aircraft Noise by Block Group (Dyess AFB Alternative)**

County	Geographic Unit	Total Off Base Population Affected (65 dB DNL or greater)	Youth		ROI>COC	Elderly		ROI>COC
			Number	Percent		Number	Percent	
Taylor	BG 1, CT 130	4	0	0	No	0	0	No
Taylor	BG 1, CT 132	117	30	25.33	No	19	16.06	Yes
Taylor	BG 1, CT 135	105	29	27.13	Yes	14	13.52	No
Taylor	BG 4, CT 134.02	265	75	28.41	Yes	31	11.64	No
Taylor	BG 4, CT 135	2	1	18.96	No	1	36.81	Yes
Taylor	BG 4, CT 136	3	1	26.65	No	1	21.67	Yes

Source: (U.S. Census Bureau, 2018d; U.S. Census Bureau, 2018e)

> = greater than; AFB = Air Force Base; BG = Block Group; COC = Community of Comparison; CT = Census Tract; ROI = Region of Influence



**Table 3.6-9. 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 dB	700	557	-143	202	159	-43	49	36	-13
70–74 dB	448	213	-235	142	85	-57	28	10	-18
75–79 dB	180	74	-106	76	32	-44	8	3	-5
80–84 dB	64	21	-43	28	10	-18	2	1	-1
85+ dB	27	4	-23	12	2	-10	1	1	0
<b>Total<sup>1</sup></b>	<b>1,419</b>	<b>869</b>	<b>-550</b>	<b>460</b>	<b>288</b>	<b>-172</b>	<b>88</b>	<b>51</b>	<b>-37</b>

Source: (U.S. Census Bureau, 2018d; U.S. Census Bureau, 2018e) Block group data used.

- = minus; + = plus; AFB = Air Force Base; dB = decibel; DNL = day-night average sound level

Note:

1. During data analysis, numbers were rounded and then totaled.

**Table 3.6-10. Environmental Justice Populations Exposed to Aircraft Noise by Block Group (Dyess AFB Alternative Snapshot)**

County	Geographic Unit	Total Off Base Population Affected (65 dB DNL or greater)	Minority		Disproportionate Impact <sup>1</sup>	Population for Whom Poverty is Determined	Low-Income		Disproportionate Impact <sup>1</sup>
			Number	Percent			Number	Percent	
Taylor	BG 1, CT 130	5	2	49.95	No	5	0.00	0	No
Taylor	BG 1, CT 132	197	50	25.43	No	197	36	18.42	No
Taylor	BG 1, CT 135	234	36	15.26	No	234	9	3.83	No
Taylor	BG 4, CT 134.02	425	199	46.76	No	425	4	0.94	No
Taylor	BG 4, CT 135	3	1	2.68	No	3	1	2.52	No
Taylor	BG 4, CT 136	5	1	9.51	No	5	1	0	No

Source: (U.S. Census Bureau, 2018d; U.S. Census Bureau, 2018e)

AFB = Air Force Base; BG = Block Group; COC = Community of Comparison; CT = Census Tract; dB = decibel; DNL = day-night average sound level

Note:

1. Although census tracts (see Table 3.6-1) 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 3.6-9.

**Table 3.6-11. 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 dB	700	557	-143	189	151	-38	94	75	-19
70–74 dB	448	213	-235	122	56	-66	60	30	-30
75–79 dB	180	74	-106	49	20	-29	24	10	-14
80–84 dB	64	21	-43	17	6	-11	8	3	-5
85+ dB	27	4	-23	8	1	-7	3	1	-2
<b>Total<sup>1</sup></b>	<b>1,419</b>	<b>869</b>	<b>-550</b>	<b>385</b>	<b>234</b>	<b>-151</b>	<b>189</b>	<b>119</b>	<b>-70</b>

Source: (U.S. Census Bureau, 2018d; U.S. Census Bureau, 2018e) Block group data used.

- = minus; + = plus; AFB = Air Force Base; dB = decibel

Note:

1. During data analysis, numbers were rounded and then totaled.

**Table 3.6-12. Sensitive Populations Exposed to Aircraft Noise by Block Group (Dyess AFB Alternative Snapshot)**

County	Geographic Unit	Total Off Base Population Affected (65 dB DNL or greater)	Youth		ROI>COC	Elderly		ROI>COC
			Number	Percent		Number	Percent	
Taylor	BG 1, CT 130	5	0	0	No	0	0	No
Taylor	BG 1, CT 132	197	50	25.33	No	32	16.06	Yes
Taylor	BG 1, CT 135	425	115	27.13	Yes	57	13.52	Yes
Taylor	BG 4, CT 134.02	234	67	28.41	Yes	27	11.64	No
Taylor	BG 4, CT 135	3	1	18.96	No	1	36.81	Yes
Taylor	BG 4, CT 136	5	1	26.65	Yes	1	21.67	Yes

Source: (U.S. Census Bureau, 2018d; U.S. Census Bureau, 2018e)

> = greater than; AFB = Air Force Base; BG = Block Group; CT = Census Tract; COC = Community of Comparison; dB = decibel; DNL = day-night average sound level; ROI = Region of Influence

1 Since the number of sensitive residents impacted is less than the number of people  
2 affected under the No Action Alternative, the Snapshot Scenario at Dyess AFB would  
3 have an overall positive impact as less residents are exposed to noise in the 65 dB DNL  
4 or greater contour. Therefore, there are no adverse impacts to sensitive populations  
5 anticipated.

6 Two sensitive receptor locations were located in the 65 dB DNL or greater contour under  
7 the No Action Alternative. Under the Snapshot Scenario at Dyess AFB, only one sensitive  
8 receptor location (Alliance After School) was identified within the 65 to 69 dB DNL contour  
9 (Figure 3.2-8). Once the B-21 has replaced the B-1, noise levels would decrease and the  
10 Alliance After School would no longer be within the 65 dB DNL contour.

### 11 **3.6.2.2.2 Proposed Resource-Specific Mitigations and Management Actions to** 12 **Reduce the Potential for Environmental Impacts**

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

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### 14 **3.6.2.3 Ellsworth AFB Alternative**

15 The number of residents exposed to aircraft noise in the 65 dB DNL or greater contours  
16 would decrease under the Ellsworth AFB Alternative (Table 3.2-17). Under the No Action  
17 Alternative, 1,985 residents are exposed to noise levels greater than 65 dB. This would  
18 decrease by 82 percent to 358 residents under the Ellsworth AFB Alternative.  
19 Additionally, the number of minority and low-income residents exposed to noise levels  
20 greater than 65 dB would decrease by 86 and 82 percent, respectively (Table 3.6-13).  
21 Table 3.6-14 shows populations of minority and low-income populations by block group.  
22 The number of people affected by aircraft related noise in the total off base population is  
23 less than the number of people affected under the No Action Alternative. Therefore, there  
24 are no adverse disproportionate impacts anticipated to environmental justice populations.

25 For sensitive populations, the number of youth and elderly residents exposed to noise  
26 levels greater than 65 dB would decrease by 83 and 81 percent, respectively, as  
27 compared to the No Action Alternative (Table 3.6-15). Table 3.6-16 shows which census  
28 tracts have a higher percent of youth (under 18 years) and elderly (65 years and older)  
29 than the COC they are located within. The Ellsworth AFB Alternative would have an  
30 overall positive impact as less residents are exposed to noise in the 65 dB DNL or greater  
31 contour than under the No Action Alternative. Therefore, no adverse impacts to sensitive  
32 residential populations are anticipated. Additionally, no sensitive receptor locations were  
33 identified in the 65 dB DNL or greater contour under the Ellsworth AFB Alternative (see  
34 Figure 3.2-9).

### 1 **3.6.2.3.1 Snapshot**

2 The number of residents exposed to aircraft noise in the 65 dB DNL or greater contours  
3 would decrease under the Snapshot Scenario at Ellsworth AFB (Table 3.2-21,  
4 Figure 3.2-10). Under the No Action Alternative, 1,985 residents are exposed to noise  
5 levels greater than 65 dB. This would decrease by 51 percent to 978 residents under the  
6 Snapshot Scenario at Ellsworth AFB. Additionally, the number of minority and low-income  
7 residents exposed to noise levels greater than 65 dB would decrease by 52 and  
8 43 percent, respectively (Table 3.6-17). Table 3.6-18 shows populations of minority and  
9 low-income populations by block group. The number of people affected by aircraft related  
10 noise in the total off base population is less than the number of people affected under the  
11 No Action Alternative. Therefore, there are no adverse disproportionate impacts  
12 anticipated to environmental justice populations.

13 With regard to sensitive populations, the number of youth and elderly residents exposed  
14 to noise levels greater than 65 dB would decrease by 48 and 52 percent, respectively  
15 (Table 3.6-19). Table 3.6-20 shows which census tracts have a higher percent of youth  
16 (under 18 years) and elderly (65 years and older) than the COC they are located within.  
17 The Snapshot Scenario at Ellsworth AFB would have an overall positive impact as less  
18 residents are exposed to noise in the 65 dB DNL or greater contour than under the No  
19 Action Alternative. Therefore, there would be no adverse impacts to sensitive residential  
20 populations.

21 Under the No Action Alternative, nine sensitive receptors (eight daycare facilities or  
22 schools and one park) are exposed to DNL of 65 dB or greater (Figure 3.2-10). Under  
23 the Snapshot Scenario at Ellsworth AFB, three sensitive receptor locations would be  
24 exposed to DNL of 65 dB or greater. Douglas High School and Vandenberg Elementary  
25 School are located within the 65 to 69 dB DNL contour and the Vandenberg Daycare is  
26 located within the 70 to 74 dB DNL contour. All three of these locations are located in  
27 noise contours with lower levels of noise exposure when compared to the No Action  
28 Alternative. No other sensitive receptors are located within the 65 dB DNL or greater  
29 contours (Figure 3.2-10). Once the B-21 has replaced the B-1, noise levels would  
30 decrease and Douglas High School, Vandenberg Elementary School, and Vandenberg  
31 Daycare would no longer be within the 65 dB DNL or greater noise contour.

### 32 **3.6.2.3.2 Proposed Resource-Specific Mitigations and Management Actions to** 33 **Reduce the Potential for Environmental Impacts**

34 No mitigations would be necessary to implement the Ellsworth AFB Alternative.

**Table 3.6-13. Environmental Justice Populations Exposed to Aircraft Noise in the Region of Influence Under the Ellsworth AFB Alternative**

Average Noise Levels	Total Affected Off-Base Population			Minority			Low-Income		
	No Action Alternative	Ellsworth AFB Alternative	Change	No Action Alternative	Ellsworth AFB Alternative	Change	No Action Alternative	Ellsworth AFB Alternative	Change
65–69 dB	1,313	340	-973	186	36	-150	166	47	-119
70–74 dB	391	18	-373	75	8	-67	59	4	-55
75–79 dB	190	0	-190	43	0	-43	39	0	-39
80–84 dB	78	0	-78	10	0	-10	15	0	-15
85+ dB	13	0	-13	4	0	-4	3	0	-3
<b>Total<sup>1</sup></b>	<b>1,985</b>	<b>358</b>	<b>-1,627</b>	<b>318</b>	<b>44</b>	<b>-274</b>	<b>282</b>	<b>51</b>	<b>-231</b>

Source: (U.S. Census Bureau, 2018d; U.S. Census Bureau, 2018e) Block group data used.

- = minus; + = plus; AFB = Air Force Base; dB = decibel; DNL = day-night average sound level

Note:

1. During data analysis, numbers were rounded and then totaled.

**Table 3.6-14. Environmental Justice Populations Exposed to Aircraft Noise by Block Group (Ellsworth AFB Alternative)**

County	Geographic Unit	Total Off Base Population Affected (65 dB DNL or greater)	Minority		Disproportionate Impact <sup>1</sup>	Population for Whom Poverty is Determined	Low-Income		Disproportionate Impact <sup>1</sup>
			Number	Percent			Number	Percent	
Pennington	BG 1, CT 109.03	219	19	8.64	No	219	40	18.46	No
Pennington	BG 1, CT 115	18	10	54.81	No	18	5	26.31	No
Meade	BG 1, CT 205	14	3	24.67	No	14	1	5.1	No
Pennington	BG 2, CT 114	6	1	12.00	No	6	1	6.42	No
Pennington	BG 2, CT 116	49	9	17.82	No	49	1	2.45	No
Pennington	BG 2, CT 202	1	1	35.17	No	0	0	0	No
Meade	BG 3, CT 203.02	51	2	4.15	No	51	3	5.05	No

Source: (U.S. Census Bureau, 2018d; U.S. Census Bureau, 2018e)

AFB = Air Force Base; BG = Block Group; COC = Community of Comparison; CT = Census Tract; dB = decibel; DNL = day-night average sound level

Note:

1. Although census tracts (see Table 3.6-2) 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 3.6-13.

**Table 3.6-15. Sensitive Populations Exposed to Aircraft Noise Under the Ellsworth AFB Alternative**

Average Noise Levels	Total Affected Off-Base Population			Youth			Elderly		
	No Action Alternative	Ellsworth AFB Alternative	Change	No Action Alternative	Ellsworth AFB Alternative	Change	No Action Alternative	Ellsworth AFB Alternative	Change
65–69 dB	1,313	340	-973	418	108	-310	114	29	-85
70–74 dB	391	18	-373	136	8	-128	28	1	-27
75–79 dB	190	0	-190	79	0	-79	12	0	-12
80–84 dB	78	0	-78	29	0	-29	6	0	-6
85+ dB	13	0	-13	6	0	-6	1	0	-1
<b>Total<sup>1</sup></b>	<b>1,985</b>	<b>358</b>	<b>-1,627</b>	<b>668</b>	<b>116</b>	<b>-552</b>	<b>161</b>	<b>30</b>	<b>-131</b>

Source: (U.S. Census Bureau, 2018d; U.S. Census Bureau, 2018e) Block group data used.

- = minus; + = plus; AFB = Air Force Base; dB = decibel; DNL = day-night average sound level

Note:

1. During data analysis, numbers were rounded and then totaled.

**Table 3.6-16. Sensitive Populations Exposed to Aircraft Noise by Block Group (Ellsworth AFB Alternative)**

County	Geographic Unit	Total Off Base Population Affected (65 dB DNL or greater)	Youth		ROI>COC	Elderly		ROI>COC
			Number	Percent		Number	Percent	
Pennington	BG 1, CT 109.03	219	79	35.93	No	17	7.81	No
Pennington	BG 1, CT 115	18	10	56.15	No	1	3.53	No
Meade	BG 1, CT 205	14	3	21.19	No	1	3.36	No
Pennington	BG 2, CT 114	6	2	26.58	No	1	10	No
Pennington	BG 2, CT 116	49	10	20.13	No	4	7.95	No
Pennington	BG 2, CT 202	1	0	0.0	No	0	0.0	No
Meade	BG 3, CT 203.02	51	13	25.45	No	7	14.14	No

Source: (U.S. Census Bureau, 2018d; U.S. Census Bureau, 2018e)

> = greater than; AFB = Air Force Base; BG = Block Group; COC = Community of Comparison; CT = Census Tract; dB = decibel; DNL = day-night average sound level; ROI = Region of Influence

**Table 3.6-17. Environmental Justice Populations Exposed to Aircraft Noise in the Region of Influence Under the Ellsworth AFB Alternative Snapshot**

Average Noise Levels	Total Affected Off-Base Population			Minority			Low-Income		
	No Action Alternative	Ellsworth AFB Alternative Snapshot	Change	No Action Alternative	Ellsworth AFB Alternative Snapshot	Change	No Action Alternative	Ellsworth AFB Alternative Snapshot	Change
65–69 dB	1,313	706	-607	186	104	-82	166	107	-59
70–74 dB	391	215	-176	75	40	-35	59	41	-18
75–79 dB	190	52	-138	43	7	-36	39	11	-28
80–84 dB	78	5	-73	10	2	-8	15	1	-14
85+ dB	13	0	-13	4	0	-4	3	0	-3
<b>Total<sup>1</sup></b>	<b>1,985</b>	<b>978</b>	<b>-1,007</b>	<b>318</b>	<b>153</b>	<b>-165</b>	<b>282</b>	<b>160</b>	<b>-122</b>

Source: (U.S. Census Bureau, 2018d; U.S. Census Bureau, 2018e) Block group data used.

- = minus; + = plus; AFB = Air Force Base; dB = decibel; DNL = day-night average sound level

Note:

1. During data analysis, numbers were rounded and then totaled.

**Table 3.6-18. Environmental Justice Populations Exposed to Aircraft Noise by Block Group  
(Ellsworth AFB Alternative Snapshot)**

County	Geographic Unit	Total Off Base Population Affected (65 dB DNL or greater)	Minority		Disproportionate Impact <sup>1</sup>	Population for Whom Poverty is Determined	Low-Income		Disproportionate Impact <sup>1</sup>
			Number	Percent			Number	Percent	
Pennington	BG 1, CT 109.03	622	54	8.64	No	622	115	18.46	No
Pennington	BG 1, CT 114	2	1	13.82	No	2	0	22.02	No
Pennington	BG 1, CT 115	119	65	54.81	No	119	31	26.31	No
Meade	BG 1, CT 202	0	0	36.19	No	0	0	14.57	No
Meade	BG 1, CT 205	20	5	24.67	No	20	1	5.10	No
Pennington	BG 2, CT 109.03	28	6	22.02	No	28	5	18.46	No
Pennington	BG 2, CT 114	7	1	12.00	No	7	2	22.02	No
Pennington	BG 2, CT 116	113	20	17.82	No	113	3	2.45	No
Meade	BG 2, CT 202	1	1	35.17	No	0	0	0	No
Meade	BG 3, CT 203.02	66	3	4.15	No	66	3	5.05	No
Pennington	BG 5, CT 116	1	1	12.52	No	1	1	6.14	No

Source: (U.S. Census Bureau, 2018d; U.S. Census Bureau, 2018e)

AFB = Air Force Base; BG = Block Group; COC = Community of Comparison; CT = Census Tract; dB = decibel; DNL = day-night average sound level

Note:

1. Although census tracts (see Table 3.6-2) 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 3.6-17.



**Table 3.6-19. Sensitive Populations Exposed to Aircraft Noise Under the Ellsworth AFB Alternative Snapshot**

Average Noise Levels	Total Affected Off-Base Population			Youth			Elderly		
	No Action Alternative	Ellsworth AFB Alternative Snapshot	Change	No Action Alternative	Ellsworth AFB Alternative Snapshot	Change	No Action Alternative	Ellsworth AFB Alternative Snapshot	Change
65–69 dB	1,313	706	-607	418	239	-179	114	57	-57
70–74 dB	391	215	-176	136	83	-53	28	15	-13
75–79 dB	190	52	-138	79	20	-59	12	4	-8
80–84 dB	78	5	-73	29	3	-26	6	1	-5
85+ dB	13	0	-13	6	0	-6	1	0	-1
<b>Total<sup>1</sup></b>	<b>1,985</b>	<b>978</b>	<b>-1,007</b>	<b>668</b>	<b>345</b>	<b>-323</b>	<b>161</b>	<b>77</b>	<b>-84</b>

Source: (U.S. Census Bureau, 2018d; U.S. Census Bureau, 2018e) Block group data used.

- = minus; + = plus; AFB = Air Force Base; dB = decibel

Note:

1. During data analysis, numbers were rounded and then totaled.

**Table 3.6-20. Sensitive Populations Exposed to Aircraft Noise by Block Group (Ellsworth AFB Alternative Snapshot)**

County	Geographic Unit	Total Off Base Population Affected (65 dB DNL or greater)	Youth		ROI>COC	Elderly		ROI>COC
			Number	Percent		Number	Percent	
Pennington	BG 1, CT 109.03	622	223	35.94	Yes	49	7.8	No
Pennington	BG 1, CT 114	2	1	23.99	No	1	17.83	Yes
Pennington	BG 1, CT 115	119	67	56.15	Yes	4	3.53	No
Meade	BG 1, CT 202	0	0	34.87	Yes	0	0	No
Meade	BG 1, CT 205	20	4	21.19	No	1	3.36	No
Pennington	BG 2, CT 109.03	28	8	29.2	Yes	3	10.75	No
Pennington	BG 2, CT 114	113	23	20.13	No	9	7.95	No
Pennington	BG 2, CT 116	1	0	0	No	0	0	No
Meade	BG 2, CT 202	66	17	25.45	No	9	14.14	Yes
Meade	BG 3, CT 203.02	1	1	27.49	Yes	1	8.04	No
Pennington	BG 5, CT 116	7	2	26.58	Yes	0.73	9.85	No

Source: (U.S. Census Bureau, 2018d; U.S. Census Bureau, 2018e)

> = greater than; AFB = Air Force Base; BG = Block Group; CT = Census Tract; COC = Community of Comparison; dB = decibel; DNL = day-night average sound level; ROI = region of influence

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## 3.7 BIOLOGICAL RESOURCES

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### 3.7.1 Biological Resources, Affected Environment

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#### 3.7.1.1 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.

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#### 3.7.1.2 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 2.4-1 and Table 2.5-1 and as shown in Figure 2.4-3, Figure 2.4-4, Figure 2.5-3, and Figure 2.5-4. 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, 2017a) and Ellsworth AFB (Ellsworth AFB, 2020a). The INRMP summarizes the natural resources that are present on each installation and outlines strategies to adequately manage those resources. This EIS utilizes other USAF 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 PRTC airspace and associated range boundaries. For aircraft operations out of Dyess AFB, the ROI also includes the lands under the Brownwood MOA, Lancer MOA, and the Pecos MOA (which includes the associated ATCAAs) (Figure 2.3-1). Because no ground disturbance would occur under the existing airspace during B-21 aircraft operations, vegetation and aquatic species (i.e., fish) were excluded from further analysis. Additionally, wildlife habitat areas would not be impacted by aircraft operations and are not considered further in this EIS. Therefore, the ROI for biological resources under the airspace only applies to various wildlife species known to occur in these areas and that have the

1 potential to be impacted by noise and bird-aircraft collisions associated with B-21 aircraft  
2 operations.

### 3 **3.7.1.2.1 Dyess AFB**

#### 4 **Vegetation**

5 Dyess AFB is located within the Southwest Plateau and Plains Dry Steppe and Shrub  
6 ecoregion (Bailey, 1995a). Specifically, the base is located within the Rolling Plains  
7 section and the Central Lowlands geomorphic province, and the Kansan biotic province.  
8 Subsection classification is the Mesquite Plains (Dyess AFB, 2017a).

9 Vegetation at Dyess AFB consists of local grasslands, deciduous mesquite woodlands,  
10 riparian vegetation, and turf and landscaped areas. Common species include honey  
11 mesquite trees (*Prosopis glandulosa*), blueberry juniper (*Juniperus asheii*) and redberry  
12 juniper (*J. pinchotti*). Shade-tolerant Texas wintergrass (*Nassella leucotricha*) is the  
13 dominant groundcover plant within the mesquite woodlands. What remains of local  
14 grasslands are short to mid-grass grasslands, which include silver bluestem (*Bothriochloa*  
15 *saccharoides*), perennial threeawn (*Aristida purpurea*), buffalograss (*Bouteloua*  
16 *dactyloides*), Texas grama (*B. rigidiseta*), sideoats grama (*B. curtipendula*), and white  
17 tridens (*Tridens albescens*) (Dyess AFB, 2017a).

18 Of the total acreage at Dyess AFB, almost half (2,645 acres, or 49 percent) of the land  
19 includes grounds that are either previously developed or are maintained (including grass  
20 areas subject to mowing and scheduled landscape maintenance). Approximately  
21 1,000 acres (or 18 percent) consist of turf and landscaped areas including the golf course,  
22 Airplane Park, picnic grounds, industrial and administrative facilities, base housing, and  
23 the hospital. The predominant turf grass is Bermuda grass (*Cynodon dactylon*); common  
24 shrubs include red tip photinia (*Photinia fraseri*) and holly (*Ilex aquifolium*); and trees  
25 consist mostly of Afghan pine (*Pinus eldarica*), live oak (*Quercus virginiana*), red oak (*Q.*  
26 *rubra*), pecan (*Carya illinoensis*), bur oak (*Q. macrocarpa*), green ash (*Fraxinus*  
27 *pennsylvanica*), desert willow (*Chilopsis linearis*) and mesquite (*Prosopis* sp.). Mesquite  
28 is a major component of all plant communities present at Dyess AFB. Ongoing mesquite  
29 reduction projects are employed through the Natural Resource Management program to  
30 suppress mesquite encroachment and restore native grasses and forbs on base (Dyess  
31 AFB, 2017a).

#### 32 **Wildlife**

33 The turf and landscaped areas on base provide little to no habitat for wildlife species, but  
34 may support small animals accustomed to human activity. Mature mesquite woodlands  
35 and old growth mesquite/scrub communities support most of the terrestrial wildlife habitat  
36 found at Dyess AFB. Resident wildlife associated with mature mesquite woodlands  
37 commonly includes the eastern cottontail rabbit (*Sylvilagus floridanus*), black-tailed  
38 jackrabbit (*Lepus californicus*), southern plains woodrat (*Neotoma micropus*), hispid  
39 cotton rat (*Sigmodon hispidus*), striped skunk (*Mephitis mephitis*), nine-banded armadillo

1 (*Dasyopus novemcinctus*), porcupine (*Erethizon dorsatum*), coyote (*Canis latrans*), bobcat  
2 (*Lynx rufus*), and badger (*Taxidea taxus*) (Dyess AFB, 2017a).

3 Common avian species observed on Dyess AFB include golden-fronted woodpecker  
4 (*Melanerpes aurifrons*), ladder-backed woodpecker (*Dryobates scalaris*), curved-billed  
5 thrasher (*Toxostoma curvirostre*), cactus wren (*Campylorhynchus brunneicapillus*),  
6 canyon towhee (*Melospiza fusca*), northern cardinal (*Cardinalis cardinalis*), pyrrhuloxia  
7 (*C. sinuatus*), mockingbird (*Mimus polyglottos*), Bewick's wren (*Thryomanes bewickii*),  
8 and greater roadrunner (*Geococcyx californianus*). Resident game birds present on  
9 Dyess AFB include the mourning dove (*Zenaidura macroura*), white-winged dove (*Z.*  
10 *asiatica*), northern bobwhite quail (*Colinus virginianus*), and wild turkey (*Meleagris*  
11 *gallopavo*). Many migrant bird species utilize the old growth mesquite forests as nesting  
12 habitat in spring and summer. These include the yellow-billed cuckoo (*Coccyzus*  
13 *americanus*), eastern bluebird (*Sialia sialis*), ash-throated flycatcher (*Myiarchus*  
14 *cinerascens*), Bell's vireo (*Vireo bellii*), painted bunting (*Passerina ciris*), scissor-tailed  
15 flycatcher (*Tyrannus forficatus*), and western kingbird (*T. verticalis*) (Dyess AFB, 2017a).

16 Raptors commonly observed at Dyess AFB include the American kestrel (*Falco*  
17 *sparverius*), Cooper's hawk (*Accipiter cooperii*), sharp-shinned hawk (*A. striatus*), red-  
18 tailed hawk (*Buteo jamaicensis*), Swainson's hawk (*B. swainsoni*), northern harrier  
19 (*Circus cyaneus*), Mississippi kite (*Ictinia mississippiensis*), barn owl (*Tyto alba*), great  
20 horned owl (*Bubo virginianus*), turkey vulture (*Cathartes aura*), and black vulture  
21 (*Coragyps atratus*) (Dyess AFB, 2017a).

## 22 **Special Status Species**

23 Special status plant and wildlife species are subject to regulations under the authority of  
24 federal and state agencies. The Endangered Species Act (ESA) (16 U.S.C. 1532 et seq.)  
25 of 1973, as amended, was enacted to protect and recover imperiled species and the  
26 ecosystems upon which they depend. The USFWS maintains a list of special status  
27 species considered endangered, threatened, or candidate.

28 "Endangered" means a species is in danger of extinction throughout all or a significant  
29 portion of its range. "Threatened" means a species is likely to become endangered within  
30 the foreseeable future. Candidate species are plants and animals for which the USFWS has  
31 sufficient information on their biological status and threats to propose them as endangered  
32 or threatened, but for which development of a proposed listing regulation is precluded by  
33 other higher priority listing activities. All federal agencies are required to implement  
34 protection programs for endangered and threatened species and to use their authority to  
35 further the purposes of the act.

36 USFWS and Texas Parks and Wildlife Department (TPWD) special status species lists,  
37 by county, were obtained to identify species with the potential to occur within the ROI.  
38 The USFWS Information for Planning and Consultation (IPaC) system was accessed  
39 online to request an *Official Species List* to identify species protected under Section 7(c)  
40 of the ESA that could occur within the ROI (Consultation Code: 02ETAU00-2020-SLI-  
41 0810) (Appendix E, Biological Resources) (USFWS, 2020a). Table 3.7-1 presents these

1 species. The TPWD list of rare species commonly found in Taylor County, Texas, is  
2 included in Appendix E (TPWD, 2020a).

3 **Table 3.7-1. Federally Listed Species with Potential to Occur at Dyess AFB**

Common Name	Scientific Name	Protection Status	Potential for Occurrence at Dyess AFB
<b>Fish</b>			
Smalleye Shiner	<i>Notropis buccula</i>	Endangered	None. Suitable habitat not present.
Sharpnose Shiner	<i>Notropis oxyrhynchus</i>	Endangered	None. Suitable habitat not present.
<b>Clams</b>			
Texas Fawnsfoot	<i>Truncilla macrodon</i>	Candidate	None. Suitable habitat not present.

Source: (USFWS, 2020a; Dyess AFB, 2017a)

AFB = Air Force Base

4 No federally listed plant or animal species are known to occur on Dyess AFB (Laurence,  
5 2020; Dyess AFB, 2017a). Additionally, there is no federally designated critical habitat on  
6 base (USFWS, 2020a). The TPWD indicates that two reptile species of state significance  
7 are known to occur or have the potential to occur within Taylor County. These species  
8 include the spot-tailed earless lizard (*Holbrookia lacerata*) (no status) and the Texas  
9 horned lizard (*Phrynosoma cornutum*) (state threatened) (Dyess AFB, 2017a).

10 The spot-tailed earless lizard prefers habitat consisting of rocky desert flats, areas with  
11 sparse vegetation or mesquite-prickly pear associations, and uplands of the Edwards  
12 Plateau in central Texas (Dyess AFB, 2017a). Although potential habitat for the spot-  
13 tailed earless lizard exists in most parts of Dyess AFB, there have been no confirmed  
14 observations to date (Laurence, 2020).

15 The Texas horned lizard inhabits open, sandy to gravelly grasslands and deserts which  
16 support grass, mesquite, and cactus. Potential habitat for this species exists throughout  
17 the installation; however, the prevalence of tight clay soils may inhibit or limit reproduction.  
18 The Texas horned lizard has been occasionally observed by base employees (Dyess  
19 AFB, 2017a).

## 20 **Migratory Birds**

21 The Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703–712) of 1918 prohibits actions  
22 resulting in the pursuit, capture, killing, and/or possession of any protected migratory bird,  
23 nest, egg, or parts thereof. The USFWS maintains a list of designated migratory birds  
24 occurring in various regions of the United States. The USFWS regulations allow for the  
25 incidental take of migratory birds for military readiness activities.

26 It is DoD policy to promote and support Partners in Flight in the protection and  
27 conservation of neo-tropical migratory birds and their habitat by protecting vital habitat,  
28 enhancing biodiversity, and maintaining healthy and productive natural systems  
29 consistent with the military mission. Birds of Conservation Concern (BCC) are a subset  
30 of MBTA-protected species identified by the USFWS as those in the greatest need of  
31 additional conservation action to avoid future listing under the ESA. BCC have been  
32 identified at three geographic scales: National, USFWS Regions, and Bird Conservation  
33 Regions (BCRs). BCRs are the smallest geographic scale at which BCC have been

1 identified, and the lists of BCC species at this scale are expected to be the most useful  
2 for governmental agencies to consider in complying with the MBTA and EO 13186  
3 (USFWS, 2008).

4 According to the *USFWS Birds of Conservation Concern* (USFWS, 2008), Dyess AFB is  
5 located within BCR 19 Central Mixed-grass Prairie Region, under the Central Flyway  
6 migration route (Figure 3.7-1). Twenty-seven BCC occur within the BCR 19 (Appendix E,  
7 Biological Resources) (USFWS, 2008).

8 Of the 27 listed BCC species for BCR 19 (Appendix E, Biological Resources), TPWD and  
9 Partners in Flight identified five species with breeding populations on Dyess AFB. These  
10 include the loggerhead shrike (*Lanius ludovicianus*), Bell's vireo, Cassin's sparrow  
11 (*Aimophila cassinii*), Mississippi kite, and scissor-tailed flycatcher (Dyess AFB, 2017a).  
12 Migratory birds are known to commonly traverse the area and may present bird/wildlife-  
13 aircraft strike hazard (BASH) concerns; however, the 7 BW Flight Safety Office  
14 implements the BASH plan to reduce this risk to aircraft (Dyess AFB, 2019a). See Section  
15 3.11 (Health and Safety) for an additional discussion of BASH safety methods.

### 16 **Bald and Golden Eagle Protection Act**

17 The bald eagle (*Haliaeetus leucocephalus*) is protected by the Bald and Golden Eagle  
18 Protection Act (BGEPA) (16 U.S.C. 668c; 50 CFR 22.3) of 1942 even though it has been  
19 delisted under the ESA. Occurrences of bald eagles at Dyess AFB may include over-  
20 flights during their spring and fall migrations; however, any occasional presence would be  
21 transient in nature. Preferred suitable habitat for the bald eagle does not occur at Dyess  
22 AFB.

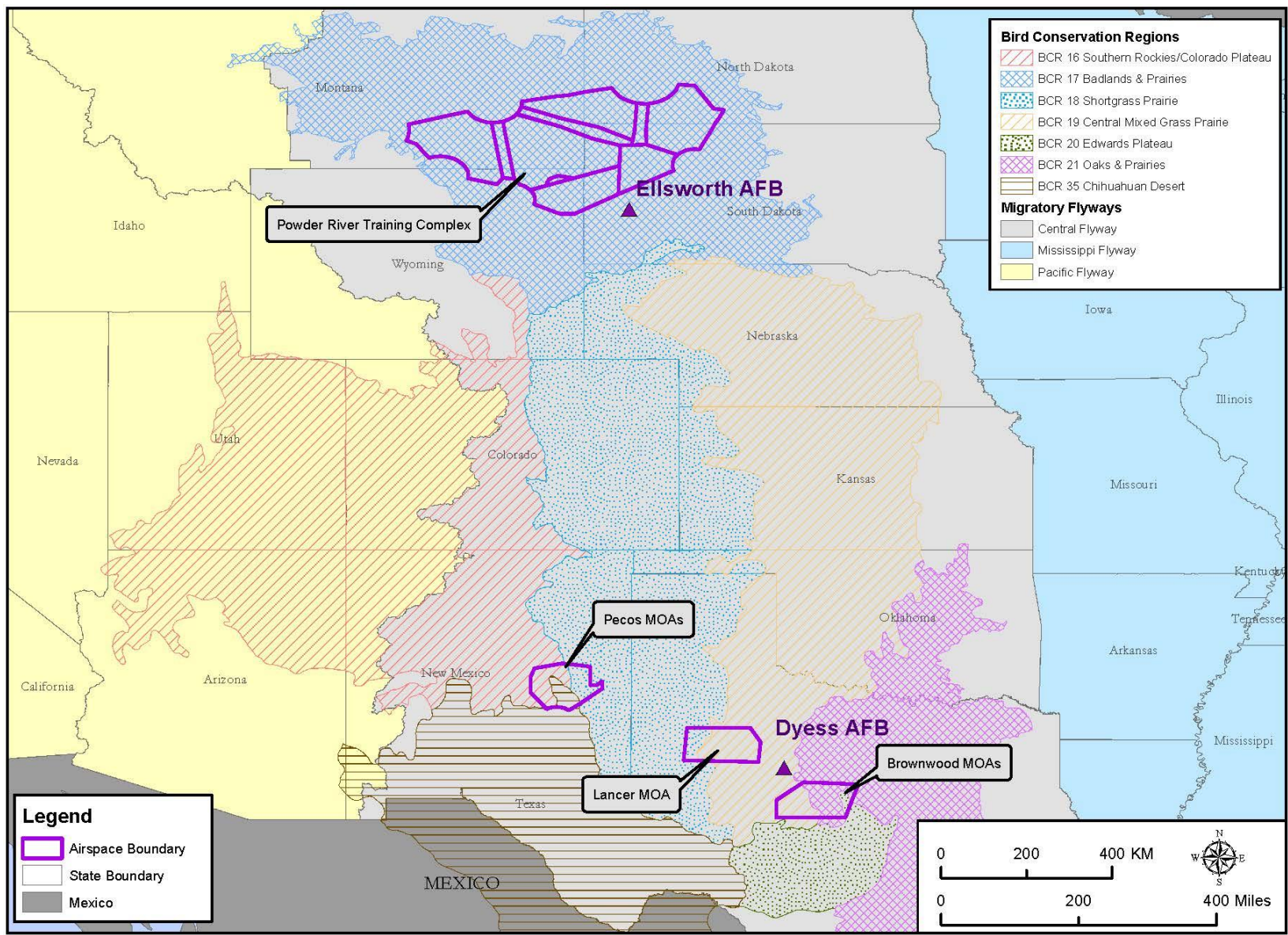
23 While golden eagles (*Aquila chrysaetos*) are year-round residents in Texas, there are no  
24 known nests in central Texas or near Dyess AFB (Texas Breeding Bird Atlas, 2007).

### 25 **3.7.1.2.2 Ellsworth AFB**

#### 26 **Vegetation**

27 Ellsworth AFB is located within the Great Plains Palouse Dry Steppe Province ecoregion  
28 (Bailey, 1995b). This area is characterized primarily by mixed-grass and shortgrass  
29 prairies with scattered trees and shrubs, primarily sagebrush (*Artemisia* spp.) and  
30 rabbitbrush (*Chrysothamnus* spp.) (Bailey, 1995b).

31 Ellsworth AFB is composed of three main vegetation types: disturbed or improved areas  
32 (approximately 81 percent of the land area), unimproved areas that consist of remnant  
33 mixed-grass prairie (17 percent), and mixed wetlands (2 percent) (Ellsworth AFB, 2020a).  
34 The disturbed areas on base primarily consist of Kentucky bluegrass (*Poa pratensis*) and  
35 common weedy species, such as hairy crabgrass (*Digitaria sanguinalis*), field bindweed  
36 (*Convolvulus arvensis*), and common dandelion (*Taraxacum officinale*).



1  
2

Figure 3.7-1. Bird Conservation Regions and Migratory Flyways

1 Riparian vegetation occurs along the mixed wetlands associated with the base lakes as  
2 well as the north and south sloughs on the west side of the airstrip. Riparian vegetation  
3 is characterized by the presence of plains cottonwood (*Populus deltoids*), narrowleaf  
4 cattail (*Typha augustifolia*), sandbar willow (*Salix exigua*), and sedges (*Carex* spp.)  
5 (Ellsworth AFB, 2020a). Remnant mixed-grass prairie habitat is comprised of western  
6 wheatgrass (*Pascopyrum smithii*), green needle-grass (*Stipa viridula*), crested  
7 wheatgrass (*Agropyron cristatum*, and other numerous grasses and forbs (native and  
8 introduced). The mixed wetland areas primarily include obligate and facultative wetland  
9 species such as cattails (*Typha* spp.), willows (*Salix* spp.), sedges (*Carex* spp.), and  
10 spikerushes (*Eleocharis* spp.) that occur in drainage channels, impoundments and swales  
11 (Ellsworth AFB, 2020a).

## 12 **Wildlife**

13 Wildlife species characteristic of the Great Plains are present on Ellsworth AFB.  
14 According to the installation's *Integrated Natural Resource Management Plan*, a total of  
15 109 vertebrate species, including 16 mammals, 69 birds, 7 reptiles, 6 amphibians, and  
16 11 fishes have been documented on base (Ellsworth AFB, 2020a).

17 Because the majority of the base includes disturbed or improved areas, wildlife within the  
18 installation are generally made up of species tolerant of human activity. Mammals  
19 commonly observed on and near the base include mice (various species), skunks  
20 (*Mephitis mephitis*), raccoons (*Procyon lotor*), squirrels (*Sciurus niger*), rabbits and hares  
21 (*Lepus townsendii*, *Sylvilagus floridanus*), prairie dogs (*Cynomys ludovicianus*), deer  
22 (*Odocoileus hemonius*), pronghorn (*Antilocapra americana*), coyotes (*Canis latrans*),  
23 foxes (*Vulpes* spp.), and bats (various species). At Ellsworth AFB, deer, coyotes, fox,  
24 jackrabbits, and prairie dogs pose wildlife aircraft strike hazards. As a result, airfields and  
25 runways are monitored for the presence of wildlife activity (Ellsworth AFB, 2020a). See  
26 Section 3.11 (Health and Safety) for an additional discussion of BASH safety.

27 Common reptiles and amphibians include various species of turtles, snakes, frogs and  
28 toads. Fish species within the lakes and ponds include bass (*Ambloplites rupestris*,  
29 *Micropterus salmoides*), bluegill (*Lepomis macrochirus*), sunfish (*Lepomis* spp.), crappie  
30 (*Pomoxis nigromaculatus*), and trout (*Oncorhynchus mykiss*, *Salmo trutta*), catfish  
31 (*Ictalurus punctatus*), and shiner (*Notemigonus crysoleucas*) (Ellsworth AFB, 2020a).

32 Ellsworth AFB lies within the Central Flyway, a migratory bird corridor used by large  
33 populations of passerines, raptors, shorebirds, and water fowl.

## 34 **Special Status Species**

35 USFWS and South Dakota Game, Fish, and Parks (SDGFP) special status species lists,  
36 by county, were obtained to identify species with the potential to occur within the ROI.  
37 The USFWS IPaC system was accessed online to request an *Official Species List* to  
38 identify species protected under Section 7(c) of the ESA that could occur within the ROI  
39 (Consultation Code: 06E14000-2020-SLI-0406) (Appendix E, Biological Resources)  
40 (USFWS, 2020b). Table 3.7-2 presents these species. The SDGFP lists of rare species



1 found in Meade and Pennington Counties, South Dakota, are included in Appendix E  
2 (SDGFP, 2016).

3 **Table 3.7-2. Federally Listed Species with Potential to Occur at Ellsworth AFB**

Common Name	Scientific Name	Protection Status	Potential for Occurrence at Ellsworth AFB
<b>Mammals</b>			
Northern Long-eared Bat	<i>Myotis septentrionalis</i>	Threatened	None. Suitable habitat not present.
<b>Birds</b>			
Least Tern	<i>Sterna antillarum</i>	Endangered	None. Suitable habitat not present.
Red Knot	<i>Calidris canutus rufa</i>	Threatened	None. Suitable habitat not present.
Whooping Crane	<i>Grus Americana</i>	Endangered	None. Suitable habitat not present.

Source: (Ellsworth AFB, 2020a; USFWS, 2020b)  
AFB = Air Force Base

4 No federally listed plant or animal species are known to occur on Ellsworth AFB (Ellsworth  
5 AFB, 2020a). Additionally, there are is no federally designated critical habitat (USFWS,  
6 2020b). Seven state-listed species have been documented on base. These include the  
7 swift fox (*Vulpes velox*) (state threatened), ferruginous hawk (*Buteo regalis*) (Species of  
8 Greatest Conservation Need [SGCN], as identified in the South Dakota Wildlife Action  
9 Plan [Title 34A, Section 34A-8-4]), burrowing owl (*Athene cunicularia*) (SGCN), lark  
10 bunting (*Calamospiza melanocorys*) (SGCN), Blanchard's cricket frog (*Acris crepitans*)  
11 (SGCN), bumble bees (*Bombus* spp.) and Monarch butterflies (*Danus plexippus*) (both  
12 species with petitions filed with the USFWS for ESA listing) (Ellsworth AFB, 2020a).

### 13 **Migratory Birds**

14 According to the *USFWS Birds of Conservation Concern* (USFWS, 2008), Ellsworth AFB  
15 is located within BCR 17 Badlands and Prairies Region, under the Central Flyway  
16 migration route (Figure 3.7-1). Twenty-eight BCC occur within BCR 17 (Appendix E,  
17 Biological Resources) (USFWS, 2008).

18 At Ellsworth AFB, migratory birds present strike hazards and safety risks; however, the  
19 28 BW Flight Safety Office implements the BASH plan to reduce this risk to aircraft  
20 (Ellsworth AFB, 2019). See Section 3.11 (Health and Safety) for an additional discussion  
21 of BASH safety.

### 22 ***Bald and Golden Eagle Protection Act***

23 In South Dakota, bald eagles occupy the state year round (USFWS, 2014). Although rare,  
24 bald eagle flyovers have been reported at Ellsworth AFB on occasion throughout the  
25 winter, but no nests are present (Brundige, 2020a; Ellsworth AFB, 2020a).

26 In South Dakota, golden eagles are found in a few select areas of the far western part of  
27 the state where suitable nesting sites are found. They are spread more widely in winter,  
28 where they can be found patrolling the grasslands of the central part of the state (South  
29 Dakota Birds and Birding, n.d.). At Ellsworth AFB, golden eagle flyovers have been

1 documented during USDA wildlife surveys conducted by flight safety. There are no nests  
2 onsite (Brundige, 2020a; Ellsworth AFB, 2020a).

### 3 **3.7.1.2.3 Powder River Training Complex**

#### 4 **Wildlife**

5 Wildlife underlying PRTC airspace and associated range boundaries is widely diverse  
6 across the multiple ecoregions. Species include those habituated to arid desert climates,  
7 forested mountains, and grassland plains habitat. Small and large mammal species  
8 include mice, prairie dogs, jackrabbits, cottontail, bears, coyotes, deer, elk, raccoons,  
9 opossums, and various species of bats, squirrels, and foxes. Reptiles and amphibians  
10 are numerous, and include various species of snakes, lizards, skinks, turtles,  
11 salamanders, frogs, and toads. Refer to the 2014 PRTC EIS and associated ROD (USAF,  
12 2014a) for further analysis of wildlife under PRTC airspace.

13 The PRTC airspace is located within the North American Central Flyway, a migration  
14 route used by over 400 bird species annually (Audubon, 2020a).

#### 15 **Special Status Species**

16 For B-21 aircraft operations under PRTC airspace and associated range boundaries,  
17 USFWS special status species lists, by county, were obtained to identify species with the  
18 potential to occur within the 28 counties across four states (Montana, North Dakota, South  
19 Dakota, and Wyoming) within the ROI (USFWS, 2020c). Federally listed threatened,  
20 endangered, and/or candidate mammal and bird species with potential to occur under  
21 PRTC airspace are presented in Table 3.7-3. GIS data queries verified that there is no  
22 federally designated critical habitat under PRTC airspace and associated range  
23 boundaries.

**Table 3.7-3. Federally Listed Species Known to Occur or with Potential to Occur Under PRTC Airspace and Associated Range Boundaries**

Common Name	Scientific Name	Protection Status	Counties	USFWS Designated Critical Habitat Under the Airspace?	Potential for Occurrence Under PRTC Airspace and Associated Range Boundaries
<b>Birds</b>					
Least Tern	<i>Sterna antillarum</i>	Endangered	<u>North Dakota:</u> Morton, Sioux  <u>Montana:</u> Custer  <u>South Dakota:</u> Corson, Meade, Ziebach	none	Potential during migration. Least terns nest along Missouri and Cheyenne rivers and may occur along Moreau River. Utilize sandbars, islands, and shorelines.

**Table 3.7-3. Federally Listed Species Known to Occur or with Potential to Occur Under PRTC Airspace and Associated Range Boundaries**

Common Name	Scientific Name	Protection Status	Counties	USFWS Designated Critical Habitat Under the Airspace?	Potential for Occurrence Under PRTC Airspace and Associated Range Boundaries
Piping Plover	<i>Charadrius melodus</i>	Threatened	<p><u>North Dakota</u>: Morton, Sioux</p> <p><u>Montana</u>: Fallon</p> <p><u>South Dakota</u>: Corson, Perkins, Ziebach</p>	none	Potential during migration. Piping plovers nest along Missouri and Cheyenne rivers and may occur along Moreau River. Utilize sandbars, islands, and shorelines.
Red Knot	<i>Calidris canutus rufa</i>	Threatened	<p><u>North Dakota</u>: Morton, Sioux</p> <p><u>South Dakota</u>: Butte, Corson, Harding, Lawrence, Meade, Perkins, Ziebach</p>	none	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.
Whooping Crane	<i>Grus americana</i>	Endangered	<p><u>North Dakota</u>: Adams, Billings, Bowman, Golden Valley, Grant, Hettinger, Morton, Sioux, Slope, Stark</p> <p><u>Montana</u>: Carter, Custer, Fallon, Powder River, Rosebud</p> <p><u>South Dakota</u>: Butte, Corson, Harding, Lawrence, Meade, Perkins, Ziebach</p>	none	Potential during migration. Whooping cranes utilize sloughs, marshes, rivers, lakes, ponds, croplands, and pastures.
<b>Mammals</b>					
Black-footed Ferret	<i>Mustela nigripes</i>	Endangered	<p><u>Montana</u>: Big Horn, Rosebud</p>	none	Yes. Historical occurrence across ROI, however all current populations have been reintroduced.

**Table 3.7-3. Federally Listed Species Known to Occur or with Potential to Occur Under PRTC Airspace and Associated Range Boundaries**

Common Name	Scientific Name	Protection Status	Counties	USFWS Designated Critical Habitat Under the Airspace?	Potential for Occurrence Under PRTC Airspace and Associated Range Boundaries
Canada Lynx	<i>Lynx canadensis</i>	Threatened	<u>Wyoming</u> : Sheridan	none	Unlikely. Known habitat is outside of the ROI, however species' historical occurrence includes the western border of Sheridan County (adjacent to, but outside of the ROI).
Northern Long-eared Bat	<i>Myotis septentrionalis</i>	Threatened	<u>North Dakota</u> : Adams, Billings, Bowman, Golden Valley, Grant, Hettinger, Morton, Sioux, Slope, Stark  <u>Montana</u> : Carter, Custer, Fallon, Powder River  <u>South Dakota</u> : Butte, Corson, Harding, Lawrence, Meade, Perkins, Ziebach  <u>Wyoming</u> : Campbell, Crook, Weston	none	Yes. Historical occurrence within the ROI. Species range includes 39 states. Roost in caves, mines, and both live and dead trees.

Source: (USFWS, 2020c)

PRTC = Powder River Training Complex; 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.

## 1 **Migratory Bird Treaty Act**

2 The PRTC airspace and associated range boundaries are located within the USFWS  
3 designated BCR 17 Badlands and Prairies (see Appendix E, Biological Resources, for a  
4 full list of species), under the Central Flyway migration route (Figure 3.7-1) (USFWS,  
5 2008).

## 6 **Bald and Golden Eagle Protection Act**

7 Bald and golden eagle habitats are present under PRTC airspace and associated range  
8 boundaries. Bald eagles utilize aquatic habitats (coastal areas, river, lakes, and

1 reservoirs) with forested shorelines or cliffs in North America (USFWS, 2015).  
2 Throughout their range they select large roost trees that are open and accessible. Bald  
3 eagles winter primarily in coastal estuaries and river systems. Golden eagles are less  
4 likely to occur, but may be observed as rare migrants or possible winter residents in small  
5 numbers. Preferred habitats include open mountains, foothills, plains, open country  
6 (Audubon, 2020b).

#### 7 **3.7.1.2.4 Lancer MOA**

##### 8 **Wildlife**

9 Common wildlife within the Southwest Plateau and Plains Dry Steppe and Shrub Province  
10 ecoregion includes pronghorn, coyote, swift fox (*Vulpes velox*), ringtail (*Bassariscus*  
11 *astutus*), whitetail deer (*Odocoileus virginianus*), raccoon (*Procyon lotor*), armadillo  
12 (*Dasyopus* spp.), black-tailed prairie dog (*Cynomys ludovicianus*), yellow-faced pocket  
13 gopher (*Cratogeomys castanops*), various mice, and various bat species (U.S. Forest  
14 Service, n.d.a).

15 Birds species that typically occur in the ecoregion include red-tailed hawk (*Buteo*  
16 *jamaicensis*), killdeer (*Charadrius vociferus*), house sparrow (*Passer domesticus*), brown-  
17 headed cowbird (*Molothrus ater*), roadrunner (*Geococcyx californianus*), house finch  
18 (*Haemorhous mexicanus*), yellow warbler (*Setophaga petechia*), cedar waxwing  
19 (*Bombycilla cedrorum*), western kingbird (*Tyrannus verticalis*), and barn swallow (*Hirundo*  
20 *rustica*). Wild turkey, mourning dove, scaled quail, and bobwhite are common game  
21 birds, and several species of hawks and owls are present (U.S. Forest Service, n.d.b).

22 Common amphibians include plains spadefoot toad (*Spea bombifrons*), western  
23 spadefoot toad (*Spea hammondi*), plains leopard frog (*Lithobates blairi*), Great Plains  
24 toad (*Anaxyrus cognatus*), and spotted chorus frog (*Pseudacris clarkii*). Reptiles include  
25 species such as Texas horned lizard, round-tailed horned lizard (*Phrynosoma*  
26 *modestum*), Great Plains skink (*Plestiodon obsoletus*), western diamondback rattlesnake  
27 (*Crotalus atrox*), western cottonmouth (*Agkistrodon piscivorus leucostoma*), and plains  
28 black-headed snake (*Tantilla nigriceps*).

##### 29 **Special Status Species**

30 For B-21 aircraft operations within the Lancer MOA airspace, USFWS special status  
31 species lists were obtained to identify species with the potential to occur within eight  
32 counties in Texas (USFWS, 2020c). Federally listed threatened, endangered, and/or  
33 candidate mammal and bird species with potential to occur under the airspace associated  
34 with the Proposed Action are presented in Table 3.7-4. GIS data queries verified that  
35 there is no federally designated critical habitat under the Lancer MOA.

**Table 3.7-4. Federally Listed Species Known to Occur or with Potential to Occur Under the Lancer MOA Airspace**

Common Name	Scientific Name	Protection Status	Counties	USFWS Designated Critical Habitat Under the Airspace?	Potential for Occurrence Under the Lancer MOA Airspace
<b>Birds</b>					
Least Tern	<i>Sterna antillarum</i>	Endangered	Texas: Borden, Dawson, Fisher, Kent, Garza, Lynn, Scurry, Stonewall	none	Potential during migration. Least terns arrive in the eastern two-thirds of Texas as uncommon to rare migrants between mid-March and mid-June. Breed from early April to early August. Fall migrants start departing in early July and are gone by mid-December.
Piping Plover	<i>Charadrius melodus</i>	Threatened	Texas: Borden, Dawson, Fisher, Kent, Garza, Lynn, Scurry, Stonewall	none	Potential during migration, piping plover's winter in Texas along the coast.
Red Knot	<i>Calidris canutus rufa</i>	Threatened	Texas: Borden, Dawson, Fisher, Kent, Garza, Lynn, Scurry, Stonewall	none	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.
Whooping Crane	<i>Grus americana</i>	Endangered	Texas: Borden, Dawson, Fisher, Kent, Garza, Lynn, Scurry, Stonewall	none	Potential during migration. Whooping cranes utilize sloughs, marshes, rivers, lakes, ponds, croplands, and pastures.

Source: (USFWS, 2020c)

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.

## 1 **Migratory Bird Treaty Act**

2 The Lancer MOA is located within the USFWS designated BCR 18 Shortgrass Prairie  
3 and BCR 19 Central Mixed-Grass Prairie (see Appendix E, Biological Resources, for a  
4 full list of species), under the Central Flyway migration route (Figure 3.7-1) (USFWS,  
5 2008).

## 6 **Bald and Golden Eagle Protection Act**

7 Bald and golden eagle habitats are present under the Lancer MOA airspace. The Texas  
8 bald eagle population is divided into two populations: breeding birds and nonbreeding or  
9 wintering birds. Breeding populations occur primarily in the eastern half of the state and  
10 along coastal counties from Rockport to Houston. Nonbreeding or wintering populations  
11 are located primarily in the Panhandle, Central, and East Texas, and in other areas of  
12 suitable habitat throughout the state (TPWD, 2020b). Golden eagles are year-round  
13 residents in Texas; however, there are no known nests in central Texas (Texas Breeding  
14 Bird Atlas, 2007).

### 15 **3.7.1.2.5 Brownwood MOA**

#### 16 **Wildlife**

17 The Cross Timbers and Prairies ecoregion supports wide variety of wildlife species.  
18 Common species include white-tailed deer, black bear (*Ursus americanus*), bobcat, gray  
19 fox (*Urocyon cinereoargenteus*), raccoon, cottontail rabbit, gray squirrel (*Sciurus*  
20 *carolinensis*), fox squirrel (*S. niger*), eastern chipmunk (*Tamias striatus*), white-footed  
21 mouse (*Peromyscus leucopus*), pine vole (*Microtus pinetorum*), and cotton mouse  
22 (*Peromyscus gossypinus*). Gamebirds include turkey, bobwhite, and mourning dove.  
23 Common songbirds include the red-eyed vireo (*Vireo olivaceus*), cardinal (*Cardinalis*  
24 *cardinalis*), tufted titmouse (*Baeolophus bicolor*), wood thrush (*Hylocichla mustelina*),  
25 summer tanager (*Piranga rubra*), blue-gray gnatcatcher (*Polioptila caerulea*), hooded  
26 warbler (*Setophaga citrina*), and Carolina wren (*Thryothorus ludovicianus*). The  
27 herpetofauna include the box turtle (*Terrapene* spp.), common garter snake (*Thamnophis*  
28 *sirtalis*), and western diamondback rattlesnake (U.S. Forest Service, n.d.c).

#### 29 **Special Status Species**

30 For B-21 aircraft operations within the Brownwood MOA airspace, USFWS special status  
31 species lists were obtained to identify species with the potential to occur within  
32 12 counties in Texas (USFWS, 2020c). Federally listed threatened, endangered, and/or  
33 candidate mammal and bird species with potential to occur under the airspace associated  
34 with the Proposed Action are presented in Table 3.7-5. GIS data queries verified that  
35 there is no federally designated critical habitat under the Brownwood MOA.

**Table 3.7-5. Federally Listed Species Known to Occur or with Potential to Occur Under the Brownwood MOA Airspace**

Common Name	Scientific Name	Protection Status	Counties	USFWS Designated Critical Habitat Under the Airspace?	Potential for Occurrence Under the Brownwood MOA Airspace
<b>Birds</b>					
Golden-cheeked Warbler	<i>Dendroica chrysoparia</i>	Endangered	Texas: Eastland, Erath, Hamilton, San Saba	None	Yes. Preferred habitat occurs within the ROI. Golden-cheeked warbler habitat includes woodlands with tall Ashe juniper, oaks, and other hardwood trees.
Least Tern	<i>Sterna antillarum</i>	Endangered	Texas: Brown, Callahan, Coleman, Comanche, Concho, Eastland, Erath, Hamilton, McCulloch, Mills, Runnels, San Saba	None	Potential during migration. Least terns arrive in the eastern two-thirds of Texas as uncommon to rare migrants between mid-March and mid-June. Breed from early April to early August. Fall migrants start departing in early July and are gone by mid-December.
Piping Plover	<i>Charadrius melodus</i>	Threatened	Texas: Brown, Callahan, Coleman, Comanche, Concho, Eastland, Erath, Hamilton, McCulloch, Mills, Runnels, San Saba	None	Potential during migration, piping plover's winter in Texas along the coast.
Red Knot	<i>Calidris canutus rufa</i>	Threatened	Texas: Brown, Callahan, Coleman, Comanche, Concho, Eastland, Erath, Hamilton, McCulloch, Mills, Runnels, San Saba	None	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.



**Table 3.7-5. Federally Listed Species Known to Occur or with Potential to Occur Under the Brownwood MOA Airspace**

Common Name	Scientific Name	Protection Status	Counties	USFWS Designated Critical Habitat Under the Airspace?	Potential for Occurrence Under the Brownwood MOA Airspace
Whooping Crane	<i>Grus americana</i>	Endangered	Texas: Brown, Callahan, Coleman, Comanche, Eastland, Erath, Hamilton, Mills, McCulloch, San Saba	None	Potential during migration. Whooping cranes utilize sloughs, marshes, rivers, lakes, ponds, croplands, and pastures.

Source: (USFWS, 2020c)

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.

## 1 **Migratory Bird Treaty Act**

2 The Brownwood MOA is located within the USFWS designated BCR 19 Central Mixed-  
3 Grass Prairie and BCR 21 Oaks and Prairies (see Appendix E, Biological Resources, for  
4 a full list of species), under the Central Flyway migration route (Figure 3.7-1) (USFWS,  
5 2008).

## 6 **Bald and Golden Eagle Protection Act**

7 Bald and golden eagle habitats are present under the Brownwood MOA airspace. The  
8 Texas bald eagle population is divided into two populations; breeding birds and  
9 nonbreeding or wintering birds. Breeding populations occur primarily in the eastern half  
10 of the state and along coastal counties from Rockport to Houston. Nonbreeding or  
11 wintering populations are located primarily in the Panhandle, Central, and East Texas,  
12 and in other areas of suitable habitat throughout the state (TPWD, 2020b). Golden eagles  
13 are year-round residents in Texas; however, there are no known nests in central Texas  
14 (Texas Breeding Bird Atlas, 2007).

### 15 **3.7.1.2.6 Pecos MOA**

## 16 **Wildlife**

17 The Colorado Plateau Semidesert Province ecoregion supports a wide variety of wildlife  
18 species. Large mammals include mule deer, pronghorn antelope, mountain lion (*Puma*  
19 *concolor*), coyote, and bobcat, and elk (*Cervus canadensis*). Smaller species include the  
20 black-tailed jackrabbit (*Lepus californicus*), Colorado chipmunk (*Tamias quadrivittatus*),  
21 rock squirrel (*Otospermophilus variegatus*), wood rat (*Neotoma*), white-footed mouse

1 (*Peromyscus leucopus*), cliff chipmunk (*Tamias dorsalis*), cottontail, porcupine (*Erethizon*  
2 *dorsatum*), and gray fox (Bailey, 1995c).

3 Abundant resident birds of the region include bushtit (*Psaltriparus minimus*), pinyon jay  
4 (*Gymnorhinus cyanocephalus*), plain titmouse (*Baeolophus inornatus*), black-chinned  
5 hummingbird (*Archilochus alexandri*), Woodhouse's scrub-jay (*Aphelocoma woodhouseii*),  
6 red-tailed hawk, golden eagle, and rock wren (*Salpinctes obsoletus*). Summer residents  
7 include the chipping sparrow (*Spizella passerina*), nighthawk (*Chordeiles minor*), black-  
8 throated gray warbler (*Setophaga nigrescens*), northern cliff swallow (*Petrochelidon*  
9 *pyrrhonota*), lark sparrow (*Chondestes grammacus*), and mourning dove (Bailey, 1995c).

10 Amphibians and reptiles include the various turtles, lizards (collard, horned and whiptails)  
11 snakes (rattlesnakes, kingsnakes, and whip snakes), frogs, and toads (Bailey, 1995c).

## 12 **Special Status Species**

13 For B-21 aircraft operations within the Pecos MOA airspace, USFWS special status  
14 species lists were obtained to identify species with the potential to occur within five  
15 counties in New Mexico (USFWS, 2020c). Federally listed threatened, endangered,  
16 and/or candidate mammal and bird species with potential to occur under the airspace  
17 associated with the Proposed Action are presented in Table 3.7-6.

18 Based on GIS data queries, federally designated critical habitat for one fish, the Pecos  
19 bluntnose shiner (*Notropis simus pecosensis*), is present under the Pecos MOA airspace.  
20 However, because no ground disturbance would occur under the existing airspace during  
21 B-21 aircraft operations, fish species were excluded from further analysis and are not  
22 discussed further in this EIS.

**Table 3.7-6. Federally Listed Species Known to Occur or with Potential to Occur Under the Pecos MOA Airspace**

Common Name	Scientific Name	Protection Status	Counties	USFWS Designated Critical Habitat Under the Airspace?	Potential for Occurrence Under the Pecos MOA Airspace
<b>Birds</b>					
Least Tern	<i>Sterna antillarum</i>	Endangered	<u>New Mexico:</u> Chaves	none	Potential summer migrant.
Mexican Spotted Owl	<i>Strix occidentalis lucida</i>	Threatened	<u>New Mexico:</u> Lincoln	none	Unlikely. Species' historical range is outside of the ROI.
Piping Plover	<i>Charadrius melodus</i>	Threatened	<u>New Mexico:</u> Chaves, Guadalupe	none	Unlikely. Piping plovers are rarely reported/observed migrating through New Mexico.

**Table 3.7-6. Federally Listed Species Known to Occur or with Potential to Occur Under the Pecos MOA Airspace**

Common Name	Scientific Name	Protection Status	Counties	USFWS Designated Critical Habitat Under the Airspace?	Potential for Occurrence Under the Pecos MOA Airspace
Southwestern Willow Flycatcher	<i>Empidonax traillii extimus</i>	Endangered	<u>New Mexico:</u> Guadalupe, Lincoln	none	Potential spring and fall migrant. Breeding habitat does not occur within the ROI.
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	Threatened	<u>New Mexico:</u> Chaves, Lincoln	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.
<b>Mammals</b>					
New Mexico Meadow Jumping Mouse	<i>Zapus hudsonius luteus</i>	Endangered	<u>New Mexico:</u> Guadalupe, Lincoln	none	Unlikely. ROI occurs outside of the species' current native distribution.
<i>Penasco Least Chipmunk</i>	<i>Tamias minimus atristriatus</i>	Candidate	<u>New Mexico:</u> Lincoln	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.

Source: (USFWS, 2020c)

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.

## 1 **Migratory Bird Treaty Act**

2 The Pecos MOA is located within the USFWS designated BCR 16 Southern  
3 Rockies/Colorado Plateau, BCR 18 Shortgrass Prairie, and BCR 35 Chihuahuan Desert  
4 (see Appendix E, Biological Resources, for a full list of species), under the Central Flyway  
5 migration route (Figure 3.7-1) (USFWS, 2008).

## 6 **Bald and Golden Eagle Protection Act**

7 Bald and golden eagle habitats are present under the Pecos MOA airspace. In New  
8 Mexico, bald eagles are primarily migratory, supporting large populations of wintering  
9 eagles. Migrating bald eagles can be found near rivers and lakes, where occasional tall  
10 trees provide lookout perches and night roosts (New Mexico Game and Fish, 1996).

11 In New Mexico, golden eagles breed locally in suitable habitat throughout the state.  
12 Suitable habitat occurs primarily in areas of mountain cliffs or canyons, or rimrock terrain  
13 adjacent to open desert or grassland areas (NMACP, 2020).

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### 14 **3.7.1.3 Analysis Methodology**

15 The first step in the analysis of potential impacts to biological resources was to determine  
16 the locations of sensitive habitats and species in relation to the Proposed Action. Maps  
17 were examined to locate sensitive species and habitats. Next, areas of overlap for the  
18 Proposed Action and sensitive habitats and species were identified. Scientific literature  
19 was reviewed for studies that examined similar types of impacts to biological resources.  
20 The literature review included a review of basic characteristics and habitat requirements  
21 of each sensitive species. Where available, information was also gathered relative to  
22 management considerations and threats to each sensitive species. Impact analysis was  
23 then conducted based on the information gathered from the literature review and  
24 discussions with experts in these areas. The analysis included an assessment of the  
25 impacts on biological resources resulting from both construction activities and aircraft  
26 operations.

27 Impacts to biological resources for beddown actions at either basing location could result  
28 from activities associated with construction, demolition, and renovation projects as well  
29 as from aircraft operations on the installation airfields including noise effects and  
30 bird/wildlife aircraft strike considerations (Section 3.2, Noise, and Section 3.11, Health  
31 and Safety).

32 Impacts to biological resources occurring under the airspace proposed for use for B-21  
33 operations would result from associated overflight noise and bird-aircraft collisions.  
34 Aircraft noise may result in adverse health and environmental impacts to wildlife (a review  
35 of current literature evaluating potential noise effects on wildlife is presented in Appendix  
36 E, Biological Resources). Bird-aircraft collisions pose BASH and safety concerns.

1 The significance of potential impacts to biological resources was determined based on  
2 (1) the importance of the resource (i.e., legal, commercial, recreational, ecological, or  
3 scientific), (2) the proportion of the resource that would be affected relative to its  
4 occurrence in the region, (3) the sensitivity of the resource to proposed activities, and  
5 (4) the duration of ecological ramifications.

6 Impacts to biological resources would be significant if species or habitats of special  
7 concern would be adversely affected over relatively large areas or if disturbances would  
8 cause reductions in population size or distribution of a special status species. This  
9 analysis focuses on wildlife and special status species that occur or potentially occur  
10 under the airspace proposed for use for B-21 operations that could be impacted by the  
11 Proposed Action and alternatives.

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## 12 **3.7.2 Biological Resources, Environmental Consequences**

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### 13 **3.7.2.1 No Action Alternative Consequences**

#### 14 **3.7.2.1.1 No Action at Dyess AFB**

15 Under the No Action Alternative, the B-21 would not beddown at Dyess AFB, and there  
16 would be no associated construction, demolition, or renovation activities. Noise resulting  
17 from baseline aircraft operations at the airfield would continue at current levels (Section  
18 3.2.2.1.1, Noise, No Action at Dyess AFB, Aircraft Noise) (Figure 3.2-1) because the B-21  
19 MOB 1 beddown would not occur.

20 On-base biological resources would continue to be managed through each of the  
21 installation's BASH and Integrated Natural Resource Management programs. Future  
22 development that is not associated with the B-21 beddown would continue to be  
23 evaluated and implemented as appropriate. The IDP prepared for Dyess AFB provides  
24 information on potential future development and construction projects. It is anticipated  
25 that future development would occur in accordance with guidance in the IDP and INRMP,  
26 as applicable, and, thus, adverse impacts would not be expected. Note that any future  
27 development projects would be subject to project-specific environmental review under the  
28 EIAP.

#### 29 **Airspace and Range Utilization**

30 Under the No Action Alternative, there would be no development or any other ground-  
31 disturbing activities that would cause changes to the biological resources under the  
32 PRTC, Lancer MOA, Brownwood MOA, or Pecos MOA airspace. Aircraft operations and  
33 airspace use under current operational parameters would continue at current levels  
34 (Section 3.1.2.1.1, Airspace, No Action at Dyess AFB) because the B-21 MOB 1 beddown  
35 would not occur.

1 Previous NEPA analyses conducted for the PRTC (USAF, 2014a), Realistic Bomber  
2 Training Initiative (USAF, 2000), and New Mexico Training Range Initiative (USAF, 2006)  
3 concluded that noise from aircraft operations would not significantly impact any biological  
4 resources. Under the baseline No Action Alternative, noise levels range from less than  
5 35 dB  $L_{dnmr}$  to 46.1 dB  $L_{dnmr}$  across PRTC (Figure 3.2-2). Likewise, baseline noise levels  
6 beneath the Brownwood, Pecos, and Lancer MOAs (less than 35, 55.9, and 43.4 dB  $L_{dnmr}$ ,  
7 respectively) (Figure 3.2-3) would also remain well below the 65 dB  $L_{dnmr}$  level that would  
8 potentially impact noise-sensitive wildlife listed species.

9 Since the B-1 will continue to operate under the No Action Alternative, there is the  
10 potential that species could be impacted by low-level flights. SELs above 90 dB where  
11 low-level overflights occur are associated with a number of behaviors to wildlife, such as  
12 retreating from the sound, freezing, or exhibiting a strong startle response. Animals  
13 typically exhibit continually decreasing responses to noise exposure, and this suggests  
14 habituation as the noise is not perceived as a threat. Threshold noise levels for mild  
15 responses (rising of the head, pricking ears, and scenting of the air) to wildlife range from  
16 65 dB for to 85 dB. It has been reported that the intensities and durations of the startle  
17 response decrease with the numbers and frequencies of exposures, suggesting no long-  
18 term adverse effects. The majority of the literature suggests that domestic animal species  
19 (cows, horses, chickens) and wildlife species exhibit adaptation, acclimation, and  
20 habituation after repeated exposure to jet aircraft noise and sonic booms. The previous  
21 NEPA analyses concluded that minimal to no effects are expected to threatened,  
22 endangered, and other special status species (USAF, 2006; USAF, 2014a; USAF, 2000).  
23 Any impact to sensitive species would likely be short term and unlikely to significantly  
24 affect the population.

25 Potential bird-aircraft strikes could occur where migratory flyways converge. Migratory  
26 bird species involved in bird-aircraft strike would be considered an incidental taking and  
27 would be exempt from any permitting requirement. An infrequent special status bird-  
28 aircraft strike would not be expected to adversely affect any populations.

### 29 **3.7.2.1.2 No Action at Ellsworth AFB**

30 Under the No Action Alternative, the B-21 would not beddown at Ellsworth AFB, and there  
31 would be no associated construction, demolition, or renovation activities. Noise resulting  
32 from baseline aircraft operations at the airfield would continue at current levels (Section  
33 3.2.2.1.2, Noise, No Action at Ellsworth AFB, Aircraft Noise) (Figure 3.2-1) because the  
34 B-21 MOB 1 beddown would not occur.

35 On-base biological resources would continue to be managed through the installation's  
36 BASH and Integrated Natural Resource Management programs. Future development that  
37 is not associated with the B-21 beddown would continue to be evaluated and  
38 implemented as appropriate. The IDP prepared for Ellsworth AFB provides information  
39 on potential future development and construction projects. It is anticipated that future  
40 development would occur in accordance with guidance in the IDP and INRMP, as  
41 applicable, and, thus, adverse impacts would not be expected. Note that any future  
42 development projects would be subject to project-specific environmental review under the  
43 EIAP.

## 1     **Airspace and Range Utilization**

2     Under the No Action Alternative, there would be no development or any other ground-  
3     disturbing activities that would cause changes to the biological resources under the  
4     current Ellsworth AFB airspace. Aircraft operations and airspace operational parameters  
5     would continue at current levels because the B-21 MOB 1 beddown would not occur.

6     Previous NEPA analyses conducted for the PRTC concluded that aircraft operations  
7     would not significantly impact any biological resources (USAF, 2014a). Airspace noise in  
8     PRTC would range from less than 35 dB L<sub>dnmr</sub> to 46.1 dB L<sub>dnmr</sub> across PRTC (Figure 3.2-2)  
9     under the No Action Alternative at Ellsworth AFB, which would also remain well below the  
10    65 dB L<sub>dnmr</sub> level that would potentially impact noise-sensitive wildlife listed species.

11    Since the B-1 will continue to operate under the No Action Alternative, there is the  
12    potential that species could be impacted by low-level flights. SELs above 90 dB where  
13    low-level overflights occur are associated with a number of behaviors to wildlife such as  
14    retreating from the sound, freezing, or a strong startle response. Animals typically exhibit  
15    continually decreasing responses to noise exposure, and this suggests habituation as the  
16    noise is not perceived as a threat. Threshold noise levels for mild responses (rising of the  
17    head, pricking ears, and scenting of the air) to wildlife range from 65 dB for to 85 dB. It  
18    has been reported that the intensities and durations of the startle response decrease with  
19    the numbers and frequencies of exposures, suggesting no long-term adverse effects. The  
20    majority of the literature suggests that domestic animal species (cows, horses, chickens)  
21    and wildlife species exhibit adaptation, acclimation, and habituation after repeated  
22    exposure to jet aircraft noise and sonic booms. It was concluded that minimal to no effects  
23    are expected to threatened, endangered, and other special status species (USAF,  
24    2014a). Any impact to sensitive species would likely be short term and unlikely to  
25    significantly affect the population.

26    Potential bird-aircraft strikes could occur where migratory flyways converge. Migratory  
27    bird species involved in bird-aircraft strikes would be considered an incidental taking and  
28    would be exempt from any permitting requirement. An infrequent special status bird-  
29    aircraft strike would not be expected to adversely affect any populations.

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### 30    **3.7.2.2     Dyess AFB Alternative**

#### 31    **3.7.2.2.1    Personnel**

32    Changes to personnel would not impact biological resources and therefore are not  
33    discussed further in this document.

#### 34    **3.7.2.2.2    Airfield Operations**

35    Under the Dyess AFB Alternative, aircraft operations would decrease from baseline  
36    conditions at Dyess AFB by approximately 1.1 percent. Additionally, noise levels at  
37    Dyess AFB would decrease from the baseline conditions analyzed under the No Action  
38    Alternative (Section 3.2, Noise, and Table 3.2-10). The B-21 is projected to be generally  
39    quieter and tends to fly higher than the B-1; therefore the noise in the area and the number

1 of acres and wildlife exposed from B-21 operations would decrease overall as a result of  
2 establishing the B-21 MOB 1 beddown at Dyess AFB. Therefore, under the Dyess AFB  
3 Alternative, there would be a reduced potential for adverse noise effects to noise sensitive  
4 wildlife, migratory birds (including BCC), and bald or golden eagles on or near Dyess AFB  
5 as a result of B-21 operations.

6 Similar to noise, an overall reduction in aircraft operations would likely decrease the  
7 potential for bird/wildlife aircraft strike encounters. Refer to Section 3.11 (Health and  
8 Safety) for additional information. During B-21 aircraft operations at Dyess AFB, current  
9 procedures for avoiding flight operations during periods of high concentrations of  
10 migratory birds would continue. Adherence to the existing BASH Program and the  
11 USFWS-issued Depredation Permit conditions would further minimize the risk of bird-  
12 aircraft strikes at Dyess AFB, including those for migratory birds (including BCC), and  
13 special status species birds to negligible levels. The Dyess AFB BASH Plan provides  
14 guidance for bird/wildlife strike hazard reduction in areas where flying operations are  
15 conducted. Tasked organizations such as USDA Wildlife Services (USDA-WS) and the  
16 7th Bomb Wing/Flight Safety (7 BW/SEF) Bird Hazard Working Group implement  
17 procedures in accordance with the plan. Procedures include (but are not limited to)  
18 reporting hazardous bird activity and altering or discontinuing flying operations;  
19 disseminating information to all assigned and transient aircrews for specific bird hazards  
20 and procedures for avoidance; eliminating or reducing environmental conditions that  
21 attract birds to the airfield; and dispersing birds on the airfield using nonlethal measures  
22 that prevent or minimize bird damage without purposefully killing or trapping birds (Dyess  
23 AFB, 2019a). When nonlethal measures cannot be used, Dyess AFB abides by the  
24 USFWS-issued Depredation Permit that authorizes the take of specific species and  
25 numbers of birds. The conditions of the permit are updated annually. Additionally, all bird-  
26 aircraft strikes and hazards will continue to be reported per AFI 91-204, *Safety*  
27 *Investigations and Reports*, and Air Force Manual 91-223, *Aviation Safety Investigations*  
28 *and Reports*.

29 Due to the overall decreases in airfield operations, the noise environment, and potential  
30 reduction in bird/wildlife-aircraft strike encounters, impacts to wildlife, special status  
31 species, migratory birds (including BCC), and bald or golden eagles at or near Dyess AFB  
32 are not anticipated to occur under the Dyess AFB Alternative.

33 No federally listed species (as presented in Table 3.7-1) or potential suitable habitats  
34 occur at Dyess AFB and no further Section 7 consultation is required with the USFWS for  
35 the Dyess AFB Alternative. Additionally, species of state significance (spot-tailed earless  
36 lizard and the Texas horned lizard) would not be impacted by airfield operations under  
37 the Dyess AFB Alternative.

### 38 **3.7.2.2.3 Airspace and Range Utilization**

39 The existing airspace would not be changed under the Dyess AFB Alternative and B-21  
40 operations would be consistent with current operations as analyzed in the 2014 PRTC  
41 EIS and the associated USAF and FAA RODs (USAF, 2015; FAA, 2015; USAF, 2014a),  
42 Realistic Bomber Training Initiative (USAF, 2000), and New Mexico Training Range



1 Initiative (USAF, 2006). For B-21 operations, flights below 3,000 AGL would not occur in  
2 SUA.

3 Under the Dyess AFB Alternative overall aircraft operations would decrease from baseline  
4 conditions at PRTC (by approximately 0.65 percent), Lancer MOA (by approximately  
5 17.73 percent), and Brownwood MOA (by approximately 0.53 percent). Increases in air  
6 operations from baseline conditions would occur within the Pecos MOA (by approximately  
7 14.68 percent).

8 Resulting noise levels from B-21 aircraft operations would remain below 46.1 dB  $L_{dnmr}$   
9 within PRTC, below 35 dB  $L_{dnmr}$  within the Lancer and Brownwood MOAs, and below 36.9  
10 dB  $L_{dnmr}$  within the Pecos MOA. These training airspace areas are very large, and training  
11 operations are sufficiently spread out such that intense overflight noise events at any one  
12 location are infrequent. Overflight activity occurs less frequently than in other areas.  
13 Because the B-21 is projected to be generally quieter and tends to fly higher than the B-1,  
14 the noise in the area and the number of acres and wildlife exposed would decrease overall  
15 as a result of establishing the B-21 MOB 1 beddown at Dyess AFB. Therefore, under the  
16 Dyess AFB Alternative, there would be a reduced potential for adverse noise effects to  
17 noise sensitive wildlife, migratory birds (including BCC), and bald or golden eagles within  
18 training airspace and ranges as a result of B-21 operations.

19 A reduction in aircraft operations within PRTC, Lancer MOA, and Brownwood MOA would  
20 likely decrease the potential for bird/wildlife aircraft strike encounters or, at a minimum,  
21 pose no additional strike risks in these areas. However, an increase in operations within  
22 the Pecos MOA would potentially result in increased bird/wildlife-aircraft strikes. Bird  
23 migrations typically occur within ranges from 500 to 2,000 feet. Since B-21 pilots would  
24 fly predominately over 3,000 AGL, the potential for bird-aircraft collisions would be minor.

25 Therefore, no significant impacts to wildlife, special status species, migratory birds  
26 (including BCC), and bald or golden eagles within training airspace and ranges would  
27 occur under the Dyess AFB Alternative. Species or habitats of special concern would not  
28 be adversely affected or cause disturbances or reductions in population size or  
29 distribution of a special status species.

#### 30 **3.7.2.2.4 Facilities and Infrastructure**

##### 31 **Vegetation**

32 Under the Dyess AFB Alternative, activities associated with construction, renovation, and  
33 demolition projects would occur in previously developed or turf and landscaped areas  
34 within Dyess AFB. Approximately 345 acres of land would be disturbed for facilities and  
35 infrastructure projects listed in Table 2.4-1. Of which, approximately 106 acres, or  
36 31 percent of the proposed construction footprint shown in Figure 2.4-3, would be newly  
37 impacted areas containing a mix of maintained turf or landscaped areas. Approximately  
38 239 acres (or 61 percent of the proposed construction footprint) would consist of  
39 previously developed areas containing pavement or previous construction. Revegetation  
40 of temporarily disturbed areas would be conducted as directed by the base Natural  
41 Resource Manager to minimize the potential for erosion and dust generation. Since the

1 majority of construction-related impacts would occur on previously developed areas, no  
2 significant impacts to vegetation would result from implementation of the Dyess AFB  
3 Alternative.

#### 4 **Wildlife**

5 Potential impacts to wildlife would include ground disturbance and construction noise from  
6 the associated facility and infrastructure projects. However, the areas planned for  
7 development for facilities and infrastructure are highly disturbed and do not provide high  
8 quality habitat for wildlife species, though a small number of wildlife species could occur  
9 in the turf grass and landscaped areas during construction (generally those tolerant of  
10 human presence and activity). As previously stated, approximately 106 acres of existing  
11 turf grass and landscaped areas would be lost with construction of the proposed facilities  
12 and infrastructure projects. However, given the remaining areas with similar features on  
13 and around Dyess AFB, this reduction in low-quality habitat is not considered significant  
14 and would not result in population level effects to wildlife species that occur on the base.

15 Noise resulting from the proposed construction, demolition, and renovation activities  
16 would be localized, short-term, and only occur during daylight hours. Areas proposed for  
17 construction are in a military industrial land use with frequent elevated noise levels.  
18 Impacts to wildlife from construction noise would be minimal.

#### 19 **Special Status Species**

20 No federally listed species (as presented in Table 3.7-1) or potential suitable habitats  
21 occur at Dyess AFB and no further Section 7 consultation is required with the USFWS for  
22 the Dyess AFB Alternative.

23 Of the two reptile species of state significance with potential to occur at Dyess AFB, only  
24 the Texas horned lizard has been observed at Dyess AFB. The presence of listed species  
25 is monitored, and updates to the INRMP are completed every 5 years. Consistent with  
26 TPWD recommendations, Dyess AFB requires that site-specific surveys be conducted for  
27 the state-listed threatened Texas horned lizard during the warm months when the lizards  
28 are active and prior to any proposed habitat disturbance activity. Prior to commencement  
29 of construction activities, the Dyess AFB Environmental Management System would  
30 identify areas of potential Texas horned lizard habitat and coordinate species surveys to  
31 be conducted by a permitted biologist. If Texas horned lizards are found on any project  
32 site, the USAF would contact TPWD to develop relocation plans. To minimize impacts to  
33 Texas horned lizards, BMPs, as described in the *Texas Horned Lizard Watch –*  
34 *Management and Monitoring Packet* (TPWD, n.d.), would be implemented.

#### 35 **Migratory Birds**

36 The areas planned for development are highly disturbed with frequent elevated noise  
37 levels, providing little to no habitat for migratory bird species. Noise resulting from  
38 construction, demolition, and renovation activities would be localized, short-term, and only  
39 occur during daylight hours. Although a relatively small number of wildlife species could  
40 occur in the grass areas during construction (generally those tolerant of human presence

1 and activity), the limited habitat value substantially decreases the biological importance  
2 of the site. No significant impacts to migratory birds (including BCC) would occur as no  
3 habitats occur within the Dyess AFB Alternative area.

#### 4 **Bald and Golden Eagles**

5 No bald or golden eagles or eagle nesting is known to occur at Dyess AFB or in the  
6 immediate vicinity of the installation and therefore impacts to sensitive nesting habitat  
7 would not occur. No significant impacts to eagles protected under the BGEPA are  
8 anticipated to result from implementation of the Dyess AFB Alternative.

#### 9 **3.7.2.2.5 Weapons Generation Facility**

10 Construction of the WGF on Dyess AFB would occur within mesquite woodland areas,  
11 totaling approximately 49.53 acres. Permanent and temporary impacts to vegetation and  
12 wildlife may result from land clearing and construction activities. Trees and other  
13 vegetation subject to clearing could support foraging, nesting, and other behaviors for  
14 mammals, birds (including migratory birds and BCC), and reptiles. Wildlife within the WGF  
15 site would be permanently displaced by the WGF and wildlife in the vicinity may be  
16 temporarily disturbed from increased noise and human activity. It is expected that noise  
17 effects would be short term and would only affect wildlife in the immediate vicinity around  
18 the WGF site. Those affected would generally be able to return to the area after the WGF  
19 is constructed. While some wildlife would be displaced and vegetation would be removed,  
20 the affected area is considered small compared with other similar habitat available  
21 nearby. Mesquite savannah is widely distributed throughout the Rolling Plains areas in  
22 Texas (TPWD, 1984). Overall, population-level effects to any species are not expected.

23 The TPWD recommends excluding vegetation clearing during migratory bird nesting  
24 season, March through August (Dyess AFB, 2017b). To the extent practicable, Dyess  
25 AFB would avoid tree removal during this nesting season. While any habitat loss could  
26 adversely affect individual birds, the amount of impacted habitat is relatively small  
27 compared to similar habitat available. Overall, population-level effects to any migratory  
28 bird species are not expected.

29 As previously described under Section 3.7.2.2.4 (Biological Resources, Dyess AFB  
30 Alternative, Facilities and Infrastructure, Special Status Species), Dyess AFB requires  
31 that site-specific surveys be conducted for the state-listed threatened Texas horned lizard  
32 during the warm months when the lizards are active and prior to any proposed habitat  
33 disturbance activity. Consistent with TPWD recommendations and prior to  
34 implementation of the Proposed Action, the Dyess AFB Environmental Management  
35 System would identify areas of potential Texas horned lizard habitat and coordinate  
36 species surveys to be conducted by a permitted biologist. If Texas horned lizards are  
37 found on any project site, the USAF would contact TPWD to develop relocation plans. To  
38 minimize impacts to Texas horned lizards, BMPs, as described in the *Texas Horned*  
39 *Lizard Watch – Management and Monitoring Packet* (TPWD, n.d.), would be  
40 implemented.

1 Because no federally listed threatened, endangered, or candidate species and/or  
2 designated critical habitat occur in the ROI near Dyess AFB, no impacts to federally listed  
3 species would result from activities associated with construction of the WGF.

#### 4 **3.7.2.2.6 Proposed Resource-Specific Mitigations and Management Actions to** 5 **Reduce the Potential for Environmental Impacts**

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

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### 7 **3.7.2.3 Ellsworth AFB Alternative**

#### 8 **3.7.2.3.1 Personnel**

9 Changes to personnel would not impact biological resources and therefore are not  
10 discussed further in this document.

#### 11 **3.7.2.3.2 Airfield Operations**

12 Under the Ellsworth AFB Alternative, aircraft operations would increase from baseline  
13 conditions at Ellsworth AFB by approximately 15.8 percent. (Section 3.2.2.3.2, Noise,  
14 Ellsworth AFB Alternative, Airfield Operations). However, the resulting noise levels at  
15 Ellsworth AFB would decrease from the baseline conditions analyzed under the No Action  
16 Alternative (Section 3.2, Noise, and Table 3.2-18). Because the B-21 is projected to be  
17 generally quieter and tends to fly higher than the B-1, the noise in the area and the number  
18 of acres and wildlife exposed would decrease overall as a result of establishing the B-21  
19 MOB 1 beddown at Ellsworth AFB. Therefore under the Ellsworth AFB Alternative, there  
20 would be a reduced potential for adverse noise effects to noise sensitive wildlife,  
21 migratory birds (including BCC), and bald or golden eagles on or near Ellsworth AFB from  
22 B-21 operations.

23 An increase in airfield operations would likely result in an increased potential for  
24 bird/wildlife aircraft strike encounters on Ellsworth AFB. Refer to Section 3.11 (Health and  
25 Safety) for additional information. Current procedures for avoiding flight operations during  
26 periods of high concentrations of migratory birds would continue at Ellsworth AFB. The  
27 28th Bomb Wing/Flight Safety (28 BW/SEF) is responsible for the overall BASH program  
28 at Ellsworth AFB. The Ellsworth AFB BASH Plan provides guidance for bird/wildlife strike  
29 hazard reduction in areas where flying operations are conducted. Tasked organizations  
30 such as USDA-WS and the 28 BW/SEF Bird Hazard Working Group implement  
31 procedures in accordance with the plan. Procedures include (but are not limited to)  
32 reporting hazardous bird activity and altering or discontinuing flying operations;  
33 disseminating information to all assigned and transient aircrews for specific bird hazards  
34 and procedures for avoidance; eliminating or reducing environmental conditions that  
35 attract birds to the airfield; maintaining a current and up-to-date installation USDA-WS  
36 Wildlife Hazard Assessment; and dispersing birds on the airfield with nonlethal measures  
37 that prevent or minimize bird damage without purposefully killing or trapping birds  
38 (Ellsworth AFB, 2019). In instances of high wildlife collision risk hazards at the airfield,  
39 Ellsworth AFB also deters or removes wildlife under a SDGFP-issued resident wildlife  
40 depredation permit.

1 Ellsworth AFB also obtains a USFWS-issued Eagle Depredation Permit that  
2 acknowledges the potential for aircraft collisions due to sporadic bald and golden eagle  
3 flyovers in the area. Conditions of the permit state that Ellsworth AFB is authorized to use  
4 nonlethal scare devices to move or disperse bald and golden eagles that are endangering  
5 human safety due to a high risk of a serious bird strike with landing and departing aircraft.  
6 The permit does not authorize the killing, injury, or capture of eagles or the destruction of  
7 young or nests. Any eagle injuries must be reported to the USFWS Migratory Bird Permit  
8 Office within 48 hours. Continued coordination with the USFWS and annual reporting is  
9 required as part of the permit preconditions.

10 Under the Ellsworth AFB Alternative, adherence to the existing BASH Program, the  
11 USFWS-issued Depredation Permit conditions, SDGFP depredation permit conditions,  
12 and the Eagle Depredation Permit conditions would continue. Implementation of these  
13 procedures would minimize the risk of wildlife aircraft strikes at Ellsworth AFB, including  
14 those for migratory birds (including BCC), and special status species birds (SGCN and  
15 eagles) to negligible levels. Additionally, all bird-aircraft strikes and hazards will continue  
16 to be reported per AFI 91-204, *Safety Investigations and Reports*, Air Force Manual  
17 91-223, *Aviation Safety Investigations and Reports*. Therefore, it is anticipated that no  
18 significant impacts to migratory birds (including BCC), eagles, or special status species  
19 (such as state-listed SGCN) would occur from airfield operations under the Ellsworth AFB  
20 Alternative.

21 No federally listed plant or animal species are known to occur on Ellsworth AFB and no  
22 further Section 7 consultation is required with the USFWS for the Ellsworth AFB  
23 Alternative. In a letter dated May 20, 2020, the USFWS agreed that ESA Section 7  
24 requirements had been applied and that no further Section 7 consultation is required for  
25 the Ellsworth AFB Alternative (Appendix E, Biological Resources).

### 26 **3.7.2.3.3 Airspace and Range Utilization**

27 As previously stated, PRTC airspace would not be changed under the Ellsworth AFB  
28 Alternative and B-21 operations would be consistent with current operations as analyzed  
29 and approved in the 2014 PRTC EIS and the associated USAF and FAA RODs (USAF,  
30 2015; FAA, 2015; USAF, 2014a). For B-21 operations, flights below 3,000 AGL would not  
31 occur in SUA.

32 Under the Ellsworth AFB Alternative, aircraft operations within PRTC would increase by  
33 approximately 41.1 percent. However, resulting noise levels within PRTC would remain  
34 below 42.0 dB L<sub>dnmr</sub>. These training airspace areas are very large, and training operations  
35 are sufficiently spread out such that intense overflight noise events at any one location  
36 are infrequent. Overflight activity occurs less frequently than in other areas. Since the  
37 B-21 is projected to be generally quieter and tends to fly higher than the B-1, noise levels  
38 in all the airspace areas would decrease overall as a result of implementing the Ellsworth  
39 AFB Alternative. Noise effects to wildlife under the airspace would not be considered  
40 significant, as species disturbances would be short term and unlikely to result in  
41 population level effects.

42 An increase in operations within PRTC under the Ellsworth AFB Alternative would  
43 potentially increase the potential for bird/wildlife-aircraft strikes in these areas. However,

1 bird migrations typically occur within ranges from 500 to 2,000 feet and B-21 pilots would  
2 fly predominately over 3,000 feet AGL. Therefore, the potential for bird-aircraft collisions  
3 within PRTC is considered to be minor.

4 Given the decrease in noise levels and minor potential for aircraft strikes associated with  
5 B-21 operations within PRTC, there would be no significant impacts to wildlife, special  
6 status species, migratory birds (including BCC), and bald or golden eagles under the  
7 Ellsworth AFB Alternative.

#### 8 **3.7.2.3.4 Facilities and Infrastructure**

#### 9 **Vegetation and Wildlife**

10 Under the Ellsworth AFB Alternative, activities associated with construction, renovation,  
11 and demolition projects listed in Table 2.5-1 would occur in previously developed or turf  
12 or landscaped areas. Approximately 394 acres of land would be disturbed for facilities  
13 and infrastructure projects. Of which, approximately 78 acres, or 20 percent of the  
14 proposed construction footprint shown in Figure 2.5-3, of would be newly impacted areas  
15 consisting of maintained turf grass or landscaped areas. Approximately 315 acres (or 80  
16 percent of the proposed construction footprint) would consist of developed areas  
17 containing pavement or previous construction. Revegetation of temporarily disturbed  
18 areas would be conducted as directed by the base Environmental Element Manager to  
19 minimize the potential for erosion and dust generation. Since the majority of construction-  
20 related impacts would occur on previously developed areas, no significant impacts to  
21 vegetation would result from implementation of the Ellsworth AFB Alternative.

22 Noise resulting from the proposed construction, demolition, and renovation activities  
23 would be localized, short-term, and only occur during daylight hours. Areas proposed for  
24 construction are in a military industrial land use with frequent elevated noise levels.  
25 Impacts to wildlife from construction noise would be minimal. Reduction of maintained turf  
26 and landscaped areas on Ellsworth AFB would not result in population level effects  
27 because these are considered low-quality habitat areas. Therefore no significant impacts  
28 to wildlife would result from implementation of the Ellsworth AFB Alternative.

#### 29 **Special Status Species**

30 No federally listed threatened, endangered, or candidate species and/or designated  
31 critical habitat occur in the ROI near Ellsworth AFB. Therefore, implementation of the  
32 Ellsworth AFB Alternative would not impact the four federally listed species presented in  
33 Table 3.7-2. In a letter dated May 20, 2020, the USFWS agreed that ESA Section 7  
34 requirements had been applied and that no further Section 7 consultation is required for  
35 the Ellsworth AFB Alternative (Appendix E, Biological Resources).

36 There is no suitable habitat within the development areas for any of the seven state-listed  
37 species that have been documented on base. The land slated for facilities and  
38 infrastructure development has been previously disturbed, and or consists of turf grass  
39 and landscaped areas, which is not suitable habitat for the swift fox, ferruginous hawk,  
40 burrowing owl, lark bunting, Blanchard's cricket frog, bumble bees, or Monarch butterflies.

1 State-listed species management would continue to be monitored under the installation's  
2 INRMP program.

3 Noise resulting from the proposed construction, demolition, and renovation activities  
4 would be localized, short-term, and only occur during daylight hours. Noise effects would  
5 not extend to off-base areas, therefore impacts to sensitive species would not occur.

## 6 **Migratory Birds**

7 The areas planned for development are highly disturbed and provide little to no habitat  
8 for migratory bird species. Noise resulting from construction, demolition, and renovation  
9 activities would be localized, short-term, and only occur during daylight hours. Although  
10 a relatively small number of wildlife species could occur in the grass areas during  
11 construction (generally those tolerant of human presence and activity), the limited habitat  
12 value substantially decreases the biological importance of the site. No significant impacts  
13 to migratory birds (including BCC) would occur as no habitats occur within the proposed  
14 construction footprint on Ellsworth AFB.

## 15 **Bald and Golden Eagles**

16 No bald or golden eagle nesting is known to occur at Ellsworth AFB or in the immediate  
17 vicinity of the installation and therefore impacts to sensitive nesting habitat would not  
18 occur. No significant impacts to eagles protected under the BGEPA are anticipated to  
19 result from implementation of the Ellsworth AFB Alternative.

### 20 **3.7.2.3.5 Weapons Generation Facility**

#### 21 **North WGF Site Subalternative**

22 Construction of the WGF under this subalternative would occur within 50 acres of  
23 unimproved areas, consisting of native and introduced grasses and forbs. This area is  
24 currently used as a grazing pasture. Permanent and temporary impacts to vegetation and  
25 wildlife may result from land clearing and construction activities. Vegetation subject to  
26 clearing could support habitats for some small mammals, foraging birds (including  
27 migratory birds and BCC), and small reptiles. Wildlife within the North WGF site would be  
28 permanently displaced by new construction, and wildlife surrounding the site may be  
29 temporarily disturbed from increased noise and human activity. It is expected that noise  
30 effects would be short term and would only affect wildlife in the immediate vicinity.  
31 Affected individuals would generally be able to return to the surrounding area after the  
32 WGF is constructed. While some wildlife would be displaced and vegetation would be  
33 removed, the affected area would be small compared with other similar habitat available  
34 nearby. Overall, population-level effects to any species are not expected.

35 As such, no significant impacts to biological resources would result from the North WGF  
36 Site Subalternative. Because no federally listed threatened, endangered, or candidate  
37 species and/or designated critical habitat occur in the ROI near Ellsworth AFB, no impacts  
38 to special status species would occur under the North WGF Site Subalternative.

## 1 **South WGF Site Subalternative**

2 Construction of the WGF under this subalternative would occur within 39 acres of  
3 unimproved areas consisting of native and introduced grasses and forbs. Impacts to  
4 biological resources from construction of the South WGF Site Subalternative would be  
5 the same as those discussed for the North WGF Site Subalternative. Therefore, no  
6 significant impacts to biological resources (vegetation, wildlife, or special status species)  
7 would result from the South WGF Site Subalternative.

### 8 **3.7.2.3.6 Proposed Resource-Specific Mitigations and Management Actions to** 9 **Reduce the Potential for Environmental Impacts**

10 No mitigations would be necessary to implement the Ellsworth AFB Alternative.

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## 11 **3.8 CULTURAL RESOURCES**

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### 12 **3.8.1 Cultural Resources, Affected Environment**

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#### 13 **3.8.1.1 Description of Resource**

14 Cultural resources consist of prehistoric and historic sites, structures, artifacts, and any  
15 other physical or traditional evidence of human activity considered relevant to a particular  
16 culture or community for scientific, traditional, religious, or other reasons. For regulatory  
17 purposes, cultural resources are assessed to determine if they are significant and exhibit  
18 integrity, in accordance with the National Register criteria (36 CFR Part 63) to qualify for  
19 listing in the National Register of Historic Places (NRHP).

20 As defined under 32 CFR 800 (l)(1), “Historic Property means any prehistoric or historic  
21 district, site, building, structure, or object included in, or eligible for inclusion in, the  
22 National Register of Historic Places maintained by the Secretary of the Interior. This term  
23 includes artifacts, records, and remains that are related and located within such  
24 properties. The term includes properties of traditional religious and cultural importance to  
25 an Indian tribe or Native Hawaiian organization and that meet the National Register  
26 criteria.” A traditional cultural property, as defined by National Register Bulletin 38, “is  
27 eligible for listing in the National Register because of its association with cultural practices  
28 or beliefs of a living community that (a) are rooted in that community’s history, and (b) are  
29 important in maintaining the continuing cultural identity of the community” (Parker & King,  
30 1990).

31 This section describes known historic properties within the affected areas that are eligible  
32 for listing in the NRHP. As the affected environment is limited to areas already used by  
33 the USAF for current bomber operations, information is drawn from existing studies,  
34 cultural resource management plans, and previous environmental documents. The USAF  
35 has initiated government-to-government consultation with Native American tribes with  
36 potential interest in the Proposed Action and is currently engaging the appropriate SHPOs



1 and other consulting parties as they complete the necessary reviews under Section 106  
2 of the National Historic Preservation Act (NHPA).

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### 3 **3.8.1.2 Region of Influence**

4 As defined under 36 CFR 800.16, “Undertaking means a project, activity, or program  
5 funded in whole or in part under the direct or indirect jurisdiction of a Federal agency,  
6 including those carried out by or on behalf of a Federal agency; those carried out with  
7 Federal financial assistance; and those requiring a Federal permit, license or approval.  
8 Also, as defined under 36 CFR 800.16, “the Area of Potential Effects is the geographic  
9 area or areas within which an undertaking may directly or indirectly cause changes in the  
10 character or use of historic properties, if such properties exist. The area of potential effects  
11 is influenced by the scale and nature of the undertaking and may be different for different  
12 kinds of effects caused by the undertaking.”

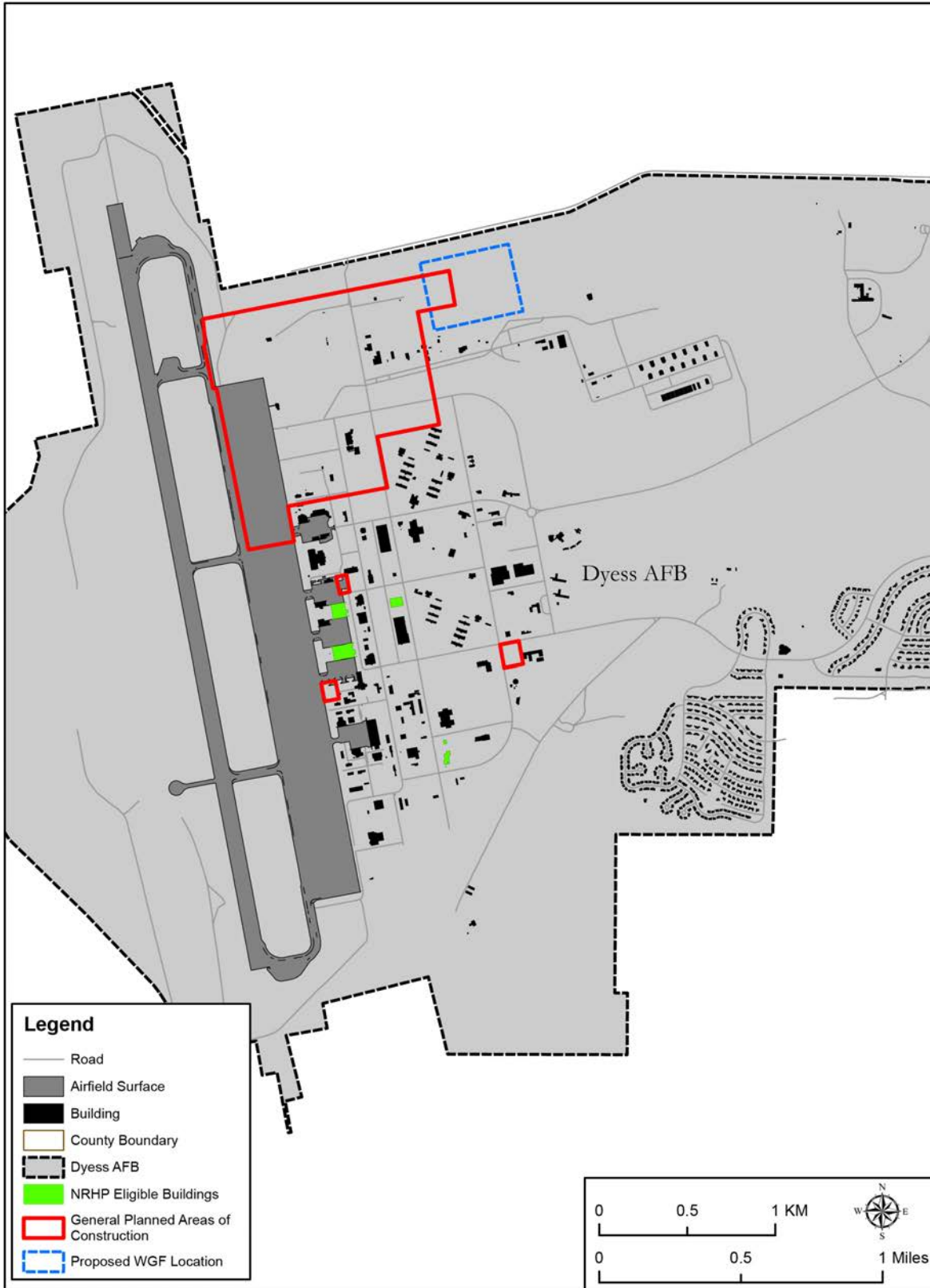
13 The Area of Potential Effects (APE) to historic properties is the ROI for cultural resources  
14 in this EIS. The APE is influenced by the scale and nature of the alternatives proposed,  
15 and, thus, may differ according to the types of effects caused by the action. The APE for  
16 this Proposed Action includes areas directly or indirect affected by construction and  
17 implementation of the proposed B-21 MOB 1 beddown at Dyess AFB or Ellsworth AFB,  
18 as well as areas beneath the airspace to be utilized for B-21 training operations.

#### 19 **3.8.1.2.1 Dyess AFB**

20 Dyess AFB traces its history to the Abilene Army Air Base, established in 1942 to support  
21 pilot training operations for Camp Barkley, located south of Abilene, Texas. The airfield  
22 was closed in 1946 and utilized as a training facility for the Texas State National Guard  
23 from 1947 to 1952. The 1,500-acre property was purchased by the City of Abilene, which  
24 raised money to purchase an additional 3,500 acres following outbreak of the Korean  
25 conflict. In 1952, the city offered the land to the DoD for creation of a new military base.  
26 The first unit was activated at Dyess AFB in 1955 (USAF, 2017a).

27 A comprehensive summary of information about cultural resources at Dyess AFB is  
28 presented in the 2017 Integrated Cultural Resources Management Plan (ICRMP), which  
29 implements AFI 32-7065, *Cultural Resources Management*, (June 1, 2004), Air Force  
30 Policy Directive 32-70, *Environmental Quality*, and DoD Instruction (DoD) 4715.3,  
31 *Environmental Conservation Program* (May 3, 1996, amended July 20, 1998). As  
32 described in the ICRMP, the entirety of Dyess AFB has been subject to archaeological  
33 and historic site inventories to identify historic properties. These inventories identified no  
34 eligible archaeological sites and six eligible historic buildings (Figure 3.8-1).

35 Two comprehensive archaeological surveys have been completed. In 1989, the Texas  
36 Archaeological Research Laboratory surveyed approximately 450 acres for the proposed  
37 Peacekeeper Rail Garrison Facilities at Dyess AFB (Powell, 1989). In 1995,  
38 3D/Environmental surveyed 1,013 acres as part of a proactive effort by the USAF to identify  
39 archaeological resources in compliance with federal cultural resources regulations  
40 (Haywood, Norman A. & Russell, Keith A., 1995).



1  
2

**Figure 3.8-1. Location of Historic Properties at Dyess AFB**

1 As a result of these two surveys, five prehistoric, two historic, and one prehistoric and historic  
2 era archaeological sites were recorded; none of these sites were determined eligible for  
3 listing in the NRHP. Although portions of Dyess AFB, consisting of developed grounds,  
4 standing water and channelized waterways, and thick stands of honey mesquite, have not  
5 been subject to archaeological survey, an archaeological needs assessment for Dyess AFB  
6 completed in 2011 by Geo-Marine, Inc., recommended that the entire base is so heavily  
7 disturbed that no additional archaeological investigations are required. Texas State Historic  
8 Preservation Officer (SHPO) concurred with this recommendation (USAF, 2017a).

9 Six architectural surveys have been conducted at Dyess AFB, including a 1994 baseline  
10 survey of Cold War material by Mariah Associates, a 1994-1995 study of DoD aircraft  
11 hangars by the U.S. Army Corps of Engineers (USACE), a 1995 study by the National Park  
12 Service, a 1995 survey of historic objects by the curator of the Dyess Visitor Center and  
13 Memorial Park, and a 2006 survey of Cold War–era resources by Geo-Marine, Inc.  
14 Together, these architectural surveys have evaluated all World War II resources and all  
15 major (and some minor) Cold War–era resources. Some minor Cold War–era resources,  
16 such as gas mains, railroad tracks, and fire hydrants, and resources constructed after 1991  
17 have not been evaluated.

18 Based on the most recent study by Geo-Marine, Inc., and subsequent consultation with the  
19 Texas SHPO, six Cold War–era buildings and structures (Buildings 4314, 5020, 8129, 8130,  
20 8131, and 7007) have been determined eligible for listing in the NRHP (USAF, 2017a). While  
21 unaccompanied personnel housing (1946–1974) (Buildings 6125, 6126, 6127, 6136, 6137,  
22 7218, 7219, 7220, 7221, 7403, 7407, 7409, 7420, 7421, 7422, and 9212) and World War II–  
23 and Cold War–era ammunition storage facilities (1939–1974) (Buildings 9117, 9122, 9123,  
24 9124, 9125, 9126, 9127, 9128, 9129, 9130, 9131, 9132, 9133, 9134, 9135, 9136, and 9139)  
25 at Dyess AFB are covered under two Advisory Council on Historic Preservation (ACHP)  
26 Program Comments, both signed August 18, 2006 (ACHP, 2006a; ACHP, 2006b), SHPO  
27 concurred that these resources are not eligible for listing in the NRHP in a letter dated March  
28 15, 2010. None of the eligible properties are located within the planned construction areas.

29 The ICRMP identifies no known traditional cultural properties, Native American burials, or  
30 sacred areas on Dyess AFB. There are six federally recognized tribes affiliated with the  
31 lands managed by Dyess AFB. These are the Apache Tribe of Oklahoma, Comanche  
32 Nation, Fort Sill Apache Tribe of Oklahoma, Jicarilla Apache Nation, Kiowa Indian Tribe of  
33 Oklahoma, and Mescalero Apache Tribe (USAF, 2017a). Additionally, the Caddo Nation of  
34 Oklahoma, Kickapoo Traditional Tribe of Texas, Wichita and Affiliated Tribes, Tonkawa  
35 Tribe of Indians of Oklahoma, and Ysleta Del Sur Pueblo may potentially be affected by the  
36 Proposed Action. Prior to the public scoping period, the USAF held two informational  
37 meetings in early March 2020 in Big Spring and Brownwood, Texas. These two locations  
38 were chosen due to their proximity to the Lancer and Brownwood MOAs. The USAF also  
39 published newspaper ads in two national tribal newspapers (Native Sun News and Indian  
40 Country Today) for both the informational meetings and the scoping period. No tribal  
41 representatives attended the informational meetings. Additionally, in March 2020, the USAF  
42 notified all 11 of the tribes, via mail, of the public scoping period and requested their level of  
43 interest in participating in government-to-government consultation. To date, only one  
44 response has been received—from the Ysleta Del Sur Pueblo, which declined government-  
45 to-government consultation (see Appendix F, Cultural Resources).

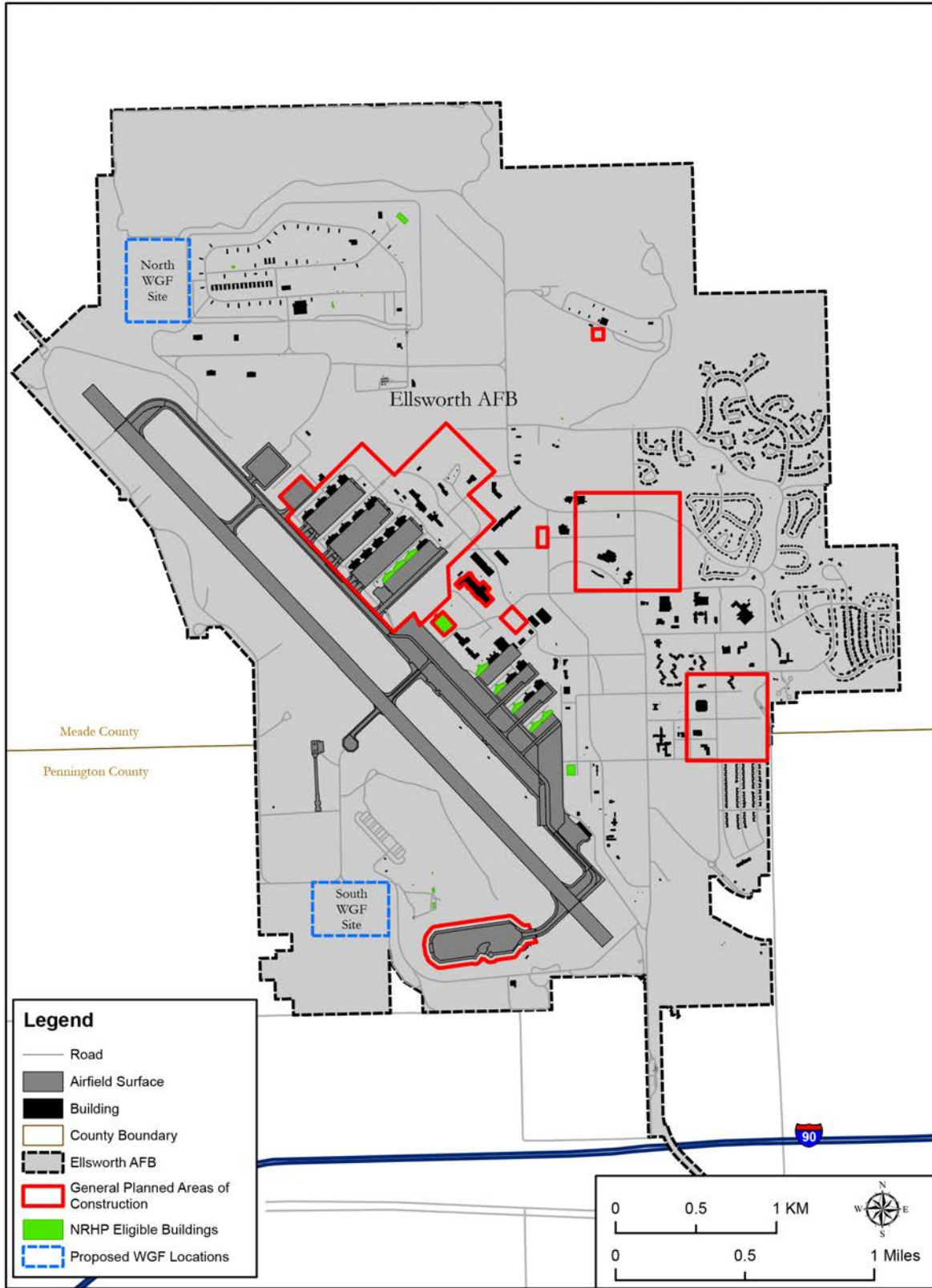
### 1 **3.8.1.2.2 Ellsworth AFB**

2 Ellsworth AFB was established during World War II as Rapid City Army Air Base; it became  
3 known as Ellsworth AFB in 1953. From 1942 to 1945 it served as a training facility for B-17  
4 and B-24 bomber crews. Inactivated in 1945, the base became a permanent USAF facility  
5 in 1947, serving as home of a fleet of long-range heavy bombers including B-36s, RB-36s,  
6 and later B-52s, as well as KC-135, EC-135 A, and T-38 aircraft. During the Cold War,  
7 Ellsworth, a unit of the Strategic Air Command, was host for a group of 150 Minuteman  
8 intercontinental ballistic missiles, which were later upgraded to Minuteman II. Aircraft were  
9 maintained on a constant-alert status enabling them to immediately respond to a military  
10 crisis. These programs were discontinued in the early 1990s, but Ellsworth's strategic  
11 importance continued as one of two bases hosting the B-1 bomber. The physical landscape  
12 of the base reflects its changing missions over time, with most of the World War II-era  
13 resources removed during building campaigns in the 1960s and 1970s, and additional  
14 significant changes made for the B1-B bomber beddown in the 1980s. Ellsworth AFB's  
15 current boundary also includes the former Rushmore Air Force Station nuclear weapons  
16 ordnance facility, established in 1952 and formerly operated by the Atomic Energy  
17 Commission (USAF, 2016a; Hufstetler et al., 1997).

18 Cultural resource management at Ellsworth AFB is facilitated by their 2016 ICRMP, which  
19 includes a summary of known cultural resources at the base. According to this document,  
20 no eligible archaeological sites and 21 eligible buildings are located at Ellsworth AFB (USAF,  
21 2016a).

22 Ellsworth AFB was subject to a comprehensive archaeological survey in 1994 that surveyed  
23 all significant tracts of undisturbed land at the base, utilizing both pedestrian survey and soil  
24 auger testing. The survey does not overlap the current APE but did identify three  
25 archaeological sites, including a modified natural spring, a lithic flake, and World War II  
26 railroad segments, none of which were determined eligible for listing in the NRHP. The only  
27 portions of the base that have not been subject to archaeological survey are areas of steep,  
28 broken hillsides at the north end of the base and the areas of the base that have been  
29 subject to extensive historical disturbance, such as the current APE. These areas have a  
30 low potential for significant archaeological resources, so no additional archaeological survey  
31 is recommended in the ICRMP (USAF, 2016a).

32 The first architectural surveys took place at Ellsworth AFB in the mid-1990s. Over 30 Historic  
33 American Building Survey (HABS)/Historic American Engineering Record (HAER)  
34 recordations also were conducted at that time. A Cultural Resources Survey Update was  
35 completed in 2006, and the report finalized in 2007. The survey addressed 119 previously  
36 surveyed structures and 20 new structures at least 45 years of age. The study concurred  
37 with the previous finding that four World War II structures and three Cold War-era structures  
38 are eligible for listing in the NRHP. The authors also recommended an additional 14 Cold  
39 War-era buildings eligible for listing in the NRHP. A 2007–2009 study of Cold War-era  
40 buildings also recommended these same 14 buildings eligible for listing in the NRHP; the  
41 South Dakota SHPO concurred with this finding (USAF, 2016a). A 2018 survey addressed  
42 24 specific buildings at Ellsworth AFB, including three buildings previously determined  
43 eligible (Figure 3.8-2).



1  
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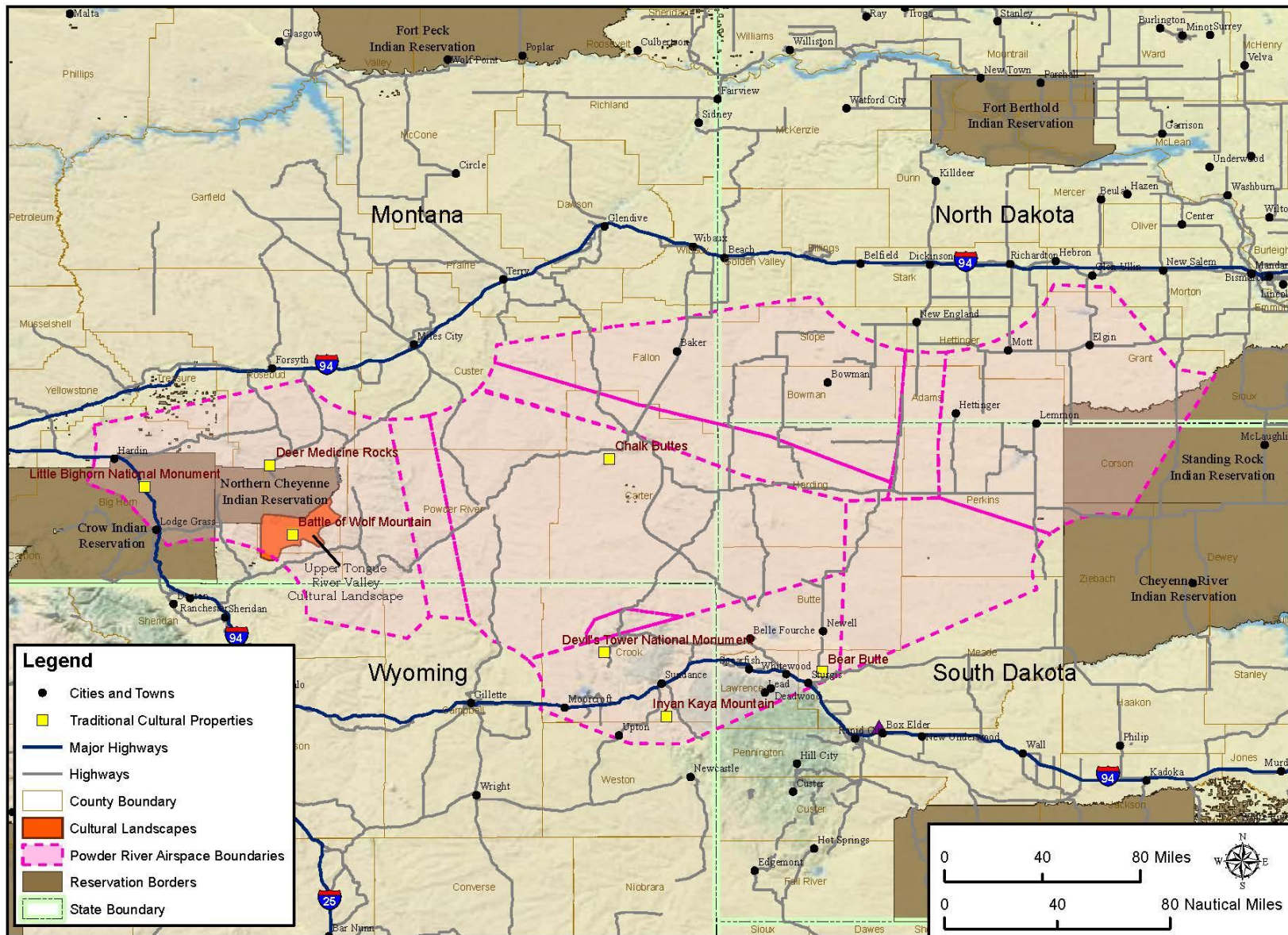
Figure 3.8-2. Location of Historic Properties at Ellsworth AFB

1 The authors recommended that the three buildings remained eligible for listing in the  
2 NRHP; the other surveyed buildings were recommended ineligible (Kintz, 2018).  
3 Currently, four World War II buildings (601, 6904, 6905, 6908) and 17 Cold War–era  
4 buildings (7258, 7260, 7262, 7504, 7610, 7614, 7618, 7622, 7624, 9050, 88031, 88106,  
5 88134, 88257, 88271, 88285, 88289) at Ellsworth AFB are eligible for listing in the NRHP  
6 (USAF, 2016a). As depicted on Figure 3.8-2, Buildings 7504 (PRIDE Hangar), 7258,  
7 7260, and 7262 are within the general planned areas of construction under the Ellsworth  
8 AFB Alternative and are either proposed for modification (Building 7504) or demolition  
9 (Buildings 7258, 7260, and 7262).

10 The ICRMP identifies no known traditional cultural properties at Ellsworth AFB. Federally  
11 recognized tribes in South Dakota with potential interest in the construction activities at  
12 Ellsworth AFB include the Crow Creek Sioux, Flandreau Santee Sioux, Lower Brule  
13 Sioux, Oglala Sioux, Rosebud Sioux, Sisseton-Wahpeton Sioux, and Yankton Sioux,  
14 (USAF, 2016a). The Cheyenne River Sioux Tribe, the Crow Tribe, the Northern Cheyenne  
15 Tribe, and the Standing Rock Tribe were invited signatories to the original 2014 PRTC  
16 Programmatic Agreement and were invited to consult on this EIS undertaking for that  
17 reason. In addition, the Blackfeet Nation; Chippewa Cree Tribe; Confederated Salish and  
18 Kootenai Tribe; Eastern Shoshone Tribe; Fort Belknap Indian Community; Fort Peck  
19 Assiniboine and Sioux Tribes; Mandan, Hidatsa and Arikara Nation; Northern Arapaho  
20 Tribe; Spirit Lake Tribe; and Turtle Mountain Band of Chippewa Indians may potentially  
21 be affected by the Proposed Action. Prior to the public scoping period, the USAF held  
22 three informational meetings in late February 2020 in Hardin and Miles City, Montana and  
23 Dickinson, North Dakota. These locations were chosen due to their proximity to tribal  
24 reservations underneath the PRTC airspace. The USAF also published newspaper ads  
25 in two national tribal newspapers (*Native Sun News* and *Indian Country Today*), as well  
26 as the *Original Briefs*, which services the Crow and Northern Cheyenne Tribes, for both  
27 the informational meetings and the scoping period. No tribal representatives attended the  
28 informational meetings. Additionally, in March 2020, the USAF notified all 21 of the  
29 previously mentioned tribes, via mail, of the public scoping period of the public scoping  
30 period and requested their level of interest in participating in government-to-government  
31 consultation (see Appendix F, Cultural Resources). To date, no responses have been  
32 received.

### 33 **3.8.1.2.3 Powder River Training Complex**

34 Cultural resources with the potential to be impacted by activities at PRTC are defined in  
35 the 2014 PRTC EIS (USAF, 2014a). The document identifies known cultural resources,  
36 including NRHP-listed properties, National Historic Landmarks, National Monuments,  
37 ghost towns, historic ranches, cultural landscapes, and traditional cultural properties  
38 located below the PRTC airspace in Wyoming, Montana, North Dakota, and South Dakota  
39 (Table 3.8-1 and Figure 3.8-3). Reported resource counts for each category are provided  
40 in Table 3.8-1.



1  
2

Figure 3.8-3. Noted Historic Properties Below PRTC Airspace

**Table 3.8-1. Historic Properties Identified in the 2014 Powder River Training Complex Environmental Impact Statement**

Location	NRHP Listed	NHL	National Monuments	Ghost Towns	Historic Ranches	Cultural Landscapes	TCPs
Wyoming	14	0	1	3	1	1	4
Montana	36	2	1	0	5	1	2
North Dakota	16	0	0	5	1	0	0
South Dakota	175	3	0	14	19	0	2

Source: (USAF, 2014a)

NHL = National Historic Landmark; NRHP = National Register of Historic Places; TCP = traditional cultural property

Depicted on Figure 3.8-3, some cultural resources of particular note below the current airspace include Little Bighorn Battlefield National Monument, which, in addition to its historic significance, is held sacred by many Native Americans; Wolf Mountains Battlefield/Where Big Crow Walked Back and Forth and Deer Medicine Rocks National Historic Landmarks; the Tongue River Valley, a cultural landscape with a high concentration of documented sites from prehistoric contexts, Great Sioux War contexts, and early ranching settlement contexts; Chalk Buttes, a traditional cultural property containing sensitive rock art; Devil's Tower National Monument and Inyan Kaya Mountain, both considered sacred by Native Americans; and Bear Butte, a National Historic Landmark and sacred site that is the prehistoric and historic location of annual Native American gatherings (USAF, 2014a).

The PRTC airspace is above portions of four Native American reservations—Cheyenne River Reservation, the Crow Reservation, the Northern Cheyenne Indian Reservation, and the Standing Rock Reservation. These four tribes, as well as the Oglala Sioux and Rosebud Sioux, engaged in government-to-government consultation for the 2014 PRTC EIS (USAF, 2014a). Key concerns of the tribes included the effects of overflights on Native American sacred areas and ceremonies, visual effects to sites and sacred areas from overflights and chaff and flares, and effects on sacred areas and historic sites from subsonic and supersonic noise (USAF, 2014a).

Section 106 consultation associated with the 2014 PRTC EIS resulted in a *Programmatic Agreement among 28<sup>th</sup> Bomb Wing, Ellsworth Air Force Base, the State Historic Preservation Offices of Montana, North Dakota, South Dakota, and Wyoming, and the Advisory Council on Historic Preservation regarding the Proposed Development, Implementation, and Operation of the Powder River Training Complex*, signed in 2014. Since the 2014 PRTC Programmatic Agreement expired in 2019, it is currently being renewed. The new agreement is expected to be similar with potentially more tribal parties and a longer, 15-year effective period. It is also anticipated that the stipulations from the 2014 PRTC Programmatic Agreement would be carried forward in the new agreement (see Appendix F, Cultural Resources) (USAF and SHPO, 2014). These stipulations include:

- Avoidance, minimization, or mitigation of adverse effects to historic properties under PRTC, namely Little Bighorn Battlefield National Monument (Monument), Montana; Great Sioux War Battlefields historic properties in Montana, South Dakota, and North Dakota other than the Monument including Deer Medicine



1 Rocks and Wolf Mountains Battlefield/Where Big Crow Walked Back and Forth;  
2 and archaeological locations containing sensitive rock art in the Tongue River  
3 Valley, Chalk Butte, and Slim Butte, Montana, and North and South Cave Hills,  
4 South Dakota

- 5 • Avoidance, minimization, or mitigation of adverse effects to historic properties,  
6 religious ceremonies, and important tribal events under PRTC, with particular  
7 mention of developing reasonable temporary or seasonal avoidance areas  
8 associated with the “Crow Fair” of the Crow Tribe, the “4<sup>th</sup> of July Chiefs Powwow”  
9 of the Northern Cheyenne Tribe, the “Porcupine Powwow” of the Standing Rock  
10 Sioux Tribe, and the “Fair Rodeo and Labor Day Powwow” of the Cheyenne River  
11 Tribe
- 12 • Awareness training for military trainers and aircrews operating in PRTC to increase  
13 cultural awareness and ensure knowledge of current operating procedures
- 14 • Avoidance protocol to implement a program allowing consulting parties to submit  
15 requests to avoid training in portions of PRTC during certain periods
- 16 • Supersonic/Large Force Exercise notification to consulting parties at least 15 days  
17 prior to such operations, which would occur a maximum of 10 days a year
- 18 • ICRMP revision to provide relevant information to PRTC operations

19 The most specific guidelines are provided for Little Bighorn National Monument, including  
20 the requirement that aircraft maintain an altitude of at least 5,000 feet AGL from 1 hour  
21 before to 1 hour after the posted hours of operation of the site; the prohibition of  
22 supersonic operation of aircraft within a defined avoidance area above the site; and  
23 coordination with the National Park Service to conduct a multi-year acoustic monitoring  
24 study. The 2014 Programmatic Agreement also called for designation of a Tribal Liaison  
25 to facilitate government-to-government relationships with the tribes relative to PRTC, and  
26 establishes procedures for damage reporting and post-review discovery of previously  
27 unidentified adverse effects (USAF and SHPO, 2014).

#### 28 **3.8.1.2.4 Lancer MOA**

29 The *Realistic Bomber Training Initiative EIS*, completed in January 2000, addressed  
30 cultural resources beneath the Lancer MOA and associated IR-178 airspace. It identified  
31 a total of 15 NRHP-listed properties, including two petroglyph sites; two pueblos, ruins,  
32 and other archaeological sites; five historic districts; three public buildings; two houses;  
33 and one other site. No National Historic Landmarks were identified within 20 miles of the  
34 airspace, and no Native American pueblos, reservations, or traditional cultural properties  
35 were located below the airspace. All the identified historic properties were located in areas  
36 overflowed by the military prior to implementation of the *Realistic Bomber Training Initiative*  
37 *EIS* proposed action. Projected noise levels at NRHP-listed properties beneath the  
38 Lancer MOA were projected to increase by 1 dB to 46 dB, and projected average daily  
39 sortie operations were expected to increase by 9; such changes were determined to pose  
40 minimal potential for adverse auditory, visual, or physical effects (USAF, 2000, pp. 4-129).  
41 Archaeological survey of 16 proposed emitter and scoring site locations identified  
42 archaeological resources at 5 of the 16 sites. These included 1 prehistoric quarry and

1 11 prehistoric isolates. The quarry site was considered eligible for listing in the NRHP and  
2 was avoided (USAF, 2000).

3 A review of NRHP records undertaken for the current proposed action indicates nine listed  
4 properties beneath the Lancer MOA in Texas; IR-178 was not considered for the current  
5 project. These include four archaeological sites near Post in Garza County; the county  
6 sanitarium and courthouse in Post, Garza County; the First National Bank building in  
7 Jayton, Kent County; the Lynn County Courthouse in Tahoka; and the Lamesa Farm  
8 Workers Community Historic District in Los Ybanez, Dawson County. The Old Algerita  
9 Hotel in Post was demolished since the 2000 *Realistic Bomber Training Initiative EIS*  
10 (National Park Service, 2020; Texas Historical Commission, 2020).

#### 11 **3.8.1.2.5 Brownwood MOA**

12 A review of NRHP records undertaken for the current proposed action indicates 17 listed  
13 properties beneath the Brownwood MOA in Texas. These include a homestead and a  
14 railroad depot in Comanche County; the county jailhouse and courthouse in Goldthwaite  
15 and the Regency Suspension Bridge in Mills County; a railroad station, church, jail, high  
16 school, and two houses in Brownwood, Brown County; the Camp Colorado Replica in  
17 Coleman County; two houses and a Carnegie Library in Ballinger, Runnels County; and  
18 the county courthouse and Paint Rock Native American Pictograph Site in Concho County  
19 (National Park Service, 2020; Texas Historical Commission, 2020).

#### 20 **3.8.1.2.6 Pecos MOA**

21 The *New Mexico Training Range Initiative EIS*, completed in October 2006, addressed  
22 cultural resources beneath the Pecos MOA. It identified four NRHP-listed sites and one  
23 additional state register site (Rodrick Drug Store) located in Fort Sumner. No Native  
24 American reservations underlie the Pecos MOA. Fort Sumner State Monument and the  
25 Bosque Redondo Memorial were identified as a site of significant cultural activity for  
26 Navajo visitors who commemorate their forced removal, known as The Long Walk, and  
27 confinement at Bosque Redondo. The site is identified as “a Noise Sensitive Area (NSA)  
28 that has been effective in reducing noise impacts from overflights” (USAF, 2006). A  
29 portion of the proposed Long Walk National Historic Trail also passes beneath the  
30 airspace. The *New Mexico Training Range Initiative EIS* found that the preferred  
31 alternative A (mitigated) was unlikely to result in adverse effects to historic properties,  
32 particularly given the continued maintenance of the Fort Sumner State Monument NSA  
33 (USAF, 2006, pp. 3-48; 4-42).

34 A review of NRHP records undertaken for the current Proposed Action indicates five listed  
35 properties beneath the Pecos MOA, all located in Fort Sumner, DeBaca County, New  
36 Mexico. These include the Fort Sumner Ruins, Fort Sumner Cemetery Wall and Entry,  
37 Fort Sumner Railroad Bridge, Fort Sumner Community House, and the DeBaca County  
38 Courthouse (National Park Service, 2020).

### 3.8.1.3 Analysis Methodology

The impact assessment evaluated the potential impacts of the proposed B-21 MOB 1 beddown to cultural resources. 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 USAF 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 AFI 32-7065 Section 3.3.1, and 36 CFR 800.8(a), the USAF 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 (AFI 32-7065 Section 3.3.2, and 36 CFR 800[c]).

The regulatory NHPA Section 106 compliance process consists of four primary stages. These include: initiation of the Section 106 process (36 CFR 800.3); identification of historic properties (36 CFR 800.4), which includes identifying historic properties potentially affected by undertakings; 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 resolution of adverse effects (36 CFR 800.6) between affected and consulting parties such as the SHPO, the ACHP, 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).

In early 2020, the USAF initiated consultation with the South Dakota SHPO regarding plans to rehabilitate the PRIDE Hangar (Building 7504) for aerospace ground equipment maintenance in support of the B-21 beddown. The project would remove the existing recreational/fitness facilities and equipment from the building, remodel existing office space and remove some interior partitions, construct a wash bay, and install new overhead doors. The South Dakota SHPO concurred that the project would result in no adverse effect on February 4, 2020 (see Appendix F, Cultural Resources).

1 The USAF also has engaged in preliminary discussion with the South Dakota SHPO  
2 regarding plans to demolish Buildings 7258, 7260, and 7262, which would result in an  
3 adverse effect to historic properties. The USAF has initiated formal Section 106  
4 consultation with the SHPO and the ACHP regarding the entire B-21 MOB 1 beddown at  
5 Ellsworth AFB, including the demolition of these historic properties. On March 11, 2020,  
6 the USAF sent Interagency/Intergovernmental Coordination for Environmental Planning  
7 (IICEP) letters to the South Dakota and Texas SHPOs and all tribes with potential interest  
8 in activates at Ellsworth AFB and Dyess AFB as part of the environmental review process  
9 for the B-21 MOB 1 beddown.

10 As described above, Dyess AFB and Ellsworth AFB previously have been subject to  
11 archaeological and architectural surveys to identify historic properties. These efforts  
12 provide comprehensive coverage of the bases; no additional identification efforts are  
13 required. While the areas below the affected airspaces have not been fully surveyed, they  
14 have been subject to past identification efforts, NHPA consultation, and NEPA  
15 assessments associated with the establishment of the current programs in these areas.  
16 Given the expansive area covered by the airspaces, comprehensive survey is neither  
17 practical nor necessary; assessment of effects to known historic properties will provide a  
18 baseline for understanding the Proposed Action's potential to affect historic properties  
19 generally.

20 Effects (i.e., impacts) to cultural resources are defined as "alteration to the characteristics  
21 of a historic property qualifying it for inclusion in or eligibility for the National Register" (36  
22 CFR 800.16(i)). For the purposes of this analysis, there are three types of effects when  
23 considering historic properties. These include "no historic properties affected," which  
24 applies when there are no historic properties present or there are historic properties  
25 present but the undertaking would have no effect upon them; "no adverse effect," which  
26 means that there is a direct or indirect effect to a historic property, but the effect does not  
27 diminish the qualities that make the property significant; and "adverse effect," which "is  
28 found when an undertaking may alter, directly or indirectly, any of the characteristics of a  
29 historic property that qualify the property for inclusion in the National Register in a manner  
30 that would diminish the integrity of the property's location, design, setting, materials,  
31 workmanship, feeling, and association" (36 CFR 800 5(a)(1)).

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## 32 **3.8.2 Cultural Resources, Environmental Consequences**

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### 33 **3.8.2.1 No Action Alternative Consequences**

#### 34 **3.8.2.1.1 No Action at Dyess AFB**

35 Under the No Action Alternative, cultural resources at Dyess AFB would continue to be  
36 managed in accordance with the ICRMP. The six NRHP-eligible buildings will be  
37 maintained in accordance with the Standard Operating Procedures (SOPs) established  
38 in Appendix A of the ICRMP (see Figure 3.8-1). The ICRMP identifies one potential  
39 project, the Consolidated Fabrication Flight MILCON, with the potential to impact

1 Buildings 8129, 8230, and 8139; however, at the time of the ICRMP, the project was a  
2 low priority (USAF, 2017a).

3 Aircraft from Dyess AFB would continue to utilize the PRTC and Lancer, Brownwood, and  
4 Pecos MOAs for training operations and would not exceed levels currently authorized for  
5 these training areas. As stated in Section 3.8.1.2.3 (Cultural Resources, Region of  
6 Influence, Powder River Training Complex), the PRTC Programmatic Agreement is  
7 currently being renewed. The new agreement is expected to be similar to the 2014 PRTC  
8 Programmatic Agreement with potentially more tribal parties and a longer, 15-year  
9 effective period. The stipulations of the new agreement are expected to minimize potential  
10 adverse effects to historic properties and guide ongoing coordination with the tribes and  
11 other stakeholders. Under the No Action Alternative, noise levels range from less than  
12 35 dB  $L_{dnmr}$  to 46.1 dB  $L_{dnmr}$  across PRTC (Figure 3.2-2).

13 Noise levels beneath the Brownwood, Pecos, and Lancer MOAs would be less than 35,  
14 55.9, and 43.4 dB  $L_{dnmr}$ , respectively (Figure 3.2-3). Since these levels are below 65 dB  
15  $L_{dnmr}$ , impacts to cultural resources are not anticipated.

### 16 **3.8.2.1.2 No Action at Ellsworth AFB**

17 Under the No Action Alternative, cultural resources at Ellsworth AFB would continue to  
18 be managed in accordance with the ICRMP. The 21 NRHP-eligible buildings would be  
19 maintained in accordance with the SOPs established in Appendix H of the ICRMP (see  
20 Figure 3.8-2). The ICRMP identifies potential plans to demolish Building 601, a World War  
21 II historic structure; however, since 2016 the USAF has developed plans for the  
22 rehabilitation of the building, for which Section 106 consultation has been initiated (USAF,  
23 2016a).

24 Aircraft from Ellsworth AFB would continue to utilize PRTC for training operations and  
25 noise levels would not exceed 46.1 dB  $L_{dnmr}$  (Figure 3.2-2). As stated in Section 3.8.1.2.3  
26 (Cultural Resources, Region of Influence, Powder River Training Complex), the PRTC  
27 Programmatic Agreement is currently being renewed. The new agreement is expected  
28 to be similar to the 2014 PRTC Programmatic Agreement with potentially more tribal  
29 parties and a longer, 15-year effective period. The stipulations of the new agreement are  
30 expected to minimize potential adverse effects to historic properties and guide ongoing  
31 coordination with the tribes and other stakeholders.

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## 32 **3.8.2.2 Dyess AFB Alternative**

### 33 **3.8.2.2.1 Airfield Operations**

34 Previous studies have found it is unlikely that noise and vibration associated with air  
35 operations would cause structural damage to buildings. In fact, several studies of the  
36 effects of noise on historic properties located in high aircraft-noise zones have found that  
37 vibration resulting from the activities of tour groups, and even vacuuming, generated more  
38 structural vibration than that generated by aircraft noise (National Research  
39 Council/National Academy of Sciences, 1977; NASA, 1976; NASA, 1978). Subsonic  
40 sound of less than 130 dB is highly unlikely to damage structural elements. Noticeable

1 vibration of window panes and objects within buildings may occur at sound levels of  
2 110 dB or greater (Wyle, n.d.).

3 Noise studies have found that because the B-21 is projected to be generally quieter and  
4 tends to fly higher than the B-1, the noise in the area and the number of acres and people  
5 impacted would decrease overall as a result of implementing the Proposed Action at  
6 Dyess AFB (see Section 3.2.2.2.2, Noise, Dyess AFB Alternative, Airfield Operations).  
7 Noise contours for the base show that noise received by each of the historic properties at  
8 Dyess AFB would be expected to decrease under the Dyess AFB Alternative.

9 **Table 3.8-2. Current and Projected Noise Levels at Historic Properties**  
10 **at Dyess AFB**

Building	Current Noise Level (dB DNL)	Projected Noise Level (dB DNL)
4314	75 to 80	70 to 75
5020	75 to 80	70 to 75
7007	65 to 70	60 to 65
8129	65 to 70	55 to 60
8130	65 to 70	55 to 60
8131	65 to 70	55 to 60

AFB = Air Force Base; dB = decibel; DNL = day-night average sound level

11 In all cases, these noise levels are well below the thresholds that might cause damage to  
12 structures.

### 13 **3.8.2.2.2 Airspace and Range Utilization**

14 The 2014 PRTC EIS (USAF, 2014a) identified the potential for adverse visual and noise  
15 effects to historic properties and Tribal ceremonies, but these adverse effects were  
16 avoided or resolved through a Programmatic Agreement to provide prior notice,  
17 avoidance in time or space where feasible, and training of aircrews in the sensitivities  
18 concerning traditional or religious properties (USAF, 2014a). The 2014 PRTC  
19 Programmatic Agreement expired in 2019 and is being renegotiated; the new agreement  
20 is expected to be similar to the 2014 PRTC Programmatic Agreement with potentially  
21 more tribal parties and a longer, 15-year effective period. As explained in Section  
22 3.2.2.2.3 (Noise, Dyess AFB, Airspace and Range Utilization), noise levels under the  
23 Dyess AFB Alternative at PRTC would range from less than 35 to 46.1 dB  $L_{dnmr}$ , which  
24 reflects no change from the No Action Alternative.

25 Previous assessment for the Lancer and Pecos MOAs found that operations result in no  
26 adverse effects to historic properties (USAF, 2006; USAF, 2000). Under the Dyess AFB  
27 Alternative, noise levels at Lancer (less than 35 dB  $L_{dnmr}$ ) and, Pecos (36.9 dB  $L_{dnmr}$ )  
28 MOAs would not exceed No Action Alternative noise levels at 43.4 and 55.9 dB  $L_{dnmr}$ ,  
29 respectively. Operations in the Brownwood MOA would decrease by 13 operations  
30 annually (see Section 3.1.2.2.2, Airspace, Airspace and Range Utilization) and would be  
31 conducted within the existing limits of the airspace (see Figure 3.1-1). Noise levels at  
32 Brownwood MOA would remain the same as under the No Action Alternative (less than  
33 35 dB  $L_{dnmr}$ ).

34 Since operations would continue to observe current guidelines and noise levels would  
35 remain the same or decrease from the No Action Alternative, no adverse impacts from

1 noise would be expected under the Dyess AFB Alternative. Furthermore, the B-21 flies  
2 higher than the B-1, so the visibility of the aircraft from historic properties below these  
3 airspaces would decrease.

#### 4 **3.8.2.2.3 Facilities and Infrastructure**

5 New and renovated facilities and infrastructure associated with the B-21 MOB 1 beddown  
6 at Dyess AFB would not directly impact any historic properties. All historic properties are  
7 located outside of the general planned areas of construction. Previous studies have not  
8 identified any historic districts at Dyess AFB; the base reflects development over time as  
9 mission needs have changed, resulting in the ongoing removal and addition of facilities.  
10 While the proposed facilities and infrastructure may be within view of some historic  
11 properties, these historic resources currently exist within the setting of an active USAF  
12 base made up of a combination of historic and non-historic facilities, and thus visual  
13 effects of the new construction would be minimal. Due to the heavy disturbance and  
14 development on the base, and as previously concurred by the Texas SHPO, there would  
15 be no effect to archaeological resources.

#### 16 **3.8.2.2.4 Weapons Generation Facility**

17 The WGF would not directly impact any historic properties. All historic properties are  
18 located outside of the proposed footprint of the WGF. While the WGF may be within view  
19 of some historic properties, these historic resources currently exist within the setting of  
20 an active USAF base made up of a combination of historic and non-historic facilities, and  
21 thus visual effects of the new construction would be minimal.

#### 22 **3.8.2.2.5 Proposed Resource-Specific Mitigations and Management Actions to** 23 **Reduce the Potential for Environmental Impacts**

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

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### 25 **3.8.2.3 Ellsworth AFB Alternative**

#### 26 **3.8.2.3.1 Airfield Operations**

27 Noise studies have found that because the B-21 is projected to be generally quieter and  
28 tends to fly higher than the B-1, the noise in the area and the number of acres and people  
29 impacted would decrease overall as a result of implementing the Proposed Action at  
30 Ellsworth AFB (see Section 3.2.2.3.2, Noise, Ellsworth AFB, Airfield Operations). Noise  
31 contours for the base show that noise received by each of the historic properties at  
32 Ellsworth AFB would decrease under the Ellsworth AFB Alternative. In all cases, these  
33 noise levels are well below the thresholds that might cause damage to structures.

**Table 3.8-3. Current and Projected Noise Levels at Historic Properties at Ellsworth AFB**

Building	Current Noise Level (dB DNL)	Projected Noise Level (dB DNL)
601	75 to 80	65 to 70
6904	75 to 80	65 to 70
6905	75 to 80	65 to 70
6908	70 to 75	65 to 70
7258	85 to 90	70 to 75
7260	85 to 90	70 to 75
7262	85 to 90	70 to 75
7504	70 to 75	65 to 70
7610	70 to 75	65 to 70
7614	70 to 75	65 to 70
7618	70 to 75	65 to 70
7622	70 to 75	65 to 70
7624	70 to 75	60 to 65
9050	60 to 65	50 to 55
88031	55 to 60	50 to 55
88106	60 to 65	55 to 60
88134	60 to 65	50 to 55
88257	60 to 65	55 to 60
88271	60 to 65	50 to 55
88285	55 to 60	50 to 55
88289	55 to 60	50 to 55

AFB = Air Force Base; dB = decibel; DNL = day-night average sound level

### 1 **3.8.2.3.2 Airspace and Range Utilization**

2 PRTC-related B-21 air operations would adhere to the legal descriptions for the PRTC  
 3 MOAs published in the National Flight Data Digest (effective date: September 17, 2015).  
 4 As explained in Section 3.2.2.3.3 (Noise, Ellsworth AFB, Airspace and Range Utilization),  
 5 noise levels under the Ellsworth AFB Alternative at PRTC would range from less than 35  
 6 to 42 dB  $L_{dnmr}$ , which reflects a decrease from the No Action Alternative.

7 The 2014 PRTC EIS (USAF, 2014a) identified the potential for adverse visual and noise  
 8 effects to historic properties and Tribal ceremonies, but these adverse effects were  
 9 avoided or resolved through a Programmatic Agreement to provide prior notice,  
 10 avoidance in time or space where feasible, and training of aircrews in the sensitivities  
 11 concerning traditional or religious properties (USAF, 2014a). The 2014 PRTC  
 12 Programmatic Agreement expired in 2019 and is being renegotiated; the new agreement  
 13 is expected to be similar to the 2014 PRTC Programmatic Agreement with potentially  
 14 more tribal parties and a longer, 15-year effective period. Refer to Section 3.8.1.2.3  
 15 (Cultural Resources, Region of Influence, Powder River Training Complex) for a list of  
 16 stipulations from the 2014 PRTC Programmatic Agreement that would be carried forward  
 17 in the new agreement.



1 Therefore, no adverse impacts from noise would be expected. Furthermore, the B-21 flies  
2 higher than the B-1, so the visibility of the aircraft from historic properties below these  
3 airspaces would decrease.

#### 4 **3.8.2.3.3 Facilities and Infrastructure**

5 The development of facilities and infrastructure for the Ellsworth AFB Alternative would  
6 require the demolition of three historic properties and renovation of a fourth historic  
7 property. As depicted on Figure 3.8-2, Buildings 7258, 7260, and 7262 are within the  
8 proposed construction limits and would be demolished. Building 7504 (PRIDE Hangar),  
9 located just outside the construction limits, also may be modified and used for  
10 maintenance.

11 Previous studies have not identified any historic districts at Ellsworth AFB; the base  
12 reflects development over time as mission needs have changed, resulting in the ongoing  
13 removal and addition of facilities. While the proposed facilities and infrastructure may be  
14 within view of some historic properties, these historic resources currently exist within the  
15 setting of an active USAF base made up of a combination of historic and non-historic  
16 facilities, and thus visual effects of the new construction would be minimal.

17 As described in Section 3.8.1.3 (Cultural Resources, Analysis Methodology), the USAF  
18 has consulted with the South Dakota SHPO regarding the renovation of the PRIDE  
19 Hangar, which would result in minimal exterior changes to the building. The South Dakota  
20 SHPO concurred that the renovation would result in no adverse effect on February 4,  
21 2020 (Appendix F, Cultural Resources). The demolition of Buildings 7258, 7260, and  
22 7262 would result in an adverse effect to these historic properties. The USAF initiated  
23 consultation with the South Dakota SHPO and the ACHP to resolve this adverse effect.  
24 The South Dakota SHPO concurred that the demolition of these buildings would result in  
25 an adverse effect, and ACHP declined to participate in the Section 106 consultation  
26 process (Appendix F, Cultural Resources). The Final EIS will be updated with the  
27 findings.

#### 28 **3.8.2.3.4 Weapons Generation Facility**

##### 29 **North WGF Site Subalternative**

30 The North WGF Site Subalternative would not directly impact any historic properties. All  
31 historic properties are located outside of the proposed footprint of the North WGF Site  
32 Subalternative. While the WGF may be within view of some historic properties, these  
33 historic resources currently exist within the setting of an active USAF base made up of a  
34 combination of historic and non-historic facilities, and thus visual effects of the new  
35 construction would be minimal.

##### 36 **South WGF Site Subalternative**

37 Based on recommendations from the South Dakota SHPO, the South WGF Site  
38 Subalternative location requires an Archaeological Survey for Section 106 compliance,  
39 as the land was acquired after the 1994 archaeological survey (as discussed in Section

1 3.8.1.2.2, Cultural Resources, Region of Influence, Ellsworth AFB). Additionally, the  
2 WGF may be within view of some historic properties; however, these historic resources  
3 currently exist within the setting of an active USAF base made up of a combination of  
4 historic and non-historic facilities, and thus visual effects of the new construction would  
5 be minimal. The Final EIS will be updated with the findings of the Archaeological Survey  
6 and the overall results of the Section 106 consultation with the South Dakota SHPO.

### 7 **3.8.2.3.5 Proposed Resource-Specific Mitigations and Management Actions to** 8 **Reduce the Potential for Environmental Impacts**

9 Appropriate mitigation for the demolition of Buildings 7258, 7260, and 7262 at Ellsworth  
10 AFB would be established in consultation with the South Dakota SHPO and formalized in  
11 an agreement document as required by Section 106 of the NHPA.

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## 12 **3.9 PHYSICAL RESOURCES**

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### 13 **3.9.1 Physical Resources, Affected Environment**

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#### 14 **3.9.1.1 Description of Resource**

15 Physical resources include topography, geology, soils, and water. Topography pertains  
16 to the relief (elevation) and local landforms of a given region. Geological resources  
17 typically include features such as bedrock and minerals. However, geology is not  
18 addressed in this EIS because impacts are not anticipated on such features based on  
19 implementation of any of the alternatives. Neither bedrock nor minerals, including  
20 extraction of minerals by mining, would be affected by any of the actions.

21 Soil refers to unconsolidated accumulation of organic and mineral materials on the land  
22 surface that is either formed from the breakdown of underlying bedrock or other parent  
23 material, or transported to an area by wind, water, or human activities. Eroded soil  
24 particles that are transported and deposited are known as sediment. The delivery and  
25 deposition of sediment in waterways is known as sedimentation. Sediment generated by  
26 erosion can alter water quality, aquatic habitats, and hydrologic characteristics of streams  
27 and wetlands, and increase flooding. Once erosion has occurred, it can lead to increased  
28 land management and operating costs. Erosion can also transport chemical contaminants  
29 that may be attached to sediment particles. Therefore, in the context of soil, the focus of  
30 this EIS is on erosion that could potentially occur as a result of the proposed activities.  
31 Topography is addressed because the erosion potential of soil depends in part on the  
32 steepness of the land.

33 Water resources relevant to this EIS are surface water features (including streams, lakes,  
34 and adjacent floodplains), wetlands, and groundwater. Surface water is defined as any  
35 water on Earth's surface and includes lakes, rivers, streams, and ponds (U.S. Geological  
36 Survey, 2020). Surface waters form where the average rate of precipitation exceeds the  
37 rate at which runoff seeps into the soil, evaporates, or is absorbed by vegetation. Surface  
38 waters also form where the water table intersects the ground surface. Surface waters are

1 important for a variety of reasons including economic, ecological, and recreational  
2 functions, and human health. Surface water features also serve as reservoirs to mitigate  
3 the impacts of flooding. Surface water features can be impacted by sedimentation and by  
4 deposition of contaminants that are transported by storm water runoff or erosion.  
5 Groundwater can be impacted directly by spills or by infiltration of contaminated surface  
6 waters; specifically for this EIS, from storm water.

7 A floodplain is defined as an area of relatively flat and normally dry land alongside a  
8 stream, river, or lake that is covered by water during a flood (U.S. Geological Survey,  
9 2020). Floodplains mitigate flood risk by slowing storm water runoff and storing  
10 floodwaters (Federal Emergency Management Agency, 2018). Other floodplain functions  
11 include groundwater recharge and nutrient cycling. Vegetation and soils act as filters,  
12 intercepting surface water runoff before it reaches lakes, streams, or rivers, and storing  
13 floodwaters during flood events. This filtration process aids in the removal of excess  
14 nutrients, pollutants, and sediments from the water. Floodplains are biologically unique  
15 ecosystems that support a wide variety of aquatic and terrestrial species. Floodplain  
16 boundaries are typically described in terms of average frequency of inundation. For  
17 example, a 100-year floodplain is defined as an area that has a 1 percent chance of  
18 inundation by a flood in any given year (once per 100 years on average).

19 Wetlands are areas of transition between terrestrial and aquatic systems where the water  
20 table is usually at or near the surface or where the land is covered by shallow water.  
21 Wetlands are defined by USACE as “those areas that are inundated or saturated by  
22 surface or ground water at a frequency and duration sufficient to support, and that under  
23 normal circumstances do support, a prevalence of vegetation typically adapted for life in  
24 saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar  
25 areas” (USACE, 1987). Wetlands provide fish and wildlife habitat, protect and improve  
26 water quality by absorbing contaminants from storm water runoff, storing floodwaters, and  
27 maintaining surface water flow in streams during dry periods (EPA, 2004).

28 Groundwater is defined as water that flows or seeps downward and saturates soil or rock,  
29 supplying springs and wells (U.S. Geological Survey, 2020). Below the water table, nearly  
30 all open spaces in sediments and rocks are filled with water, and the water contained in  
31 this zone is called *groundwater*. An aquifer is a geological formation (e.g., a layer of rock  
32 or sediment) that stores relatively large volumes of groundwater, and through which  
33 groundwater typically can easily move. Groundwater is an important source of water  
34 supply and is also a recharge source for streams and wetlands.

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### 35 3.9.1.2 Region of Influence

36 The ROI for physical resources consists of areas within and adjacent to the alternative  
37 MOB boundaries where soil and water resources may be directly or indirectly affected by  
38 components of the Proposed Action (e.g., construction activities). Off-base areas could  
39 be affected if, for example, stormwater or surface water carries contaminants or  
40 sediments to nearby streams and wetlands; or if contaminants migrate to groundwater,  
41 which subsequently flows to off-base portions of the aquifer. Air operations and airspace

1 and range utilization would not affect physical resources at PRTC, or the Brownwood,  
2 Lancer, or Pecos MOAs.

### 3 3.9.1.2.1 Dyess AFB

#### 4 Topography

5 Dyess AFB is in the southern part of the Osage Plains Section in the Central Lowlands  
6 physiographic province (U.S. Geological Survey, 2018). The Osage Plains Section spans  
7 an area that includes north-central Texas, central Oklahoma, and southeastern Kansas,  
8 and is characterized by gently rolling terrain (U.S. Geological Survey, 1990). Figure 3.9-1  
9 shows the topography of Dyess AFB. Each line (referred to as a contour line) on the figure  
10 represents locations with the same ground surface elevation. Within the primary  
11 construction area, elevation is highest at the northwest corner and drops approximately  
12 15 feet over a distance of 4,600 feet to the southeast corner, corresponding to a slope of  
13 approximately 0.3 percent. At the WGF site, elevation is also highest at the northeast  
14 corner and drops approximately 10 feet to lowest point on the southwest corner over a  
15 distance of 2,000 feet, corresponding to a slope of approximately 0.5 percent. Slopes  
16 between 0.2 and 0.5 percent are considered very flat (United Nations, 1985).

#### 17 Soils

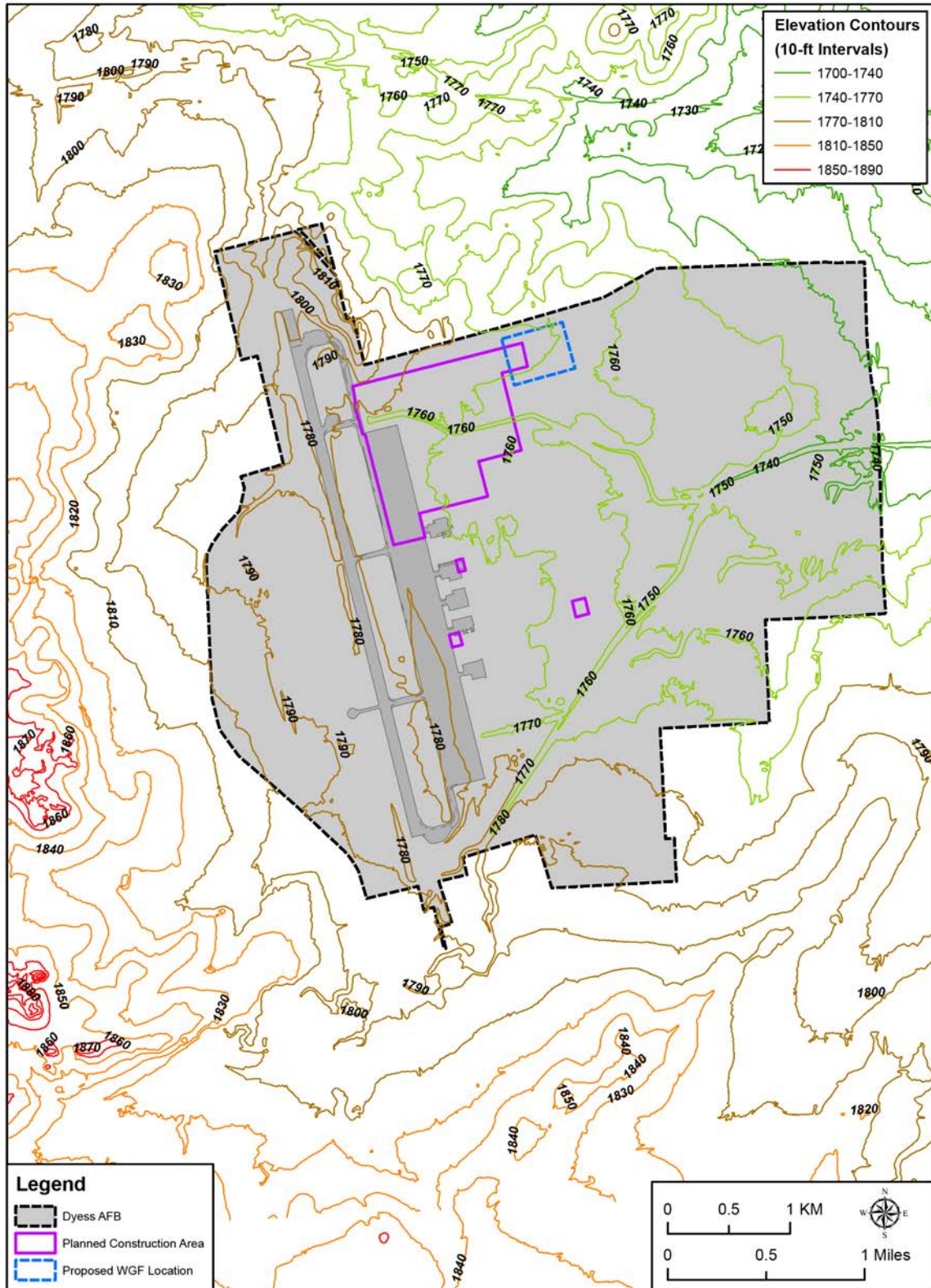
18 The soil types found in the planned construction areas and WGF site at Dyess AFB  
19 consist of Tobosa clay, Urban land, Vernon clay, Tillman clay loam, Hamby sandy loam,  
20 and Sagerton clay loam, as well as “complexes” (or combinations) of these soil types  
21 (Figure 3.9-2) (NRCS, 2019). Table 3.9-1 presents a description of each soil type. Table  
22 3.9-2 shows the areal extent and erosion factor for each soil type and soil type complex.  
23 The erosion factor indicates the relative susceptibility of a soil to sheet or rill erosion by  
24 water. Values range from 0.02 for the least erodible soils to 0.64 for the most erodible  
25 (NRCS, 2020a). Erosion factors for soils in the planned construction areas and WGF site  
26 at Dyess AFB range from 0.24 to 0.32, which indicates the soils are moderately erodible.

27 **Table 3.9-1. 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 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 noncemented claystone bedrock or dense clay of Permian Age
Tillman Clay	Consists of very deep, well drained, slowly permeable soils formed in loamy and clayey alluvium derived from redbed clays and claystone sediments of Permian Age
Hamby Sandy Loam	Consists of very deep, well drained, moderately slowly permeable soils 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

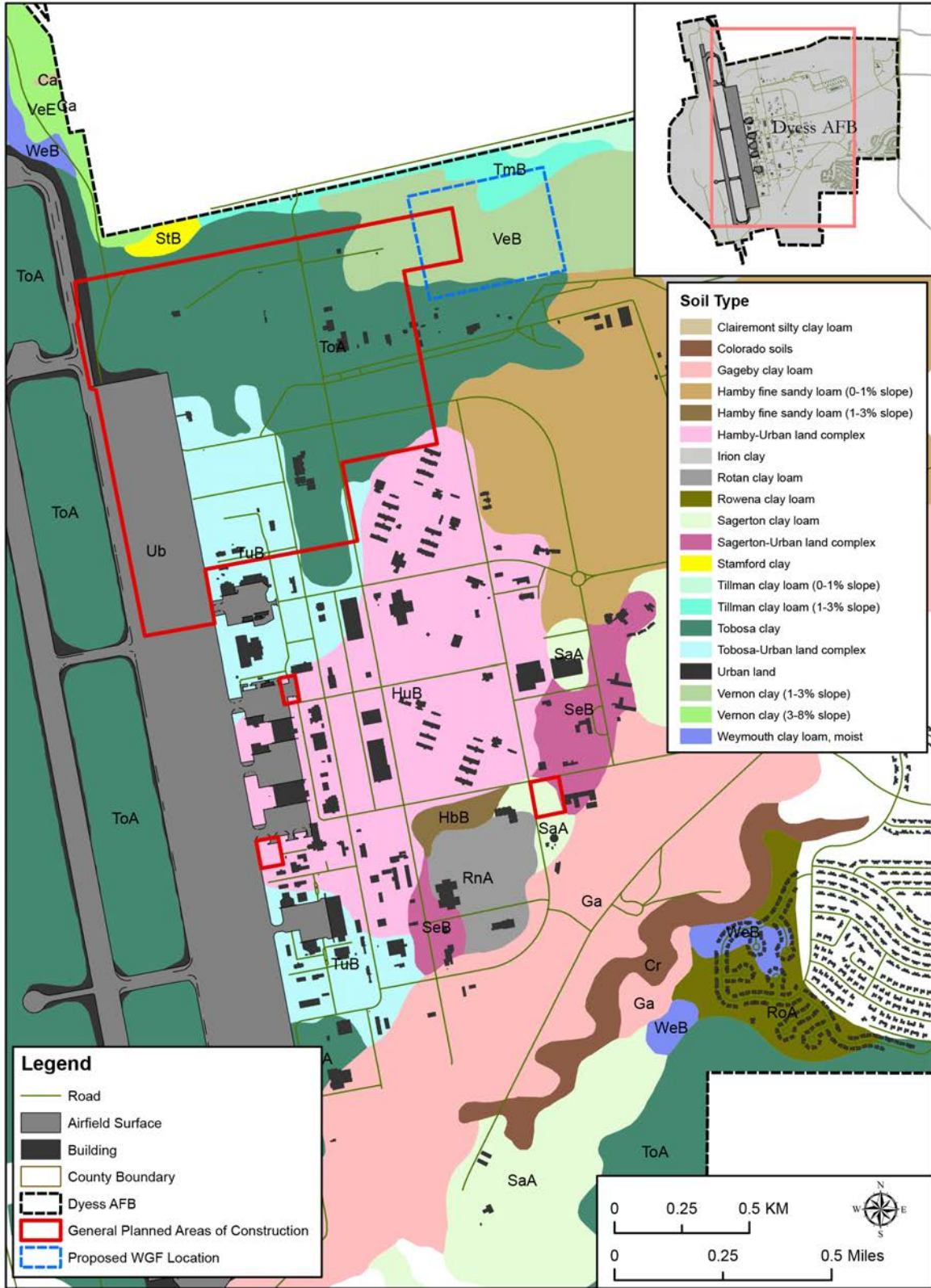
Source: (NRCS, 2020b)

AFB = Air Force Base; WGF = Weapons Generation Facility



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2

Figure 3.9-1. Topography, Dyess AFB



1

2

**Figure 3.9-2. Soil Types, Planned Construction Areas and WGF Site, Dyess AFB**

**Table 3.9-2. Areal Extent and Erosion Factors for Soil Types at Planned Construction Areas and WGF Site, Dyess AFB**

Soil Unit Name	Soil Map Symbol	Erosion Factor	Acres in Area of Interest <sup>1</sup>	Percent of Area of Interest <sup>1</sup>
Tobosa Clay, 0 to 1 percent slopes	ToA	0.24	196.2	50.6%
Urban Land	Ub	N/A	69.0	17.8%
Vernon Clay, 1 to 3 percent slopes	VeB	0.28	55.7	14.4%
Tobosa-Urban Land, 0 to 3 percent slopes	TuB	0.24	52.8	13.6%
Tillman clay loam, 1 to 3 percent slopes	TmB	0.32	5.8	1.5%
Hamby-Urban Land complex, 0 to 3 percent slopes	HuB	0.32	4.6	1.2%
Sagerton clay loam, moist, 0 to 1 percent slopes	SaA	0.28	2.9	0.7%
Sagerton-Urban land complex, 0 to 3 percent slopes	SeB	0.24	0.7	0.2%
<b>Total for Area of Interest</b>			<b>387.7</b>	<b>100.0%</b>

Source: (NRCS, 2019)

% = percent; AFB = Air Force Base; N/A = not available; WGF = Weapons Generation Facility

Note:

1. Area of Interest consists of the planned construction areas and WGF site at 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 3.9-3). 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 3.9-3). 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, 2017a). 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 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 storm water from Dyess AFB. Storm water 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 storm water from the southeastern part of the base.

1 The North Diversion Ditch flows southeast, joining the South Diversion Ditch (the  
2 channelized section of Little Elm Creek) within the property approximately 1 mile from the  
3 base's east fence line/property boundary.

4 The South Diversion Ditch is dammed by a  
5 weir and discharges through two outlets  
6 that are controlled by valves located  
7 approximately 50 feet west of the base  
8 boundary (see photograph, *right*). In the  
9 event of an emergency, the valves can be  
10 shut to prevent storm water from exiting  
11 Dyess AFB property except in cases of  
12 heavy rainfall (Dyess AFB, 2018c).



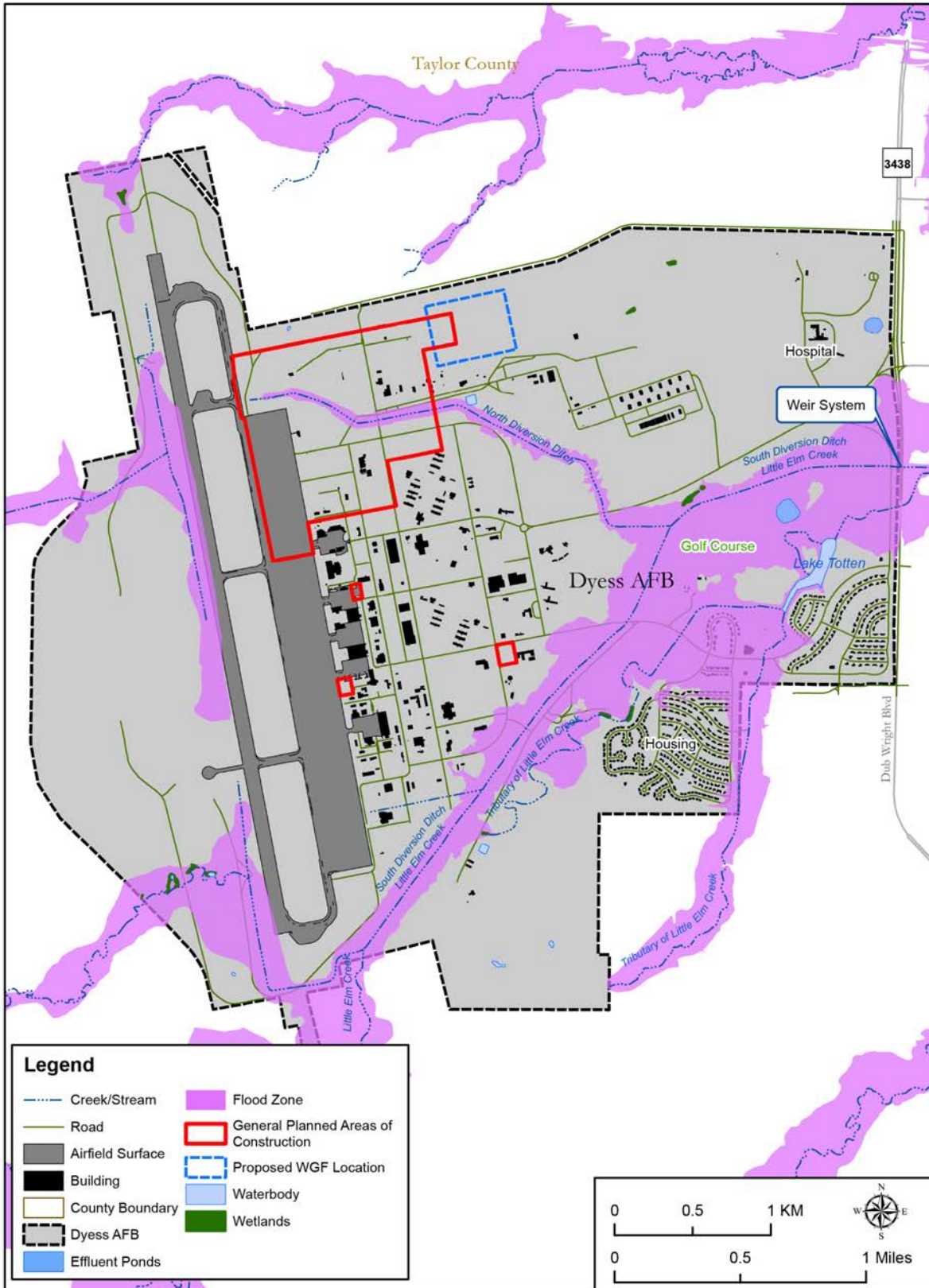
**Photograph of Weir System on the South  
Diversion Ditch, Dyess AFB**

13 Under normal conditions, water flows  
14 through the outlets into a concrete catch  
15 basin which directs water across the  
16 boundary crossing. After exiting the base,  
17 the ditch becomes Little Elm Creek, which  
18 flows for about 4.5 miles before  
19 discharging into Big Elm Creek. Approximately 9 miles downstream, Big Elm Creek flows  
20 into Lake Fort Phantom Hill, a reservoir that is owned and operated by the City of Abilene  
21 for municipal, industrial, and recreational use (Texas Water Development Board, 2020a).  
22 The lake serves as a principal drinking water source for the city. Dyess AFB holds a permit  
23 from the TCEQ for storm water discharges associated with industrial activities. Permit  
24 number TXR05L345 expires on August 14, 2021. As one of the permit requirements, the  
25 base has prepared a SWPPP (Dyess AFB, 2018c) that describes stormwater controls  
26 (e.g., the weir system described above) and BMPs that the base implements to prevent  
27 the release of storm water pollutants. As outlined in the SWPPP and required by the  
28 permit, Dyess AFB monitors stormwater outfalls to ensure compliance with permit limits.  
29 The weir system on the South Diversion Ditch is one of the outfalls routinely monitored.  
30 The SWPPP also notes that the Military Family Housing Area of Dyess AFB is subject to  
31 Phase II Municipal Separate Storm Sewer System (MS4) Permit requirements  
32 (TXR040000).

33 In addition to surface water features, Figure 3.9-3 also shows the 100-year floodplain and  
34 wetlands at Dyess AFB. Floodplains are generally associated with drainage ditches, Little  
35 Elm Creek, and the unnamed streams in the golf course and on-base housing area. There  
36 are 12 jurisdictional wetland areas at Dyess AFB, all of which are less than an acre in  
37 area (Dyess AFB, 2017a).

38 Other than the floodplain associated with the portion of the North Diversion Ditch located  
39 in the primary planned construction area, there are no floodplains or wetlands located  
40 within the planned construction areas or the WGF site.





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**Figure 3.9-3. Streams, Lakes, 100-year Floodplains, and Wetlands, Dyess AFB**

## 1 **Water Resources – Groundwater**

2 Figure 3.9-4 depicts the active water supply wells near Dyess AFB.

3 The Texas Water Development Board has identified 9 major aquifers and 22 minor  
4 aquifers that are used for water supply in the state of Texas (Texas Water Development  
5 Board, 2020b). Major aquifers are defined as “aquifers that produce large amounts of  
6 water over large areas,” and minor aquifers are defined as “aquifers that produce minor  
7 amounts of water over large areas or large amounts of water over small areas”.

8 None of the major aquifers are located within 5 miles of the base boundary, but a minor  
9 aquifer (the Cross Timbers Aquifer) lies beneath Dyess AFB. Wells of an average depth  
10 of 174 to 193 feet are present and can draw groundwater from the Cross Timbers Aquifer  
11 (Texas Water Development Board, 2019). Although this aquifer is present beneath the  
12 area around Dyess AFB, it does not appear to be frequently used as a water supply  
13 source (Figure 3.9-4). There are only two wells within 1 mile outside of the base. These  
14 wells are 32 and 33 feet deep and draw water from alluvium, a shallow unconsolidated  
15 aquifer that consists of loose deposits of clay, silt, sand, and gravel left by flowing water  
16 and often found near streams (in this case, Little Elm Creek).

### 17 **3.9.1.2.2 Ellsworth AFB**

#### 18 **Topography**

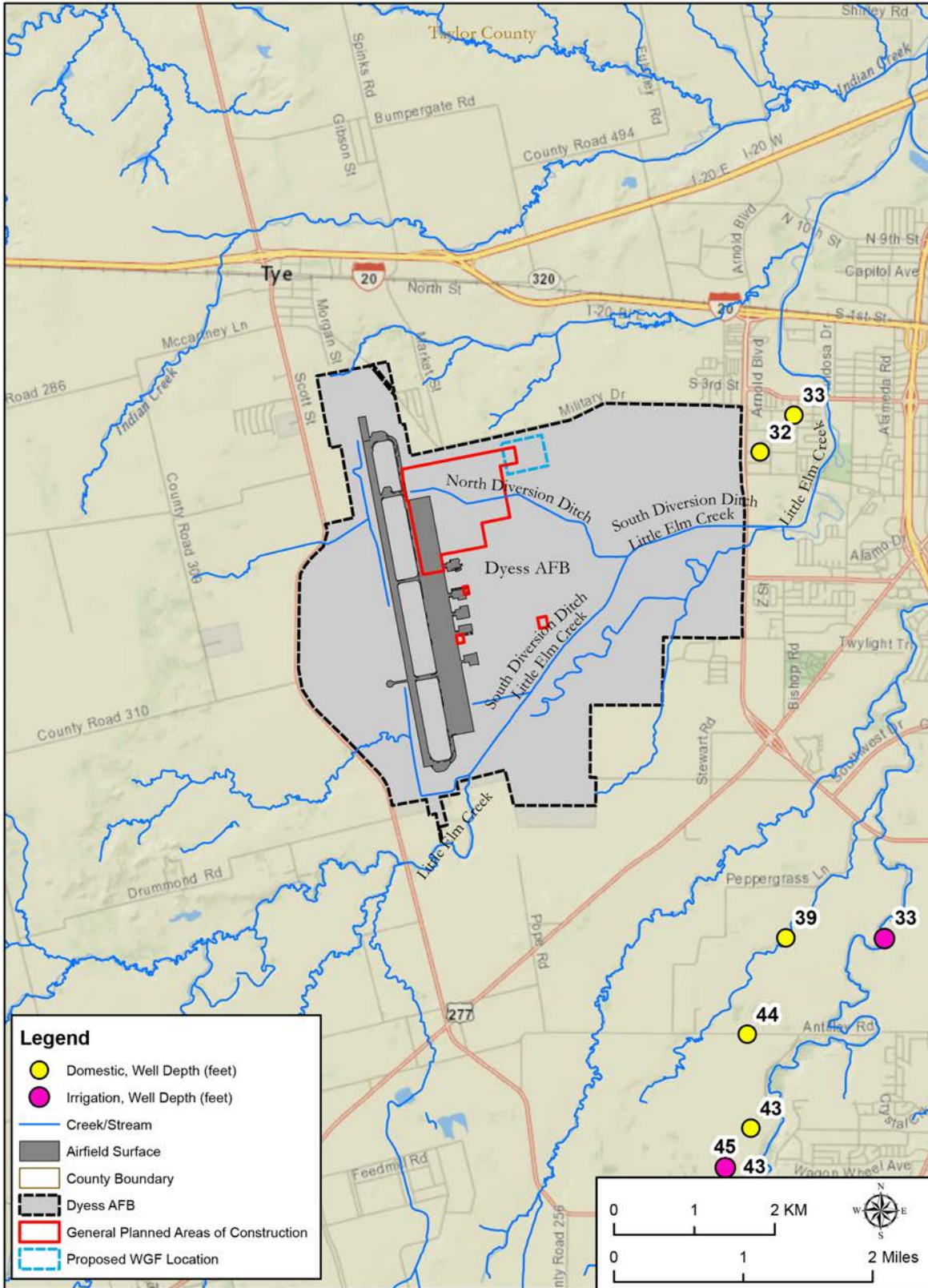
19 Ellsworth AFB is in the Unglaciaded Missouri Plateau Section on the Great Plains  
20 physiographic province (U.S. Geological Survey, 2018). The topography of the Missouri  
21 Plateau is generally level but is interrupted by steep river valleys. The flat areas between  
22 the river valleys are called tablelands.

23 Figure 3.9-5 shows the topography of Ellsworth AFB. Topography is mostly gently  
24 sloping, except for the northernmost part of the base where the terrain has a steeper  
25 slope. Most of the planned construction areas and the South WGF Site have slopes of  
26 about 1 percent but portions of these areas have steeper slopes of about 4 percent. The  
27 North WGF Site is an area with more topographic relief (surface slopes of about  
28 5 percent). Slopes between 1 percent and 2.5 percent are considered moderate, while  
29 slopes greater than 2.5 percent are considered steep (United Nations, 1985).

#### 30 **Soils**

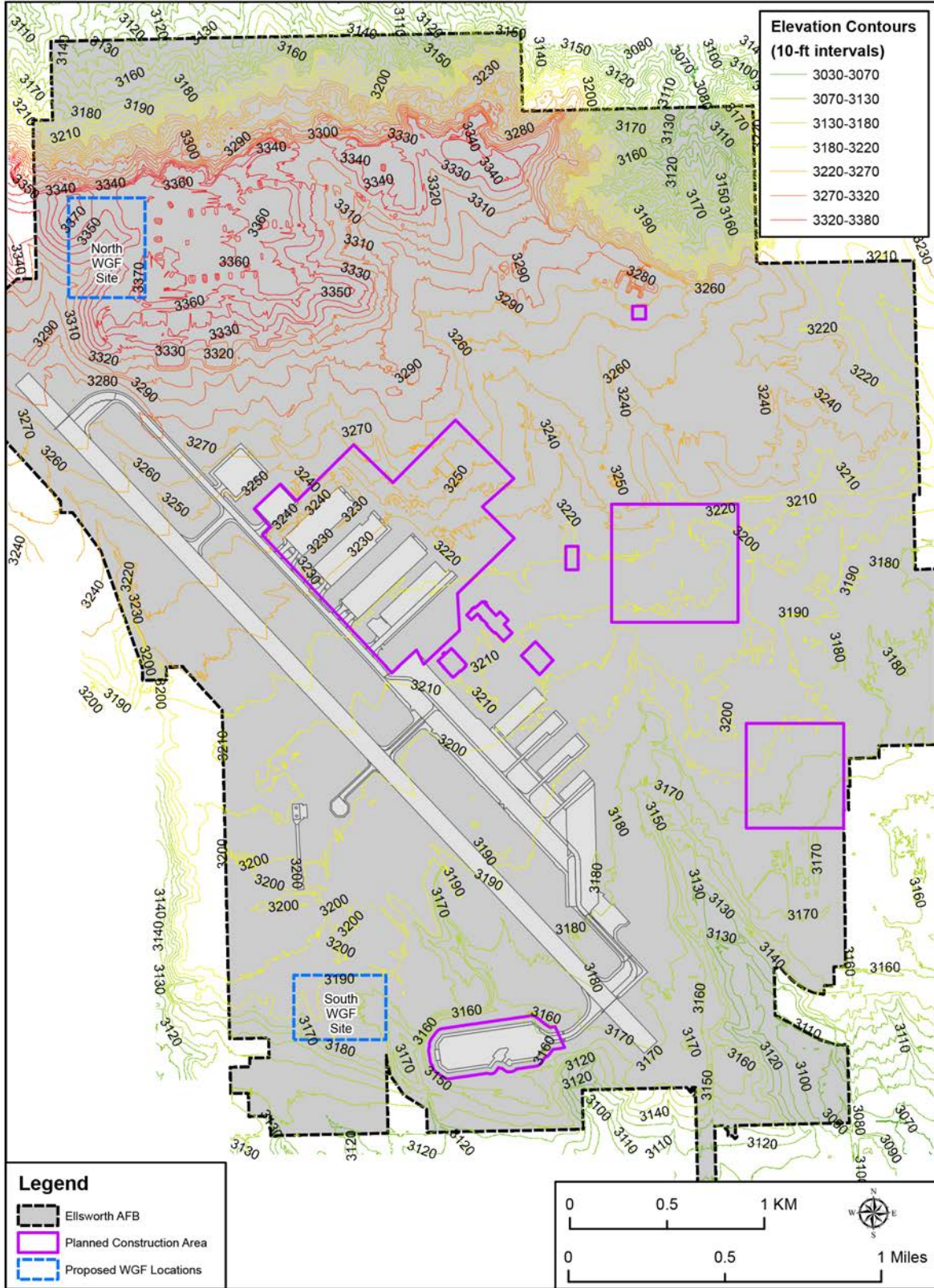
31 The soil types found in the planned construction areas and WGF sites at Ellsworth AFB  
32 consist of Nunn clay loam, Zigweid-Nihill complex, Urban Land, and Onita clay loam  
33 (Figure 3.9-6) (NRCS, 2019). Table 3.9-3 presents a description of each soil type, and  
34 Table 3.9-4 shows the areal extent and erosion factor for each soil type and soil type  
35 complex.

36 Erosion factors range from 0.02 for the least erodible to 0.64 for the most erodible soils.  
37 Erosion factors for soils in the planned construction areas and WGF sites at Ellsworth  
38 AFB range from 0.24 to 0.32, which indicates the soils are moderately erodible.



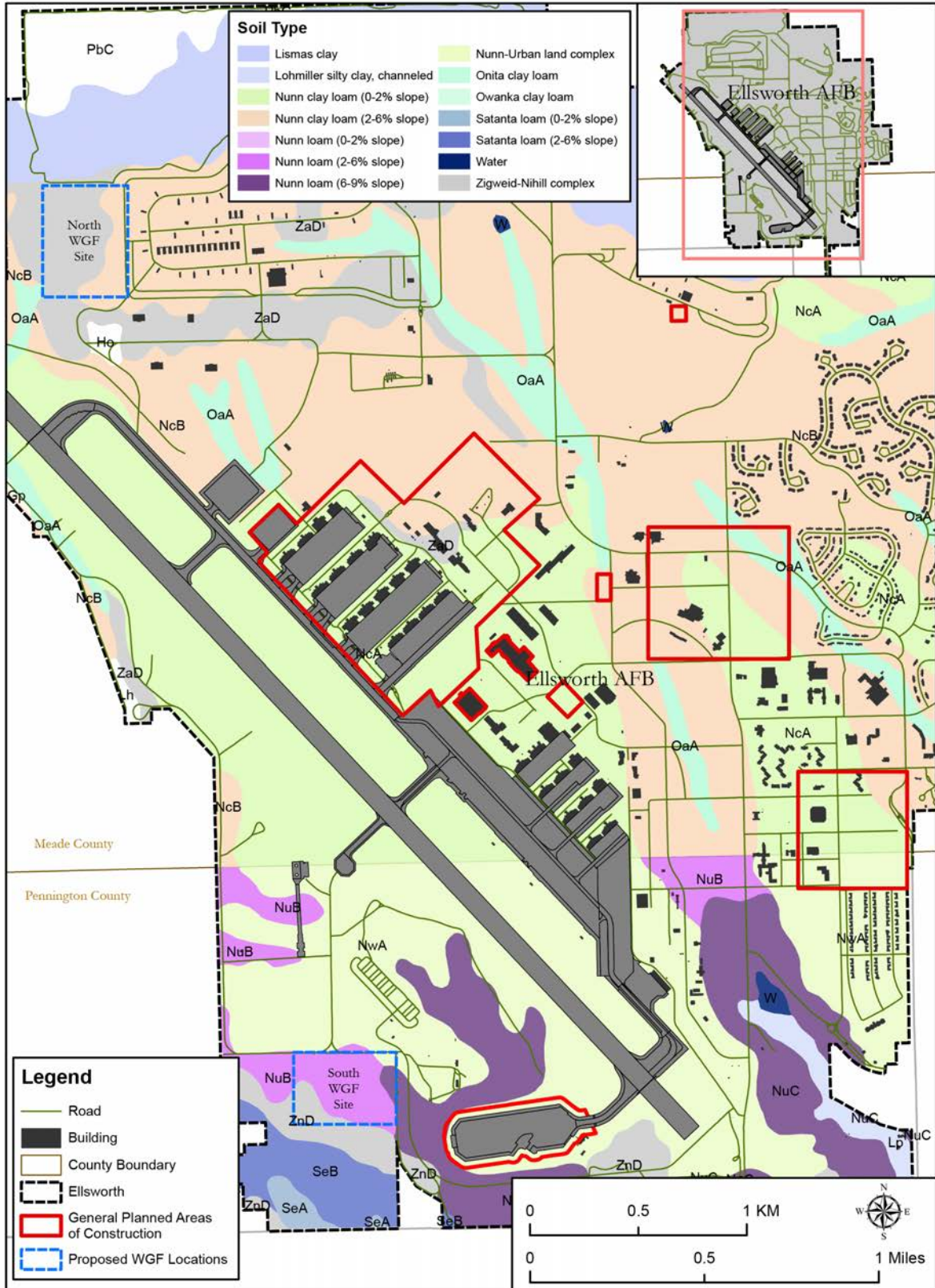
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**Figure 3.9-4. Active Water Supply Wells near Dyess AFB**



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Figure 3.9-5. Topography, Ellsworth AFB



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**Figure 3.9-6. Soil Types, Planned Construction Areas and WGF Sites, Ellsworth AFB**

1 **Table 3.9-3. Soil Types in Planned Construction Areas and WGF Site, Ellsworth AFB**

Soil Type	Description
Nunn clay loam	Consists of very deep, well drained, soils that formed in loess or mixed alluvium.
Urban land	Soils extensively influenced by human activities.
Nihill gravelly loam	Consists of very deep very well drained soils formed in gravelly alluvium from mixed sources.
Zigweid fine loam	Consists of very deep, well drained soils formed in alluvium from mixed sedimentary sources on fan aprons, alluvial fans, fan piedmonts, fan remnants, terraces, ridges, and hills.
Onita silt loam	Consists of very deep, well and moderately drained soils formed in local alluvium mainly on footslopes.

Source: (NRCS, 2020b)

AFB = Air Force Base; WGF = Weapons Generation Facility

2 **Table 3.9-4. Areal Extent and Erosion Factors for Soil Types at Planned Construction**  
3 **Areas and WGF Sites, Ellsworth AFB**

Soil Unit Name	Soil Map Symbol	Erosion Factor	Acres in Area of Interest <sup>1</sup>	Percent of Area of Interest <sup>1</sup>
Nunn clay loam, 0 to 2 percent slopes	NcA	0.24	226.5	44.3%
Nunn clay loam, 2 to 6 percent slopes	NcB	0.24	132.5	25.9%
Nunn-Urban land complex, 0 to 3 percent slopes	NwA	0.28	60.7	11.9%
Zigweid-Nihill complex, 6 to 15 percent slopes	ZaD	0.32	45.0	8.8%
Nunn loam, 2 to 6 percent slopes	NuB	0.28	28.3	5.5%
Onita clay loam, 0 to 4 percent slopes	OaA	0.28	8.5	1.7%
Zigweid-Nihill complex, 6 to 15 percent slopes	ZnD	0.32	6.9	1.3%
Nunn loam, 6 to 9 percent	NuC	0.28	2.9	0.6%
<b>Total for Area of Interest</b>			<b>511.3</b>	<b>100.0%</b>

Source: (NRCS, 2019)

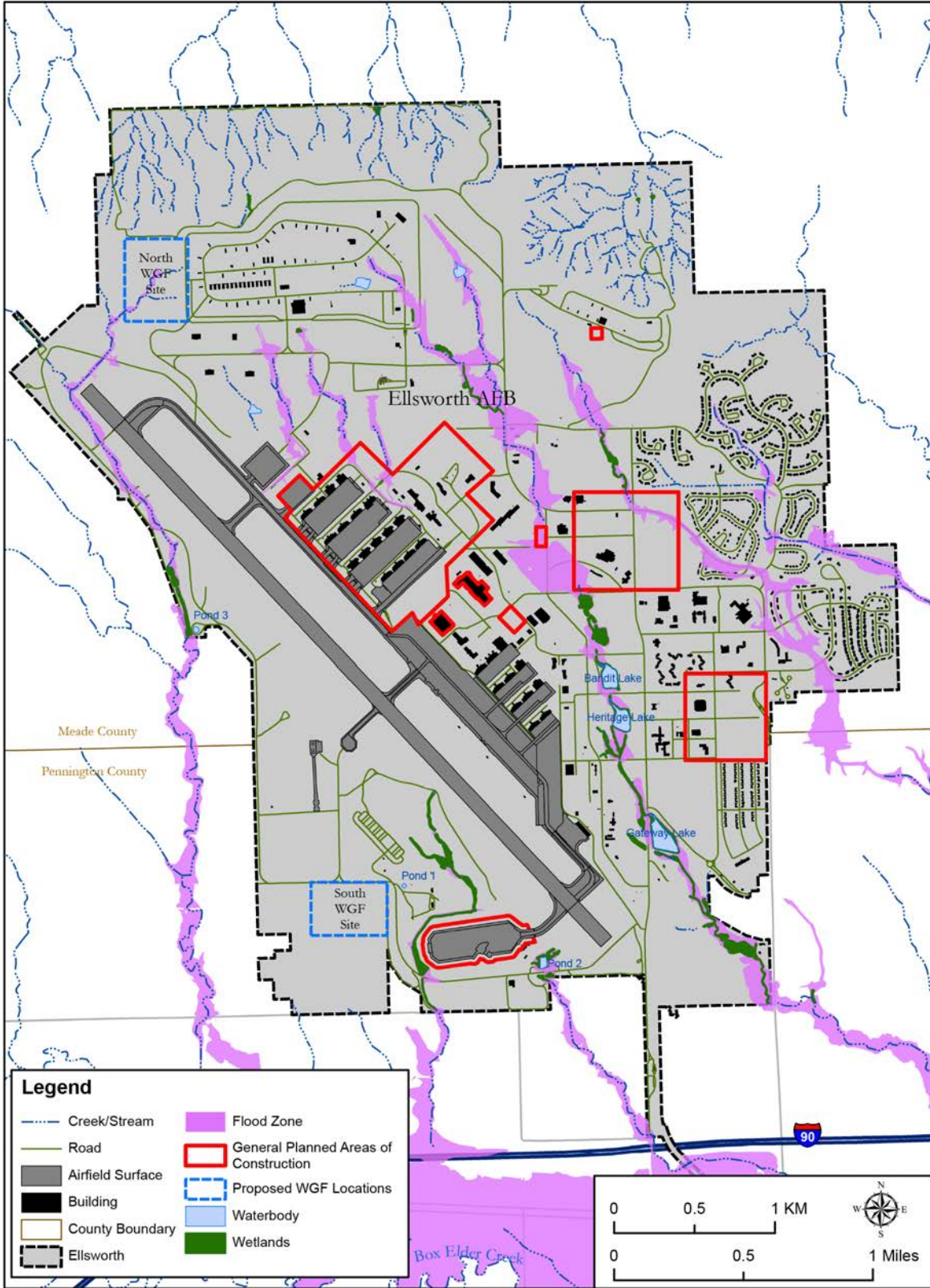
% = percent; AFB = Air Force Base; WGF = Weapons Generation Facility

Note:

1. Area of Interest consists of the planned construction areas and WGF sites at Ellsworth AFB.

4 **Water Resources – Surface Water, Floodplains, and Wetlands**

5 The major streams closest to Ellsworth AFB are Elk Creek to the north and Box Elder  
6 Creek and Rapid Creek to the south. Surface runoff from the northern portion of the base  
7 flows through unnamed drainages towards Elk Creek, approximately 5 miles to the  
8 northeast (Figure 3.9-7).



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**Figure 3.9-7. Streams, Lakes, 100-year Floodplains, and Wetlands, Ellsworth AFB**

1 Surface runoff from the southern portion of Ellsworth AFB (including the planned  
2 construction areas and both North and South WGF Sites) flows generally south-southeast  
3 via retention ponds, ditches, storm sewers, and ephemeral streams, eventually  
4 discharging into Box Elder Creek approximately 1 mile south of the installation boundary  
5 (Figure 3.9-7). One of the streams has been impounded to form Bandit Lake, Heritage  
6 Lake, and Gateway Lake. There are three small man-made ponds on the western side of  
7 the base (Pond 1, 2, and 3). These ponds receive storm water or liquids from the areas  
8 where deicing and fueling are performed, and have been designed to contain floating  
9 pollutants. Additional details regarding these ponds are described in this section.

10 Ellsworth AFB holds a permit from SDDENR for storm water discharges associated with  
11 industrial activities (discharge permit # SD0000281). The permit expired in 2014 but  
12 because the base had submitted a renewal application, SDDENR granted an extension  
13 to the existing permit while the renewal is being processed. The new permit is anticipated  
14 to be completed in 2021 (Goyer, 2019).

15 As one of the permit requirements, the base has prepared a SWPPP (Ellsworth AFB,  
16 2019a) that describes stormwater controls and BMPs that the base implements to prevent  
17 the release of pollutants. As outlined in the SWPPP and required by the permit, Ellsworth  
18 AFB monitors stormwater outfalls to ensure compliance with permit limits. Runoff from  
19 areas where deicing and fueling are performed flow through stormwater pipes to Pond 1,  
20 2, or 3 (Figure 3.9-7). The inlets for each of the ponds are equipped with manually-  
21 controlled spill control valves. In the event of a chemical spill, the spill control valve can  
22 be used to prevent liquids (chiefly fuels) from flowing into the pond. Discharges from the  
23 ponds flow through oil skimmers before being released to drainageways that carry the  
24 discharge towards permitted outfalls (Ellsworth AFB, 2020a).

25 In addition to surface water features, Figure 3.9-7 also shows the 100-year floodplain and  
26 wetlands at Ellsworth AFB. Floodplains occur along the main base drainage and along  
27 several creek drainages (Ellsworth AFB, 2020a). Wetlands occur along drainage  
28 channels, impoundments, and swales, primarily at drainages associated with the main  
29 base channel, fire training area, alert apron, west boundary, and munitions storage area.

### 30 **Water Resources – Groundwater**

31 The aquifers beneath the Ellsworth AFB include a shallow aquifer and three bedrock  
32 aquifers (the Inyan Kara, Minnelusa, and the Madison) (Trihydro Corporation, 2019). The  
33 shallow aquifer consists of unconsolidated alluvial terrace sediments and an upper portion  
34 of Pierre Shale that lies below the unconsolidated overburden. The Inyan Kara aquifer  
35 consists of sandstones and is separated from the shallow aquifer by a layer of Pierre  
36 Shale, which is 860 feet thick at the base. The Pierre Shale is not an aquifer because it  
37 is a clay-rich bedrock and does not yield groundwater at a reasonable rate (Nichols, 1992;  
38 Rust Infrastructure, 1996). The Minnelusa aquifer consists of sandstone and other  
39 bedrock units. The Minnelusa aquifer has an average thickness of 736 feet and can be  
40 as much as 3,460 feet deep at the base. The Madison aquifer is 521 feet thick and is not  
41 commonly used as a drinking water source in the area because of its depth (4,140 feet at  
42 the base) (Trihydro Corporation, 2019).



1 Figure 3.9-8 shows domestic and municipal water supply wells within 1 mile of Ellsworth  
2 AFB. Well depths are either shallower than 100 feet or greater than 2,000 feet. The wells  
3 that are shallower than 100 feet draw groundwater from the shallow unconsolidated  
4 aquifer. The wells that are deeper than 2000 feet draw water from the deeper bedrock  
5 aquifers.

6 As a result of historical activities at Ellsworth AFB, groundwater in the shallow  
7 unconsolidated aquifer has been contaminated by fuels and chemicals previously used  
8 for maintenance and operations. Groundwater contaminated by petroleum fuel  
9 hydrocarbons and chlorinated solvents is currently contained within the base boundary  
10 (Figure 3.9-8) (ARGO/LRS JV and Gilbane Federal, 2019). To prevent exposure to  
11 petroleum and chlorinated solvent-contaminated groundwater, an institutional control  
12 prohibits the use of groundwater within base property (Krebs, 2019).

13 Groundwater contaminated by per- and polyfluoroalkyl substances (PFAS) in the shallow  
14 aquifer extends off-base and is present above the EPA Lifetime Health Advisory of  
15 0.07 micrograms per liter ( $\mu\text{g/L}$ ) in 24 private drinking water wells in the area adjacent to  
16 the west and south base boundaries, as well as adjacent to Box Elder Creek for 18 miles  
17 east of the base (Krebs, 2020). The USAF is providing an alternative source of water for  
18 the affected residences and is performing investigations to identify PFAS sources on  
19 base. A deep well for the City of Box Elder has been recommended as a long-term  
20 solution to PFAS contamination of the private wells. The deep well would benefit the base  
21 because it could serve as a back-up water supply for Ellsworth AFB (Varley, 2020).

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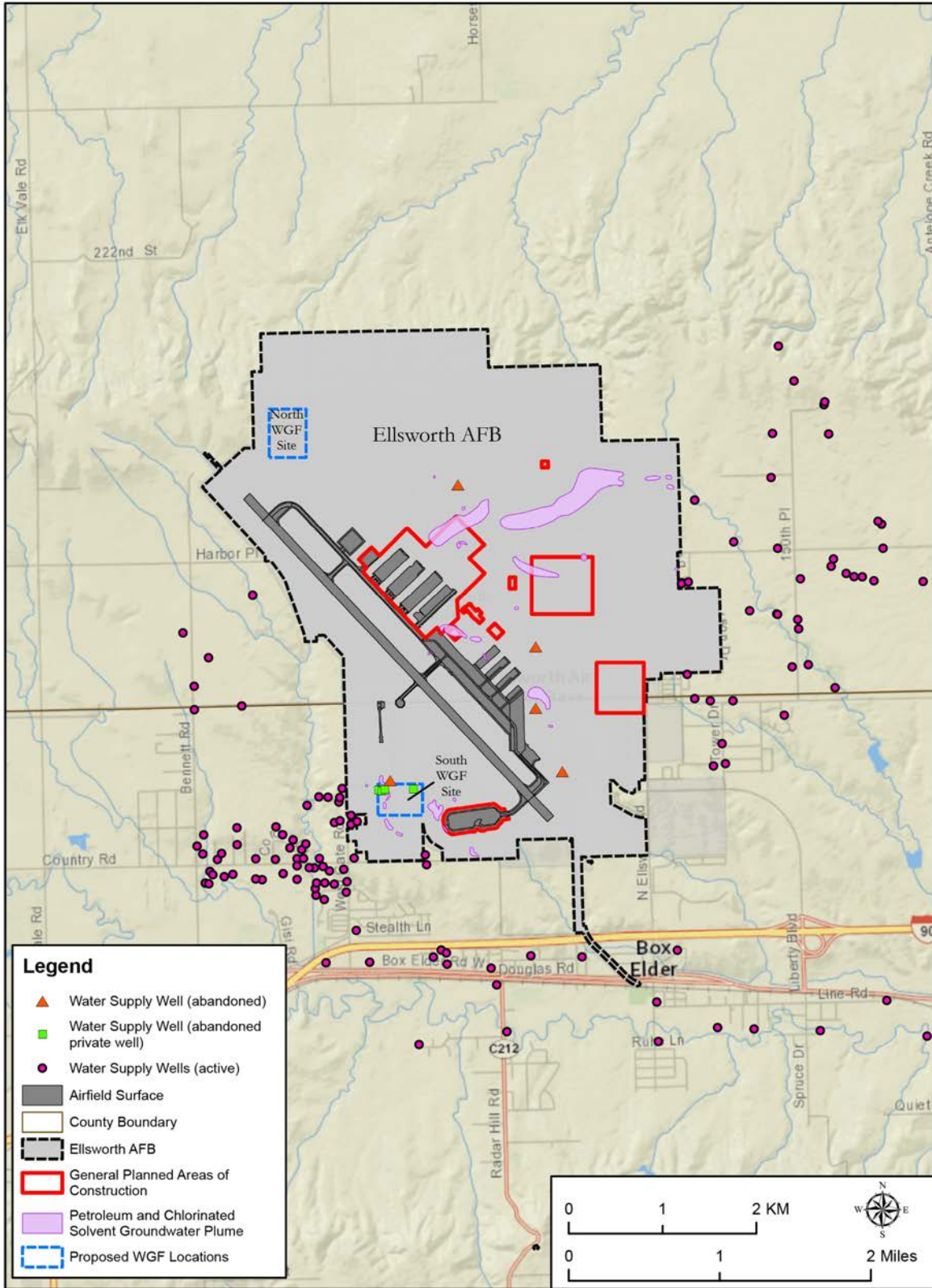
### 22 **3.9.1.3 Analysis Methodology**

#### 23 **Soils**

24 Soils in the planned construction areas and WGF sites were evaluated to identify soil  
25 types and erosion potential, which is influenced by drainage characteristics and site  
26 topography. The Proposed Action involves new construction, which would require land  
27 disturbance and introduce the potential for soil erosion that can possibly impact on  
28 surface water features within and downstream of the Dyess AFB and Ellsworth AFB.

#### 29 **Water Resources**

30 Potential impacts on water resources were evaluated by identifying surface water features  
31 and groundwater within and around Dyess AFB and Ellsworth AFB. This allowed for the  
32 determination of direct impacts on water resources (e.g., construction in floodplains,  
33 storm water runoff to streams, migration of contaminants into groundwater), as well as  
34 the potential for impacts on downstream or downgradient of the planned construction  
35 areas and WGF sites for each alternative. Potential impacts were also evaluated in the  
36 context of Section 303 of the Clean Water Act, which requires states to establish water  
37 quality standards for waterways, identify those that fail to meet the standards, and take  
38 action to clean up impaired waterways. Waters determined to be impaired are submitted  
39 to the EPA for approval as each state's 303(d) list.



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**Figure 3.9-8. Active Water Supply Wells near Ellsworth AFB**

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## 3.9.2 Physical Resources, Environmental Consequences

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### 3.9.2.1 No Action Alternative Consequences

Under the No Action Alternative, impacts would not occur on physical resources however, demolition, construction, and maintenance would continue as part of normal operations and installation development, and these activities may affect physical resources. These activities would be subject to project-specific environmental review under the EIAP and physical resources concerns would be addressed during that review.

#### 3.9.2.1.1 No Action at Dyess AFB

##### Soils

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, 2018c). 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 Section 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.

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 Section (Dyess AFB, 2018c). 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.

##### Water Resources

Dyess AFB maintains and implements a SWPPP (Dyess AFB, 2018c) that includes BMPs and controls for reducing the potential impact from the ongoing military activities on surface water, floodplains, or wetlands. The SWPPP also provides spill prevention measures and response actions, and describes employee training, as well as monitoring and inspection programs. These programs protect surface water and groundwater 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 groundwater. Therefore, by continuing implementation of the SWPPP, the SPCC Plan, and associated BMPs, significant impacts on water resources would not occur under the No Action Alternative.

1 In summary, soils and water management activities at Dyess AFB under the No Action  
2 Alternative would not result in significant adverse impacts on physical resources.

### 3 **3.9.2.1.2 No Action at Ellsworth AFB**

#### 4 **Soils**

5 Site topography at Ellsworth AFB is mostly gently sloping, which results in low erosion  
6 potential. However, areas with steeper topography, such as an area near the north  
7 boundary of the base, have greater erosion potential. The Ellsworth AFB SWPPP  
8 (Ellsworth AFB, 2019a) includes a detailed description of areas within the base with  
9 potential for significant erosion, as well as recommended management actions.  
10 Continuing implementation of the SWPPP and associated management actions would  
11 prevent significant impacts on soils at Ellsworth AFB under the No Action Alternative.

#### 12 **Water Resources**

13 Ellsworth AFB maintains and implements a SWPPP (Ellsworth AFB, 2019a) that includes  
14 BMPs and controls for reducing the potential impact from ongoing military activities on  
15 surface water, floodplains, or wetlands. The SWPPP also provides spill prevention  
16 measures and response actions, and describes employee training, monitoring and  
17 inspection programs. Ellsworth AFB implements an Annual Comprehensive Site  
18 Compliance Evaluation program, which lists specific items to be inspected in the SWPPP.  
19 The results of the comprehensive compliance evaluation are documented and maintained  
20 onsite with the SWPPP. These programs protect surface water and groundwater at and  
21 downgradient from the base.

22 Ellsworth AFB also maintains an SPCC Plan. The SPCC Plan identifies regulated areas  
23 where POLs are used, stored, and handled. The SPCC plan describes the spill prevention  
24 and control devices and procedures used by Ellsworth AFB to prevent unregulated  
25 discharges to the environment. Many requirements implemented in the SPCC Plan  
26 prevent stormwater pollution and adverse impacts on surface water, floodplains,  
27 wetlands, and groundwater. Therefore, by continuing implementation of the SWPPP and  
28 the SPCC Plan, significant impacts on water resources would not occur under the No  
29 Action Alternative.

30 In summary, soils and water management activities at Ellsworth AFB under the No Action  
31 Alternative would not result in significant adverse impacts on physical resources.

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### 32 **3.9.2.2 Dyess AFB Alternative**

#### 33 **3.9.2.2.1 Personnel**

34 Potable water is supplied to Dyess AFB by the City of Abilene, which obtains its water  
35 primarily from Fort Phantom Hill Lake. The water treatment system for the City of Abilene  
36 has a maximum capacity of 46,000,000 gallons per day (City of Abilene, 2020). Dyess  
37 AFB currently uses approximately 169,000 gallons of water per day on average. Water  
38 usage would be expected to increase to approximately 235,000 gallons per day to support

1 the increased number of personnel at the base with the B-21 MOB 1 beddown (Section  
2 3.13, Utilities and Infrastructure). The increased water usage rate is less than 1 percent  
3 of the maximum capacity of the water treatment system for the City of Abilene. As such,  
4 this increase is not expected to have significant impacts on Fort Phantom Hill Lake from  
5 which the City of Abilene primarily draws its water.

6 The increased number of personnel would also increase vehicle use and potential  
7 oil/lubricant spills and leaks (Section 3.12, Transportation). No adverse impacts on the  
8 environment are expected from vehicular spills and leaks since these would be captured  
9 by stormwater systems at the base. The stormwater system at Dyess AFB is managed  
10 and monitored under the SWPPP (Dyess AFB, 2018c).

### 11 **3.9.2.2.2 Airfield Operations**

12 Water resources at Dyess AFB could potentially be impacted by inadvertent releases of  
13 hazardous chemicals that may occur during airfield operations such as fueling,  
14 conventional and unconventional munitions storage, equipment maintenance, and waste  
15 disposal. Hazardous chemical releases could also occur from leaking fuel storage tanks.  
16 The volume of fuels and hazardous chemicals used at Dyess AFB and volume of  
17 hazardous waste generated are not expected to change if the B-21 MOB 1 beddown  
18 occurs at this location, although the nature of some hazardous wastes could change  
19 based on the type of materials used in repair operation. Hazardous Material Management  
20 and Hazardous Waste Disposal programs described in Section 3.10 (Hazardous  
21 Materials and Hazardous and Solid Wastes) are currently being implemented, and these  
22 programs would protect surface waters and groundwater resources downstream of the  
23 proposed construction footprints for projects listed in Table 2.4-1 and the WGF site. The  
24 Dyess AFB SWPPP (Dyess AFB, 2018) includes BMPs for spill prevention and response  
25 actions. It also describes employee training, monitoring, and inspection programs.  
26 Accidental chemical releases would be prevented by the control measures. If these  
27 events do occur, spills can be prevented from leaving the base boundary by the weir/valve  
28 control system at the South Diversion Ditch/Little Elm Creek. In the event of an  
29 emergency, the valves can be shut to prevent chemicals from exiting the Dyess AFB  
30 property except in cases of heavy rainfall events (Dyess AFB, 2018).

31 The Dyess AFB SPCC Plan contains spill response procedures and a list of facilities that  
32 have containers for POLs with storage capacities of 55 gallons or greater. The plan would  
33 need to be updated to include new POL storage tanks associated with the proposed B-21  
34 MOB 1. Many requirements implemented in the SPCC Plan also prevent stormwater  
35 pollution and adverse impacts on surface water as well as groundwater.

### 36 **3.9.2.2.3 Airspace and Range Utilization**

37 Airspace and range utilization under the Dyess AFB Alternative would not affect physical  
38 resources at PRTC or the Brownwood, Lancer, or Pecos MOAs.

### 1 **3.9.2.2.4 Facilities, Infrastructure, and the Weapons Generation Facility**

#### 2 **Soils**

3 Establishment of the B-21 MOB 1 at Dyess AFB would require construction of new  
4 facilities, as well as renovation and demolition of existing structures. The B-21 MOB 1  
5 beddown would also require construction of a WGF, which would consist of a 52,210-  
6 square-foot building within a 35-acre footprint. Construction and other ground-disturbing  
7 activities may cause soil disturbance and soil erosion unless mitigation practices are  
8 implemented.

9 The soils in the planned areas of construction and WGF site are shown on Figure 3.9-2.  
10 Erosion factors range from 0.24 to 0.32, which indicate moderate erodibility (Table 3.9-2).  
11 The slopes in the planned areas of construction and WGF site range from approximately  
12 0.3 percent to 0.5 percent, which are considered very flat (United Nations, 1985). Overall,  
13 there is low potential for soil erosion at the planned construction areas and WGF site due  
14 to construction and other ground-disturbing activities.

15 The potential for soil erosion would be further reduced by controls implemented by Dyess  
16 AFB for construction projects at the base. As noted above, the Civil Engineering  
17 Squadron (CES) Environmental Group reviews construction projects (Dyess AFB, 2018c)  
18 and identifies additional erosion and sediment control requirements in the work order or  
19 contract if baseline runoff BMPs do not provide adequate protection of surface water  
20 during construction. Examples of erosion and sediment controls include minimization of  
21 earth-moving activities during wet weather/conditions, covering soil stockpiles, installation  
22 of silt fencing and sediment traps, and revegetation of disturbed areas with native plants  
23 as soon as possible to contain and prevent off-site migration of sediment or eroded soils  
24 from the project areas.

25 In addition to BMPs specified in the SWPPP or project-specific requirements from the  
26 CES Environmental Group, construction of the B-21 MOB 1 facilities and WGF would be  
27 covered under a construction general permit (TXR150000) because the area of the WGF  
28 building and the areas of many of the new facilities (Table 2.4-1) would be greater than  
29 1 acre (43,560 square feet). The largest new facilities are the Alert Ramp (825,000 square  
30 feet or 18.9 acres), the Central Hangar Maintenance Aprons (235,000 square feet or  
31 5.4 acres), the Northern Maintenance Apron (190,000 square feet or 4.4 acres), and the  
32 Southern Maintenance Apron (210,000 square feet or 4.8 acres). Construction covered  
33 under the construction general permit will adhere to sediment and erosion control  
34 requirements included in the permit.

35 In summary, beddown of the B-21 at Dyess AFB would not result in significant impacts  
36 on soil because of the low erosion potential associated with the flat topography at the  
37 base in general and in the planned areas of construction and WGF site specifically. The  
38 likelihood of potential impacts would be further reduced by the application of BMPs  
39 identified in the Dyess AFB SWPPP, adherence to erosion and sediment control  
40 requirements established by the CES Environmental Group, and implementation of  
41 requirements in the construction general permit for construction projects where land  
42 disturbance is greater than 1 acre.

## 1 Water Resources

2 Surface waters that could potentially be affected by construction and operations at the  
3 planned areas of construction and WGF site are the North Diversion Ditch, the South  
4 Diversion Ditch, and Little Elm Creek (downstream of these ditches). Little Elm Creek is  
5 not on the Texas 303(d) list of impaired waters (TCEQ, 2020). Establishment of the B-21  
6 MOB 1 at Dyess AFB would not be expected to cause impairment of this surface water.  
7 Wetlands at Dyess AFB would not be affected because there are no wetlands in the  
8 planned areas of construction for projects listed in Table 2.4-1 or in the WGF construction  
9 footprint. A floodplain associated with a portion of North Diversion Ditch is present in the  
10 primary planned construction area (Figure 3.9-3).

11 Surface runoff from the main planned construction footprint located on the north portion  
12 of Dyess AFB would likely flow towards the North Diversion Ditch (Figure 3.9-3). Surface  
13 runoff from the smaller planned construction areas located south of the main construction  
14 footprint would flow into the underground stormwater system and be conveyed either to  
15 the North Diversion Ditch or the South Diversion Ditch.

16 Potential impacts on surface water typically occur during construction/demolition activities  
17 from land disturbance due to eroded soil being transported into nearby drainageways.  
18 However, these impacts are unlikely to occur under the Dyess AFB Alternative because  
19 of the low likelihood of soil erosion, which stems from the flat topography in the  
20 construction footprints for projects listed in Table 2.4-1 and the WGF site. Additionally,  
21 erosion control measures would be implemented in accordance with the Dyess AFB  
22 SWPPP (Dyess AFB, 2018c), and requirements in the construction general permit  
23 (TXR150000) for construction areas where land disturbance would be greater than 1 acre.

24 Surface water could also potentially be impacted by increased impervious surface area  
25 from new facilities and higher discharge volume of stormwater flowing into drainage ways.  
26 Based on the areas provided in Table 2.4-1 for new facilities, existing facilities to be  
27 demolished, and the WGF building, the net increase in impervious surfaces is estimated  
28 to be approximately 64 acres. Increased runoff can be managed by conveyance  
29 structures (e.g., roadways, channels, and culverts) designed in accordance with  
30 established engineering standards. In addition, stormwater impacts can be reduced by  
31 using site controls that treat, store, and infiltrate runoff onsite before it can affect water  
32 bodies downstream (EPA, 2020a). These control measures include but are not limited to  
33 grassed swales, infiltration basins and trenches, rain gardens, and pervious pavements.  
34 Stormwater management controls would conform with Section 438 of the Energy  
35 Independence and Security Act, which requires agencies to protect water resources by  
36 reducing stormwater runoff from any federal development projects (EPA, 2009).

37 Because there are subareas within the primary planned construction footprint that are  
38 within a 100-year floodplain, Dyess AFB would comply with EO 11988, *Floodplain*  
39 *Management*, in siting new facilities in this area. EO 11988 requires federal agencies to  
40 avoid to the extent possible the long and short-term adverse impacts associated with the  
41 occupancy and modification of floodplains and to avoid direct and indirect support of  
42 floodplain development wherever there is a practicable alternative (Federal Emergency  
43 Management Agency, 2015). The affected floodplain area is associated with the North

1 Diversion Ditch and is approximately 20.5 acres, which is a relatively small area  
2 (6 percent) of the total main construction footprint (Figure 3.9-3). Siting B-21 MOB 1  
3 facilities away from the 100-year floodplain area to avoid impacts is considered likely  
4 given the limited areal extent of the floodplain area relative to the main construction  
5 footprint, with one exception. As part of the Dyess AFB Alternative, the existing aircraft  
6 parking apron would need to be expanded. This would impact a portion of the Northern  
7 Diversion Ditch and approximately 2 acres of floodplain delineated within the ditch. The  
8 Northern Diversion Ditch is an already disturbed environment within the cantonment area  
9 of Dyess AFB. The proposed extension of the ramp to the north will require extending  
10 the existing 10 foot x 10 foot concrete box culvert that runs west to east under the main  
11 runway, maintaining similar flow capacity and discharging to the existing lined culvert of  
12 the diversion ditch. The hydrological properties of the floodplain would not be impacted.

13 Currently, Dyess AFB does not have available land to expand the aircraft parking apron  
14 without working within the floodplain. If the Dyess AFB Alternative is chosen, a Finding  
15 of No Practicable Alternative will be included in the Record of Decision.

16 No significant impacts on groundwater would be anticipated to result from establishment  
17 of the B-21 MOB 1 at Dyess AFB. BMPs and spill prevention practices in the Dyess AFB  
18 SWPPP and SPCC plan would serve to protect groundwater. Contamination of the  
19 underlying Cross Timbers Aquifer is unlikely given its depth (174 to 193 feet, based on  
20 the existing water wells that draw groundwater from this aquifer) (Texas Water  
21 Development Board, 2019).

22 In summary, there would be no significant impacts on physical resources under the Dyess  
23 AFB Alternative.

#### 24 **3.9.2.2.5 Proposed Resource-Specific Mitigations and Management Actions to** 25 **Reduce the Potential for Environmental Impacts**

26 Construction-related impacts on soil and surface water quality can be reduced through  
27 implementation of erosion and sediment control measures. Examples of controls include  
28 minimization of earth-moving activities during wet weather/conditions, covering soil  
29 stockpiles, installation of silt fencing and sediment traps, and revegetation of disturbed  
30 areas with native plants as soon as possible to contain and prevent off-site migration of  
31 sediment or eroded soils from the project areas.

32 Site drainage around the new facilities would be designed to manage the anticipated  
33 increase in runoff from increased impervious surfaces through properly sized stormwater  
34 conveyance structures and incorporating stormwater management features such as  
35 porous pavements and infiltration basins that treat, store, and infiltrate runoff onsite before  
36 it can affect downstream water bodies (EPA, 2020a).

37 Building sites would be located to avoid the 100-year floodplain areas, if possible.



### 3.9.2.3 Ellsworth AFB Alternative

#### 3.9.2.3.1 Personnel

Potable water is supplied to Ellsworth AFB by Rapid City, which obtains its water primarily from the Rapid City Alluvium, Rapid Creek, and Minnelusa and Madison aquifers (Rapid City Water Division, 2019). Rapid City's Jackson Springs water treatment plant has a maximum capacity of 8,000,000 gallons per day (Burns and McDonnell, 2020). Ellsworth AFB currently uses approximately 500,000 gallons of water per day. Based on the projected personnel increase associated with the B-21 MOB 1 beddown and the current estimated daily usage, water usage would be expected to increase to approximately 650,000 gallons per day (Section 3.13, Utilities and Infrastructure). Given that the increased usage is a relatively low percentage (8 percent) of the maximum capacity of the Rapid City water treatment plant, the expected water demand from increased personnel associated with the B-21 MOB 1 beddown at Ellsworth AFB would not be expected to significantly impact groundwater and surface waters that Rapid City uses as water sources.

Like the Dyess AFB Alternative, an increased number of personnel would also increase vehicle use and potential oil/lubricant spills and leaks (Section 3.12, Transportation). However, no adverse impacts on the environment are expected from potential increased vehicular spills and leaks since these would be captured by stormwater systems at the base. The Ellsworth AFB stormwater system is managed and monitored under the SWPPP (Ellsworth AFB, 2019a).

#### 3.9.2.3.2 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 Ellsworth AFB and the volume of hazardous waste generated would not be expected to change if the B-21 MOB 1 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 3.10 (Hazardous Materials and Hazardous and Solid Wastes) are currently being implemented, would protect surface waters in the planned areas of construction, WGF site, and downstream. The Ellsworth AFB SWPPP (Ellsworth AFB, 2019a) 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 and it describes employee training, monitoring, and inspection programs. Ellsworth AFB implements an Annual Comprehensive Site Compliance Evaluation Program, which includes specific items to be inspected in the SWPPP. If the B-21 MOB 1 were established at Ellsworth AFB, the SWPPP would need to be updated to include the new facilities to include inspections during the comprehensive compliance program at the base.

1 The Ellsworth AFB SPCC Plan identifies regulated areas where POLs are used, stored,  
2 and handled. The SPCC also describes the spill prevention and control devices as well  
3 as procedures used by Ellsworth AFB to prevent unregulated discharges to the  
4 environment. The SPCC would need to be revised if there are changes to the number  
5 and location of POL storage tanks associated with construction of the proposed B-21  
6 MOB 1. Many requirements implemented in the SPCC prevent stormwater pollution and  
7 adverse impacts on surface water, floodplains, wetlands, and groundwater.

8 Two of the planned construction areas at Ellsworth AFB (North and South WGF sites) are  
9 located on the western side of the base. The other two planned areas of construction are  
10 on the eastern side (Figure 3.9-7). If a liquid chemical release occurred in the areas on  
11 the western side of the base, the liquid would flow towards Ponds 1, 2, or 3. All three  
12 ponds are equipped with spill control valves on the pond inlet that would block the flow of  
13 liquids into the ponds to prevent downstream and offsite release should a large spill occur.  
14 If spills occur in the planned areas of construction on the east side of the base, liquids  
15 would flow to a series of ponds including Bandit, Heritage, and Gateway Lakes. These  
16 lakes ultimately discharge through a permitted outfall to Box Elder Creek (Ellsworth AFB,  
17 2020a; Ellsworth AFB, 2019a). There are physical barriers that would prevent releases  
18 from going offsite on the west side of Ellsworth AFB. There are no physical barriers for  
19 releases on the east side of Ellsworth AFB.

### 20 **3.9.2.3.3 Airspace and Range Utilization**

21 Airspace and range utilization under the Ellsworth AFB Alternative would not affect  
22 physical resources at PRTC.

### 23 **3.9.2.3.4 Facilities, Infrastructure, and the WGF**

#### 24 **Soils**

25 The soils in the planned areas of construction, the North and South WGF Sites at  
26 Ellsworth AFB have been identified in Figure 3.9-6. Erosion factors range from 0.24 to  
27 0.32, which indicate moderate erodibility (Table 3.9-4). Most of the planned construction  
28 areas have slopes of about 1 percent but portions of these areas have steeper slopes of  
29 about 4 percent.

30 Based on the soil erosion factors and surface slopes in the planned construction areas  
31 and WGF sites, there is moderate to high likelihood for soil erosion in these areas unless  
32 mitigation practices are implemented. The Ellsworth AFB SWPPP (Ellsworth AFB, 2019a)  
33 recognizes the existence of potential erosion-prone areas and provides erosion and  
34 sediment control measures that can be used for moderate to steep slopes.

35 Construction of the B-21 MOB 1 facilities and WGF at Ellsworth AFB would likely be  
36 covered under a construction general permit (SDR100000) because the area of the WGF  
37 building and the areas of many of the new facilities (Table 2.5-1) are greater than 1 acre.  
38 For example, new pavement would be constructed with areas ranging from 105,000 to  
39 1,211,000 square feet (2.4 to 27.8 acres). During construction, erosion and sediment  
40 control requirements specified in the construction general permit would be followed.

1 In summary, there is potential for soil erosion during construction of the B-21 MOB 1  
2 beddown at Ellsworth AFB because of the moderate to steep slopes in the planned areas  
3 of construction and WGF sites. With the application of erosion and sediment control  
4 measures in the Ellsworth AFB SWPPP, and adherence to requirements in the  
5 construction general permit, potential impacts on soil could be reduced if the B-21 MOB 1  
6 were established at Ellsworth AFB.

## 7 Water Resources

8 The surface waters that could potentially be affected by establishment of B-21 MOB 1  
9 facilities and the WGF include the streams that flow south/southeast towards Box Elder  
10 Creek. None of the wetlands at Ellsworth AFB are located within the planned areas of  
11 construction and would not be directly impacted. Box Elder Creek is on South Dakota's  
12 303(d) list of impaired waters due to elevated levels of *E. coli* (SDDENR, 2020).  
13 Establishment of the B-21 MOB 1 at Ellsworth AFB would not be expected to affect *E. coli*  
14 levels or to otherwise degrade water quality at Box Elder Creek because domestic and  
15 industrial wastewater from the base is treated in an off-site wastewater treatment plant in  
16 the City of Box Elder.

17 Impacts on surface waters from erosion during construction/demolition could be avoided  
18 if erosion and sediment control measures specified in the Ellsworth AFB SWPPP  
19 (Ellsworth AFB, 2019a) were implemented. Furthermore, for construction projects  
20 involving land disturbance greater than 1 acre, coverage under the construction general  
21 permit (SDR100000) is required, and erosion would be controlled through adherence to  
22 the permit requirements.

23 There are 100-year floodplains within two of the planned construction areas and at the  
24 North WGF Site (Figure 3.9-7). Siting of facilities within these areas will need to comply  
25 with EO 11988, *Floodplain Management*. The 100-year floodplain areas are limited in  
26 areal extent and siting facilities away from these areas would be feasible. The floodplain  
27 areas are 2 percent (4.4 out of 217 acres) and 8 percent (8.1 out of 98 acres) of the  
28 planned construction areas. The USAF would site facilities to avoid impacting the 100-  
29 year floodplains. Proposed development in the floodplain includes a stormwater detention  
30 cell for stormwater runoff control. The stormwater cell is likely to require flow modulation,  
31 erosive velocity control, solids settlement, and maintenance access features. The finished  
32 detention cell is not expected to result in filling of or obstructions to the present flood  
33 control channel.

34 Surface water could potentially be impacted by increased impervious surface area from  
35 new construction and higher discharge volume of stormwater flowing into streams. Based  
36 on the areas provided in Table 2.5-1 for new facilities, existing facilities to be demolished,  
37 and the WGF, the net increase in impervious surfaces is estimated to be approximately  
38 72 acres. As in the Dyess AFB Alternative, increased runoff at Ellsworth AFB can be  
39 managed by properly designed stormwater conveyance structures and by using site  
40 designs, such as rain gardens and pervious pavement that treat, store, and infiltrate runoff  
41 onsite before it can affect downstream water bodies (EPA, 2020a).

1 No significant impacts on groundwater are anticipated to result from establishment of the  
2 B-21 MOB 1 at Ellsworth AFB. Site groundwater will be protected by Hazardous Material  
3 and Waste Management programs at Ellsworth AFB described in Section 3.10  
4 (Hazardous Materials and Hazardous and Solid Wastes), as well as BMPs and spill  
5 prevention practices in the Ellsworth AFB SWPPP and SPCC. Groundwater in the shallow  
6 unconsolidated aquifer at Ellsworth AFB has been contaminated by historical releases of  
7 fuels and chlorinated solvent chemicals previously used for maintenance. The  
8 groundwater contaminated by petroleum and chlorinated solvents is currently contained  
9 within the base boundary (ARGO/LRS JV and Gilbane Federal, 2019). To prevent  
10 exposure to the contaminated groundwater, an institutional control prohibits the use of  
11 groundwater within base property (Krebs, 2019). A long-term monitoring program is in  
12 place at Ellsworth AFB to monitor groundwater contaminant plumes and evaluate the  
13 effectiveness of groundwater remediation efforts (ARGO/LRS JV and Gilbane Federal,  
14 2019). Shallow groundwater contaminated by PFAS extends off the base and has been  
15 detected above the EPA Lifetime Health Advisory level of 0.07 µg/L in 24 private drinking  
16 water wells. The USAF has provided an alternate drinking water source to the affected  
17 residences. PFAS-containing firefighting foam was last used at Ellsworth AFB in  
18 November 2016 (Ellsworth AFB, 2019b).

19 In summary, there would be no significant impacts on physical resources under the  
20 Ellsworth AFB Alternative.

### 21 **North WGF Site Subalternative**

22 The North WGF Site is in an area of more topographic relief where the estimated slope  
23 is about 5 percent, which is considered steep. Steep slopes at the North WGF Site could  
24 lead to potential soil erosion issues during construction. However, this would be reduced  
25 by application of erosion and sediment control measures described in the Ellsworth AFB  
26 SWPPP and adherence to requirements in the construction general permit, which would  
27 be needed because land disturbance to construct the WGF building would exceed 1 acre.  
28 There are no wetlands within the North WGF Site, but a 100-year floodplain area is  
29 present (Figure 3.9-7). The floodplain area is associated with the drainageway that cuts  
30 across the North WGF Site, but it is limited in areal extent (2.1 acres) compared to the  
31 area extent of the North WGF Site (4 percent of 50 acres). If this subalternative is selected  
32 and the floodplain area at the North WGF Site cannot be avoided, the USAF would  
33 prepare a Finding of No Practicable Alternative and include it in the Record of Decision.

### 34 **South WGF Site Subalternative**

35 Slopes at the South WGF Site are about 1 percent, which is less steep when compared  
36 to the North WGF Site. However, this site is still considered vulnerable to soil erosion  
37 with moderate potential. Negative impact from construction could be readily reduced by  
38 erosion and sediment control measures specified in the Ellsworth AFB SWPPP and  
39 construction general permit requirements. There are no wetlands or 100-year floodplain  
40 areas in the South WGF Site.

### 3.9.2.3.5 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. If possible, buildings should be sited in areas with moderate slopes and avoid disturbing areas with steep slopes, specifically at the North WGF Site.

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 onsite before it can affect downstream water bodies (EPA, 2020a).

Facilities and structures where military operations would involve handling of hazardous chemicals or fueling operations would be best placed where spill control valves serve as physical barriers that could prevent releases from flowing into the ponds and offsite streams.

Building sites should be located to avoid the 100-year floodplain areas. These areas are present at the North WGF Site and in two planned construction areas but are limited in areal extent and could be easily avoided.

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## 3.10 HAZARDOUS MATERIALS AND HAZARDOUS AND SOLID WASTES

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### 3.10.1 Hazardous Materials and Hazardous and Solid Wastes, Affected Environment

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#### 3.10.1.1 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 an hazardous waste under 40 CFR Part 261. Texas and South Dakota generally follow federal regulations related to hazardous waste management. In Texas, specific requirements may be found in Texas Administrative Code, Title 30, Chapter 335,

1 *Industrial Solid Waste and Municipal Hazardous Waste.* South Dakota regulations are  
2 found under the Administrative Rules of South Dakota, Chapter 74:28, *Hazardous Waste*.  
3 The state hazardous waste programs are responsible for regulating the storage,  
4 treatment, transport, and disposal of hazardous waste, and provide technical assistance,  
5 conducts inspections, and assigns generator identification numbers.

6 The affected resources include ERP sites. The CERCLA established prohibitions and  
7 requirements concerning closed and abandoned hazardous waste sites; provided for  
8 liability of persons responsible for releases of hazardous waste at these sites; and  
9 established a trust fund to provide for cleanup when no responsible party could be  
10 identified. The Superfund Amendments Reauthorization Act mandated the military  
11 departments within DoD to follow the same cleanup regulations that apply to private  
12 entities under CERCLA and established the Defense ERP. The ERP is used by DoD to  
13 identify, characterize, clean up, and restore sites contaminated with toxic and hazardous  
14 substances, low-level radioactive materials, petroleum products, or other pollutants and  
15 contaminants.

16 The affected resources also include the potential presence of toxic substances in  
17 structures (i.e., asbestos in building materials and lead in paints). Asbestos is a naturally  
18 occurring mineral that is a very effective heat and sound insulator. Consequently, it was  
19 used in many buildings as a fire and noise retardant. Asbestos has been linked to several  
20 diseases, including lung cancer, and has not been used in construction materials since  
21 1987. Friable (brittle) asbestos becomes hazardous when fibers become airborne and  
22 are inhaled. Asbestos management is addressed in various federal and state regulations,  
23 key among these is the Asbestos National Emission Standards for Hazardous Air  
24 Pollutants (NESHAP). This regulation is intended to minimize the release of asbestos  
25 fibers during activities involving the handling of asbestos.

26 Lead was used as an additive and pigment in paints for many years prior to 1978;  
27 therefore, older structures on the base that have multiple layers of older paint are potential  
28 sources of lead. Lead has been associated with central nervous system disorders,  
29 particularly among children and other sensitive populations. Exposure to lead is usually  
30 through inhalation during renovation and demolition activities or through ingestion of paint  
31 chips or lead-contaminated drinking water. Title IV of the Toxic Substances Control Act,  
32 as well as other authorities in the Residential Lead-Based Paint Hazard Reduction Act of  
33 1992, directs EPA to regulate lead-based paint (LBP) hazards.

34 Finally, this resource area evaluates impacts associated with solid waste disposal from  
35 proposed activities. This includes both municipal solid waste (MSW) C&D debris. In  
36 Texas, requirements related to solid waste management may be found in Texas  
37 Administrative Code, Title 30, Chapter 330, *Municipal Solid Waste*, while South Dakota  
38 solid waste regulations are found under South Dakota Codified Law 34A-6, *Solid Waste*  
39 *Management*. These regulations require the effective and safe disposal of solid waste.

## 1 **Commonalities**

2 The following elements of hazardous materials and hazardous waste management are  
3 common to Dyess AFB and Ellsworth AFB.

## 4 **Hazardous Materials Management**

5 A variety of products containing hazardous materials are used by the installations as part  
6 of day-to-day operations. These include fuels, oils and lubricants, solvents, paints, etc.  
7 To administer these materials, the installations have implemented a comprehensive  
8 hazardous materials management process, including the use of a Hazardous Material  
9 Pharmacy (HAZMART). The HAZMART encompasses a storage facility and an  
10 established set of procedures designed to control the acquisition, storage, issue, and  
11 disposition of serviceable hazardous materials. Working in coordination with the  
12 Environmental Management, Bio-environmental, and Safety Offices, the HAZMART  
13 ensures that only approved products are purchased and stored and that they are only  
14 issued to authorized users. In addition, the HAZMART helps minimize waste by ensuring  
15 residual materials are returned to use until the products are exhausted. Unserviceable or  
16 excess materials may also be returned for proper disposal. Contractors conducting  
17 operations on the installation are required to supply information to the installation  
18 regarding any hazardous materials utilized (USAF, 2018).

## 19 **Hazardous Waste Management**

20 Hazardous waste at both installations are generated from maintenance of aircraft, vehicle,  
21 and aviation support equipment activities and from petroleum, oils, and lubricants  
22 management and distribution. Types of hazardous waste generated include waste paint  
23 and paint-related products, used solvents, used sealants/adhesives, and waste corrosive  
24 or flammable liquids. Petroleum and recyclable waste are also generated (managed as  
25 regulated non-hazardous waste) that include used oil and filters, waste antifreeze,  
26 reclaimed jet fuel, waste diesel, used hydraulic fluid, etc. Universal wastes, a subset of  
27 hazardous wastes, generated include used fluorescent lamps and batteries (USAF,  
28 2016b; USAF, 2019a).

29 Hazardous wastes at each industrial facility (shop) are accumulated at Initial  
30 Accumulation Points (IAP), as long as the amount of waste does not exceed 55 gallons  
31 or 1 quart of acute hazardous waste (P-Listed waste as listed in 40 CFR 261.33), and the  
32 accumulation container remains in good condition. Each IAP is under the control of an  
33 appointed and trained Accumulation Point Manager. Once a container is full at the IAP,  
34 the container is relocated to the Central Accumulation Points, where it is stored for up to  
35 90 days until it can be shipped off site. The waste is then transported to an approved off-  
36 base treatment, storage, or disposal facility where it is managed in accordance with all  
37 applicable local, state, federal, USAF, and DoD regulations (USAF, 2016b).

1 Both installations have implemented *Hazardous Waste Management Plans* that identify  
2 waste generating locations and waste types and addresses proper labeling, storage, and  
3 handling of these wastes (USAF, 2016b; USAF, 2019a). These plans include  
4 requirements associated with record keeping, spill contingency and emergency response,  
5 as well as personnel training requirements.

## 6 **Other Ongoing Investigations**

7 As part of the overall program to identify contamination from historical operations, the  
8 USAF is also currently investigating potential contamination related to chemicals known  
9 as per- and polyfluoroalkyl substances (i.e., PFAS). This family of chemicals was  
10 developed in the 1940s and include the chemicals perfluorooctane sulfonate (PFOS) and  
11 perfluorooctanoic acid (PFOA). While PFOS was used in stain- and water-resistant  
12 products, PFOA was used for protective coatings. PFASs have been used in many  
13 industrial and consumer products since the 1950s. Although aqueous film forming foam  
14 (AFFF) containing PFAS (i.e., PFOS and/or PFOA) was developed and deployed by the  
15 Navy in the early 1960s, AFFFs have been used at U.S. airports, municipal fire stations  
16 and airports, petroleum facilities, and other industries to effectively extinguish  
17 hydrocarbon-based fires.

18 The history of AFFFs placed on the Qualified Product List indicates that multiple AFFFs  
19 were available for use between the 1970s and 1990s when fire fighters on military bases  
20 regularly trained with AFFF. Due to the uncontained nature of AFFF use during  
21 emergencies and fire-fighter training, perfluoroalkyl carboxylates, sulfonates (PFSAs),  
22 and precursors that degrade to these compounds, along with other AFFF constituents  
23 (e.g. hydrocarbon surfactants) and co-contaminants (e.g., petroleum hydrocarbons and  
24 chlorinated solvents) have contaminated surrounding soils, sediment, surface water and  
25 groundwater. Note: PFAS are in numerous consumer goods and AFFF is only one of  
26 many products that has been produced.

27 In May 2016, the EPA Office of Water issued lifetime drinking water Health Advisory (HA)  
28 values for PFOS and PFOA: 0.07 µg/L for each constituent; however, when these two  
29 chemicals co-occur in a drinking water source, a conservative and health protective  
30 approach is recommended that compares the sum of the concentrations (PFOS + PFOA)  
31 to the HA value (0.07 µg/L). HA values are not legally enforceable federal standards and  
32 are subject to change as new information becomes available.

33 Although the EPA has not established HA values for PFAS in soil, the USAF calculated  
34 a residential screening level of 1.26 milligrams per kilogram for PFOS and PFOA in soil.  
35 EPA has also derived Tap Water Regional Screening Level (RSL) values for  
36 perfluorobutanesulfonic acid (PFBS) for which there is a Tier 2 toxicity value of 40 µg/L  
37 (USAF, 2019b).



1 The base will comply with Air Force Guidance Memorandum 2019-32-01, *AAAA-Related*  
2 *Waste Management Guidance*, to manage waste streams containing PFOS/PFOA.

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### 3 **3.10.1.2 Region of Influence**

4 The ROI for hazardous materials and hazardous and solid wastes is defined as the  
5 installation boundaries where hazardous materials are used and hazardous and solid  
6 wastes generated. The ROI includes on-base contamination (ERP) areas as well as any  
7 off-base areas potentially impacted by this contamination. Finally, the ROI includes off-  
8 base landfills where solid wastes are disposed of.

#### 9 **3.10.1.2.1 Dyess AFB**

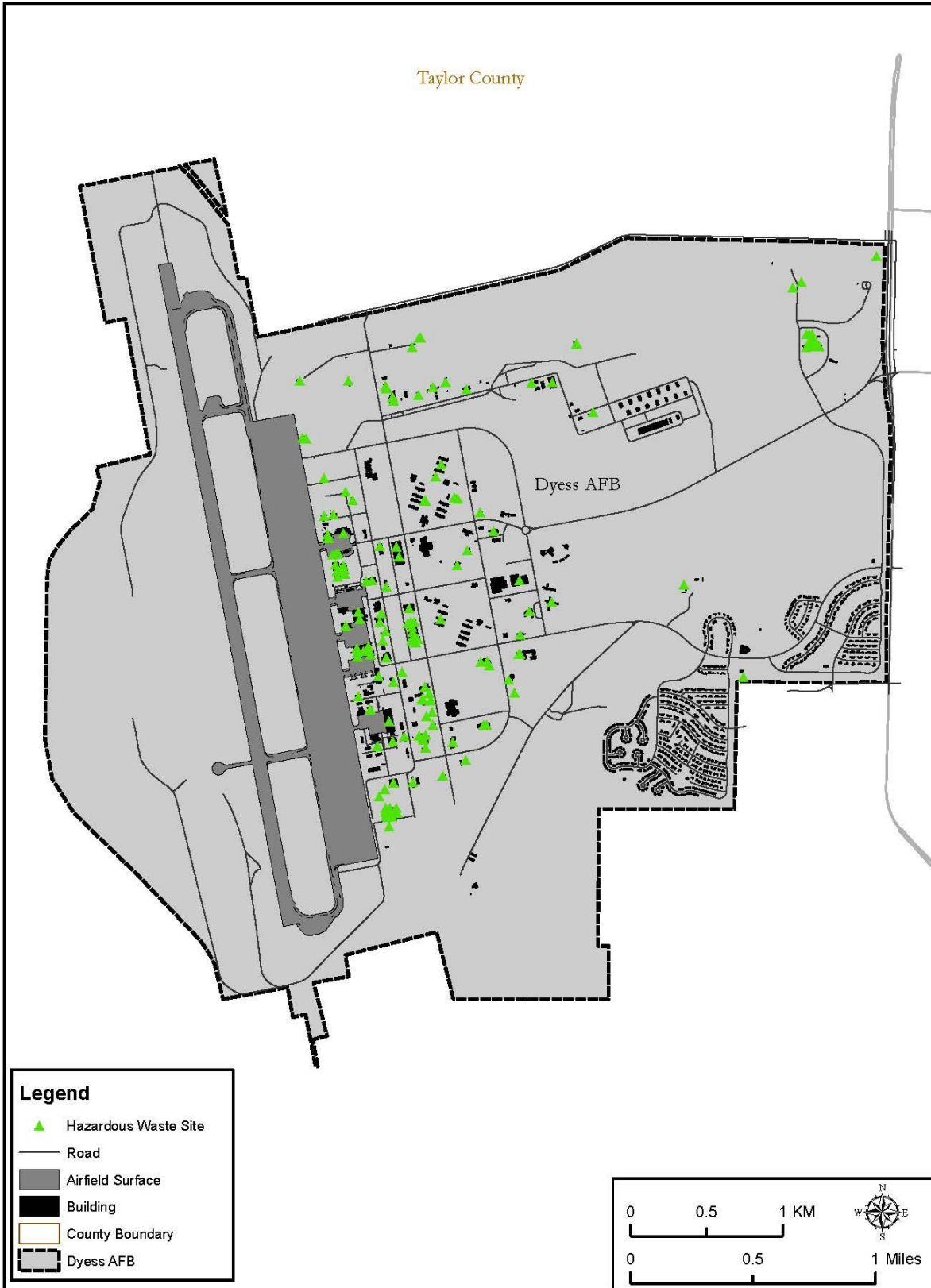
##### 10 **Hazardous Materials Management**

11 Dyess AFB has implemented a comprehensive hazardous materials management  
12 process, including the use of a HAZMART described above (Building 7004), to effectively  
13 manage hazardous materials. Dyess AFB has also implemented various procedures,  
14 such as the *Hazardous Material Planning and Emergency Response Plan (One Plan)*.  
15 The concept of the One Plan involves consolidating requirements in multiple plans  
16 (including a petroleum SPCC) in order to facilitate and streamline emergency response  
17 efforts in case of an unintended release of hazardous materials or petroleum products  
18 (USAF, 2018).

##### 19 **Hazardous Waste Management**

20 Dyess AFB is classified as a Large Quantity Generator of hazardous waste per Federal  
21 and Texas regulations and maintains an EPA Identification Number of TX3571924643.  
22 Large Quantity Generators are defined as facilities that generate more than  
23 1,000 kilograms (2,240 pounds) of hazardous waste per month. During Calendar Year  
24 2019 (CY19), Dyess AFB generated and disposed of a total of approximately  
25 24,000 pounds of hazardous waste (USAF, 2020a). The location of hazardous waste  
26 sites is depicted in Figure 3.10-1.

27 Dyess AFB utilizes two Central Accumulation Points, located at Buildings 4313 and 5205,  
28 where hazardous wastes is stored for up to 90 days until it can be shipped off site (USAF,  
29 2016b). To manage hazardous wastes, the Dyess AFB *Hazardous Waste Management*  
30 *Plan* includes requirements associated with record keeping, spill contingency and  
31 emergency response, as well as personnel training requirements (USAF, 2016b).



1

2

Figure 3.10-1. Hazardous Waste Sites at Dyess AFB

## 1 Toxic Substances

2 Surveys at Dyess AFB have identified asbestos-containing materials (ACM) in older  
3 buildings; this includes Building 4111, which is proposed for demolition under the  
4 Proposed Action (USAF, 2020b). Friable and nonfriable ACM in this and other older  
5 buildings may include pipe insulation, caulk, mastic, ceiling panels, asphalt shingles, and  
6 floor tiles. The base's *Asbestos Management Plan* (USAF, 2019c) guides all activities  
7 associated with existing ACM. ACM is typically managed in-place unless demolition or  
8 renovation occurs. Unless buildings have been previously tested or have been certified  
9 that ACM is not present, all buildings undergoing renovation or demolition must be tested  
10 for the presence of ACM prior to the commencement of work. (USAF, 2019c).

11 No comprehensive base-wide survey has been conducted to determine the presence and  
12 extent of LBP on all buildings; however, the potential for LBP exists for buildings  
13 constructed prior to 1978. If older buildings have not been rehabilitated (i.e., LBP has  
14 been removed or encapsulated with new paint), it is assumed that LBP is present. Dyess  
15 AFB's process for management of LBP is described in the *Lead Management Plan*  
16 (USAF, 2004a) and is as follows: 1) maintain in place LBP that is undamaged and does  
17 not pose a health risk, 2) repair, which involves sealing or encapsulating LBP to prevent  
18 the release of LBP dust, and 3) abatement (removal).

19 Base facilities are prioritized for LBP surveys, with facilities including childcare facilities,  
20 medical facilities, and residential housing receiving the highest priority. Surveys are also  
21 conducted prior to the commencement of renovation or demolition work on any building  
22 suspected of containing LBP (USAF, 2004a).

## 23 ERP Sites

24 The ERP at Dyess AFB began in 1984 with a base-wide records search that identified  
25 seven ERP sites for further investigation. Supplemental site assessments and  
26 investigations in the later 1980s and early 1990s have brought the total number of sites  
27 to 43. Most ERP sites have undergone regulatory closure with No Further Action  
28 approved. These sites include storage tanks, oil/water separators, landfills, drainage  
29 areas, fire training areas, spill areas, and waste disposal pits.

30 Environmental assessment and response actions for Dyess AFB have generally been  
31 conducted under 30 Texas Administrative Code, Chapter 335, Subchapter S, the Risk  
32 Reduction Rule. This program establishes procedures for closure or remediation of sites.  
33 Three Risk Reduction Standards (RRSs) are associated with the program and are  
34 described below:

- 35 • RRS 1 – Closure with No Further Action/Remediation to Background
- 36 • RRS 2 – Closure/Remediation to Health-Based Standards and Criteria
- 37 • RRS 3 – Closure/Remediation with Controls

38 Based on this program, the remaining 16 ERP sites at Dyess AFB have received  
39 regulatory closure with established LUCs (see Table 3.10-1 and Figure 3.10-2).

**Table 3.10-1. Dyess AFB ERP Sites with Established Land Use Controls**

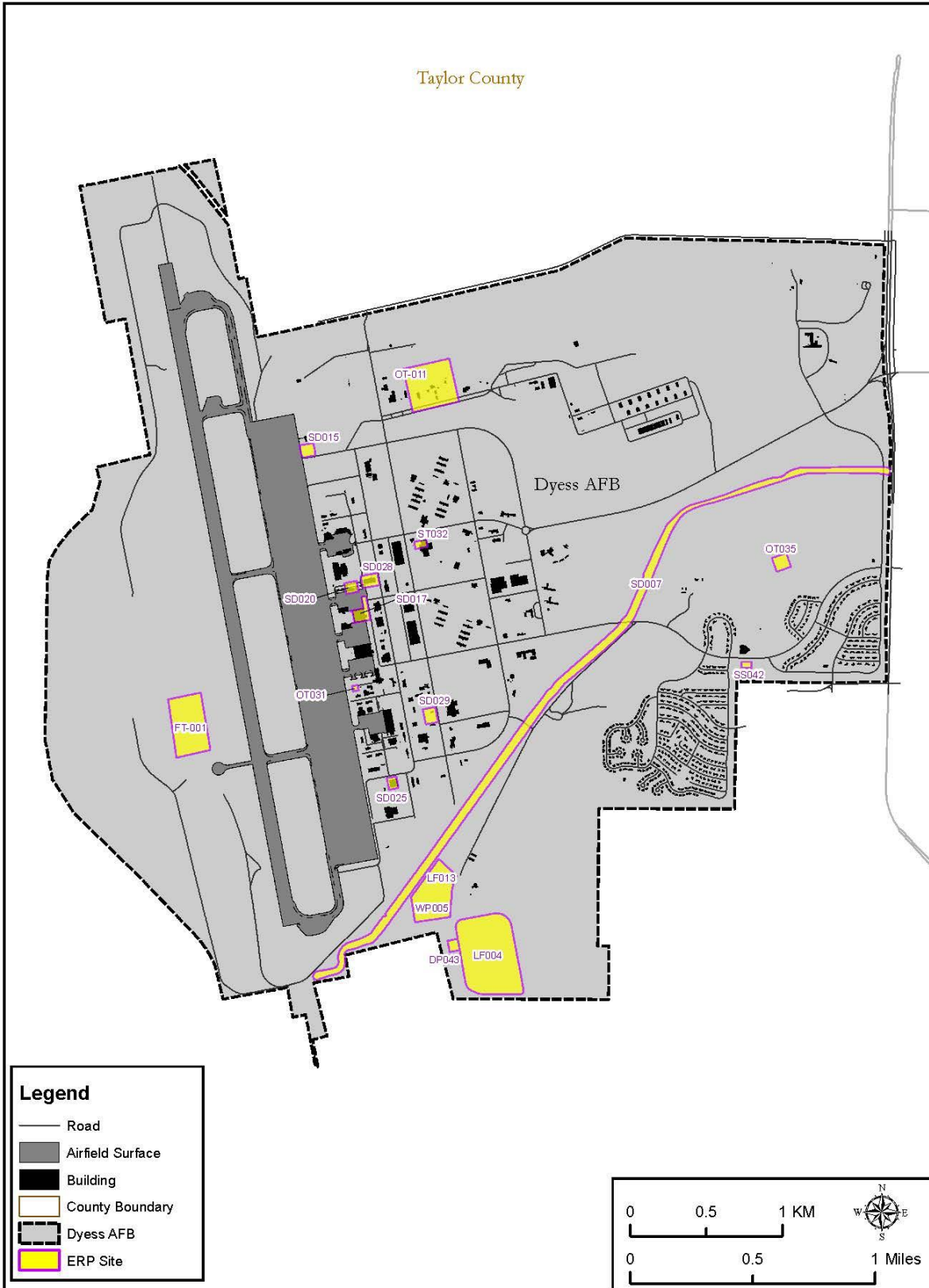
Site ID	Site Name	Closure Dates	Remedy Components	Current Status
FT001	FPTA No. 1A (SWMU 3A)	January 1998 (Soil and Groundwater)	Closure for groundwater under TCEQ RRS 2 with LUC for non-potable groundwater use within the site boundaries. Closure for soil under TCEQ RRS 3 with deed recordation of site 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 Groundwater)	Closure for groundwater under TCEQ RRS 3 with LUCs for non-potable groundwater 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)	Groundwater monitoring requirements removed in 2003		Site is currently under LTM.
SD007	South Diversion Ditch (SWMU 34)	January 1998 (Soil/Sediment)	Closure for groundwater 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 (Groundwater) January 1998 (Soil)	Closure for groundwater under TCEQ RRS 2 with LUCs for non-potable groundwater 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 Groundwater) TCEQ issued final closure letter March 2016.	Closure for groundwater under TCEQ RRS 3 with LUCs for non-potable groundwater 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 (SWMU 14)	January 1998 (Soil and Groundwater) TCEQ issued final closure		Site is currently under LTM.

**Table 3.10-1. Dyess AFB ERP Sites with Established Land Use Controls**

Site ID	Site Name	Closure Dates	Remedy Components	Current Status
		letter March 2016.		
SD020	Building 4317 OWS (SWMU 17)	July 1996 (Soil) January 1998 (Groundwater)		Site is currently under LTM.
SD025	Building 5204 OWS (SWMU 23)	July 1996 (Soil) January 1998 (Groundwater)	Closure for soil and groundwater under TCEQ RRS 3 with deed recordation of site boundaries requiring LUCs to maintain non-residential property use and non-potable groundwater use.	Site is currently under LTM.
SD028	Building 7040 OWS (SWMU 26)	January 1998 (Soil) July 1996 (Groundwater)	Closure for groundwater 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 (Groundwater)	Closure for groundwater 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 (Groundwater)	Closure for groundwater 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 groundwater 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	Closure for groundwater 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

Source: (USAF, 2016c)

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



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**Figure 3.10-2. Dyess AFB ERP Sites with Established Land Use Controls**

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 USAF enter a 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 onsite soil disturbance or groundwater use, disallowing sensitive uses of the property (i.e., residential development). A 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 a 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.

### Other Ongoing Investigations

In September 2014, TCEQ established Protective Concentration Levels (PCLs) for 16 PFAS in soil and groundwater 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 groundwater. The TRRP does not provide PCLs for sediment or surface water (USAF, 2019b).

A Site Inspection Report, published in April 2019, documented results of an investigation of PFAS/PFOA at Dyess AFB. Measured concentrations of these chemicals in groundwater, 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 3.10-2, Figure 3.10-3) (USAF, 2019b).

**Table 3.10-2. Summary of PFAS Investigation Results<sup>1</sup> for Dyess AFB**

Site ID	Parameter	Exceeds Screening Level <sup>2</sup>	Potentially Complete GW Exposure Pathway
AFFF Release Area 1, Former Fire Protection Training Area 2	Surface soil	Yes	No
	Subsurface soil	Yes	
	Groundwater	Yes	
AFFF Release Area 2, Active Fire Training Area	Surface soil	Yes	No
	Subsurface soil	Yes	
	Groundwater	Yes	
AFFF Release Area 3, Hangar 4225	Surface soil	Yes	No
	Subsurface soil	-	
	Groundwater	Yes	
AFFF Release Areas 4, 5, and 6; Hangars 4312, 4314, and 4315	Surface soil	Yes	No
	Subsurface soil	-	
	Groundwater	Yes	
AFFF Release Area 7, Hangar 5020	Surface soil	Yes	No
	Subsurface soil	-	
	Groundwater	Yes	

**Table 3.10-2. Summary of PFAS Investigation Results<sup>1</sup> for Dyess AFB**

Site ID	Parameter	Exceeds Screening Level <sup>2</sup>	Potentially Complete GW Exposure Pathway
AFFF Release Areas 8, 9, and 10; Hangars 5105, 5110, and 5112	Surface soil	Yes	No
	Subsurface soil	-	
	Groundwater	Yes	
AFFF Release Area 11, Former Fire Station (Building 4003)	Surface soil	Yes	No
	Subsurface soil	No	
	Groundwater	-	
AFFF Release Area 12, Spray Test Area No. 1	Surface soil	Yes	No
	Subsurface soil	Yes	
	Groundwater	Yes	
AFFF Release Area 13, Spray Test Area No. 2	Surface soil	Yes	No
	Subsurface soil	-	
	Groundwater	Yes	
AFFF Release Area 14, North and South Diversion Ditches	Sediment	Yes	No
	Surface water	Yes	
	Groundwater	-	
AFFF Release Area 15, Taxiway C	Surface soil	Yes	No
	Subsurface soil	No	
	Groundwater	Yes	

Source: (USAF, 2019b)

AFB = Air Force Base; AFFF = aqueous film forming foam; ID = identification number; GW = groundwater; PFAS = per- and polyfluoroalkyl substances; PFOA = perfluorooctanoic acid; PFOS = perfluorooctane sulfonate

Notes:

1. Remedial investigations are planned for all sites listed in the table (Varley, 2020).

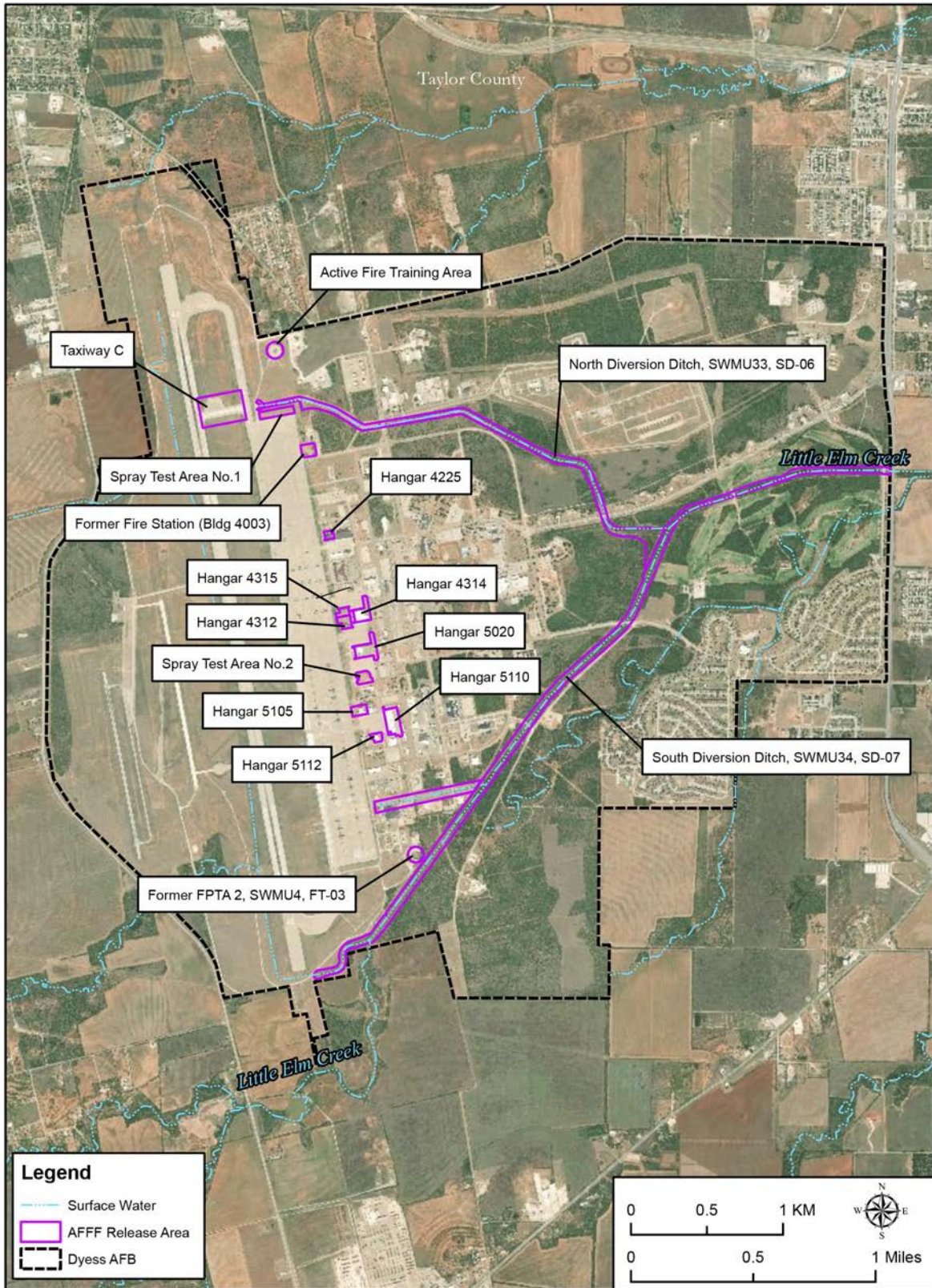
2. A "Yes" indicated exceedance of any of 16 PFAS-related constituents evaluated, including PFAS, PFOA, and PFOS.

A dash (-) means no sampling was conducted.

1 The 2019 Site Inspection report showed PFOS was detected in soil at concentrations  
 2 exceeding the EPA RSL based on a residential exposure scenario, at AFFF Areas 1  
 3 through 4, 7 through 9, 11, and 12. PFOA was also detected in soil at concentrations  
 4 exceeding the EPA RSL based on a residential exposure scenario at AFFF Areas 1 and  
 5 8. PFOS and PFOA were also detected in surface water at concentrations exceeding the  
 6 EPA HA at all sample locations, and PFOS and PFOA were detected in groundwater at  
 7 concentrations exceeding the EPA HA at all sample locations (USAF, 2019b).

8 Additionally, PFBS was detected at concentrations above the EPA Tapwater RSL at  
 9 Areas 2 and 12 (USAF, 2019b). With respect to TCEQ TRRP Tier 1 Residential PCLs, at  
 10 all soil locations sampled PFAS concentrations exceeding PCLs. Likewise, PFAS were  
 11 detected in groundwater and surface water at concentrations exceeding the TCEQ TRRP  
 12 Tier 1 Residential PCLs at all sample locations. These sites were recommended for  
 13 further investigation to evaluate if contamination exposure pathways are complete and to  
 14 better quantify the level of ground water impacts (USAF, 2019b).





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Figure 3.10-3. PFAS/PFOA on Dyess AFB

## 1 **Solid Wastes**

2 Wastes generated and requiring management under the Proposed Action would be  
3 associated with MSW and C&D debris. Solid waste tracking data show that during FY19,  
4 Dyess AFB disposed to the landfill approximately 1,470 tons of MSW. This number  
5 includes both MSW from industrial operations as well as from military family housing  
6 located on the installation. During the same period, Dyess AFB generated and disposed  
7 of approximately 75 tons of C&D debris (USAF, 2020a). Note: The quantities of C&D  
8 wastes generated fluctuates significantly annually depending on the amount of  
9 construction, renovation, and demolition occurring on base. Disposal of C&D debris  
10 generated during development activities at the installation is the responsibility the  
11 construction contractor.

12 There are no on-base disposal facilities for MSW. Two on-base municipal landfills were  
13 used in the past, but both have been closed. Solid waste (including C&D debris)  
14 generated at the base are disposed of at the Abilene Environmental Landfill, located on  
15 Farm-to-Market Road 3034, approximately 2.5 miles north of I-20 in Abilene, Texas. The  
16 facility has been in operation since 2006 and is permitted to provide disposal of MSW,  
17 C&D debris, and non-hazardous industrial wastes. The facility encompasses 246 acres  
18 and receives approximately 770 tons per day of mixed waste (estimated at 220,000 tons  
19 per year), with MSW comprising approximately 65 percent of the total waste stream and  
20 C&D comprising most of the remainder. The landfill is expected to remain in operation  
21 for an additional 63 years (Rhodes, 2020). MSW and C&D debris may also be disposed  
22 of at the BFI Landfill, also located on Farm-to-Market Road 3034. This landfill, which has  
23 been in operation since 1983 and covers nearly 400 acres, has a projected life expectancy  
24 of nearly 200 years. The landfill has an average disposal rate of 700 to 800 tons per day  
25 of mixed waste (Grothaus, 2011).

### 26 **3.10.1.2.2 Ellsworth AFB**

#### 27 **Hazardous Materials Management**

28 At Ellsworth AFB, a variety of products containing hazardous materials are used as part  
29 of day-to-day operations. Ellsworth AFB has also implemented a HAZMART (located in  
30 Building 1911) to administer these materials. As described previously, the HAZMART  
31 helps minimize waste by ensuring residual materials are returned to use until the products  
32 are exhausted. Unserviceable or excess materials may also be returned for proper  
33 disposal (USAF, 2019a).

34 To effectively manage hazardous materials, Ellsworth AFB has implemented various  
35 procedures, such as the *Integrated Contingency Plan*, to mitigate and respond to releases  
36 of hazardous materials and petroleum products (USAF, 2017c).

#### 37 **Hazardous Waste Management**

38 Ellsworth AFB is classified as a Large Quantity Generator of hazardous waste per Federal  
39 and South Dakota regulations and maintains an EPA Identification Number of ID#  
40 SD2571924644 (USAF, 2019a). Hazardous wastes at Ellsworth AFB are also generated  
41 from maintenance of aircraft, vehicle, and aviation support equipment. During the 1-year

1 period from October 2018 through September 2019, Ellsworth AFB generated and  
2 disposed of a total of approximately 107,000 pounds of hazardous waste (Ellsworth AFB,  
3 2020b). Ellsworth AFB utilizes two Central Accumulation Points, located at Buildings  
4 1913 and 1908, where hazardous wastes is stored for up to 90 days until it can be shipped  
5 off site (USAF, 2019a). The location of hazardous waste sites is depicted in  
6 Figure 3.10-4.

7 The Ellsworth AFB *Hazardous Waste Management Plan* identifies waste generating  
8 locations and waste types, addresses proper labeling, storage, and handling of these  
9 wastes, and summarizes record keeping, emergency response, and training  
10 requirements (USAF, 2019a).

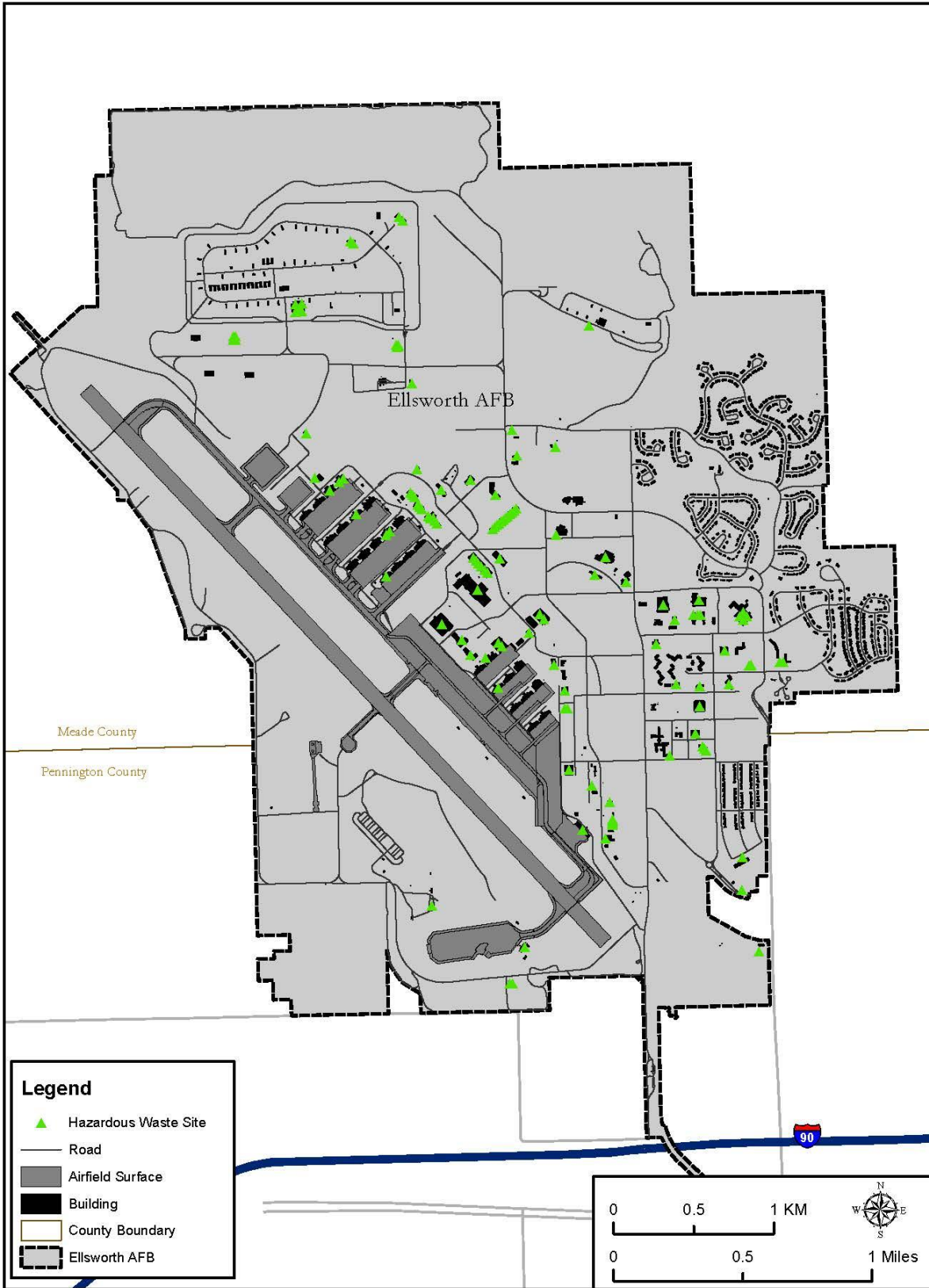
## 11 Toxic Substances

12 Surveys at Ellsworth have identified ACM in older buildings. Friable and nonfriable ACM  
13 in these buildings may include pipe insulation, caulk, mastic, ceiling panels, asphalt  
14 shingles, and floor tiles. The base's *Asbestos Management Plan* (USAF, 2004b) guides  
15 all activities associated with existing ACM. ACM is typically managed in-place unless  
16 demolition or renovation occurs. Unless buildings have been previously tested or have  
17 been certified that ACM is not present, all buildings undergoing renovation or demolition  
18 must be tested for the presence of ACM prior to the commencement of work.

19 No comprehensive base-wide survey have been conducted to determine the presence  
20 and extent of LBP on all buildings; however, a 1995 survey for LBP focused on sensitive  
21 buildings, including the Pediatrics Wing of the Base Clinic, the Youth Center, the Child  
22 Development Center, and selected units from base housing. Detected LBP was  
23 encapsulated or removed, as required. The potential for LBP also exists for all buildings  
24 constructed prior to 1978. If older buildings have not been rehabilitated (i.e., LBP has  
25 been removed or encapsulated with new paint), it is assumed that LBP is present.  
26 Ellsworth AFB's process for management of LBP is described in the *Lead Paint Hazard*  
27 *Management Plan* (USAF, 2004c) and comprises maintaining undamaged LBP in place,  
28 repairing damaged LBP to prevent the release of LBP dust, or abating LBP. Surveys are  
29 also conducted prior to the commencement of renovation or demolition work on any  
30 building suspected of containing LBP (USAF, 2004c).

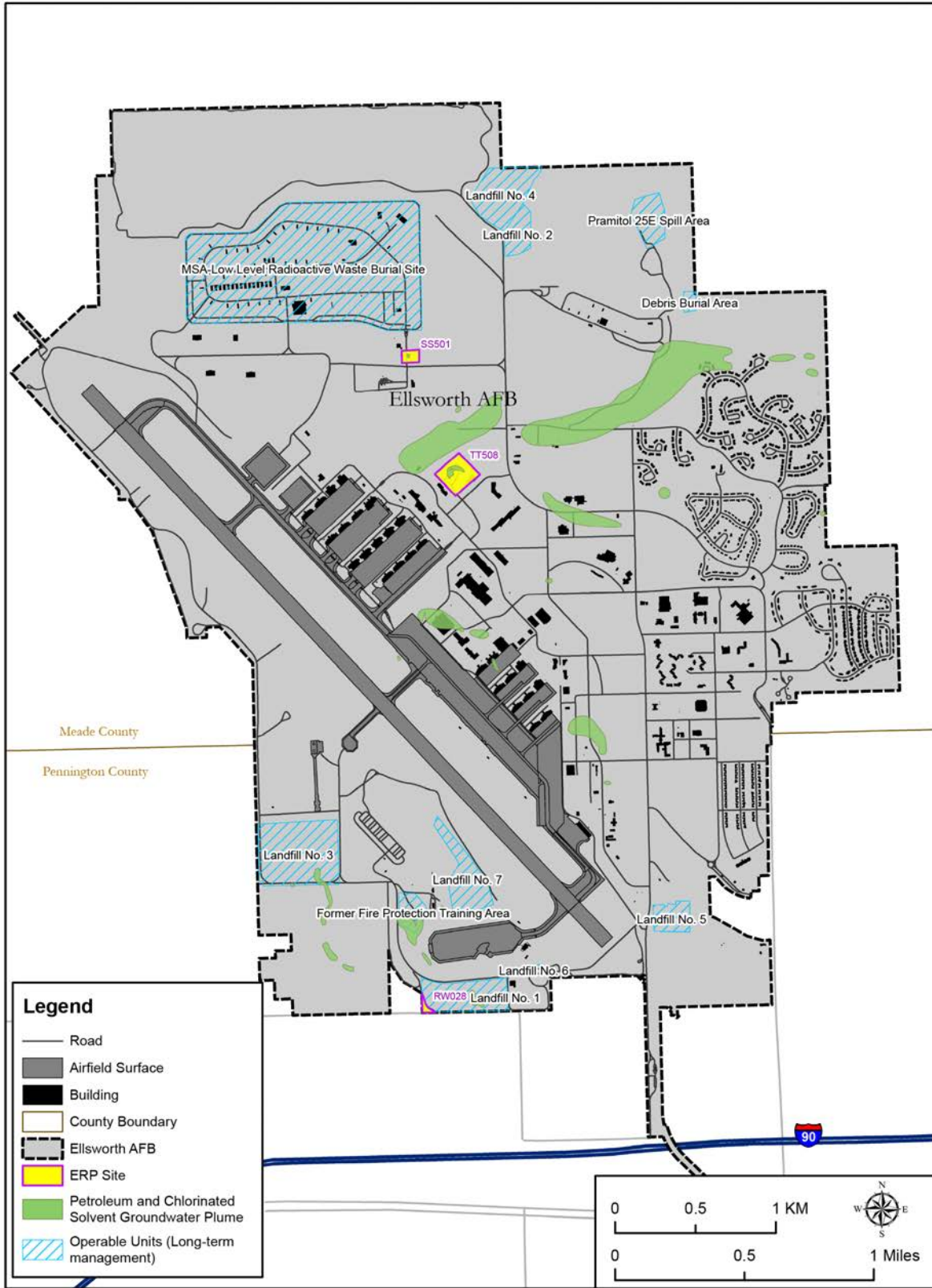
## 31 ERP Sites

32 The ERP at Ellsworth AFB began on May 1985 with a base-wide records search that  
33 identified 15 potential contamination sites for further investigation. Supplemental site  
34 assessments and investigations in the later 1980s, 1990s, and 2000s have brought the  
35 total number of sites to 43. Additional investigations in the 2010s resulted in numerous  
36 additional sites being added, to bring the current total number of ERP sites to 59. These  
37 include: Former Compliance Restoration Program sites added in 2010; Military Munitions  
38 Response Program sites added in 2016; and PFOS/PFOA sites added in 2020. Many of  
39 these sites were closed with Further Action required. Current ERP sites are depicted in  
40 Figure 3.10-5.



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Figure 3.10-4. Hazardous Waste Sites at Ellsworth AFB



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Figure 3.10-5. Open ERP Sites at Ellsworth AFB

- 1 Table 3.10-3 list sites undergoing long-term monitoring or other remedial/investigative
- 2 actions. They include landfills, fire training areas, spill areas, and radioactive waste sites.
- 3 Primary contaminants in soil and water include fuels, waste solvents, dissolved phase
- 4 fuels and solvents, and low-level radiation waste (USAF, 2019d; USAF, 2020c).

**Table 3.10-3. ERP Sites at Ellsworth AFB Undergoing Monitoring or Other Remedial/Investigative Actions**

Site ID	OU Site	Description	Current Status
FT-01	OU-1	Fire Training Area	A Remedial Investigation is currently underway at FT001 (OU-1) for PFCs PFOS/PFOA in soil and groundwater. A “sub-site” was opened under FT001 (FT001P-SUB) to track PFOS/PFOA phases and funding. The PFOS/PFOA sub-site of FT001 also includes the current fire training area. <sup>1</sup>
LF-02	OU-2	Landfills 1 and 6	Long-term Monitoring
LF-03	OU-3	Landfill 2	
LF-04	OU-4	Landfill 3	
LF-05	OU-5	Landfill 4	
LF-06	OU-6	Landfill 5	
RW-07	OU-7	Low-Level Radioactive Waste Burial Site	
SS-11	OU-8	EOD Area, Pramitol Spill	Long-term Monitoring
SS-501	N/A	Spill Site 88408	A remedial investigation was completed in 2015-2016 and in-situ chemical injections were conducted in December 2017 in accordance with the Remedial Action Work Plan. Semiannual monitoring is being conducted until site closure is achieved. <sup>1</sup>
ST-10	N/A	Hydrant Leaks (Pumphouses 1-5)	Pumphouses 1–4 have all received no further action letters from SDDENR and no further work is required at these areas. Pumphouse 5 has a SDDENR status of “monitoring.” Persulfate injections were conducted in 2011 at Pumphouse 5 to treat petroleum contamination in groundwater. Long-term monitoring has indicated an increasing trend in benzene and naphthalene in groundwater and SDDENR has indicated that additional work may be required. <sup>1</sup>
ST-17	N/A	Installation wide USTs	Long-term Monitoring
ST-19	OU-10	North Hangar Complex	
ST-23	N/A	Abandoned WWII POL System	The site consists of dissolved-phase petroleum constituents in groundwater (benzene and naphthalene) and nonaqueous phase liquid is occasionally detected and subsequently removed. The site also consists of a nearby benzene plume surrounding extraction well SDDW04. <sup>1</sup>
OT-20	OU-11	Base-wide Groundwater	Long-term monitoring and implementation of Remedial Action Objective <sup>2</sup>
OW-525	N/A	Oil Water Separator 6909	A Site Assessment was completed in 2017, and SDDENR agreed to site closure with the understanding that the fuel-related

**Table 3.10-3. ERP Sites at Ellsworth AFB Undergoing Monitoring or Other Remedial/Investigative Actions**

Site ID	OU Site	Description	Current Status
			contamination to the east/southeast was from a different source and would be investigated. OW525 was reopened in 2019 to investigate the fuel-related contamination. <sup>2</sup>
LF-21	OU-12	Hardfill No.1/Landfill 7	Long-term Monitoring
TT508	N/A	Fuels Area D	A remedial investigation was completed in 2015 and the recommendation from the remedial investigation was to complete in-situ chemical oxidation injections to further decrease concentrations. A Remedial Action Work Plan was prepared, and injections completed in 2018. Due to site constraint, not all contamination was accessible for injections. In 2019, SDDENR agreed to change monitoring frequency from quarterly to semiannually until site closure is achieved. <sup>2</sup>

Source: (USAF, 2019d; USAF, 2020c)

AFB = Air Force Base; EOD = Explosive Ordnance Disposal; ERP = Environmental Restoration Program; ID = identification code; N/A = not applicable; No. = number; OU = Operable Unit; PFC = perfluorocarbon; PFOA = perfluorooctanoic acid; PFOS = perfluorooctane sulfonate; POL = petroleum, oil, and lubricant; SDDENR = South Dakota Department of Environment and Natural Resources; UST = underground storage tank

Notes:

1. Source: (Varley, 2020)

2. The Remedial Action Objectives for OT-20/OU11 are: (1) Prevent current and future human exposure to on-base groundwater with contaminants of concern exceeding South Dakota and Federal water quality standards; (2) Prevent additional groundwater containing contaminants of concern from moving off base; (3) Prevent human exposure to off-base groundwater with contaminants of concern at concentrations that pose an unacceptable risk to human health; and (4) Attain South Dakota and Federal water quality standards.

1 Due to onsite contamination, Ellsworth AFB was added to the National Priorities List on  
2 August 30, 1990 (EPA No. SD2571924644). In January 1992, the USAF, EPA, and  
3 SDDENR signed a Federal Facilities Agreement, which identified discrete environmental  
4 study areas that are designated as Operable Units (OUs).

5 Ellsworth AFB has 12 OUs, which are addressed under the ERP. Ten of the 12 identified  
6 OUs (OU-2, OU-3, OU-4, OU-5, OU-6, OU-7, OU-8, OU-9, OU-10, and OU-12) were  
7 deleted from the National Priorities List in December 2006. All clean-up activities for  
8 these sites were accomplished in accordance with the National Oil and Hazardous  
9 Substances Pollution Contingency Plan, CERCLA guidance and policy, RCRA guidance  
10 and policy, and applicable South Dakota law. Groundwater contamination identified at  
11 these OUs, as well as OU-1 was transferred into OU-11 via an Explanation of Significant  
12 Differences. Surface soil, unsaturated subsurface soil, surface water, and sediments at  
13 OU-1 were deleted from the National Priorities List on May 25, 2012. No active remedial  
14 systems are currently operating at any of the OUs (USAF, 2019d).

15 Over time, the volatile organic compounds from released chlorinated solvents at the base  
16 migrated to groundwater, creating contaminant plumes that have migrated laterally with  
17 groundwater flow underneath base buildings and residences. The volatile organic  
18 compounds have the potential to migrate out of the groundwater and up through the  
19 vadose zone via diffusion, where they may accumulate under buildings. Once under the

1 buildings, the volatile organic compounds may migrate into the building indoor air via  
2 diffusion or direct flow through foundation cracks, utility penetrations, or other preferential  
3 pathways. The chlorinated solvent subsurface plumes associated with these sites are  
4 being remediated by in-situ reductive treatment and monitored natural attenuation (USAF,  
5 2020d; USAF, 2019d).

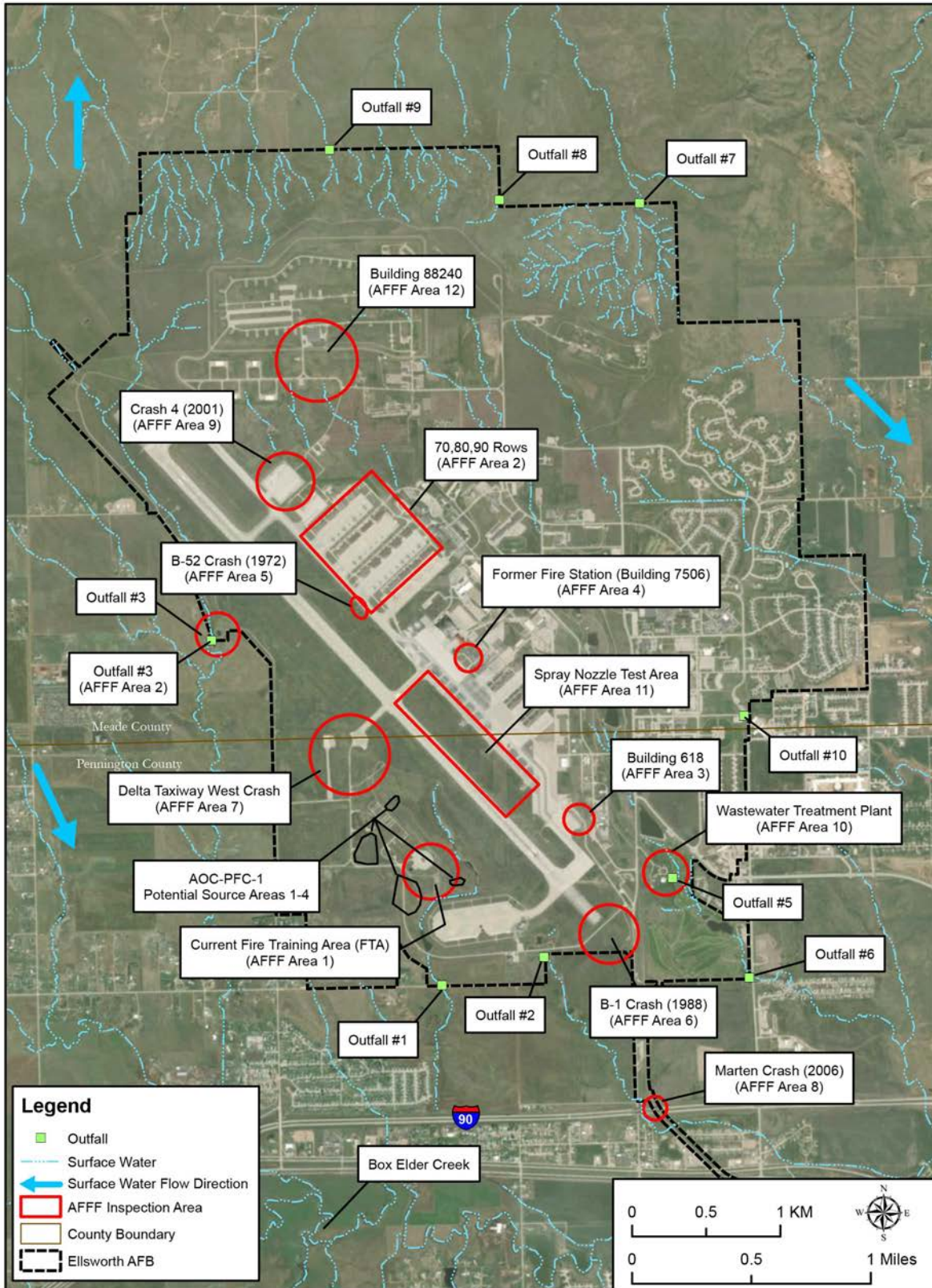
6 A 2019 base-wide investigation for vapor intrusion at Ellsworth AFB evaluated potential  
7 hazards to building occupants from vapors associated with groundwater plumes. After a  
8 screening process that evaluated a total of 59 buildings, the investigation focused on  
9 15 buildings identified as meeting the screening criteria. Buildings evaluated for vapor  
10 intrusion included the 28 BW Headquarters (Building 7925), Operations Group  
11 Headquarters (Building 7918), Radar Relay Facility (Building 9050), PRIDE Hangar  
12 (Building 7504), Fire Station (Building 7502), Communications Facility Land Radio  
13 Manager (Building 7235), and Child Development Center (Building 7812). The results of  
14 the investigation indicated vapor intrusion did not represent a significant exposure pathway  
15 at buildings on Ellsworth AFB. The report concluded no further base-wide investigation of  
16 vapor intrusion was warranted. The report did make two recommendations: seal any  
17 foundation cracks/utility penetrations at the PRIDE Hangar (Building 7504) and resample  
18 indoor air to verify trichloroethene concentrations at the Communications Facility (Building  
19 7235) to ensure these were below screening levels (USAF, 2020d).

## 20 **Other Ongoing Investigations**

21 A PFOS/PFOA site inspection completed in 2018 evaluated 12 suspected areas of AFFF  
22 releases at Ellsworth AFB (Figure 3.10-6). Based on the site inspection, AFFF releases  
23 at Ellsworth AFB have resulted in PFOA and PFOS concentrations above screening  
24 levels in groundwater at AFFF Areas 1, 2, 3, 4, 5, 6, 9, 11, and 12 (9 of the 12 areas  
25 investigated). The presence of PFOS and PFOA in groundwater and a complete ingestion  
26 pathway represents a potential risk to human health. PFOS/PFOA impacted groundwater  
27 from AFFF Areas 1, 2, 3, 4, 5, 6, 9, 11, and 12 was shown to have migrated off base,  
28 posing a threat to down-gradient private drinking water wells. USAF sampling of the off-  
29 base wells confirmed the presence of PFOS and PFOA at concentrations above the EPA  
30 lifetime Health Advisory level in 24 private wells, and immediate steps were taken to  
31 provide alternate sources of safe drinking water. The groundwater ingestion exposure  
32 pathway for groundwater is incomplete for AFFF Areas 7, 8, and 10 where PFOA and  
33 PFOS concentrations were below screening levels (USACE, 2019). Table 3.10-4  
34 presents a summary of the investigation results.

35 PFOA and PFOS were also detected at concentrations above screening levels in surface  
36 water at AFFF Areas 2, 10, 11, and 12. Impacted surface water discharging from Outfall  
37 #3 (AFFF Area 2) and from Outfall #5 (at the former Wastewater Treatment Plant at AFFF  
38 Area 10) impacts groundwater in communication with surface water downstream from the  
39 outfalls. There is also potential for discharge of impacted groundwater from the base to  
40 surface water (i.e., Box Elder Creek and its tributaries) based on groundwater flow to the  
41 southeast. The human ingestion exposure pathway for impacted surface water is,  
42 therefore, potentially complete via surface water to groundwater interactions (USACE,  
43 2019).





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Figure 3.10-6. PFAS/PFOA on Ellsworth AFB

**Table 3.10-4. Summary of PFAS Investigation Results for Ellsworth AFB**

Site ID	Media	Exceeds Screening Level <sup>1</sup>	Potentially Complete Exposure Pathway
AFFF Area 1, Current Fire Training Area <sup>2</sup>	Surface soil	Yes	No
	Subsurface soil	Yes	No
	Groundwater	Yes	Yes
AFFF Area 2, 70, 80, 90 Rows and Outfall #3 <sup>(3)</sup>	Surface soil	No	No
	Subsurface soil	No	No
	Groundwater	Yes	No
AFFF Area 3 (Building 618) <sup>3</sup>	Surface soil	No	No
	Subsurface soil	-	-
	Groundwater	Yes	Yes
AFFF Area 4, Former Fire Station (Building 7506) <sup>3</sup>	Surface soil	Yes	No
	Subsurface soil	No	No
	Groundwater	Yes	Yes
AFFF Area 5, B-52 Crash (1972) <sup>3</sup>	Surface soil	No	No
	Subsurface soil	No	No
	Groundwater	Yes	Yes
AFFF Area 6, B-1 Crash (1988) <sup>3</sup>	Surface soil	No	No
	Subsurface soil	No	No
	Groundwater	Yes	Yes
AFFF Area 7, Delta Taxiway West Crash (2000)	Surface soil	No	No
	Subsurface soil	No	No
	Groundwater	No	No
AFFF Area 8, Marten Crash (2006)	Surface soil	No	No
	Subsurface soil	No	No
	Groundwater	No	No
AFFF Area 9, Crash 4 (2001) <sup>3</sup>	Surface soil	No	No
	Subsurface soil	No	No
	Groundwater	Yes	Yes
AFFF Area 10, Wastewater Treatment Plant <sup>3</sup>	Surface soil	Yes	No
	Subsurface soil	No	Np
	Groundwater	No	No
AFFF Area 11, Spray Nozzle Test Area <sup>3</sup>	Surface soil	No	No
	Subsurface soil	No	No
	Groundwater	Yes	Yes
Building 88240 AFFF Area 12 <sup>(3)</sup>	Surface soil	Yes	No
	Subsurface soil	No	No
	Groundwater	Yes	Yes

Source: (USACE, 2019)

AFB = Air Force Base; AFFF = aqueous film forming foam; ID = identification number; PFAS = per- and polyfluoroalkyl substances; PFC = perfluorocarbon; PFOA = perfluorooctanoic acid; PFOS = perfluorooctane sulfonate

Notes:

1. A "Yes" indicated exceedance of any of the three constituents evaluated (i.e., PFAS, PFOA, and PFOS). A dash (-) means no sampling was conducted.
2. A Remedial Investigation is currently underway at FT001 (OU-1) for PFCs PFOS/PFOA in soil and groundwater. A "sub-site" was opened under FT001 (FT001P-SUB) to track PFOS/PFOA phases and funding. The PFOS/PFOA sub-site of FT001 also includes the current fire training area (Varley, 2020).
3. Remedial investigations are planned for all sites listed in the table (Varley, 2020).

1 PFOS was also detected above residential screening levels in surface soil at AFFF Areas  
2 1, 4, 10 and 12; in subsurface soil at Area 1; and in sediment at AFFF Area 10. Complete  
3 human ingestion exposure pathways for PFOS-impacted soil or sediment are unlikely,  
4 but impacted soil or sediment could represent a continuing source for groundwater and/or  
5 surface water impacts. These sites were recommended for further investigation to  
6 evaluate if contamination exposure pathways are complete and to better quantify the level  
7 of ground water impacts interactions (USACE, 2019).

## 8 **Solid Wastes**

9 Solid waste data show during the 1-year period of October 2018 to September 2019,  
10 Ellsworth AFB generated approximately 1,510 tons of MSW, of which approximately  
11 1,100 tons were disposed to the landfill (the rest was used for energy recovery or  
12 recycled). During the same period, the installation disposed of 178 tons of C&D debris to  
13 the landfill (Ellsworth AFB, 2020b).

14 There are no active landfills on Ellsworth AFB. Solid waste generated at the base,  
15 including C&D debris, is collected by contractors and transported to the Rapid City  
16 Sanitary Landfill, which is a 450-acre landfill that has been in operation since 1960. The  
17 Rapid City Sanitary Landfill receives approximately 450 tons per day, varying between  
18 350 to 550 tons, of mixed solid waste. This equates to approximately 133,000 tons per  
19 year. The landfill is currently permitted to operate another 20 years; however, the landfill  
20 has access to additional land areas that could extend its life expectancy until at least 2060  
21 (Roth, 2020).

### 22 **3.10.1.2.3 Airspace and Range Utilization**

23 Training operations at PRTC, and the Lancer MOA, Brownwood MOA, and Pecos MOA  
24 would have no impact on the affected environment for hazardous materials, hazardous  
25 or solid wastes, or ERP sites; consequently, these are not discussed further.

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### 26 **3.10.1.3 Analysis Methodology**

27 The significance of potential impacts associated with hazardous materials, constituents,  
28 substances, and wastes is based primarily on their characteristics, distribution,  
29 transportation, storage, and disposal. Factors used to assess significance include the  
30 extent or degree to which implementation of an alternative would substantially increase  
31 the human health risk or environmental exposure resulting from the storage, use,  
32 handling, transportation, or disposal of these hazardous materials, toxic substances, and  
33 hazardous wastes. A second measure of significance is whether the use, storage, or  
34 disposal of hazardous wastes is consistent with applicable federal and state  
35 requirements.

36 To evaluate significance related to impacts on existing ERP/contaminated sites, the  
37 location of these sites was compared with the location of proposed activities. Site-specific  
38 conditions, including the existence of LUCs, were then analyzed against proposed  
39 activities to assess whether these activities could result in health impacts to workers or  
40 releases of hazardous constituents to the environment. Additionally, significance was

1 evaluated in terms of whether project-generated C&D debris and MSW would exceed  
2 available disposal capabilities (e.g., landfill space) or require extraordinary effort to meet  
3 applicable solid waste regulatory requirements.

---

### 4 **3.10.2 Hazardous Materials and Hazardous and Solid Wastes, Environmental** 5 **Consequences**

#### 6 ***Commonalities***

7 The following potential environmental consequences for hazardous materials and  
8 hazardous waste management and toxic substances are common to both the Dyess AFB  
9 Alternative and Ellsworth AFB Alternative.

#### 10 **Hazardous Materials Management**

11 Hazardous materials and petroleum products (e.g., paints, solvents, lubricants, fuels)  
12 would be used during construction and renovation activities. These materials would be  
13 stored in proper containers, employing secondary containment as necessary to prevent  
14 and limit accidental spills. Additionally, emergency generators with integral fuel storage  
15 tanks may be required at proposed construction sites. All spills and accidental discharges  
16 of hazardous materials or petroleum products would be reported and mitigated in  
17 accordance with installation emergency response plans and procedures for the  
18 management of hazardous materials as described previously.

19 Hazardous materials would be also be used as part of aircraft maintenance to support  
20 aircraft operations. Many of the hazardous materials used under the Proposed Action,  
21 such as oils, lubricants, and fuels, would be the same as those currently used under  
22 existing conditions (i.e., the No Action Alternative). The primary difference between the  
23 B-1 aircraft and the B-21 is the extensive use of advanced composites and coatings in  
24 the B-21. These composites play a key role in the aircraft's operational and low  
25 observable characteristics. Fabricating or repairing composite components and applying  
26 coatings would involve the use of hazardous materials including resins, curing agents,  
27 reinforceable fibers, and coatings. Contact with these materials has been shown to  
28 potentially result in acute health effects, such eye and skin irritation, respiratory  
29 sensitization, contact dermatitis, and conjunctivitis. Continued exposure to some of these  
30 hazardous materials may also result in chronic conditions, such as hepatotoxicity (liver  
31 toxicity) or cancer (OSHA, 2020).

32 Potential health hazards associated with the use of advanced composites would be  
33 controlled through the implementation established of safe work practices. These safe  
34 work practices are identified in the bases' standard operating procedures and comprise  
35 engineering controls, work practice controls, proper personal protective equipment, and  
36 administrative controls, as listed below:

- 37 • *Engineering Controls* – Isolation (e.g., isolated storage, separate process areas,  
38 closed systems) and local exhaust ventilation.
- 39 • *Work Practice Controls* – Employee training and education; proper procedures for  
40 use of process and control equipment; proper use, maintenance, and cleaning of

1 personal protective equipment; periodic inspection and maintenance of process  
2 and control equipment; and good supervision.

- 3 • *Personal Protective Equipment* – Use of gloves, protective clothing, respirators,  
4 and eye protection.
- 5 • *Administrative Controls* – Control employee exposures by scheduling operations  
6 with the highest exposures at a time when the fewest employees are present.

7 Use of described safe work practices and of established or new management procedures  
8 would ensure there would be no adverse environmental impacts from the use of  
9 hazardous materials.

## 10 **Hazardous Waste Management**

11 Aircraft maintenance operations would also generate liquid and solid hazardous wastes.  
12 The total quantity of hazardous wastes generated would not be expected to significantly  
13 change under the alternatives; however, the nature of these wastes may change based  
14 on the type of hazardous materials used in composite repair operations. If any additional  
15 waste streams were to be identified as part of new maintenance procedures, the Bases  
16 would establish new IAPs at generation locations, and personnel managing these  
17 locations would be properly trained in waste management. This would include the  
18 implementation of any new applicable safe work practices (as described above).  
19 Management of hazardous wastes would be performed according to prescribed  
20 procedures already in place, and the installation-specific Hazardous Waste Management  
21 Plans would be updated as required to reflect any new procedures. The existing  
22 hazardous waste management process is adequate for the quantity and types of wastes  
23 that would be generated at both installations, and no changes to permits or hazardous  
24 waste generator status are anticipated.

25 Use of described safe work practices and of established or new management procedures  
26 would ensure there would be no adverse environmental impacts from the generation of  
27 hazardous wastes.

## 28 **Toxic Substances**

29 Due to their age, some of the buildings associated with proposed projects have a potential  
30 for containing ACM and LBP. Prior to any renovation or demolition activities, new building  
31 surveys would be conducted, as required, to identify if any such materials are present.  
32 Abatement of structures known to contain ACM or LBP would be conducted in  
33 accordance with federal and state regulations, including submission of applicable state  
34 notifications, use of state-certified contractors, and use of appropriate personal protective  
35 equipment. Management and disposal of any resulting ACM- or LBP-contaminated  
36 debris would be conducted in accordance with applicable regulations, including the  
37 Occupational Safety and Health Act, Toxic Substances Control Act, and NESHAP  
38 regulations. Disposal of any contaminated debris would be accompanied by a waste  
39 manifest and would only occur at an approved facility.

40 Implementation of these management procedures would eliminate any adverse impacts  
41 resulting from ACM and LBP. These materials would not be employed in new

1 construction; consequently, there would be beneficial impacts from the removal of existing  
2 ACM and LBP.

### 3 **Solid Waste**

4 Construction, renovation and demolition activities associated with the Dyess AFB  
5 Alternative would generate C&D debris. Buildings would be constructed primarily of  
6 masonry and steel construction or be of a prefabricated design over a concrete slab-type  
7 foundation, while resulting debris would include wood, drywall, plastic, steel, masonry,  
8 etc. To the greatest extent possible, construction projects would incorporate Leadership  
9 in Energy and Environmental Design<sup>®</sup>, commonly referred to as LEED<sup>®</sup>, and sustainable  
10 development concepts to achieve optimum resource efficiency, sustainability, and energy  
11 conservation. MSW waste would also be generated from construction site operations  
12 (e.g., food waste, office waste, empty containers, and packaging materials). The quantity  
13 of this type of waste would be minor when compared to the volume of C&D debris  
14 expected to be generated. Construction activities at both installations would occur over  
15 multiple years and all feasible waste recycling and management measures would be  
16 implemented through enforcement of contract specifications to further minimize the  
17 quantity of C&D debris generated. Construction waste recycling and management  
18 involves the process and separation of salvaging the recoverable waste materials for  
19 recycling and reuse.

20 As an example, in the case of paved surfaces, debris would likely consist mostly of  
21 wooden forms that could be recycled. Also, durable modular metal form systems for use  
22 in concrete construction may be selected based on being readily demountable and  
23 reusable on other projects, thus eliminating wood waste associated with formwork  
24 fabricated of plywood and dimensional lumber. Any suitable substitute for aggregate  
25 (e.g., recovered masonry, concrete, and asphalt rubble) may be recycled into new  
26 aggregate or asphalt and would be considered during construction. Some building-related  
27 waste can also be minimized (e.g., construction products) can be selected based on its  
28 being designed and manufactured to be shipped with minimal packaging. Soil excavated  
29 during construction activities would be stockpiled for construction and landscaping uses,  
30 while woody debris from land-clearing activities could also be chipped or mulched onsite  
31 and used for landscaping. New materials, such as asphalt and concrete, would not be  
32 expected to generate significant waste because they are produced in the needed  
33 quantities and can be recycled if the material or its placement does not meet  
34 specifications. Additional MSW diversion measures, including recycling of office waste,  
35 beverage containers, cardboard, plastics, and scrap metal would further limit any potential  
36 adverse impacts on landfill capacity.

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### 37 **3.10.2.1 No Action Alternative Consequences**

#### 38 **3.10.2.1.1 No Action at Dyess AFB**

39 Under the No Action Alternative, the Proposed Action would not occur and there would  
40 be no change in the storage or use of hazardous materials or the generation of solid or  
41 hazardous wastes at Dyess AFB. Ongoing activities related to the management of ERP

1 sites would continue. Furthermore, the base will comply with Air Force Guidance  
2 Memorandum 2019-32-01, *AFFF-Related Waste Management Guidance*, to manage  
3 waste streams containing PFOS/PFOA. As such, implementation of the No Action  
4 Alternative would not result in significant impacts.

### 5 **3.10.2.1.2 No Action at Ellsworth AFB**

6 Under the No Action Alternative, the Proposed Action would not occur and there would  
7 be no change in the storage or use of hazardous materials or the generation of solid or  
8 hazardous wastes at Ellsworth AFB. Ongoing activities related to the management of  
9 ERP sites would continue. Additionally, the base will comply with Air Force Guidance  
10 Memorandum 2019-32-01, *AFFF-Related Waste Management Guidance*, to manage  
11 waste streams containing PFOS/PFOA. As such, implementation of the No Action  
12 Alternative would not result in significant impacts.

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## 13 **3.10.2.2 Dyess AFB Alternative**

### 14 **3.10.2.2.1 Personnel**

15 Potential impacts resulting from the proposed change in the number of personnel would  
16 be associated with an increase in generation of MSW. These potential impacts are  
17 discussed in Section 3.10.2.2.4 (Hazardous Materials and Hazardous and Solid Wastes,  
18 Dyess AFB Alternative, Facilities and Infrastructure).

### 19 **3.10.2.2.2 Airfield Operations**

20 Potential impacts to hazardous materials and hazardous wastes resulting from aircraft  
21 operations would be associated with maintenance activities to support these operations.  
22 These potential impacts were discussed above, under Commonalities.

### 23 **3.10.2.2.3 Airspace and Range Utilization**

24 There would be no impacts to hazardous materials and hazardous and solid waste from  
25 airspace and range utilization associated with training operations in PRTC, or the Lancer  
26 MOA, Brownwood MOA, or Pecos MOA, as hazardous materials would not be used or  
27 stored at these locations. Similarly, no hazardous or solid wastes would be generated.

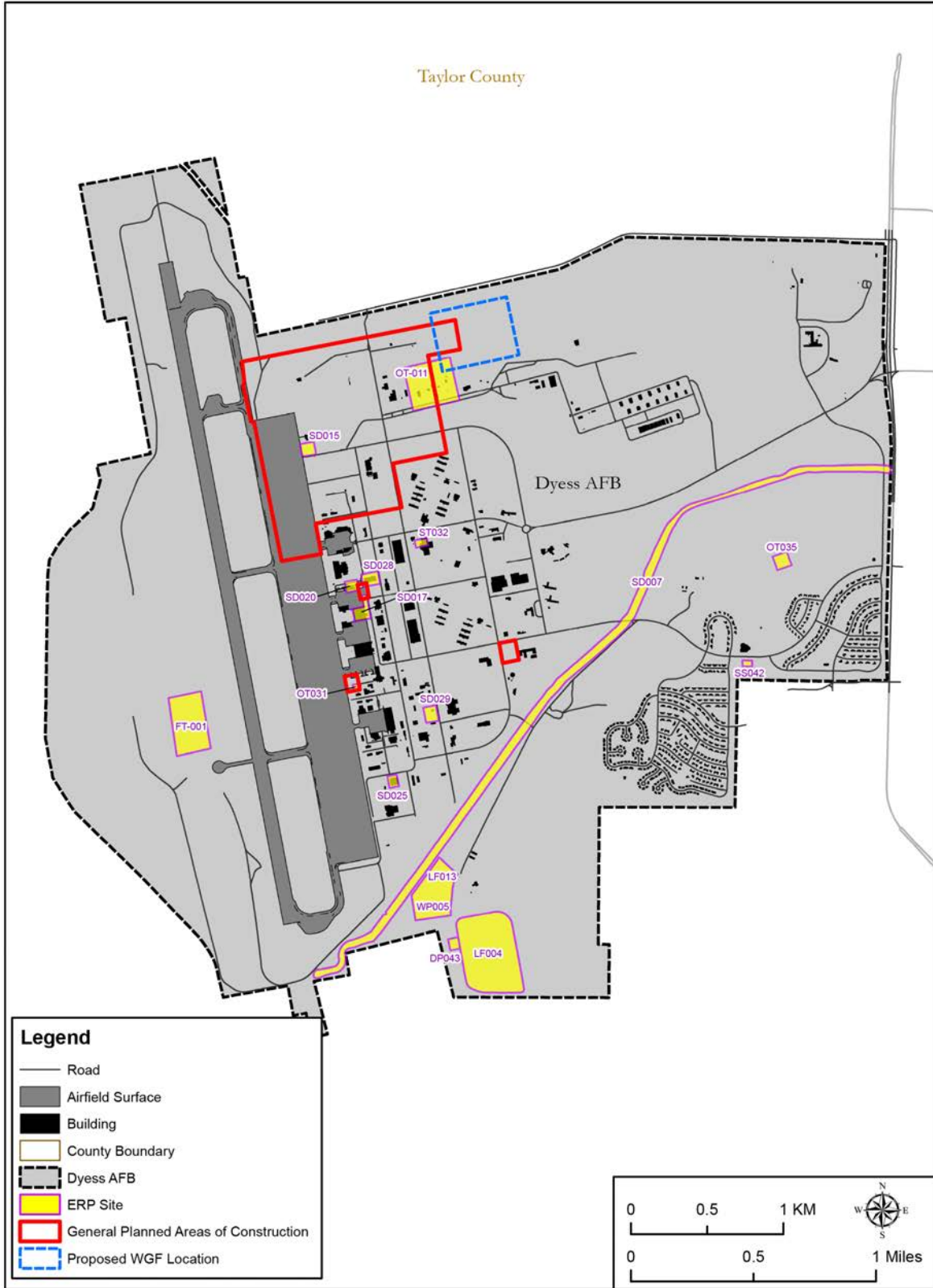
### 28 **3.10.2.2.4 Facilities and Infrastructure**

#### 29 **Toxic Substances**

30 Potential impacts associated with toxic substances from upgrades to facilities and  
31 infrastructure were discussed above, under Commonalities.

#### 32 **ERP Sites**

33 As Figure 3.10-7 shows, the general planned areas of construction would overlap areas  
34 associated with ERP sites SD015, SD017, SD020, SD028, and OT-11. As shown in  
35 Table 3.10-5, these sites that have established LUCs that limit development to industrial  
36 uses (i.e., nonresidential). Most sites also limit groundwater use to non-potable only.



1  
2

**Figure 3.10-7. Overlap of Proposed Projects on ERP Sites at Dyess AFB**



1

**Table 3.10-5. 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 groundwater 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	LUC requiring land use be limited to industrial; no restrictions for groundwater use

Source: (USAF, 2016c)  
 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

2 As part of proposed activities, these sites would be only redeveloped for industrial use  
 3 and would not use groundwater for potable purposes. Also, exposure to environmental  
 4 media during construction (soil, surface water, sediment, or groundwater) would be  
 5 unlikely to result in adverse human health effects. Prior to any work on or near ERP sites,  
 6 the Environmental Office would be notified. This would include disturbance to any existing  
 7 any remediation infrastructure, such as groundwater monitoring wells. Dyess AFB would  
 8 also coordinate with TCEQ, if required, regarding disturbance at existing ERP sites. As  
 9 discussed in Section 3.10.1.2.1 (Hazardous Materials and Hazardous and Solid Wastes,  
 10 Region of Influence, Dyess AFB), the USAF is currently investigating possible  
 11 contamination at identified PFAS sites. Construction activities would avoid these sites to  
 12 the greatest extent possible. Any actions at these sites would be coordinated with TCEQ  
 13 and other applicable stakeholders.

14 Should contaminated soils need to be removed, transported, treated, and/or disposed,  
 15 RCRA regulations would apply to the characterization, transportation, and disposal of this  
 16 material. Additionally, prior to disturbing these sites, the potential presence of hazardous  
 17 constituents would be communicated to workers. Site safety briefings that include  
 18 distribution of material safety data sheets and discussion of safe work practices would be  
 19 conducted to protect worker health.

20 With implementation of the procedures described above, there would be no significant  
 21 impacts to ERP sites.

22 Additionally, MSW would be generated as a result of new personnel assigned to the base.  
 23 As discussed in Section 3.10.1.2.1 (Hazardous Materials and Hazardous and Solid  
 24 Wastes, Region of Influence, Dyess AFB), during FY19, Dyess AFB disposed to the  
 25 landfill approximately 1,470 tons of MSW. This number included both MSW from  
 26 industrial operations as well as from on-base residents in military family housing. Under  
 27 this alternative, the total number of personnel (including dependents) would increase by  
 28 approximately 39 percent (10,145 versus 14,098). As a rough approximation, it is  
 29 assumed the quantity of MSW would similarly increase. This means an additional  
 30 573 tons of MSW would be generated annually, for a total of 2,043 tons. Table 3.10-6  
 31 shows total tons of MSW and C&D debris associated with this alternative. Note:  
 32 Construction activities at Dyess would occur over multiple years, limiting the quantity of  
 33 debris generated at any one time.

1 **Table 3.10-6. Total Solid Waste Disposed of from the Dyess AFB Alternative**

Action	Total Square Feet <sup>1</sup>	C&D Generation Factor <sup>2</sup> (lb/sf)	C&D Tons
New Construction	1,192,769	4.34	2,588
Renovation	46,000	11.32	260
Demolition	71,762	158	5,669
<b>C&amp;D Debris Total (Tons)<sup>3</sup></b>			<b>8,517</b>
<b>Annual MSW Total (Tons)<sup>4</sup></b>			<b>2,043</b>
<b>Solid Waste Total (Tons)</b>			<b>10,560</b>

AFB = Air Force Base; C&D = construction and demolition; lb = pounds; MSW = municipal solid waste; sf = square feet

Notes:

1. 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.
2. Source: EPA, 2003
3. Construction activities at Dyess would occur over multiple years, further limiting the quantity of debris generated at any one time.
4. Total assumes an approximate 30 percent increase over current MSW generation quantity, based on the number of additional personnel at the installation.

2 As the table shows, approximately 10,560 tons of solid waste would be disposed of at the  
 3 Abilene Environmental Landfill. As discussed in Section 3.10.1.2.1 (Hazardous Materials  
 4 and Hazardous and Solid Wastes, Region of Influence, Dyess AFB), the Abilene  
 5 Environmental Landfill receives approximately 220,000 tons of mixed waste per year.  
 6 The combined quantity of C&D debris and MSW generated at Dyess AFB under this  
 7 alternative would represent only approximately 5 percent of average annual landfill  
 8 disposal. At its current disposal capacity, the landfill is expected to remain in operation  
 9 for an additional 63 years.

10 Implementation of appropriate waste recycling, diversion and management measures, as  
 11 described in the Commonalities, would further minimize the quantity of MSW and C&D  
 12 debris generated. Based on the results of the analyses, the Dyess AFB Alternative would  
 13 not result in significant impacts to solid wastes or landfill capacity.

#### 14 **3.10.2.2.5 Weapons Generation Facility**

15 There would be no potential impacts associated with hazardous materials, hazardous  
 16 wastes, toxic substances, and solid wastes for the WGF not previously discussed under  
 17 the Commonalities section. The construction footprint for the WGF would overlap areas  
 18 associated with ERP Site OT-11. With implementation of the procedures described in  
 19 Section 3.10.2.2.4 (Hazardous Materials and Hazardous and Solid Wastes, Dyess AFB  
 20 Alternative, Facilities and Infrastructure), there would be no significant impacts to this  
 21 ERP site.

#### 22 **3.10.2.2.6 Proposed Resource-Specific Mitigations and Management Actions to** 23 **Reduce the Potential for Environmental Impacts**

24 There is a potential that construction sites could be impacted by PFOS/PFOA or other  
 25 contaminants (e.g., fuels, solvents). The base will comply with Air Force Guidance  
 26 Memorandum 2019-32-01, *AFFF-Related Waste Management Guidance*, to manage  
 27 waste streams containing PFOS/PFOA. If construction would require soil  
 28 removal/disposal, then characterization and disposal would be conducted in accordance  
 29 with USAF policy and guidance (Air Force Guidance Memorandum 2019-32-01).  
 30 Contaminated soils may be addressed on site or disposed of in an appropriate landfill. No

1 other mitigation measures or additional management actions other than those described  
2 in the Commonalities section would be necessary to reduce impacts to below significant  
3 levels for hazardous materials and hazardous and solid waste because no significant  
4 impacts are anticipated.

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### 5 **3.10.2.3 Ellsworth AFB Alternative**

#### 6 **3.10.2.3.1 Personnel**

7 Potential impacts resulting from the proposed change in the number of personnel would  
8 be associated with an increase in generation of MSW. These potential impacts are  
9 discussed in Section 3.10.2.3.4 (Hazardous Materials and Hazardous and Solid Wastes,  
10 Ellsworth AFB Alternative, Facilities and Infrastructure).

#### 11 **3.10.2.3.2 Airfield Operations**

12 Potential impacts to hazardous materials and hazardous wastes resulting from aircraft  
13 operations would be associated with maintenance activities to support these operations.  
14 These potential impacts were discussed above, under Commonalities.

#### 15 **3.10.2.3.3 Airspace and Range Utilization**

16 There would be no impacts to hazardous materials and hazardous and solid waste  
17 associated with training operations in PRTC, as hazardous materials would not be used  
18 or stored at these locations. Similarly, no hazardous or solid wastes would be generated.

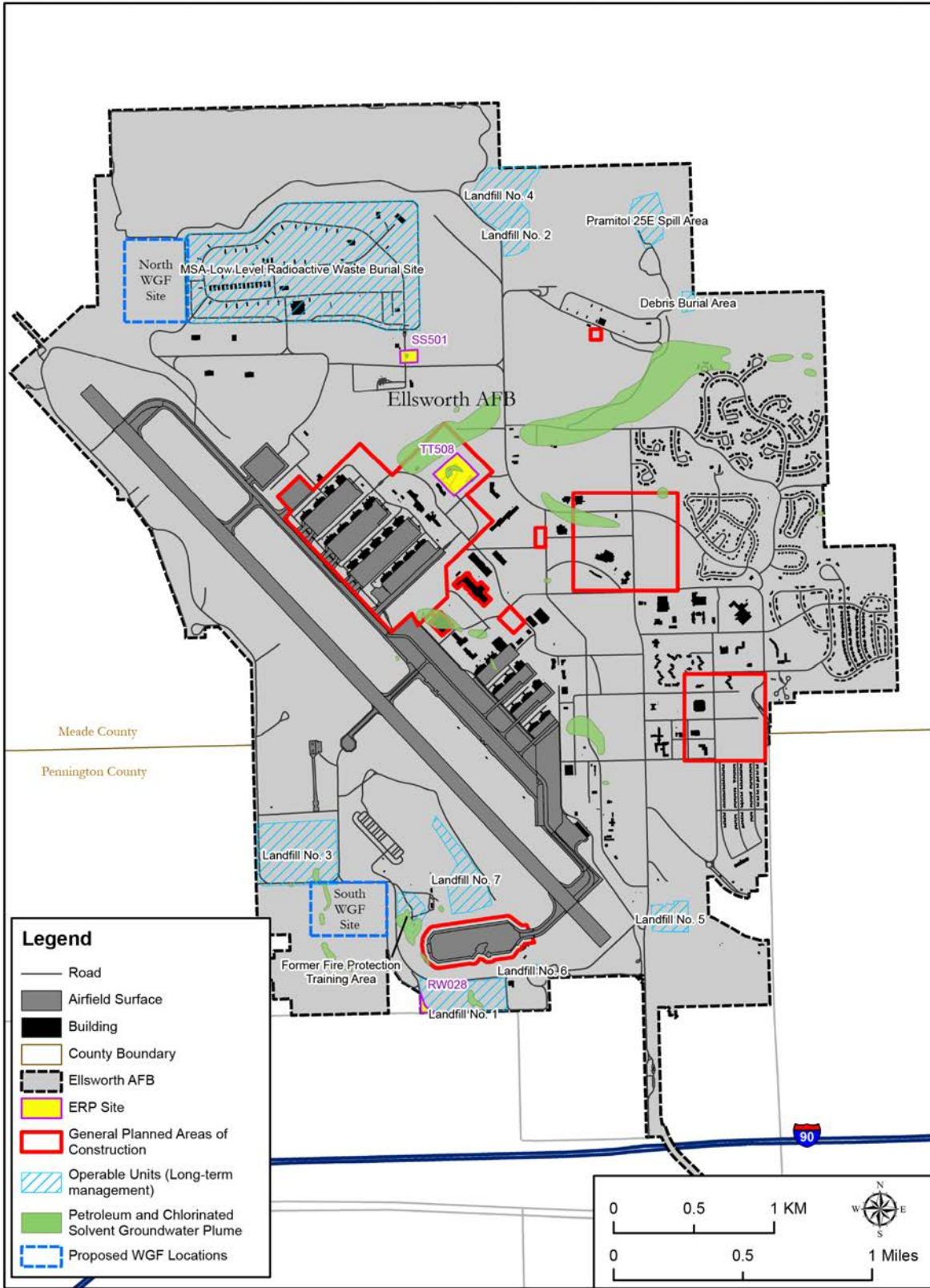
#### 19 **3.10.2.3.4 Facilities and Infrastructure**

#### 20 **Toxic Substances**

21 Potential impacts associated with toxic substances from upgrades to facilities and  
22 infrastructure were discussed above, under Commonalities.

#### 23 **ERP Sites**

24 As Figure 3.10-8 shows, the general planned areas of construction would only overlap  
25 areas associated with ERP site TT-508. TT508 is located within a petroleum, oil, and  
26 lubricant area of Ellsworth AFB and has historically been used for bulk storage of jet  
27 propellant. Underground storage tanks containing diesel fuel and unleaded gasoline were  
28 also located in this area. Various investigations have identified soil and groundwater  
29 hydrocarbon contamination associated with petroleum releases from historical  
30 operations. In January 2018, in-situ chemical oxidation, using hydrogen peroxide/iron  
31 catalyst injections, was completed to address identified contaminant of concerns, which  
32 include benzene and naphthalene. Site TT-508 is currently undergoing quarterly post-  
33 injection monitoring to evaluate progress towards reducing contaminant levels in the  
34 subsurface. The current groundwater monitoring network includes 18 monitoring wells  
35 and two piezometers (USAF, 2020e).



1

2

Figure 3.10-8. Overlap of Proposed Projects on ERP Sites at Ellsworth AFB

1 Prior to any work on or near ERP sites, the Environmental Office and the Air Force Civil  
2 Engineer Center Remedial Project Managers would be notified and would engage  
3 SDDENR and the EPA as needed/required. As discussed in Section 3.10.1.2.2  
4 (Hazardous Materials and Hazardous and Solid Wastes, Region of Influence, Ellsworth  
5 AFB), the USAF is currently investigating possible contamination at identified PFAS sites.  
6 Construction activities would avoid these sites to the greatest extent possible. Any  
7 actions at these sites would be coordinated with SDDENR and other applicable  
8 stakeholders.

9 Should contaminated soils need to be removed, transported, treated, and/or disposed,  
10 RCRA regulations would apply to the characterization, transportation, and disposal of this  
11 material. Additionally, prior to disturbing the site, the potential presence of hazardous  
12 constituents would be communicated to workers. Site safety briefings that include  
13 distribution of material safety data sheets and discussion of safe work practices would be  
14 conducted to protect worker health. With implementation of the procedures described  
15 above, there would be no significant impacts to ERP sites.

## 16 **Solid Waste**

17 Construction, renovation and demolition activities associated with this alternative would  
18 generate C&D debris. Additionally, MSW would be generated as a result of new personnel  
19 assigned to the base. As discussed in Section 3.10.1.2.2 (Hazardous Materials and  
20 Hazardous and Solid Wastes, Region of Influence, Ellsworth AFB), during the 1-year  
21 period of October 2018 to September 2019, Ellsworth AFB disposed to the landfill  
22 approximately 1,100 tons of MSW. This number included MSW from industrial operations  
23 as well as from on-base residents. Under this alternative, the total number of personnel  
24 (including dependents) would increase by approximately 30 percent (see 10,596 versus  
25 13,743). As a rough approximation, it is assumed the quantity of MSW would similarly  
26 increase. This means that an additional 330 tons of MSW would be generated annually,  
27 for a total of 1,430 tons. Table 3.10-7 shows total tons of MSW and C&D debris  
28 associated with this alternative. Note: Construction activities at Ellsworth AFB would  
29 occur over multiple years, further limiting the quantity of debris generated at any one time.

30 As the table shows, approximately 13,572 tons of solid waste would be disposed of at the  
31 Rapid City Sanitary Landfill. As discussed in Section 3.10.1.2.2 (Hazardous Materials  
32 and Hazardous and Solid Wastes, Region of Influence, Ellsworth AFB), the landfill  
33 receives approximately 133,000 tons of mixed waste per year. The combined quantity of  
34 C&D debris and MSW generated at Ellsworth AFB would represent approximately  
35 10 percent of average annual landfill disposal. At its current disposal capacity, the landfill  
36 is permitted to operate another 20 years; however, the landfill has access to additional  
37 land areas that could extend its life expectancy until at least 2060.

38 Implementation of appropriate waste recycling, diversion and management measures, as  
39 described in the Commonalities, would further minimize the quantity of MSW and C&D  
40 debris generated. Based on the results of the analyses, the Ellsworth AFB Alternative  
41 would not result in significant impacts to solid wastes or landfill capacity.

1 **Table 3.10-7. Total Solid Waste Disposed of from the Ellsworth AFB Alternative**

Action	Total Square Feet <sup>1</sup>	C&D Generation Factor <sup>2</sup> (lb/sf)	C&D Tons
New Construction	798,664	4.34	1,733
Minor Renovation (Re-use)	647,817	4.34	1,406
Major Renovation (Add/Alter)	42,840	11.32	242
Demolition	109,632	158	8,661
<b>C&amp;D Debris Total (Tons)<sup>3</sup></b>			<b>12,042</b>
<b>Annual MSW Total (Tons)<sup>4</sup></b>			<b>1,430</b>
<b>Solid Waste Total (Tons)</b>			<b>13,572</b>

AFB = Air Force Base; C&D = construction and demolition; lb = pound; MSW = municipal solid waste; sf = square feet  
Notes:

1. 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.
2. Source: EPA, 2003
3. Construction activities at Dyess would occur over multiple years, further limiting the quantity of debris generated at any one time.
4. Total assumes an approximate 30 percent increase over current MSW generation quantity, based on the number of additional personnel at the installation.

### 2 **3.10.2.3.5 Weapons Generation Facility**

3 There would be no potential impacts associated with hazardous materials, hazardous  
4 wastes, toxic substances, ERP sites, and solid wastes for the North WGF Site or South  
5 WGF Site Subalternatives not previously discussed under the Commonalities section or  
6 Section 3.10.2.3.4 (Hazardous Materials and Hazardous and Solid Wastes, Ellsworth  
7 AFB Alternative, Facilities and Infrastructure).

### 8 **3.10.2.3.6 Proposed Resource-Specific Mitigations and Management Actions to** 9 **Reduce the Potential for Environmental Impacts**

10 There is a potential that construction sites could be impacted by PFOS/PFOA or other  
11 contaminants (e.g., fuels, solvents). The base will comply with Air Force Guidance  
12 Memorandum 2019-32-01, *AFB-Related Waste Management Guidance*, to manage  
13 waste streams containing PFOS/PFOA. If construction would require soil  
14 removal/disposal, then characterization and disposal would be conducted in accordance  
15 with USAF policy and guidance (Air Force Guidance Memorandum 2019-32-01).  
16 Contaminated soils may be addressed on site or disposed of in an appropriate landfill. No  
17 other mitigation measures or additional management actions other than those described  
18 in the Commonalities section would be necessary to reduce impacts to below significant  
19 levels for hazardous materials and hazardous and solid waste as no significant impacts  
20 are anticipated.

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## 3.11 HEALTH AND SAFETY

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### 3.11.1 Health and Safety, Affected Environment

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#### 3.11.1.1 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 USAF regulations govern the various aspects of safety. For example, policies related to flight safety include AFI 91-202, *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. Air Force Manual 91-201, *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 Air Force Manual 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 to happen). The B-21 would likely be smaller in size than the existing B-1, 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.

## 1 **Commonalities**

2 The following elements of health and safety are common to Dyess AFB and Ellsworth  
3 AFB.

## 4 **Flight Safety and Mishap Prevention**

5 Flight safety is based on the physical risks associated with aircraft flight. Military aircraft  
6 fly in accordance with FAA Regulations Part 91, General Operating and Flight Rules,  
7 which govern such things as operating near other aircraft, right-of-way rules, aircraft  
8 speed, and minimum safe altitudes. These rules include the use of testing and training  
9 flight areas, arrival and departure routes, and airspace restrictions as appropriate to help  
10 control air operations.

11 There is no generally recognized threshold of flight safety that defines acceptable or  
12 unacceptable conditions. Instead, the focus of airspace managers is to reduce risks  
13 through numerous measures. These include, but are not limited to, providing and  
14 disseminating information to airspace users, setting appropriate standards for equipment  
15 performance and maintenance, defining rules governing the use of airspace, and  
16 assigning appropriate and well-defined responsibilities to the users and managers of the  
17 airspace.

18 The USAF values safety and professionalism and has adopted many measures to  
19 promote aviation safety. All personnel are provided continuous safety training throughout  
20 their career with the USAF. Specifically, all USAF pilots use state-of-the-art simulators  
21 for training purposes that include all facets of flight operations and comprehensive  
22 emergency (such as mechanical failure or bird strike) response procedures that minimize  
23 the mishap risks associated with pilot error. Maintenance crews are also highly trained  
24 to perform preventative maintenance actions, maintenance repairs, diagnostic testing of  
25 the repair, and flight safety inspections on each aircraft in accordance with USAF  
26 regulations.

27 The primary safety concern regarding military aircraft operations is the potential for  
28 aircraft mishaps to occur. Mishaps may be caused by mid-air collisions with other aircraft  
29 or objects, weather, mechanical failures, pilot error, etc. Although mishap rates from  
30 previous years cannot predict future mishap rates, reviewing mishap historical data is  
31 helpful in providing perspective. Aircraft mishaps are categorized based on the extent of  
32 property damage, loss of life, or disability they cause. The military services define four  
33 categories of aircraft mishaps (A to D), with “Class A” mishaps defined as the most  
34 serious. Class A mishaps are classified as resulting in a total property damage of  
35 \$2 million or more, a fatality, or permanent total disability. Due to the potential for impact  
36 severity, only Class A mishaps are discussed in this section.

37 For in-flight emergencies, military pilots are trained take all appropriate emergency  
38 measures, including avoiding populated areas, if possible. If a mishap does occur, there  
39 are well-established emergency response procedures currently in-place. Each  
40 installation maintains emergency and mishap response plans to guide responses to



1 aircraft accidents. These plans assign responsibilities and prescribe functional activities  
2 necessary to react to mishaps, whether on- or off-station. Additionally, highly trained  
3 maintenance crews perform inspections on each aircraft in accordance with DoD  
4 regulations, and maintenance activities are monitored to ensure that aircraft are equipped  
5 to safely withstand the rigors of operational and training events. When these measures  
6 are implemented, risks are minimized, even though they can never be eliminated.

7 In the unlikely event of an aircraft emergency or mishap, installations maintain emergency  
8 and mishap response plans to guide responses to aircraft accidents. These plans assign  
9 responsibilities and prescribe functional activities necessary to react to mishaps, whether  
10 on- or off-base. Response would normally occur in two phases. The initial response  
11 focuses on rescue, evacuation, fire suppression, safety, elimination of explosive devices,  
12 securing the area, and other actions immediately necessary to prevent loss of life or  
13 further property damage. The second phase is the mishap investigation, which involves  
14 an array of organizations whose participation would be governed by the circumstances  
15 associated with the mishap and actions required to be performed (DoD, 2018c).  
16 Installations also maintain mutual aid agreements with local fire departments, which detail  
17 each party's responsibility when responding to a mishap. The installations also conduct  
18 annual training drills, where emergency personnel are instructed on proper response  
19 procedures. These drills may include participation of emergency response agencies from  
20 the local community.

21 After all required investigations and related actions on a mishap site are complete, the  
22 aircraft would be removed from the mishap site. Installation personnel accomplishes  
23 cleanup of the site or contracts to an outside agency to accomplish the cleanup. Overall,  
24 the purpose of response planning is to:

- 25 • Save lives, property, and material by timely and correct response to mishaps
- 26 • Quickly and accurately report mishaps to higher Headquarters
- 27 • Investigate the mishap to preclude the recurrence of the same or a similar mishap

## 28 **Explosives Safety**

29 Both installation store and maintain a range of munitions required for performance of their  
30 mission. All explosives handling operations must undergo risk assessments that analyze  
31 hazards associated with transporting, storing, disposing of, handling or firing ammunition  
32 and explosive materials. These risk assessments may range from examining the  
33 relationship between a potential explosion site and an exposed site to determine what  
34 effect one has on the other in the event of an accidental explosion, to ascertaining the  
35 worst credible event ramifications of an explosives handling mishap. All explosives  
36 storage and handling operations are documented in a site-specific Explosive Site Plan  
37 (ESP). These ESPs must contain all the information needed for the reviewer to determine  
38 if the explosives safety requirements of Air Force Manual 91-201 are met. ESPs may  
39 include documentation such as detailed drawings, engineering analyses, risk

1 assessments, commanders' risk acceptances, etc., in order to verify compliance with  
2 explosives safety requirements.

3 At both installations, munitions storage areas are located away from the main cantonment  
4 area. The installations have established QD arcs (i.e., safety buffers) around the  
5 munitions storage areas that limit the types of development allowed to maintain personnel  
6 safety and to minimize the potential for damage to other facilities. QD arcs are also  
7 established around the aircraft parking areas on the main ramp. Aircraft undergoing hot-  
8 pit refueling or undergoing end-of-runway or arm/de-arm operations are in categorized as  
9 being in transportation mode and are exempt from QD criteria; however, separation  
10 distances to exposed sources must still be considered. For example, in their respective  
11 Master Aircraft Parking Plans, the installations may implement compensatory measures  
12 that address which buildings need to be evacuated when munitions are loaded on certain  
13 areas of the flightline.

### 14 **Construction Safety**

15 Daily operations and maintenance operations at both installations are performed in  
16 accordance with applicable USAF safety regulations, USAF technical guidance, and the  
17 standards stipulated in AFOSH requirements. Construction and demolition activities are  
18 common and have associated inherent risks such as chemical (e.g., asbestos, lead,  
19 hazardous materials) and physical (e.g., noise propagation, falling, electrocution,  
20 collisions with equipment) sources.

21 Companies and individuals contracted to perform construction activities on USAF  
22 installations are responsible for adhering to OSHA requirements to mitigate these  
23 hazards. Industrial hygiene programs address exposure to hazardous materials, use of  
24 personal protective equipment, and the availability and use of safety data sheets, the  
25 latter of which are also the responsibility of construction contractors to provide to workers.  
26 Federal civilian and military personnel that have a need to enter areas under construction  
27 must adhere to OSHA and AFOSH requirements, as well as applicable industrial hygiene  
28 programs. Individuals tasked to operate and maintain equipment, such as power  
29 generators, are responsible for following all applicable technical guidance, as well as  
30 adhering to established OSHA and USAF safety guidelines.

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#### 31 **3.11.1.2 Region of Influence**

32 The ROI for health and safety include the installation boundaries, with an emphasis on  
33 areas used for munitions storage or where construction activities would occur, as well as  
34 any adjacent off-base areas (i.e., public lands, military training areas, MOAs) that  
35 potentially would be affected by safety issues related to the Proposed Action.

### 3.11.1.2.1 Dyess AFB

#### Flight Safety and Mishap Prevention

Dyess AFB has been operating the B-1 bomber 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 USAF 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 see Figure 3.11-1. QD arcs are also established around the aircraft parking areas on the main ramp. As discussed under Commonalities, all munitions are handled and stored in accordance with USAF explosive safety directives and all munitions maintenance is carried out by trained, qualified personnel using USAF-approved technical procedures.

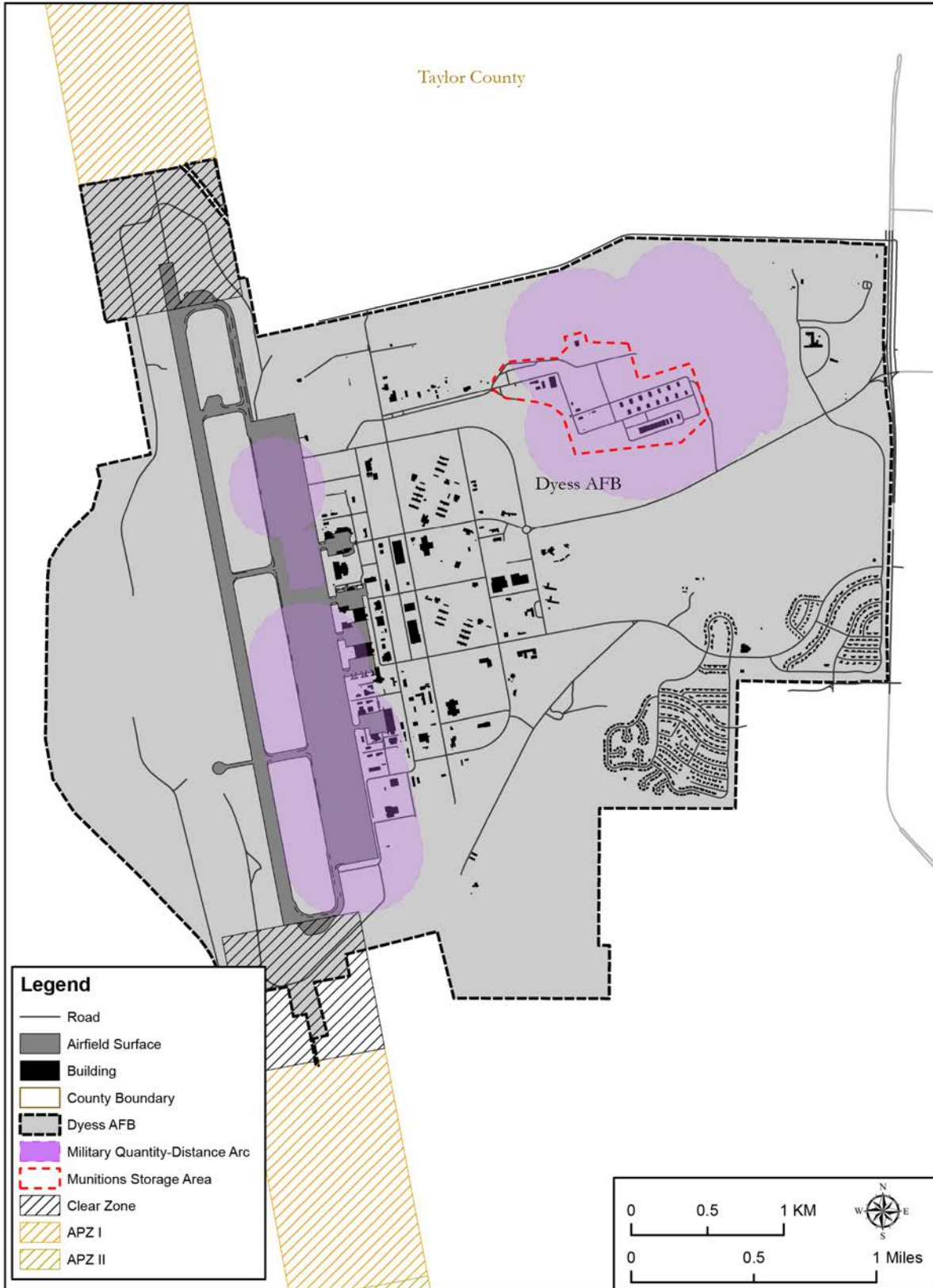
### 3.11.1.2.2 Ellsworth AFB

#### Flight Safety and Mishap Prevention

There have been five Class A mishaps associated with Ellsworth AFB B-1 bomber aircraft. The first occurred in November 1988 when the aircraft crashed while landing at the base. A USAF investigation concluded that the pilots lost track of altitude because of weather conditions. Four subsequent mishaps have occurred with the last one happening in August 2013. Two of these occurred while the aircraft was training overseas. The cause of these mishaps have included pilot error, mechanical failure, or the cause could not be determined. As discussed under the common elements, the USAF 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

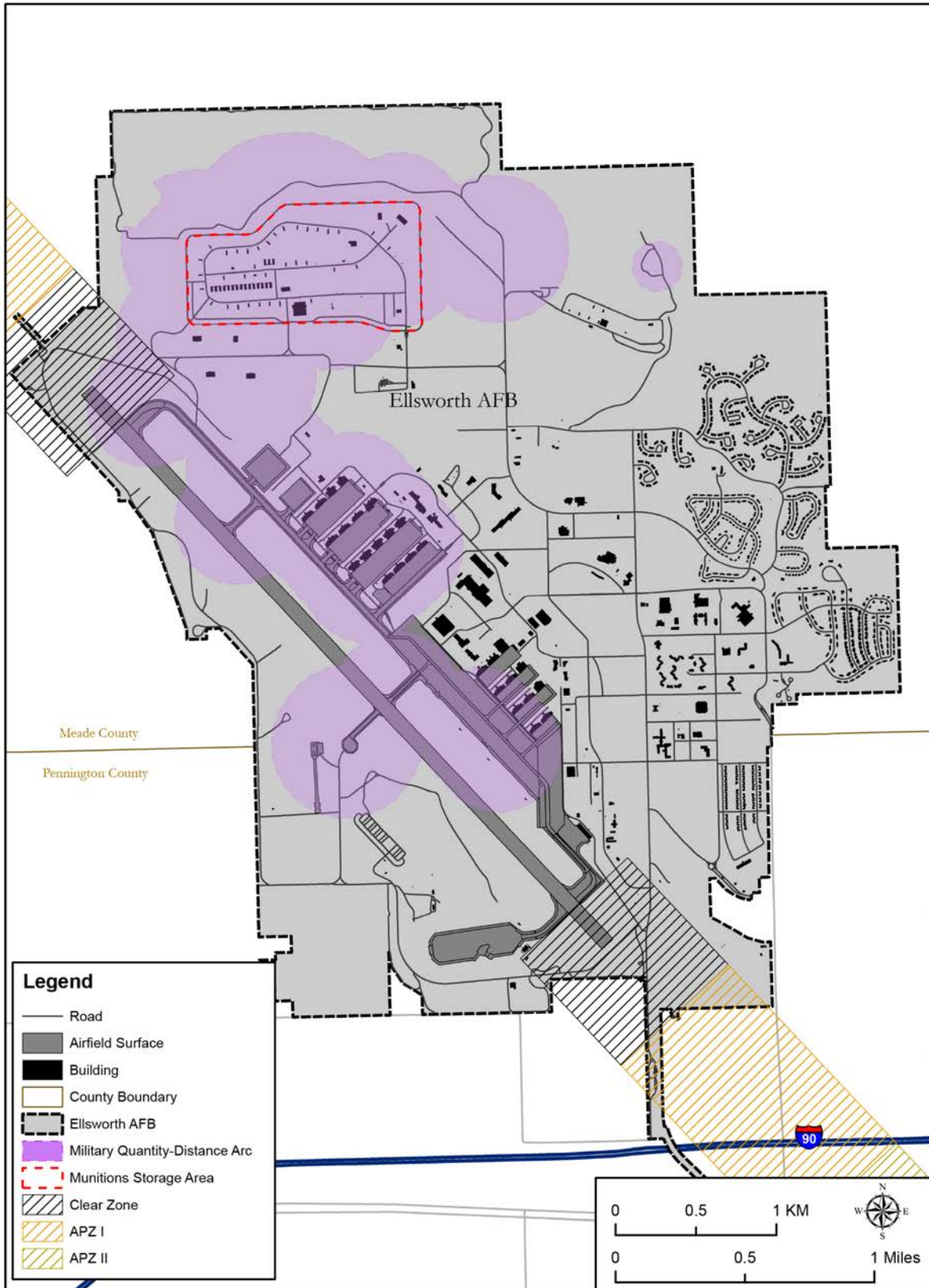
Explosives safety QD arcs are implemented for the munitions storage area, located on the northern portion of the installation, that extend outwards for several hundred feet (see Figure 3.11-2). QD arcs are also established around the aircraft parking areas and hangars, as well as around areas of the airfield where aircraft may be temporarily parked. As discussed under the common elements, all munitions are handled and stored in accordance with USAF explosive safety directives and all munitions maintenance is carried out by trained, qualified personnel using USAF-approved technical procedures.



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**Figure 3.11-1. Established Quantity-Distance Arcs at Dyess AFB**



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**Figure 3.11-2. Established Quantity-Distance Arcs at Ellsworth AFB**

### 1 **3.11.1.2.3 Airspace and Range Utilization**

2 The affected environment for flight safety and mishap risks would be the same as under  
3 those discussed for Dyess AFB for Lancer, Brownwood, and Pecos MOAs and Ellsworth  
4 AFB for PRTC. Airspace and range utilization would have no impact on the affected  
5 environment for explosive or construction safety; consequently, these are not discussed  
6 further.

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### 7 **3.11.1.3 Analysis Methodology**

8 In the analyses, issues that have a potential to affect safety are evaluated relative to the  
9 degree to which the activity increases or decreases safety risks to military personnel, the  
10 public, and property. For example, the analyses evaluate whether buildings would fall  
11 within munitions safety buffers (i.e., QD arcs). Likewise, the potential for a change in the  
12 number of aircraft Class A mishaps from flight operations are evaluated by comparing  
13 aircraft types and sorties against aircraft-specific aircraft mishap rates.

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## 14 **3.11.2 Health and Safety, Environmental Consequences**

### 15 ***Commonalities***

16 The following potential environmental consequences for health and safety are common  
17 to the Dyess AFB Alternative and Ellsworth AFB Alternative.

### 18 **Flight Safety and Mishap Prevention**

19 The USAF calculates Class A mishap rates for each type of aircraft in the inventory.  
20 Mishaps rates are computed based on the number of mishaps per 100,000 flying hours.  
21 (Note: Combat losses due to enemy action are excluded from mishap statistics.) The  
22 B-21 has not yet entered service. From an operational and design standpoint, the B-21  
23 would most closely align with the existing B-2 “Spirit” stealth bomber. That is, the B-21  
24 would likely employ operational profiles not unlike the B-2’s, though, overall dimensions  
25 appear to indicate a smaller overall bomber form when compared to the B-2. Because  
26 this would be a new aircraft, mishap rates are not available; consequently, historical  
27 mishap rates for the B-2A are used in the analysis.

28 Through 2019, the B-2 logged a total of 142,944 flying hours (it began flying operations  
29 in 1990) with only a single recorded Class A mishap. This equates to a lifetime mishap  
30 rate of 0.7 or approximately one mishap approximately every 143,000 flying hours (USAF,  
31 2020f). Proposed air operations at both installations would comprise 94.5 sorties per  
32 month (1,134 sorties per year). With an estimated sortie length of approximately 2 hours,  
33 this would equate to 2,268 hours of annual operations. Using the historical B-2 mishap  
34 rate of 0.7, this would mean that, statistically, a mishap could occur approximately every  
35 63 years.

1 This analysis makes only a statistical prediction regarding the frequency of mishaps and  
2 may not represent real-world conditions. Current aircraft flight safety policies and  
3 procedures (as described in Section 3.11.1.1, Health and Safety, Description of  
4 Resource) are designed to ensure that the potential for aircraft mishaps is reduced to the  
5 lowest possible level. These safety policies and procedures would continue under this  
6 alternative. If a mishap was to occur, there are well-established procedures for  
7 responding to aircraft mishaps on USAF and non-USAF property (see Section 3.11.1.1,  
8 Health and Safety, Description of Resource, for more information).

9 As discussed in Section 3.10.2 (Hazardous Materials and Hazardous and Solid Wastes,  
10 Environmental Consequences), the B-21 is primarily comprised of advanced composite  
11 materials. When these materials burn, as may be the case in a mishap-related fire, they  
12 may give off fumes containing toxic constituents; consequently, appropriate personal  
13 protective equipment, such as adequate respirators, would be required by response  
14 personnel. Note: Health and safety impacts related to the use of composite materials are  
15 discussed in Section 3.10.2 (Hazardous Materials and Hazardous and Solid Wastes,  
16 Environmental Consequences, Commonalities).

17 During mishap prevention training, the USAF would communicate any requirements to  
18 local fire department personnel regarding the need for specific response procedures  
19 and/or protective equipment. Any such requirements would also be implemented (as  
20 necessary) when removing and disposing of any mishap-related debris or associated  
21 contaminated soils. No significant impacts to flight safety would occur with continued  
22 implementation of established and new mishaps prevention procedures.

### 23 **Construction Safety**

24 Companies and individuals contracted to perform construction activities on USAF  
25 installations would be responsible for adhering to OSHA requirements to mitigate all  
26 hazards. Industrial hygiene programs would be implemented to address exposure to  
27 hazardous materials, use of personal protective equipment, and the availability and use  
28 of safety data sheets. Federal civilian and military personnel that have a need to enter  
29 areas under construction would adhere to OSHA and AFOSH requirements, as well as  
30 applicable industrial hygiene programs. Individuals tasked to operate and maintain  
31 equipment, such as power generators, would be responsible for following all applicable  
32 technical guidance, as well as adhering to established OSHA and USAF safety  
33 guidelines. All actions would be accomplished by technically qualified personnel and  
34 would be conducted in accordance with applicable USAF safety requirements, approved  
35 technical data, and AFOSH standards; consequently, no significant impacts would occur.

### 1 **3.11.2.1 No Action Alternative Consequences**

#### 2 **3.11.2.1.1 No Action at Dyess AFB**

3 Under the No Action Alternative, Dyess AFB would continue current operations using the  
4 B-1 aircraft. All actions would be accomplished by technically qualified personnel and  
5 would be conducted in accordance with applicable USAF safety requirements, approved  
6 technical data, and AFOSH standards; consequently, no significant impacts would occur.

#### 7 **3.11.2.1.2 No Action at Ellsworth AFB**

8 Under the No Action Alternative, Ellsworth AFB would continue current operations using  
9 the B-1 aircraft. All actions would be accomplished by technically qualified personnel and  
10 would be conducted in accordance with applicable USAF safety requirements, approved  
11 technical data, and AFOSH standards; consequently, no significant impacts would occur.

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### 12 **3.11.2.2 Dyess AFB Alternative**

#### 13 **3.11.2.2.1 Personnel**

14 There would be no unique operations (e.g., use of extremely hazardous substances)  
15 posing specific health and safety impacts to new personnel from implementation of this  
16 alternative. All actions would be accomplished by technically qualified personnel and  
17 would be conducted in accordance with applicable USAF safety requirements, approved  
18 technical data, and AFOSH standards.

#### 19 **3.11.2.2.2 Airfield Operations**

20 Potential impacts to health and safety from air operations at all locations would be  
21 associated with flight safety and mishap prevention. These potential impacts were  
22 previously discussed under the Commonalities section (Section 3.11.2, Health and  
23 Safety, Environmental Consequences).

#### 24 **3.11.2.2.3 Airspace and Range Utilization**

25 There would be no unique health and safety impacts related to airspace and range  
26 utilization at PRTC, or the Lancer MOA, Brownwood MOA, or Pecos MOA from  
27 implementation of this alternative. Potential impacts related to flight operations were  
28 previously discussed under the Commonalities section (Section 3.11.2, Health and  
29 Safety, Environmental Consequences).



#### 1 **3.11.2.2.4 Facilities and Infrastructure**

##### 2 **Explosives Safety**

3 Under this alternative, QD arcs for aircraft parking would move from the south end of the  
4 parking apron to the north end. Additionally, general planned areas of construction  
5 located near the center and north portions of the flightline would fall within existing QD  
6 arcs (Figure 3.11-3).

7 Proposed structures in these areas would undergo an explosive safety review to ensure  
8 occupancy and land uses would be compatible with these locations. Based on that  
9 review, Dyess AFB may implement compensatory measures, such as identifying which  
10 buildings need to be evacuated when munitions are loaded on certain areas of the  
11 flightline. As part of this process, existing explosive safety plans (e.g., ESPs or Aircraft  
12 Parking Plans) would be updated accordingly. With implementation of these measures,  
13 there would be no adverse impacts related to explosive safety.

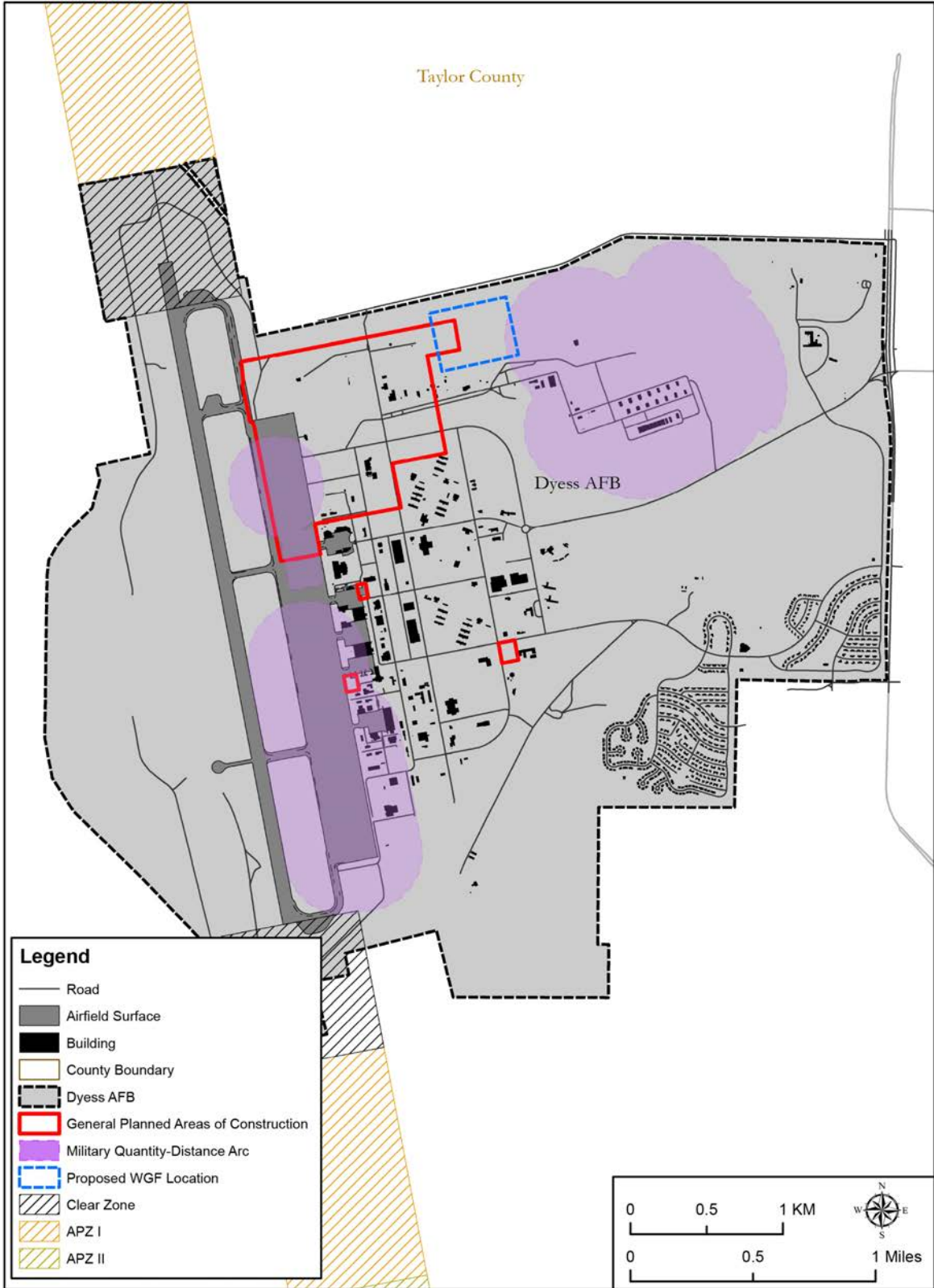
#### 14 **3.11.2.2.5 Weapons Generation Facility**

##### 15 **Explosives Safety**

16 The footprint for the WGF would fall within the existing QD arcs at the munitions storage  
17 area. It would also overlap a portion of the northernmost planned area of construction  
18 (Figure 3.11-3). The WGF would be used to maintain nuclear ordnance carried on the  
19 B-21. This ordnance contains nuclear components as well as components employing  
20 small quantities of conventional explosives. These facilities have been used to support  
21 the USAF's nuclear program throughout its history. The WGF would be purpose-built to  
22 ensure that nuclear material and conventional explosives would be stored separately.  
23 Additionally, building design (i.e., reinforced concrete construction, interior layout, blast  
24 resistant walls), combined with dedicated explosive safety and fire suppression systems,  
25 would eliminate any risk to the public. The facility would also be subject to the ESP  
26 process to ensure that appropriate QD arcs are established and adjoining land uses are  
27 compatible; consequently, there would be no adverse impacts related to explosives  
28 safety.

#### 29 **3.11.2.2.6 Proposed Resource-Specific Mitigations and Management Actions to** 30 **Reduce the Potential for Environmental Impacts**

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



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**Figure 3.11-3. Quantity-Distance Arcs and Proposed Construction at Dyess AFB**

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### 1 **3.11.2.3 Ellsworth AFB Alternative**

#### 2 **3.11.2.3.1 Personnel**

3 There would be no unique operations (e.g., use of extremely hazardous substances)  
4 posing specific health and safety impacts to new personnel from implementation of this  
5 alternative. All actions would be accomplished by technically qualified personnel and  
6 would be conducted in accordance with applicable USAF safety requirements, approved  
7 technical data, and AFOSH standards.

#### 8 **3.11.2.3.2 Airfield Operations**

9 Potential impacts to health and safety from air operations at all locations would be  
10 associated with flight safety and mishap prevention. These potential impacts were  
11 previously discussed under the Commonalities section (Section 3.11.2, Health and  
12 Safety, Environmental Consequences).

#### 13 **3.11.2.3.3 Airspace and Range Utilization**

14 There would be no unique health and safety impacts related to training at PRTC from  
15 implementation of this alternative. Potential impacts related to flight operations were  
16 previously discussed under the Commonalities section (Section 3.11.2, Health and  
17 Safety, Environmental Consequences).

#### 18 **3.11.2.3.4 Facilities and Infrastructure**

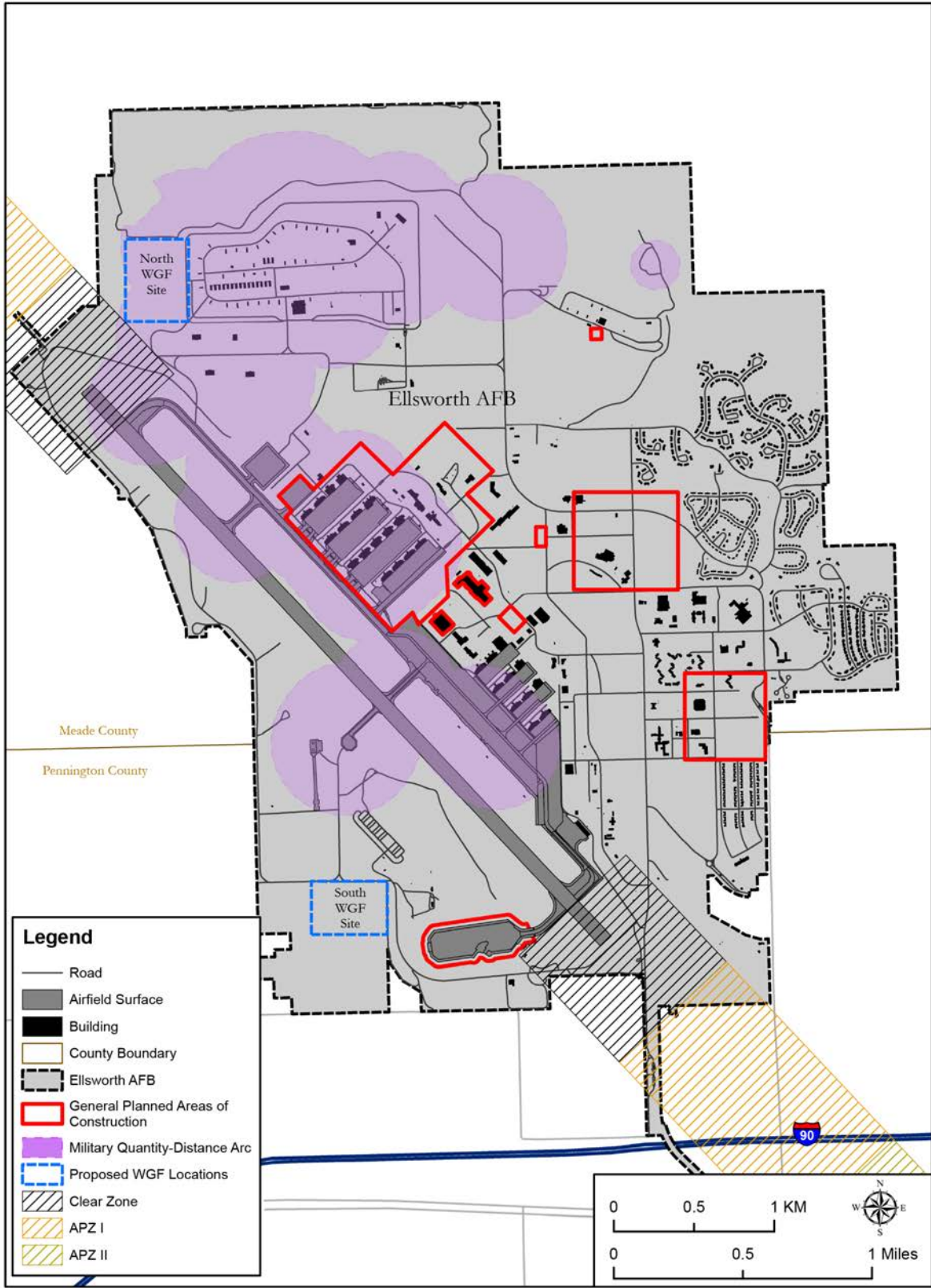
##### 19 **Explosives Safety**

20 General planned areas of construction would be located within existing QD arcs at  
21 munitions storage area, near the center the flightline, and near the south end of the  
22 runway (Figure 3.11-4). Proposed structures in these areas would undergo an explosives  
23 safety review to ensure occupancy and land uses would be compatible with these  
24 locations. Based on that review, Ellsworth AFB may implement compensatory measures,  
25 such as identifying which buildings need to be evacuated when munitions are loaded on  
26 certain areas of the flightline. As part of this process, existing explosives safety plans  
27 (e.g., ESPs or Aircraft Parking Plans) would be updated accordingly. With implementation  
28 of these measures, there would be no adverse impacts related to explosives safety.

#### 29 **3.11.2.3.5 Weapons Generation Facility**

##### 30 **Explosives Safety**

31 The footprint for the North WGF Site Subalternative would fall within existing QD arcs  
32 (Figure 3.11-4). Regardless of the subalternative selected, the WGF would be purpose-  
33 built to store B-21 ordnance and would employ dedicated explosives safety and fire  
34 suppression systems to eliminate any risk to the public. The facility would also be subject  
35 to the ESP process to ensure that appropriate QD arcs are established and adjoining land  
36 uses are compatible; consequently, there would be no adverse impacts related to  
37 explosive safety.



1

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Figure 3.11-4. Quantity-Distance Arcs and Proposed Construction at Ellsworth AFB

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

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

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## 3.12 TRANSPORTATION

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### 3.12.1 Transportation, Affected Environment

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#### 3.12.1.1 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 or Ellsworth AFB, as well as the road network and associated features within the boundaries of Dyess and Ellsworth AFBs. 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

1 *Highway Capacity Manual* defines LOS for signalized and unsignalized intersections as  
 2 shown in Table 3.12-1.

3 **Table 3.12-1. 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, 2018e)

4 Regional transportation planning entities may designate minimum acceptable LOS  
 5 standards based on operational conditions such as the type of roadway, time of day (peak  
 6 versus non-peak traffic), and setting (urban versus rural). Standards are typically  
 7 designated for the design year, which is defined as 20 years after construction  
 8 completion. Desirable and minimum LOS standards identified by the states of Texas and  
 9 South Dakota are provided in Table 3.12-2 and Table 3.12-3.

10 **Table 3.12-2. 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)

11 **Table 3.12-3. Traffic Level of Service Standards in South Dakota**

Transportation Component	Level of Service			
	Rural – Level or Rolling Terrain	Rural – Mountainous Terrain	Urban	
			Desirable	Minimum
Freeways and Auxiliary Facilities	B	C	B	C
Principal Arterial <sup>1</sup>	B	C	C	D
Minor Arterial <sup>1</sup>	B	C	C	D
Collector <sup>2</sup>	C	D	C	D

Source: (South Dakota DOT, 2018)

Notes:

1. Arterials are multi-lane roads, such as freeways and highways, which connect major urban areas.
2. Collectors are single- or multi-lane roads that connect local roads with arterials.

### 12 3.12.1.2 Region of Influence

13 The ROI for transportation consists of the local roadway network within the boundaries of  
 14 alternative MOB 1 locations (Dyess AFB and Ellsworth AFB), as well as the surrounding

1 regional roadway network providing access to the MOB or otherwise potentially affected  
 2 by the Proposed Action. Air operations and airspace and range utilization would not affect  
 3 transportation at PRTC or the Brownwood, Lancer, or Pecos MOAs. Therefore, these  
 4 training and operating areas are not carried forward in the Transportation section.

### 5 **3.12.1.2.1 Dyess AFB**

6 Vehicular traffic patterns on Dyess AFB primarily radiate off Arnold Boulevard, which  
 7 becomes Avenue B at the intersection with 5th Avenue (Dyess AFB, 2018b). Arnold  
 8 Boulevard/Avenue B supports a large portion of the on-base traffic volume, as most  
 9 vehicles enter and exit the installation via this roadway. Secondary and tertiary roads  
 10 serve the remainder of the installation. The most frequently used are 2nd Street,  
 11 3rd Street, and 4th Street, which intersect with Avenue B and run approximately north-  
 12 south through most of the developed portion of the base. Avenue C, Avenue D, and  
 13 Avenue E run parallel to and south of Avenue B.

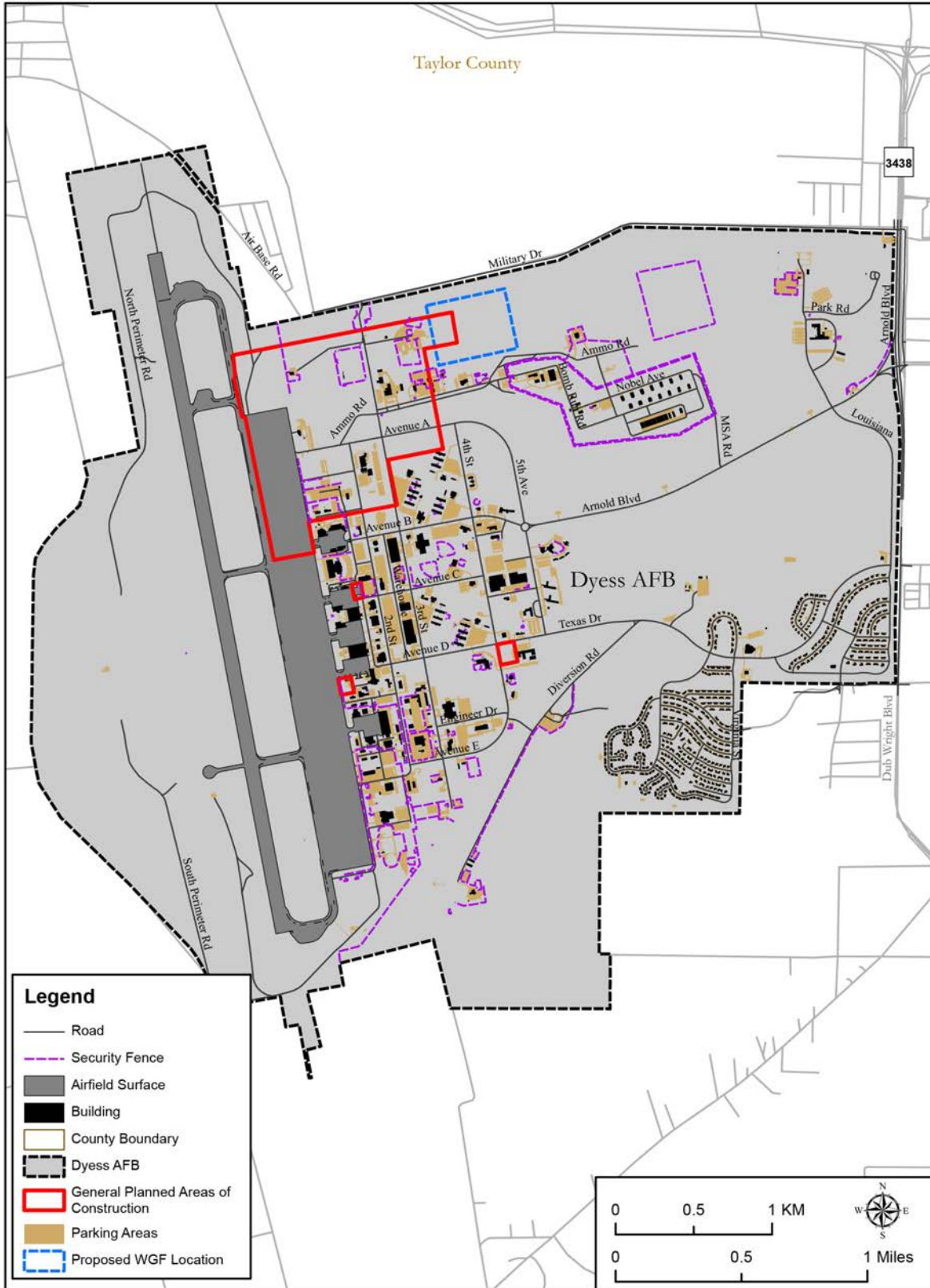
14 Overall, the road system on Dyess AFB is considered to function adequately and to  
 15 efficiently connect all areas of the installation (Dyess AFB, 2018b). However, congestion  
 16 is noted on Arnold Boulevard during peak morning hours, where vehicles entering the  
 17 base may back up due to main gate capacity (Dyess AFB, 2014; Dyess AFB, 2018d).  
 18 Military Drive connects Arnold Boulevard to the Tye gate on the north side of the  
 19 installation and extends into the city of Tye, where it becomes Air Base Road. Commercial  
 20 traffic is intended to access the base through the north gate via Arnold Boulevard and  
 21 Military Drive, although commercial vehicles sometimes use Air Base Road instead  
 22 (Dyess AFB, 2018d). The road network on and immediately adjacent to Dyess AFB is  
 23 shown on Figure 3.12-1.

24 A traffic engineering study conducted on Dyess AFB analyzed conditions at  
 25 15 intersections under existing and potential future operations (Dyess AFB, 2018e). The  
 26 study evaluated LOS, which included qualitative (e.g., congestion) and quantitative  
 27 (delays measured in seconds per vehicle) factors. Under existing conditions, LOS was  
 28 considered adequate (level C or better) for 11 of the intersections and poor for one or  
 29 more components of the remaining intersections. Intersections with inadequate LOS are  
 30 identified in Table 3.12-4. The study notes that traffic volume is relatively low at the  
 31 intersections with poor service levels, and that signal light installation is therefore not  
 32 warranted. However, roundabouts were recommended at two locations: Avenue B/3rd  
 33 Street and Avenue D/5th Street.

34 **Table 3.12-4. 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, 2018e)  
 AFB = Air Force Base



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Figure 3.12-1. Road Network on Dyess AFB



1 U.S. Interstate 20 (I-20) is the major off-base traffic artery in the Abilene area near Dyess  
 2 AFB. Other U.S. highways in the vicinity include U.S. Highway (US-) 83/84 and US-277.  
 3 Dub Wright Boulevard, a four-lane north-south road, provides base access from 7th Street  
 4 and numerous other roadways to the east of Dyess AFB. An off-base encroachment  
 5 report prepared in 2014 concluded that these roads provide adequate capacity and are  
 6 generally not considered congested (Dyess AFB, 2014). However, another study  
 7 identified several roadway segments in the vicinity of Dyess AFB, including segments of  
 8 I-20, US-83/84, US-277, and Arnold Boulevard/Dub Wright Boulevard, as experiencing  
 9 substantial congestion at various days and times (Abilene Metropolitan Planning  
 10 Organization, 2015). Population growth and associated retail commercial development  
 11 in southwest Abilene has resulted in traffic congestion in this area, particularly along  
 12 Southwest Drive near US-83/84 (Abilene Metropolitan Planning Organization, 2010). An  
 13 off-base privatized military housing area (Quail Hollow Family Housing) was established  
 14 slightly west of this highly developed area, near the intersection of US-277 and Rebecca  
 15 Lane. Farm-to-Market Road 707, which connects Tye and Caps, lies immediately west  
 16 of the base. The road network in the region near Dyess AFB is shown on Figure 3.12-2.  
 17 Estimated average daily traffic counts for roads in the vicinity of Dyess AFB are shown in  
 18 Table 3.12-5.

19 **Table 3.12-5. Approximate Average Daily Traffic Count Near Dyess AFB**

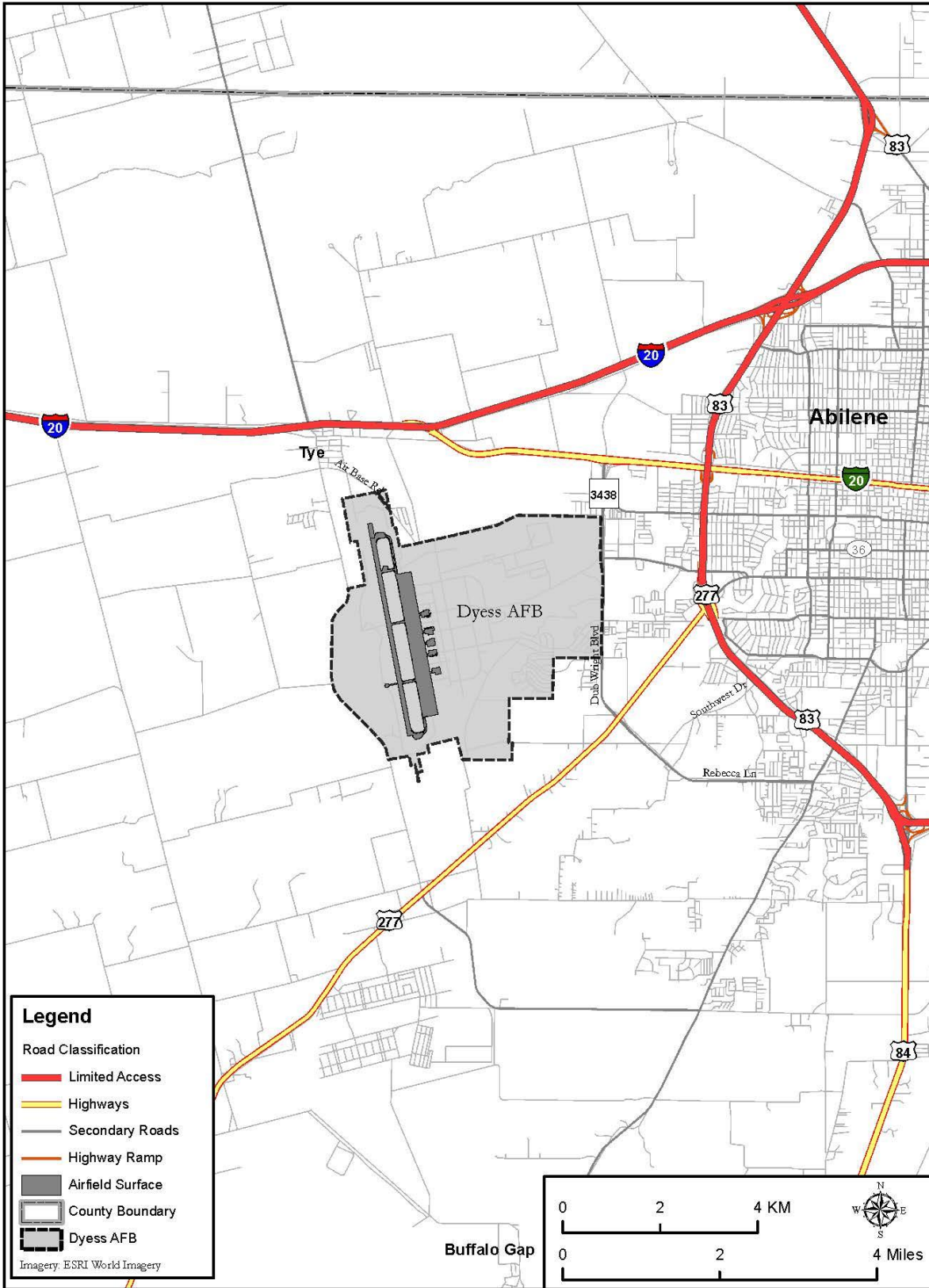
Road/Road Segment	Approximate Average Traffic Count (vehicles per day)
I-20 west of Dyess AFB	25,000
I-20 near the city of Tye	29,000
I-20 east of U.S. Highway 84 interchange	21,000
U.S. Highway 84 near I-20	12,000
Farm-to-Market Road 707	2,000
Texas Avenue	13,000
Arnold Boulevard north of Dyess AFB entrance	8,000
Dub Wright Boulevard	13,000

Source: (Texas DOT, 2016; Texas DOT, 2020)

AFB = Air Force Base; I-20 = U.S. Interstate 20; U.S. = United States

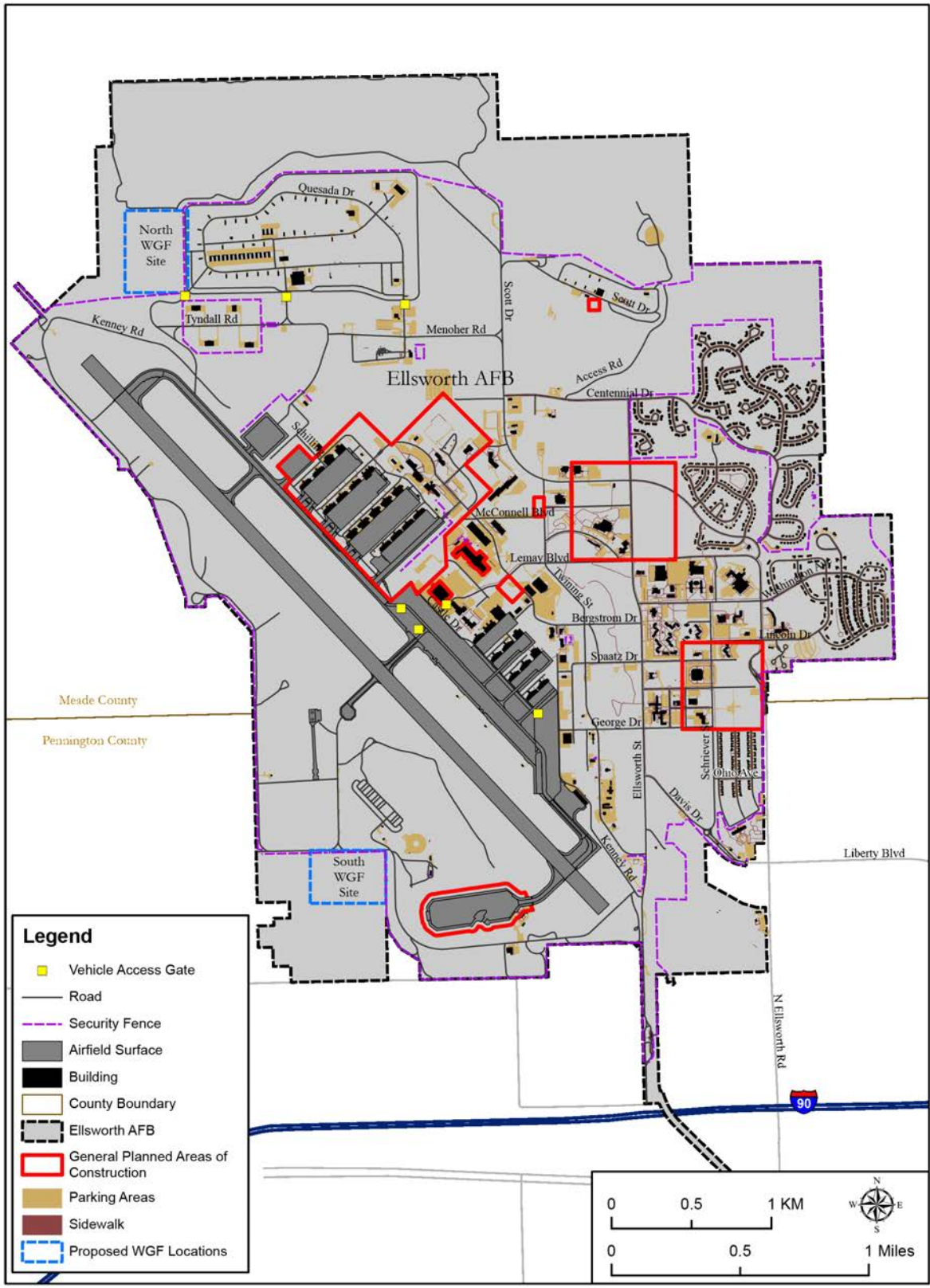
### 20 **3.12.1.2.2 Ellsworth AFB**

21 The primary entrance onto Ellsworth AFB is through the Liberty (Main) Gate. Liberty  
 22 Boulevard serves as the principal route for traffic moving between Liberty Gate and I-90  
 23 to the south (Ellsworth AFB, 2011). Secondary gates include the Bismarck (Commercial)  
 24 Gate, which is accessed from Ellsworth Street, and the Patriot Gate, which is accessed  
 25 from North Ellsworth Road. The primary vehicular routes on the installation include  
 26 Ellsworth Street, North Ellsworth Road, Lemay Boulevard, and Schriever Street.  
 27 Secondary roads such as Ohio Avenue, Washington Avenue, and Scott Drive provide  
 28 access to on-base housing. Traffic capacity is considered adequate. The installation  
 29 generally does not experience traffic congestion, even during periods of peak operation.  
 30 Potential short-, mid-, and long-range projects associated with the base's transportation  
 31 network development plan are identified in the IDP (Ellsworth AFB, 2017). The road  
 32 network on and immediately adjacent to Ellsworth AFB is shown on Figure 3.12-3.



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Figure 3.12-2. Highway and Road Network Near Dyess AFB



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Figure 3.12-3. Road Network on Ellsworth AFB

1 Low density rural neighborhoods are located adjacent to Ellsworth AFB. The city of Box  
 2 Elder occurs immediately east and south, and the unincorporated community of Ashland  
 3 Heights is located about a mile to the southwest. Rapid City is located about 9 miles  
 4 southwest. I-90, which is the major east-west highway corridor through southern South  
 5 Dakota, is located south of the installation and provides access to the base's gates via  
 6 Highway 1416 to the west of the base and Liberty Boulevard to the east (Ellsworth AFB,  
 7 2017). Ellsworth Road and Ellsworth Street/Commercial Gate Road extend off-base to  
 8 the south, through Box Elder. Other major roadways near the base are County Highway  
 9 1416 and Radar Hill Road, which also traverse Box Elder. About 70 percent of traffic using  
 10 the Highway 1416/I-90 ramps is related to travel to and from the base (South Dakota  
 11 DOT, 2017). Ashland Heights is accessed by secondary roads such as Country Road  
 12 214 and T218. U.S. Highways 44, 79, and 16 (Elk Vale Road) converge on Rapid City  
 13 from the south. The road network in the region near Ellsworth AFB is shown on  
 14 Figure 3.12-4. Estimated average daily traffic counts for roads in the vicinity of Ellsworth  
 15 AFB are shown in Table 3.12-6.

16 **Table 3.12-6. Approximate Average Daily Traffic Count Near Ellsworth AFB**

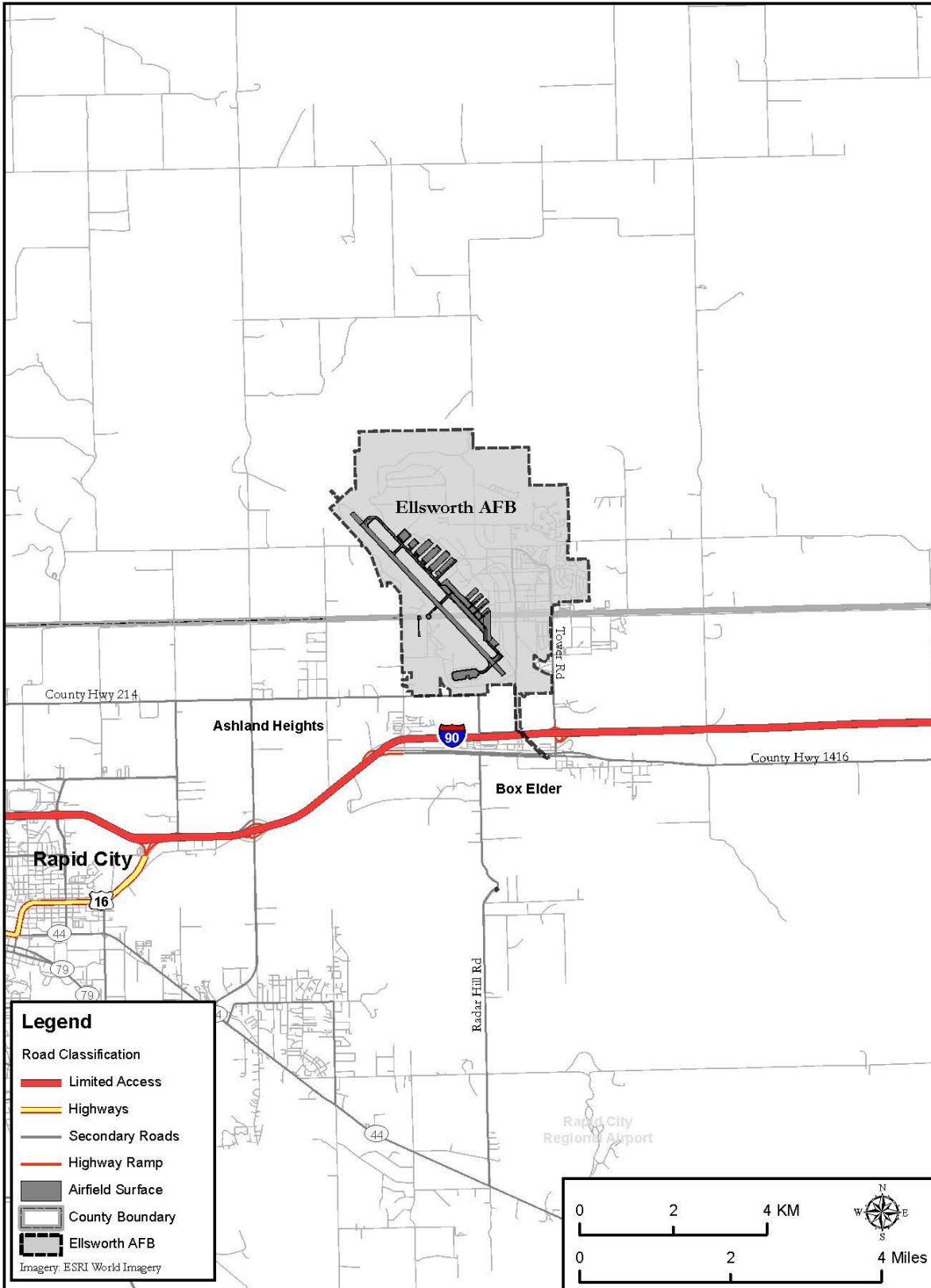
Road/Road Segment	Approximate Average Traffic Count (vehicles per day)
I-90 at Elk Vale Road	28,000
I-90 south of Ellsworth AFB	16,000
I-90 east of Ellsworth AFB	11,000
U.S. Highway 1416 near West Gate Road	7,000
North Ellsworth Road	7,000
Liberty Boulevard near I-90	9,000
Liberty Boulevard near North Ellsworth Road	3,000

Source: (South Dakota DOT, 2020a)

AFB = Air Force Base; I-90 = U.S. Interstate 90; U.S. = United States

17 A recent study evaluated existing traffic operations along I-90 and adjoining roads (Elk  
 18 Vale Road, Liberty Boulevard) between the exit 61 and 67 interchanges, along with ramp  
 19 merge/diverge points and associated intersections (South Dakota DOT, 2017). This  
 20 segment encompasses access to Ellsworth AFB, Rapid City, and Box Elder. LOS on I-90  
 21 was calculated based on density (the number of vehicles per mile per lane) and average  
 22 annual daily traffic. All I-90 segments evaluated were found to operate at a LOS of A or  
 23 B. Similarly, all ramp merge/diverge points operated at a LOS of A or B. Intersection  
 24 service levels along the segment varied widely, ranging from LOS A to F during peak  
 25 hours among various locations, directions, and time of day.

26 The City of Box Elder has experienced growth in recent years, with population doubling  
 27 between 2009 and 2014 (City of Box Elder, 2014). New single family residential units  
 28 increased by about 11 to 21 percent between 2016 and 2018 (City of Rapid City, 2018).  
 29 In the immediate vicinity of Ellsworth AFB, most development has occurred between  
 30 Tower Road and Liberty Boulevard, which are located east and south of the installation,  
 31 respectively.



1  
2

**Figure 3.12-4. Highway and Road Network Near Ellsworth AFB**

1 Residential development has also occurred along the Radar Hill Road corridor south of  
2 I-90 and in the western part of the city near I-90/Elk Vale Road. Commercial development  
3 has occurred along Highway 1416. With the exception of I-90, Elk Vale Road, and portions  
4 of Highway 1416 and Liberty Boulevard, only two-lane roads occur in Box Elder.

5 The highest peak hour traffic volumes occur along Highway 1416, Ellsworth Road, Tower  
6 Road, and Liberty Boulevard. Transit to and from Ellsworth AFB is a major contributor to  
7 traffic patterns, particularly since the base's gates are located adjacent to Box Elder (City  
8 of Box Elder, 2014). Although growth has taxed the city's transportation infrastructure  
9 (e.g., periodic congestion is noted), volume-to-capacity ratios calculated in 2014 indicated  
10 that roadways generally had sufficient capacity to accommodate existing traffic levels. In  
11 addition, analysis of 10 intersections found that, with one exception, they operated at an  
12 acceptable LOS of C or better during peak hours. The exception was the westbound  
13 Highway 1416/Ellsworth Road intersection, which operated at LOS F during peak hours.

14 Northeastern Rapid City (the portion nearest Ellsworth AFB) has experienced recent  
15 growth and development, along with increased traffic congestion. New single family  
16 residential units increased by 7.5 to 9.5 percent between 2016 and 2018 (City of Rapid  
17 City, 2018). A study was conducted to identify potential transportation improvements in  
18 the area encompassing East North Street, Campbell Street, and Omaha Street/Highway  
19 44, which is considered to be the core transportation network of northeastern Rapid City  
20 (Rapid City Area Metropolitan Planning Organization, 2019). The study evaluated  
21 intersection and corridor (flowing traffic) LOS, among other factors. Overall, taking into  
22 consideration all times and travel directions, intersections mostly operated at a LOS of B  
23 or C. However, some intersections operated at level D or E, at specific times and/or  
24 directions. The South Dakota DOT generally considers an intersection LOS of C or better  
25 to be acceptable. Corridor LOS was determined by comparing prevailing travel speeds  
26 with free-flow travel speeds. Overall, morning peak hour traffic operated at a corridor LOS  
27 of C or better, while afternoon peak hour traffic operated at level D at several segments.  
28 Annual average daily traffic volumes in the area ranged from about 15,000 to 25,000.

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### 29 **3.12.1.3 Analysis Methodology**

30 Potential impacts on transportation were assessed with respect to changes in on-base  
31 and off-base traffic operations. For the Proposed Action, potential effects to on-base  
32 operations were evaluated in the context of construction/demolition activities, short-term  
33 and long-term traffic re-routing and road closure, and short-term and long-term changes  
34 in traffic volume. Potential effects to off-base operations considered short-term and long-  
35 term changes in traffic patterns and volume. Potential impacts would be considered  
36 adverse if the Proposed Action would likely result in disruption of existing traffic  
37 operations, decreased corridor or intersection LOS, or roadways operating at or above  
38 their full design capacity.

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## 3.12.2 Transportation, Environmental Consequences

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### 3.12.2.1 No Action Alternative Consequences

#### 3.12.2.1.1 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 would continue as described in Section 3.12.1.2.1 (Transportation, 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.

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), which would increase traffic volume at adjacent road segments and intersections. Construction, maintenance, and transportation improvement projects that are not associated with the B-21 beddown would continue to be evaluated and implemented as appropriate.

The base's IDP provides general discussion of 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, 2018e) 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

1 segments and result in reduced service levels. However, the effects would generally be  
2 short-term and most would affect relatively small portions of the base. It is expected that  
3 unaffected roads could reasonably accommodate rerouted traffic and that overall impacts  
4 to traffic operations would not be significant. An exception would be activities requiring  
5 lane closures near the main gate that would result in substantially increased wait time to  
6 enter or exit the base. In these cases, it is expected that project planning would include  
7 measures to minimize the effects.

8 Completion of projects designed to improve traffic operations would result in long-term  
9 beneficial impacts to the transportation system. Population growth of base personnel  
10 would likely be minor in the foreseeable future and would not affect on-base traffic  
11 operations.

12 Under the No Action Alternative, off-base traffic operations would also continue as  
13 described in Section 3.12.1.2.1 (Transportation, Region of Influence, Dyess AFB). I-20  
14 and other highways and secondary roads in the vicinity of Dyess AFB would continue to  
15 function adequately at times, but substantial traffic congestion would likely be  
16 experienced at some highways (e.g., US-83/84, Dub Wright Boulevard) during peak  
17 hours. Traffic congestion would continue to occur at times on Air Base Road between  
18 Dyess AFB and Tye.

19 Overall regional population growth would not likely affect traffic operations substantially.  
20 As described in Section 3.5 (Socioeconomics), population growth for Taylor County is  
21 projected to be only 0.5 percent per year between 2018 and 2025. Growth was projected  
22 to be 5 and 12 percent for Abilene and Tye, respectively, between 2010 and 2030 (Dyess  
23 AFB, 2018b). The projected Abilene growth rate is considered essentially stagnant,  
24 although the southwest portion of the city nearest Dyess AFB would likely experience  
25 continued development and associated congestion. Data compiled in 2014 indicated that  
26 relatively few new addresses occurred immediately adjacent to the installation (Abilene  
27 Metropolitan Planning Organization, 2015). Northwest Abilene, including the City of Tye,  
28 is expected to experience little urban growth, with the possible exception of  
29 neighborhoods located north of Dyess AFB (Abilene Metropolitan Planning Organization,  
30 2010). Although growth is projected for Tye, the baseline population level is low and  
31 residential growth is expected to be slow and incremental, resulting in little impact on the  
32 Abilene transportation system.

33 Various off-base transportation improvement projects through the year 2040 are being  
34 evaluated by the city of Abilene, including projects involving roadways near Dyess AFB  
35 (Abilene Metropolitan Planning Organization, 2015). The potential projects include a wide  
36 variety of activities such as bridge replacement, road widening, routine maintenance, and  
37 installing signaling and drainage, among many others. In the context of traffic operations,  
38 impacts resulting from components of the various projects could range from relatively  
39 minor (e.g., shoulder closure or reduced speed limits) to major (e.g., lane closures on I-20  
40 or principal highways). Major projects could result in decreased LOS of some roadway  
41 segments and auxiliary features (exits, intersections) due to decreased capacity,  
42 increased congestion and travel time, and safety issues. Many projects would be short-



1 term, but activities such as bridge replacement and road widening could impact traffic  
2 operations for an extended time.

3 It is expected that project planning would include measures to minimize adverse effects  
4 to the extent feasible. Completion of projects designed to improve operations would result  
5 in long-term beneficial impacts to the regional transportation system.

6 In summary, there would be no significant impacts to the on-base transportation system  
7 under the No Action Alternative. Off-base traffic operations would continue to be affected  
8 by existing congestion, population growth, and transportation improvement projects, but  
9 activities associated with Dyess AFB would not contribute significantly to these issues.

#### 10 **3.12.2.1.2 No Action at Ellsworth AFB**

11 Under the No Action Alternative, the B-21 would not be based at Ellsworth AFB, and there  
12 would be no associated personnel changes or construction, demolition, or renovation  
13 activities. Traffic operations on and outside the base would continue as described in  
14 Section 3.12.1.2.2 (Transportation, Region of Influence, Ellsworth AFB). The on-base  
15 road system would continue to function adequately, and traffic congestion would generally  
16 not be expected.

17 Construction, maintenance, and transportation improvement projects that are not  
18 associated with the B-21 beddown would continue to be evaluated and implemented as  
19 appropriate. Potential facility development projects, airfield development projects, and  
20 projects associated with the base's transportation network development plan are  
21 identified in the IDP (Ellsworth AFB, 2017).

22 Transportation-specific projects include street repairs, road grading, and street  
23 expansion. Activities such as street repairs could involve closure of the shoulder, which  
24 would likely slow traffic and could increase the potential for minor accidents. Other  
25 activities (e.g., grading and street expansion) would likely involve lane closure or street  
26 segment closure, which could cause traffic congestion, traffic rerouting, increased travel  
27 time, and increased potential for crashes, particularly during peak flow periods. The  
28 effects of some of the actions could therefore potentially increase traffic volume at some  
29 road segments, result in reduced service levels, and amplify issues at intersections with  
30 existing poor service levels. However, the effects would generally be short-term and most  
31 would affect relatively small portions of the base. It is expected that unaffected roads  
32 could reasonably accommodate rerouted traffic and that overall impacts to traffic  
33 operations would not be significant. Completion of projects designed to improve traffic  
34 operations would result in long-term beneficial impacts. Note that any future  
35 transportation-related projects on Ellsworth AFB would be subject to project-specific  
36 environmental review under the EIAP.

37 Population growth of base personnel would likely be minor in the foreseeable future and  
38 would not affect on-base traffic operations. Under the No Action Alternative, off-base  
39 traffic operations would also continue as described in Section 3.12.1.2.2 (Transportation,  
40 Region of Influence, Ellsworth AFB). The segment of I-90 near Ellsworth AFB, along with  
41 ramp merge/diverge points, would probably continue to operate at acceptable LOS into

1 the intermediate future. However, associated intersection service levels would be  
2 variable, ranging from A to F during peak hours. Projected traffic volumes in the year 2045  
3 were evaluated based on residential and commercial growth, as well as two scenarios of  
4 population growth on Ellsworth AFB (South Dakota DOT, 2017). The scenarios assumed  
5 either no growth in base population, or that the base population would double by 2045.

6 Overall, the highest projected traffic volume growth was associated with Elk Vale Road  
7 and Liberty Boulevard, with volume forecasts ranging from 2.5 to 3.1 times higher than  
8 current levels. Projected growth throughout the remaining areas was variable, ranging  
9 from 20 to 70 percent without Ellsworth AFB growth and 40 to 90 percent with doubling  
10 of the base population. Analysis indicated that doubling Ellsworth AFB personnel would  
11 not significantly change forecasts for roadways that do not directly access the base (e.g.,  
12 Elk Vale Road). However, traffic volume forecasts for roadways that feed directly or  
13 indirectly to base gates (e.g., Ellsworth Road, Liberty Boulevard, Highway 1416) were 20  
14 to 30 percent higher than existing operations. Under these conditions, I-90 and associated  
15 ramp merge/diverge points were projected to operate at a LOS between A and C  
16 (depending on the segment), while intersections were projected to operate at a LOS  
17 between D and F. The projections included the assumption that no roadway  
18 improvements beyond those currently planned would be implemented.

19 Box Elder roadways would likely continue to have sufficient capacity, and intersections  
20 would operate at an acceptable LOS, into the intermediate future (approximately the next  
21 15 years). Potential future traffic volumes were modeled for the year 2035, assuming an  
22 increase of 1,900 households and 1,700 employees (City of Box Elder, 2014). Results  
23 suggested that roadways would have sufficient capacity to accommodate projected traffic  
24 levels but that some intersection capacity problems would be expected. It is anticipated  
25 that numerous intersections would require the addition of signalized or roundabout  
26 controls by 2035 to operate at LOS C.

27 With some exceptions, Rapid City intersections would generally continue to operate at an  
28 acceptable LOS. Corridor flow would continue to operate at an acceptable LOS during  
29 morning peak hour traffic, but would operate at LOS D at several segments during  
30 afternoon peak hour traffic. Future intersection and corridor LOS in northeastern Rapid  
31 City (the portion of the city nearest Ellsworth AFB) is expected to deteriorate due to  
32 population growth (Rapid City Area Metropolitan Planning Organization, 2019).  
33 Therefore, the city is currently evaluating improvement options.

34 Various off-base transportation improvement projects are ongoing or are being evaluated  
35 in the vicinity of Ellsworth AFB, including interstate maintenance projects, major arterial  
36 projects, and projects specific to the City of Box Elder (Rapid City Area Transportation  
37 Improvement Program, 2019; Rapid City Area Metropolitan Planning Organization, 2019;  
38 City of Box Elder, 2014). The potential projects include a wide variety of activities such as  
39 road construction, road widening, and routine maintenance, among many others.

40 Impacts resulting from components of the various projects could range from relatively  
41 minor (e.g., shoulder closure or reduced speed limits) to major (e.g., lane closures or  
42 traffic rerouting). Major projects could result in decreased LOS of some roadway

1 segments and auxiliary features. Many projects would be short-term, but some activities  
2 could impact traffic operations for an extended time. It is expected that project planning  
3 would include measures to minimize adverse effects to the extent feasible. Completion of  
4 projects designed to improve operations would result in long-term beneficial impacts to  
5 the regional transportation system.

6 In summary, there would be no significant impacts to the on-base transportation system  
7 under the No Action Alternative. Off-base traffic operations would continue to be affected  
8 by existing congestion, population growth, and transportation improvement projects, but  
9 activities associated with Ellsworth AFB would not contribute significantly to these issues.

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### 10 **3.12.2.2 Dyess AFB Alternative**

#### 11 **3.12.2.2.1 Personnel**

12 An increase in personnel associated with the B-21 beddown would result in additional  
13 vehicle use and related impacts to on-base traffic operations. The specific number of  
14 additional vehicles that would be operated on the installation is unknown but may be  
15 estimated based on an end-state increase of 1,645 active military personnel (Table 3.0-1),  
16 which represents an increase of approximately 37 percent over baseline conditions.  
17 There could potentially be a similar increase in general on-base traffic volume during  
18 typical work hours.

19 The overall on-base road system currently functions adequately, and existing capacity of  
20 some road segments might accommodate the increased usage without substantial  
21 decrease in LOS. However, in at least some areas, higher traffic volume would likely  
22 increase traffic congestion and decrease road segment or intersection service levels, and  
23 could possibly cause some segments to operate near capacity. The potential for such  
24 effects is greater for segments and intersections that currently operate at low LOS. For  
25 example, intersection LOS at Avenue D and 4th Street is low during morning peak hours,  
26 likely due in part to drivers accessing the Child Development Center, and a personnel  
27 increase would result in more traffic near this facility.

28 The increased traffic volume could cause significant on-base congestion near the gates.  
29 The potential for impacts could be decreased by implementing the base's goal of compact  
30 and mixed use development, which is intended to encourage walking and other  
31 alternative modes of transportation (Dyess AFB, 2018b), and by implementing  
32 recommendations in the base's JLUS related to roadway capacity (Dyess AFB, 2018d).  
33 Recommendations include investigating methods to reduce congestion at the main gate,  
34 implementing staggered work shifts, and promoting alternative transportation (e.g.,  
35 walking, bicycling, carpooling).

36 Increased personnel would also affect off-base traffic operations, including commuter  
37 traffic during peak hours, due to higher volume and potentially increased congestion. The  
38 number of vehicles that would be added to the existing traffic volume is unknown but may  
39 be notionally evaluated based on personnel demographics. It is assumed that 55 percent  
40 of additional military personnel would be married. Applying this percentage results in

1 740 unaccompanied and 905 married personnel. Unaccompanied personnel could  
2 generally contribute one vehicle to existing traffic volume at any given time. The results  
3 of studies on vehicle use indicate that there are approximately two vehicles per U.S.  
4 household on average (Wagner, 2020; Bureau of Transportation Statistics, 2020).  
5 Therefore, it is assumed that married personnel and their dependents could contribute  
6 two vehicles. Combining these factors, there could theoretically be a maximum end-state  
7 addition of 2,550 vehicles to the regional transportation system, although the actual  
8 number of additional vehicles operated at any given time would probably be less. There  
9 would not necessarily be two vehicles associated with all additional married personnel,  
10 as the number of household vehicles is influenced by dependents' age, and it is very  
11 unlikely that all vehicles in every household would be operated simultaneously. In  
12 addition, new personnel that live on base would use services on the installation (e.g.,  
13 community services, commercial businesses, and medical facilities) at least part of the  
14 time, decreasing the amount of off-base traffic volume.

15 Most new personnel living off base would likely reside in western or southwestern Abilene,  
16 including the Quail Hollow family housing area, while a smaller number could reside in  
17 other parts of Abilene, the City of Tye, or other communities. Therefore, although vehicle  
18 operation would potentially increase traffic throughout the Abilene region, the increase  
19 would likely be concentrated in and near the western part of the city. Some road  
20 segments in this area currently experience substantial congestion during peak hours.  
21 Areas near the base with notable congestion include Arnold Boulevard/Dub Wright  
22 Boulevard near the main gate, and Air Base Road between Dyess AFB and Tye. Existing  
23 traffic volume is approximately 20,000 to 30,000 vehicles per day on I-20 near the  
24 installation, and is 8,000 and 13,000 vehicles per day on Arnold Boulevard and Dub  
25 Wright Boulevard, respectively. Increased vehicle operation associated with the beddown  
26 would probably cause moderate effects on I-20 traffic but could cause a noticeable  
27 increase in traffic volume and decreased service levels on highways and other  
28 components (e.g., intersections) near the base.

29 Overall, vehicles would generally be operated in different areas of the ROI at various  
30 times and would not necessarily be concentrated in any given location. However, there  
31 would be an increase in traffic volume concentrated near the base gates during peak  
32 commute hours. Assuming that 78 percent of new active duty personnel (end state) would  
33 live off base (see Section 3.5, Socioeconomics) and commute to work daily, there could  
34 be a maximum of 1,283 additional vehicles accessing and leaving the installation during  
35 peak hours, primarily through the main gate but also including the Tye gate. The increase  
36 would potentially cause a substantial increase in congestion and queuing near these  
37 points.

38 In summary, a personnel increase would affect on-base and off-base traffic operations  
39 differently at various locations. However, in the absence of management actions, impacts  
40 would potentially be significant in areas of concentrated operation, such as near the base  
41 gates.

#### 1 **3.12.2.2.2 Airfield Operations**

2 Aircraft operations would not affect transportation on Dyess AFB or at adjacent off-base  
3 areas. Road closures due to aircraft operations or ordnance handling are not anticipated.

#### 4 **3.12.2.2.3 Airspace and Range Utilization**

5 Airspace and range utilization would not affect transportation at PRTC or the Brownwood,  
6 Lancer, or Pecos MOAs.

#### 7 **3.12.2.2.4 Facilities and Infrastructure**

8 On-base transportation components potentially affected by construction, demolition, and  
9 renovation activities mostly occur near the northern end of the runway. Small areas would  
10 also be affected near the parking apron and the intersection of Avenue D and 4th Street.  
11 Activities could potentially result in shoulder, lane, or road segment closures, traffic  
12 rerouting, and reduced travel speeds. These effects could cause traffic congestion and  
13 reduced service levels, particularly during peak flow periods, and increase traffic volume  
14 on otherwise unaffected road segments. These effects could amplify issues at  
15 intersections with existing poor service levels. However, the effects would be temporary  
16 and would cease with completion of facility and infrastructure projects. Unaffected roads  
17 could potentially accommodate rerouted traffic, and LOS would not likely be affected  
18 substantially on most parts of the base. C&D activities would not directly affect roads  
19 near the Dyess AFB fire department. However, it is recommended that project planning  
20 include measures to ensure that response to fires, injuries, and other emergencies (e.g.,  
21 fuel spills, ordnance handling issues) would not be hindered by road conditions or new  
22 road configuration.

23 Facilities and infrastructure projects would require delivery and removal of materials and  
24 debris, as well as base access by construction crews. Commercial vehicles would access  
25 the base at the commercial gate, while crews could access the base by any gate. As a  
26 result, there would be a small increase in off-base traffic on Military Drive, Arnold  
27 Boulevard, and Dub Wright Boulevard. Areas between the commercial gate and Tye,  
28 and on Arnold Boulevard near the main gate, experience congestion during peak hours  
29 currently. Although increased use would contribute to existing congestion, the number of  
30 vehicles involved would be relatively small, and activities would potentially occur  
31 throughout the work day (not restricted to peak hours). In addition, the effects would be  
32 temporary and would cease with completion of the projects. It is expected that heavy  
33 equipment would be kept on the installation for the duration of activities.

34 Overall, there would be no significant impacts due to facilities and infrastructure  
35 placement.

#### 36 **3.12.2.2.5 Weapons Generation Facility**

37 On-base transportation components potentially affected by construction of the WGF  
38 would mostly be limited to the area between Military Drive and Ammo Road. This section  
39 of the base is remote from the “downtown” Dyess area and is less heavily used in general,

1 although a nearby segment of 3rd Street is used frequently during morning peak hour  
2 (Dyess AFB, 2018e).

3 Activities could result in shoulder, lane, or road segment closures, traffic rerouting, and  
4 reduced travel speeds. These effects could reduce service levels and increase traffic  
5 volume on unaffected road segments, potentially amplifying issues at intersections with  
6 existing poor service levels. The effects would be temporary and would not result in  
7 substantially reduced LOS. Unaffected roads could likely accommodate rerouted traffic.  
8 Impacts would cease with completion of construction. Activities would require delivery  
9 and removal of materials, as well as base access by construction crews, which would  
10 cause a small increase in off-base traffic on Military Drive and Arnold Boulevard due to  
11 use of the commercial gate. Although increased use would contribute to existing  
12 congestion, the number of vehicles would be small and the effects would be temporary.  
13 It is recommended that project planning include measures to ensure that emergency  
14 response would not be hindered by activities.

15 Overall, there would be no significant impacts due to construction of the WGF.

#### 16 **3.12.2.2.6 Snapshot**

17 Overlap of B-1 and B-21 operations would result in a temporary increase of 386 active  
18 military and contractor personnel (not including dependents), compared to the end-state  
19 associated with the B-21 beddown (see Table 3.0-1). There would be a temporary  
20 corresponding increase in on-base and off-base traffic in the ROI. Increased traffic  
21 volume would potentially affect LOS on the base and in western Abilene. The number of  
22 personnel associated with the overlap would initially be about 11 percent of the new  
23 personnel arriving at the base due to the beddown, and would decrease as B-1 operations  
24 were phased out. Additional traffic caused by the overlap could be noticeable on base  
25 and in adjacent areas but would not likely affect LOS substantially in the context of overall  
26 personnel numbers.

#### 27 **3.12.2.2.7 Proposed Resource-Specific Mitigations and Management Actions to** 28 **Reduce the Potential for Environmental Impacts**

- 29 • During construction, demolition, and renovation activities, consider scheduling  
30 commercial deliveries outside peak traffic hours and requiring all construction  
31 crews to use the commercial gate.
- 32 • During project planning, include measures to ensure proper emergency response  
33 ability is maintained during construction activities and after project completion.

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#### 34 **3.12.2.3 Ellsworth AFB Alternative**

##### 35 **3.12.2.3.1 Personnel**

36 An increase in personnel associated with the B-21 beddown would result in additional  
37 vehicle use and related impacts to on-base traffic operations. The specific number of  
38 additional vehicles that would be operated on the installation is unknown but may be

1 estimated based on an end-state increase of 1,664 active military personnel, which  
2 represents an increase of approximately 52 percent over baseline conditions. There could  
3 theoretically be a similar increase in on-base traffic volume during typical work hours.

4 The overall on-base road system currently functions adequately, and existing capacity of  
5 some road segments could potentially accommodate the increased usage without  
6 substantial decrease in LOS. The base's road system was designed and built in the mid-  
7 1990s, when personnel numbers were higher than at the present time (Ellsworth AFB,  
8 2017). However, it is possible that in some areas the traffic volume would increase  
9 congestion and decrease service levels substantially, and could cause some road  
10 segments to operate at or near capacity. The increased traffic volume could potentially  
11 cause substantial on-base congestion near the base's gates.

12 The potential for impacts could be decreased by implementing the base's goal of compact  
13 mixed use development and by implementing the transportation network development  
14 plan, both of which are intended to reduce vehicular traffic (Ellsworth AFB, 2017). The  
15 potential for impacts could be additionally reduced by implementing recommendations in  
16 the base's JLUS related to roadway capacity (Ellsworth AFB, 2016b). Recommendations  
17 include a feasibility study for public transportation service to the base and constructing a  
18 multi-modal transportation center outside the main gate.

19 Off-base traffic operations could also be impacted. The number of vehicles that would be  
20 added to the existing traffic volume is unknown but may be notionally evaluated based on  
21 the assumption that 55 percent of additional military personnel would be married.  
22 Applying this percentage results in 749 unaccompanied and 915 married personnel.  
23 Unaccompanied personnel could generally contribute one vehicle to existing traffic  
24 volume at any given time. The results of studies on vehicle use indicate that there are  
25 approximately two vehicles per U.S. household on average (Wagner, 2020; Bureau of  
26 Transportation Statistics, 2020). Therefore, it is assumed that married personnel and their  
27 dependents could contribute two vehicles. Combining these factors, there could be a  
28 theoretical maximum end-state addition of 2,579 vehicles to the regional transportation  
29 system, although the actual number of additional vehicles operated at any given time  
30 would probably be less. There would not necessarily be two vehicles associated with all  
31 additional married personnel, as the number of household vehicles is influenced by  
32 dependents' age, and it is very unlikely that all vehicles in every household would be  
33 operated simultaneously. In addition, new personnel that live on base would use services  
34 on the installation (e.g., community services, commercial businesses, and medical  
35 facilities) at least part of the time, decreasing the amount of off-base traffic volume.

36 Most new personnel living off base would probably reside in northwestern Rapid City or  
37 Box Elder. Therefore, although vehicle operation would potentially increase traffic  
38 throughout the region, the increase would be concentrated in these areas. Increased  
39 traffic volume could lead to congestion and reduced LOS. Existing traffic volume is  
40 approximately 11,000 to 28,000 vehicles per day on I-90 near the base, and from 3,000  
41 to 9,000 vehicles per day on other area roadways. Increased vehicle operation  
42 associated with the beddown would probably have moderate effects on I-90 traffic but

1 could cause a noticeable increase in traffic volume and decreased service levels on  
2 highways near the base.

3 Overall, vehicles would generally be operated in different areas of the ROI at various  
4 times and would not necessarily be concentrated in any given location. However, there  
5 would be an increase in traffic volume concentrated near the base gates during peak  
6 commute hours. As discussed in Section 3.12.2.1.2 (Transportation, No Action at  
7 Ellsworth AFB), roads in Box Elder that lead directly to the base would experience  
8 increased congestion, and intersections throughout Box Elder could operate at reduced  
9 LOS.

10 Assuming 78 percent of new active duty personnel would live off base (see Section 3.5,  
11 Socioeconomics) and commute to work daily, there could be a maximum of 1,298  
12 additional vehicles accessing and leaving the installation during peak hours. The base's  
13 three gates currently process approximately 4,000 scans per day and are able to process  
14 current peak demand (the peak number of scans is unknown) without long backups  
15 (Ellsworth AFB, 2017). Although existing capacity would be able to accommodate some  
16 of the increased usage, there would likely be substantial congestion and queuing near  
17 the gates.

18 In summary, a personnel increase would affect on-base and off-base traffic operations  
19 differently at various locations. However, in the absence of management actions, impacts  
20 would potentially be significant in areas of concentrated operation, such as near the base  
21 gates.

#### 22 **3.12.2.3.2 Airfield Operations**

23 Aircraft operations would not affect the transportation on Ellsworth AFB or at adjacent off-  
24 base areas. Road closures due to aircraft operations or ordnance handling are not  
25 anticipated.

#### 26 **3.12.2.3.3 Airspace and Range Utilization**

27 Airspace and range utilization would not affect transportation at PRTC.

#### 28 **3.12.2.3.4 Facilities and Infrastructure**

29 On-base transportation components potentially affected by facility and infrastructure  
30 projects mostly occur along the north and south ends of the runway, between Lemay  
31 Boulevard and Scott Drive, and between Schriever Street and North Ellsworth Road.  
32 Activities could potentially result in shoulder, lane, or road segment closures, traffic  
33 rerouting, and reduced travel speeds. These effects could cause traffic congestion and  
34 reduced service levels, particularly during peak flow periods, and increase traffic volume  
35 on otherwise unaffected road segments. These effects could amplify issues at  
36 intersections with existing poor service levels. However, the effects would be temporary  
37 and would cease with completion of facility and infrastructure projects. Unaffected roads  
38 could potentially accommodate rerouted traffic, and LOS would not likely be affected  
39 substantially on most parts of the base. Construction and demolition activities would affect



1 roads near the Ellsworth AFB emergency services facility. It is recommended that project  
2 planning include measures to ensure that emergency response would not be hindered by  
3 road conditions or new road configuration.

4 There would be an increase in off-base traffic during project activities due to delivery and  
5 removal of materials and base access by construction crews. Commercial vehicles would  
6 use the commercial gate, while crews could use the commercial gate or main gate. The  
7 activities would result in a small increase in traffic volumes on Liberty Boulevard and  
8 Ellsworth Street/Commercial Gate Drive. Although traffic volume would increase, the  
9 number of vehicles involved would be small and would not likely affect roadway or  
10 intersection LOS substantially. Any effects would be temporary. It is anticipated that  
11 heavy equipment would be kept on the installation for the duration of activities.

12 Overall, there would be no significant impacts due to facilities and infrastructure  
13 placement.

#### 14 **3.12.2.3.5 Weapons Generation Facility**

##### 15 **North WGF Site Subalternative**

16 The North WGF Site is remote from the cantonment area, and there are no nearby  
17 roadways providing base entry or exit. Therefore, traffic volume is expected to be low,  
18 and construction activities would have only minor direct effects on the base transportation  
19 system with little effect on LOS. Commercial vehicles entering at the commercial gate  
20 would have to traverse the base north-to-south to reach the construction site.  
21 Commercial traffic could therefore cause congestion and reduced traffic flow, but the  
22 effects would be temporary and relatively minor. It is recommended that project planning  
23 include measures to ensure that emergency response would not be hindered by road  
24 conditions or new road configuration. Delivery and removal of materials and debris, as  
25 well as base access by construction crews, would cause a small increase in off-base  
26 traffic on Liberty Boulevard, Commercial Gate Drive, and potentially Highway 1416.  
27 However, the number of vehicles entering and exiting the base would be small, and any  
28 effects would be temporary. Impacts due to traffic congestion or reduced LOS would not  
29 be expected. Overall, there would be no significant impacts due to construction of the  
30 WGF.

##### 31 **South WGF Site Subalternative**

32 The South WGF Site is remote from the cantonment area and there are no roadways  
33 providing base entry or exit in the area. Therefore, traffic volume is expected to be low,  
34 and construction activities would have only minor direct effects on the base transportation  
35 system with little effect on LOS. On-base commercial traffic would mostly be limited to the  
36 southernmost portion of the installation, and any congestion or reduced traffic flow would  
37 be minor. It is recommended that project planning include measures to ensure that  
38 emergency response would not be hindered by road conditions or new road configuration.  
39 Delivery and removal of materials and debris, as well as base access by construction

1 crews, would cause a small increase in off-base traffic on Liberty Boulevard, Commercial  
2 Gate Drive, and potentially Highway 1416. However, the number of vehicles entering and  
3 exiting the base would be small, and any effects would be temporary. Impacts due to  
4 traffic congestion or reduced LOS would not be expected. Overall, there would be no  
5 significant impacts due to construction of the WGF.

#### 6 **3.12.2.3.6 Snapshot**

7 Overlap of B-1 and B-21 operations would result in a temporary increase of 384 active  
8 military and contractor personnel (not including dependents) compared to the end-state  
9 associated with the B-21 beddown (see Table 3.0-2). There would be a temporary  
10 corresponding increase in on-base and off-base traffic in the ROI. Increased traffic  
11 volume would potentially affect LOS on the base and in northwestern Rapid City and Box  
12 Elder. The number of personnel associated with the overlap would initially be about 11  
13 percent of the new personnel arriving at the base due to the beddown and would decrease  
14 as B-1 operations were phased out. Additional traffic caused by the overlap could be  
15 noticeable on base and in adjacent areas but would not likely affect LOS substantially in  
16 the context of the overall personnel number.

#### 17 **3.12.2.3.7 Proposed Resource-Specific Mitigations and Management Actions to** 18 **Reduce the Potential for Environmental Impacts**

- 19 • During construction, demolition, and renovation activities, consider scheduling  
20 commercial deliveries outside peak traffic hours and requiring all construction  
21 crews to use the commercial gate.
- 22 • During project planning, include measures to ensure proper emergency response  
23 ability is maintained during construction activities and after project completion.

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### 24 **3.13 UTILITIES AND INFRASTRUCTURE**

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#### 25 **3.13.1 Utilities and Infrastructure, Affected Environment**

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##### 26 **3.13.1.1 Description of Resource**

27 The utilities described and analyzed for potential impact resulting from the beddown of  
28 the B-21 MOB 1 include potable water, wastewater, electricity, and natural gas. The  
29 description of each utility focuses on the existing infrastructure, current utility use, and  
30 any pre-defined capacity or limitations as set forth in permits or regulations.

##### 31 **Potable Water**

32 Potable water is safe to consume because it either comes from an uncontaminated  
33 aquifer (an underground layer of porous rock containing water) or it has been pre-treated  
34 to eliminate contaminants that would potentially cause illness in humans.

## 1 **Wastewater**

2 Wastewater is water that has been used and contains dissolved or suspended waste  
3 materials. The waste materials include a wide variety of pollutants such as human  
4 excreta, food waste, soaps, detergents, and other cleaning materials. Before the  
5 wastewater can be released into waterways, it is treated at wastewater treatment plants  
6 to get rid of the pollutants.

## 7 **Electricity**

8 Electricity is a form of energy typically supplied to homes and businesses by the electric  
9 power industry. Electricity is distributed through the use of aboveground or underground  
10 wires to supply power to resources such as lighting, heating, air conditioning, and  
11 machinery. Electricity is commonly measured in kilowatt hours.

## 12 **Natural Gas**

13 Natural gas is a non-renewable hydrocarbon found in deep underground rock formations.  
14 It is often used as a source of energy for heating and cooking, as well as electricity  
15 generation. Consumption of natural gas is typically measured in cubic feet.

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### 16 **3.13.1.2 Region of Influence**

#### 17 **3.13.1.2.1 Dyess AFB**

### 18 **Potable Water**

19 Potable water is supplied to Dyess AFB by the City of Abilene. There are no aquifers of  
20 regional significance in the area; therefore, the primary source of potable water is Fort  
21 Phantom Hill Lake, with the O.H. Ivie Reservoir and Hubbard Creek Lake as alternate  
22 sources. Dyess AFB has a contract with the City of Abilene to receive up to 5 million  
23 gallons per day (MGD) (Dyess AFB, 2018b); however, the maximum capacity that can be  
24 supplied to the base is 416,000 gallons per day. The capacity is limited by system design  
25 rather than permits; the water mains on base consist of 6- to 12-inch diameter pipes,  
26 where the city line is actually 16 inches in diameter (Ford et al., 2019). Typical daily usage  
27 at the installation is approximately 169,000 gallons, leaving sufficient capacity for growth  
28 (Denslow, 2020). If more capacity is needed in the future, the base could increase the  
29 size of the water lines (Ford et al., 2019).

30 On-base water storage totals 1.28 million gallons and consists of a 500,000-gallon  
31 elevated tank and two smaller, ground-level storage tanks (25,000-gallon clear well tank  
32 and 755,000-gallon ground storage tank). Non-potable water is used for hangar fire  
33 protection and irrigation and is stored in individual tanks and in retention ponds,  
34 respectively (Dyess AFB, 2018b).

1 The potable water system main lines extend throughout most of the main cantonment  
2 area and flightline area; however, the system does not currently serve Avenue A (the  
3 northern portion of 5th Avenue) and the portion of 4th Avenue located north of the  
4 Temporary Lodging Facility (Figure 3.13-1). Any new construction in these areas would  
5 require extension of the potable water system (Dyess AFB, 2018b).

## 6 **Wastewater**

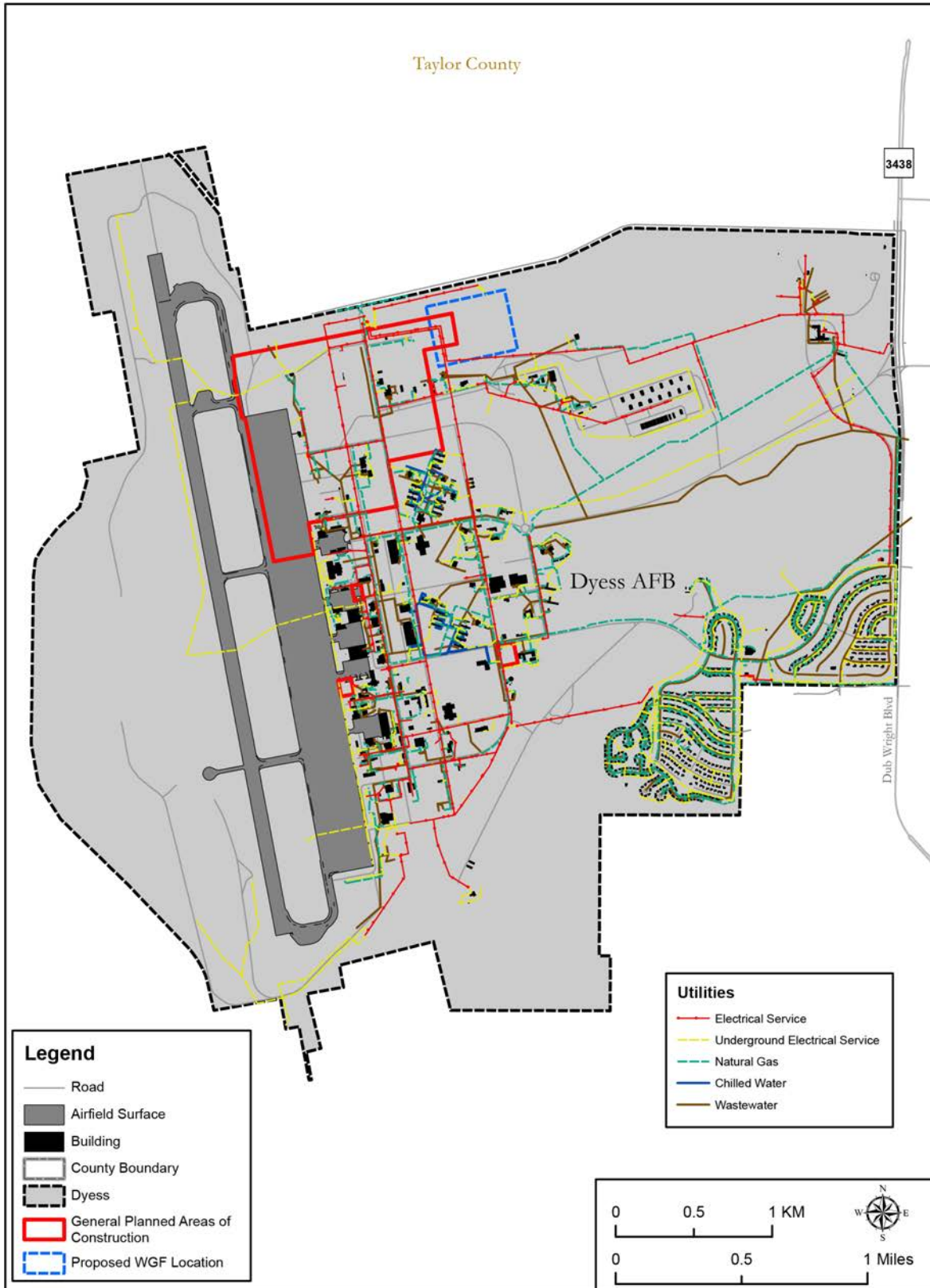
7 Domestic and industrial wastewater at Dyess AFB is discharged to the City of Abilene's  
8 Hamby Wastewater Treatment Plant in Hamby, Texas; there are no septic systems in use  
9 on the installation. The wastewater system is a gravity collection system and covers most  
10 of the main cantonment area and flightline area, with a central main running from west to  
11 east across the installation. As with the potable water system, however, some northern  
12 portions of the installation (Avenue A, the northern portion of 5th Avenue, and the portion  
13 of 4th Avenue located north of the Temporary Lodging Facility) has minimal coverage  
14 (Figure 3.13-1). Dyess AFB is permitted to discharge 3 MGD but typically discharges 0.3  
15 to 1.8 MGD (Dyess AFB, 2018b).

## 16 **Electricity**

17 Electricity is supplied to Dyess AFB by American Electric Power via two 69-kilovolt (kV)  
18 feeders that serve three on-base substations. Electrical system capacity at Dyess AFB is  
19 40.43 megavolt amperes (mVA) (Dyess AFB, 2018b). Systematic improvements to the  
20 grid structure have been made over the past 15 years, resulting in a peak usage of  
21 approximately 10 to 12 mVA and an average usage of 6 mVA (Hughes, 2019; Ford et al.,  
22 2019). These energy efficient improvements have led to a capacity that would allow for  
23 future growth. Some areas of the base (along Avenue A—between 3rd Avenue and 4th  
24 Avenue, and the north portion of 5th Avenue) are not serviced by a primary line, and  
25 would require extension of the primary electrical system (Figure 3.13-1) (Dyess AFB,  
26 2018b).

## 27 **Natural Gas**

28 Natural gas is provided and distributed throughout Dyess AFB by Atmos Energy  
29 Corporation via more than 47 miles of recently upgraded polyethylene transmission lines.  
30 Areas not serviced by a natural gas main include the area along Avenue A (between 3rd  
31 Avenue and 4th Avenue), the north portion of 5th Avenue, and along Avenue E. Access  
32 to natural gas in these areas would require extension of the natural gas distribution  
33 system (Figure 3.13-1). As of 2018, natural gas capacity at Dyess AFB is 3,000,000 cubic  
34 feet per day (expressed as 3,000 MCF where MCF equals thousands of cubic feet per  
35 day), with a consumption rate of only 457 MCF per day, leaving approximately 85 percent  
36 capacity available (Dyess AFB, 2018b).



1  
2

Figure 3.13-1. Dyess AFB Utilities

### 1 **3.13.1.2.2 Ellsworth AFB**

#### 2 **Potable Water**

3 Potable water is supplied to Ellsworth AFB by the City of Rapid City. The water distribution  
4 system runs throughout all areas of the base and along the flightline (Figure 3.13-2). As  
5 part of the legislation for building Pactola Reservoir, an agreement was made between  
6 Rapid City and Ellsworth AFB that Ellsworth AFB would receive all the water it may need,  
7 paying Rapid City only for treatment and transportation. Ellsworth AFB has an annual  
8 allocation of 977,553,000 gallons and typical usage at the installation is  
9 165,000,000 gallons per year, or 17 percent of allocated capacity (Cleberg, 2020). On-  
10 base potable water storage consists of four tanks (two ground-level and two  
11 aboveground), with a total capacity of 3.8 million gallons. Additional water storage tanks,  
12 dedicated for providing fire protection to the hangars in the North Docks, also exist on  
13 base and have a total capacity of 2.1 million gallons (Ellsworth AFB, 2017).

#### 14 **Wastewater**

15 Domestic and industrial wastewater at Ellsworth AFB is discharged and treated at an off-  
16 base facility in Box Elder. The wastewater system covers all areas of the base  
17 (Figure 3.13-2). Ellsworth AFB is permitted to discharge 1.5 MGD, but only discharges  
18 about 0.5 MGD, only using approximately 33 percent of the capacity (Ellsworth AFB,  
19 2017).

#### 20 **Electricity**

21 Electricity is supplied to Ellsworth AFB by Western Area Power Association via two  
22 115-kV feeds from New Underwood and Rapid City that serve one substation and two  
23 switching stations on base. Each feed operates at about 38 percent capacity, leaving  
24 about 62 percent capacity for growth (Ellsworth AFB, 2017).

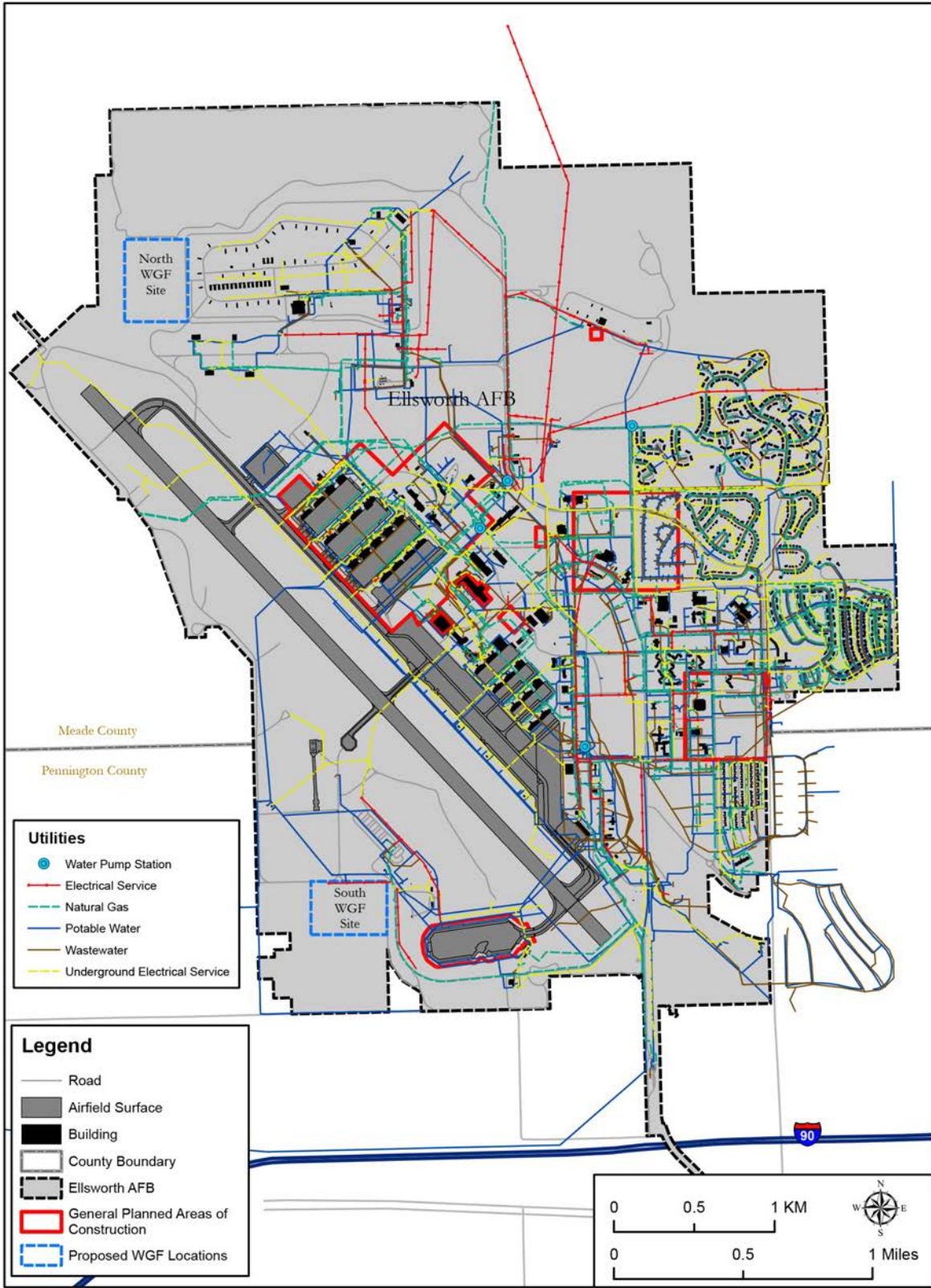
#### 25 **Natural Gas**

26 Natural gas is provided and distributed throughout Ellsworth AFB by Montana Dakota  
27 Utilities. Natural gas is primarily used for heating facilities and water at Ellsworth AFB.  
28 Natural gas capacity at Ellsworth AFB is 4,069 MCF per day, with a consumption rate of  
29 about 1,343 MCF per day, leaving approximately 67 percent capacity available. For  
30 extremely cold days, where additional gas may be needed for the largest users, Ellsworth  
31 AFB has a Propane-Air Mix Plant as a back-up system (Ellsworth AFB, 2017).

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### 32 **3.13.1.3 Analysis Methodology**

33 In general, analysis of impacts to utilities and infrastructure is conducted by comparing  
34 the amount of the utility currently being used, regulatory limitations on consumption, and  
35 how implementation of each alternative would affect those factors.



1  
2

Figure 3.13-2. Ellsworth AFB Utilities

## 1 Potable Water

2 The methodology used to estimate potable water use is based on the number of  
3 personnel expected to be affiliated with the B-21 mission. Estimated potable water use  
4 is determined by calculating the percent increase in personnel at each base and  
5 comparing that against the total percent capacity available for each potable water system.  
6 The increase in personnel at each base is determined by adding the number of personnel  
7 associated with the Proposed Action (7,700) to the baseline numbers for each base  
8 (10,145 at Dyess and 10,596 at Ellsworth AFB), and then subtracting the number of  
9 personnel associated with the B-1 mission (3,747 at Dyess and 4,553 at Ellsworth AFB)  
10 at each base, respectively (see Table 3.5-3 and Table 3.5-10).

## 11 Wastewater

12 The methodology used to estimate wastewater rates pertaining to the B-21 mission is  
13 based on general wastewater quantity guidance found in *Civil Engineering Reference*  
14 *Manual for the PE Exam* (Lindeburg, 1999). According to this guidance, approximately  
15 70 to 80 percent of a domestic/industrial water supply for a community is discharged as  
16 wastewater, either to a sanitary or storm sewer system (Lindeburg, 1999). To be  
17 conservative, wastewater discharge estimates for both Dyess and Ellsworth AFB are  
18 calculated using the assumption that 80 percent of the estimated potable water usage  
19 associated with the Proposed Action at each base will be discharged to the respective  
20 wastewater treatment system. It is important to note that the overall wastewater discharge  
21 rate for a facility usually represents a combination of sources; water other than sanitary  
22 can flow into the system from surface runoff, cross connections between storm and  
23 sanitary sewers, groundwater, and other miscellaneous sources. This analysis focuses  
24 only on the increase in wastewater directly related to the increase in potable water usage.

25 The estimated rates of wastewater discharge are then compared to the permitted  
26 wastewater treatment system capacity for each base to determine if each system would  
27 be sufficient to support the estimated increase in wastewater discharge. If the amount of  
28 wastewater estimated causes the permitted capacity to be exceeded, potentially adverse  
29 wastewater discharge impacts could result. To accommodate the additional wastewater  
30 and achieve discharge standards, permit adjustments coordinated with the provider could  
31 be made.

32 In addition to the water supplied to the base on a daily basis, there is also on-base water  
33 storage that can contribute to the wastewater rate.

## 34 Electricity and Natural Gas

35 The context and intensity for the proposed B-21 mission is used to quantify potential  
36 consequences upon electricity and natural gas resources. Current consumption of  
37 electricity was compared to the capacity to generate electricity at both Dyess and  
38 Ellsworth AFB. The natural gas infrastructure capability was considered by comparing  
39 the current capacity at each base against the current level of natural gas consumed. A  
40 large amount of excess natural gas capacity currently exists at both bases.



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## 3.13.2 Utilities and Infrastructure, Environmental Consequences

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### 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 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 3.13.1.2 (Utilities and Infrastructure, Region of Influence) describe the current state of utilities, which would continue under the No Action Alternative and serve as a baseline for the analysis under the Proposed Action.

#### 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 200,000 gallons per day in 2017 to a minimum average of 169,000 gallons per day in 2019. Assuming this trend in the usage rate would continue, 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 remain steady under the No Action Alternative, wastewater usage would also be expected to remain the same. There would be no anticipated increase in annual wastewater discharge under the No Action Alternative.

#### Electricity and Natural Gas

According to historical facility metering data, annual average demands for electricity have actually decreased from 2013 to 2018 on Dyess AFB (Dyess AFB, 2019b). Assuming this trend would continue, there would be no increase in electricity usage under the No Action Alternative.

Based on data provided for potable water usage, there has been no significant increase in personnel at Dyess AFB over the past 5 years. If population is to continue to remain steady, natural gas usage would also be expected to stay the same under the No Action Alternative. There would be no increase in natural gas usage under the No Action Alternative.

#### 3.13.2.1.2 No Action at Ellsworth AFB

Under the No Action Alternative, the B-21 would not be beddown at Ellsworth AFB, and therefore, would not require the use of existing utilities. The existing conditions discussed in Section 3.13.1.2 (Utilities and Infrastructure, Region of Influence) describe the current state of utilities, which would continue under the No Action Alternative and serve as a baseline for the analysis under the Proposed Action.

## 1 **Potable Water**

2 Based on the average potable water usage rate over the past 5 years (165 million gallons  
3 per year), Ellsworth AFB has not had a significant increase in potable water usage  
4 (Cleberg, 2020). Assuming this usage rate would remain steady, there would be no  
5 anticipated increase in the annual water usage under the No Action Alternative.

## 6 **Wastewater**

7 Based on the assumption that the potable water usage rate would not increase under the  
8 No Action Alternative, wastewater usage would also be expected to remain steady. There  
9 would be no anticipated increase in annual wastewater discharge under the No Action  
10 Alternative.

## 11 **Electricity and Natural Gas**

12 Based on data provided for potable water usage, there has been no significant increase  
13 in personnel at Ellsworth AFB over the past 5 years. If population is to continue to remain  
14 steady, electricity and natural gas utility usage would also be expected to stay the same  
15 under the No Action Alternative. There would be no anticipated usage increase in  
16 electricity and natural gas under the No Action Alternative.

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### 17 **3.13.2.2 Dyess AFB Alternative**

18 The Proposed Action to beddown the B-21 MOB at Dyess AFB would result in a  
19 39 percent increase in personnel (see Table 3.0-1). For this reason, utility usage would  
20 be expected to increase based on the proposed changes.

#### 21 **3.13.2.2.1 Personnel**

### 22 **Potable Water**

23 Potable water usage and capacity is based on personnel; an explanation of potable water  
24 estimates is provided in Section 3.13.1.3 (Utilities and Infrastructure, Analysis  
25 Methodology, Potable Water). As discussed in Section 3.13.1.2.1 (Utilities and  
26 Infrastructure, Region of Influence, Dyess AFB), Dyess AFB currently uses approximately  
27 169,000 gallons of water per day on average, which is an estimated 62 million gallons per  
28 year. Based on projected personnel increase associated with the B-21 MOB 1 beddown  
29 and the current estimated daily usage, water usage would be expected to increase to  
30 approximately 235,000 gallons per day or 86 million gallons per year.

31 The current water supply capacity at Dyess AFB is more than sufficient to support the  
32 increased growth associated with the B-21 MOB 1 beddown (see Section 3.13.1.2.1,  
33 Utilities and Infrastructure, Region of Influence, Dyess AFB). Because the additional  
34 potable water requirements would not exceed the contracted limits of 5 MGD or system  
35 design capacity of 416,000 gallons per day, it is expected that there would be no adverse  
36 impacts on the potable water system as a result of the Dyess AFB Proposed Action.

## 1 **Wastewater**

2 For this analysis, wastewater rates are proportional to water supply, which is determined  
3 based on personnel. An explanation of wastewater estimates is provided in Section  
4 3.13.1.3 (Utilities and Infrastructure, Analysis Methodology, Wastewater). As discussed  
5 in Section 3.13.1.2.1 (Utilities and Infrastructure, Region of Influence, Dyess AFB), Dyess  
6 AFB currently discharges between 0.3 and 1.8 MGD of wastewater. Based on the  
7 methodology described in Section 3.13.1.3 (Utilities and Infrastructure, Analysis  
8 Methodology), 80 percent of the current estimated potable water supply is  
9 135,200 gallons per day. The difference between the calculated wastewater rate  
10 associated with the potable water supply and the total wastewater discharge rate received  
11 by the municipal collection system is 0.2 to 1.7 MGD.

12 Based on the projected increase in water usage associated with the B-21 MOB 1  
13 beddown (235,000 gallons per day), wastewater rates specifically associated with the  
14 increased potable water supply would be estimated at 188,000 gallons per day. To  
15 determine the total wastewater discharge rate (to include other potential wastewater  
16 sources), the 188,000 gallons is added to the calculated difference (0.2 to 1.7 MGD) for  
17 an estimated rate of 0.4 to 1.9 MGD. The current permitted wastewater discharge  
18 capacity allowed by the receiving wastewater treatment plant is 3 MGD; therefore, there  
19 would be sufficient capacity to support the increased growth associated with the B-21  
20 MOB 1 beddown (see Section 3.13.1.2.1, Utilities and Infrastructure, Region of Influence,  
21 Dyess AFB). Because the additional wastewater discharge requirements would not  
22 exceed the permit limits of 3 MGD, it is expected that there would be no adverse impacts  
23 on the wastewater system as a result of the Dyess AFB Alternative.

## 24 **Electricity and Natural Gas**

25 Based on the current average usage (see Section 3.13.1.2.1, Utilities and Infrastructure,  
26 Region of Influence, Dyess AFB) and the number of personnel under the No Action  
27 Alternative, it is estimated that each person uses approximately 0.0006 mVA. Under the  
28 Proposed Action, it is estimated that the base would support an additional  
29 3,953 personnel (Table 3.5-16), which would equate to an additional 2.4 mVA of usage.  
30 As a result, total average usage of electricity under the Proposed Action would be  
31 estimated at 10.4 mVA, which is well below the electrical system capacity of 40.43 mVA.  
32 Therefore, there would be no adverse impacts on the electrical system as a result of the  
33 Dyess AFB Alternative.

34 Using the same method for calculating natural gas usage, it is estimated that each person  
35 uses 0.05 MCF per day on average. Based on the increase of personnel under the  
36 Proposed Action, the natural gas requirement would increase by an estimated 198 MCF  
37 per day, for a total usage of 655 MCF per day. As described in Section 3.13.1.2.1 (Utilities  
38 and Infrastructure, Region of Influence, Dyess AFB), there is ample capacity for the  
39 increase in natural gas usage under the Proposed Action (3,000 MCF per day). There  
40 would be no adverse impacts on the natural gas supply at Dyess AFB.

### 1 **3.13.2.2.2 Airfield Operations**

2 Airfield operations associated with the B-21 MOB 1 beddown at Dyess AFB would not  
3 directly impact utilities and infrastructure and are not discussed further in this section.

### 4 **3.13.2.2.3 Airspace and Range Utilization**

5 Airspace and range utilization associated with the B-21 MOB 1 beddown at Dyess AFB  
6 would not directly impact utilities and infrastructure and is not discussed further in this  
7 section.

### 8 **3.13.2.2.4 Facilities and Infrastructure**

9 There would be a number of new facilities constructed to support the B-21 MOB 1  
10 beddown at Dyess AFB. See Table 2.4-1 for a list of the facilities proposed for C&D under  
11 the Proposed Action. Impacts to utilities have been calculated based on personnel  
12 numbers and are addressed in Section 3.13.2.2.1 (Utilities and Infrastructure, Dyess AFB  
13 Alternative, Personnel) above.

### 14 **3.13.2.2.5 Weapons Generation Facility**

15 Construction of the WGF would have minimal impact on utilities usage at Dyess AFB. As  
16 addressed in Section 3.13.2.2.1 (Utilities and Infrastructure, Dyess AFB Alternative,  
17 Personnel) and Section 3.13.2.2.4 (Utilities and Infrastructure, Dyess AFB Alternative,  
18 Facilities and Infrastructure), there is ample available capacity in regards to potable water,  
19 wastewater, electricity, and natural gas systems at Dyess AFB. However, as depicted in  
20 Figure 3.13-1, extension of the natural gas, potable water, and wastewater systems may  
21 be required for the proposed WGF location. There would be no adverse impacts  
22 anticipated in relation to utilities as a result of the WGF construction.

### 23 **3.13.2.2.6 Snapshot**

24 Under the Snapshot Scenario, the number of personnel located at Dyess AFB would  
25 increase over the No Action Alternative during the transition from the B-1 to the B-21 (see  
26 Table 3.0-1). Under this scenario, the potential impacts associated with this snapshot  
27 analysis would be similar to those presented in Section 3.13.2.2.1 (Utilities and  
28 Infrastructure, Dyess AFB Alternative, Personnel). During the transition, there would be  
29 a slight, but temporary, increase in personnel over the Proposed Action. The temporary  
30 increase would be minute (4 percent) when compared to the available utility capacity  
31 described under the current baseline conditions (see Section 3.13.1.2.1, Utilities and  
32 Infrastructure, Regions of Influence, Dyess AFB).

### 33 **3.13.2.2.7 Proposed Resource-Specific Mitigations and Management Actions to** 34 **Reduce the Potential for Environmental Impacts**

35 No utilities and infrastructure mitigations are proposed specific to the B-21 MOB 1  
36 beddown at Dyess AFB.

### 3.13.2.3 Ellsworth AFB Alternative

The Proposed Action to beddown the B-21 MOB at Ellsworth AFB would result in a 30 percent increase in personnel (Table 3.5-22). For this reason, utility usage would be expected to increase based on the proposed changes.

#### 3.13.2.3.1 Personnel

##### Potable Water

Potable water usage and capacity is based on personnel; an explanation of potable water estimates is provided in Section 3.13.1.3 (Utilities and Infrastructure, Analysis Methodology, Potable Water). As discussed in Section 3.13.1.2.2 (Utilities and Infrastructure, Region of Influence, Ellsworth AFB), Ellsworth AFB currently uses approximately 500,000 gallons of water per day on average, which is an estimated 165 million gallons per year. Based on the projected personnel increase associated with the B-21 MOB 1 beddown and the current estimated daily usage, water usage would be expected to increase to approximately 650,000 gallons per day or 237 million gallons per year.

The current water supply capacity at Ellsworth AFB is more than sufficient to support the increased growth associated with the B-21 MOB 1 beddown (see Section 3.13.1.2.2, Utilities and Infrastructure, Region of Influence, Ellsworth AFB). Because the additional potable water requirements would not exceed the water supply capacity of 977,553,000 gallons per year, it is expected that there would be no adverse impacts on the potable water system as a result of the Ellsworth 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 3.13.1.3 (Utilities and Infrastructure, Analysis Methodology, Wastewater). As discussed in Section 3.13.1.2.2 (Utilities and Infrastructure, Region of Influence, Ellsworth AFB), Ellsworth AFB currently discharges approximately 0.5 MGD of wastewater. Based on the methodology described in Section 3.13.1.3 (Utilities and Infrastructure, Analysis Methodology), 80 percent of the current estimated potable water supply is 400,000 gallons per day. 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 100,000 gallons per day.

Based on the projected increase in water usage associated with the B-21 MOB 1 beddown (650,000 gallons per day), estimated wastewater rates specifically associated with the increased potable water supply would be approximately 520,000 gallons per day. To determine the total wastewater discharge rate (to include other potential wastewater sources), the 520,000 gallons is added to the calculated difference (100,000 gallons per day) for an estimated rate of 620,000 gallons per day. The current permitted wastewater discharge capacity allowed by the receiving wastewater treatment plant is 1.5 MGD;

1 therefore, there would be sufficient capacity to support the increased growth associated  
2 with the B-21 MOB 1 beddown (see Section 3.13.1.2.2, Utilities and Infrastructure, Region  
3 of Influence, Ellsworth AFB). Because the additional wastewater discharge requirements  
4 would not exceed the permit limits of 1.5 MGD, it is expected that there would be no  
5 adverse impacts on the wastewater system as a result of the Ellsworth AFB Alternative.

## 6 **Electricity and Natural Gas**

7 Based on the current average usage (see Section 3.13.1.2.2, Utilities and Infrastructure,  
8 Region of Influence, Ellsworth AFB) and the number of personnel under the No Action  
9 Alternative, it is estimated that each person uses approximately 0.0004 percent of  
10 capacity. Under the Proposed Action, it is estimated that the base would support an  
11 additional 3,147 personnel (Table 3.5-22), which would equate to an additional  
12 1.25 percent of usage. As a result, total average usage of electricity under the Proposed  
13 Action would be estimated at 39 percent capacity, leaving 61 percent capacity available  
14 for growth under the Ellsworth AFB Alternative.

15 Using the same method for calculating natural gas usage, it is estimated that each person  
16 uses 0.13 MCF per day on average. Based on the increase of personnel under the  
17 Proposed Action, the natural gas requirement would increase by an estimated 407 MCF  
18 per day, for a total usage of 1,750 MCF per day. As described in Section 3.13.1.2.2  
19 (Utilities and Infrastructure, Region of Influence, Ellsworth AFB), there is ample capacity  
20 for the increase in natural gas usage under the Proposed Action (4,069 MCF per day).  
21 There would be no adverse impacts on the natural gas supply at Ellsworth AFB.

### 22 **3.13.2.3.2 Airfield Operations**

23 Airfield operations associated with the B-21 MOB 1 beddown at Ellsworth AFB would not  
24 directly impact utilities and infrastructure and are not discussed further in this section.

### 25 **3.13.2.3.3 Airspace and Range Utilization**

26 Airspace and range utilization associated with the B-21 MOB 1 beddown at Ellsworth AFB  
27 would not directly impact utilities and infrastructure and is not discussed further in this  
28 section.

### 29 **3.13.2.3.4 Facilities and Infrastructure**

30 There would be a number of new facilities constructed to support the B-21 MOB 1  
31 beddown at Ellsworth AFB. See Table 2.5-1 for a list of the facilities proposed for C&D  
32 under the Proposed Action. Impacts to utilities have been calculated based on personnel  
33 numbers are addressed in Section 3.13.2.3.1 (Utilities and Infrastructure, Ellsworth AFB  
34 Alternative, Personnel) above.

### 35 **3.13.2.3.5 Weapons Generation Facility**

36 Construction of the WGF would have minimal impact on utilities usage at Ellsworth AFB.  
37 As addressed in Sections 3.13.2.3.1 (Utilities and Infrastructure, Ellsworth AFB  
38 Alternative, Personnel) and 3.13.2.3.4 (Utilities and Infrastructure, Ellsworth AFB  
39 Alternative, Facilities and Infrastructure), there is ample available capacity in regards to

1 potable water, wastewater, electricity, and natural gas systems. There would be no  
2 adverse impacts anticipated in relation to utilities as a result of the WGF construction.

### 3 **North WGF Site Subalternative**

4 While there is ample utility capacity to support construction of the WGF at Ellsworth AFB,  
5 selection of the North WGF Site Subalternative may require extension of the electrical,  
6 natural gas, potable water, and wastewater systems. See Figure 3.13-2 for depiction of  
7 the utility lines in relation to the proposed site.

### 8 **South WGF Site Subalternative**

9 While there is ample utility capacity to support construction of the WGF at Ellsworth AFB,  
10 selection of the South WGF Site Subalternative may require extension of the wastewater  
11 system. See Figure 3.13-2 for depiction of the utility lines in relation to the proposed site.

#### 12 **3.13.2.3.6 Snapshot**

13 Under the Snapshot Scenario, the number of personnel located at Ellsworth AFB would  
14 increase over the No Action Alternative during the transition from the B-1 to the B-21 (see  
15 Table 3.0-2). Under this scenario, the potential impacts associated with this snapshot  
16 analysis would be similar to those presented in Section 3.13.2.3 (Utilities and  
17 Infrastructure, Ellsworth AFB Alternative). During the transition, there would be a slight,  
18 but temporary, increase in personnel over the Proposed Action. The temporary increase  
19 would be minute (5 percent) when compared to the available utility capacity described  
20 under the current conditions (see Section 3.13.1.2.2, Utilities and Infrastructure, Region  
21 of Influence, Ellsworth AFB).

#### 22 **3.13.2.3.7 Proposed Resource-Specific Mitigations and Management Actions to** 23 **Reduce the Potential for Environmental Impacts**

24 No utility and infrastructure mitigations are proposed specific to the B-21 MOB 1 beddown  
25 at Ellsworth AFB.

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## 4. CUMULATIVE EFFECTS AND OTHER ENVIRONMENTAL CONSIDERATIONS

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### 4.1 CUMULATIVE EFFECTS

#### 4.1.1 Introduction

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

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

Accordingly, the USAF has made an effort to identify actions on or near the areas that are under consideration and in the planning stage at this time. These actions are included in the cumulative effects analysis to the extent that details regarding such actions exist and the actions have a potential to interact with the proposed alternatives outlined in this EIS. Although the level of detail available for those future actions varies, this approach provides the most current information. The EIS addresses cumulative impacts to assess the incremental contribution of the alternatives to impacts on affected resources from all factors.

The analysis first discusses past actions, events, and circumstances that are relevant to the environments associated with each of the B-21 MOB 1 beddown alternatives. Following is a discussion of other actions that, when combined with military activities and conceptual construction actions, may result in incremental impacts.

#### 4.1.2 Dyess AFB Cumulative Effects

##### 4.1.2.1 Dyess AFB Relevant Past and Present Actions

The relevant past and present actions associated with the impacts of the Proposed Action include continued use of Dyess AFB for the B-1 mission activities, plus nearby development and infrastructure improvements such as roads, pipelines, and power transmission lines. Past and present actions in and around the action areas associated with these activities may have cumulative effects on the local environment.

## 1 **Dyess AFB Infrastructure Repairs/Upgrades**

- 2 • A major water main replacement project has been completed to replace the original  
3 1957 asbestos-cement pipe. Dyess AFB's water mains were replaced by a three-  
4 phase effort. A water tower renovation project has also been recently  
5 accomplished. These efforts will improve water use on the base (Dyess AFB,  
6 2018b; Downing, 2020).
- 7 • There is a current project to repair the base electrical distribution system. Based  
8 on discussion with 7th CES personnel during the November 2019 site visit, plans  
9 include upgrading the Charlie substation to have a 4-megawatt capacity as part of  
10 the Energy Savings Performance Contract (Dyess AFB, 2020; Ford et al., 2019).

## 11 **Dyess AFB Dormitories**

12 The base has programmed a new dormitory (approximately 60,000 square feet) for  
13 construction. Four more dormitories (approximately 113,000 square feet) have been  
14 awarded and are under renovation. Several demolitions are planned (approximately  
15 111,000 square feet), with two buildings currently available to be demolished. Three  
16 buildings will be vacated with the Security Forces consolidation and one building with the  
17 Cyber Intel C2 facility project. This demolition will clear the area of administrative  
18 functions housed in former dining facilities associated with the dormitories, clearing the  
19 way for development of new dormitories should new missions require them (Downing,  
20 2020).

## 21 **Wylie Independent School District Bond 2019 Program**

22 The purpose of the 2019 bond program is to accommodate the growing student  
23 population within the Wylie Independent School District (ISD). The bond proposal  
24 includes approximately \$211.9 million in renovations and additions to two high schools,  
25 three junior high schools, two intermediate schools, and seven elementary schools in the  
26 district (Wylie ISD, 2019a). As of March 2020, structural foundation work had begun and  
27 continues at Wylie East High School, and work on additions and renovations to Bush  
28 Elementary, Cox Elementary, Watkins Elementary, and Harrison Intermediate are  
29 scheduled to begin once contract details have been completed (Wylie ISD, 2019b).

## 30 **Dyess AFB Community Center Complex**

31 Although most redevelopment of the family housing area has been completed, a new  
32 community center complex was recently completed by the private owner, Balfour Beatty  
33 Communities of Newtown Square, Pennsylvania (Downing, 2020). The existing  
34 community center building (including parking, green space, pavilions, tennis courts, etc.)  
35 encompasses 8 acres, with the facility itself being 5,830 square feet in size. For the  
36 purpose of this analysis, it is assumed that the new proposed complex is to be  
37 approximately equivalent in size. The terms of the partnership are such that the private  
38 owner owns the houses outright (674 separate dwelling units at Dyess AFB) and leases  
39 the ground upon which the housing neighborhoods are situated. The land subject to the  
40 ground lease is described in *Dyess Air Force Base, Taylor County, Texas, ALTA/ACSM*

1 *Land Title Survey, ACC III Housing (Ground Survey)*. All the existing roads and streets  
2 within the housing area are maintained by the private owner (except for a section of Texas  
3 Street). The utilities (electrical, natural gas, wastewater, and water) are subject to  
4 maintenance based on the Points of Demarcation (Dyess AFB, 2018b).

#### 5 **4.1.2.2 Dyess AFB Reasonably Foreseeable Future Actions**

6 For the purposes of facilitating cumulative impact analysis, reasonably foreseeable  
7 actions have been categorized as those projects outside of the control of Dyess AFB;  
8 generally, these are regional development projects. Based on their scope, projects have  
9 been identified that may contribute incrementally to impacts associated with the Proposed  
10 Action; projects that the USAF considered minor in scope (e.g., building of a courthouse  
11 annex, improvements to roadways for pedestrians, etc.) are not identified here and were  
12 not included in the impact analysis.

#### 13 **Air Force Reserve Command F-35A Operational Mission**

14 The Air Force Reserve Command is proposing a beddown action that includes Joint Base  
15 Fort Worth. This action would include 24 F-35As with two backup inventory aircraft. The  
16 F-35A aircraft would replace the Air Force Reserve Command F-16 fighters and utilize  
17 Lancer and Brownwood MOAs for aircraft operations.

#### 18 **Abilene Independent School District (AISD) Development Plans**

19 A meeting was conducted by the 2018 Bond Oversight Committee on December 19,  
20 2018, to discuss the status of 2018 Bond Projects. Major projects addressed during the  
21 meeting that may contribute incrementally to impacts associated with the Proposed Action  
22 include the following (AISD, 2019):

- 23 • **Academy of Technology, Engineering, Mathematics and Science/Career and**  
24 **Technical Education (ATEMS/CTE) Center**—A new 124,000-square foot facility,  
25 to be called “The LIFT,” is being constructed to hold the ATEMS and CTE schools  
26 on Texas State Technical College Campus, off of Loop 322, near Abilene Regional  
27 Airport. Anticipated construction is to take place during the 2020–21 timeframe  
28 (Gersh, 2019; Abilene ISD News, 2019).
- 29 • **New Dyess Elementary School**—A new two-story elementary school  
30 (approximately 101,000 square feet) is planned to be constructed on the existing  
31 Dyess Elementary School campus (McLean, 2020), which is located southeast of  
32 Dyess AFB, just outside the boundary. The current campus buildings, which total  
33 approximately 60,000 square feet, would be demolished. Construction plans also  
34 include the relocation of a 16-inch water line in early 2020, with construction to  
35 follow (AISD, 2019). Anticipated completion date for construction is July 2021, with  
36 the new school scheduled to open in August 2021 (Jensen, 2019; McLean, 2020).

### 1 **4.1.2.3 Dyess AFB Cumulative Effects Analysis**

#### 2 **4.1.2.3.1 Airspace Use and Management**

3 The only potential overlapping action with the B-21 beddown at Dyess AFB is the  
4 proposed AFRC F-35A basing at Naval Air Station Fort Worth, identified in Section 4.1.2.2  
5 (Dyess AFB Reasonably Foreseeable Future Actions). These two actions would only  
6 overlap with regards to aircraft operations within Brownwood MOA and Lancer MOA.  
7 Neither action would affect airspace utilization. For the Dyess AFB Alternative, there are  
8 no proposed physical changes (external boundaries, dimensions, altitudes, etc.) to any  
9 airspace currently utilized. Therefore, no cumulative impacts to airspace use and  
10 management would be anticipated from the Dyess AFB Alternative combined with past,  
11 present, and reasonably foreseeable actions.

12 Changes resulting from the Dyess AFB Alternative would be limited to how the airspace  
13 is used, particularly with introduction of the B-21. Although additional airspace is not  
14 required, certain airspace may be utilized more extensively, while use of other airspace  
15 units may decrease. Therefore, the utilization of the current airspace would likely be  
16 modified. The result would potentially change the noise levels, patterns, and dispersal  
17 over how these areas are currently used. Additionally, changes in utilization of the  
18 airspace could also potentially change the air quality within the affected airspace.  
19 Potential cumulative impacts on noise and air quality are provided in Section 4.1.2.3.2  
20 (Noise) and Section 4.1.2.3.3 (Air Quality).

#### 21 **4.1.2.3.2 Noise**

22 Cumulative noise impacts consist of the combined potential effects resulting from the  
23 Proposed Action and applicable past, present, and reasonably foreseeable future projects  
24 described in Section 4.1.2.1 (Dyess AFB Relevant Past and Present Actions) and Section  
25 4.1.2.2 (Dyess AFB Reasonably Foreseeable Future Actions). Noise modeling was  
26 conducted to assess cumulative impacts by combining operations for both the Dyess AFB  
27 Alternative and the proposed AFRC F-35A basing at Naval Air Station Fort Worth. The  
28 overlap of these two proposed actions occur at Brownwood MOA and Lancer MOA. At  
29 Brownwood MOA, neither action contributes to the overall cumulative noise levels. The  
30 combination of both actions do not generate  $L_{dnmr}$  levels above 35 dB. For proposed  
31 missions at Lancer MOA, the cumulative  $L_{dnmr}$  noise levels would be 43.5 dB, which is  
32 similar to  $L_{dnmr}$  noise levels associated with the No Action Alternative (43.4 dB), but  
33 represents an 8.5-dB increase from the Dyess AFB Alternative (less than 35 dB).

34 Therefore, the increase in cumulative noise levels resulting from combining B-21  
35 operations with the proposed AFRC F-35A would offset noise reductions associated with  
36 the Dyess AFB Alternative to levels similar to baseline conditions modeled for the No  
37 Action Alternative. As a result, there would be no significant cumulative noise impacts  
38 from operations in the airspace.

39 Other potential cumulative effects of noise on the surrounding communities, wildlife, and  
40 cultural resources would be associated with construction and other noise-generating  
41 activities, operation of new facilities, and increased aircraft and vehicle use.

1 Several projects would involve construction or demolition of USAF facilities, and  
2 community construction projects could also contribute to noise in the area. The majority  
3 of the relevant past and present actions considered as part of the cumulative impacts in  
4 Section 4.1.2.1 (Dyess AFB Relevant Past and Present Actions) and Section 4.1.2.2  
5 (Dyess AFB Reasonably Foreseeable Future Actions) involve construction of a new  
6 facility or demolition or renovation of an existing facility. Construction noise is temporary,  
7 lasting only for the duration of the construction project and typically limited to normal  
8 working hours (7:00 a.m. to 5:00 p.m.). However, construction noise would be noticeable  
9 to persons living and working nearby and may cause additional annoyance. Noise  
10 impacts associated with these projects are expected to be limited to the immediate areas  
11 surrounding the individual projects and would be insignificant both separately and  
12 cumulatively. Under the Dyess AFB Alternative, aircraft noise would decrease in the  
13 region, as shown and discussed in Section 3.2 (Noise). As a result, there would be no  
14 incremental noise impacts from the Dyess AFB Alternative. Furthermore, no significant  
15 cumulative impacts from noise are anticipated from the Dyess AFB Alternative combined  
16 with past, present, and reasonably foreseeable future projects.

#### 17 **4.1.2.3.3 Air Quality**

18 Cumulative effects to air quality consist of the combined potential effects resulting from  
19 the Proposed Action and applicable past, present, and reasonably foreseeable future  
20 projects described in Section 4.1.2.1 (Dyess AFB Relevant Past and Present Actions) and  
21 Section 4.1.2.2 (Dyess AFB Reasonably Foreseeable Future Actions). These projects  
22 would result in direct emissions of criteria pollutants and GHGs. Potential cumulative  
23 effects to air quality would be associated with combustion of fossil fuels during  
24 construction, transportation, and operation of new facilities.

25 Dyess AFB infrastructure repairs and dormitory construction would involve construction  
26 of USAF facilities. In addition, air emissions would result from the proposed community  
27 projects, such as the new ATEMS/CTE Center, and Dyess Elementary School demolition  
28 and construction would also contribute air emissions. For some of these projects, air  
29 emissions would cease once the initial construction phase is complete, such as the  
30 infrastructure repairs. Other projects, such as the ATEMS/CTE Center and Dyess AFB  
31 Community Center Complex, would result in minimal increased long-term emissions,  
32 such as those associated with heating and transportation. Furthermore, any projects that  
33 would include larger emissions-generating sources would be subject to permitting  
34 requirements under New Source Review (NSR)/PSD and/or Title V Air Construction or  
35 Air Operation permits. With implementation of permit requirements and appropriate  
36 management practices, the cumulative amount of emissions resulting from the Dyess  
37 AFB Alternative and other past, present, and future actions is unlikely to significantly  
38 affect regional air quality. As a result, no significant cumulative impacts to air quality are  
39 anticipated from the Dyess AFB Alternative combined with past, present, and reasonably  
40 foreseeable future projects.

#### 41 **4.1.2.3.4 Land Use**

42 Cumulative effects to land use consist of the combined potential effects resulting from the  
43 Dyess AFB Alternative and applicable past, present, and reasonably foreseeable future

1 projects described in Section 4.1.2.1 (Dyess AFB Relevant Past and Present Actions)  
2 and Section 4.1.2.2 (Dyess AFB Reasonably Foreseeable Future Actions). Potential  
3 cumulative effects would be associated with changes to on-base and off-base land use  
4 compatibility related to infrastructure and facility placement and noise.

5 Water mains replacement, electrical substation expansion, dormitory construction and  
6 renovation, and community center complex development would occur within the  
7 installation boundary. It is expected that all activities would be conducted in accordance  
8 with applicable installation land use planning procedures and requirements, including  
9 guidance contained in the IDP and future land use plan. Projects related to water and  
10 electrical supply would result in either no or only minor expansion of the existing  
11 infrastructure footprint; therefore, no change to existing land use would be required.  
12 Dormitory construction and renovation and community center complex development  
13 would occur in areas compatible with those land uses. Noise levels associated with  
14 aircraft operations would be less than 65 dB DNL at the dormitory and community center  
15 complex sites. Noise generated during infrastructure, construction, and demolition  
16 projects would be temporary and would not affect land use on or adjacent to the  
17 installation.

18 The ATEMS/CTE schools and Dyess Elementary School sites, which are located outside  
19 the installation boundary, would not be exposed to aircraft noise levels above 65 dB DNL.  
20 In addition, the sites are located outside the aircraft APZs and would not result in safety  
21 issues due to building height. Therefore, the Dyess AFB Alternative would not have  
22 significant cumulative impacts to land use.

#### 23 **4.1.2.3.5 Socioeconomics**

24 Personnel changes and facility construction and modifications would generate economic  
25 activity in the ROI. Implementation of the B-21 beddown separately or in conjunction with  
26 relevant past, present, and reasonably foreseeable future projects within the ROI would  
27 increase the demand for employment, as well as for housing, schools, and other services  
28 within the region. Construction of the Dyess AFB Dormitories and the new Dyess  
29 Elementary School and the 2019 bond proposal for schools in the Wylie ISD would  
30 address some of the housing and education demands. Incremental effects of the B-21  
31 beddown, in combination with potential impacts associated with other Dyess AFB  
32 projects, would be expected to create employment and population growth. This growth  
33 has the potential to result in cumulative impacts to socioeconomic resources in the ROI.  
34 On-base projects would increase demand for socioeconomic resources, while off-base  
35 projects would have the potential to address some of the increased demand, especially  
36 for labor and housing.

#### 37 **4.1.2.3.6 Environmental Justice**

38 A number of projects have been identified (Section 4.1.2.1, Dyess AFB Relevant Past and  
39 Present Actions, and Section 4.1.2.2, Dyess AFB Reasonably Foreseeable Future  
40 Actions) that are in proximity to construction activities in the Proposed Action area. All  
41 projects identified involve the construction of new facilities and are not anticipated to have  
42 adverse impacts to environmental justice or other sensitive populations. There is a

1 potential that projects such as the construction of the new Dyess Elementary School, the  
2 ATEMS/CTE Center, and the Dyess AFB Community Center Complex would have a  
3 positive impact on environmental justice and other sensitive populations, due to increased  
4 access to educational and recreational facilities.

5 Environmental justice analysis in this EIS indicated that no adverse impacts would occur  
6 to environmental justice or other sensitive populations and that implementing the  
7 Proposed Action would result in positive impacts. Therefore, no disproportionately high  
8 and adverse cumulative impacts to environmental justice or other sensitive populations  
9 would be anticipated from the Proposed Action combined with past, present and  
10 reasonably foreseeable future projects.

#### 11 **4.1.2.3.7 Biological Resources**

12 A number of projects have been identified (Section 4.1.2.1, Dyess AFB Relevant Past and  
13 Present Actions, and Section 4.1.2.2, Dyess AFB Reasonably Foreseeable Future  
14 Actions) that are in proximity to construction, demolition, and renovation activities in the  
15 Proposed Action area. These construction-related activities would have similar biological  
16 resource impacts as those described in this EIS. Impacts would include disturbance or  
17 reduction of existing habitat (greater than 10 acres) for wildlife species that occur on the  
18 base. There would also be short-term increases in noise resulting from proposed  
19 construction, demolition, and renovation activities. Short-term additive noise effects would  
20 only occur if construction activities from the Proposed Action and cumulative actions were  
21 conducted during the same timeframe. In addition to these impacts, runway  
22 improvements at the Ellsworth AFB airfield would impact wetland habitat potentially  
23 utilized by migratory birds with the possibility of reducing bird habitat areas on the base.  
24 Coordination is ongoing with USACE for that project, and it is assumed that the project  
25 mitigation plan would reduce those potential impacts below a significant impact threshold.

26 Aircraft operations associated with the Dyess AFB Alternative were found to have no  
27 significant impacts to noise-sensitive wildlife, special status species, migratory birds  
28 (including BCC), and bald or golden eagles within the training airspace and ranges. None  
29 of the past, present, or reasonably foreseeable future projects identified in Section 4.1.2.1  
30 (Dyess AFB Relevant Past and Present Actions) and Section 4.1.2.2 (Dyess AFB  
31 Reasonably Foreseeable Future Actions) have the potential to interact with aircraft  
32 operations or increase the noise levels in the training airspace and ranges. Therefore, no  
33 cumulative impacts to biological resources would be anticipated from the Proposed Action  
34 combined with past, present and reasonably foreseeable future actions.

#### 35 **4.1.2.3.8 Cultural Resources**

36 Cumulative impacts to cultural resources can result from alterations or demolition of  
37 historic structures or disturbance of archaeological resources that incrementally diminish  
38 the integrity of the cultural resources at Dyess AFB. Previous comprehensive  
39 archaeological studies and needs assessments conducted at Dyess AFB have not  
40 identified archaeological resources eligible for listing in the NRHP (Section 3.8.1.2.1  
41 (Cultural Resources, Region of Influence, Dyess AFB). These studies provided coverage  
42 of all portions of the base likely to contain intact archaeological deposits, and significant

1 archaeological resources were not identified. Therefore, implementing the Dyess AFB  
2 Alternative along with the relevant past and present actions would not impact  
3 archaeological resources. As a result, no cumulative effects to archaeological resources  
4 are expected. If any of these projects result in inadvertent discoveries, SOP 5 in the Dyess  
5 AFB ICRMP would be followed (USAF, 2017a).

6 Dyess AFB does not contain any eligible historic districts, and the proposed B-21 MOB 1  
7 beddown at Dyess AFB would not directly impact any eligible historic structures. If the  
8 proposed work on the Dyess AFB Dormitories has the potential to affect historic  
9 structures, the USAF will follow SOP 1 (New Construction) and SOP 2 (Demolition) of the  
10 Dyess AFB ICRMP to implement Section 106 of the NHPA (USAF, 2017a). No cumulative  
11 effects associated with this Proposed Action are expected.

#### 12 **4.1.2.3.9 Physical Resources**

13 Construction-related soil disturbance from concurrent construction projects at multiple  
14 adjacent locations may result in cumulative impacts. If the construction of facilities  
15 associated with the Dyess AFB Alternative occur simultaneous to construction of the  
16 Dyess AFB Dormitories or the Dyess AFB Community Center Complex, wind-borne  
17 eroded soil and increased transport through stormwater runoff can have cumulative  
18 impacts on water quality. Impacts from soil disturbance from concurrent construction  
19 activities would be minimized by consistently implementing erosion and sediment control  
20 practices.

21 Military activities associated with the new B-21 aircraft at multiple facilities, when B-21  
22 MOB 1 is established, may also result in potential cumulative impacts on water resources.  
23 However, consistent basewide application of BMPs and control measures for hazardous  
24 material handling, hazardous waste disposal, spill prevention, and stormwater  
25 management will reduce the likelihood of cumulative effects.

#### 26 **4.1.2.3.10 Hazardous Materials and Hazardous and Solid Waste**

27 Construction of projects under the Dyess AFB Alternative, in combination with past,  
28 present, or reasonably foreseeable future actions listed in Section 4.1.2.1 (Dyess AFB  
29 Relevant Past and Present Actions) and Section 4.1.2.2 (Dyess AFB Reasonably  
30 Foreseeable Future Actions), would result in contributions of MSW and C&D debris to  
31 regional landfills. As standard practice for proposed projects, C&D waste would be  
32 diverted from the landfill to the greatest extent possible through reuse or recycling. Waste  
33 would either be segregated and recycled at a certified facility or disposed of (for mixed or  
34 nonsegregated waste) at a certified recycling facility.

35 As result of the Dyess AFB Alternative, 10,560 tons of solid waste would be disposed of  
36 at the Abilene Environmental Landfill. As discussed in Section 3.1.1.2.1 (Airspace,  
37 Region of Influence, Dyess AFB), the Abilene Environmental Landfill receives  
38 approximately 220,000 tons of mixed waste per year. The combined quantity of C&D  
39 debris and MSW generated at Dyess AFB under this alternative would only represent  
40 approximately 5 percent of average annual landfill disposal. At its current disposal  
41 capacity, the landfill is expected to remain in operation for an additional 63 years. Solid  
42 waste from the Dyess AFB Alternative would be generated over multiple years, further



1 limiting any potential impacts. For cumulative actions, construction of new facilities would  
2 be addressed under separate and specific environmental reviews. Because landfill  
3 capacity is anticipated to be sufficient for the combined demand of the cumulative actions,  
4 as well as projects under the Dyess AFB Alternative, cumulative impacts on solid waste  
5 facilities would be less than significant.

6 There would be no cumulative impacts associated with management of hazardous  
7 materials, toxic substances, hazardous wastes, or ERP sites. These would continue to  
8 be managed according to established procedures.

#### 9 **4.1.2.3.11 Health and Safety**

10 Flight, ground, and munitions safety associated with B-21 operations are not expected to  
11 have any cumulative effects in conjunction with other past, present, and reasonably  
12 foreseeable future actions. Proposed activities would be similar in nature to existing  
13 operations, and the USAF would continue to apply established safety, accident mitigation,  
14 and crash response procedures. Planned structures would undergo explosive safety  
15 reviews to ensure occupancy and land uses would be compatible with all locations. As  
16 part of this process, existing explosive safety plans (e.g., ESPs or Aircraft Parking Plans)  
17 would be updated as required.

18 Potential short-term minor impacts to contractor health and safety may occur from  
19 implementation of demolition and construction activities. However, construction safety  
20 and environmental health effects would not be significant, because risks to workers,  
21 potential for offsite dispersion of contaminants, and future exposure to residual onsite  
22 contamination would be small and confined to the immediate project site. All actions  
23 would be performed in accordance with AFOSH directives and OSHA regulations; no  
24 cumulative impacts would occur. Regional cumulative demolition and construction would  
25 be required to adhere to OSHA regulations.

#### 26 **4.1.2.3.12 Transportation**

27 Cumulative effects on transportation consist of the combined potential effects resulting  
28 from the Dyess AFB Alternative and applicable past, present, and reasonably foreseeable  
29 future projects described in Section 4.1.2.1 (Dyess AFB Relevant Past and Present  
30 Actions) and Section 4.1.2.2 (Dyess AFB Reasonably Foreseeable Future Actions).  
31 Potential cumulative effects would be associated with short-term and long-term changes  
32 in traffic patterns and volume, due to construction/demolition/renovation projects and  
33 placement of new facilities.

34 On-base water mains replacement, electrical substation expansion, dormitory  
35 construction, demolition and renovation, and community center complex development  
36 could potentially require reduced travel speeds near project areas, road-shoulder  
37 closures, and lane closures. In addition, commercial vehicles associated with construction  
38 crews and delivery and removal of construction materials and debris would be operated  
39 on the base. These actions could cause increased traffic volume and congestion on the  
40 installation, which would contribute cumulatively to similar impacts potentially resulting  
41 from the B-21 beddown. However, the effects would generally be short-term and would  
42 affect relatively small portions of the base at any given time. Establishment of the new

1 dormitory and community center complex would not likely change traffic flow patterns on  
2 the base noticeably. Overall, there would be no long-term impacts to the on-base  
3 transportation system.

4 C&D activities at Dyess Elementary School would potentially cause delays on roads  
5 adjacent to and near the school, including Dub Wright Boulevard. These actions could,  
6 therefore, contribute to increased traffic volume and congestion associated with the B-21  
7 beddown. However, the effects would be short-term and would cease after completion of  
8 the project. Establishment of the ATEMS/CTE schools could result in a very small  
9 population increase (and associated traffic operations) and slightly altered traffic flow  
10 patterns near the facilities. However, the project site is located on the eastern side of  
11 Abilene (opposite Dyess AFB), and the cumulative contribution to traffic volume would be  
12 negligible in the context of personnel additions associated with the B-21 beddown.

#### 13 **4.1.2.3.13 Utilities and Infrastructure**

14 Of the actions described as potentially creating cumulative impacts, two of the current  
15 projects are improvements to the existing utility infrastructure and would have a positive  
16 impact on water and electricity usage. The current construction of the Dyess AFB  
17 Dormitory would increase water, electricity, and natural gas use, but would be balanced  
18 out by the demolition of several facilities. For the reasonably foreseeable future actions,  
19 only the Dyess AFB Community Center Complex would impact Dyess AFB utility usage;  
20 the other projects are located outside the base and would not impact Dyess AFB utility  
21 usage. Since the overall use of water, electricity, and natural gas is projected to be  
22 considerably less than current capacity, it is not expected that the addition of a community  
23 center complex would have a cumulative impact on utilities. In conclusion, there would  
24 be no cumulative impact on utilities from past, current, and foreseeable future projects.

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### 25 **4.1.3 Ellsworth AFB Cumulative Effects**

#### 26 **4.1.3.1 Ellsworth AFB Relevant Past and Present Actions**

27 The relevant past and present actions associated with the impacts of the Proposed  
28 Action include continued use of Ellsworth AFB for the B-1 mission activities, plus nearby  
29 development and infrastructure improvements such as roads, pipelines, and power  
30 transmission lines. Past and present actions in and around the action areas associated  
31 with these activities may have cumulative effects on the local environment.

#### 32 **Ellsworth AFB Infrastructure Repairs/Upgrades**

33 There have been no significant infrastructure repairs or upgrades completed within the  
34 last 5 years or currently under construction at Ellsworth AFB.

## 1 **Ellsworth AFB Veterinary Clinic**

2 The Ellsworth AFB Veterinary Clinic (8,339 square feet) completed a large-scale  
3 renovation for the 28th Medical Group in March 2020. This project also included facilities  
4 for the 28th Security Forces Squadron military working dog team (Ellsworth AFB, 2020c).

## 5 **Ellsworth AFB Attack-Resistant Dormitories**

6 Construction of a dormitory complex was recently completed on Ellsworth AFB to provide  
7 additional housing for unaccompanied Airmen. The complex includes up to 140 new  
8 rooms, which all meet the latest dormitory design standard of a four-bedroom, partitioned  
9 design (Dorms-4-Airmen concept). Each floor consists of a core area that branches into  
10 four smaller “pod” areas. Each pod includes a kitchen, laundry area, and four bedrooms.  
11 Also included in the design is a common area on each floor (Ellsworth AFB, 2018).  
12 Construction of the complex included the following:

- 13 • Individual climate control for each room
- 14 • Soundproofing of walls and floors
- 15 • Energy efficient building and design
- 16 • Green building practices, including the use of recycled materials for construction

## 17 **Eddie's Truck Center, Rapid City**

18 A new tractor-trailer truck center was completed in October 2017. It is 3.4 miles west of  
19 Ellsworth AFB. It sits on a 10-acre parcel, southwest of the intersection of I-90 and  
20 Highway 16 (also known as North Elk Vale Road). Seven acres of this 10-acre parcel  
21 were developed. This facility replaced the previous truck center located on Omaha Street.  
22 The construction included the following elements (Dean Kurtz Construction, 2020):

- 23 • More than 90,000 cubic yards of fill transported to the site to prepare the land for  
24 building
- 25 • Geothermal ground-source heat loops to provide geothermal heating and cooling
- 26 • An 18,000-square foot service shop
- 27 • Various interior spaces (retail shopping, truck service bay, indoor showroom and  
28 sales floor, two-story office structure, parts warehouse, and car wash bays)

## 29 **Fleet Farm Store, Rapid City**

30 Fleet Farm plans to open a new store in Rapid City in the summer of 2020 with  
31 construction already underway. The store will be located on Mall Drive, between  
32 Lacrosse and North Streets, approximately 5 miles west of Ellsworth AFB. The store will  
33 be approximately 190,000 square feet and will bring approximately 200 jobs to the area  
34 (Fleet Farm, 2019; Brundige, 2020b).

## 1 **The Monument (Civic Center), Rapid City**

2 The Monument is currently under construction and located southeast of the intersection  
3 of Mount Rushmore Road and North Street. It is 6.7 miles southwest of Ellsworth AFB.  
4 The project's completion is planned for the summer of 2021. The Monument is an  
5 expansion of the current civic center and will be located directly west of the existing  
6 Rushmore Plaza Civic Center. The facility will be approximately 250,000 square feet, to  
7 include a new indoor arena with approximately 12,500 seats. This arena is expected to  
8 have the capability of hosting a variety of large-scale entertainment and sporting events.  
9 Other construction elements include the following (M. A. Mortenson Company, 2020;  
10 Black Hills Knowledge Network, n.d.):

- 11 • Large arena floor
- 12 • Expansive rigging grid
- 13 • Up-to-date height clearances and infrastructure to support technical requirements  
14 for modern large-scale events
- 15 • Minimum seating capacity of 10,000 for an end-stage concert setup
- 16 • Loading dock that can handle a 15 to 20-truck show (with appropriate turning radii  
17 in access/parking areas)

### 18 **4.1.3.2 Ellsworth AFB Reasonably Foreseeable Future Actions**

19 For the purpose of facilitating cumulative impact analysis, reasonably foreseeable future  
20 actions have been categorized as those projects outside of the control of Ellsworth AFB;  
21 generally, these projects are regional development projects. Based on their scope,  
22 projects have been identified that may contribute incrementally to impacts associated with  
23 the Proposed Action; projects that the USAF considered minor in scope (e.g., building of  
24 a courthouse annex, improvements to roadways for pedestrians, etc.) are not identified  
25 here and were not included in the impact analysis.

### 26 **Ellsworth AFB Construction and Infrastructure Repairs/Upgrades**

27 The following projects are proposed for construction for FY21 through FY25 (Ellsworth  
28 AFB, 2020d):

- 29 • Repair Concrete Slabs - Taxiway G
- 30 • Repair Runway 13 Keel Section
- 31 • B601 Rehabilitation Project (historic eligible World War II-era hangar)

32 Additionally, Ellsworth AFB has begun discussions with USACE regarding a project that  
33 would fill approximately 1.2 acres of non-wetland riparian and slope vegetation and  
34 0.2 acre of jurisdictional wetlands on the west side of the runway due to BASH concerns.  
35 This project has been approved and a mitigation plan is being developed (Brundige,  
36 2020c).

## 1 **Ellsworth AFB Demolition**

2 There are no significant demolition projects proposed for FY21 through FY25 at Ellsworth  
3 AFB.

## 4 **Interstate 90 and LaCrosse Street Interchange Reconstruction, Rapid City**

5 The South Dakota DOT is planning a reconstruction of the interchange at the intersection  
6 of I-90 (Exit 59) and LaCrosse Street, Rapid City (South Dakota DOT, 2020b; South  
7 Dakota DOT, 2014). This intersection is a 15-minute drive west of Ellsworth AFB. The  
8 project's design and public-involvement phase started in 2019 and is still ongoing. The  
9 construction is expected to let to bid in the summer of 2020. The estimated duration of  
10 the construction phase is 2 years. The purpose of this project is to accommodate future  
11 traffic volume demands projected for 2035 and improve its safety, traffic flow, and road  
12 conditions. The need was first identified in the *2010 South Dakota Decennial Interstate  
13 Corridor Study* and the *Rapid City Area Metropolitan Planning Organization 2015 Long-  
14 Range Transportation Plan*. The design was detailed in the South Dakota DOT's  
15 Interchange Modification Justification Report. The proposed design of the interchange  
16 includes a Diverging Diamond Interchange configuration.

## 17 **Capital Improvement Plan and Road Construction Projects, Rapid City**

18 Rapid City's Capital Improvement Plan (CIP) and project list are managed by their  
19 Engineering Services Division. The total number of projects that are actively under  
20 construction is constantly changing. All the CIP projects are budgeted for, but may not  
21 be constructed unless a bid is made, awarded, and approved. The CIP project list  
22 primarily focuses on transportation and infrastructure projects, with fewer facility  
23 improvements (City of Rapid City, 2020a; City of Rapid City, 2020b; Furchner, 2020).  
24 Currently, there are no CIP projects in the construction phase that would have a significant  
25 cumulative impact.

### 26 **4.1.3.3 Ellsworth AFB Cumulative Effects Analysis**

#### 27 **4.1.3.3.1 Airspace Use and Management**

28 With the exception of the addition of the B-21 to Ellsworth AFB and drawdown of the B-1,  
29 none of the past, present, or reasonably foreseeable future projects identified in Section  
30 4.1.3.1 (Ellsworth AFB Relevant Past and Present Actions) and Section 4.1.3.2 (Ellsworth  
31 AFB Reasonably Foreseeable Future Actions) would affect airspace utilization. For the  
32 Ellsworth AFB Alternative, there are no proposed physical changes (external boundaries,  
33 dimensions, altitudes, etc.) to any airspace currently utilized. Therefore, no cumulative  
34 impacts to airspace use and management would be anticipated from the Ellsworth AFB  
35 Alternative combined with past, present, and reasonably foreseeable future actions.

36 Changes from the Ellsworth AFB Alternative would be limited to how the airspace is used,  
37 particularly with introduction of the B-21. Although additional airspace is not required,  
38 certain airspace units may be utilized more extensively, while use of other airspace units  
39 may decrease. Therefore, the utilization of the current airspace would likely be modified,

1 but only within the constraints of the PRTC EIS ROD. The result would potentially change  
2 the noise levels, patterns, and dispersal over how the airspace is currently used.  
3 Additionally, changes in utilization of the airspace could also potentially change the air  
4 quality within the affected airspace. Potential cumulative impacts on noise and air quality  
5 are provided in Section 4.1.3.3.2 (Noise) and Section 4.1.3.3.3 (Air Quality).

#### 6 **4.1.3.3.2 Noise**

7 Cumulative noise impacts consist of the combined potential effects resulting from the  
8 Ellsworth AFB Alternative and applicable past, present, and reasonably foreseeable  
9 future projects described in Section 4.1.3.1 (Ellsworth AFB Relevant Past and Present  
10 Actions) and Section 4.1.3.2 (Ellsworth AFB Reasonably Foreseeable Future Actions).  
11 Potential cumulative effects of noise on the surrounding communities, wildlife, and cultural  
12 resources would be associated with construction and other noise-generating activities,  
13 operation of new facilities, and increased aircraft and vehicle use.

14 Several projects would involve construction or demolition of USAF facilities, and  
15 community construction projects could also contribute to noise in the area. The majority  
16 of the relevant past and present actions considered as part of the cumulative impacts in  
17 Section 4.1.3.1 (Ellsworth AFB Relevant Past and Present Actions) and Section 4.1.3.2  
18 (Ellsworth AFB Reasonably Foreseeable Future Actions) involve construction of a new  
19 facility or demolition or renovation of an existing facility. Construction noise is temporary,  
20 lasting only for the duration of the construction project, and is typically limited to normal  
21 working hours (7:00 a.m. to 5:00 p.m.). However, construction noise would be noticeable  
22 to persons living and working nearby and may cause additional annoyance. Noise  
23 impacts associated with these projects are expected to be limited to the immediate areas  
24 surrounding the individual projects and would be insignificant both separately and  
25 cumulatively. Under the Ellsworth AFB Alternative, aircraft noise would decrease in the  
26 region, as shown and discussed in Section 3.2 (Noise). As a result, there would be no  
27 incremental noise impacts from the Ellsworth AFB Alternative. Furthermore, no significant  
28 cumulative impacts from noise are anticipated from the Ellsworth AFB Alternative  
29 combined with past, present, and reasonably foreseeable future projects.

#### 30 **4.1.3.3.3 Air Quality**

31 Cumulative effects to air quality consist of the combined potential effects resulting from  
32 the Proposed Action and applicable past, present, and reasonably foreseeable future  
33 projects described in Section 4.1.3.1 (Ellsworth AFB Relevant Past and Present Actions)  
34 and Section 4.1.3.2 (Ellsworth AFB Reasonably Foreseeable Future Actions). These  
35 projects would result in direct emissions of criteria pollutants and GHGs. Potential  
36 cumulative effects to air quality would be associated with combustion of fossil fuels during  
37 construction, transportation, and operation of new facilities.

38 Ellsworth AFB infrastructure repairs, veterinary clinic construction, and dormitory  
39 construction would involve construction of USAF facilities. In addition, air emissions would  
40 result from the proposed community projects, such as Eddie's Truck Center and The  
41 Monument; Rapid City's CIP projects would also contribute air emissions. For some of  
42 these projects, air emissions would cease once the initial construction phase is complete,

1 such as the infrastructure repairs. Other projects, such as Eddie's Truck Center and The  
2 Monument, would result in minimal increased long-term emissions, such as those  
3 associated with heating and transportation. Furthermore, any projects that would include  
4 larger emissions-generating sources would be subject to permitting requirements under  
5 NSR/PSD and/or Title V Air Construction or Air Operation permits. With implementation  
6 of permit requirements and appropriate management practices, the cumulative amount  
7 of emissions resulting from the Ellsworth AFB Alternative and other past, present, and  
8 future actions is unlikely to significantly affect regional air quality. As a result, no significant  
9 cumulative impacts to air quality are anticipated from the Ellsworth AFB Alternative  
10 combined with past, present, and reasonably foreseeable future projects.

#### 11 **4.1.3.3.4 Land Use**

12 Cumulative effects to land use consist of the combined potential effects resulting from the  
13 Ellsworth AFB Alternative and applicable past, present, and reasonably foreseeable  
14 future projects described in Section 4.1.3.1 (Ellsworth AFB Relevant Past and Present  
15 Actions) and Section 4.1.3.2 (Ellsworth AFB Reasonably Foreseeable Future Actions).  
16 Potential cumulative effects would be associated with changes to on-base and off-base  
17 land use compatibility related to infrastructure and facility placement and noise.

18 No cumulative impacts are identified for renovation and construction of the on-base  
19 veterinary clinic and dormitories, as these projects were completed in accordance with  
20 existing land use policies, and the facilities are located in compatible noise zones. Future  
21 repair and construction projects at and adjacent to the airfield would also occur in  
22 accordance with applicable procedures and requirements; these projects would not result  
23 in changes to existing land use. Noise generated during the repair and construction  
24 projects would be temporary and would not affect land use on or adjacent to the  
25 installation.

26 The tractor-trailer truck center, Fleet Farm retail store, and future civic center site, which  
27 are located outside the installation boundary, would not be exposed to aircraft noise levels  
28 greater than 65 dB DNL. In addition, the sites are located outside the aircraft APZs and  
29 would not result in safety issues due to building height. Therefore, the Ellsworth AFB  
30 Alternative would not affect land use at these locations. Reconstruction of the I-  
31 90/LaCrosse Street interchange would not change land use in Rapid City or encroach  
32 upon operations at Ellsworth AFB. Similarly, encroachment and associated land use  
33 issues are not anticipated for any future Rapid City CIP projects. The Rapid City Planning  
34 Commission has enacted zoning ordinances to regulate land use adjacent to the base,  
35 and the city's Comprehensive Plan discourages development that could conflict with  
36 aircraft operations at the base (Ellsworth AFB, 2016a). Therefore, there would be no  
37 significant cumulative impacts to land use from the Ellsworth AFB Alternative.

#### 38 **4.1.3.3.5 Socioeconomics**

39 Personnel changes and facility construction and modifications would generate economic  
40 activity in the ROI. Implementation of the B-21 beddown separately or in conjunction with  
41 relevant past, present, and reasonably foreseeable future projects within the ROI would  
42 increase the demand for employment, as well as for housing, schools, and other services

1 within the region. Construction of the Ellsworth AFB Dormitories, along with construction  
2 and renovation projects associated with the Rapid City Area School 6-year plan, would  
3 address some of the housing and education demands. Incremental effects of the B-21  
4 beddown, in combination with potential impacts associated with other Ellsworth AFB  
5 projects, would be expected to create employment and population growth. This growth  
6 has the potential to result in cumulative impacts to socioeconomic resources in the ROI.  
7 On-base projects would increase demand for socioeconomic resources, while off-base  
8 projects would have the potential to address some of the increased demand, especially  
9 for labor and housing.

#### 10 **4.1.3.3.6 Environmental Justice**

11 A number of projects have been identified (Section 4.1.3.1, Ellsworth AFB Relevant Past  
12 and Present Actions, and Section 4.1.3.2, Ellsworth AFB Reasonably Foreseeable Future  
13 Actions) that are in proximity to construction activities in the Proposed Action. All projects  
14 identified involve the construction of new facilities and are not anticipated to have adverse  
15 impacts to environmental justice or other sensitive populations.

16 Environmental justice analysis in this EIS indicated that no adverse impacts would occur  
17 to environmental justice or other sensitive populations and that implementing the  
18 Proposed Action would result in positive impacts. Therefore, no disproportionately high  
19 and adverse cumulative impacts to environmental justice or other sensitive populations  
20 would be anticipated from the Proposed Action combined with past, present and  
21 reasonably foreseeable future projects.

#### 22 **4.1.3.3.7 Biological Resources**

23 A number of projects have been identified (Section 4.1.3.1, Ellsworth AFB Relevant Past  
24 and Present Actions, and Section 4.1.3.2, Ellsworth AFB Reasonably Foreseeable Future  
25 Actions) that are in proximity to construction, demolition, and renovation activities in the  
26 Proposed Action area. These construction-related activities would have similar biological  
27 resource impacts as those described in this EIS. Impacts would include disturbance of  
28 existing habitat (greater than 10 acres) and short-term increases in noise resulting from  
29 proposed construction, demolition, and renovation activities. Short-term noise impacts  
30 would only occur if construction activities from the Proposed Action and cumulative  
31 actions occurred during the same timeframe. In addition to these impacts, runway  
32 improvements at the Ellsworth AFB airfield would impact wetland habitat potentially  
33 utilized by migratory birds. Coordination is ongoing with USACE for that project, and the  
34 project mitigation plan will replace any lost wetlands at a 1:1 ratio (Brundige, 2020b),  
35 reducing potential impacts below a significant impact threshold.

36 No significant impacts to vegetation, wildlife, or special status species would result from  
37 implementation of the Ellsworth AFB Alternative, and no significant cumulative impacts to  
38 biological resources are anticipated from implementing the known construction projects  
39 in the vicinity of Ellsworth AFB. Therefore, no significant cumulative impacts to biological  
40 resources are anticipated with implementation of the construction portion of the Ellsworth  
41 AFB Alternative in conjunction with past, present, and reasonably foreseeable future  
42 construction actions.



1 Aircraft operations associated with the Ellsworth AFB Alternative were found to have no  
2 significant impacts to noise-sensitive wildlife, special status species, migratory birds  
3 (including BCC), and bald or golden eagles within the training airspace and ranges. None  
4 of the past, present, or reasonably foreseeable future projects identified in Section 4.1.3.1  
5 (Ellsworth AFB Relevant Past and Present Actions) and Section 4.1.3.2 (Ellsworth AFB  
6 Reasonably Foreseeable Future Actions) have the potential to interact with aircraft  
7 operations or increase the noise levels in the training airspace and ranges. Therefore, no  
8 cumulative impacts to biological resources would be anticipated from the Proposed Action  
9 combined with past, present and reasonably foreseeable future actions.

#### 10 **4.1.3.3.8 Cultural Resources**

11 Cumulative impacts to cultural resources can result from alterations or demolition of  
12 historic structures or disturbance of archaeological resources that incrementally diminish  
13 the integrity of the cultural resources at Ellsworth AFB. Ellsworth AFB was subject to a  
14 comprehensive archaeological survey in 1994 that surveyed all significant tracts of  
15 undisturbed land at the base, utilizing both pedestrian survey and soil auger testing. The  
16 survey does not overlap the current APE. The only portions of the base that have not  
17 been subject to archaeological survey are areas of steep, broken hillsides at the north  
18 end of the base and the areas of the base that have been subject to extensive historical  
19 disturbance, such as the current APE. These areas have a low potential for significant  
20 archaeological resources, so no additional archaeological survey is recommended in the  
21 ICRMP (USAF, 2016a). However, based on recommendations from the South Dakota  
22 SHPO during currently ongoing consultation, the South WGF Site Subalternative location  
23 requires an Archaeological Survey for Section 106 compliance, as the land was acquired  
24 after the 1994 archaeological survey. The findings of this survey and results of Section  
25 106 consultation will be included in the Final EIS. Nonetheless, implementing the  
26 Ellsworth AFB Alternative along with the relevant past and present actions is not  
27 anticipated to impact archaeological resources, as the USAF would implement any  
28 requirements resulting from Section 106 consultation. As a result, no cumulative effects  
29 to archaeological resources are expected. If any of these projects result in inadvertent  
30 discoveries, SOP 7.4 in the Ellsworth AFB ICRMP would be followed (USAF, 2016a).

31 Four World War II buildings and 17 Cold War–era buildings at Ellsworth AFB are eligible  
32 for listing in the NRHP. Four of the Cold War–era buildings would be impacted under the  
33 Ellsworth AFB Alternative, three of which would be demolished and one renovated.  
34 Consultation with the South Dakota SHPO and the ACHP in accordance with Section 106  
35 of the NHPA would identify appropriate mitigation measures, once completed. None of  
36 the past, present, or reasonably foreseeable future projects at Ellsworth AFB would  
37 directly impact any of the individually eligible historic structures at the base or have the  
38 potential for significant indirect effects to historic properties. Implementing the Ellsworth  
39 AFB Alternative would not have incremental effects above those described in Section  
40 3.8.2.3 (Cultural Resources, Ellsworth AFB Alternative). Adherence to requirements  
41 outlined during Section 106 consultation would reduce the severity of adverse effects.  
42 Therefore, no cumulative effects to aboveground historic properties would occur under  
43 the Ellsworth AFB Alternative.

#### 1 **4.1.3.3.9 Physical Resources**

2 As in the Dyess AFB Alternative, construction-related soil disturbance from concurrent  
3 construction projects at multiple adjacent locations at Ellsworth AFB may result in  
4 cumulative impacts. None of the actions noted in Section 4.1.3.1 (Ellsworth AFB Relevant  
5 Past and Present Actions) and Section 4.1.3.2 (Ellsworth AFB Reasonably Foreseeable  
6 Future Actions) would involve significant land disturbance. However, simultaneous  
7 construction of facilities associated with the Ellsworth AFB Alternative may result in  
8 cumulative effects. Potential cumulative impacts from soil disturbance from concurrent  
9 construction activities would be minimized by consistently implementing erosion and  
10 sediment control practices.

11 Runway improvements at the Ellsworth AFB airfield would impact wetland habitat.  
12 However, implementation of project-specific mitigations identified during coordination with  
13 USACE would reduce the severity of potential impacts to wetlands. It is expected that any  
14 lost wetland areas would be replaced at a 1:1 ratio. BMPs would be implemented to  
15 reduce the potential for indirect wetland impacts. As a result, there would be no  
16 incremental impacts to wetlands on Ellsworth AFB.

17 Military activities associated with new B-21 aircraft at multiple facilities, when B-21 MOB 1  
18 is established, may have potential cumulative impacts on water resources. However,  
19 consistent basewide application of BMPs and control measures for hazardous material  
20 handling, hazardous waste disposal, spill prevention, and stormwater management will  
21 reduce the likelihood of cumulative effects.

#### 22 **4.1.3.3.10 Hazardous Materials and Hazardous and Solid Waste**

23 Construction of projects under the Ellsworth AFB Alternative, in combination with past,  
24 present, or reasonably foreseeable future actions listed in Section 4.1.3.1 (Ellsworth AFB  
25 Relevant Past and Present Actions) and Section 4.1.3.2 (Ellsworth AFB Reasonably  
26 Foreseeable Future Actions), would result in contributions of MSW and C&D debris to  
27 regional landfills. As standard practice for proposed projects, C&D waste would be  
28 diverted from the landfill to the greatest extent possible through reuse or recycling. Waste  
29 would either be segregated and recycled at a certified facility or disposed of (for mixed or  
30 nonsegregated waste) at a certified recycling facility.

31 As result of the Ellsworth AFB Alternative, 13,572 tons of solid waste would be disposed  
32 of at the Rapid City Sanitary Landfill. As discussed in Section 3.1.1.2.2 (Airspace, Region  
33 of Influence, Ellsworth AFB), the landfill receives approximately 133,000 tons of mixed  
34 waste per year. The combined quantity of C&D debris and MSW generated at Ellsworth  
35 AFB would represent approximately 10 percent of average annual landfill disposal. At its  
36 current disposal capacity, the landfill is permitted to operate another 20 years; however,  
37 the landfill has access to additional land areas that could extend its life expectancy until  
38 at least 2060. Solid waste from the Ellsworth AFB Alternative would be generated over  
39 multiple years, further limiting any potential impacts. For cumulative actions, construction  
40 of new facilities would be addressed under separate and specific environmental reviews.  
41 Because landfill capacity is anticipated to be sufficient for the combined demand of the

1 cumulative actions, as well as projects under the Ellsworth AFB Alternative, cumulative  
2 impacts on solid waste facilities would be less than significant.

3 There would be no cumulative impacts associated with management of hazardous  
4 materials, toxic substances, hazardous wastes, or ERP sites. These would continue to  
5 be managed according to established procedures.

#### 6 **4.1.3.3.11 Health and Safety**

7 As with Dyess AFB, flight, ground, and munitions safety associated with B-21 operations  
8 are not expected to have any cumulative effects in conjunction with other past, present,  
9 and reasonably foreseeable future actions. Proposed activities would be similar in nature  
10 to existing operations, and the USAF would continue to apply established safety, accident  
11 mitigation, and crash response procedures. Planned structures would undergo explosive  
12 safety reviews to ensure occupancy and land uses would be compatible with all locations.  
13 As part of this process, existing explosive safety plans (e.g., ESPs or Aircraft Parking  
14 Plans) would be updated as required.

15 Potential short-term minor impacts to contractor health and safety may occur from  
16 implementation of demolition and construction activities. However, construction safety  
17 and environmental health effects would not be significant, because risks to workers,  
18 potential for offsite dispersion of contaminants, and future exposure to residual onsite  
19 contamination would be small and confined to the immediate project site. All actions  
20 would be performed in accordance with AFOSH directives and OSHA regulations; no  
21 cumulative impacts would occur. Regional cumulative demolition and construction would  
22 be required to adhere to OSHA regulations.

#### 23 **4.1.3.3.12 Transportation**

24 Cumulative effects on transportation consist of the combined potential effects resulting  
25 from the Ellsworth AFB Alternative and applicable past, present, and reasonably  
26 foreseeable future projects described in Section 4.1.3.1 (Ellsworth AFB Relevant Past  
27 and Present Actions) and Section 4.1.3.2 (Ellsworth AFB Reasonably Foreseeable Future  
28 Actions). Potential cumulative effects would be associated with short-term and long-term  
29 changes in traffic patterns and volume, due to construction/demolition/renovation projects  
30 and placement of new facilities.

31 No cumulative impacts to the on-base transportation system are identified for renovation  
32 and construction of the veterinary clinic and dormitories, as these projects have been  
33 completed. Future repair and construction projects at and adjacent to the airfield would  
34 not affect overall traffic flow on the installation due to road shoulder or lane closures,  
35 because the project sites are limited to the industrial area near the runway. Commercial  
36 vehicles associated with construction crews and delivery and removal of construction  
37 materials and debris would be operated on the base; this could cause increased traffic  
38 volume and congestion, which would contribute cumulatively to similar impacts potentially  
39 resulting from the B-21 beddown. However, the effects would be short-term and would  
40 affect a small portion of the base at any given time.

1 No cumulative impacts to the off-base transportation system are identified for construction  
2 of the tractor-trailer truck center, because this project has been completed. Construction  
3 of the civic center and Farm and Fleet retail store would potentially cause delays and  
4 traffic congestion on roads adjacent to and near the facilities. The civic center project site  
5 is located in western Rapid City (opposite Ellsworth AFB), and, the cumulative  
6 contribution to traffic congestion would, therefore, be negligible in the context of personnel  
7 additions associated with the B-21 beddown. The Farm and Fleet project could contribute  
8 to traffic congestion in north and northeast Rapid City, but the effects would similarly be  
9 minor in the context of existing traffic conditions and personnel additions associated with  
10 the beddown. Reconstruction of the I-90/LaCrosse Street interchange and potential future  
11 Rapid City CIP projects would likely cause some level of traffic congestion and delays,  
12 particularly if lane closures or traffic rerouting were required. These effects could  
13 contribute to increased off-base traffic volume and congestion associated with the B-21  
14 beddown. The effects would generally be short-term and would cease after completion of  
15 construction activities. The projects would have a long-term beneficial impact on traffic  
16 operations.

#### 17 **4.1.3.3.13 Utilities and Infrastructure**

18 There are no current infrastructure repairs/upgrades being conducted at Ellsworth AFB.  
19 Recently completed construction of the veterinary clinic and dormitories would slightly  
20 increase water, electricity, and natural gas usage; however, overall use of these utilities  
21 at Ellsworth AFB is projected to be considerably less than current capacity. In addition,  
22 there are no foreseeable future actions identified that would impact utility usage on  
23 Ellsworth AFB; projects that require utilities are located outside the base. In conclusion,  
24 there would be no cumulative impacts on utilities from past, current, and future  
25 foreseeable projects.

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## 26 **4.2 OTHER ENVIRONMENTAL CONSIDERATIONS**

### 27 **4.2.1 Relationship Between Short-Term Uses and Long-Term Productivity**

28 Construction, demolition, and renovation-related activities would result in a short-term use  
29 of resources. Long-term productivity impacts are determined by comparing the project's  
30 impacts against long-term regional and local planning objectives. Impacts are associated  
31 with land use changes, population increases, and the related traffic and socioeconomic  
32 factors. The short- and long-term effects of the Proposed Action and alternatives are  
33 summarized below.

### 34 **4.2.2 Short-Term Uses**

35 All alternatives would have minor short-term effects related to their construction and  
36 military activities through the use of construction-related materials, fuels, etc. The  
37 significant economic benefits created during construction in the form of jobs and the direct

1 and indirect demand for goods and services would offset the short-term use of the  
2 environment.

### 3 **4.2.3 Long-Term Productivity**

4 Long-term adverse impacts to productivity as a result of unmitigated short-term impacts  
5 and uses would include the following:

- 6 • Increased traffic in the local area
- 7 • Increased demand for housing and schools
- 8 • Increased demand for utilities

9 Long-term beneficial impacts to productivity would include the following:

- 10 • Decreased noise levels associated with the B-21
- 11 • Overall support of the region's continued economic development through:
  - 12 ○ Creation of more jobs locally
  - 13 ○ Increases in the tax base
  - 14 ○ Increased revenues for local businesses
  - 15 ○ Increased revenues for local utilities
  - 16 ○ Increased housing construction
  - 17 ○ Continued military mission

### 18 **4.2.4 Short-Term Uses Versus Long-Term Productivity**

19 The construction/demolition period for each alternative would result in a short-term  
20 increase in employment, income, and net fiscal benefits and revenues to the surrounding  
21 community. Additionally, there would be a short-term increase in the amount of local  
22 building supplies needed to execute all of the facilities and infrastructure projects. It is  
23 not expected that the availability of these resources for other users would be reduced due  
24 to the small size of the project relative to the regional building industry around each  
25 installation.

26 Local short-term resource uses resulting from both alternatives would be consistent with  
27 the maintenance and enhancement of long-term productivity for the local communities,  
28 state, and region surrounding Dyess AFB and Ellsworth AFB. The ongoing missions at  
29 each installation is consistent with regional planning objectives, and Dyess AFB's and  
30 Ellsworth AFB's continued growth is beneficial and essential from an economic  
31 standpoint.

32 Many of the potential adverse impacts to long-term productivity are the result of short-term  
33 factors, which are often mitigated through planning aspects when implementing a  
34 proposed action and/or alternatives; traffic is one example. The Proposed Action and  
35 alternatives analyzed in this document would have immediate impacts to traffic in the  
36 short-term with long-term implications.

1 Typically, the DoD looks to normal civil highway programs to make highway  
2 improvements to defense installations because the installations generate major economic  
3 benefits. The USAF, local planning agencies, and the Texas or South Dakota DOT would  
4 work to address transportation issues to ensure that long-term impacts would be mitigated  
5 through proper planning and design of local roadways and transportation infrastructure.  
6 The Defense Access Road Program is one method for DoD to help pay for public highway  
7 improvements required as a result of sudden/unusual defense-generated traffic impacts.  
8 The challenge is accommodating the base's growth and the needs of the local community  
9 in a manner that is mutually beneficial. While there are potential adverse impacts to long-  
10 term productivity, many impacts can be mitigated, resulting in benefits to long-term  
11 productivity associated with local increases in employment, income, and net fiscal  
12 benefits and revenues that outweigh short-term impacts.

#### 13 **4.2.5 Irreversible and Irretrievable Commitment of Resources**

14 The NEPA requires environmental analysis to identify any irreversible and irretrievable  
15 commitments of resources involved in the implementation of the Proposed Action or  
16 alternatives. Irreversible and irretrievable resource commitments are related to the use  
17 of nonrenewable resources and the effects that the uses of these resources have on  
18 future generations. *Irreversible* effects primarily result from the use or destruction of a  
19 specific resource (e.g., energy and minerals) that cannot be replaced within a reasonable  
20 time frame. *Irretrievable* resource commitments involve the loss in value of an affected  
21 resource that cannot be restored as a result of the action (e.g., extinction of a threatened  
22 or endangered species or the disturbance of a cultural site).

23 Implementing the Proposed Action through any of the alternatives would require a  
24 commitment of natural, physical, human, and fiscal resources. In all of these categories,  
25 irreversible and irretrievable commitments of resources would occur. Land required for  
26 new construction would be irreversibly committed during the functional life of the facilities;  
27 in some cases land uses would change from undeveloped to developed. Although it is  
28 possible for land to revert to its former state if the facilities were abandoned and  
29 destroyed, the likelihood of such an occurrence for established facilities would be low.

30 Considerable amounts of fossil fuels and construction materials, such as steel, cement,  
31 aggregate, and bituminous material, would be expended under the action alternatives.  
32 These physical resources should generally be in sufficient supply during the proposed  
33 project initiation, and their commitment to the project would not have an adverse effect  
34 on the resource's continued or future availability.

35 Some cultural resources would be irreversibly and irretrievably lost with construction of  
36 the proposed facilities and infrastructure at Ellsworth AFB, as three NRHP-eligible  
37 buildings would be demolished. This would result in an adverse effect to historic  
38 properties. The USAF began corresponding with the South Dakota SHPO and the ACHP  
39 regarding the proposed demolition of the three NRHP-eligible buildings as separate  
40 projects. After additional discussions with the South Dakota SHPO, the USAF decided to  
41 prepare a single consultation and memorandum of agreement package for the entire  
42 beddown for the Section 106 consultation. The USAF submitted the package to the South

1 Dakota SHPO and the ACHP to formally initiate consultation. The Final EIS will include  
2 the results of the Section 106 consultation.

3 In terms of human resources, labor would be used in preparation, fabrication, and  
4 construction of the project. Labor is generally not considered to be a resource in short  
5 supply, and commitment to the project would not have an adverse effect on the continued  
6 availability of these resources. Project construction would require a substantial  
7 expenditure of funds.

8 The proposed commitment of natural, physical, human, and fiscal resources is based on  
9 the requirements mandated by the DoD. It is anticipated that businesses, employees,  
10 and residents of the local area would benefit from improved economics resulting from  
11 implementation of the Proposed Action.

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