Draft
Environmental Assessment of Proposed Wastewater Line Connection to San Antonio Water System at Joint Base San Antonio, Bullis, Bexar and Comal Counties, Texas

July 2024

Prepared for:
United States Air Force
502d Air Base Wing

PRIVACY ADVISORY

This Environmental Assessment (EA) 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 CFR Parts 1500–1508), and 32 CFR Part 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 EA. As required by law, comments provided will be addressed in the EA 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 EA or associated documents. Private addresses will be compiled to develop a mailing list for those requesting copies of the EA; 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 Personal home addresses and phone numbers will not be published in the EA.

COMPLIANCE

This document has been certified that it does not exceed 75 pages, not including appendices pursuant to 40 CFR 1501.5(f). As defined in 40 CFR 1508.1(v), a "page" means 500 words and does not include maps, diagrams, graphs, tables, and other means of graphically displaying quantitative or geospatial information

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COVER SHEET
Draft Environmental Assessment for
Proposed Wastewater Line Connection to San Antonio Water System at Joint Base San Antonio, Camp Bullis, Texas

a. *Responsible Agency:* United States Air Force

b. *Location:* Joint Base San Antonio, Camp Bullis, Texas

c. *Designation:* Draft Environmental Assessment

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Abstract: This Environmental Assessment (EA) has been prepared pursuant to provisions of the National Environmental Policy Act, Title 42 *United States Code* § 4321 et seq., implemented by Council on Environmental Quality regulations at Title 40, *Code of Federal Regulations* (CFR) Parts 1500–1508, and 32 CFR Part 989, *Environmental Impact Analysis Process (EIAP)*. Potentially affected environmental resources were identified in coordination with local, state, and federal agencies. Specific environmental resources with the potential for environmental consequences include land use; noise; air quality; earth, water, biological, and cultural resources; socioeconomics; environmental justice and protection of children; utilities, infrastructure, and transportation; hazardous materials and wastes; and health and safety.

The purpose of the Proposed Action is to provide Joint Base San Antonio, Camp Bullis (JBSA-BUL) with more efficient, reliable, and less-costly wastewater treatment services that can be sustained over the long term. Construction of a new wastewater line to convey effluent to the San Antonio Water System would accomplish multiple objectives in support of the military mission at JBSA-BUL.

The analysis of the affected environment and environmental consequences of implementing the Proposed Action concluded that it has the potential to impact threatened and endangered species within the project area. By implementing standing environmental protection measures and best management practices, impacts associated with the Proposed Action would be minor. When considered in conjunction with other past, present, or reasonably foreseeable environmental trends or future actions at JBSA-BUL, significant cumulative impacts are not anticipated with implementation of the Proposed Action.

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ABBREVIATIONS AND ACRONYMS

ACM	asbestos-containing material
AFMAN	Air Force Manual
Air Force	United States Air Force
APE	Area of Potential Effects
APO	Asbestos Program Officer
AQCR	Air Quality Control Region
BA	Biological Assessment
BMP	best management practices
BO	Biological Opinion
BUL	Camp Bullis
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CT	Census Tract
CZP	contributing zone plan
dB	decibels
DNL	Day-Night Average Sound Level
DoD	Department of Defense
EA	Environmental Assessment
EAPP	Edwards Aquifer Protection Plan
ECP	Entry Control Point
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EO	Executive Order
ERP	Environmental Restoration Program
ESA	Endangered Species Act
ETJ	Extraterritorial Jurisdiction
FFRMS	Federal Flood Risk Management Standard
FONPA	Finding of No Practicable Alternative
FONSI	Finding of No Significant Impact
ft^2	square foot/feet
GCWA	golden-cheeked warbler
GHG	greenhouse gas
HAZMAT	hazardous materials
HCP	habitat conservation plan
HUC	hydrologic unit code
ICRMP	integrated cultural resources management plan
I	Interstate
IICEP	Interagency and Intergovernmental Coordination for Environmental Planning
INRMP	integrated natural resources management plan
JBSA	Joint Base San Antonio
LBP	lead-based paint
LID	low-impact development
KPA	karst preserve area
mgd	million gallons per day
MBTA	Migratory Bird Treaty Act
MIA	Military Influence Area
MMRP	Military Munitions Response Program
MS4	municipal separate storm sewer system
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act

NHPA	National Historic Preservation Act
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
OSH	occupational safety and health (programs)
OSHA	Occupational Safety and Health Administration
PA	Programmatic Agreement
PCBs	polychlorinated biphenyls
PM*x*	particulate matter equal to or less than *x* microns in diameter
PPE	personal protective equipment
ppm	parts per million
PSD	Prevention of Significant Deterioration
RCRA	Resource Conservation and Recovery Act
RIFA	red imported fire ant
ROI	Region of Influence
ROW	right of way
SAWS	San Antonio Water System
SCS	sewage collection system
SHPO	State Historic Preservation Office
SPCC	spill prevention, control and countermeasures
SWMU	solid waste management unit
SWP3	stormwater pollution prevention plan
TAC	Texas Administrative Code
TCEQ	Texas Commission on Environmental Quality
TCP	traditional cultural property
TEMF	Tactical Equipment Maintenance Facility
TPDES	Texas Pollutant Discharge Elimination System
TPWD	Texas Parks & Wildlife Department
tpy	ton per year
TRRP	Texas Risk Reduction Program
TWDB	Texas Water Development Board
US	United States
USC	United States Code
USCB	United States Census Bureau
USFWS	United States Fish and Wildlife Service
UST	underground storage tank
UXO	unexploded ordnance
WOTUS	Waters of the US
WWTP	Wastewater Treatment Plant

CHAPTER 1 PURPOSE AND NEED FOR THE PROPOSED ACTION

1.1 INTRODUCTION

Joint Base San Antonio (JBSA), Camp Bullis (BUL) is a military training base located north of the city of San Antonio in Bexar and Comal counties, Texas (**Figure 1-1**). The United States (US) Air Force (Air Force) manages the Base, which is used to train US Army, Air Force, and Marine Corps combat units. Most of the approximately 300 buildings on JBSA-BUL are concentrated in the southwest portion of the Base, an area referred to as the "cantonment" (**Figure 1-2**). Training lands generally surround the cantonment and occupy all other portions of JBSA-BUL. Approximately 1,500 personnel are stationed at the Base, not including the visitor population on temporary training assignments (Air Force, 2018a).

Since the early 1930s, JBSA-BUL has operated a small wastewater treatment system to support training and operations at the Base. The current system consists of a replacement package (modular) wastewater treatment plant (WWTP), a modular system that combines processes such as aeration, settling, and solids treatment in a multi-compartment unit. The package WWTP was installed in 2019 as a short-term replacement for the predecessor WWTP, which was determined irreparable due to its deteriorated condition. JBSA-BUL is permitted to operate the package WWTP through 1 March 2025 but seeks connection with the San Antonio Water System (SAWS) for discharge of its wastewater effluent in the long term (Air Force, 2020a).

Accordingly, the Air Force proposes to construct a new wastewater conveyance line from JBSA-BUL to a SAWS connection point in the vicinity of the Base. Once connected to the SAWS, the Air Force further proposes to decommission and remove the deactivated components of the existing wastewater treatment system on JBSA-BUL. The Air Force prepared this Environmental Assessment (EA) to evaluate the potential environmental, cultural, and socioeconomic effects of its proposal, hereinafter referred to as the "Proposed Action," which would occur over approximately 5 years, from 2025 through 2029. **Chapter 2** of this EA describes the Proposed Action in more detail.

This EA is prepared in accordance with the *National Environmental Policy Act of 1969*, as amended (42 United States Code [USC] § 4321 et seq.) (NEPA); the 2020 update to the Council on Environmental Quality (CEQ) NEPA regulations (40 *Code of Federal Regulations* [CFR] Parts 1500–1508); and the Air Force NEPA regulations at 32 CFR Part 989, *Environmental Impact Analysis Process (EIAP)*. Per the updated CEQ NEPA regulations, the EIAP complies with the prescriptive timeline and page limits for an EA. Other applicable provisions of 40 CFR Parts 1500–1508 are cited below. The EIAP informs decision-makers, regulatory agencies, and the public about an Air Force proposed action before any decision is made on whether to implement the action. During the EIAP, if analyses in the EA determine that potential, significant adverse effects would be likely to occur, the Air Force would publish a Notice of Intent (NOI) in the *Federal Register* to prepare an Environmental Impact Statement (EIS).

The CEQ NEPA regulations at 40 CFR § 1500.1(b), 40 CFR § 1506.6(b) and (c), and 40 CFR § 1507.4 provide purpose and direction for streamlining the NEPA process. CEQ memoranda (e.g., March 6, 2012) and guidance on modernizing the NEPA process (CEQ, 2003) also identify opportunities to streamline the NEPA process, including the use of technology for communications and information dissemination. This EA satisfies the requirements of NEPA in accordance with the CEQ regulations and promotes NEPA streamlining through the implementation of the Air Force EIAP. To render this document more concise, links are provided to online data sources to which the reader can refer for more information. Should the reader not have internet access, please contact the Air Force point-of-contact listed on the Cover Sheet of this EA and accommodations will be made to provide printed copies of relevant information requested.

1.2 BACKGROUND

The wastewater system in operation at JBSA-BUL is defined as a "small treatment system," one that services a population of up to 10,000 people or produces an average wastewater flow of less than 1 million gallons per day (mgd). The package WWTP is located on JBSA-BUL to the east of Military Highway along

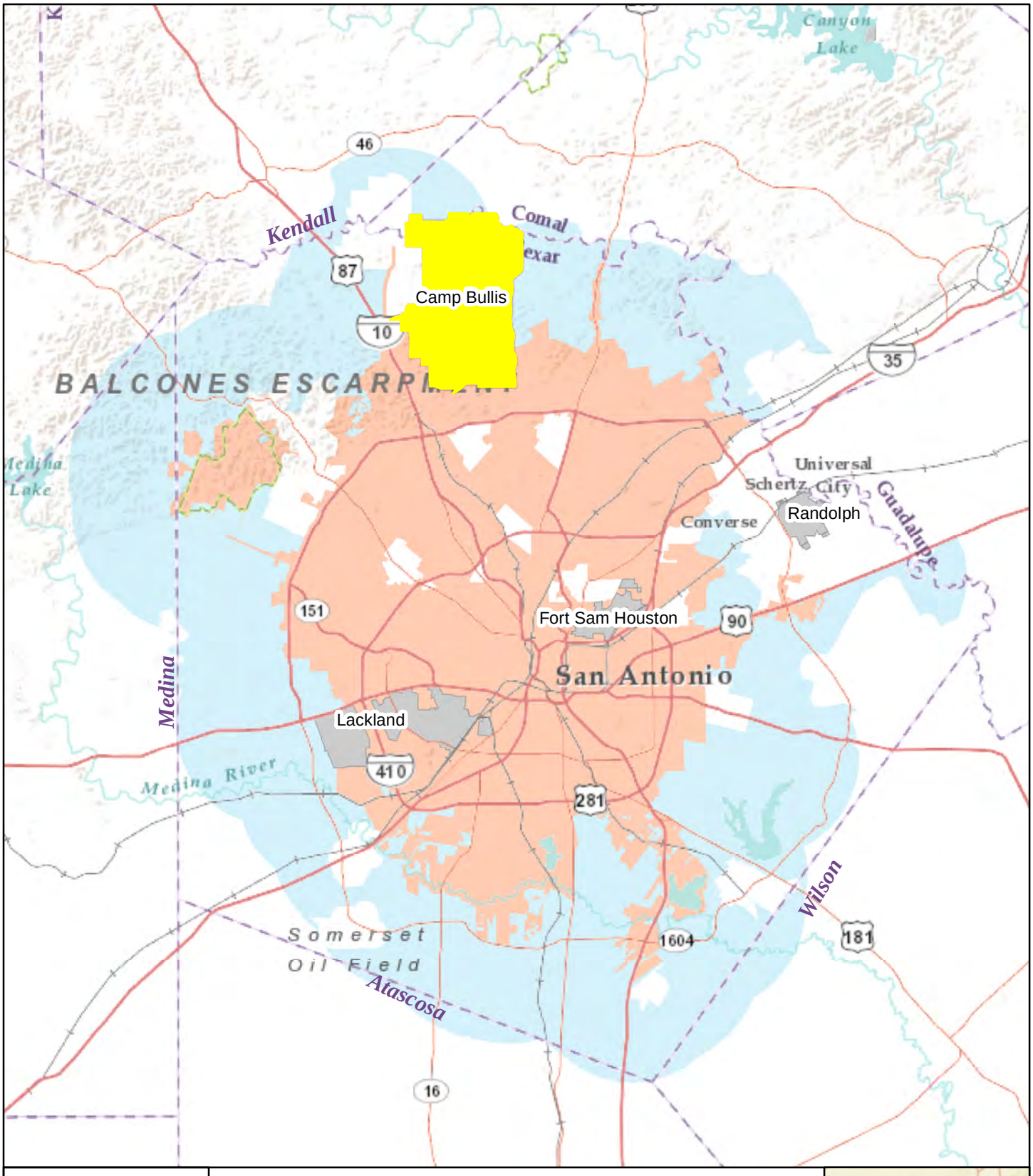


FIGURE 1-1

REGIONAL LOCATION

N

Imagery: ESRI 2021
Projection: WGS 1984
Zone 14N

0 3.5 7 Miles

- City of San Antonio (COSA)
- COSA Extraterritorial Jurisdiction
- JBSA-BUL
- Other JBSA Installation

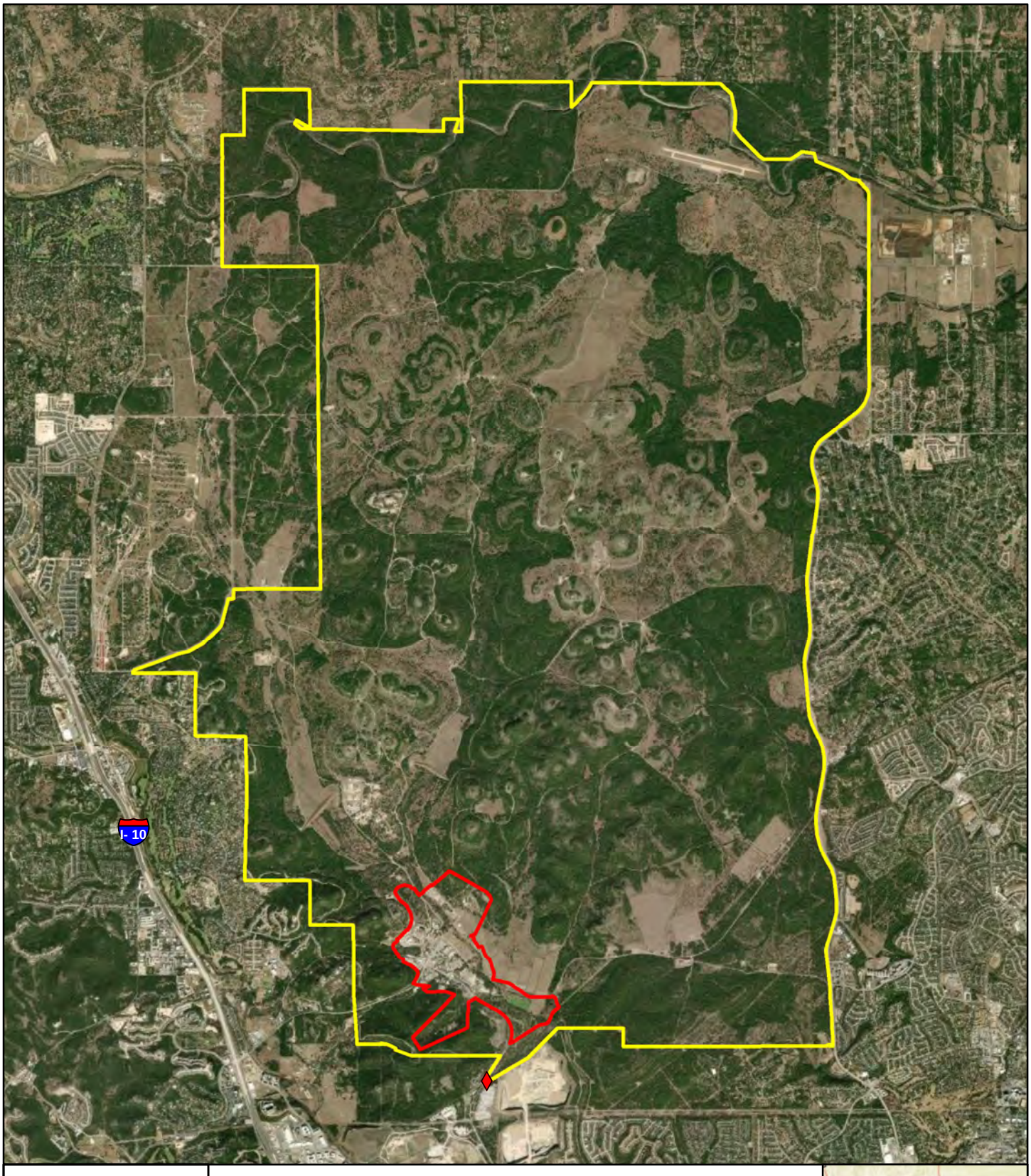


FIGURE 1-2

JOINT BASE SAN ANTONIO CAMP BULLIS

Entry Control Point

Cantonment Area

JBSA-BUL

N

Imagery: ESRI 2021
Projection: WGS 1984
Zone 14N

0 0.5 1 Miles

Range Control Road (see **Figure 1-2**). As the package WWTP employs a variation of the activated sludge process, the former WWTP was used as a source of "seed sludge" during startup.

Treated wastewater effluent discharges into one of three storage ponds to the southeast of the package WWTP; the storage ponds have a combined surface area of 7 acres and 139 acre-feet in storage capacity. JBSA-BUL maintains a Texas Pollutant Discharge Elimination System (TPDES) permit with the Texas Commission on Environmental Quality (TCEQ) to dispose of treated wastewater effluent. The permit authorizes disposal of treated effluent via surface application, irrigation, and evaporation of approximately 190 acres of non-public access land. The irrigation area is located adjacent to the effluent storage ponds and an associated pump house. Application rates to the irrigated land are limited to 4 acre-feet per year per acre irrigated. The irrigated crops include Buffalo grass, curly mesquite, and Texas winter grass (TCEQ, 2020a).

1.3 PURPOSE OF THE ACTION

The **purpose** of the Proposed Action is to provide JBSA-BUL with more efficient, reliable, and less-costly wastewater treatment services that can be sustained over the long term. Construction of a new wastewater line to convey effluent to the SAWS would accomplish multiple objectives in support of the military mission at JBSA-BUL. Privatization of this utility would eliminate JBSA's cost to operate and maintain the current treatment and collection system. It would also accommodate an increased demand for such services at JBSA-BUL should it be required to support future mission growth. Under SAWS management, JBSA would no longer be responsible for monitoring, process controls, maintenance, and operation of the current wastewater treatment system. This would result in time and cost savings to the benefit of the military mission (Air Force, 2011, 2018b, 2021a; US Department of Defense [DoD], 2019).

1.4 NEED FOR THE ACTION

The Proposed Action is **needed** to replace the aging infrastructure components of the wastewater system currently in operation at JBSA-BUL with a more efficient means of treatment and disposal. Currently, maintenance of a TPDES permit to authorize onsite wastewater treatment, discharge, and disposal requires regular funding and substantial technical resources to ensure the system continues to operate. Wastewater operations also increase potential risks to human health and the environment at JBSA-BUL. The Proposed Action would address these concerns and also provide flexibility for future mission growth in the developed portion of the Base.

1.5 SCOPE OF THE ENVIRONMENTAL ASSESSMENT

An EA is a concise public document that briefly discusses the purpose and need, alternatives, and potential environmental impacts of a proposed federal action. It aids in agency planning and decision-making or facilitates the preparation of an EIS, as necessary (40 CFR § 1501.5). In accordance with 40 CFR § 1501.3, the Air Force determined that the appropriate level of analysis for the Proposed Action is an EA.

This EA evaluates the potential environmental consequences of implementing the Proposed Action and Alternatives on and in the vicinity of JBSA-BUL. It serves as a basis for the Air Force to determine whether the Proposed Action and Alternatives—individually or cumulatively—would result in a significant impact on the human environment.

If the EA determines that potential impacts would be less than significant, the Air Force would select an Alternative to implement and document its decision by issuance of a Finding of No Significant Impact (FONSI). If the EA determines that potential impacts could or likely would be significant, the Air Force would announce its intent to prepare an EIS or choose to take no action. In lieu of preparing an EIS, the Air Force may also "mitigate" potentially significant environmental impacts found during preparation of an EA to less-than-significant levels. Any required, agreed upon mitigation for this purpose would be documented in the FONSI. Should the Proposed Action and Alternatives affect floodplains or wetlands subject to Executive Order (EO) 11988, *Floodplain Management*; EO 13690, *Establishing a Federal Flood Risk Management*

Standard and a Process for Further Soliciting and Considering Stakeholder Input, as reinstated by EO 14030; or EO 11990, *Protection of Wetlands*, the Air Force would also prepare a Finding of No Practicable Alternative (FONPA).

The scope of this EA is generally limited to the routing and construction of a new wastewater conveyance line for JBSA-BUL to connect with the SAWS and related removal and closure actions at the Base. However, because implementing the Proposed Action would be subject to agreement between the Air Force, SAWS, and/or other third-party interests, the scope of this EA is limited to the means by which such agreements would be made possible. This EA assumes the provisions of such an agreement are applicable and could be leveraged to implement the Proposed Action.

This EA addresses the potential effects of the Proposed Action and Alternatives on resource areas subject to potential impacts. **Chapter 3** presents information on the existing condition of each resource area, includes the environmental impact analysis, and, when appropriate, recommends mitigation measures. In accordance with 40 CFR § 1502.15, the existing conditions presented in **Chapter 3** also describe reasonably foreseeable environmental trends and planned actions in the area(s) that could, in conjunction with the Proposed Action, contribute to potential adverse cumulative effects. To document and account for potential direct, indirect, and cumulative effects, a Region of Influence (ROI) is defined for the resources or sub-resources subject to analysis in this EA. The resources eliminated from further, more detailed analysis, as well as the rationale for their elimination, are presented in **Section 3.2**.

1.6 Decision To Be Made

The decision to be made is whether to implement the Proposed Action. Should the Air Force choose to implement the Proposed Action, this EA will assist in determining an appropriate scope of action to minimize potential adverse environmental impacts or allow for additional, project-specific environmental review in compliance with NEPA. The decision-making framework for this EA (see also **Section 3.1**) is described as follows:

- Do not implement the Proposed Action.
- Implement the Proposed Action as documented in a FONSI for this EA.
- Publish a NOI in the *Federal Register* to prepare an EIS for the Proposed Action.

Should the Air Force decide to implement the Proposed Action, this EA will identify any actions the Air Force will commit to undertake to minimize environmental effects and comply with NEPA.

1.7 Environmental Impact Analysis Process

NEPA requires federal agencies to consider the potential environmental impacts of their proposed actions on the human environment, including the natural environment. The EIAP implements Air Force compliance with NEPA in accordance with the CEQ NEPA regulations and guidance.

1.7.1 Interagency and Intergovernmental Coordination and Consultation

The EIAP, in compliance with NEPA guidance, includes public and agency review of information pertinent to a proposed action and alternatives. The Air Force's compliance with the requirement for intergovernmental coordination and agency participation begins with the scoping[1] process (40 CFR § 1501.9). Accordingly, on 28 June 2022, the Air Force sent scoping letters concerning the Proposed Action to federal, state, and local government agencies. All responses to the scoping letters were reviewed and

[1] Scoping is a process for determining the extent of issues to be addressed and analyzed in a NEPA document.

incorporated into the Draft EA, as appropriate. A list of recipients, a sample of the correspondence, and agency responses are provided in **Appendix A**.

1.7.2 Public and Agency Review

The intent of this EA is to inform decision-makers and the public of the potential environmental effects of the Proposed Action and Alternatives prior to making a federal decision to move forward with any Alternative. This allows the Air Force to make a fully informed decision, aware of any potential environmental effects. Overall, this EA

- documents the NEPA process or EIAP;
- provides an opportunity for the public, regulatory agencies, and federally recognized Native American tribes to participate in the Air Force's decision-making process; and
- considers input on the possible environmental effects of the Proposed Action and Alternatives, including methods to reduce such effects.

The Air Force invites the public and other interested stakeholders to review and comment on the Draft EA. Accordingly, a Notice of Availability of the Draft EA and Draft FONSI was published in the following local newspapers to commence a 30-day public comment period:

- *The San Antonio Express News*
- *San Antonio Business Journal*

The public comment period for the Draft EA and Draft FONSI concludes on 20 August 2024. During the public comment period, the Draft EA and Draft FONSI are available online for view or download at https://www.jbsa.mil/Resources/Environmental/. Printed copies are available by request to the Air Force point of contact on the **Cover Sheet**. A printed copy was also made available for review at the San Antonio Public Library, 600 Soledad Street, San Antonio 78205.

The Final EA will address all substantive comments received on the Draft EA and Draft FONSI; written comments will be included as an appendix to the Final EA. Following issuance of the Final EA and Final Draft FONSI, the Air Force will then issue a Final (signed) FONSI to comply with NEPA, as appropriate.

1.8 Integration of Other Environmental Statutes and Regulations

This EA organizes separate, but related, environmental compliance requirements associated with the Proposed Action and Alternatives in a single compliance document. In accordance with NEPA and CEQ regulations, the Air Force addresses these requirements concurrently with the EIAP to the extent possible.

The Air Force is working closely with relevant federal, state, and local agencies, and federally recognized Native American tribes, with purview over the Proposed Action. **Sections 1.8.1–1.8.4** summarize relevant environmental compliance requirements and their concurrency with this EA. These and other applicable environmental statutes and regulations are further described in **Chapter 3**.

1.8.1 Floodplain Management and Protection of Wetlands

EO 11988 directs federal agencies to determine whether a proposed action would occur within a floodplain and to avoid or minimize adverse impacts on floodplains. If an agency considers avoiding adverse impacts on a floodplain and determines that no practicable alternative to undertaking the action is feasible, EO 11988 requires minimizing impacts by design or modification. In such cases, agencies must also prepare and circulate a notice to explain how avoidance was not practicable and describe minimization measures. The planning and evaluation steps required by EO 11988 also apply to EO 11990 a similar directive requiring federal agencies to avoid or minimize adverse impacts on wetlands.

To implement EO 11988, processes for evaluating the impacts of federal actions in or affecting floodplains (and wetlands) are in place. EO 13690 creates a new flood risk reduction standard for federally funded projects, the Federal Flood Risk Management Standard (FFRMS). The FFRMS is a flexible framework for increasing resilience against flooding and preserving the natural-function benefits of floodplains. The incorporation of the FFRMS will expand federal management of actions that affect floodplains from the current base flood level to a higher vertical elevation and corresponding horizontal extent. EO 13690 also sets forth a process for further solicitation and consideration of public input. As applicable, this EA documents Air Force compliance with EOs 11988, 11990, and 13690, respectively.

To comply with the EOs noted above, the Air Force placed an early public notice (EPN) in the *San Antonio Express News* (24 and 25 June 2022) and *San Antonio Business Journal* (1 July 2022) regarding the Proposed Action and its potential to affect floodplain and wetland resources on and in the vicinity of JBSA-BUL (**Appendix B**). No public comments in response to the EPN have since been received by the Air Force.

1.8.2 State Historic Preservation Office

Section 106 of the *National Historic Preservation Act* (54 USC § 300101 et seq.) (NHPA) requires that federal agencies consider the potential effects of their undertakings on historic properties and afford the Advisory Council on Historic Preservation an opportunity to comment on the undertaking. This EA assists the Air Force in identifying relevant or interested consulting parties and describes the Section 106 process for the proposed undertaking concurrent with the NEPA process.

In accordance with 36 CFR Part 800, the Air Force maintains a Programmatic Agreement (PA) with the Texas State Historic Preservation Office (SHPO) under Section 106 for the operation, maintenance, and development of JBSA. Under the Proposed Action, the Air Force would adhere to the project review process as stipulated in the PA. This process outlines the agreed upon procedures for monitoring, recording, qualifying, and mitigating for potential adverse effects on cultural resources under JBSA's management, including those associated with JBSA-BUL. The PA also identifies development program activities that are "exempted" from Section 106 requirements.

The Air Force uses scoping to determine an appropriate level of analysis for potential effects on cultural resources, including historic properties. This EA is also used to document the Air Force's compliance with Section 106, as follows:

1. Determine if the Proposed Action and Alternatives would potentially affect historic properties;

2. Define the Area of Potential Effects (APE) for any potentially affected historic properties; and

3. Consult with the SHPO and other relevant or interested parties to establish an appropriate level of effort for gathering additional information by inventory or investigation within the APE.

If no historic properties are identified, or those present would not be adversely affected under the Proposed Action and Alternatives, the Air Force would seek the review and concurrence of the SHPO on a "no adverse effects" determination. Historic properties potentially subject to adverse effects under the Proposed Action and Alternatives would be subject to further consultation under Section 106 of the NHPA, including any required mitigation measures. A copy of the Air Force's correspondence to the SHPO is included in **Appendix A**.

1.8.3 Federally Recognized Tribal Governments

Numerous federal laws, regulations, policies, and directives protect the rights of indigenous communities and resources that preserve their heritage, culture, or religious beliefs. These include the NHPA, NEPA, *Native American Graves Protection and Repatriation Act* (25 USC § 3001 et seq.) (NAGPRA), and more

recent federal policy directives.[2] DoD Instruction 4710.02, *DoD Interactions with Federally Recognized Tribes*, describes and implements the DoD policy for engaging with tribal governments.

In accordance with Department of the Air Force Instruction 90-2002, *Interactions with Federally Recognized Tribes*, the Air Force engages with federally recognized Native American tribes who have a documented interest in Air Force lands and activities. As part of the scoping process for this EA, the Air Force identified federally recognized Native American tribes with a potential interest in the Proposed Action and Alternatives. Those tribes that expressed an interest in the Proposed Action were invited to participate in this EIAP and as consulting parties under Section 106 of the NHPA. To date, none of the tribes has commented on the Proposed Action. A list of tribes that received scoping letters and a sample letter is provided in **Appendix A**.

1.8.4 Endangered Species Act

Section 7 of the *Endangered Species Act* (16 USC § 1531 et seq.) (ESA) requires federal agencies to consider the potential impacts of their proposed actions on ESA-listed threatened and endangered species or habitat considered essential to their recovery, defined and designated as "critical habitat" under the ESA. Federal agencies are required to consult with the US Fish and Wildlife Service (USFWS) or National Oceanic and Atmospheric Administration, as applicable, for actions that may affect federally listed threatened and endangered species or their critical habitat.

In April 2024, the Air Force initiated consultation with the USFWS regarding Section 7 requirements applicable to the Preferred Alternative of the Proposed Action. If an action alternative besides the Preferred Alternative is chosen, the Air Force would reengage with the USFWS for further consultation on the Proposed Action at that time.

1.9 Applicable Laws and Environmental Regulations

Other laws and regulations applicable to the Proposed Action include, but are not limited to:

- *Edwards Aquifer Rules* (Title 30 Texas Administrative Code, Chapter 213-A)
- *Clean Water Act* (33 USC § 1251 et seq.)
- *Resource Conservation and Recovery Act* (42 USC § 6901 et seq.)
- *Comprehensive Environmental Response, Compensation, and Liability Act* (42 USC § 9601 et seq.)
- *Federal Clean Air Act* (42 USC § 7401 et seq., as amended)
- *Migratory Bird Treaty Act* (16 USC § 703 et seq.)
- *Toxic Substances Control Act* (15 USC § 2601 et seq.)
- EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (1994)
- EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks* (1997), as amended by EO 13296 (2003).

[2] For example, Presidential Memorandums on *Tribal Consultation and Strengthening Nation-to-Nation Relationships* (26 January 2021) and *Indigenous Traditional Ecological Knowledge and Federal Decision Making* (15 November 2021).

CHAPTER 2 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

The following sections describe the Proposed Action, alternatives screening process, alternatives considered but eliminated from detailed analysis, and alternatives retained for detailed analysis in this EA.

2.1 INTRODUCTION

Wastewater systems are primarily composed of a WWTP, lift stations, manholes, and sewer main lines. Although various other system components support wastewater operations, the primary components largely determine the necessity to upgrade, expand, or replace the system or system components. Currently, JBSA-BUL's wastewater system consists of the package WWTP; five lift stations; more than 175 manholes; and 8 miles of mostly underground sewer lines to include gravity and force mains. There are four lift stations in operation to convey effluent from point of origin to the WWTP site along Range Control Road.

The 502d Air Base Wing recently completed a *Wastewater System Condition Assessment and Sanitary Sewer Feasibility Study* (Air Force, 2020a) to inventory and evaluate the condition of JBSA-BUL's wastewater system. Based on the inventory and condition assessment, a hydraulic model was developed to evaluate the capacity of the system to treat wastewater effluent under varying conditions such as dry- and wet-weather flows or surges from changes to the military mission. These data were then used to identify and assess alternatives to meet future system needs (see **Sections 2.3.2** and **2.3.3** below) (Air Force, 2020a).

The SAWS provides water and wastewater services for an area nearly 500 square miles in size. SAWS operates three major water recycling centers that produce approximately 125,000 acre-feet of tertiary treated recycled water in a dry year.[3] Most sewage generated by the more than 1.2 million people living in and around San Antonio flows into the Steven M. Clouse Water Recycling Center, a 500-acre facility on the southern end of the city. There are more than 4,700 sewer lines in the SAWS collection system that, on average, convey 100 mgd of wastewater effluent. SAWS has a combined treatment capacity of 225 mgd (SAWS, 2022).

2.2 DESCRIPTION OF THE PROPOSED ACTION

The Proposed Action includes two main components: 1) the construction of a wastewater conveyance line from JBSA-BUL to a SAWS connection point in the vicinity of the Base; and 2) removal and closure of the deactivated wastewater effluent storage ponds, co-located pump house used for spray irrigation, and the permitted irrigation area (**Figure 2-1**). In addition, the existing irrigation area and holding ponds would be decommissioned. Under the Proposed Action, construction of the wastewater conveyance line would occur from approximately 2025 through 2027; removal and closure of the deactivated existing wastewater treatment system components would occur from approximately 2028 to 2029. The Proposed Action is described in more detail below.

[3] Dry-weather wastewater flows account for the impact of nutrients in discharges of treated effluent to surface waters, which are substantially affected by dilution. In other words, dry-weather flows dilute less than wet-weather flows, resulting in higher instream concentrations of nutrients to the degradation of water quality (SAWS, 2020).

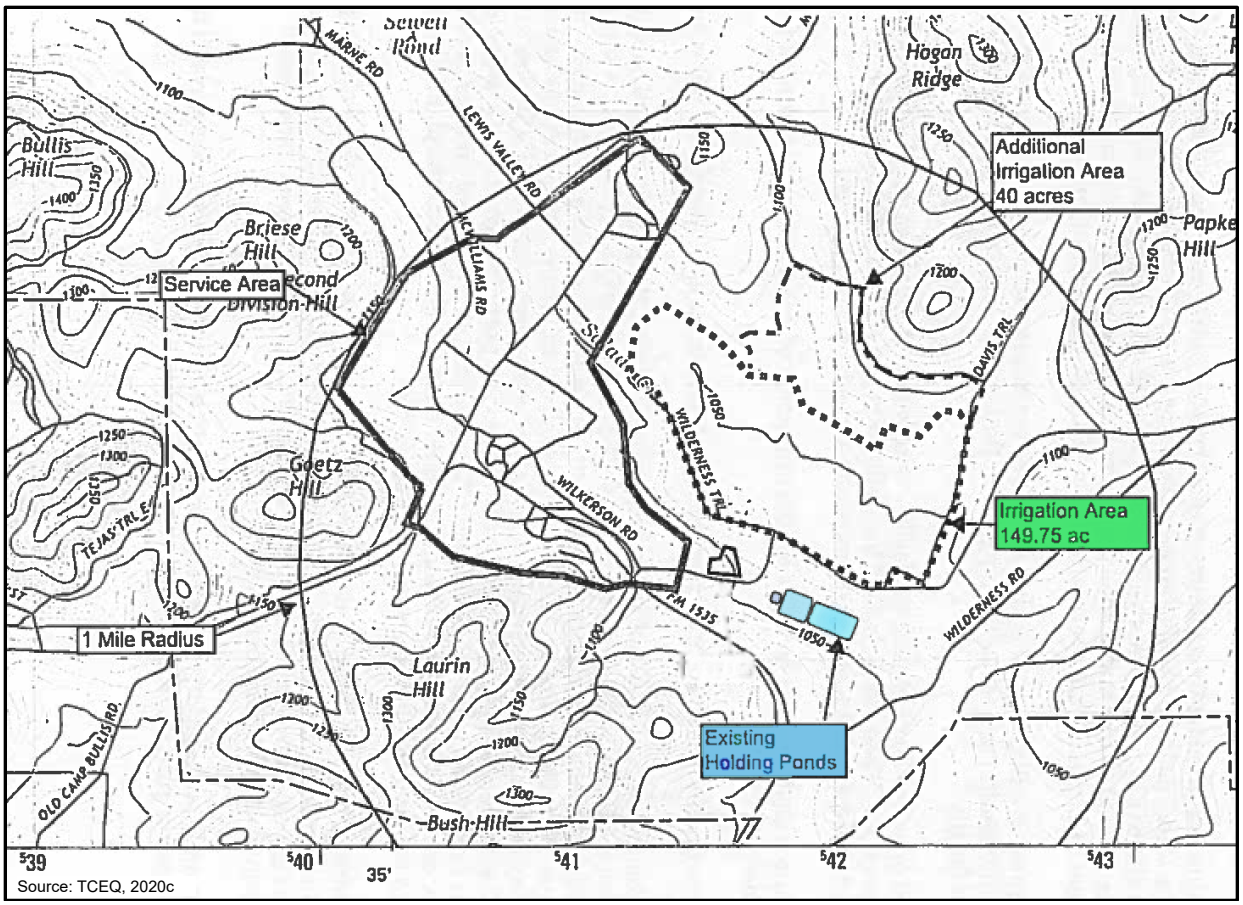


Figure 2-1 Effluent Storage Ponds and Irrigation Area within the JBSA-BUL Cantonment

2.2.1 Construct a New Wastewater Line

The initial phase of the Proposed Action would involve construction of a new wastewater conveyance line from the package WWTP site along Range Control Road that connects with the SAWS in the vicinity of JBSA-BUL. The selected SAWS connection point would be of sufficient capacity and flow rate to convey wastewater from JBSA-BUL to a municipal treatment facility. Determination of an average peak wastewater flow for the Proposed Action would be based on the current and projected, permanent and temporary, population of the Base.

The route selected for this component of the Proposed Action would allow for construction of the wastewater conveyance line within the required timeframe and at a reasonable cost as established by industry precedents. Under the Proposed Action, the route selected would determine more specific or additional requirements for wastewater management and conveyance. For example, slope requirements to maintain adequate flow by gravity main could require deeper excavations in hilly or flat terrain, or additional or repurposed lift stations. Other newly constructed or repurposed system components such as manhole installations and holding tanks would also be incorporated into the Proposed Action by design (Air Force, 2020a).

Source: PHMSA, 2020

The route selected would influence the technique (e.g., open cut trenching or boring) used for installation of the various wastewater line segments. For example, trenching likely would occur along route segments with an existing right of way (ROW) in place, while boring would be considered to avoid surface features such as streams, wetlands, or roads. **Figure 2-2** illustrates the trench and backfill specifications of a typical sanitary sewer pipe; **Figure 2-3** illustrates boring using horizontal directional drilling.

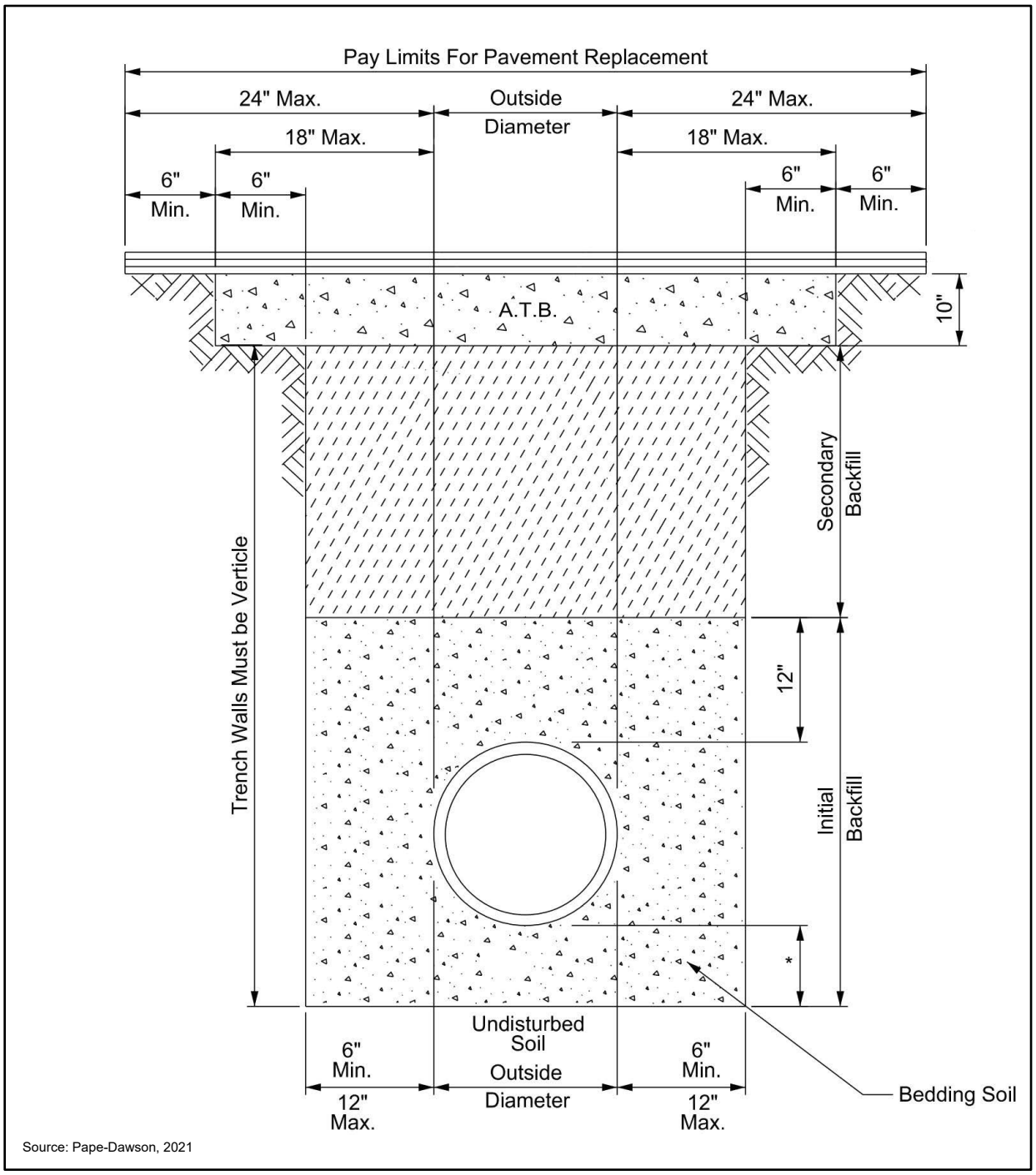


Figure 2-2 Illustration of Sewer Line Laid in Trench

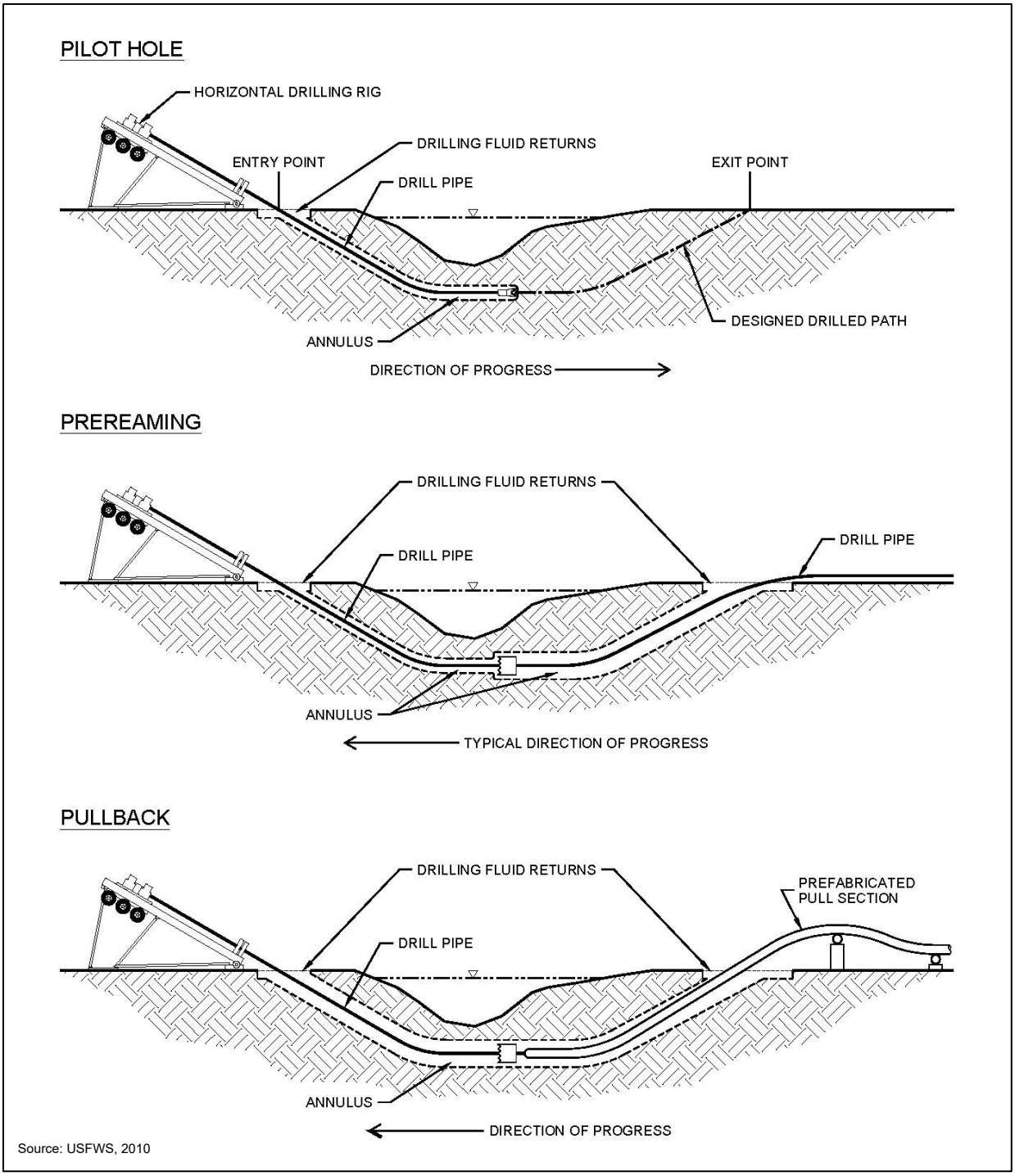


Figure 2-3 Illustration of Horizontal Directional Drilling

Upon selection of a preferred route to implement the Proposed Action, any necessary ROW(s) would be acquired prior to the start of construction. An easement would then be put in place with conditional approval to construct a new wastewater conveyance system. Because construction and operation of a new wastewater conveyance line would occur across federal, state, local/municipal, and privately owned lands and involve multiple stakeholders and beneficiaries (i.e., the DoD and SAWS), adherence to a variety of applicable rules, standards, and specifications would be required under the Proposed Action. These primarily include:

- Title 30 *Texas Administrative Code* Chapter 217 (30 TAC 217), design rules for constructing or altering wastewater collection systems, treatment facilities, and treatment units.
- 30 TAC 213, as applicable for protection of the Edwards Aquifer.
- Unified Facility Criteria (UFC) 3-240-01*, Wastewater Collection and Treatment*
- UFC 3-201-01, *Civil Engineering*, as applicable to site development, grading, and storm drainage systems.
- UFC 4-010-06, *Cybersecurity of Facility-Related Control Systems*
- UFC 01-200-02, *High Performance and Sustainable Building Requirements*, as applicable to comprehensive replacement and sustainment, restoration, and modernization projects.
- Unified Facility Guidance Specifications (UFGS) 33 30 00, *Sanitary Sewerage*
- UFGS 01 74 19, *Construction Waste Management and Disposal*
- *Construction and Material Specifications*, as applicable to SAWS wastewater collection and treatment systems.

2.2.2 Removal and Closure of Deactivated Wastewater Treatment System Components

This component of the Proposed Action would remove and seek regulatory closure for a portion of the deactivated wastewater system on JBSA-BUL. First, the package WWTP would be shut down and transported to an off-Base facility for decontamination, operational maintenance, and repair, as appropriate. As a modular system, the package WWTP would be repurposed at a location yet to be determined. Second, the Air Force would conduct sampling in and around the effluent storage ponds, including the pump house and irrigation area. The Air Force would implement this portion of the Proposed Action to comply with *Resource Conservation and Recovery Act* (42 USC § 6901 et seq.) (RCRA) clean closure provisions, as implemented by the Texas Risk Reduction Program (TRRP).

Clean closure refers to a hazardous waste management unit that is taken out of service and meets the conditions of a risk-based performance standard for waste removal and decontamination (40 CFR Part 264 and 40 CFR § 265.111). When complete, clean closure ensures the removal of hazardous waste to levels protective of human health and the environment. With no physical controls required, certification of clean closure concludes any further regulation under RCRA. The TCEQ administers the TRRP rule with RCRA in Texas (TCEQ, 2009).

Under the Proposed Action, sampling results would be used to classify and quantify residual wastes (i.e., biosolids and biosolid [dry] residuals, sewage sludge, and other hazardous substances) so that requirements for their disposition under federal and state laws could be met. Regulations applicable to this phase of the Proposed Action primarily include provisions of the *Texas Water Code* such as 30 TAC 312; 30 TAC 319.21–319.29; 30 TAC 335; and 30 TAC 330. As such, all wastes would be either transported to a permitted landfill facility for processing, dewatering, and disposal, or conveyed by the newly constructed wastewater line to a SAWS treatment facility for treatment and recycling, reuse, or discharge to surface waters. Other removal and disposal actions that would be required under the Proposed Action include:

- dismantlement and removal by demolition of the pump house to or above the concrete slab foundation;
- cutting and capping of pipes to be flush with the floor or ground-level section;
- the use of concrete fill and leveling to leave belowground structures in place; and
- implanting soil amendments, grading, and vegetation with native species to mimic natural environment conditions in or around the project area.

The Air Force would more specifically detail this phase of the Proposed Action through the preparation of a closure plan. This plan would be submitted to the TCEQ for review and approval prior to any removal or closure activities (TCEQ, 2020b).

2.3 ALTERNATIVES SCREENING PROCESS

NEPA requires federal agencies to objectively explore and evaluate reasonable alternatives to a proposed action. Alternatives not found to be reasonable can be eliminated from evaluation provided the EA or EIS includes a brief rationale for their elimination (40 CFR § 1502.14(a)).

2.3.1 Selection Standards for Alternatives Screening

Consistent with 32 CFR § 989.8(c), the following selection standards meet the purpose of and need for the Proposed Action (see **Sections 1.3** and **1.4**) and were used to identify reasonable alternatives for analysis in the EA:

- **Location and Capacity –** The SAWS connection point shall be in the vicinity of JBSA-BUL and have sufficient operational capacity to support the Proposed Action.
- **Land Use, including ROW –** The pipeline route to the cantonment shall be compatible with existing land use on and around JBSA-BUL, as well as be supported by an existing and/or reasonably obtainable ROW.
- **Efficiency and Reliability –** The Proposed Action shall provide more efficient, reliable wastewater services to JBSA-BUL in the long term, as well as meet the required timeframe.
- **Security and Safety –** The Proposed Action shall improve and safeguard the security of the military mission at JBSA-BUL. The design, construction, operation, and maintenance of the Proposed Action shall comply with applicable federal and state laws and regulations pertaining to wastewater management.
- **Cultural Resources –** The Proposed Action shall avoid, to the maximum extent practicable, adverse effects on cultural resources such as archaeological sites, historic buildings or structures, cemeteries, and traditional cultural properties such as Native American sites of cultural importance.
- **Natural Resources –** The Proposed Action shall avoid, to the maximum extent practicable, adverse effects on sensitive or protected natural resources such as threatened and endangered species and their habitat, floodplains, and groundwater.

Section 2.3.2 describes the alternatives considered but eliminated from detailed analysis, including a brief rationale for their elimination. **Section 2.3.3** describes the alternatives retained for more detailed analysis, including the No Action Alternative.

2.3.2 Alternatives Considered but Eliminated from Detailed Analysis

The Air Force considered multiple options for implementing the Proposed Action, several of which are briefly described below. Ultimately, only two alternatives were determined to meet the purpose of and need for the action (see **Sections 1.3** and **1.4**).

2.3.2.1 Alternative Route Option

Under this alternative, the Air Force would construct a new, 0.7-mile gravity main from the package WWTP site toward the southeast in parallel with an existing, abandoned sewer line. This line would terminate at a newly constructed lift station along the proposed route from which 1.1 miles of force main would be constructed across the Base boundary, east of Salado Creek. The new force main would then tie into the collection system of a subdivision in the northern extent of Salado Canyon to convey wastewater to a SAWS treatment facility.

This alternative route would require additional ROW acquisition and overlies a large portion of the Edwards Aquifer recharge zone, including habitat for various federally protected invertebrate species. Therefore, the Air Force considered but dismissed this alternative from further analysis in this EA.

2.3.2.2 Replacement and Repair Option

Under this alternative, the Air Force would select a site on JBSA-BUL to construct and operate a new WWTP. The new WWTP would be designed for tertiary treatment of wastewater effluent to a level that allows for onsite water recycling and reuse. This alternative would also extend the wastewater collection system on the Base to the new WWTP and address deficiencies in existing infrastructure via replacement and repair projects.

The package WWTP is a modular system designed to support remote military operations. Accordingly, it was brought online to provide wastewater services to JBSA-BUL in the short term as a temporary replacement for the inoperable former WWTP. Although construction of a new WWTP would provide permanent, reliable wastewater services to the Base in the long term, this alternative would not be complete within the required timeframe. Further, improvements to the larger wastewater system would necessarily occur over a long period of time. Therefore, the Air Force considered but dismissed this alternative from further analysis in this EA.

2.3.3 Alternatives Retained for Detailed Analysis

As described in **Sections 2.1–2.3,** two of the considered alternatives were determined to satisfy the purpose of and need for the Proposed Action (see **Sections 1.3** and **1.4**). These alternatives, described below, are carried forward for detailed analysis in this EA, along with the No Action Alternative.

The Action Alternatives described below would include decommissioning and removal of the former WWTP and associated operational components. However, the scope and nature of such activities would depend upon the alternative selected and the need to retrofit existing infrastructure systems for reuse.

2.3.3.1 No Action Alternative

Under the No Action Alternative, current wastewater treatment and collection operations at JBSA-BUL would continue in accordance with the status quo. The package WWTP would continue to operate in the short term.

While the No Action Alternative would not satisfy the purpose of and need for the Proposed Action, this alternative is retained to provide a comparative baseline against which to analyze the effects of the Proposed Action, as required under the CEQ regulations (40 CFR § 1502.14(c)). The No Action Alternative reflects the status quo and serves as a benchmark against which the effects of the Proposed Action can be evaluated.

2.3.3.2 Alternative 1 – Camp Bullis Road

Under Alternative 1, JBSA would construct a new force main of 1.1 miles in length from the package WWTP site along Military Highway toward Camp Bullis Road (**Figure 2-4**). A 2-mile-long gravity main would then be constructed along Camp Bullis Road to Interstate (I)-10. The new gravity main would tie into the SAWS wastewater system 0.3 mile to the south along I-10. Wastewater conveyance under this alternative would require retrofitting an existing lift station on JBSA-BUL to support operations; however, the SAWS connection point would have sufficient capacity to support peak wastewater flows generated at the Base. Alternative 1 would require manhole installations along the gravity main portion of the route and horizontal boring installation with air and vacuum relief along other route segments**.** No additional ROW acquisition would be required under Alternative 1.

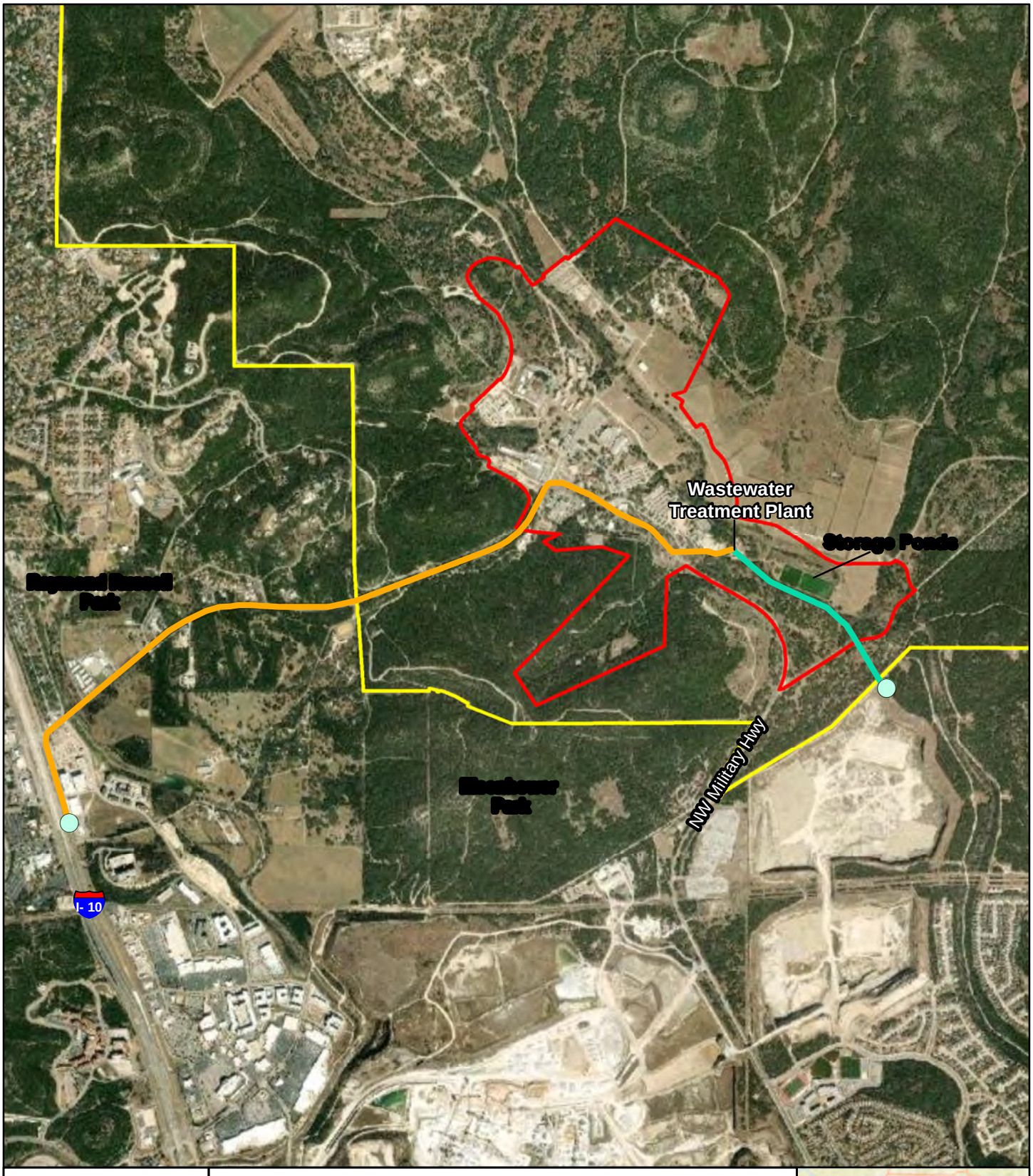


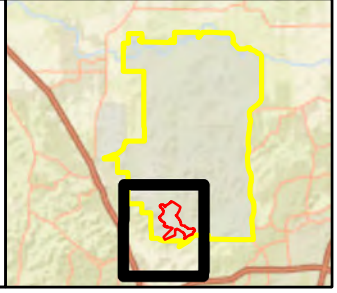
FIGURE 2-4
ROUTE ALTERNATIVES FOR THE PROPOSED ACTION

N

Imagery: ESRI 2021
Projection: WGS 1984
Zone 14N

0 0.25 0.5 Miles

Connection Point
Alternative 1
Alternative 2
Cantonment Area
Installation Boundary



2.3.3.3 Alternative 2 – Shavano Highlands Subdivision (Preferred Alternative)

Under Alternative 2, JBSA would construct a new force main of 1 mile in length from the package WWTP site toward the southeast. This route would cross Wilkerson Road, parallel the southern extent of the effluent storage ponds, and turn toward the southeast before crossing Wilderness Road near the southern boundary of JBSA-BUL. The route would terminate approximately 5 to 10 feet beyond the Installation fence line at a connection point along the western perimeter of the Shavano Highlands Subdivision, which is currently under development (**Figure 2-4**). Alternative 2 would convey wastewater to a SAWS treatment facility via the wastewater collection system of the subdivision. As such, this alternative would require construction of a 60,000-gallon-capacity detention facility to store excess flow from the Base above 0.18 mgd. Wastewater conveyance under this alternative would require retrofit of an existing lift station on JBSA-BUL to support operations. Alternative 2 would establish a new ROW and may require ROW acquisition for the portion of the proposed route outside the boundary of JBSA-BUL.

2.4 SUMMARY OF ENVIRONMENTAL CONSEQUENCES

Table 2-1 summarizes potential impacts associated with Alternative 1, Alternative 2, and the No Action Alternative. The summary is based on the information and analyses detailed in **Chapter 3** of this EA.

Table 2-1
Summary of Environmental Consequences

Resource Area	Alternative 1	Alternative 2 (Preferred)	No Action
Land Use	Short-term, minor effects would be expected to occur. Potential beneficial effects for aesthetics would be short term and negligible during construction and minor and beneficial post construction.	Short-term, negligible effects would be expected to occur. Potential beneficial effects for aesthetics would be short term and negligible during construction and minor and beneficial post construction.	No effects to land use would be expected to occur.
Noise	Short-term, minor effects would be expected to occur. In the long term, no appreciable change to the existing noise environment would result.	No effects on noise would be expected to occur.	No effects to noise would be expected to occur.
Air Quality	Short-term, minor effects would be expected to occur.	Short-term, minor effects would be expected to occur.	No effects to air quality would be expected to occur.
Earth Resources	Potential short-term, minor effects would be expected to occur. Effects would be reduced through best management practices. Potential long-term effects to soil would be minor.	Potential short-term, moderate effects would be expected to occur. Effects would be reduced through best management practices. Potential long-term effects to soil would be minor.	No effects to earth resources would be expected to occur.
Water Resources	Potential short-term, negligible effects would be expected for watershed management and wetlands; short-term, minor effects would be expected for surface water and water quality, stormwater management, groundwater, and floodplains.	Alternative 2 would cross approximately 8 acres of 100-year floodplains. Potential short-term, negligible effects would be expected for watershed management and wetlands; short-term, minor effects for floodplains and stormwater management; long-term, moderate effects for surface water and water quality; and short-term and moderate effects for groundwater due to alternative trenching through	No effects to water resources would be expected to occur.

Resource Area	Alternative 1	Alternative 2 (Preferred)	No Action
		the Edward's Aquifer Recharge Zone.	
Biological Resources	Potential long-term, minor effects would be expected for vegetation; short-term, minor effects would be expected for wildlife and migratory birds. Alternative 1 may affect the tricolored bat, the golden-cheeked warbler, karst species, and the bracted twistflower within the Region of Influence (ROI). If Alternative 1 is selected, Section 7 consultation would be performed at that time.	Potential long-term, moderate, adverse effects would be expected for wildlife and vegetation; short-term, moderate effects for migratory birds. Alternative 2 may affect, but is not likely to adversely affect, the tricolored bat and the golden-cheeked warbler within the ROI. Alternative 2 may affect, and is likely to adversely affect, karst species and the bracted twistflower within the ROI.	No effects to biological resources would be expected to occur.
Cultural Resources	There are no archaeological sites or traditional cultural properties located within the Area of Potential Effects (APE). Therefore, there would be no adverse effects to archaeological sites or traditional cultural properties. Contributing elements of the historic district potentially would be affected either directly or indirectly.	There are no historic properties eligible or potentially eligible for listing in the National Register of Historic Places (NRHP) within the direct APE of Alternative 2. Archaeological sites within the project footprint are not eligible for listing in the NRHP. Therefore, there would be no adverse impacts to historic properties or archaeological resources.	No effects to cultural resources would be expected to occur.
Socioeconomics	Short-term, minor, beneficial effects to socioeconomics would be expected to occur.	Short-term, minor, beneficial effects to socioeconomics would be expected to occur.	No effects to socioeconomics would be expected to occur.
Environmental Justice and Protection of Children	Short-term, minor effects to environmental justice concerns and protection of children would be expected to occur.	No effects to environmental justice concerns and protection of children would be expected to occur.	No effects to environmental justice concerns and protection of children would be expected to occur.
Utilities and Infrastructure, including Transportation	Potential short-term, negligible effects would be expected for transportation systems and utilities. Long-term, moderate, beneficial impacts would be expected for the sanitary sewer system.	Potential short-term, negligible effects would be expected for transportation systems and utilities. Long-term, moderate, beneficial impacts would be expected for the sanitary sewer system.	No effects to utilities and infrastructure, including transportation would be expected to occur.
Hazardous Materials and Wastes	Potential short-term, minor effects would be expected for hazardous materials. Long-term, minor effects would be expected for hazardous wastes. There would be no effects to pesticides or other hazardous materials.	Potential short-term, minor effects would be expected for hazardous materials. Long-term, minor effects would be expected for hazardous wastes. There would be no effects to pesticides or other hazardous materials.	No effects to hazardous materials and wastes would be expected to occur.
Health and Safety	Short-term, minor, adverse effects and long-term, beneficial effects would be expected for health and safety as a result of updated wastewater system components.	Short-term, minor, adverse effects and long-term, beneficial effects would be expected for health and safety as a result of updated wastewater system components.	Long-term, adverse effects to health and safety would be expected to occur.

APE = Area of Potential Effect; NRHP = National Register of Historic Places; ROI = Region of Influence

CHAPTER 3 EXISTING CONDITIONS AND ENVIRONMENTAL CONSEQUENCES

This section describes the baseline resource conditions and environmental consequences of Alternative 1 (Camp Bullis Road), Alternative 2 (Shavano Highlands Subdivision), and the No Action Alternative.

The methodology used to analyze potential adverse effects that could result from the Proposed Action and Alternatives is briefly described in **Section 3.1**. Resources considered but dismissed from detailed analysis in this EA, including a brief justification for their dismissal, are discussed in **Section 3.2**. Resources carried forward for analysis are identified in **Section 3.3**. These resources are further described and analyzed in **Sections 3.4** through **3.16**.

3.1 FRAMEWORK FOR ANALYSIS

To provide a framework for analysis, the Air Force defined a study area, or ROI, specific to each resource area. Each ROI delineates a boundary where possible effects from the considered alternatives would have a reasonable likelihood to occur. Beyond these ROIs, potential adverse effects on resources would not be anticipated. Potential effects are described as follows:

- **Beneficial –** positive effects that improve or enhance resource conditions.
- **Negligible –** adverse effects likely to occur but at levels not readily observable by evaluation.
- **Minor –** observable, measurable, tangible adverse effects qualified as below one or more significance threshold(s).
- **Significant –** obvious, observable, verifiable adverse effects qualified as above one or more significance threshold(s); not mitigable to below significance.

When relevant to the analyses in this EA, potential effects are further defined as direct or indirect, short or long term, and temporary, intermittent, or permanent. To determine the potential for "significant" effects under the Proposed Action, the Air Force defined impact thresholds to support the analyses in this EA. Based upon the nature and location of the Proposed Action (see **Section 2.2**), and existing resource conditions, qualitative and/or quantitative thresholds were used to qualify effects that may require further Air Force management or mitigation.

Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time (40 CFR § 1508.1(g)(3)). For example, the Proposed Action could combine with other actions and contribute to potentially significant cumulative effects. Accordingly, the Air Force identified past, present, and reasonably foreseeable actions that could overlap with the Proposed Action on a regional and time-scale basis. **Table 3-1** lists the relevant projects for the cumulative effects analyses in **Sections 3.5–3.16**.

3.2 RESOURCES ELIMINATED FROM DETAILED ANALYSIS

The CEQ regulations state that federal agencies shall "[i]dentify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review(s)" (40 CFR § 1501.9(f)(1)). Accordingly, the Air Force considered but eliminated from further analysis the following resource areas:

- **Airspace Management –** The Proposed Action would not alter the current airspace configurations associated with JBSA-BUL; the frequency, tempo, and volume of current aircraft training and operations would not change.
- **Coastal Zone Management –** JBSA-BUL lies outside the jurisdiction of the federally approved Texas Coastal Zone Management Program.

- **Radon –** Bexar County is located within Radon Zone 3. This zone has predicted average indoor radon screening levels of less than 2 picocuries per liter. In accordance with United States Environmental Protection Agency (USEPA)-established thresholds, there is a low probability of radon occurring in excess of 4 picocuries per liter under the Proposed Action (USEPA, 2019).

Table 3-1
Past, Present, and Reasonably Foreseeable Actions

Name	Description	Timeframe / Duration	Location
US 281 Expansion	Reconstruct and widen from 4 to 6 lanes a divided expressway with two high-occupancy vehicle lanes.	2017–2023	From Loop 1604 to Bexar/Comal County line
New Entry Control Point (ECP)	Construct ECP to accommodate future traffic demand for access to JBSA-BUL.	2019	Southern boundary of JBSA-BUL along Military Highway
Panther Springs Creek Restoration	Make improvements to natural channel for increased water flow.	2021–2022	Southeast corner of JBSA-BUL (off Base)
North Rim Corporate Campus	Construct 550,000-square-foot campus with four office buildings, two multi-level parking garages, and retail space.	phase 1 (2022) phase 2 (2023)	Immediately south of the I-10 intersection with Camp Bullis Road
Classen-Steubing Ranch Park	Make improvements to park.	2022	Approximately 2.5 miles east of the southeast boundary of JBSA-BUL along Huebner Road
Natural Gas Line Installation	Construct natural gas pipeline from a central location within JBSA-BUL to a main line connection point.	2025–2029	Within JBSA-BUL along Camp Bullis Road or Military Highway to connection points outside the Installation
Blanco Road Phase III	Expand roadway from 2 to 4 lanes (Borgfeld Drive to County Line).	Planning Stage TBD	Near the eastern boundary of JBSA-BUL
Replace Tactical Equipment Maintenance Facility (TEMF)	Demolish existing facility and construct a new TEMF with vehicle wash facility, parking, storage, and infrastructure improvements.	TBD	JBSA-BUL (cantonment)
Shavano Highlands Subdivision	Construct planned residential subdivision with access to Salado Creek Greenway.	TBD	East of Eisenhower Park and south of JBSA-BUL

Sources: COSA, 2022a; Texas Department of Transportation, 2022; Air Force, 2017, 2018a; Pape-Dawson, 2021; Bexar County, 2022.
ECP = entry control point; TEMF = Tactical Equipment Maintenance Facility

3.3 Resources Carried Forward for Detailed Analysis

Based on the results of internal and external scoping (see **Section 1.8**), the following resource areas are carried forward for analysis: land use; noise; air quality; earth, water, biological, and cultural resources; socioeconomics; environmental justice and protection of children; utilities and infrastructure, including transportation; hazardous materials and waste; and health and safety. To provide context for the resource analysis sections, **Section 3.4** briefly describes the environmental setting on and around JBSA-BUL.

3.4 Environmental Setting

San Antonio is centrally located in Bexar County, Texas, (**Figure 1-1)** and is part of the larger San Antonio-New Braunfels metropolitan statistical area. JBSA-BUL is situated north of downtown San Antonio in northern Bexar County. A small portion of the Base overlaps with Comal County to the north. As one of the most urbanized counties in Texas, the population of Bexar County is projected to surpass 2 million in the next decade (Texas Water Development Board [TWDB], 2021a). The Base is bounded by Farm Road and

Market Road to the east, Amman Road to the north, I-10 to the west, and the northern portion of the city of San Antonio to the south. The incorporated city of Fair Oaks Ranch and Camp Stanley, a National Guard-owned and -operated Base, abut JBSA-BUL to the west and northwest (Air Force, 2017).

3.5 LAND USE

Land use describes the natural or developed condition of a given parcel of land or area and the types of functions and structures it supports. Land use designations vary by jurisdiction, but commonly used terms include residential, commercial, industrial, agricultural, recreation, and open space. Land use is typically guided and regulated by management plans, policies, regulations, and ordinances that determine the type and extent of land use allowable in specific areas, including specially designated or environmental conservation lands.

The ROI for land use includes JBSA-BUL and the potentially affected portions of San Antonio's North Sector Planning Area outside of the Base.

3.5.1 Existing Conditions

3.5.1.1 Municipal Land Use

Land use in San Antonio is administered by a collective of plans that together guide and regulate development within the municipality and its extraterritorial jurisdiction (ETJ)[4] in unincorporated Bexar County (see **Figure 1-1**). Adopted in 2016, the *2015 SA Tomorrow Comprehensive Plan* defines the framework for land use planning within the city and its ETJ. There are two additional framework plans with a region-level focus, the *Sustainability Plan* and *Multimodal Transportation Plan*. More detailed sub-area plans tier from the framework plans to address city-wide functions (e.g., housing and transportation) or different types of land use (e.g., industry, neighborhood, or community). There are also incorporated jurisdictions within San Antonio and its ETJ with land use planning authority. While the framework plans establish overarching policies at a regional level, they do not alter or negate land use planning at the sub-area or local level. The applicable sub-area plan for the Proposed Action is the *City of San Antonio North Sector Plan* (COSA, 2022a).

Land use to the west, southwest, and south of JBSA-BUL includes mixed-use development interspersed with public lands (e.g., parks, conservation areas, and road and utility corridors) (**Figure 3-1**). Residential communities are the predominate land use; commercial, industrial, and open space further characterize these localities. The area south-southwest of JBSA-BUL, anchored by the University of Texas at San Antonio, is a designated "regional center" for its various entertainment and retail destinations. Immediately south of and adjacent to the JBSA-BUL boundary lies the 320-acre Eisenhower Park. A new residential development is under construction to the south and southeast of Eisenhower Park. Other areas immediately south of JBSA-BUL include privately held lands, some of which preserve relatively large tracts of woodlands (COSA, 2010).

Both the Comprehensive Plan and the North Sector Plan have incorporated an overlay district for JBSA-BUL into their future land use map. The overlay district encompasses four military influence areas (MIAs), each delineated to address a specific land use compatibility concern (i.e., noise, vertical obstruction, light, and safety). The boundary of the overlay district is defined by the largest MIA, the Light MIA, delineated as a 5-mile area around the Base (COSA, 2016, 2010).

[4] The ETJ is a legally designated area of land outside a municipality that can be annexed for land use planning and management purposes (e.g., development regulation, service delivery, economic opportunity, and preservation). In Texas, the size of an ETJ is based on population; San Antonio has a 5-mile ETJ.

3.5.1.2 Installation Land Use

Land use on JBSA-BUL is generally classified as improved, semi-improved, and unimproved. Improved areas (1,121 acres) are defined as those with buildings and other permanent structures, including maintained or landscaped grounds associated with the built environment. Most improved areas are concentrated in JBSA-BUL's cantonment area. Land use in the cantonment includes various administrative, housing (temporary), commercial, industrial, and other mission or community support facilities and spaces (see **Figure 3-1**).

Semi-improved areas (1,788 acres) include portions of the Base that support the military mission on a somewhat regular basis such as roads and trails used for transit or for training purposes (e.g., vehicle maneuvers). Unimproved areas (25,075 acres) are those generally not subject to development or regular maintenance; rather, these lands support JBSA-BUL's training mission in their natural state. Unimproved lands also include habitat for federally protected species under Air Force management. Land use on JBSA-BUL is further characterized by 28 training areas that range in size from 338 to 6,405 acres. When compatible with the military mission, some training areas support game hunting for approved military personnel and their dependents (Air Force, 2020b).

3.5.2 Environmental Consequences

The Air Force defines a significant effect to or from land use within the ROI as one or both of the following:

- land use that would discontinue or substantially change existing or adjacent land use; and/or
- land use that would be inconsistent with applicable management plans, policies, regulations, and ordinances.

3.5.2.1 No Action Alternative

Under the No Action Alternative, wastewater operations on JBSA-BUL would continue in accordance with the status quo. Land use on and around JBSA-BUL would continue to change in response to applicable existing, updated, or amended plans.

3.5.2.2 Alternative 1 – Camp Bullis Road

Municipal Land Use

Outside of JBSA-BUL, future land use designations associated with Alternative 1 include the University of Texas San Antonio Regional Center south of Camp Bullis Road and residential land use of varying densities to the north (COSA, 2022a, 2010) (see **Figure 3-2**). However, Alternative 1 would occur entirely within an existing utility ROW; no ROW acquisition would be required. Easement(s) would set forth conditions for the future management and maintenance of the proposed wastewater conveyance system. JBSA would prepare easement documentation for the portion of Alternative 1 on the Base and coordinate with external stakeholders regarding the easement conditions formalized for the off-Base extent of the ROW, as appropriate.

Therefore, Alternative 1 would be consistent with applicable land use plans and policies within the ROI. This alternative would not discontinue or change existing or future land use designations therein. Potential adverse effects on land use under Alternative 1 would be short term and negligible.

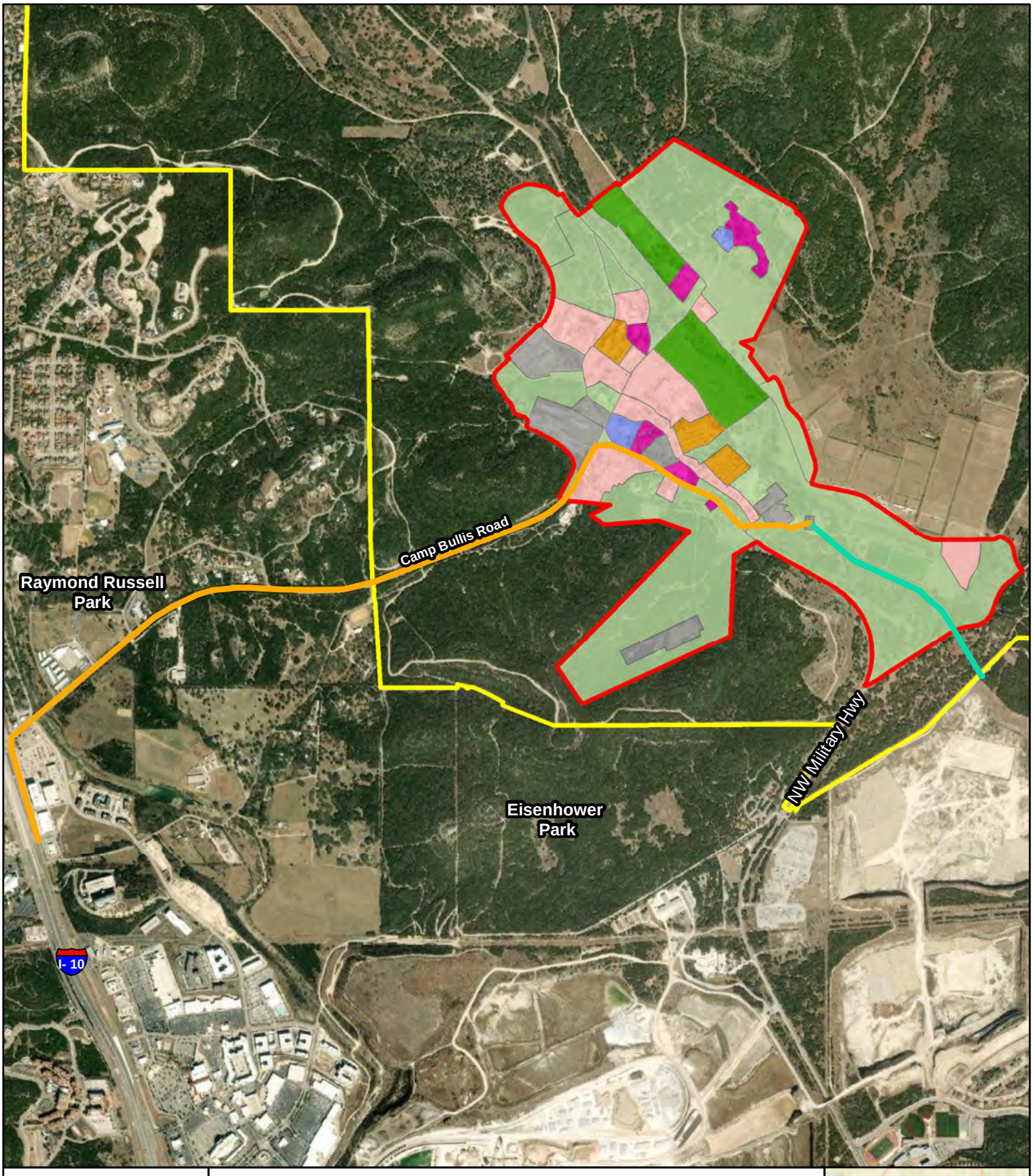


FIGURE 3-1

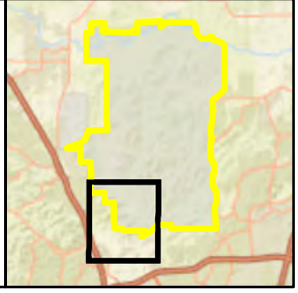
INSTALLATION LAND USE

N

Imagery: ESRI 2021
Projection: WGS 1984
Zone 14N

0 0.2 0.4 Miles

- Alternative 1
- Alternative 2
- Cantonment Area
- Installation Boundary
- Administrative
- Community Service
- Housing Unaccompanied
- Industrial
- Medical
- Open Space
- Outdoor Recreation



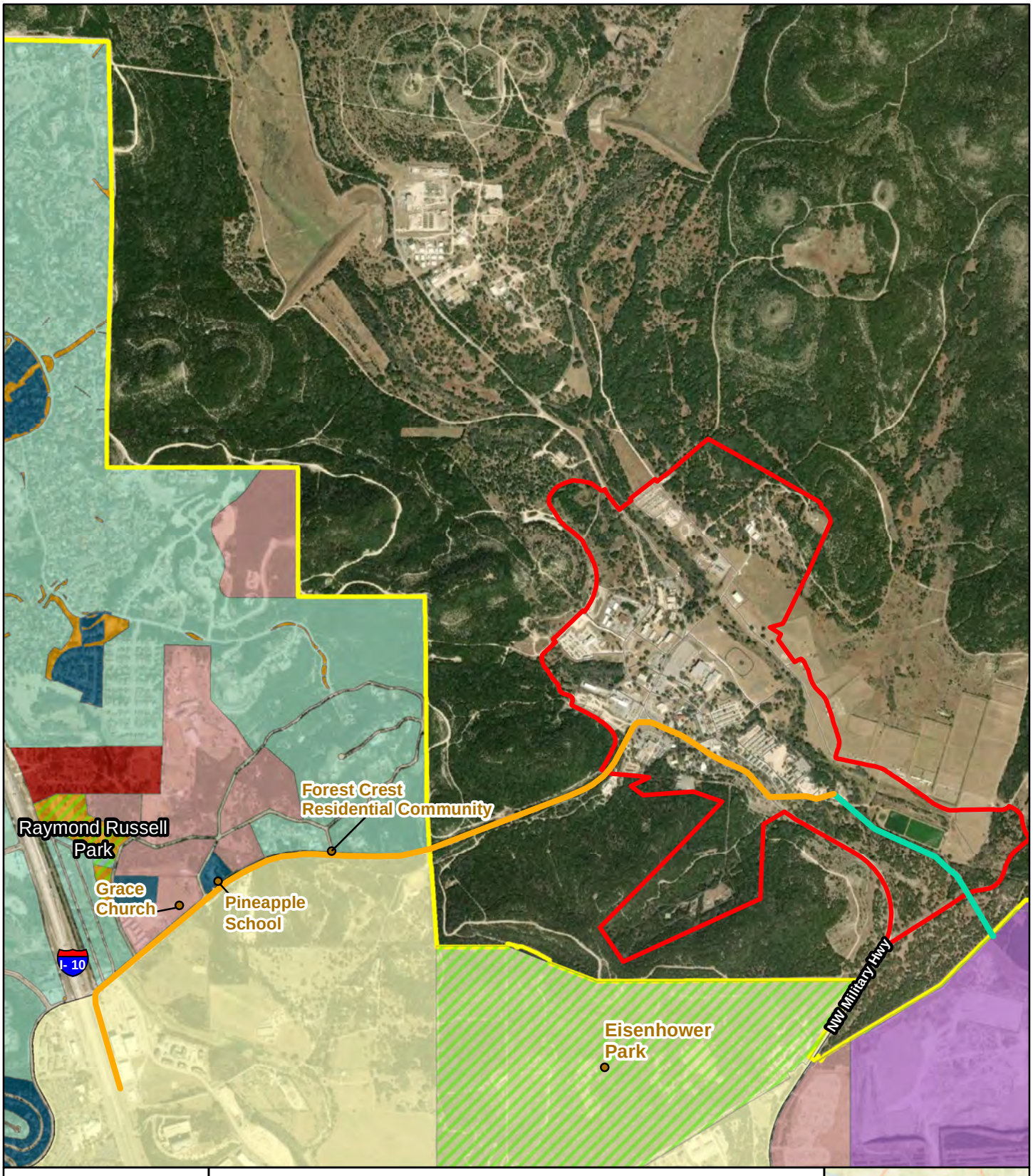


FIGURE 3-2
MUNICIPAL
LAND USE

N

Imagery: ESRI 2021
Projection: WGS 1984
Zone 14N

0 0.2 0.4
Miles

- Noise-Senstive Receptors
- Alternative 1
- Alternative 2
- Trail
- Cantonment Area
- Civic Center
- Country Tier
- Installation Boundary
- Mixed Use Center
- Natural Tier
- Park
- Rural Estate Tier
- Suburban Tier
- USTA Regional Center

Installation Land Use

Alternative 1 would not permanently discontinue or change existing land use within JBSA-BUL. Minor, temporary impacts to the land use within the Installation would be expected during construction activities. Because the proposed wastewater conveyance line would be placed underground, long-term, significant impacts to land use would not be anticipated to result from implementation of Alternative 1. Under Alternative 1, minor beneficial effects on land use aesthetics in the JBSA-BUL cantonment would result from the removal of the deactivated wastewater system components.

Cumulative Effects

Alternative 1 would be consistent with applicable regional land use plans and policies (COSA, 2016, 2010, 2022a). Therefore, when considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-BUL, no significant cumulative effects to land use would be anticipated to occur with implementation of Alternative 1.

3.5.2.3 Alternative 2 – Shavano Highlands Subdivision

Municipal Land Use

Outside of JBSA-BUL, future land use under Alternative 2 is designated as a mixed-use center (COSA, 2010) (see **Figure 3-2**). The portion of Alternative 2 outside of JBSA-BUL may require minor ROW acquisition; however, given its proximity to and potential tie in with the wastewater collection system of the Shavano Highlands Subdivision (under construction), ROW acquisition would not be anticipated to substantially alter the existing or future land use in this area.

Therefore, Alternative 2 would be consistent with applicable land use plans and policies within the ROI. This alternative would not discontinue or change existing or future land use designations therein. Potential adverse effects on land use under Alternative 2 would be short term and negligible.

Installation Land Use

Alternative 2 would not permanently discontinue or change existing land use within JBSA-BUL. Minor, temporary impacts to the land use within the Installation would be expected during construction activities. Because the proposed wastewater conveyance line would be placed underground, long-term, significant impacts to land use would not be anticipated to result from implementation of Alternative 2. Under Alternative 2, minor beneficial effects on land use aesthetics in the JBSA-BUL cantonment would result from the removal of the deactivated wastewater system components.

Cumulative Effects

Alternative 2 would be consistent with applicable regional land use plans and policies (COSA, 2016, 2010, 2022a). Therefore, when considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-BUL, no significant cumulative effects to land use would be anticipated to occur with implementation of Alternative 2.

3.5.3 Best Management Practices and Mitigation Measures

No additional, project-specific best management practices (BMPs) or mitigation measures for land use were identified by analysis.

3.6 NOISE

Sound is a physical phenomenon consisting of minute vibrations that travel through a medium, such as air or water, and are sensed by the human ear. Noise is generally described as unwanted sound. Unwanted sound can be grounded in objectivity (e.g., hearing loss or damage to structures) or subjectivity (e.g., an individual's level of tolerance or annoyance to different sounds). Noise events elicit varying responses within

a population or area based on the activity generating noise, its perceived importance, and related factors, such as setting, time of day, exposure period or duration, and receptor sensitivity. In addition to humans, noise may also affect wildlife as indicated by behavioral changes during nesting, foraging, migration, or other life-cycle activities (USEPA, 1978).

Sound is expressed in logarithmic units of decibels (dB). A sound level of 0 dB is approximately the threshold of human hearing (i.e., sound that is barely audible under quiet listening conditions). Normal speech has a sound level of approximately 60 dB. Sound levels above 120 dB begin to be felt inside the human ear as discomfort; sound levels of 130 dB or greater are felt as pain. In terms of varying levels of sound, the average human ear can detect changes at approximately 3 dB or higher.

The magnitude of a sound is influenced by its frequency, measured in cycles per second or hertz. To normalize frequency relative to the human ear, environmental noise measurements are usually weighted to replicate human sensitivity to noise. The most commonly used metric is the "A-weighted" scale as indicated by the addition of an "A" to the measurement unit (i.e., dBA). In this EA, the dB unit refers to A-weighted sound levels unless otherwise noted.

Some noise-generating activities produce short-in-duration, impulsive sounds such as explosions or sonic booms. Impulse noise can sometimes be felt and may also result in secondary physical effects on structures from shaking or rattling. Due to the unique nature and characteristics of impulse noise, the "C-weighted" scale is used to approximate the human ear's sensitivity to these higher-intensity sounds (i.e., dBC) (USEPA, 1979).

The *Noise Control Act of 1972* (42 USC § 4901 et seq.) directs federal agencies to comply with applicable federal, state, and local noise control regulations. In 1974, the USEPA provided information suggesting that continuous and long-term noise levels greater than 65 dBA are normally unacceptable for noise-sensitive receptors such as residences, schools, churches, and hospitals (USEPA, 1974).

The ROI for noise includes JBSA-BUL and the potentially affected portions of San Antonio's North Sector Planning Area outside the Base.

3.6.1 Existing Conditions

There is a noise ordinance within the city of San Antonio that defines and regulates "noise nuisances." Construction projects are identified as a noise nuisance if occurring outside of normal weekday work hours or if noise exceeds 80 dBA as measured near the boundary line of where the noise is generated. The noise ordinance also defines two types of "quiet zones" where noise is not to interfere with operations within a distance of 250 feet of the real-property line (COSA, 2001).

JBSA-BUL is situated in the highly urbanized metropolitan area of San Antonio. Higher-density development generally occurs to the southwest and west of the Base along I-10. Some areas to the south of JBSA-BUL are zoned for industrial land use. Additionally, military training operations on JBSA-BUL and portions of the ROI outside the Base are a regular source of noise. For example, a preferred route for helicopters originating from JBSA-BUL is the airspace immediately south-southwest of the Base.

Noise-sensitive receptors in the ROI are primarily associated with schools, healthcare facilities, recreation and conservation lands, and places of religion. Many federal agencies use a day-night average sound level (DNL) of 65 dB as a criterion that protects those most impacted by noise and that often can be achieved on a practical basis (Federal Interagency Committee on Noise, 1992). Based on the location of the Proposed Action, noise-sensitive receptors within approximately 800 feet of the proposed projects could reasonably be expected to hear construction noise under the Proposed Action (**Figure 3-2**). Noise-sensitive receptors outside of JBSA-BUL occurring within 800 feet of the proposed projects include:

- Forest Crest Residential Community
- Pineapple School

- Grace Church
- Eisenhower Park

Noise-sensitive receptors within the boundaries of JBSA-BUL are limited to community support facilities along portions of Military Highway such as the main dining facility in the cantonment and a theater. These facilities are interspersed with various mission support facilities and functions. The existing ambient noise in the cantonment is a product of JBSA-BUL's training mission and no permanent residents occupy the Base.

3.6.2 Environmental Consequences

3.6.2.1 Evaluation Criteria

When evaluating noise effects, several aspects are examined:

- the degree to which noise levels generated by construction, demolition, and renovation activities would be higher than the ambient noise levels;
- the degree to which there would be hearing loss and/or annoyance; and
- the proximity of noise-sensitive receptors (e.g., residences, schools, hospitals, parks) to the noise source.

Noise associated with the operation of construction equipment is generally short term, intermittent, and localized, with the loudest machinery typically producing peak sound pressure levels ranging from 86 to 95 dBA at a 50-foot distance from the source (**Table 3-2**). However, when averaged over a year, construction equipment typically does not generate a predicted noise exposure of 65 dBA DNL or greater, even at extremely high rates of operation.

Table 3-2
Peak Sound Pressure Level of Construction Equipment from 50 Feet

Equipment	Sound Pressure Level (dBA)
Bulldozer	95
Scraper	94
Front Loader	94
Backhoe	92
Grader	91
Crane	86

Source: Reagan and Grant, 1977
dBA = A-weighted decibel

For the purpose of analysis in this EA, noise levels above 65 dBA would potentially affect noise-sensitive receptors within approximately 800 feet of a construction site along the involved utility ROW. A potential noise exposure in excess of 80 dBA would be considered significant.

The sections below evaluate potential effects on noise-sensitive receptors based on their proximity or distance from the Proposed Action. Onsite noise exposure with potential to adversely affect construction workers is evaluated in **Section 3.16***;* potential noise effects on wildlife are evaluated in **Section 3.10**.

3.6.2.2 No Action Alternative

Under the No Action Alternative, wastewater operations on JBSA-BUL would continue in accordance with the status quo. The average ambient noise levels on and around JBSA-BUL would not change in the short term. Over time, noise levels would be determined by ongoing changes in land use and population, and in response to other future plans and activities at a local and regional level.

3.6.2.3 Alternative 1 – Camp Bullis Road

Under Alternative 1, the Air Force would construct a 3.4-mile-long wastewater conveyance line from the package WWTP site along Military Highway to its intersection with Camp Bullis Road. The conveyance line would then be routed west-southwest along Camp Bullis Road to its intersection with I-10, connecting to the SAWS toward the south along I-10 (see **Figure 2-4**). Under Alternative 1, construction activities would generate varying types and levels of noise along this proposed route. The removal of the existing WWTP would generate construction noise within the Installation boundary; however, the existing facility is located within an industrial area surrounded by open training space. Adverse impacts to the noise environment would not be anticipated as a result of this action due to the lack of noise-sensitive receptors.

Construction activities along portions of Camp Bullis Road outside the boundary of JBSA-BUL would potentially affect noise-sensitive receptors within approximately 800 feet of the proposed alignment. From east to west, these include residents of the Forest Crest neighborhood and those in attendance at Pineapple School and Grace Church (see **Figure 3-2**). Several commercial establishments are also situated adjacent to the ROW to the north of Camp Bullis Road. However, construction noise typically does not generate a predicted noise exposure of 65 dBA DNL or greater even at extremely high rates of operation because the equipment itself does not generate noise that would produce a 65-dBA DNL when averaged over a year. Potential adverse effects on other noise-sensitive receptors in the ROI would be further reduced by site-specific noise reduction measures to ensure that noise remains below 65 dBA DNL during construction.

Noise associated with the construction of Alternative 1 would be short term and minor. In the long term, no appreciable change to the existing noise environment would result under Alternative 1.

Cumulative Effects

Under Alternative 1, construction and operation activities would combine with other sources of noise locally and regionally; however, no appreciable increase in noise generated concurrently with Alternative 1 would be anticipated. When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-BUL, no significant cumulative effects to the noise environment would be anticipated to occur with implementation of the Proposed Action.

3.6.2.4 Alternative 2 – Shavano Highlands Subdivision

Under Alternative 2, the Air Force would construct a 1.3-mile-long wastewater conveyance line from the WWTP site on JBSA-BUL to a point along the Salado Creek Greenway immediately west of the Shavano Highlands Subdivision (under construction) (see **Figure 2-4**). Under Alternative 2, construction activities would generate varying types and levels of construction noise along this proposed route. The removal of the existing WWTP would generate construction noise within the Installation boundary; however, the existing facility is located within an industrial area surrounded by open training space. Adverse impacts to the noise environment would not be anticipated as a result of this action due to the lack of noise-sensitive receptors.

The wastewater conveyance line proposed under Alternative 2 would traverse portions of the Base where only military training and operations take place; no noise-sensitive receptors are located in the on-Base portion of the ROI. Outside the Base, the route would continue along the Salado Creek Greenway where development is sparse and currently limited to private residences, none of which are situated within 800 feet of the proposed route. Further, because this area remains mostly undeveloped, peak noise generated from construction activities would be progressively reduced by attenuation with distance from the source. Therefore, no significant impacts to noise levels would be anticipated to occur under Alternative 2.

Cumulative Effects

Under Alternative 2, construction and operation activities would combine with other sources of noise locally and regionally; however, no appreciable increase in noise generated concurrently with Alternative 2 would be anticipated. When considered in conjunction with other past, present, and reasonably foreseeable

environmental trends and planned actions at JBSA-BUL, no significant cumulative effects to the noise environment would be anticipated to occur with implementation of the Proposed Action.

3.6.3 Best Management Practices and Mitigation Measures

The Air Force would require contractors to implement the following BMPs to reduce potential noise effects of the Proposed Action:

- Ensure construction work within the 300-foot golden-cheeked warbler (GCWA) buffer zone occurs outside of the nesting season to limit noise impacts to the species (i.e., from approximately 16 August to 28 February).

3.7 AIR QUALITY

Air pollution is a threat to human health and damages trees, crops, other plants, lakes, and animals. It creates haze or smog that reduces visibility in national parks and cities and interferes with aviation. To improve air quality and reduce air pollution, Congress passed the *Clean Air Act of 1963* (42 USC § 7401 et seq.) (CAA) and its amendments in 1970 and 1990, which set regulatory limits on air pollutants to protect human health and the environment.

This section describes regional air quality conditions and analyzes potential effects on air quality resulting from the Proposed Action and Alternatives. This section also discusses greenhouse gas (GHG) emissions.

The ROI for air quality is the Metropolitan San Antonio Intrastate Air Quality Control Region (AQCR) and Bexar County, Texas, designated by the USEPA as being in "marginal nonattainment" for ozone under the CAA. This airshed designation is further defined and described below.

3.7.1 Existing Conditions

3.7.1.1 Criteria Pollutants

In accordance with the CAA, the air quality in a given region or area is measured by the concentration of various pollutants in the atmosphere. Measurements of these "criteria pollutants" in ambient air are expressed in units of parts per million (ppm) or micrograms per cubic meter.

The CAA directed the USEPA to develop, implement, and enforce environmental regulations that would ensure clean and healthy ambient air quality. Accordingly, the USEPA developed the National Ambient Air Quality Standards (NAAQS), numerical, concentration-based standards for pollutants determined harmful to human health and the environment at certain atmospheric concentrations. There are two types of NAAQS under the CAA: primary and secondary. The primary NAAQS represent maximum levels of background air pollution considered adequate to protect public health. Secondary NAAQS represent the maximum pollutant concentration necessary to protect vegetation, crops, and other public resources in addition to maintaining visibility standards. NAAQS are currently established for the criteria air pollutants ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, respirable particulate matter (including particulate matter equal to or less than 10 microns in diameter [PM_{10}] and equal to or less than 2.5 microns in diameter [$PM_{2.5}$]), and lead.

Ozone is formed in the atmosphere by photochemical reactions involving sunlight and previously emitted pollutants or "ozone precursors." Ozone precursors consist primarily of nitrogen oxides and volatile organic compounds emitted from a wide range of man-made sources and are subject to regulation under the NAAQS.

3.7.1.2 General Conformity and Attainment

When a region or area meets NAAQS for a criteria pollutant, it is classified as "in attainment" for that pollutant. When a region or area fails to meet NAAQS for a criteria pollutant, it is classified as

"nonattainment" for that pollutant. In cases of nonattainment, the affected state, territory, or local agency must develop a state implementation plan (SIP) for USEPA review and approval. The SIP is an enforceable plan developed to chart a course for how a state will comply with air quality standards. If air quality improves in a region that is classified as nonattainment such that it meets the criteria or criterion for classification as attainment, then that region is classified as a "maintenance" area.

The CAA General Conformity Rule requires proposed federal agency activities in designated nonattainment or maintenance areas to demonstrate conformity with the SIP for attainment of NAAQS. Agencies are required to show that the net change in emissions from a federal proposed action would be below applicable *de minimis* threshold levels. The thresholds are more restrictive as the severity of the nonattainment status of the region increases (see 40 CFR § 93.153(b)(1) and (2) for nonattainment and maintenance areas, respectively).

3.7.1.3 New Source Review

Per the CAA, the USEPA's Prevention of Significant Deterioration (PSD) New Source Review permit program regulates criteria, and certain non-criteria, air pollutants for air quality control regions designated unclassified or in attainment. In such areas, a PSD review is required for new "major source" or "major modification of existing source" emissions that exceed 100 or 250 tons per year (tpy) of a regulated CAA pollutant, dependent on the type of major stationary source.[5] For "minor source" emissions, a PSD review is required if a project increases a "major source" threshold by itself.

3.7.1.4 Greenhouse Gases

GHGs are gases that trap heat in the atmosphere. These emissions are generated by both natural processes and human activities. The accumulation of GHGs in the atmosphere contributes to global climate change. GHGs include carbon dioxide, methane, nitrous oxide, ozone, and several hydrocarbons and chlorofluorocarbons. Each GHG has an estimated global-warming potential, a function of its atmospheric lifetime and ability to absorb and radiate infrared energy emitted from the earth's surface. The global-warming potential of a particular gas provides a relative basis for calculating its carbon dioxide equivalent (CO_2e) or the amount of CO_2 to the emissions of that gas. Carbon dioxide has a global-warming potential of 1 and is therefore the standard by which all other GHGs are measured. The GHGs are multiplied by their global-warming potential, and the resulting values are added together to estimate the total CO_2e.

The USEPA regulates GHG primarily through a permitting program known as the GHG Tailoring Rule. This rule applies to GHG emissions from larger stationary sources. Additionally, the USEPA promulgated a rule for large GHG emission stationary sources, fuel and industrial gas suppliers, and carbon dioxide injection sites if they emit 25,000 metric tons or more of CO_2e per year (40 CFR § 98.2(a)(2)).

3.7.1.5 Operating Permits

TCEQ has adopted the federal NAAQS. Pursuant to 30 TAC 122, TCEQ administers a permit program for stationary source emissions generated at federal facilities. Permitting requirements for federal owners and operators are largely based on a "potential to emit," defined as the maximum capacity of a stationary source to emit any air pollutant under its physical and operational design or configuration. Under the CAA, potential-to-emit calculations determine whether a federal facility is defined as a "major source," requiring a Title V operating permit, or "non-major" or "minor source" and subject to permit-by-rule requirements (30 TAC 106). Such requirements authorize stationary source emissions for individual or specific operations.

[5] There are two types of "major stationary source" emissions: named and unnamed. A named stationary source is listed in 40 CFR § 51.166(b)(1) and has a potential to emit 100 tpy (includes fugitive emissions). An unnamed stationary source is one that is ***not*** listed in 40 CFR § 551.166(b)(1) and has a potential to emit 250 tpy.

TCEQ's delegated authority under the CAA extends to mobile emissions generated in Texas. Pursuant to 30 TAC 111.145, fugitive dust generated by construction or demolition involving 1 acre or more of land requires, at a minimum, two dust-control measures, including the use of water (or other suitable oil or chemical application) for dust suppression and other measures to prevent airborne particulate matter during sandblasting or similar operations.

3.7.1.6 Joint Base San Antonio, Bullis

JBSA-BUL is located in Bexar County, Texas, part of the larger Metropolitan San Antonio Intrastate AQCR.

The USEPA's reclassification of Bexar County to ozone nonattainment with a marginal classification was conditioned on 2015–2017 data recorded at 0.073 ppm from two monitoring stations: one at JBSA-BUL and one in northwest Bexar County. The change from attainment to marginal nonattainment for Bexar County required a revision to the Texas SIP for attainment of the ozone NAAQS based on 2018–2020 monitoring data. In January 2020, TCEQ adopted a SIP revision and requested the USEPA's approval by demonstration that Bexar County would attain the 2015 8-hour ozone NAAQS by its statutory attainment deadline of 21 September 2021 "but for" anthropogenic emissions emanating from outside the US (TCEQ, 2020a). Most recently, the USEPA announced its intent to move Bexar County from marginal to moderate nonattainment for ozone. Should the proposal be finalized, Bexar County would be required to meet the ozone standard of 70 ppm by 24 September 2024 (COSA, 2022b). The city of San Antonio, within Bexar County, has been designated as moderate nonattainment for ozone.

JBSA-BUL is defined as a "minor source" and operates under a TCEQ-issued permit-by-rule. Facilities operating under a permit-by-rule are required to monitor emissions and report the findings.

3.7.1.7 Regional Meteorology

The ROI is typified by warm, temperate weather conditions. On average, temperatures range from 62 to 95 degrees Fahrenheit in the summer, and 39 to 74 degrees Fahrenheit in the winter. Average annual precipitation is approximately 33 inches but can vary from 10 to 51 inches from year to year. Common weather conditions for San Antonio and the surrounding region include clear, sunny skies and low wind speeds. Average annual evaporation is 69 inches, or 1.3 inches per week (Air Force, 2020b).

3.7.2 Environmental Consequences

3.7.2.1 Evaluation Criteria

The environmental impact methodology for air quality impacts presented in this EA is derived from Air Force Manual (AFMAN) 32-7002, *Environmental Compliance and Pollution Prevention* (February 2020). First, a proposed action is broken down into basic units (e.g., demolition [ft^2], grading [ft^2], building construction [ft^2 and height], architectural coatings [ft^2], and paving [ft^2]). Second, these data are entered into the Air Force's Air Conformity Applicability Model (ACAM), a software program used to estimate the resultant criteria pollutant emissions, as defined in the NAAQS. These emissions are then compared against the applicable threshold based on the attainment status of the applicable AQCR or county. If the annual net increase in emissions of the proposed action are below the applicable thresholds, then it is not considered significant and does not require a more in-depth analysis to comply with the CAA (i.e., a conformity determination). The ACAM analyses for the Proposed Action is included as **Appendix C**.

Because Bexar County is in marginal nonattainment for ozone, the *de minimis* value in 40 CFR § 93.153(b)(1) was used as the threshold for ozone precursors. As Bexar County is in attainment for all other criteria pollutants under the NAAQS, the applicable PSD values were used as thresholds, except for lead. Due to its toxicity, the Air Force used the *de minimis* value for lead. Specifically, applicable thresholds for the Proposed Action include:

- 100 tpy *de minimis* value for ozone precursors (volatile organic compounds and nitrogen oxides),
- 250 tpy PSD value for carbon monoxide, sulfur dioxide, PM_{10}, $PM_{2.5}$ precursor ammonia, and
- 25 tpy *de minimis* value for lead.

3.7.2.2 No Action Alternative

Under the No Action Alternative, wastewater operations on JBSA-BUL would continue in accordance with the status quo. Over time, air quality conditions would be determined by changes in population, land and energy usage, and related factors within Bexar County, Texas, and the Metropolitan San Antonio Intrastate AQCR.

3.7.2.3 Alternative 1 – Camp Bullis Road

Table 3-3 summarizes the total estimated annual emissions of criteria pollutants that would result from implementation of Alternative 1 over the action period (i.e., from approximately 2025 to 2029) (see **Appendix C**) including the removal of the existing WWTP. These values were then compared to the applicable (annual) NAAQS thresholds. Since the net annual increase in emissions of criteria pollutants under Alternative 1 would not exceed the NAAQS thresholds for any one year between 2025 and 2029, the Air Force is not required to prepare a more detailed conformity determination under the CAA. As such, potential air quality effects under Alternative 1 would be short term and minor.

Table 3-3
Comparison of Air Emissions and Annual PSD Thresholds under Alternative 1 (2025–2029)

Pollutant	Action Emissions (tpy)	GENERAL CONFORMITY	
		Threshold (tpy)	Exceedance (yes or no)
volatile organic compounds	0.595	100	No
nitrogen oxides	3.153	100	No
carbon monoxide	4.437	250	No
sulfur oxides	0.012	250	No
PM_{10}	34.403	250	No
$PM_{2.5}$	0.115	250	No
lead	0.000	25	No
ammonia	0.002	250	No
CO_2e	1163.4	N/A	N/A

CO_2e = carbon dioxide equivalent; N/A = not applicable; PM_x = particulate matter equal to or less than *x* microns in diameter; PSD = Prevention of Significant Deterioration; tpy = ton per year

Cumulative Effects

Under Alternative 1, Bexar County and the City of San Antonio would continue to revise and implement the SIP for attainment of ozone and to maintain attainment status for all other criteria pollutants. Enforcement of the General Conformity Rule would also continue within Bexar County, Texas, and the Metropolitan San Antonio Intrastate AQCR. When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-BUL, no significant cumulative effects to air quality would be anticipated to occur with implementation of the Proposed Action.

3.7.2.4 Alternative 2 – Shavano Highlands Subdivision

Table 3-4 summarizes the total estimated annual emissions of criteria pollutants that would result from implementation of Alternative 2 over the action period (i.e., from approximately 2025 to 2029) (see **Appendix C**) including the removal of the existing WWTP. These values were then compared to the applicable (annual) NAAQS thresholds. Overall, emissions from implementation of Alternative 2 would be lower than those under Alternative 1 because the conveyance line under Alternative 2 would be approximately 2.1 miles shorter. Since the net annual increase in emissions of criteria pollutants under

Alternative 2 would not exceed the NAAQS thresholds for any one year between 2025 and 2029, the Air Force is not required to prepare a more detailed conformity determination under the CAA. Therefore, potential air quality effects associated with Alternative 2 would be short term and minor.

Table 3-4
Comparison of Air Emissions and Annual PSD Thresholds under Alternative 2 (2025–2029)

Pollutant	Action Emissions (tpy)	GENERAL CONFORMITY	
		Threshold (tpy)	Exceedance (yes or no)
volatile organic compounds	1.150	100	No
nitrogen oxides	5.702	100	No
carbon monoxide	8.478	250	No
sulfur oxides	0.023	250	No
PM_{10}	20.288	250	No
$PM_{2.5}$	0.206	250	No
lead	0.000	25	No
ammonia	0.004	250	No
CO_2e	2195.1	N/A	N/A

CO_2e = carbon dioxide equivalent; N/A = not applicable; PM_x = particulate matter equal to or less than x microns in diameter; PSD = Prevention of Significant Deterioration; tpy = ton per year

Cumulative Effects

Under Alternative 2, Bexar County and the City of San Antonio would continue to revise and implement the SIP for attainment of ozone and to maintain attainment status for all other criteria pollutants. Enforcement of the General Conformity Rule would also continue within Bexar County, Texas, and the Metropolitan San Antonio Intrastate AQCR. When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-BUL, no significant cumulative effects to air quality would be anticipated to occur with implementation of the Proposed Action.

3.7.3 Best Management Practices and Mitigation Measures

The Air Force would implement the following BMPs to reduce potential air quality effects under the Proposed Action:

- Comply with JBSA environmental specifications during construction activities.
- Minimize vehicle idling by turning off equipment and vehicles when not in use.
- Cover dump truck beds while in transit or not in use to minimize fugitive dust emissions.
- Regularly water stockpiles or unpaved areas to minimize fugitive dust emissions.

No project-specific mitigation measures for air quality were identified by analysis.

3.8 EARTH RESOURCES

Earth resources include geology, topography, and soils. Geology refers to the structure and configuration of surface and subsurface features. Characteristics of geology include geomorphology, subsurface rock types, and structural elements. Topography refers to the shape, height, and position of the land surface. Soil refers to the unconsolidated materials overlying bedrock or other parent material. Soils are defined by their composition, slope, and physical characteristics. Attributes of soil, such as elasticity, load-bearing capacity, shrink-swell potential, and erodibility, determine its suitability to support a particular land use.

The ROI for earth resources is defined as the JBSA-BUL cantonment and 100 feet from each side of the ROW in all other project locations.

3.8.1 Existing Conditions

3.8.1.1 Geology and Topography

The Balcones Canyonlands, formed from uplift and subsidence along the Balcones Fault Zone, is a transition zone between central Texas and the coastal plain defined by the gradual descent of the ridge and its characteristic stairstep topography. The exposed and underlying limestone is another defining feature of the Balcones Canyonlands. The soluble limestone dissects springs, streams, and rivers working above and below ground to create canyons, sinkholes, and caverns (karst).

The geology underlying JBSA-BUL and northern San Antonio is influenced by the Balcones Fault Zone. The escarpment trends northeast to southwest across Texas and bisects the southeast portion of JBSA-BUL and northern San Antonio. In doing so, it separates the Glen Rose Limestone Formation to the northwest from the Edwards Limestone Formation to the southeast. The Glen Rose Limestone Formation consists of alternating layers of limestone, dolomite, and marl that outcrop in the central and northern portions of JBSA-BUL. Except for areas farther north along Cibolo Creek, this formation ranges in thickness from 410 to 450 feet. The Edwards Limestone Formation consists of nodular limestone, mudstone, highly altered crystalline limestone, and chert, and ranges in thickness from 210 to 250 feet.

The topography of JBSA-BUL and northern San Antonio is characterized by karst landforms created by the dissolution of carbonate rocks (e.g., limestone and dolomite) exposed to acidic water. Hydrogeologic features associated with karst landforms include sinkholes, sinking streams, closed depressions, subterranean drainage, mesocaverns (humanly impassable voids in karst limestone), and caves (Texas Speleological Survey, 2014). On JBSA-BUL, elevations range from approximately 700 to 1,500 feet above mean sea level. The steeper topography is found northwest of the Balcones Fault Zone. Surface drainage is generally oriented south to southeast; however, in many areas, the highly permeable limestone minimizes overland flows (USGS, 2021). Karst Zone designations at JBSA-BUL are defined via USFWS guidelines and are further discussed in **Section 3.10.1.4.**

In accordance with the USFWS' *Karst Preserve Managing and Monitoring Recommendations* (USFWS, 2014), JBSA-BUL maintains karst preserve areas (KPAs). KPAs are delineated as buffer zones around each cave where military training and operational restrictions apply. Approximately 1,757 acres of habitat area on JBSA-BUL are associated with the KPAs, most of which are found in the southernmost part of the Base (see **Figure 3-7** in **Section 3.10.1.4**).

3.8.1.2 Soils

The soils in the ROI are shown on **Figure 3-3. Table 3-5** further characterizes the soils associated with the Proposed Action.

The most predominant soils underlying the Proposed Action include the Eckrant and Brackett series soils. Eckrant soils are well drained, shallow, cobbly clay loam soils, with a moderately slow rate of permeability. These soils are found in areas that range from level to very steep (Air Force, 2020b). Brackett soils are well drained, clay and loam soils, typically found on steeper slopes.

None of the soils associated with the Proposed Action is classified as "hydric." The Brackett, Krum, Lewisville, and Sunev soil series have a compaction rating of "medium," meaning the upper 12 inches of these soils are susceptible to compaction when moist; all other soil series have a compaction rating of "low" (Natural Resources Conservation Service, 2022).

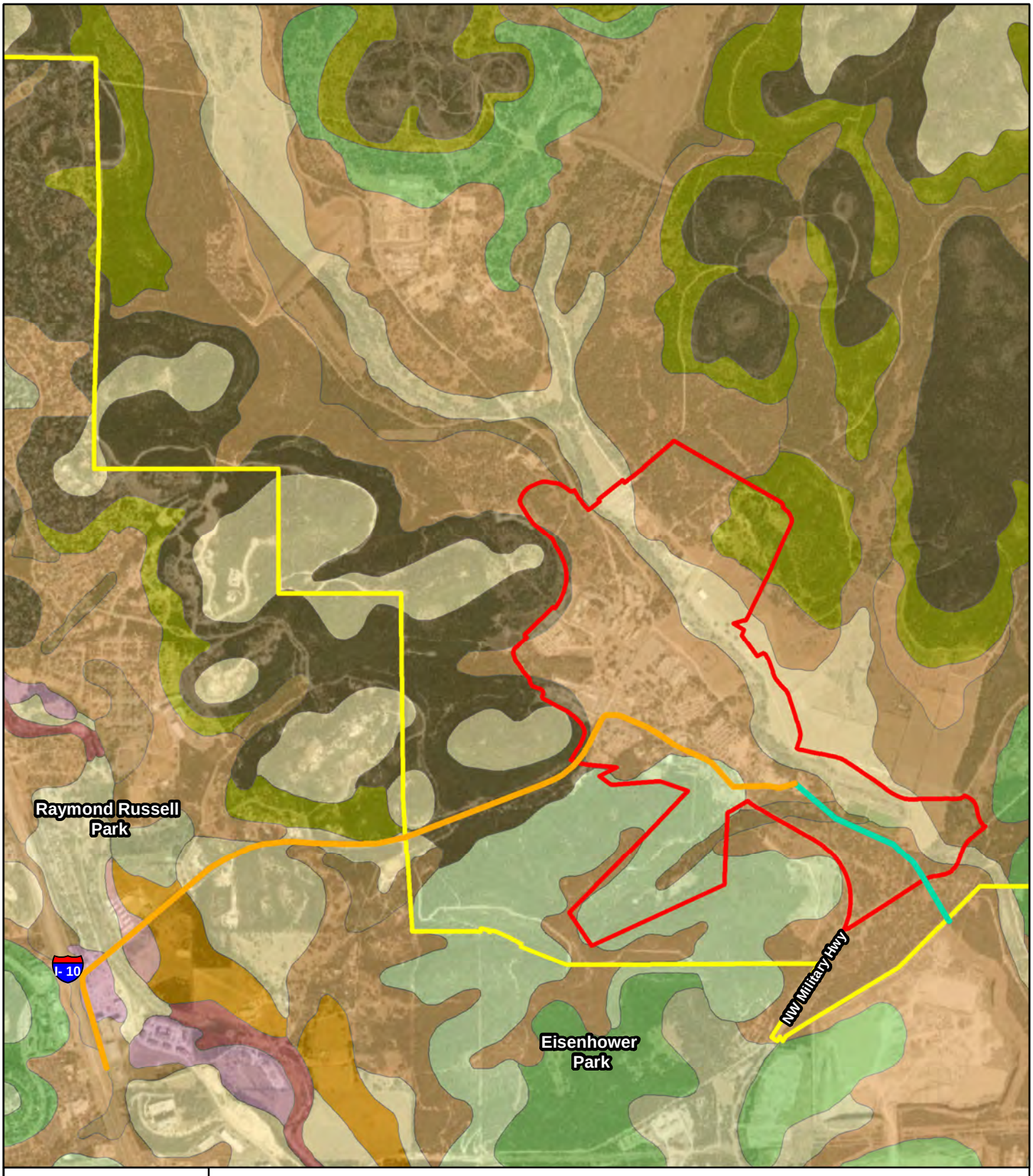


FIGURE 3-3
SOIL TYPES

N

Imagery: ESRI 2021
Projection: WGS 1984
Zone 14N

20 10 0 Miles

- Alternative 1
- Alternative 2
- Cantonment Area
- Installation Boundary
- BtE Brackett-Eckrant association, 20 to 60 percent slopes
- BrD Brackett gravelly clay loam, 3 to 12 percent slopes
- BrE Brackett gravelly clay loam, 12 to 20 percent slopes
- Cb Crawford, stony and Bexar soils, 0 to 5 percent slopes
- TaB Eckrant cobbly clay, 1 to 8 percent slopes
- TaD Eckrant-rock outcrop complex, 8 to 30 percent slopes
- TaC Eckrant very cobbly clay, 5 to 15 percent slopes
- Kr Krum clay, 1 to 5 percent slopes
- LvA Lewisville silty clay, 0 to 1 percent slopes
- LvB Lewisville silty clay, 1 to 3 percent slopes
- PaB Patrick soils, 1 to 3 percent slopes, rarely flooded
- VaB Sunev loam, 1 to 3 percent slopes
- Tf Tinn and Frio soils, 0 to 1 percent slopes
- Tc Tinn clay, 0 to 1 percent slopes, occasionally flooded

Prime Farmland

As defined by the *Farmland Protection Policy Act* (7 USC §§ 4201–4209), two soils associated with the Proposed Action are classified as "prime farmland" (Lewisville silty clay A and B); a third, Krum clay, is considered "prime farmland if irrigated." Additionally, Sunev loam soils are classified as "farmland of statewide importance" (Natural Resources Conservation Service, 2022).

Table 3-5
Soil Types Associated with the Proposed Action

Map Unit	Description	Depth to Bedrock[a] (ft)	Acreage of ROI (%)	Erosion Potential[b] (*K*)	Slope Gradient[c] (%)	Plasticity Rating[d] (%)	Farmland Class
BtE	Brackett-Eckrant association, 20 to 60 percent slopes	< 1	19	0.17	40	17	N/A
BrE	Brackett gravelly clay loam, 12 to 20 percent slopes	< 1	15	0.17	16	17	N/A
Cb	Crawford, stony and Bexar soils, 0 to 5 percent slopes	2.8	3	0.10	2	36	N/A
TaB	Eckrant cobbly clay, 1 to 8 percent slopes	< 1	59	0.10	3	32	N/A
TaD	Eckrant-Rock outcrop association, 8 to 30 percent slopes	< 1	1	0.05	19	32	N/A
Kr	Krum clay, 1 to 5 percent slopes	> 6.5	< 1	0.15	2	31	prime farmland if irrigated
LvA	Lewisville silty clay, 0 to 1 percent slopes	> 6.5	1	0.20	< 1	27	prime farmland
LvB	Lewisville silty clay, 1 to 3 percent slopes	> 6.5	< 1	0.20	2	27	prime farmland
VaB	Sunev loam, 1 to 3 percent slopes	> 6.5	< 1	0.28	2	14	farmland of statewide importance

Source: Natural Resources Conservation Service, 2022
Notes:
a Bedrock in soil survey refers to a continuous root and water restrictive layer of rock.
b Erosion factor *K* measures a soil's susceptibility to erosion based on its structure and permeability. Values of *K* range from 0.02 to 0.69; the higher the value, the more susceptible soils are to rill and gully erosion.
c Slope gradient is the difference in elevation between two points, expressed as a percentage of the distance between those points.
d Plasticity is the difference between the liquid and plastic limits of a soil or the range of water content in which a soil exhibits the characteristics of a plastic solid. Soils with a wide range of moisture content, such as clays, perform more as a plastic material.
ft = feet; N/A = not applicable; ROI = Region of Influence

3.8.2 Environmental Consequences

The Air Force defines a significant effect to earth resources within the ROI as one or more of the following:

- substantial alteration of unique or valued geologic or topographic conditions,
- substantial soil erosion, sedimentation, and/or loss of natural function (e.g., compaction), and
- development on soils with characteristics that do not support the intended land use.

3.8.2.1 No Action Alternative

Under the No Action Alternative, wastewater operations on JBSA-BUL would continue in accordance with the status quo. The probability of contaminants in wastewater being released into the soil would increase as the components of the treatment and collection system continue to age. Application of treated wastewater effluent would also continue within the permitted irrigation area on JBSA-BUL. Over time, development plans and projects on and around JBSA-BUL would disturb and alter the surface and subsurface in select areas, creating the potential for adverse effects on or from earth resources.

3.8.2.2 Alternative 1 – Camp Bullis Road

Potential effects on geology and topography would be short term and negligible under Alternative 1. Under Alternative 1, construction activities would involve earthwork to install the wastewater conveyance line below ground. Earthwork would include trench excavation, subsurface boring, backfill of soils (i.e., reuse and fill) and substrate to meet design specifications, and compaction and grading of topsoil post construction. These activities would expose soils and increase their susceptibility to water and wind erosion. Inclement weather (e.g., rain or wind) would increase the probability and severity of soil erosion, particularly during construction. Alternative 1 could also result in the accidental release of contaminants or unintentional disturbance of contaminated soils that already persist in the environment.

To minimize potential effects from erosion, JBSA would obtain and comply with Texas Pollutant Discharge Elimination System (TPDES) General Permit No. TXR150000. This construction general permit requires projects disturbing 5 acres or more of land to prepare and obtain a TCEQ-approved stormwater pollution prevention plan (SWP3) and publish an NOI prior to construction to solicit input on the project. Copies of the SWP3 and NOI (if required) would be submitted to the JBSA Water Quality Manager for review prior to start of construction. A Notice of Termination would be filed to the TCEQ prior to project completion, with a copy submitted to the JBSA Water Quality Manager. If total acreage of all projects is greater than 5 acres, the project would require an Edwards Aquifer contributing zone plan (CZP), in accordance with 30 TAC 213. The SWP3 would include required BMPs for structural and non-structural erosion, sediment, and waste control during and after construction. The SWP3 may also include planning and operational considerations such as staging construction equipment and materials on existing gravel or paved surfaces and minimizing or restricting vehicle movements within the construction ROW. Implementation of these measures would minimize soil erosion and loss and reduce the potential for contaminants to enter the soil media.

Alternative 1 would alter soil structure, composition, and function in portions of the ROW. However, the siting and design of Alternative 1 would necessarily consider soil structure and function to ensure the operational integrity and safety of the wastewater conveyance line. The compaction ratings of the involved soils would also be considered by design. Further, existing gravel and paved surfaces within the ROW of Alternative 1 would provide ample space to park or stage construction vehicles and equipment.

Upon installation of the pipeline and backfill with soils and substrate in accordance with design criteria, surficial soils under Alternative 1 would be graded to conform to local topography and achieve positive surface drainage. Under Alternative 1, construction would conclude with revegetation of the landscape using native plants and trees. JBSA would then conduct post-construction site inspections to ensure any agreed upon management measures remain effective and pre-construction conditions remain the same or improve.

At any time during trenching and boring, new cave and karst features could be discovered (see **Section 3.10.1.4**). If new caves or habitat were to be discovered, all construction work would stop until USFWS could be contacted and new surveys conducted.

Overall, under Alternative 1, construction activities would result in potential short-term, minor effects on soils; however, effects would be temporary and further reduced by implementing required management measures and best practices. In the long term, potential effects on soils from operations under Alternative 1 would be minor.

Prime Farmland

Under Alternative 1, Krum clay is the only soil associated with the on-Base portion of the Proposed Action designated prime farmland (if irrigated). Given the historic use of JBSA-BUL for military training and because these areas of the Base are not subject to irrigation, no impacts to prime farmland soils on JBSA-BUL would occur under Alternative 1.

The off-Base portion of Alternative 1 would potentially affect approximately 6.3 acres of prime farmland (i.e., Lewisville silty clays A and B) and approximately 1.5 acres of farmland of statewide importance (i.e.,

Sunev loam). These soils would be further evaluated in the planning and design phase of Alternative 1 to determine whether such areas qualify for protection under the *Farmland Protection Policy Act*.

Cumulative Effects

Under Alternative 1, development plans and projects within and around the San Antonio metropolitan area would continue to be regulated under the National Pollutant Discharge Elimination System (NPDES) permitting program. Depending on the nature and size of development, regulatory compliance measures would be in place to prevent or minimize potential effects on earth resources. When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-BUL, no significant cumulative effects on earth resources, including soils, would be anticipated to occur with implementation of the Proposed Action.

3.8.2.3 Alternative 2 – Shavano Highlands Subdivision

Potential effects on earth resources from the construction of a new wastewater conveyance line under Alternative 2 would be similar to those described for Alternative 1. Although the conveyance line under Alternative 2 would be approximately 2.1 miles shorter, associated construction activities would have the potential to disrupt undisturbed soils in the newly acquired ROW.

Implementation of Alternative 2 would expose soils subject to potential erosion via surface runoff or leaching downward into groundwater due to proposed site grading and removal of existing underground infrastructure.

However, Alternative 2 would also be subject to conditions set forth in a TPDES permit, including preparation of TCEQ-approved SWP3. All other requirements and measures to minimize potential adverse effects on or from soils described above for Alternative 1 would also apply to Alternative 2.

Overall, under Alternative 2, construction activities would result in potential short-term, moderate effects on soils. Potential effects would be temporary and further reduced by implementing required management measures and best practices. In the long term, potential effects on soils from operations under Alternative 2 would be minor.

Prime Farmland

No soils associated with Alternative 2 are designated prime farmland or farmland of statewide importance. Therefore, Alternative 2 would have no potential to affect farmland resources.

Cumulative Effects

Under Alternative 2, development plans and projects within and around the San Antonio metropolitan area would continue to be regulated under the NPDES permitting program. Depending on the nature and size of development, regulatory compliance measures would be in place to prevent or minimize potential effects on earth resources. When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-BUL, no significant cumulative effects on earth resources, including soils, would be anticipated to occur with implementation of the Proposed Action.

3.8.3 Best Management Practices and Mitigation Measures

The Air Force would require contractors to implement the following BMPs to reduce potential effects on or from earth resources under the Proposed Action:

- Comply with JBSA environmental specifications during construction activities.
- Prior to construction, obtain an applicable TPDES permit to manage stormwater on a site-specific basis. Prepare a State-approved SWP3 and submit a NOI as appropriate. Adhere to the permit

conditions during construction to minimize soil erosion, sedimentation, and compaction under the Proposed Action.

- When practicable or in compliance with applicable laws and regulations, incorporate low-impact development (LID)[6] features and techniques into the design of the Proposed Action to increase stormwater retention and infiltration on the project sites.
- When practicable, identify and implement BMPs for construction and post-construction stormwater management in accordance with the USEPA's National Menu of Best Management Practices (BMPs) for Stormwater or other technical guidance.

No project-specific mitigation measures for or from earth resources were identified by analysis.

3.9 WATER RESOURCES

Water resources include watershed management, surface waters, wetlands, stormwater management, floodplains, and groundwater, the features and functions of which are valued by or beneficial to humans (e.g., water quality, recreation, and flood protection).

The ROI for water resources includes the surface and subsurface environments at, adjacent to, and downstream of the Proposed Action where potential effects could reasonably be expected to occur.

3.9.1 Existing Conditions

3.9.1.1 Watershed Management

Bexar County is part of the 4,180-square-mile San Antonio River Basin, including the principal tributaries of the Medina River, Leon Creek, Cibolo Creek, and Salado Creek. The TWDB administers a program for the long-term planning and development of state water resources. The TWDB divides Texas into 16 distinct regional water planning areas for this purpose. Each regional water planning area is tasked with developing a regional water plan for incorporation into the statewide water plan prepared by the TWDB. Bexar County is part of the Region L regional water planning area.

Most of the southern half of JBSA-BUL is part of the Salado Creek watershed; a small area of land in the southwest corner of the Base lies within the Leon Creek watershed. The Proposed Action would take place in portions of the following three sub-watersheds as identified by their principal tributaries (**Figure 3-4**):

- Lewis Creek-Salado Creek (Hydrologic Unit Code [HUC] 121003010101)
- Upper Leon Creek (HUC 121003020402)
- Leon Creek Headwaters (HUC 121003020401)

Water quality concerns primarily relate to increases in urbanization and contaminants generated on the land surface that convey downstream to areas that function to recharge the Edwards Aquifer.

[6] LID measures include filtration, infiltration, evaporation, plant transpiration, and rainwater reuse to retain and treat stormwater on site, in contrast to conventional management practices that temporarily store and ultimately discharge stormwater to receiving waterbodies.

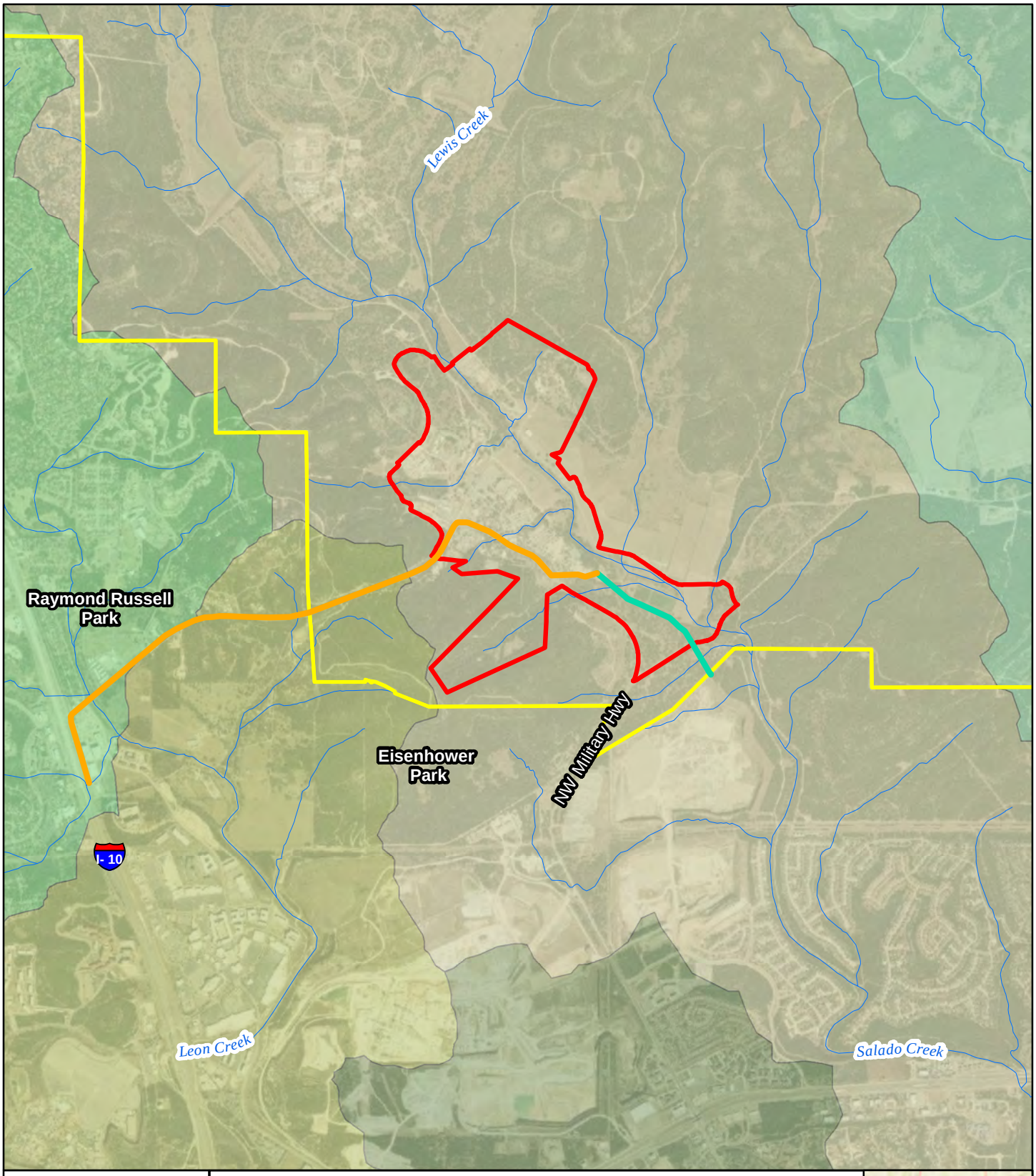


FIGURE 3-4
DRAINAGE BASINS

N

Imagery: ESRI 2021
Projection: WGS 1984
Zone 14N

0 0.25 0.5 Miles

Alternative 1
Alternative 2
Stream/Creek
Cantonment Area

Headwaters Leon Creek
Installation Boundary
Lewis Creek Salado Creek
Olmos Creek/ San Antonio River

Panther Springs/ Salado Creek
Upper Leon Creek

3.9.1.2 Surface Waters and Water Quality

Pursuant to the *Clean Water Act* (33 USC § 1251 et seq.) (CWA), TCEQ sets and enforces water quality standards for surface waters in Texas. Discharges to state waters are permitted under the TPDES permit program. TPDES permits are required for different types of pollutant-generating activities such as construction, industrial operations, and public-owned and -operated storm sewers (TCEQ, 2020a, 2021c).

Under Section 303(d) of the CWA, the TCEQ is required to identify and develop a list of waterbodies (or waterbody segments) that are impaired based on their intended use (e.g., swimming or fishing). Impaired waterbodies are those that are not in attainment with water quality standards promulgated by the TCEQ. To achieve attainment status, a total maximum daily load (TMDL) is developed for the impairment. TMDLs use science-based criteria to establish a regulatory ceiling for the impaired waterbody to achieve attainment of water quality standards; that is, the maximum pollutant loads a waterbody may receive from all or portions of a basin or sub-basin in attainment of water quality standards. TMDLs target specific pollutants and set enforceable limits to improve or maintain the current conditions of 303(d)-listed waterbodies. TCEQ also implements a statewide water quality sampling program for this purpose and requires sampling through the issuance of TPDES permits (USEPA, 2021a).

The water quality of the San Antonio River Basin has improved over historic levels, in large part due to more advanced wastewater treatment within the region. For example, dissolved oxygen concentrations in the surface waters of the basin have increased substantially in the last several decades. However, water quality in portions of the basin continues to be of management concern for low dissolved oxygen levels and contaminants such as fecal coliform and nutrients.

The surface waters of JBSA-BUL are characterized by numerous intermittent streams, three large flood structures that regulate surface flow downstream in certain areas of the Base (e.g., the cantonment area), and, to a lesser extent, man-made ponds (**Figure 3-5**). Most streams and ponded areas remain dry throughout the year but are subject to overflow during high-intensity rainfall events.

The ROI for water resources is characterized by the convergence of Salado Creek and Lewis Creek north of the JBSA-BUL cantonment and Leon Creek west of the Base. From its point of convergence with Lewis Creek, Salado Creek flows in a southernly direction through the cantonment and eventually discharges to the San Antonio River; however, surface waters often percolate to groundwater quickly, leaving the stream bed dry for much of the year. Segment 1910 of Salado Creek, from its headwaters in Camp Stanley to its confluence with Lewis Creek on JBSA-BUL, was previously designated “impaired” for low levels of dissolved oxygen. However, recent studies concluded there is now sufficient capacity to assimilate oxygen-demanding materials within this portion of Salado Creek and that an implementation plan for the TMDL is not necessary (TCEQ, 2021a).

Leon Creek is a south-to-southeast-flowing tributary of the Medina River that generally parallels the portion of I-10 to the west of JBSA-BUL. It then flows through western San Antonio before discharging to the Medina River approximately 12 miles south of downtown. Like Salado Creek, segments of Leon Creek within the ROI are often dry due to high rates of percolation into groundwater. To the south-southwest of the ROI, Segment 1906 of Leon Creek from northwest San Antonio south to its confluence with the Medina River was previously designated “impaired” for low levels of dissolved oxygen. However, the impairment was removed by assessment in 2016 (TCEQ, 2021b).

3.9.1.3 Wetlands

The natural-function benefits of wetlands include flood control, groundwater recharge, wildlife habitat, recreational opportunities, and maintenance of water quality. For these reasons, wetlands are regulated as a subset of Waters of the US under Section 404 of the CWA. When a federal action requires a Section 404 wetlands permit, states have authority under Section 401 of the CWA to enforce surface water quality standards through review of the Section 404 permit application.

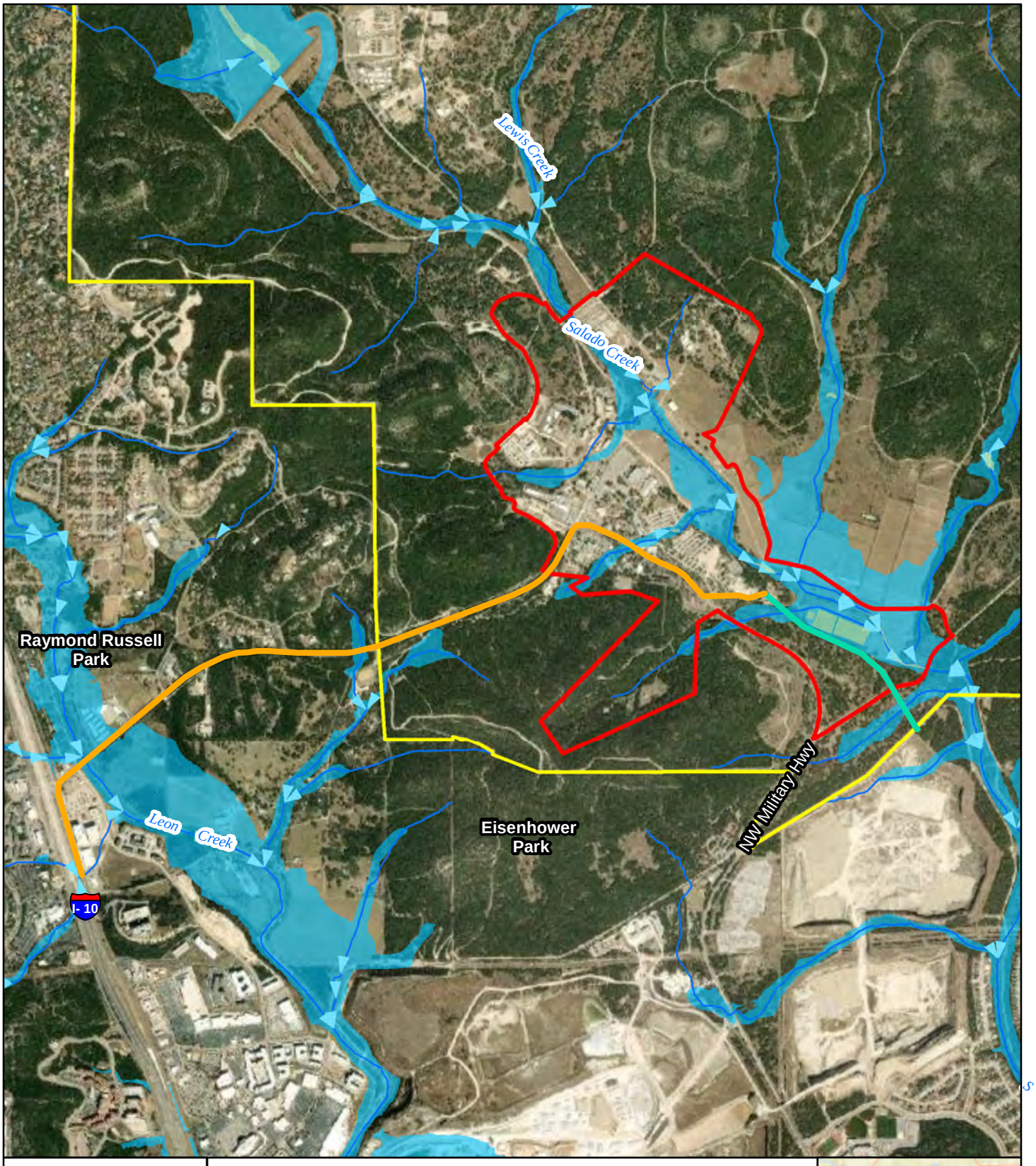


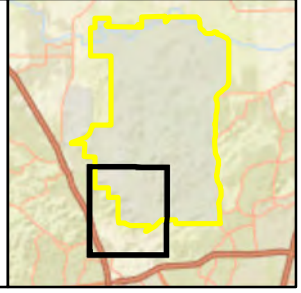
FIGURE 3-5
SURFACE WATERS AND FLOODPLAINS

N

Imagery: ESRI 2021
Projection: WGS 1984
Zone 14N

0 0.25 0.5 Miles

- Surface Flow Direction
- Alternative 1
- Alternative 2
- Stream/Creek
- Cantonment Area
- Installation Boundary
- Wetland
- 100-Year Floodplain



Wetlands in the ROI are characterized by relatively small, isolated communities, many of which occur within portions of 100-year floodplains. Treated wastewater storage ponds associated with the existing WWTP are classified as wetlands because of their ability to support wetland vegetation and wildlife; however, these wetlands are not considered jurisdictional[7] and do not connect to other wetlands or surface water systems. The wetlands associated with the Proposed Action are limited to these treated wastewater storage ponds in the southeast portion of the JBSA-BUL cantonment (see **Figure 3-5**).

3.9.1.4 Stormwater Management

Stormwater management in the ROI is focused on precipitation runoff that occurs as sheet flow during major storm events. For example, on JBSA-BUL, the San Antonio River Authority (SARA) constructed four stormwater impoundments north of the Base cantonment to decrease the rate of stormwater runoff downstream. Pursuant to the CWA, JBSA-BUL is regulated as a small municipal separate storm sewer system (MS4) operator and maintains an MS4 permit for its stormwater conveyance system. As a requirement of the MS4 permit, JBSA-BUL maintains a Base-wide SWP3. This SWP3 describes procedures for the management of stormwater on the Base, including its conveyance to four regulated outfalls subject to compliance with JBSA-BUL's multi-sector general permit (MSGP) for industrial facilities (TPDES General Permit No. TXR0550000). Three of these outfalls discharge to Salado Creek; the other discharges to Panther Springs Creek. The Base's MSGP is associated with vehicle maintenance, refueling, and explosives detonation operations, as well as with several landfill sites contaminated by past military operations. Stormwater discharges are further regulated under the *Edwards Aquifer Rules* (30 TAC 213), the requirements of which are incorporated into the MSGP for the Base.

Stormwater discharges from construction activities on JBSA-BUL are also permitted under the TPDES. The type and extent of a construction activity on the Base determines stormwater management requirements on a case-by-case basis as follows:

- Disturbance of **1 acre** to less than **5 acres** that ***are not*** part of a larger common plan of development requires preparation, implementation, and maintenance of a site-specific SWP3.
- Disturbance of **1 acre** to less than **5 acres** that ***are*** part of a larger common plan of development requires authorization under TPDES General Permit No. TXR150000, including a TCEQ-approved SWP3 and NOI publication prior to construction.
- Disturbance of **5 acres or more** requires authorization under TPDES General Permit No. TXR150000, including a TCEQ-approved SWP3 and NOI publication (i.e., whether part of a larger common plan of development or not) prior to construction.

These construction general permits establish standard measures to prevent or minimize potential soil erosion and sedimentation from construction sites (TCEQ, 2020a).

3.9.1.5 Floodplains

Floodplains are areas of low-lying, relatively flat ground adjacent to rivers, streams, large wetlands, or coastal waters with a potential for inundation due to rain or melting snow. In a natural vegetated state, floodplains slow the rate at which incoming overland flows reach the adjacent waterbody. Floodplains also function to recharge groundwater, maintain water quality, provide wildlife habitat, and support recreation.

The Federal Emergency Management Agency (FEMA) defines the 100-year floodplain or base flood as an area that has a 1-percent chance of inundation in any given year; the area with a 0.2-percent chance of inundation in any given year is defined as the 500-year floodplain. FEMA designates 100-year floodplain zones to indicate the severity or type of flooding in an area. Zone A designates portions of 100-year

[7] Jurisdictional delineations are performed on a property in order to delineate which waters are Waters of the US and are therefore subject to CWA 404 (see https://www.epa.gov/cwa-404/what-jurisdictional-delineation-under-cwa-section-404).

floodplains where depths or base flood elevations are not yet known and require further study. Conversely, Zone AE portions of 100-year floodplains are those with defined base flood elevations. Beyond the 100-year floodplain, areas designated as Zone X are either shaded to indicate the 500-year floodplain or unshaded to indicate a lower risk of flooding outside the 100- and 500-year floodplains (FEMA, 2021).

EO 11988, *Floodplain Management*, requires federal agencies to determine whether proposed development would occur within a floodplain and to consider alternatives to avoid adverse effects and incompatible development in floodplains. Where construction within the floodplain is unavoidable, development of a FONPA is required detailing why no other practicable alternatives exist. EO 13690, *Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input,* reinforces the tenets of EO 11988 to avoid actions in a floodplain or minimize potential harm if an action must take place in a floodplain. For example, EO 13690 directs federal agencies to use nature-based approaches when developing alternatives for actions under EO 11988.

EO 13690 further directs federal agencies to use higher standards for actions in floodplains by managing beyond the base flood to a higher vertical flood elevation and corresponding horizontal floodplain. The FFRMS describes varying ways to determine a higher flood elevation and extent for federally funded projects; however, the goal is to establish the level to which a structure or facility must be to minimize current and future flood risks. As a resilience standard, the FFRMS provides flexibility to use structural or nonstructural methods to reduce or prevent damage, elevate a structure, or, if appropriate, consider adaptation or recovery by design.

The San Antonio River Basin is part of an area commonly associated with “flash” flooding from high-intensity, short-in-duration rainfall (SARA, 2021). In coordination with FEMA, the SARA regulates floodplain use in Bexar County. SARA also functions as a technical resource for floodplain management (e.g., the surface water impoundments on JBSA-BUL). Such flood control structures hold water temporarily after rain events to increase infiltration into groundwater.

Floodplains associated with the ROI are primarily found adjacent to stream channels and within impoundment areas (see **Figure 3-5**).

3.9.1.6 Groundwater and Water Quality

Groundwater is water that collects or flows beneath the land surface. As precipitation occurs, water percolates through the ground and occupies porous space in soil, sediment, and rocks. Groundwater resources are often used for potable water consumption, agricultural irrigation, and industrial applications. An aquifer is a body of porous rock or sediment saturated with groundwater. In Texas, aquifers are a critical source of water, supplying more than 60 percent of annual water use (TWDB, 2021b). As defined by the TWDB, there are two “major” aquifers associated with Bexar County, the Trinity Aquifer and the Edwards (Balcones Fault Zone) Aquifer.

The Trinity Aquifer extends across central and northeastern Texas. This aquifer system occupies 21,308 square miles of subsurface area, underlying all or parts of 61 Texas counties. Because it is composed of several smaller aquifers within the Trinity Group, the Trinity Aquifer is referred to by several different names across the state. For example, in Bexar County, the aquifer is often referred to as the Glen Rose Aquifer. Regardless of nomenclature, the smaller aquifers that comprise the Trinity Aquifer consist of limestones, sands, clays, gravels, and conglomerates. The Trinity Aquifer discharges to numerous springs throughout its reach. The groundwater of the Trinity Aquifer is primarily used as a source of potable water. There are no major concerns with respect to the water quality of the Trinity Aquifer; however, increased total dissolved solids and concentrations of sulfate and chloride have been detected in portions of the aquifer. JBSA-BUL is part of the Trinity Aquifer’s outcrop area, the part of an aquifer that lies at the land surface (TWDB, 2021c).

The Edwards (Balcones Fault Zone) Aquifer occupies a subsurface area of 2,314 square miles in south-central Texas. The Edwards Aquifer extends across parts of 13 Texas counties, including Bexar County. Because it primarily consists of partially dissolved limestone, the Edwards Aquifer is highly permeable. The

Edwards Aquifer discharges to numerous springs throughout its reach. The water quality of the Edwards Aquifer is generally considered to be high. The groundwater of the aquifer is primarily used as a source of potable water and for agricultural irrigation; the city of San Antonio obtains nearly half of its water supply from the Edwards Aquifer. Because of its high rate of permeability, water levels and spring flows in the Edwards Aquifer can fluctuate rapidly in response to rainfall, drought, or pumping. This characteristic also increases the aquifer's susceptibility to pollution from stormwater runoff or spills. Groundwater contamination in the Edwards Aquifer is of particular concern with respect to drinking water and the unique ecology of the aquifer (TWDB, 2021d, 2021b).

Most of JBSA-BUL overlies a portion of the Edwards Aquifer designated the "contributing zone"; that is, the area that drains to surface waters that are a source of recharge for the aquifer. Approximately 4,000 acres in the southeastern portion of the Base are designated as the "recharge zone," an area where water recharge occurs directly from surface to groundwater in unconfined portions of the aquifer, such as springs and sinkholes (Edwards Aquifer Authority, 2021). Because of their proximity to one another in the sub-stratum, the Trinity and Edwards aquifers are hydrologically connected at JBSA-BUL. Hydrologic connectivity occurs in areas of combined groundwater where effects on one aquifer may also affect the other.

Edwards Aquifer Protection Zones

TCEQ regulates activities in the Edwards Aquifer Authority-designated Edwards Aquifer protection zones. Although requirements depend on the type of activity and zone in which it would occur, any activity with a potential to pollute the aquifer and surface streams that recharge it is subject to regulation. All activities, regardless of zone, must install erosion and sedimentation controls that meet specific requirements before any work begins. These controls must be maintained during construction and remain in place post construction until vegetation is re-established.

When conducting a regulated activity over the Edwards Aquifer where a project site is all or partially on the recharge zone, the preparation of an Edwards Aquifer Protection Plan (EAPP) is required prior to the start of construction. Project sites located entirely over the contributing zone require an EAPP when disturbing 5 acres or more of land, either individually or as a part of a larger plan of development. Although there is more than one type of EAPP,[8] these activity-specific plans outline and codify BMPs to prevent contamination of the Edwards Aquifer. EAPPs are subject to TCEQ review and approval and include measures to be implemented before and maintained after the regulated activity.

During construction on the recharge or transition zones, if sensitive features (as defined in 30 TAC 213.3(29)) are encountered where a potential exists for hydrologic connectivity between the surface and subsurface portions of the Edwards Aquifer, work must stop immediately, and workers must adhere to additional rules for the activity. In such cases, a Texas-certified professional engineer or geoscientist must conduct a geologic assessment, including recommendations to protect the groundwater resources of the aquifer (TCEQ, 2008).

3.9.2 Environmental Consequences

The Air Force defines a significant effect to water resources within the ROI as one or more of the following:

- substantial, permanent alteration, damming, diversion or redirection of jurisdictional stream segments or hydrological connections to Waters of the US, including wetlands;
- substantial changes to the volume, rate, or quality of stormwater discharges that result in non-compliance with applicable water quality regulations or permit conditions;

[8] An EAPP may include a water pollution abatement plan, organized sewage collection system plan, under- or above-ground storage tank facility plan, contributing zone plan, or a modification or exception granted under 30 TAC 213.

- development within 100- or 500-year floodplains or jurisdictional wetlands without full consideration of other practicable alternatives or methods to avoid and minimize adverse effects;
- release of contaminants to groundwater underlying a project site exceeding applicable regulatory thresholds (i.e., maximum concentration levels); and
- substantially reduced groundwater recharge or volume at or near a project site (e.g., lowering of the water table).

The Air Force has determined that the Proposed Action necessitates development within and proximate to 100-year floodplains. Although alternative routes were considered to avoid or minimize potential adverse effects on floodplain resources, no other routes evaluated were determined feasible to support the project largely due to other associated environmental concerns. Other factors considered included safety, security, and the location and capacity of existing infrastructure. Alternative 1 and Alternative 2 were determined to be the only feasible options available that would meet technical specifications of the Proposed Action with the least environmental impacts. To document planning conducted to avoid and minimize potential adverse effects of the Proposed Action on 100-year floodplains, the Air Force prepared a FONPA.

3.9.2.1 No Action Alternative

Under the No Action Alternative, wastewater operations on JBSA-BUL would continue in accordance with the status quo. The probability of contaminants in wastewater being released into groundwater and surface water would increase as the components of the treatment and collection system continue to age. Application of treated wastewater effluent would also continue within the permitted irrigation area on JBSA-BUL. Over time, development plans and projects on and around JBSA-BUL would disturb soils creating the potential for erosion and sedimentation of surface waters or leaching into groundwater.

3.9.2.2 Alternative 1 – Camp Bullis Road

Watershed Management

Alternative 1 would occur in parts of both the Lewis Creek-Salado Creek and Upper Leon Creek sub-watersheds. Project areas under Alternative 1 would be drained by several unnamed, intermittent tributaries of Salado Creek or Leon Creek. Under Alternative 1, construction activities would involve earthwork to install the wastewater conveyance line below ground, to include excavation, boring, grading, and site restoration. All creeks within the ROI flow southward toward portions of both sub-watersheds. These activities are unlikely to lead to measurable adverse effects on the sub-watersheds or overall watershed management because the Proposed Action would not result in an increase in impervious surface within the ROI. Potential impacts under Alternative 1 would be short term and negligible.

Surface Waters and Water Quality

Alternative 1 would occur in parts of both the Salado Creek and Leon Creek watersheds. Project areas under Alternative 1 would be drained by several unnamed, intermittent tributaries of Salado Creek or Leon Creek. Under Alternative 1, construction activities would involve earthwork to install the wastewater conveyance line below ground, to include excavation, boring, grading, and site restoration. These activities would have the potential to result in erosion and sedimentation or potential release of contaminants that could degrade surface water quality in the ROI.

As described in **Section 3.7.2**, Alternative 1 would be subject to the conditions of a TPDES construction general permit, which would require the preparation of a TCEQ-approved SWP3. These plans contain project-specific measures to minimize potential effects from erosion and sedimentation of surface waters. With these measures in place, sedimentation and pollution of surface waters would not be likely to occur under Alternative 1; potential effects would be short term and minor.

Under Alternative 1, construction activities in the ROI would bisect three intermittent streams: small segments of Leon Creek and two of its (unnamed) tributaries. Leon Creek is a jurisdictional Water of the US (WOTUS) (USACE, 2014). Therefore, at a later stage of design, the wastewater line installation method

selected would comply with CWA Sections 404 and 401 regarding dredge or fill activities within any jurisdictional WOTUS. Based on a temporary construction ROW of 100 feet, approximately 332 linear feet of intermittent streams would be subject to potential effects under Alternative 1. Compliance with applicable TCEQ water quality standards would also be met through this permitting process. With regulatory compliance measures in place, potential effects from dredge or fill activities within these stream segments would be short term and minor.

Wetlands

The proposed wastewater conveyance line under Alternative 1 would not cross any existing wetlands and would not result in adverse effects to these resources. Although Leon Creek is a jurisdictional WOTUS, no jurisdictional wetlands associated with this channel have been identified (USACE, 2014). The non-jurisdictional storage ponds would be decommissioned and left in their current state, with no further actions planned to modify the resources. Under Alternative 1, there would be no direct effects on these wetlands. During construction, required erosion and sedimentation controls would prevent or minimize the potential effects of stormwater runoff into these wetlands. Therefore, potential effects on wetlands under Alternative 1 would be short term and negligible.

Stormwater Management

There would be no increase in impervious surfaces under Alternative 1. Alternative 1 would occur in parts of both the Salado Creek and Leon Creek watersheds. Project areas under Alternative 1 would be drained by several unnamed, intermittent tributaries of Salado Creek or Leon Creek. Under Alternative 1, construction activities would involve earthwork to install the wastewater conveyance line below ground, to include excavation, boring, grading, and site restoration. These activities would have the potential to result in erosion and sedimentation or potential release of contaminants that could degrade surface water quality in the ROI.

Potential contaminants from stormwater would be regulated and monitored under a TCEQ-approved SWP3. Alternative 1 would incorporate LID measures to the maximum extent technically feasible. These design measures would help to maintain or restore stormwater runoff to pre-construction conditions in terms of temperature, rate, volume, and duration of surface flow. Under Alternative 1, the Air Force would conduct an analysis of pre-development hydrology to establish a baseline condition and set design objectives for stormwater management. If design objectives could not be met on one or more project sites, LID measures would be considered for application in areas downstream thereof (i.e., either on or in the vicinity of the ROI). These compliance measures would further reduce potential erosion and sedimentation downstream of project sites associated with Alternative 1. Potential effects on stormwater management under Alternative 1 would be short term and minor.

Floodplains

Alternative 1 would occur within and directly affect approximately 4.4 acres of 100-year floodplains (see **Figure 3-5**). However, potential effects on the function and capacity of these floodplains would be limited to the construction phase. Following construction, site restoration of floodplain areas would include revegetation of disturbed areas with native grass, plant, and tree species. Because the wastewater conveyance line would be relocated underground, no permanent structures would be erected that could impede surface water flows in or across floodplains, and impervious surfaces would not increase. Under Alternative 1, the ROW and resultant land use would generally preserve the natural-function benefits of the 100-year floodplains following construction and site restoration. Therefore, potential effects on floodplains under Alternative 1 would be short term and minor.

Groundwater and Water Quality

Under Alternative 1, construction activities would occur within the Edwards Aquifer contributing zone or drainage area. Based on a temporary construction ROW of 100 feet, approximately 36 acres of the contributing zone would be subject to potential effects. Within these areas, Alternative 1 would increase the potential for stormwater to discharge contaminants in runoff into surface waterbodies that function as

sources of recharge for the Edwards Aquifer. Due to its hydrologic connectivity with the Trinity Aquifer, this potential would extend to groundwater in this aquifer.

As a regulated activity subject to the Edwards Aquifer Rules, Alternative 1 would require enhanced erosion and sedimentation controls. These and other BMPs to protect the water quality of the Edwards Aquifer would be codified by preparation of an EAPP. Because Alternative 1 would be located entirely within the contributing zone of the Edwards Aquifer and disturb more than 5 acres of land, JBSA would be required to prepare a TCEQ-approved CZP prior to construction. The CZP would be incorporated into project-specific SWP3(s), maintained at project sites during construction, and, for the on-Base portion of the project, documented as part of JBSA-BUL's MS4 permit. Pre-construction meetings would be held to ensure that contractors are aware of and understand the BMPs required by the CZP. Additionally, the TCEQ would be notified in advance of all construction start dates.

Under Alternative 1, construction contractors would be required to install temporary erosion and sediment controls and protective barriers around sensitive features, such as caves, sinkholes, and wells, as approved by TCEQ. Temporary detention ponds with approved linings would be installed as an outlet structure for any water discharges generated during construction. Should groundwater be encountered during construction, excavations would be de-watered and subject to filtering to remove sediments in the water. All work would occur within the delineated construction limits of disturbance; any changes would be subject to TCEQ review and approval. JBSA also would conduct regular project site inspections to ensure that erosion and sedimentation controls are in place, meet specifications, and remain functionally adequate. During the construction and operations activities under Alternative 1, any spills or accidental releases of hazardous substances would be reported immediately to TCEQ and be subject to JBSA-BUL's spill prevention, control and countermeasures (SPCC) plan and any CZP codified response measures.

Overall, under Alternative 1, construction and operations activities would comply with the applicable provisions of 30 TAC 213 to ensure protection of groundwater in the Edwards Aquifer. Therefore, potential effects on groundwater resources under Alternative 1 would be short term and minor.

Cumulative Effects

Under Alternative 1, development plans and projects within and around the San Antonio metropolitan area would continue to be regulated under the NPDES permitting program. Depending on the location, nature, and size of a regulated activity, enforcement of the Edwards Aquifer Rules would also continue. These regulatory compliance measures would serve to prevent or minimize potential effects on water resources from development on a regional scale. When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-BUL, no significant cumulative effects on water resources would be anticipated to occur with implementation of Alternative 1.

3.9.2.3 Alternative 2 – Shavano Highlands Subdivision

Watershed Management

Alternative 2 would occur entirely within the Lewis Creek-Salado Creek sub-watershed. Project areas under Alternative 2 would be drained by several unnamed, intermittent tributaries of Salado Creek. Under Alternative 2, construction activities would involve earthwork to install pipelines below ground, including excavation, boring, grading, and site restoration. Potential effects of these activities would not result in a net increase in impervious surface within the ROI. These impacts are unlikely to lead to measurable adverse effects on the sub-watershed or overall watershed management because the Proposed Action would not result in an increase in impervious surface within in the ROI. Potential impacts under Alternative 2 would be short term and negligible.

Surface Waters and Water Quality

Alternative 2 would occur entirely within the Salado Creek watershed. Project areas under Alternative 2 would be drained by several unnamed, intermittent tributaries of Salado Creek. Under Alternative 2, construction activities would involve earthwork to install the wastewater conveyance line below ground, to

include excavation, boring, grading, and site restoration. These activities would have the potential to result in erosion and sedimentation or potential release of contaminants that could degrade surface water quality in the ROI.

Under Alternative 2, construction activities would bisect two intermittent streams in the ROI. Based on a temporary construction ROW of 100 feet, approximately 216 linear feet of intermittent streams would be subject to potential effects under Alternative 2. However, at a later stage of design, the wastewater line installation method selected would comply with CWA Sections 404 and 401 regarding dredge or fill activities within jurisdictional Waters of the US that also meet water quality standards set by the TCEQ. With regulatory compliance measures in place, potential effects from dredge or fill activities within these stream segments would be short term and minor.

Although the proposed wastewater line under Alternative 2 would occur over a shorter distance than Alternative 1, the construction of a new wastewater detention facility would increase potential erosion and sedimentation during construction. Additionally, the operation of a wastewater detention facility would increase the potential for contaminant releases into the environment. These risks would increase over time as the facility ages and reaches its useful life.

Alternative 2 would not impact any known WOTUS. However, as described for Alternative 1, construction activities under Alternative 2 would be subject to conditions set forth in a TPDES permit, including preparation of TCEQ-approved SWP3 prior to the start of construction. Under Alternative 2, the design, construction, and operation of the wastewater detention facility would be carried out in accordance with applicable federal and state laws, regulations, and industry standards. With these regulatory compliance measures in place, potential adverse effects on surface water quality under Alternative 2 would be moderate over the short and long term.

Wetlands

The proposed wastewater line under Alternative 2 would bypass the non-jurisdictional wetlands associated with the WWTP storage ponds in the JBSA-BUL cantonment area. These existing storage ponds would be decommissioned and left in their current state, with no further actions planned to modify the resource. Under Alternative 2, there would be no direct effects on these wetlands. If Alternative 2 is chosen and wetlands are found in the project area, a jurisdictional determination would be completed prior to commencement of construction activities. During construction, required erosion and sedimentation controls would prevent or minimize the potential effects of stormwater runoff into these wetlands. Therefore, potential effects on wetlands under Alternative 2 would be short term and negligible.

Stormwater Management

Alternative 2 would occur in the Salado Creek watershed. Project areas under Alternative 2 would be drained by several unnamed, intermittent tributaries of Salado Creek. Under Alternative 2, construction activities would involve earthwork to install the wastewater conveyance line below ground, to include excavation, boring, grading, and site restoration. The removal of the existing WWTP would have the potential to disturb soils near these tributaries that feed into the downstream watershed. These activities would have the potential to result in erosion and sedimentation or potential release of contaminants that could degrade surface water quality in the ROI.

Potential contaminants from stormwater would be regulated and monitored under a TCEQ-approved SWP3. Under Alternative 2, the Air Force would conduct an analysis of pre-development hydrology to establish a baseline condition and set design objectives for stormwater management. If design objectives could not be met on one or more project sites, LID measures would be considered for application in areas downstream thereof (i.e., either on or in the vicinity of the ROI). These compliance measures would further reduce potential erosion and sedimentation downstream of project sites associated with Alternative 2. Potential effects on stormwater management under Alternative 1 would be short term and minor.

Floodplains

Alternative 2 would occur within and directly impact approximately 8 acres of 100-year floodplains; there are no practicable alternatives to avoiding the floodplains. As described for Alternative 1, potential effects would be temporary during wastewater line installation and, in the long term, the natural-function benefits of these floodplains would be preserved. The decommissioning of the existing WWTP under Alternative 2 would occur outside of the floodplain and would not result in any direct impacts. Therefore, potential effects on floodplains under Alternative 2 would be short term and minor.

Groundwater and Water Quality

Under Alternative 2, construction activities would occur within the Edwards Aquifer recharge and contributing (drainage) zones. Based on a temporary construction ROW of 100 feet, approximately 6.5 acres of the recharge zone and 6 acres of the drainage zone would be subject to potential effects. Within these areas, Alternative 2 would increase the potential for contaminants to leach downward into groundwater or to enter surface waterbodies that function as sources of recharge for the Edwards Aquifer through stormwater runoff. Due to its hydrologic connectivity with the Trinity Aquifer, this potential would extend to groundwater in this aquifer.

As a regulated activity subject to the Edwards Aquifer Rules, Alternative 2 would require enhanced erosion and sedimentation controls. These and other BMPs to protect the water quality of the Edwards Aquifer would be codified by preparation of an EAPP. Because Alternative 2 would construct an organized sewage collection system (SCS) and be partially located in the recharge zone of the Edwards Aquifer, JBSA would be required to prepare a TCEQ-approved SCS plan prior to construction. The SCS would be incorporated into project-specific SWP3(s), maintained at project sites during construction, and, for the on-Base portion of the project, documented as part of JBSA-BUL's MS4 permit. Pre-construction meetings would be held to ensure contractors and operators are aware of and understand the protective measures required by the SCS. Additionally, the TCEQ would be notified in advance of all construction start dates.

Under Alternative 2, construction contractors would be required to install temporary erosion and sediment controls and protective barriers around sensitive features, such as caves, sinkholes, and wells, as approved by TCEQ. Temporary detention ponds with approved linings would be installed as an outlet structure for any water discharges generated during construction. Should groundwater be encountered during construction, excavations would be de-watered and subject to filtering to remove sediments in the water. All work would occur within the delineated construction limits of disturbance; any changes would be subject to TCEQ review and approval. JBSA also would conduct regular project site inspections to ensure that erosion and sedimentation controls are in place, meet specifications, and remain functionally adequate. During construction and operations activities under Alternative 2, any spills or accidental releases of hazardous substances would be reported immediately to TCEQ and be subject to JBSA-BUL's SPCC plan and any SCS plan codified response measures.

Overall, under Alternative 2, construction and operations activities would comply with the applicable provisions of 30 TAC 213 to ensure protection of groundwater in the Edwards Aquifer. Therefore, potential effects on groundwater resources under Alternative 2 would be short term and moderate.

Cumulative Effects

As described for Alternative 1, when considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-BUL, no significant cumulative effects on water resources would be anticipated to occur with implementation of Alternative 2.

3.9.3 Best Management Practices and Mitigation Measures

The Air Force would consider the following additional, project-specific BMPs to reduce potential effects on water resources under the Proposed Action:

- Comply with JBSA environmental specifications during construction activities.

- Identify and implement BMPs for construction and post-construction stormwater management in accordance with the USEPA's National Menu of BMPs for Stormwater or other technical guidance.
- Incorporate LID measures and techniques into the design of the Proposed Action to increase onsite infiltration of stormwater.
- When possible, establish construction staging areas on existing hardscape and at least 100 feet away from surface water resources.

No project-specific mitigation measures for water resources were identified by analysis.

3.10 BIOLOGICAL RESOURCES

Biological resources include plants, animals, and the habitats upon which they rely for sustenance and survival. These resources include terrestrial and aquatic species; game and non-game species; special status species (i.e., state or federally listed species and species of concern such as migratory birds); and environmentally sensitive habitats or natural areas that have functional or intrinsic value to humans. Pursuant to the *Sikes Act* (16 USC § 670a), JBSA maintains an integrated natural resources management plan (INRMP) to guide the use and management of natural resources within the Joint Region, including JBSA-BUL (Air Force, 2020b).

The ROI for biological resources includes the construction corridors for the new wastewater lines for Alternatives 1 and 2 to the point of connection with SAWS wastewater lines, and the existing wastewater system and surrounding area on JBSA-BUL. The construction corridors are assumed to be 100 feet wide with potential disturbance effects extending approximately 300 feet beyond the construction corridor.

3.10.1 Existing Conditions

3.10.1.1 Vegetation

Bexar County, Texas, includes parts of three different ecoregions; two of these ecoregions, the Balcones Canyonlands and Northern Blackland Prairies, help to characterize the ecology of JBSA-BUL. Expansive tallgrass prairie vegetation once typified the Northern Blackland Prairies ecoregion of Texas. The regional ecology was further characterized by irregular plains and low-to-moderate gradient streams with silt, clay, and sand substrates. However, due to urbanization and conversion to cropland and pasture, less than 1 percent of the original Northern Blackland Prairies ecoregion exists today in small, scattered areas across the region.

Although vegetation on JBSA-BUL resembles some ecoregion characteristics, due to fragmentation of the landscape, the dominant plant communities on the Base now consist of woodlands, forests,[9] and grasslands. Riparian, deciduous, and evergreen forests and woodlands, interspersed with grasses and shrubs, are organized along soil and moisture gradients. Higher-density trees and shrubs are generally concentrated within canyons and riparian areas. In areas of high relief, slope orientation determines the duration of light exposure and influences the type and density of vegetation. Typical woody species found in upland areas of JBSA-BUL include Ashe juniper (*Juniperus ashei*), Texas oak (*Quercus buckleyi*), live oak (*Quercus virginiana*), escarpment black cherry (*Prunus serotina var.*eximia), Texas persimmon (*Diospyros texana*), and agarito (*Mahonia trifoliolata*) (TCEQ, 2007).

Vegetation communities in other areas of JBSA-BUL include managed grasses, herbaceous grasslands, and shrublands. Native and non-native grasses are managed to support military operations or provide recreation for authorized personnel and their dependents. These include grasslands or savanna within and outside the cantonment area. Native grassland species found on JBSA-BUL include little bluestem

[9] Forests are differentiated from woodlands as having more extensive canopies that limit light penetration to understory vegetation; that is, shrubs, bushes, and younger trees are commonly the understory of forests whereas grasses and shrubs typify the understory of woodlands.

(*Schizachyrium scoparium*), Indiangrass (*Sorghastrum nutans*), big bluestem (*Andropogen gerardii*), switchgrass (*Panicum virgatum*), sideoats gramma (*Bouteloua curtipendula*), plains lovegrass (*Eragrostis intermedia*), vine-mesquite (*Panicum obtusum*), Lindheimer muhly (*Muhlenbergia lindheimeri*), silver bluestem (*Bothriochloa laguroides*), green sprangletop (*Leptochloa dubia*), tall dropseed (*Sporobolus asper*), and Texas cupgrass (*Eriochloa sericea*).

Herbaceous grasslands consist of forbs, grasses, and scattered trees. These areas are not regularly maintained but some are managed to minimize or prevent hardwood encroachment. Shrublands or areas in which shrubs are the predominate plant community are also not subject to regular maintenance; however, prescribed fire or mechanical treatment is used to control density in some areas (Air Force, 2017).

In areas outside of JBSA-BUL, to the west, southwest, and south of the cantonment area, vegetation is generally limited by development. However, in some cases, development is interspersed with public and private conservation lands. For example, Eisenhower Park abuts the southern boundary of JBSA-BUL to the west of Military Highway, portions of which provide habitat for threatened and endangered species (see **Section 3.10.1.4**) (USFWS, 2021b).

Vegetation in the area of the Proposed Action activities has been disturbed by JBSA-BUL activities and by commercial and residential development outside the JBSA-BUL boundary. The proposed wastewater conveyance line segment from the existing wastewater treatment system to the intersection with Camp Bullis Road is located near the cantonment area and is largely developed with scattered trees along the route. At Camp Bullis Road, the proposed wastewater line would follow an existing utility ROW along Camp Bullis Road to the boundary of JBSA-BUL. The vegetation along Camp Bullis Road, a main access route into JBSA-BUL, is forest/shrub communities that have been fragmented by roads and an electrical powerline ROW. On the north side of Camp Bullis Road is an electrical powerline ROW that has been cleared of vegetation and a service road (Vera Cruz Road). A narrow strip of trees (30 to 50 feet wide) remains between Camp Bullis Road and the electrical powerline/service road. Several service or access roads also parallel Camp Bullis Road on the south side with narrow strips (50 to 100 feet wide) of trees between the roads. Beyond the service roads on either side of Camp Bullis Road is relatively undisturbed forest vegetation. From the JBSA-BUL boundary to I-10, the current wastewater line follows Camp Bullis Road. The road is bordered by forest/shrub vegetation on both sides of the road for about 0.75 mile and then by grass fields, shrubs, and commercial development. Residential and commercial development are located along the road and have fragmented parts of the adjacent forest/shrub vegetation.

Vegetation along the 1-mile Shavano Highlands Subdivision related to the Proposed Action is primarily woodland with a more open canopy and areas of grasses and shrubs. After crossing the JBSA-BUL boundary, the route would parallel a small, forested area and a large (approximately 160 acres) open quarry for approximately 0.25 mile before connecting with SAWS.

3.10.1.2 Wildlife

The unique ecology preserved by JBSA-BUL provides habitat for diverse wildlife species. Over several decades, surveys have documented more than 350 different wildlife species on the Base. JBSA administers an on-Base hunting program for certain native and non-native wildlife species. Game species managed as part of the hunting program include Aoudad sheep (*Ammotragus lervia*), coyote (*Canis latrans*), feral hog (*Sus scrofa*), axis deer (*Axis axis*), Rio Grande turkey (*Meleagris gallopavo*), black-tailed jackrabbit (*Lepus californicus*), Catalina goat (*Capra hircus*), and white-tailed deer (*Odocoileus virginianus*), among other small mammals and birds (Air Force, 2020b). Many of these same wildlife species also occur on undeveloped lands adjacent to or in the vicinity of JBSA-BUL.

3.10.1.3 Threatened or Endangered Species and Other Protected Species

Threatened, endangered, and other protected species include plants and animals that receive protection under federal or state laws, regulations, or policy directives. Under the Proposed Action, these primarily include the ESA (16 USC § 1531 et seq.), the Migratory Bird Treaty (16 USC §§ 703–712) (MBTA), *Bald*

and Golden Eagle Protection Act (16 USC §§ 668–668d), EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, and the Texas Parks and Wildlife Code (Title 5, Chapters 67 and 68). JBSA maintains an INRMP to manage the natural resources of JBSA-BUL, including threatened or endangered species and other protected species and their habitat (Air Force, 2020b).

Pursuant to Section 7 of the ESA, JBSA engaged in *Informal Consultation for the Continuation of the Military Mission and Mission Sustainment Activities on Joint Base San Antonio – Camp Bullis in Relation to 5 Listed Species* with the USFWS for military activities and trainings at JBSA-BUL with a potential to adversely affect listed species or their habitat (JBSA, 2015). For construction and maintenance activities, the informal consultation covered activities that fall within the following conservation measures:

- New construction projects would avoid sensitive areas (sensitive areas include but are not limited to GCWA habitat and KPAs) on JBSA-BUL. Additionally, all work would be reviewed by and coordinated with the JBSA natural resources office prior to planning. If a project must occur in listed species' habitat or KPAs, JBSA-BUL would seek consultation with USFWS.
- All structure, sign, and utility maintenance would be conducted under the guidelines of the seasonal training restrictions.
- Road, trail, firebreak, culvert, fence, and easement maintenance within a 300-foot buffer of GCWA habitat would only take place outside of breeding season (16 August to 28 February). Clearing would not exceed 8 feet from either side of existing road, trail, culvert, firebreak, culvert, fence, or easement. Tree trimming would be restricted to branches below 6 feet, and all oak cuts would be painted with pruning paint no later than 30 minutes after the cut. Tree removal would be confined to re-growth juniper of less than 12 feet in height.
- All personnel responsible for construction activities would be informed, via scopes of work, contract, other methods, about the need to follow design plans, stay within demarcated construction boundaries, and minimize impacts to wildlife and other environmental concerns.

Any activities not included in this informal consultation, or that would come into conflict with the established measures, would be subject to separate Section 7 consultation requirements.

Table 3-6 lists the federal- and state-listed threatened or endangered species known or with the potential to occur in the ROI.

3.10.1.4 Federally Listed Species

The ESA, as amended by the *National Defense Authorization Act for Fiscal Year 2004* (Public Law 108-136), exempts military installations from "critical habitat" designations in cases where a *Sikes Act*-compliant INRMP provides a demonstrable benefit to one or more ESA-listed species. As such, no ESA-designated critical habitat is present on JBSA-BUL; critical habitat designations outside the Base in the ROI are identified and described below.

Tricolored Bat (*Perimyotis subflavus*)

Tricolored bats are a small insectivorous bat that were proposed for listing as endangered by the USFWS in 2022 (87 FR 56381, September 14, 2022). During the winter months, these bats hibernate in safe and stable sites with suitable microclimates. In the winter, such sites include caves, culverts, abandoned mines, and abandoned tunnels. Tricolored bats often swarm at cave or mine entrances before entering hibernation. They spend six to nine months per year hibernating in caves or mines, mostly at ambient temperatures of 46.4–55.4 degrees Fahrenheit. No critical habitat has been designated for this species. These bats are known to use Headquarters Cave, approximately 1,000 feet from the project area (JBSA, 2024).

Table 3-6
Federal- and State-Listed Species Known or with Potential to Occur at JBSA-BUL

Common Name	Scientific Name	Federal Status	State Status
Listed Species Recorded on JBSA			
Cascade Caverns salamander	*Eurycea latitans*	N/A	T
Texas salamander	*Eurycea neotenes*	N/A	T
Golden-cheeked warbler	*Setophaga chrysoparia*	E	E
White-faced ibis	*Plegadis chihi*	N/A	T
Zone-tailed hawk	*Buteo albonotatus*	N/A	T
Ground beetle [unnamed]	*Rhadine exilis*	E	N/A
Ground beetle [unnamed]	*Rhadine infernalis*	E	N/A
Madla cave meshweaver	*Cicurina madla*	E	N/A
Texas tortoise	*Gopherus berlandieri*	N/A	T
Texas horned lizard	*Phrynosoma cornutum*	N/A	T
Bracted twistflower	*Streptanthus bracteatus*	C	N/A
Tricolor bat	*Perimyotis subflavus*	PE	N/A
Piping plover	*Charadrius melodus*	T	N/A
Red knot	*Calidris canutus rufa*	T	N/A
Helotes mold beetle	*Batrisodes venyivi*	E	N/A
Monarch butterfly	*Danaus plexippus*	C	N/A
Cokendolpher cave harvestman	*Texella cokendolpheri*	E	N/A
Government Canyon bat cave meshweaver	*Cicurina vespera*	E	N/A
Government Canyon bat cave spider	*Tayshaneta microps*	E	N/A
Robber Baron Cave meshweaver	*Cicurina baronia*	E	N/A
Edwards Aquifer-Dependent Species Affected by JBSA Withdrawal			
San Marcos salamander	*Eurycea nana*	T	N/A
Texas blind salamander	*Eurycea rathbuni*	E	N/A
Widemouth blindcat	*Satan eurystomus*	N/A	T
Toothless blindcat	*Trogloglanis pattersoni*	N/A	T
Fountain darter	*Etheostoma fonticola*	E	E
Guadalupe darter	*Percina apristis*	N/A	T
San Marcos gambusia	*Gambusia georgei*	E	N/A
Comal Springs riffle beetle	*Heterelmis comalensis*	E	E
Comal Springs dryopid beetle	*Stygoparnus comalensis*	E	E
Peck's Cave amphipod	*Stygobromus pecki*	E	E
Texas wild-rice	*Zizania texana*	E	N/A

Source: JBSA 2020
C = Candidate; E = Endangered; N/A = not applicable; PE = Proposed Endangered; T = Threatened

Golden-Cheeked Warbler (*Setophaga chrysoparia*)

The GCWA is a federal- and state-listed migratory bird species that breeds exclusively in central Texas. During the winter, the GCWA inhabits the highlands of Central America from southern Mexico to Nicaragua. Known for its distinct yellow cheek feathers and vocalization, the GCWA's range in Texas coincides closely with that of the Ashe juniper tree. Dense forests and woodlands with closed canopies dominated by mature Ashe juniper and interspersed with other mostly deciduous trees such as walnuts, oaks, and elms are preferred habitat for nesting GCWAs. The fall migration of the GCWA starts in early July and continues through August. As an early breeder, these birds return to central Texas by mid-March, with most eggs reported between 1 April and 27 June. Overall, the breeding and nesting season occurs from 1 March to 15 August each year. No "critical habitat" has been designated for the GCWA under the ESA (USFWS, 2021b).

GCWAs have been observed on and around JBSA-BUL since the late 19th century. JBSA currently manages and monitors the GCWA population on the Base by conducting annual territory and point counts (Air Force, 2020b). Data collected over a 3-year period informs habitat protection measures in place for the GCWA at JBSA-BUL as the configuration of woodlands likely determines habitat use (i.e., nesting or foraging). In general, suitable habitat for establishment of a GCWA territory in the ROI consists of large, contiguous tracts

of oak-juniper woodlands with tree canopy cover in excess of 60 percent; adjacent, less dense woodlands with tree canopy in the range of 35 to 40 percent may be used for GCWA foraging (USFWS, 2015).

On JBSA-BUL, there are 8,491 acres of designated GCWA habitat (i.e., habitat known to support breeding pairs of GCWA). Buffer areas of 300 feet around the GCWA habitat total 13,987 acres on Base where military training and operational restrictions apply (Air Force, 2020b). The buffer and habitat both have seasonal restrictions between 1 March and 15 August that do not allow for vegetation removal or noise disturbance during that time. **Figure 3-6** depicts the GCWA habitat management areas for the Base portion of the ROI.

Karst Invertebrates

The unique ecology of JBSA-BUL and surrounding area is characterized by the close connection between surface water flows and groundwater within a karst region. As surface water infiltrates the ground, it dissects the soluble bedrock (e.g., limestone) in the subsurface, and karst features such as sinkholes and caves are formed. These formations provide habitat for numerous species of troglobites, invertebrates that are well adapted to spend all or most of their lives underground. Characterized by small or absent eyes and pale coloration, these species rely on the high humidity, stable temperatures, and suitable substrates found below ground; however, such ecosystems are uniquely dependent on surface-derived nutrients from sources that include leaf litter and animal eggs (e.g., cave cricket), feces, and carcasses (USGS, 2021; USFWS, 2019).

There are three federally listed endangered karst invertebrates documented to occur on and around JBSA-BUL: Madla's cave meshweaver (*Cicurina madla*), a small cave-adapted spider, and *Rhadine exilis* and *Rhadine infernalis*, two species of small, cave-adapted ground beetles with no common name. In 2012, the USFWS designated 28 critical habitat units under the ESA for nine karst invertebrates in Bexar County (77 FR 8450; 14 February 2012), including all three federally listed species. Three of the critical habitat units for *Rhadine exilis* and *Rhadine infernalis* are located within 500 meters (1,600 feet) of JBSA-BUL on private property (see **Figure 3-6**) (USFWS, 2021a, 2019). No critical habitat crosses or is located within 400 meters (1,300 feet) of the Proposed Action.

In cooperation with the USFWS, Bexar County delineated five karst zones based upon the probable presence of a rare or endemic karst invertebrate species. Bexar County karst zones 1 through 5 are defined as follows:

- **Zone 1 –** areas known to contain listed invertebrate karst species;
- **Zone 2 –** areas with a high probability of containing suitable habitat for listed invertebrate karst species;
- **Zone 3 –** areas that probably do not contain listed invertebrate karst species;
- **Zone 4 –** areas that require further research but are generally equivalent to Zone 3, although they may include sections that could be classified as Zone 2 or Zone 5 as more information becomes available; and
- **Zone 5 –** areas that do not contain listed invertebrate karst species.

JBSA-BUL includes approximately 3,194 acres of karst zone 1 and 1,464 acres of karst zone 2; the remaining portions of the Base are part of either karst zone 3 or 5. There are 29 caves on Base known to contain one or more federally listed karst invertebrates. To further protect karst habitat on JBSA-BUL, ground disturbance is prohibited within karst zones 1 and 2 except in areas that are previously disturbed (USFWS, 2015).

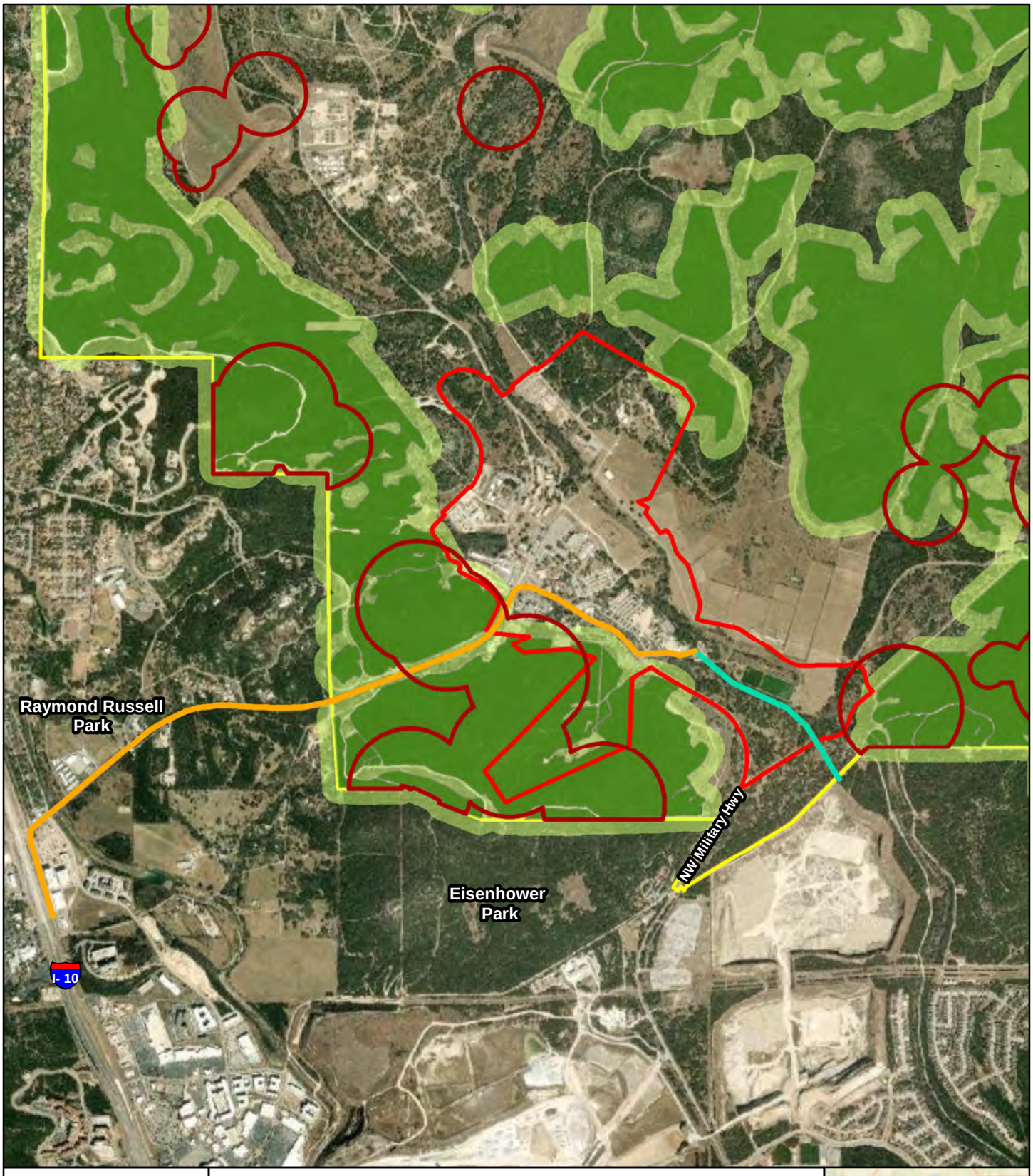


FIGURE 3-6
HABITAT MANAGEMENT AREAS

N

Imagery: ESRI 2021
Projection: WGS 1984
Zone 14N

0 0.25 0.5 Miles

- Alternative 1
- Alternative 2
- Cantonment Area
- Installation Boundary
- Karst Preserve Area
- GCW Buffer (300 ft)
- GCW Habitat

In accordance with the USFWS' *Karst Preserve Managing and Monitoring Recommendations* (USFWS, 2014), JBSA-BUL maintains KPAs around caves known to contain one or more federally listed karst species. KPAs function to protect other endemic karst species known to occur on JBSA-BUL but that are not federally or state-protected (**Table 3-7**). KPAs are delineated as buffer zones around each cave where military training and operational restrictions apply. Approximately 1,757 acres of habitat area on JBSA-BUL are associated with the KPAs, most of which are found in the southernmost part of the Base (see **Figure 3-7**) and within karst zone 1.

Table 3-7
Endemic Species Associated with Karst Habitat on JBSA-BUL

Common Name	Scientific Name
Ground beetle (unnamed)	*Rhadine bullis*
Ground beetle (unnamed)	*Rhadine ivyi*
Ground beetle (unnamed)	*Rhadine sprousei*
Millipede (unnamed)	*Speodesmus ivyi*
Millipede (unnamed)	*Speodesmus falcatus*
Cave meshweaver (unnamed)	*Cicurina brunsi*
Cave meshweaver (unnamed)	*Cicurina bullis*
Cave meshweaver (unnamed)	*Cicurina platypus*
Armored harvestmen (unnamed)	*Texalla elliotti*
Armored harvestmen (unnamed)	*Texalla hilgerensis*
Dipluran (undescribed)	*Myxojapyx* sp.
Pseudoscorpion (unnamed)	*Tarttartogreagis reyesi*
Seed shrimp	*Ostracoda podocopida*

Source: Air Force, 2020b

The portions of the Proposed Action that lie outside the boundary of JBSA-BUL are also subject to karst regulations for continued protection of the nine Bexar County karst species with ESA-designated critical habitat regionally. Surveys would be required for the portions of the wastewater line associated with the Proposed Action that fall outside of the Installation boundary. Prior to construction, properties in karst zones 1 through 4 may require a karst survey by a qualified professional biologist or geologist. Any surveys required as a result of Section 7 consultation with USFWS would be conducted concurrently with the development of this EA. Should the survey involve activities with a potential to "take" federally listed species, the surveyor would also be advised by the USFWS to obtain a Section 10(a)(1)(A) permit issued pursuant to the ESA prior to conducting such activities (USFWS, 2006). When necessary, the following two primary steps are required in making a presence/absence determination for karst species:

1. **Initial Karst Feature Survey –** Prior to survey, submit a formal data request to the Texas Speleological Survey to obtain locations for known caves and karst features and review available data from applicable prior surveys or assessments (i.e., those on file at TCEQ's regional office in San Antonio). Conduct a visual inspection for signs of karst features in accordance with applicable TCEQ procedural guidelines.

2. **Suitable Habitat Assessment –** Karst features identified by the initial survey are further assessed by a qualified biologist or geologist with relevant experience in identifying cave-adapted invertebrate species. An assessment of potential suitable habitat for federally listed karst species is conducted, with or without excavation, and survey results are prepared and submitted to the USFWS for review (USFWS, 2006).

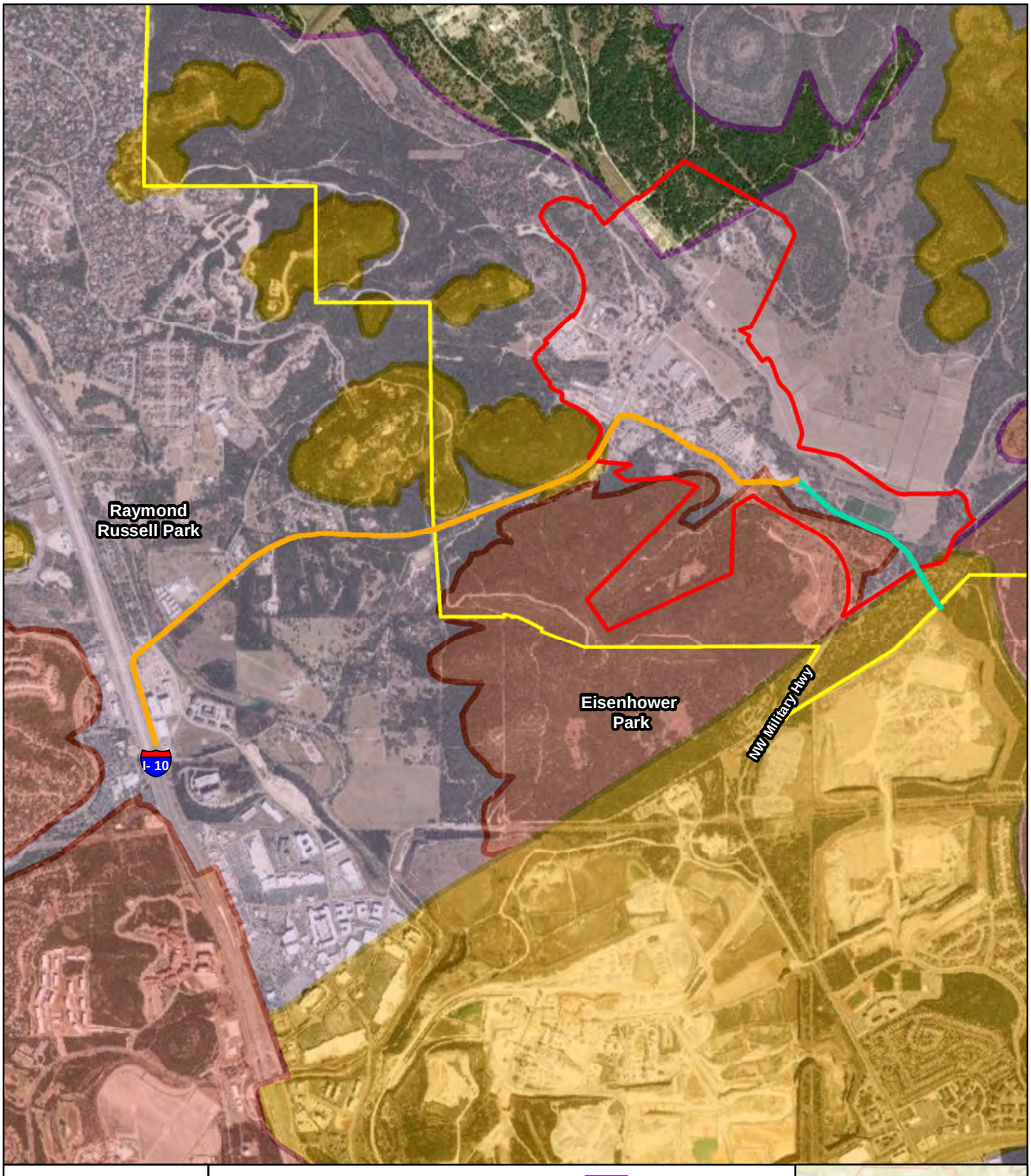


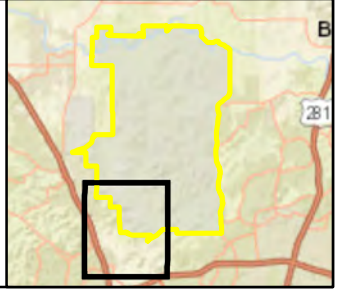
FIGURE 3-7
KARST
ZONES

N

Imagery: ESRI 2021
Projection: WGS 1984
Zone 14N

0 0.25 0.5 Miles

Alternative 1
Alternative 2
Cantonment Area
Installation Boundary
Karst Zone 1
Karst Zone 2
Karst Zone 3



Bracted Twistflower (*Streptanthus bracteatus*)

The bracted twistflower is federally listed as threatened. It is an annual herbaceous plant in the mustard family (*Brassicaceae*) that inhabits juniper-oak woodlands and occurs exclusively along the southeastern edge of the Edwards Plateau of Texas, from Travis County in the northeast to Uvalde County in the southwest. Bracted twistflowers are a winter annual plant. Seeds germinate in response to fall and winter rainfall, forming basal rosettes of leaves, and flower stalks emerge the following spring; flowering usually peaks in late April to early May and die by mid-summer. The species was recorded in 2006 near Eisenhower Park. Several attempts have been made to locate bracted twistflower in the same area and other potential areas identified by the USFWS; however, there have been no further detections. Potential critical habitat has been designated for this species adjacent to the Installation (JBSA, 2024).

3.10.1.5 Migratory Birds

In the US, migratory birds are protected by the MBTA (see **Section 3.10.1.3**). EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, further directs federal agencies to protect migratory birds.

JBSA-BUL is located in the Central Flyway, a migratory bird corridor that extends from northern Alaska, south through Canada and the central US, and into northern Mexico. More than 200 migratory birds have been documented to occur at the Base. **Table 3-8** lists birds included on the USFWS' *Birds of Conservation Concern 2021* that have been observed or documented to occur at JBSA-BUL.

Table 3-8
Birds of Conservation Concern Observed at JBSA-BUL

Common Name	Scientific Name	Common Name	Scientific Name
American white pelican	*Pelecanus erythrorhynchos*	LeConte's sparrow	*Ammodramus leconteii*
Bay-breasted warbler	*Setophaga castanea*	Lesser yellowlegs	*Tringa flavipes*
Belted kingfisher	*Megaceryle alcyon*	Little blue heron	*Egretta caerulea*
Black-capped vireo	*Vireo atricapilla*	Loggerhead shrike	*Lanius ludovicianus*
Blue-winged warbler	*Vermivora cyanoptera*	Long-billed curlew	*Numenius americanus*
Bobolink	*Dolichonyx oryzivorus*	Marbled godwit	*Limosa fedoa*
Canada warbler	*Cardellina canadensis*	Northern harrier	*Circus hudsonius*
Cassin's sparrow	*Peucaea cassinii*	Marbled godwit	*Limosa fedoa*
Cerulean warbler	*Setophaga cerulea*	Olive-sided flycatcher	*Contopus cooperi*
Chestnut-collared longspur	*Calcarius ornatus*	Painted bunting	*Passerina ciris*
Chimney swift	*Chaetura pelagica*	Pyrrhuloxia	*Cardinalis sinuatus*
Chuck-will's widow	*Antrostomus carolinensis*	Rose-breasted grosbeak	*Pheucticus ludovicianus*
Cinnamon teal	*Spatula cyanoptera*	Rufous hummingbird	*Selasphorus rufus*
Curve-billed thrasher	*Toxostoma curvirostre oberholseri*	Rufous-crowned sparrow (rock)	*Aimophila ruficeps eremoeca*
Dickcissel	*Spiza americana*	Rusty blackbird	*Euphagus carolinus*
Eastern meadowlark	*Sturnella magna*	Scarlet tanager	*Piranga olivacea*
Field sparrow	*Spizella pusilla*	Scott's oriole	*Icterus parisorum*
Franklin's gull	*Leucophaeus pipixcan*	Short-eared owl	*Asio flammeus*
Golden-cheeked warbler[a]	*Setophaga chrysoparia*	Upland sandpiper	*Bartramia longicauda*
Harris' hawk	*Parabuteo unicinctus harrisi*	Wood thrush	*Hylocichla mustelina*
Kentucky warbler	*Oporornis formosus*	Yellow headed blackbird	*Xanthocephalus xanthocephalus*

Source: Air Force, 2020b
Notes:
a Golden-cheeked warbler is federally listed by USFWS as endangered and is further discussed in **Section 3.10.1.4**.

3.10.1.6 Invasive Species

Invasive plant and animal species on JBSA-BUL are managed in accordance with JBSA's *Integrated Pest Management Plan*. Invasive species of management concern on Base primarily include feral hog (*Sus scrofa Linnaeus*), tawny crazy ant (*Nylanderia fulva*), and red imported fire ant (RIFA; *Solenopsis invicta*

sp.). Feral hogs have the potential to erode soil (e.g., rooting), contaminate surface waters, and prey on smaller mammals and the eggs of ground nesting birds. The feral hog population on the Base is, in part, controlled by the hunting program discussed in **Section 3.10.1.2**.

Tawny crazy ants and RIFAs tend to populate disturbed areas on JBSA-BUL and may feed on karst invertebrates, including cave crickets (*Orthoptera: Rhaphidophoridae*), the eggs of which are an important source of food for karst invertebrates. JBSA conducts monitoring at 75 caves and karst features across the Base to inform management and control measures, including biannual high-pressure hot water and soap treatments to deter ants from populating karst habitat. RIFA concerns were also considered in defining buffer distances around KPAs on JBSA-BUL. Additionally, tawny crazy ants and RIFAs are known to depredate GCWA nests (Air Force, 2020b).

3.10.2 Environmental Consequences

The Air Force defines a significant effect to biological resources within the ROI as one or more of the following:

- mortality or diminishment of regionally or locally important plant or animal species as defined in **Section 3.10.1**;
- substantial vegetation removal, particularly in riparian habitat areas;
- direct loss or substantial degradation of terrestrial (e.g., fragmentation) or aquatic (e.g., wetlands) habitats; and
- “take” of a federally listed threatened or endangered species.

3.10.2.1 No Action Alternative

Under the No Action Alternative, wastewater operations on JBSA-BUL would continue in accordance with the status quo. Biological resources on JBSA-BUL would continue to be managed consistent with the JBSA INRMP. On a regional level, biological resources would continue to be managed by federal, state, and local governments, as well as through other private, quasi-public, and public interests.

3.10.2.2 Alternative 1 – Camp Bullis Road

Vegetation

Under Alternative 1, construction activities would remove existing vegetation along the utility ROW. Under Alternative 1, areas subject to vegetation removal would be replanted with native grass species post construction. The long-term maintenance of the utility ROW would not allow a full return to current vegetative conditions, permanently changing or altering the structure of the vegetation community along the ROW in some areas. However, because Alternative 1 would occur within an existing ROW, the removal or alteration of vegetation would be minimized. Long-term, minor effects on vegetation would occur under Alternative 1.

Wildlife

Under Alternative 1, construction activities would remove existing, vegetated wildlife habitat in the ROI. Since ROW maintenance would limit re-establishment of natural vegetation communities, some areas along the ROW would not provide equivalent wildlife habitat post construction. However, because Alternative 1 would occur within an existing ROW, habitat fragmentation would be minimized.

Under Alternative 1, construction activities would generate noise and increase risk to wildlife from the use of heavy equipment and vehicles on project sites. In the short term, wildlife species would be displaced from areas along the ROW. Although most wildlife would be expected to relocate elsewhere in the ROI, possibly returning to such areas post construction, less-mobile species could be killed by construction vehicles or equipment.

Because most wildlife would relocate from project sites during construction activities, no appreciable decline in common wildlife species that inhabit the ROI would be anticipated. Therefore, potential adverse effects on wildlife under Alternative 1 would be short term and minor.

Federally Listed Species

The Air Force has determined that Alternative 1 would have "no effect" to the piping plover (*Charadrius melodus*), red knot (*Calidris canutus rufa*), San Marcos salamander (*Eurycea nana*), fountain darter (*Etheostoma fonicola*), Comal Springs riffle beetle (*Heterelmis comalensis*), Helotes mold beetle (*Batrisodes venyivi*), Monarch butterfly (*Danaus plexippus*), Cokendolpher Cave harvestman (*Texella cokendolpheri*), Government Canyon bat cave meshweaver (*Cicurina vespera*), Government Canyon bat cave spider (*Tayshaneta microps*), Robber Baron Cave meshweaver (*Cicurina baronia*), Peck's Cave amphipod (*Stygobromus pecki*), and Texas wild-rice (*Zizania texana*).

Tricolored Bat

The nearest identified tricolored bat-inhabited cave is located outside of the project area. All construction activities would occur during hibernation season; therefore, under Alternative 1, no tricolored bat-inhabited caves would be disturbed and no impacts to the tricolored bat would be anticipated to occur.

Golden-Cheeked Warbler

Under Alternative 1, the new wastewater conveyance line would pass through an approximately 0.5-mile buffer area for adjacent GCWA habitat along the Camp Bullis Road, although most of this area has been bisected with roads and a utility ROW adjacent to Camp Bullis Road.

Under Alternative 1, construction of a new wastewater conveyance line would affect up to 16 acres of designated GCWA buffer habitat on JBSA-BUL. However, no direct adverse effects on designated GCWA habitat would result from Alternative 1; a small area of habitat in the wastewater line ROI would be avoided by design. Because construction activities would occur outside of the GCWA breeding season of 1 March to 15 August, potential direct and indirect adverse effects from construction activities on individuals or groups of GCWA would not be likely to occur under Alternative 1.

As designated GCWA buffer habitat is known to support GCWA foraging activities around established territories, Alternative 1 would result in a permanent reduction of foraging opportunity for GCWAs that nest in nearby habitat areas of JBSA-BUL. Activities under Alternative 1 would also preclude GCWAs from establishing nests in such areas in the future because GCWA territories are not static entities; rather, they move and change over time. Therefore, the loss of GCWA foraging habitat or potential GCWA habitat under Alternative 1 would be anticipated to cause long-term, minor adverse effects to the species.

Although no *critical habitat* has been designated for the GCWA under the ESA, *potentially suitable habitat* for this species exists in the ROI. Construction activities under Alternative 1 would potentially affect suitable habitat outside the boundary of JBSA-BUL, particularly along Camp Bullis Road. However, the use of an existing utility ROW corridor would limit vegetation removal to less than 100 feet on either side of the roadway. Suitable habitat for the GCWA immediately adjacent to the roadway would be of lesser quality than that found elsewhere in the ROI. By extension, GCWAs would be less likely to establish nests in areas immediately adjacent to the roadway. Since the wastewater conveyance line under Alternative 1 would run along an established utility ROW, habitat loss and fragmentation would be minimized along Camp Bullis Road. The proposed conveyance route under Alternative 1 contains an average of approximately 39 percent tree canopy within 100 feet of the northern side of Camp Bullis Road and approximately 21 percent tree canopy cover within 100 feet of the south side of Camp Bullis Road. Potential direct adverse effects on GCWA habitat under Alternative 1 outside of JBSA-BUL would be limited to this construction corridor; potential noise disturbances as a result of construction activities would be short term and minor. Since construction activities would occur outside of the GCWA breeding season of 1 March to 15 August, potential direct and indirect effects on individuals or groups of GCWA would not be likely to occur.

Overall, with seasonal restrictions in place to avoid potential adverse effects from construction activities on individuals or groups of GCWA on or around JBSA-BUL during construction, Alternative 1 would not be anticipated to contribute to an appreciable decline in GCWA habitat or population within the ROI.

Karst Invertebrates

JBSA conducted surveys to identify karst features within the existing ROW under Alternative 1. The identified karst features were further evaluated for the presence of federally protected karst species. In the absence of federally protected karst species, habitat conditions were assessed to qualify their value as suitable to support karst invertebrates. The survey results, proposed management measures, and JBSA's "effect" determination under Section 7 of the ESA are summarized in a Biological Assessment (BA) (JBSA, 2024). The BA also addresses potential indirect adverse effects on federally listed karst species such as habitat degradation due to increases in RIFA post construction and reduced nutrient sources relied upon by karst invertebrates that are found at or near the land surface (e.g., declining population of cave crickets), among others, that could result from construction activities under Alternative 1.

Under Alternative 1, the wastewater conveyance line would cross a small segment (approximately 400 feet) of karst zone 1 along a service road between the intersection with Military Way and the existing wastewater treatment line (**Figure 3-7**). A portion of this karst zone 1 area on the north side of the service road is in a developed area of the cantonment area. Approximately 0.3 mile of this line would cross a karst zone 2 area along the utility ROW along Camp Bullis Road. This area is also part of a KPA.

Under Alternative 1, construction would occur within Bexar County karst zones 1, 2, and 3 (see Section 3.10.1.4). On JBSA-BUL, construction activities would directly or indirectly disturb up to 1.9 acres of karst zone 1, 6.6 acres of karst zone 2, and 27.2 acres of karst zone 3. The potentially affected portions of karst zones 1 and 2 coincide with approximately 10.3 acres of designated KPA on the Base. Areas classified as karst zones 1 or 2 under Alternative 1 consist of previously disturbed and undisturbed lands. Closure and removal of the existing WWTP infrastructure would result in approximately 58,000 ft2 of grading at the site. The location of the plant would fall within karst zone 3; however, it is located outside of the KPA and would not be anticipated to result in adverse effects.

Under Alternative 1, the portion of the wastewater conveyance line outside of JBSA-BUL would affect up to 37 acres of karst zone 3. Accordingly, these areas may require survey and assessment to determine the presence/absence of federally listed karst species prior to the start of construction. Should any federally listed karst species or their suitable habitat be identified by survey outside of JBSA-BUL, a USFWS Section 7 consultation would be required prior to the start of construction; a formal Section 7 consultation was not performed for Alternative 1 as this is not the preferred alternative. If Alternative 1 is chosen, consultation would be completed prior to commencement of construction. Currently, it is unknown if underground voids exist along the proposed pipeline's construction footprint and the action may result in adverse effects to listed karst species.

Bracted Twistflower

Bracted twistflower has been identified in areas near Eisenhower Park, east of Alternative 1. While the plant has not been identified since 2006, potential critical habitat has been designated in this area. Bracted twistflower may be adversely affected should its presence be discovered during construction associated with Alternative 1 (JBSA, 2024). No occurrences of bracted twistflowers were identified within the project area during a pedestrian survey conducted on 9 February 2024 (JBSA, 2024).

In April 2024, the Air Force initiated consultation with the USFWS regarding Section 7 requirements applicable to the Preferred Alternative of the Proposed Action and coordination is ongoing. Alternative 1 is not the Preferred Alternative and, therefore, was not part of the consultation with USFWS. If Alternative 1 is chosen, the Air Force would reengage with the USFWS for further Section 7 consultation at that time.

Migratory Birds

Site disturbance and noise associated with construction activities under Alternative 1 could affect migratory birds that use the ROI for stop-over during migration, foraging, or breeding (see **Table 3-8** above). Many such species do not breed in central Texas and have ample foraging or stop-over elsewhere on and around JBSA-BUL. The migratory birds that do breed in central Texas have breeding seasons that generally overlap that of the GCWA. As such, construction scheduling and phasing would account for and avoid any known habitat areas where these birds likely would be present. Vegetation removal/disturbance would occur between 15 September and 28 February, which is outside the nesting season for MBTA species. These measures would be in addition to the seasonal restrictions in place for the GCWA.

Under Alternative 1, most migratory birds likely would avoid construction sites by relocating elsewhere on or around JBSA-BUL. Should any migratory birds (or nests of migratory birds) identified by the USFWS as a species of particular conservation concern be observed on or around construction sites, construction work would cease and JBSA's natural resources office would be consulted prior to conducting any further work. In general, vegetation or structures containing nests of migratory birds would be left in place until abandonment. Therefore, Alternative 1 would result in short-term, minor effects on migratory birds. No long-term, appreciable effects on populations of migratory birds would be likely from implementation of Alternative 1.

Cumulative Effects

Under Alternative 1, conservation laws and initiatives would continue to limit, control, or guide development in a manner that protects natural resources in the public interest (e.g., habitat management for the GCWA and federally listed karst species on JBSA-BUL). JBSA-BUL would continue to maintain and implement a USFWS-approved INRMP and comply with the provisions of BOs issued by the USFWS under the ESA or as a result of additional Section 7 consultation. These measures would ensure populations of native or special status plants and animals on and around JBSA-BUL remain at levels commensurate with conservation objectives for the region or range of such species. When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-BUL, no significant cumulative effects on regional biological resources would be anticipated to occur with implementation of Alternative 1.

3.10.2.3 Alternative 2 – Shavano Highlands Subdivision

Vegetation

Alternative 2 would establish a new ROW along the proposed wastewater conveyance line (see **Section 2.3.3.3**). As ROW establishment would occur in undeveloped areas on JBSA-BUL and outside the Base, a larger amount of vegetation would be removed. Under Alternative 2, areas subject to vegetation removal would be replanted with native grass species post construction. The long-term maintenance of the utility ROW would not allow a full return to current vegetative conditions. This would permanently alter the structure of existing vegetative communities along the newly established ROW. Therefore, Alternative 2 would result in long-term, moderate adverse effects on vegetation within the ROI.

Wildlife

For the reasons described above, construction activities under Alternative 2 would remove a larger amount of vegetated wildlife habitat compared to Alternative 1. Since ROW establishment and maintenance associated with Alternative 2 would limit re-establishment of natural vegetation communities, Alternative 2 would modify available wildlife habitat on and along the new ROW. As such, Alternative 2 would increase habitat fragmentation in select areas on and around JBSA-BUL. The construction and operation of the new wastewater detention facility would generate noise during these activities or operations, potentially disturbing wildlife. Therefore, Alternative 2 would result in long-term, moderate, adverse effect to wildlife.

Construction activities under Alternative 2 would temporarily displace wildlife species that use or inhabit areas on and around the construction corridor, resulting in a short-term negligible impact. Individuals of

less-mobile species (e.g., reptiles and burrowing rodents) would be more susceptible to injury or death caused by construction vehicles or equipment.

Federally Listed Species

The Air Force has determined that Alternative 2 would have "no effect" to the piping plover, red knot, San Marcos salamander, fountain darter, Comal Springs riffle beetle, Helotes mold beetle, Monarch butterfly, Cokendolpher cave harvestman, Government Canyon bat cave meshweaver, Government Canyon bat cave spider, Robber Baron Cave meshweaver, Peck's Cave amphipod, and Texas wild-rice.

Tricolored Bat

The nearest identified tricolored bat-inhabited cave is located approximately 1,000 ft from the project area. All construction activities would occur during hibernation season. However, it is not known whether trees removed during construction would have provided hibernaculum for the tricolored bat. The Air Force prepared a BA to evaluate the effects of this project, and others, on tricolored bats. The BA concluded that Alternative 2 "may affect" but "is not likely to adversely affect" the tricolored bat (JBSA, 2024).

Golden-Cheeked Warbler

Under Alternative 2, the wastewater conveyance line would not pass through any area mapped as GCWA habitat. The open woodland habitat along the proposed route is not preferred GCWA habitat. Under Alternative 2, construction of a new wastewater conveyance line would not affect designated GCWA buffer or habitat on JBSA-BUL.

Under Alternative 2, based upon the location and design of the wastewater conveyance system outside the boundary of JBSA-BUL, GCWA surveys would be conducted during the breeding season to determine the potential presence and abundance of GCWAs. If GCWAs are observed in such areas, the survey would also determine whether GCWAs use the habitat for foraging or nesting. If necessary, prior to the start of construction, a USFWS-approved HCP would be prepared, and an incidental take permit obtained, pursuant to Section 10 of the ESA. In 2024, the Air Force, in accordance with USFWS Section 7 consultation, prepared a BA to evaluate the effects of this project, and others, on the GCWA. Any activities that would potentially affect the GCWA would be conducted in accordance with the BMPs outlined in the 2024 BA. All vegetation removal, either on Base or off Base, would occur outside of nesting season and when the GCWA are not present. This season occurs from 16 September to 28 February. Construction noise may move foraging GCWA away from the project area; however, there is nearby, high-quality, contiguous nesting habitat available on either side of the project area. Under Alternative 2, adherence to applicable permit conditions would avoid, minimize, and, if necessary, mitigate potential adverse effects on GCWAs or their habitat. The BA concluded that Alternative 2 "may affect" but is "not likely to adversely affect" GCWAs on JBSA-BUL (JBSA, 2024).

Karst Invertebrates

Under Alternative 2, construction activities would occur within Bexar County karst zones 1, 2, and 3 (see **Section 3.10.1.4)**. On JBSA-BUL, construction activities would directly or indirectly disturb up to 1.6 acres of karst zone 1; 3.2 acres of karst zone 2; and 12 acres of karst zone 3. However, no designated KPA on JBSA-BUL would be affected under Alternative 2. Areas classified as karst zones 1 or 2 under Alternative 2 consist of previously disturbed and undisturbed lands. Closure and removal of the existing WWTP infrastructure would result in approximately 58,000 ft^2 of grading at the site; however, this would be located outside of the KPA and would not be anticipated to result in adverse effects.

Alternative 2 would cross a karst zone 3 area (0.5 mile) near the existing effluent detention basin to Bushmaster Road and run parallel to a karst zone 1 area (0.15 mile). Between Bushmaster Road and the JBSA-BUL boundary (0.15 mile), the wastewater conveyance line would cross a karst zone 2 area. A 160-acre, 100-foot-deep quarry has been excavated in this same karst zone 2 approximately 100 to 200 feet from the JBSA-BUL boundary. None of the Shavano Highlands Subdivision alternative is in a KPA. Accordingly, JBSA conducted surveys to identify karst features within the proposed ROW of Alternative 2; the results are summarized in the BA (JBSA, 2024).

Under Alternative 2, the portion of the wastewater conveyance line outside of JBSA-BUL would affect up to 8 acres of karst zone 2. Accordingly, these areas may require survey and assessment to determine the presence/absence of federally listed karst species prior to the start of construction. Should any federally listed karst species or their suitable habitat be identified by survey of these areas, prior to the start of construction, a USFWS-approved HCP would be prepared, and an incidental take permit obtained, pursuant to Section 10 of the ESA. Under Alternative 2, adherence to applicable permit conditions would avoid, minimize, and, if necessary, mitigate potential adverse effects on federally listed karst species or their habitat. The Air Force, in accordance with USFWS Section 7 consultation, prepared a BA to evaluate the effects of this project, and others, to karst invertebrates. It is unknown if underground voids exist along the proposed pipeline's construction footprint. The BA concluded that Alternative 2 "may affect" and is "likely to adversely affect" karst species *Rhadine exilis, Rhadine infernalis,* and Madla's cave meshweaver on JBSA-BUL (JBSA, 2024).

Bracted Twistflower

Bracted twistflowers have been identified in areas near Eisenhower Park, west of Alternative 2. While the plant has not been identified since 2006, potential critical habitat has been designated in this area. The Air Force, in accordance with USFWS Section 7 consultation, prepared a BA to evaluate the effects of this project, and others, on the bracted twistflower. The plant may be adversely affected should its presence be discovered during construction associated with Alternative 2; therefore, the BA concluded that Alternative 2 "may affect" and is "likely to adversely affect" the bracted twistflower (JBSA, 2024). No occurrences of bracted twistflowers were identified within the project area during a pedestrian survey conducted on 9 February 2024 (JBSA, 2024). If bracted twistflowers are found during construction, development would pause and JBSA Natural Resources staff would be notified before continuing.

Coordination with USFWS regarding the impacts to threatened and endangered species as a result of the Proposed Action is currently ongoing.

Migratory Birds

Due to more substantial vegetation removal associated with Alternative 2, potential effects on migratory birds would be more likely to occur under this alternative. However, for the reasons described above for Alternative 1, potential adverse effects on migratory birds under Alternative 2 would be short term and moderate. Vegetation removal/disturbance would occur between 15 September and 28 February, which is outside the nesting season for MBTA species. No long-term, appreciable effects on populations of migratory birds would be likely to result from Alternative 2.

Cumulative Effects

Under Alternative 2, conservation laws and initiatives would continue to limit, control, or guide development in a manner that protects natural resources in the public interest (e.g., habitat management for the GCWA and federally listed karst species on JBSA-BUL). JBSA-BUL would continue to maintain and implement a USFWS-approved INRMP and comply with the provisions of BOs issued by the USFWS under the ESA. These measures would ensure populations of native or special status plants and animals on and around JBSA-BUL remain at levels commensurate with conservation objectives for the region or range of such species. The Air Force has determined that impacts to several federally listed species may occur. Should other projects occur at the same time as those identified in Alternatives 1 and 2, additional surveys and guidance may be needed; impacts to federally listed species may have the potential to occur. All potential projects occurring in proximity to the identified federally listed species would need to be evaluated and adhere to BMPs and mitigation measures identified in **Section 3.10.3** below. When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-BUL, no significant cumulative effects on regional biological resources would be anticipated to occur with implementation of Alternative 2.

3.10.3 Best Management Practices and Mitigation Measures

The Air Force would require contractors to implement the following BMPs to reduce potential effects on biological resources under the Proposed Action:

- Cease construction work and notify JBSA's Natural Resources staff if migratory birds (or nests of migratory birds) identified by the USFWS as a species of conservation concern are observed on or around construction sites.
- Comply with JBSA environmental specifications during construction activities.
- Revegetate disturbed areas with native species; TPWD recommends incorporating pollinator conservations and management into revegetation and landscaping plans.
- Design, construct, and maintain project-specific stormwater management features to the benefit of wildlife habitat, when applicable and possible.
- Do not conduct vegetation removal and construction within nesting GCWA habitat or in KPA.
- Conduct vegetation removal between 16 September and 28 February to avoid bird nesting season, when GCWA are present; tricolor bat birthing; bracted twistflower flowering; disturbing Monarch butterfly life-cycle stages, which include the egg, the larvae (caterpillar), and the pupa (chrysalis) stages; and the majority of oak wilt season.
- Notify the TCEQ immediately upon encountering a void larger than 6 inches in any direction during trenching activates and complete a void mitigation plan using TCEQ-10256, *Solution Feature Discovery Notification Form*.
- Identify all oak species within the construction footprint prior to initiating vegetation removal. Immediately paint all oaks that are trimmed or accidentally wounded during the action with pruning paint. Sterilize equipment between individual trees to prevent the spread of oak wilt.
- Avoid mature trees when possible to keep canopy intact.
- Survey the construction footprint in April or May, i.e., prior to initiating vegetation clearing, to identify any bracted twistflower in the area. Flag identified plants and protect from construction activities when possible.
- Detail silt fencing placement in the Edwards Aquifer Protection Plan in accordance with all TCEQ requirements as well as safeguards around Cement Cave from sediment and runoff.
- Place fueling points outside Karst Zone 1 or 2 and over containments.
- Once construction is complete, reseed all disturbed areas with regionally native wildflower seed mix to include milkweed species known in the area that are host species for the Monarch butterfly.
- Schedule operations and maintenance activities, to include mowing and brush management, that affect vegetation between 16 September and 28 February to minimize impacts to protected species.
- Thoroughly wash all equipment and machinery used for construction prior to entering the Installation to avoid the introduction of invasive species to the area. Continue monitoring and removal of invasive species.

3.11 CULTURAL RESOURCES

Cultural resources include a broad range of resources consisting of physical evidence of past human activity. The term encompasses prehistoric or historic structures, buildings, objects, sites, districts (i.e., a collection of related structures, buildings, objects, and/or sites), landscapes, natural features, traditional cultural properties (TCPs), and cemeteries. These terms are further described as follows:

- **Archaeological Resources –** prehistoric or historic sites, objects, and districts where remnants of physical evidence, such as artifacts, features, and ecological evidence, of a past culture are present.
- **Architectural Resources –** structures, buildings, objects, sites, and districts that are over 45 years old.
- **Cemeteries –** the burial locations, formal or informal, of deceased persons from any time period, prehistoric or historic.
- **TCPs –** places associated with the cultural practices or beliefs of a living community that are rooted in that community's history and are important to their continued cultural identity. For example, a Native American "sacred site" is one with established religious significance to, or ceremonial use by, a Native American religion.

The ROI for cultural resources is the APE.[10] The archaeological APE is defined as the construction limits of disturbance for the Proposed Action. The architectural APE accounts for both physical effects within the construction limits of disturbance (direct APE) and visual and noise effects to or from areas where the Proposed Action would be distinctly visible (indirect APE). The direct and indirect architectural APEs for the Proposed Action are 50 meters (164 feet) and 800 meters (2,600 feet) from the Proposed Action, respectively (**Figure 3-8**).

3.11.1 Existing Conditions

3.11.1.1 Archaeological Resources, Including Traditional Cultural Properties

Archaeological investigations at JBSA-BUL have recorded 446 archaeological sites on the Base since 1977. Thirty of these sites have been determined eligible for listing in the National Register of Historic Places (NRHP); 18 sites are currently under review for eligibility. Seven sites are known to contain human remains, including at least one Native American burial site. Three archaeological sites within JBSA-BUL overlap with or occur in areas associated with the Proposed Action; however, each of these sites has been determined not eligible for listing in the NRHP.

Native American tribes identified as having a historical association with the JBSA area include three federally recognized tribes: Comanche Nation, Oklahoma; Mescalero Apache Tribe of the Mescalero Reservation, New Mexico; and Tonkawa Tribe of Indians of Oklahoma. JBSA consults with these tribes when planning to conduct a proposed action on JBSA, including JBSA-BUL. To date, none of these Native American tribes has expressed interest in or provided input on the Proposed Action.

Although no TCPs or sacred sites have been formally designated as such on JBSA-BUL, Native American human remains have been identified through prior archaeological investigations conducted at the Base (Air Force, 2020c). Pursuant to the NAGPRA, standard operating procedures for the inadvertent discovery of Native American human remains is part of the PA in place between JBSA and the SHPO (Air Force, 2020c).

There are no known eligible archaeological sites or TCPs in the ROI outside the boundary of JBSA-BUL. However, two cemeteries occur near segments of Camp Bullis Road between the Installation boundary and I-10 (see **Figure 3-8**).

[10] As defined in implementing regulations for Section 106 of the NHPA, the APE is "the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any properties exist…. [The APE] is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking" (36 CFR § 800.16).

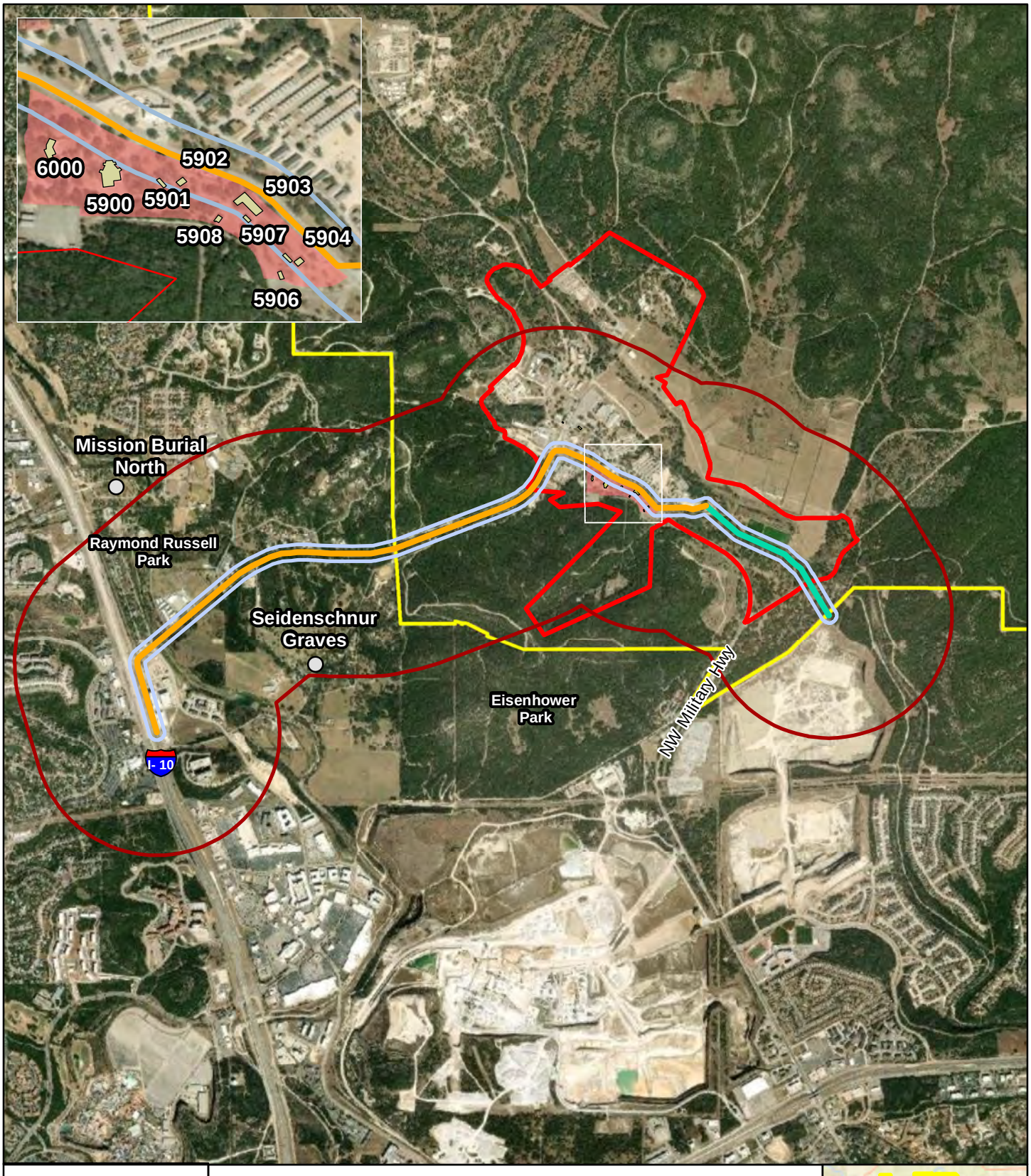


FIGURE 3-8
PROPOSED CULTURAL APE HISTORIC DISTRICT

N

Imagery: ESRI 2021
Projection: WGS 1984
Zone 14N

0 0.25 0.5 Miles

- Cemetery
- Alternative 1
- Alternative 2
- Cantonment Area
- Contributing Element of NRHP-Eligible District
- Direct APE (50 m)
- Indirect APE (800 m)
- Installation Boundary
- Proposed Historic District

3.11.1.2 Architectural Resources

There are numerous architectural resources associated with JBSA-BUL, including 18 buildings or structures determined eligible for listing in the NRHP on an individual basis, as a contributing element to an eligible historic district, or by Program Alternative. Per a recent Section 106 consultation with the Texas SHPO (Texas Historical Commission, 2021), JBSA is preparing a formal nomination for the "Upper Military" portion of the JBSA-BUL cantonment for listing in the NRHP. **Figure 3-8** depicts the proposed historic district within the JBSA-BUL cantonment. **Table 3-9** identifies the contributing elements of the proposed historic district. Two of the buildings, Buildings 5902 and 5908, were also determined eligible for listing in the NRHP on an individual basis. Several buildings that are part of the proposed historic district lie within the direct APE, while the others are in the indirect APE for the Proposed Action. No other historic properties or structures associated with JBSA-BUL are located in the direct or indirect APEs.

There are no historic properties located in the ROI outside the boundary of JBSA-BUL. The nearest historic properties listed on the NRHP lie approximately 3 miles northwest of Camp Bullis Road and 5 miles southeast of Military Highway.

Table 3-9
Buildings Included in the Proposed "Upper Military" Historic District on JBSA-BUL

Building Number	Site Date	Site Type
5900	1930	Technical Training Classroom
5901	1930	Vehicle Operations Administration
5902	1930	Air Education and Training Command Technical Training Support
5903	1930	Administrative Office, Non-Air Force
5904	1930	Chapel, Base
5905	1930	Separate Toilet/Shower Building
5906	1951	Administrative Office, Non-Air Force
5907	1930	Separate Toilet/Shower Building
5908	1930	Headquarters Named/Numbered Division
6000	1931	Consolidated Open Mess

Source: Freeman, 1998; Air Force, 2020b

3.11.2 Environmental Consequences

The Air Force defined a significant effect to cultural resources as one that would meet the criteria of adverse effect under NHPA implementing regulations at 36 CFR 800.5(a)(2).

3.11.2.1 No Action Alternative

Under the No Action Alternative, wastewater operations on JBSA-BUL would continue in accordance with the status quo. Cultural resources on JBSA-BUL would continue to be managed consistent with the JBSA Integrated Cultural Resources Management Plan (ICRMP) (Air Force, 2020c) and as agreed to under the PA with the SHPO. On a regional level, cultural resources would continue to be managed by federal, state, and local governments, as well as through other private, quasi-public, and public interests.

3.11.2.2 Alternative 1 – Camp Bullis Road

Archaeological Resources, Including Traditional Cultural Properties

There are no recorded archaeological sites or TCPs found within the archaeological APE for Alternative 1. Therefore, no impacts to archaeological resources would be anticipated to occur under Alternative 1.

During the construction of Alternative 1, should any human remains be unearthed or discovered, work would be halted immediately and JBSA would adhere to the applicable provisions of NAGPRA. In such an event, a qualified professional archaeologist, with assistance from the SHPO, would determine if remains are

Native American, Euro-American, or indeterminate. Should all parties concur that the remains are Native American, those remains would be temporarily curated at JBSA-BUL until their disposition is determined. Further, under Alternative 1, no human remains would be disinterred prior to following the applicable provisions of the Texas Health and Safety Code. Any human remains discovered in caves, regardless of how fragmentary, would be treated as intentional interments.

Likewise, should any archaeological materials be unearthed or discovered during the construction activities, work would stop immediately and JBSA would contact the SHPO to consult regarding the appropriate treatment of the site. Work would not resume until the appropriate treatment is completed by a qualified archaeologist.

The portion of Alternative 1 not contained by JBSA-BUL would occur within 0.5 mile of two cemeteries; however, given the natural and built environment features that minimize visibility from the cemeteries to areas along Camp Bullis Road, potential viewshed effects would be negligible at this distance. In the event of an unanticipated discovery of an archaeological resource during demolition or construction related to the Proposed Action, the contractor would suspend ground-disturbing activities and JBSA would call a meeting with the SHPO to determine the need for an unanticipated discovery plan. There would be no adverse effect to archaeological resources.

Architectural Resources

The wastewater conveyance line under Alternative 1 would have the potential to pass through the north side of the “Upper Military” historic district near the intersection of Military Highway and Camp Bullis Road (see **Figure 3-8**). As such, Alternative 1 would potentially affect the contributing elements of the district, directly or indirectly. No other historic properties eligible or potentially eligible for listing in the NRHP would be subject to potential adverse effects under Alternative 1, and it is anticipated that there would be no adverse effect to historic architectural resources.

Cumulative Effects

Under Alternative 1, historic preservation laws and initiatives would continue to limit, control, or guide development in a manner that protects cultural resources in the public interest (e.g., nomination of the “Upper Military” historic district for listing in the NRHP). JBSA-BUL would continue to maintain and implement its ICRMP and PA in coordination with the SHPO and other interested consulting parties, including its obligations under Section 106 of the NHPA. These measures would ensure that cultural resources continue to be evaluated and considered in planning for future actions that could affect such resources on or around JBSA-BUL. When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-BUL, no significant cumulative effects to cultural resources would be anticipated to occur with implementation of Alternative 1.

3.11.2.3 Alternative 2 – Shavano Highlands Subdivision

Archaeological Resources, Including Traditional Cultural Properties

The wastewater conveyance line under Alternative 2 would bisect three previously recorded archaeological sites on JBSA-BUL (**Table 3-10**). All of these sites were evaluated and determined not eligible for listing in the NRHP. However, existing survey data in this area are unreliable. Additional surveys would be recommended prior to any ground-disturbing activities in the vicinity of these sites. There are no known TCPs associated with Alternative 2. Because the sites have previously been determined not eligible for NRHP listing, Alternative 2 would have no adverse effect to archaeological resources.

Should any archaeological materials be unearthed or discovered during construction activities, work would stop immediately and JBSA would contact the SHPO to consult regarding the appropriate treatment of the site. Work would not resume until the appropriate treatment is completed by a qualified archaeologist.

Closure and removal of the existing WWTP infrastructure and the construction of a replacement facility would result in approximately 58,000 ft^2 of grading and ground disturbance; however, the existing WWTP is not located within a known archaeological site.

As described for Alternative 1, standard operating procedures codified in JBSA's PA with the SHPO would apply to any inadvertent discoveries of Native American human remains or archaeological materials.

Table 3-10
Archaeological Sites Associated with Alternative 2

Site No.	Site Type	Site Date	NRHP Eligibility Status	Citation (from Air Force, 2020c)
41BX0036	Camp	Prehistoric	Determined not eligible.	Gerstle (1978)
41BX0918	Camp	Prehistoric	Determined not eligible.	Pagoulatos (2008); Veni (2009)
41BX0920	Camp/quarry	Prehistoric	Determined not eligible.	Veni (2009)

Source: Air Force, 2020a
NRHP = National Register of Historic Places

Architectural Resources

There are no historic properties eligible or potentially eligible for listing in the NRHP within the direct APE of Alternative 2. Therefore, no direct, physical adverse effects on the contributing elements of the proposed "Upper Military" historic district would occur under Alternative 2 and there would be no adverse effect to architectural resources (see **Figure 3-8**).

Cumulative Effects

Under Alternative 2, historic preservation laws and initiatives would continue to limit, control, or guide development in a manner that protects cultural resources in the public interest (e.g., nomination of the "Upper Military" historic district for listing in the NRHP). JBSA-BUL would continue to maintain and implement its ICRMP and PA in coordination with the SHPO and other interested consulting parties, including its obligations under Section 106 of the NHPA. These measures would ensure that cultural resources continue to be evaluated and considered in planning for future actions that could affect such resources on or around JBSA-BUL. When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-BUL, no significant cumulative effects to cultural resources would be anticipated to occur with implementation of Alternative 2.

3.11.3 Best Management Practices and Mitigation Measures

The Air Force would implement the following BMPs to reduce potential effects to cultural resources under the Proposed Action:

- Comply with JBSA environmental specifications during construction activities.
- Incorporate design elements to minimize the potential to impact the proposed historic district.
- Plant native and habitat-appropriate trees and vegetation to limit undesirable views from historic properties that could result from projects included in the Proposed Action such as newly constructed buildings or structures.
- Comply with applicable development standards and regulations with respect to architectural design of the Proposed Action in accordance with the JBSA Installation Development Plan (Air Force, 2018b).
- Conduct archaeological field survey prior to ground-disturbing activities in the vicinity of previously recorded sites.

No project-specific mitigation measures for cultural resources were identified by analysis.

3.12 SOCIOECONOMICS

Socioeconomics refer to the demographic and economic characteristics of an area and its population. Demography specifically refers to the composition of a population in an area and looks at factors such as age and race. Economic characteristics include variables related to the economy, such as employment, income, poverty, and housing.

The socioeconomic ROI is Bexar County, Texas.

3.12.1 Existing Conditions

3.12.1.1 Population

Bexar County was one of the fastest growing US counties in the last decade (**Table 3-11**) (United States Census Bureau [USCB], 2020a). Although the rate of population growth in Bexar County is projected to slow by 6 percent in the decade between 2020 and 2030, the projected population for the year 2050 is 2,695,668, a 34-percent increase from the 2020 Census count (USCB, 2020a). If current projections hold true, Bexar County will continue to experience population growth well above that occurring at a national level over the next several decades.

Table 3-11
Population Growth in the ROI by Comparison (2010–2020)

Geographic Area	2010 Population	2020 Population	Percent Change in Population from 2010 to 2020 (%)
Bexar County	1,714,773	2,009,324	17.0
Texas	25,145,561	29,145,505	15.9
United States	308,745,538	331,449,281	7.3

Source: USCB, 2019
ROI = Region of Influence

3.12.1.2 Housing

Housing characteristics for Bexar County are generally consistent with state and national trends (**Table 3-12**). Home ownership and value are lower when compared to state and national data. A higher percentage of the population in Bexar County rents homes compared to state and national populations. Although home ownership and rental rates are also lower when compared to those at the state and national levels, overall, the housing market in Bexar County is comparable.

Table 3-12
Housing Characteristics in the ROI by Comparison (2016–2020)

Housing Characteristic	Bexar County	Texas	United States
Total housing units	705,038	11,283,353	139,684,244
Owner-occupied housing unit rate (%)	58.5	62.3	64.4
Median value of owner-occupied housing units ($)	171,200	187,200	229,800
Median gross rent ($)	1,048	1,082	1,096

Source: USCB, 2019
ROI = Region of Influence

3.12.1.3 Labor Force and Employment

The employment rate for Bexar County is slightly higher than the rate for Texas and the US. The industry sectors for employment in Bexar County are similar to those for Texas and the US, the exception being San Antonio's popularity as a tourist destination in lieu of manufacturing jobs (**Table 3-13**).

3.12.1.4 Community Services

Community support functions in the ROI include both military and civilian institutions and organizations that collectively contribute to law enforcement, fire protection, medical, and educational services. A health clinic, police/military police station, and fire station are located in the cantonment along with various retail services for the visitor and working populations of the Base. Other JBSA installations in the ROI offer redundant and more specialized community support services.

A network of community support functions throughout Bexar County and within the municipal limits of San Antonio also serve the ROI, providing law enforcement, fire protection, and medical services to the resident population. Additionally, through various public-to-public and public-to-private initiatives, mutual-aid agreements are in place to reduce response times to emergency incidents on and around military installations throughout the region. For example, Shavano Park, an incorporated jurisdiction to the south of JBSA-BUL, often responds to fire and medical emergencies on the Base, and vice versa (JBSA, 2020).

Table 3-13
Labor Force and Employment Characteristics in the ROI by Comparison

Labor Force or Employment Characteristic	Bexar County	Texas	United States
Approximate employment rate (%)	65.1	64.8	63.4
Largest industry sectors for employment (over 15% of labor force)	• educational services • health care and social assistance	• educational services • health care and social assistance	• educational services • health care and social assistance
Second largest industry sectors for employment (10–15% of the labor force)	• professional, scientific, and management • administrative and waste management services • retail trade • arts, entertainment, and recreation • accommodation and food services	• professional, scientific, and management • administrative and waste management services • retail trade • manufacturing	• professional, scientific, and management • administrative and waste management services • retail trade • manufacturing

Source: USCB, 2020c

3.12.2 Environmental Consequences

The Air Force defines a significant effect to socioeconomics as an appreciable change to current demographic or economic conditions in the ROI that would be harmful for surrounding communities and residents.

3.12.2.1 No Action Alternative

Under the No Action Alternative, wastewater operations on JBSA-BUL would continue in accordance with the status quo. Current demographic and socioeconomic conditions and trends would continue to change over time.

3.12.2.2 Alternative 1 – Camp Bullis Road

Alternative 1 would not result in a permanent increase to the population of JBSA-BUL or within the ROI. Temporary construction workers under Alternative 1 likely would be procured from within, or in close proximity to, the ROI. No appreciable change in the population of the ROI would be likely to occur under Alternative 1. Therefore, no appreciable change in the demand for housing and public or social services would be anticipated under Alternative 1; potential effects would be negligible.

Alternative 1 would result in a minor increase in the demand for materials and labor needed to construct and install the wastewater conveyance line. However, given the limited scope and temporary nature of this work, the material and labor supply in the ROI (or nearby areas of Texas) would be sufficient to meet the demand for such resources. Under Alternative 1, short-term, minor, beneficial effects to local economic conditions likely would result in the form of increased expenditures (e.g., procurement of construction materials and temporary jobs) and incidental spending.

Cumulative Effects

When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-BUL, no significant cumulative socioeconomic effects would be anticipated to occur with implementation of Alternative 1.

3.12.2.3 Alternative 2 – Shavano Highlands Subdivision

Potential socioeconomic effects in the ROI under Alternative 2 would be the same as described for Alternative 1.

Cumulative Effects

When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-BUL, no significant cumulative socioeconomic effects would be anticipated to occur with implementation of Alternative 2.

3.12.3 Best Management Practices and Mitigation Measures

No project-specific BMPs or mitigation measures for socioeconomics were identified by analysis.

3.13 Environmental Justice and Protection of Children

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (1994), as amended by EO 14008, *Tackling the Climate Crisis at Home and Abroad* (2021), directs federal agencies to address disproportionate adverse human health, environmental, and climate-related impacts on disadvantaged communities. As part of these directives, federal agencies are required to consider low-income and minority populations when implementing a federal action with the potential to affect the environment. Because children are more susceptible to environmental contaminants than adults, EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, provides similar direction to federal agencies to address these risks when implementing a federal action.

For purposes of analysis, minority populations are defined as Alaska Natives, American Indians, Native Hawaiians, Pacific Islanders, and people of color to include Asians, Blacks or African Americans, and persons of Hispanic origin (of any race). Low-income, disadvantaged populations include persons living below the poverty threshold as determined by USCB and youth populations under the age of 18 years.

The ROI for environmental justice and protection of children includes the Census Tracts (CTs) in the vicinity of JBSA-BUL, as shown on **Figure 3-9**, where potential adverse effects to minority, disadvantaged, or more vulnerable populations or communities could be most directly felt (e.g., from increased traffic or noise, or environmental degradation).

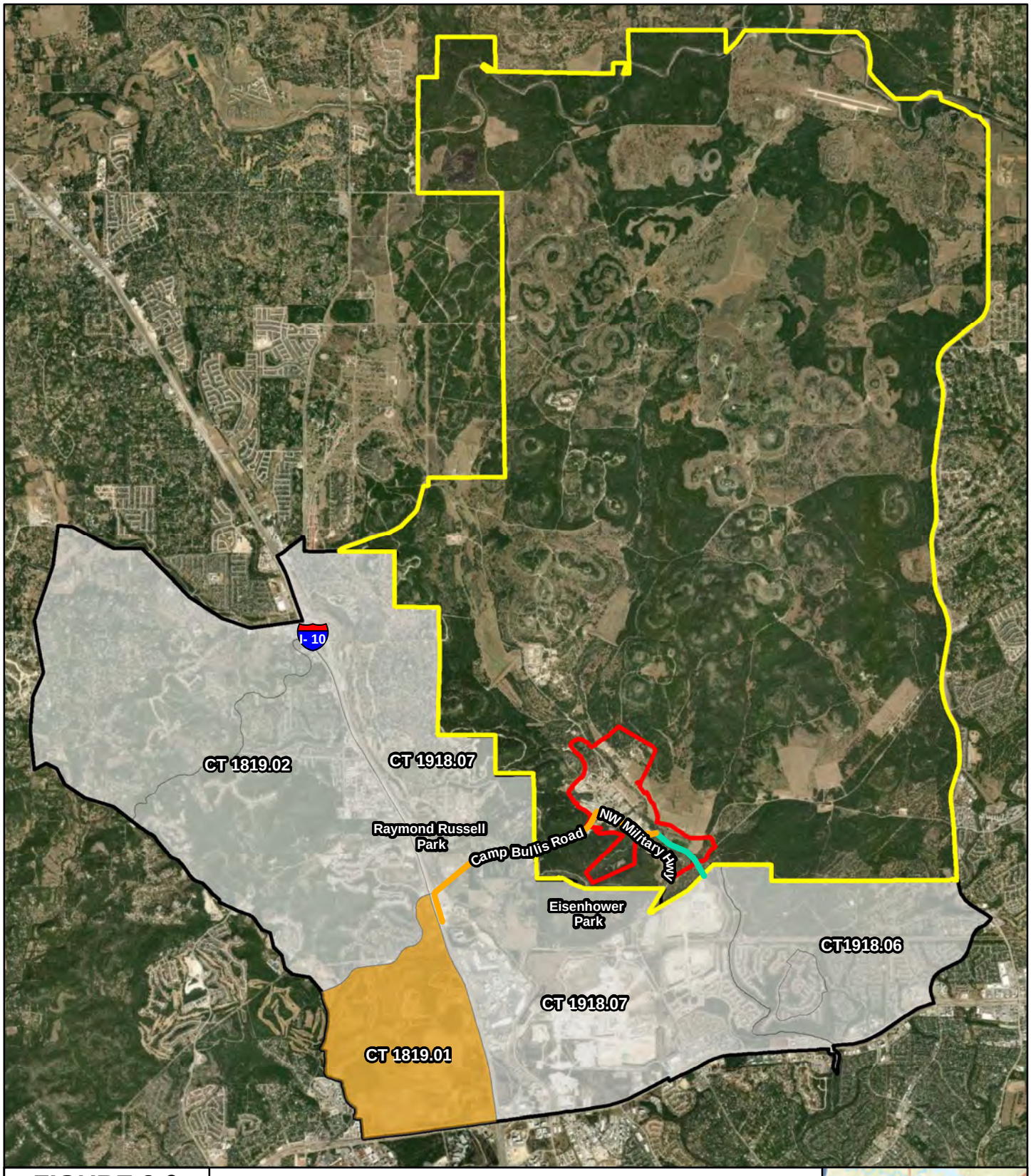


FIGURE 3-9
ENVIRONMENTAL JUSTICE COMMUNITIES

N

Imagery: ESRI 2021
Projection: WGS 1984
Zone 14N

0 0.75 1.5 Miles

- Alternative 1
- Alternative 2
- Cantonment Area
- Installation Boundary
- Region of Influence
- Census Tract (CT)
- Environmental Justice Community

3.13.1 Existing Conditions

Table 3-14 characterizes minority and disadvantaged populations in the ROI for comparison with county, state, and federal demographics. Indicative of the ethnic diversity in Texas and Bexar County, all four CTs in the ROI have a minority population that is higher than that of the US. CTs 1918.06, 1918.07, and 1819.02 report minority percentages lower than that of surrounding Bexar County; CT 1819.01 has a higher percent minority than Bexar County, indicating the presence of an environmental justice population. CTs 1918.07, 1819.01, and 1819.02 have higher percent minority totals than the state of Texas. Although the Hispanic or Latino population in the ROI is lower than that of Bexar County, all four CTs are comparable to the Hispanic or Latino population in the state and well above that of the nation.

Table 3-14
Total Population and Populations of Concern

Region	Census Tract No.	Total Population	Percent Minority	Percent Hispanic or Latino[a]	Percent Below Poverty	Percent Youth[b]
ROI	1918.06	8,484	40.7	26.7	2.1	30.4
	1918.07	7,565	52.2	37.7	11.7	18.3
	1819.01	5,945	68.4	42.6	27.6	12.2
	1819.02	7,984	52.6	35.1	2.1	25.1
Bexar County	N/A	2,009,324	54.2	59.3	15.6	25.5
Texas	N/A	29,145,505	49.9	39.3	14.2	25.8
United States	N/A	331,449,281	23.6	18.7	12.8	22.4

Source: USCB, 2019, 2020b
Notes:
a Hispanic and Latino denote a place of origin.
b Percent youth are all persons under the age of 18.
N/A = not applicable; ROI = Region of Influence

The percent population of CT 1819.01 estimated to be below the poverty line is 27.6 percent, well above the percent population considered below poverty at a county, state, and national level. The percent population considered below the poverty line in the other portions of the ROI fall below those of the county, state, and nation. Therefore, only Census Tract 1819.01 is also considered to be a low-income, disadvantaged community. Census Tract 1918.06 (30.4 percent) and 1819.02 (25.1 percent) have youth populations above or comparable to the county, state, and nation.

3.13.2 Environmental Consequences

The Air Force defines a significant effect to environmental justice communities and children within the ROI as any adverse effect (e.g., air and water pollution and exposure to contaminants or noise) that could be disproportionately felt by minority, low-income, or youth populations.

3.13.2.1 No Action Alternative

Under the No Action Alternative, wastewater operations on JBSA-BUL would continue in accordance with the status quo. Current conditions and trends would continue to change over time with respect to environmental justice communities and children.

3.13.2.2 Alternative 1 – Camp Bullis Road

A portion of Alternative 1 near I-10 would potentially affect the population of CT 1819.01, identified as an environmental justice community (see **Figure 3-9**). Under Alternative 1, construction activities would generate localized levels of noise, fugitive dust, traffic, stormwater, and waste. Construction activities also would create potential health and safety risks for children living in these same areas.

As determined by analysis in this EA, adverse effects under Alternative 1 would be short term and minor; No adverse effects would accrue disproportionally to the only environmental justice community in the ROI, CT 1819.01, as Alternative 1 would not cross into this CT. While Alternative 1 would cross CT 1918.07, this CT does not comprise an environmental justice community. CTs 1819.02 and 1918.06 have a comparable or higher percent youth population when compared to Bexar County; however, these CTs would not be impacted by Alternative 1. During construction, standard BMPs and operational protocols would be in place to prevent or minimize potential adverse effects (as noted in the sections above). Construction activities under Alternative 1 would occur in phases and only during normal daytime hours. Overall, no disproportionate adverse effects on environmental justice communities or children would occur under Alternative 1; potential effects would be short term and minor.

Cumulative Effects

When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-BUL, no significant cumulative effects to environmental justice communities and children would be anticipated to occur with implementation of Alternative 1.

3.13.2.3 Alternative 2 – Shavano Highlands Subdivision

No environmental justice communities were identified in proximity to Alternative 2 (see **Figure 3-9**). CTs 1819.02 and 1918.06 have a comparable or higher percent youth population when compared to Bexar County; however, these CTs would not be impacted by Alternative 2. Therefore, no disproportionate adverse effects to environmental justice communities or children would occur under Alternative 2. Potential effects would be short term and minor.

Cumulative Effects

When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-BUL, no significant cumulative effects to environmental justice communities and children would be anticipated to occur with implementation of Alternative 2.

3.13.3 Best Management Practices and Mitigation Measures

No additional, project-specific BMPs or mitigation measures for environmental justice communities and children were identified by analysis.

3.14 UTILITIES AND INFRASTRUCTURE, INCLUDING TRANSPORTATION

Infrastructure consists of the systems and structures that enable a population in a specified area to function. Infrastructure is wholly man-made, with a high correlation between the type and extent of infrastructure and the degree to which an area is characterized as developed. The availability of infrastructure and its capacity to support more users, including residential and commercial expansion, are generally regarded as essential to the economic growth of an area. Infrastructure components generally include transportation and utility systems, as well as other types of essential services.

Transportation is defined as the system of roadways, highways, and transit services on JBSA-BUL, and those external to the Base, that support the movement of people, materials, or services to and from the northern San Antonio area. Utilities include natural gas, sanitary sewer/wastewater, electrical, potable water, communications systems, and solid waste management.

The ROI for utilities and infrastructure is JBSA-BUL and the larger San Antonio metropolitan area where services are procured.

3.14.1 Existing Conditions

3.14.1.1 Transportation

JBSA-BUL is located adjacent to San Antonio and is approximately 21 miles northeast of the downtown area. Intermodal road, rail, and air transportation networks connect San Antonio, the county seat of Bexar County and the second largest city in Texas, to other parts of the state and the US. JBSA-BUL and San Antonio are serviced by I-10, which runs along the western side of the Base boundary. The I-10 corridor extends to the south San Antonio. Frontage roads along I-10 provide access to the commercial and residential areas to the south and southwest of JBSA-BUL. Camp Bullis Road extends under I-10 to the west and southwest to residential areas.

The roadway system within JBSA-BUL is made up of a network of roads and trails with different surface types, including pavement, gravel, and dirt. The two paved, primary roads on the JBSA-BUL cantonment are Highway and Camp Bullis Road, with most buildings on the Base adjacent to these roads. The main access roads to the training areas from the cantonment area are Camp Bullis Road, Lewis Valley Road, Marne Road, Malabang Trail, and Wilderness Trail. There is only one access control gate for JBSA-BUL, located immediately south of the cantonment on Military Highway. All non-military and commercial vehicles access the Base via this gate (Air Force, 2017).

3.14.1.2 Utilities

Propane and Natural Gas

Most facilities in the JBSA-BUL cantonment burn propane gas to meet their heating needs. However, the aging propane tank and distribution system is in poor condition and operates inefficiently. Although natural gas services are readily available in the vicinity of JBSA-BUL, currently there is no means to deliver natural gas to the cantonment area of the Base.

Planning for construction of a natural gas pipeline that would connect the JBSA-BUL cantonment to a natural gas distribution line in the vicinity of the Base is currently underway. JBSA's anticipated timeframe for the proposed natural gas project is approximately 2025–2029, the same as that anticipated for the Proposed Action subject to analysis in this EA. Should the proposed plans come to fruition, natural gas would replace the use of propane to meet the heating needs of facilities within the cantonment.

Sanitary Sewer

JBSA-BUL operates a small wastewater treatment system and disposal site located approximately 3.4 miles northeast of the intersection of Farm to Market 1604 and I-10 to support training and operations at the Base. Wastewater is collected and conveyed to a package WWTP located in the cantonment area of the Base. Constructed in 1995, the current water-collection tower, Building 5920, is a 20-foot tall steel tank with an approximate diameter of 82 feet. The WWTP consists of an activated sludge process plant using the conventional mode. Treatment units in the interim phase include three bar screens, three aeration basins, three final clarifiers, three digesters, and a Parshall flume that measures irrigation flow. Treatment units in the final phase include bar screens, grit chambers, aeration basin, final clarifier, digester, a chlorine contact chamber, and an evaporation/storage pond system with a spray irrigation system. The package WWTP has adequate capacity to meet the Base's current peak wastewater flow of 0.68 million gallons per day. Treated effluent discharges to one of three settling ponds located to the south of the WWTP; the ponds have a total surface area of 7 acres and total capacity of 139 acre-feet for storage of treated effluent prior to irrigation.

The wastewater collection system in operation at JBSA-BUL is in a state of disrepair due to age. Although the package WWTP currently has sufficient capacity to support training and operations in the short term; it would not support increases to wastewater flows in the long term (i.e., future mission expansion). JBSA's management of wastewater operations requires in-house technical expertise to maintain its TCEQ discharge permit, and continual operations will require substantial infrastructure reinvestment in the future

due to its poor condition. The WWTP site, effluent storage ponds, and associated irrigation area also occupy a relatively large area of land in the cantonment area of the Base.

Electricity

JBSA-BUL receives electrical power through City Public Service Energy. There are no contractual limitations on the amount of electricity the Base may purchase. Electric utility lines extend along Camp Bullis Road through to the intersection of Camp Bullis Road and Military Highway. However, most facilities within the JBSA-BUL cantonment rely primarily on propane gas to meet their heating needs.

Potable Water

JBSA-BUL operates a small water production, storage, and distribution system. There are three water supply wells that withdraw water from the Trinity Aquifer system underlying the Base. Water withdrawals are treated on Base prior to being pumped to elevated storage tanks on JBSA-BUL, with a total storage capacity of 0.45 million gallons.

Communications Systems

Information technology communications systems on JBSA-BUL are limited and many lack compatibility with modern standards and related capabilities. Information technology communications systems in the off-Base portion of the ROI are generally abundant and most are compatible with modern standards and related capabilities.

Solid Waste Management

Solid waste management primarily relates to the availability of landfills to support a population's residential, commercial, and industrial needs. Solid waste generated on JBSA-BUL is collected and disposed of by a certified contractor at a TCEQ-approved landfill located off Base (Air Force, 2018a).

3.14.2 Environmental Consequences

The Air Force defines a significant effect to or from utilities and infrastructure within the ROI as one or more of the following:

- measurable change or service reduction within the regional transportation network,
- prolonged or repeated interruption of public transportation services regionally,
- prolonged or repeated service disruptions to utility end users, and
- substantial increase in utility demand relative to existing and planned regional uses.

3.14.2.1 No Action Alternative

Under the No Action Alternative, wastewater operations on JBSA-BUL would continue in accordance with the status quo. The wastewater treatment and collection system on the Base would continue to fall into disrepair and become less effective and efficient over time. Regionally, other utility and infrastructure systems would continue to operate, providing essential services to the population of JBSA-BUL and that of the larger San Antonio metropolitan area.

3.14.2.2 Alternative 1 – Camp Bullis Road

Transportation

Under Alternative 1, roadways in the ROI would generally remain accessible to military and civilian users. Localized increases in traffic on JBSA-BUL and along the utility ROW west of the Base would be likely to result from the delivery of equipment and construction materials, removal of debris, and daily commuting of construction workers. Some delays and road closures would be likely in localized areas along the ROW

during construction. However, increases of traffic under Alternative 1 would be a small fraction of existing levels of traffic in the ROI, and traffic measures would be in place to minimize delays. Therefore, potential effects to transportation under Alternative 1 would be short term and negligible.

Propane and Natural Gas

The operation of Alternative 1 would not affect the condition or capacity of the existing propane tank and distributions system in use on JBSA-BUL. However, the siting and construction of Alternative 1 could affect JBSA's plans for construction of a natural gas pipeline from the JBSA-BUL cantonment to a connection point within the Proposed Action ROI. Alternative 1 would occur within the same anticipated timeframe as that of the proposed natural gas pipeline project. Further, the utility ROW along Camp Bullis Road is also under consideration as a route for the proposed wastewater conveyance line. Should Camp Bullis Road be selected as the utility ROW for both proposed projects, potential effects could occur if the ROW does not provide adequate space to accommodate both utility lines in accordance with siting and design requirements.

Sanitary Sewer

Under Alternative 1, conveyance of wastewater to the SAWS would provide JBSA with reliable wastewater treatment services over the long term at a reduced cost. The current package WWTP is intended only for temporary use and would be removed and reused elsewhere. Removing the temporary WWTP and providing a permanent solution would result in long-term, moderate, beneficial impacts to the current wastewater system. The SAWS wastewater collection and treatment system also has adequate capacity to accept additional wastewater flows from JBSA-BUL sufficient to support future mission growth. Alternative 1 would also allow the Installation to convey the management and maintenance of wastewater system operations and infrastructure to the SAWS. This divestment would reduce potential risks to human health and the environment on JBSA-BUL and would allow JBSA to continue to concentrate development in the cantonment while limiting development elsewhere on the Base. Overall, by conveying wastewater flows generated at JBSA-BUL to the SAWS, more time and resources would be put toward its military mission. Therefore, wastewater conveyance to the SAWS under Alternative 1 would result in moderate, beneficial effects to JBSA-BUL sanitary sewer infrastructure and operations.

Other Utilities

Under Alternative 1, construction activities would occur in localized areas of JBSA-BUL and along the utility ROW west of the Base. Electricity, potable water, and communications systems are readily available in the ROI. During construction, these systems and services would largely remain available on Base (e.g., mobile systems for power and communications). The condition and capacity of electricity, potable water, and communications systems in the ROI would also be adequate to support the operation post construction.

Solid waste management under Alternative 1 would comply with all applicable federal, state, and local regulations. Procurement of construction materials would consider life-cycle management, and all solid waste generated during construction activities would be recycled or reused to the maximum extent possible.

Therefore, potential effects to or from these utilities that could result under Alternative 1 would be short term and negligible.

Cumulative Effects

When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-BUL, no significant cumulative effects to utilities and infrastructure, including transportation, would be anticipated to occur with implementation of Alternative 1.

3.14.2.3 Alternative 2 – Shavano Highlands Subdivision

Transportation

Under Alternative 2, roadways in the ROI would generally remain accessible to military and civilian users. Localized increases in traffic on JBSA-BUL and along the utility ROW south of the Base would be likely to result from the delivery of equipment and construction materials, removal of debris, and daily commuting of construction workers. Some delays and road closures would be likely in localized areas along the ROW during construction. However, increases of traffic under Alternative 2 would be a small fraction of existing levels of traffic in the ROI, and traffic measures would be in place to minimize delays. Therefore, potential effects to transportation under Alternative 2 would be short term and negligible.

Propane and Natural Gas

Under Alternative 2, construction and operations activities would not affect the condition or capacity of the existing propane tank and distribution system in use on JBSA-BUL. Because the siting and construction of Alternative 2 would not overlap geographically with JBSA's plans to construct and operate a natural gas pipeline from the JBSA-BUL cantonment south of the Base along Military Highway, no potential effects would be anticipated despite both proposed projects occurring over the same approximate time period.

Sanitary Sewer

Under Alternative 2, conveyance of wastewater to the SAWS would provide JBSA with reliable wastewater treatment services over the long term at a reduced cost. The current package WWTP is intended only for temporary use and would be removed and reused elsewhere. Removing the temporary WWTP and providing a permanent solution would result in long-term, moderate, beneficial impacts to the current wastewater system. JBSA-BUL would continue to execute and maintain wastewater treatment operations prior to the material being transported off Base to the SAWS line connection southeast of the Installation. Therefore, implementation of Alternative 2 would result in minor, beneficial effects to sanitary sewer infrastructure and operations at JBSA-BUL.

Other Utilities

Potential effects to or from the condition or capacity of electricity, potable water, communications systems, and solid waste management under Alternative 2 would be the same as those described above for Alternative 1.

Cumulative Effects

When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-BUL, no significant cumulative effects to utilities and infrastructure, including transportation, would be anticipated to occur with implementation of Alternative 2.

3.14.3 Best Management Practices and Mitigation Measures

No additional, project-specific BMPs or mitigation measures for utilities and infrastructure were identified by analysis.

3.15 HAZARDOUS MATERIALS AND WASTE

For this EA, hazardous material (HAZMAT) includes contaminants (i.e., chemicals, substances, or compounds) known to present potential risks to health, safety, or the environment when they occur at certain concentrations and that are managed under one or more applicable regulatory program.

RCRA defines "hazardous wastes" as "a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics, may – (A) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible,

illness; or (B) pose a substantial present of potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed." (42 USC § 6903(5)). RCRA gives USEPA the authority to control hazardous waste from "cradle to grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA authorizes mandatory procedures and requirements for federal facilities that use, accumulate, transport, store or dispose of hazardous substances, materials, and wastes.

The ROI for HAZMAT and hazardous wastes includes JBSA-BUL and northern San Antonio; in particular, areas that may be affected by construction activities under the Proposed Action.

3.15.1 Existing Conditions

3.15.1.1 Hazardous Materials

HAZMAT in use at JBSA-BUL includes flammable and combustible liquids, acids, corrosives, caustics, anti-icing chemicals, compressed gases, solvents, paints, paint thinners, and pesticides. JBSA-BUL maintains a hazardous waste management plan (HWMP) for operations that involve the handling, storage, transportation, and use of these materials. The HWMP includes procedures for the prevention, containment, and response to discharges of such materials on the Base. On JBSA-BUL, HAZMAT is used and applied in strict accordance with label and manufacturer instructions. When not used, HAZMAT is stored in appropriate, clearly labeled containers and secured in storage lockers or cabinets that are accessible only by authorized personnel (JBSA, 2016).

Section 311 of the CWA, as amended by the *Oil Pollution Act* (Public Law 101-380), establishes requirements to prevent, prepare for, and respond to oil discharges at specific types of facilities, including military bases. The intent is to prevent oil from reaching navigable waters and adjoining shorelines and to contain discharges of oil. To do so, facilities are required to develop and implement SPCC plans to establish procedures, methods, and equipment requirements for response and cleanup actions. JBSA-BUL maintains an SPCC plan to guide response and cleanup actions immediately following an accidental release or discharge of oil into the environment.

There are four underground storage tanks (USTs) located within 100 meters (330 feet) of the Proposed Action **(Figure 3-10**). Two active service station USTs are situated immediately northwest of Camp Bullis Road, near the main line terminus in the JBSA-BUL cantonment. A third UST (Facility No. TX89620 [closed]) is located between JBSA-BUL and I-10. The fourth UST (Facility No.TX38931 [active]) is located along Camp Bullis Road near its intersection with I-10 (Air Force, 2017).

Per- and Polyfluoroalkyl Substances

Per- and polyfluoroalkyl substances (PFAS) are a group of manufactured chemicals used in industry and consumer products since the 1940s due to their useful properties. There are thousands of different chemicals in the PFAS group, some of which are more widely used and studied than others. Most PFAS share characteristics of concern in their ability to move, persist, and bioaccumulate in the environment over time. Although PFAS exposure in humans at relatively low concentrations is common, research suggests that exposure to concentrated sources of PFAS over long periods of time may be linked to adverse health outcomes (USEPA, 2021b).

The DoD identifies PFAS as emerging contaminants of concern as components of legacy aqueous film forming foam (AFFF) used to extinguish petroleum fires. In 2016, the USEPA issued a lifetime drinking water health advisory for two PFAS precursors in AFFF and health-based regional screening levels for a third PFAS used as a firefighting agent in AFFF. Per DoD's relative risk evaluation site evaluation framework, the Air Force continues to evaluate potential AFFF releases on its current and former bases.

There are no known PFAS-contaminated areas associated with the Proposed Action.

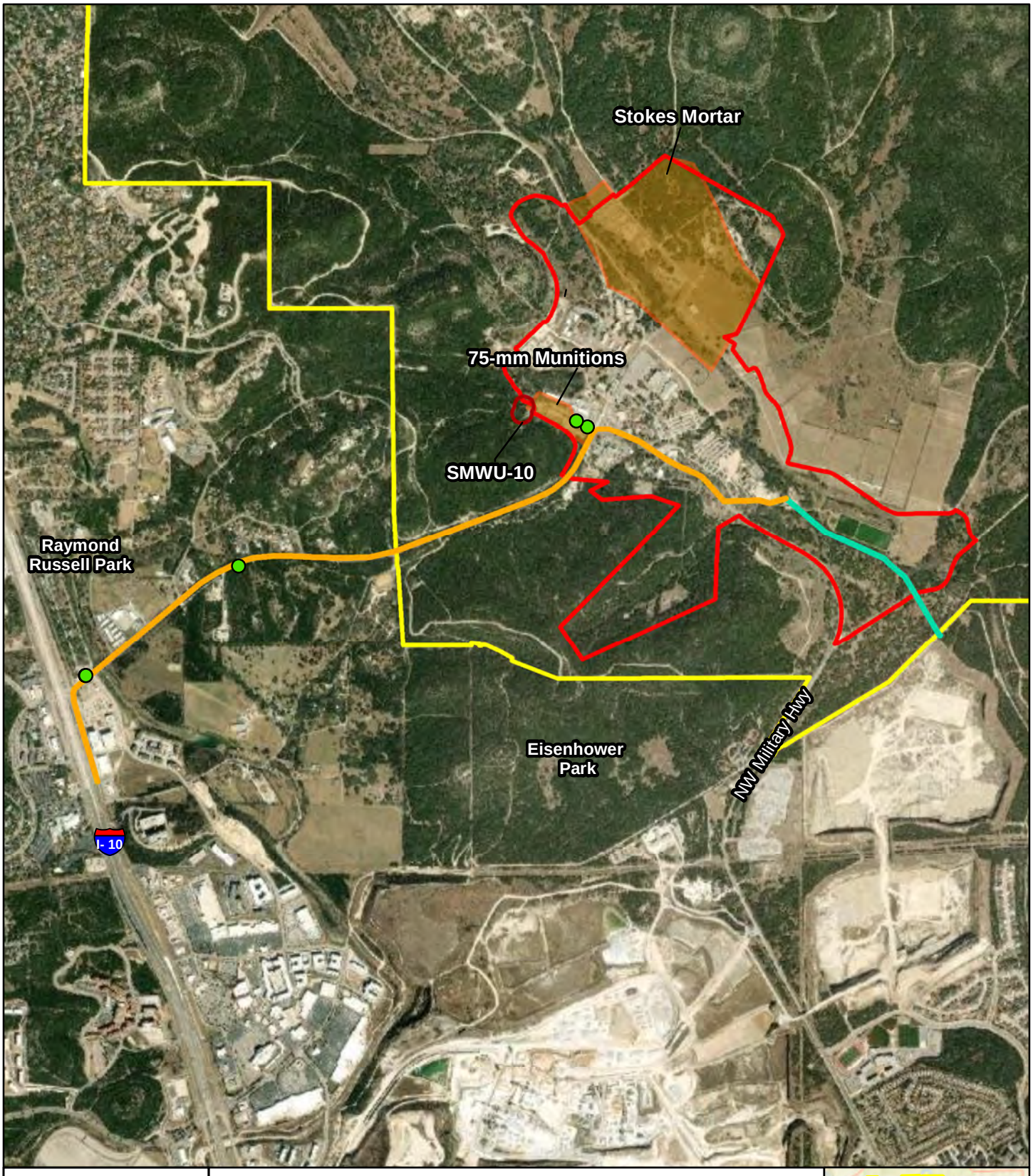


FIGURE 3-10
HAZARDOUS MATERIALS/WASTE

N

Imagery: ESRI 2021
Projection: WGS 1984
Zone 14N

0 0.25 0.5 Miles

Underground Storage Tank (Within 100 m)
Alternative 1
Alternative 2
Cantonment Area
Installation Boundary
MMRP Sites
SWMU-10

Pesticides

The application of all pesticides at JBSA-BUL, including herbicides, fungicides, insecticides, and rodenticides, is authorized by JBSA's *Integrated Pest Management Plan*, which includes processes and procedures to minimize pesticide usage, enhance environmental protection, and maximize the use of integrated pest management techniques.

Pesticide usage outside the Base boundary is also subject to federal regulation under the *Toxic Substances Control Act* (15 USC § 2601 et seq.). In cooperation with the USEPA, the Texas Department of Agriculture is the lead authority for pesticide regulation in the state. For example, the State agency registers pesticide products, enforces pesticide label compliance, and trains and licenses professional applicators.

Other Hazardous Materials

The Air Force manages asbestos in accordance with Air Force Instruction 32-1001, *Civil Engineer Operations*, and applicable USEPA regulations. Nonfriable asbestos is not considered HAZMAT until removed or disturbed. The JBSA *Asbestos Management Plan* identifies the need for asbestos management, abatement, and removal, where applicable, when funding is available, or where damage or exposure warrants the need (JBSA, 2019). The *Asbestos Management Plan* focuses on in-place management of asbestos, meaning, where applicable, asbestos-containing material (ACM) can be left in place until there is a need for removal (i.e., due to conditions, renovation, demolition) (JBSA, 2020). Disruption of these materials causes asbestos to become airborne, producing a risk of inhalation.

The Occupational Safety and Health Administration (OSHA) and USEPA have determined that human exposure to lead is an adverse health risk. Sources of exposure to lead are contaminated dust, soils, and lead-based paint (LBP). In 1973, the Consumer Product Safety Commission established a maximum lead content in paint of 0.5 percent by weight in a dry film of newly applied paint. In 1978, under the *Consumer Product Safety Act* (15 USC §§ 2051–2089), the Commission lowered the allowable lead level in paint to 0.06 percent (600 parts per million). The Act also restricted the use of LBP in non-industrial facilities; however, due to their age, it is possible that facilities on the Installation may contain LBP.

Polychlorinated biphenyls (PCBs) are a group of chemical mixtures used as insulators in electrical equipment, such as transformers and fluorescent light ballasts. Chemicals classified as PCBs were widely manufactured and used in the US until being banned in 1979. The Air Force manages PCBs in accordance with AFMAN 32-7002 as well as under USEPA regulations. Buildings within the Installation have the potential to contain PCBs in various machinery and wiring.

3.15.1.2 Hazardous Waste

Activities that require the use of HAZMAT may also generate hazardous wastes. Accordingly, RCRA authorizes mandatory procedures and requirements for federal facilities that accumulate, transport, treat, store, or dispose of hazardous waste. In Texas, the TCEQ implements the RCRA program under the federally delegated authority of the USEPA.

Pursuant to RCRA, JBSA-BUL is classified as a small-quantity generator of hazardous waste (#TX4210020133). Activities that generate hazardous waste on the Base include vehicle operations and maintenance, construction, and small arms and weapons training. Hazardous waste generation, handling, and disposal at JBSA-BUL is conducted in accordance with the HWMP.

Environmental Restoration Program Sites

To comply with RCRA, JBSA-BUL implements the cleanup of hazardous waste through its Environmental Restoration Program (ERP). One ERP site is located within the Installation boundary (see **Figure 3-10**). ERP sites on the Base are subject to more detailed site assessments and, when necessary, media sampling to identify cleanup options. Applicable regulatory requirements determine the scope of remedial actions, monitoring, and eventual closure of the site under RCRA authority.

The ERP site on JBSA-BUL is associated with two former landfill sites regulated under RCRA as a single solid waste management unit (SWMU)-10. Individually identified as Landfill 12a and 12b, the SWMU is located immediately west of the 75-mm Munitions site (FR004) (see **Figure 3-10**). SWMU-10 is managed in accordance with a TCEQ Industrial Hazardous Waste permit (#50335). No other ERP sites on JBSA-BUL are known to occur within the Proposed Action ROI (Air Force, 2017).

No contaminated sites subject to RCRA or CERCLA regulation were identified for the off-Base portion of the ROI.

Military Munitions Response Program Sites

Current and historic military training activities at JBSA-BUL are a source of munitions constituent releases to the environment. Munitions constituents include antimony, chromium, copper, lead, zinc, white phosphorus, and explosives. In most cases, these are found in soils associated with firing points/lines, target/impact areas, range floors, and berms used as backstops at the firing sub-ranges. However, there is a potential for munitions constituents to migrate into other environmental media; surface or groundwater of most concern. Once soils containing such constituents are disturbed, they are classified as hazardous waste and subject to RCRA requirements.

There are two Military Munitions Response Program (MMRP) sites with the Proposed Action ROI (see **Figure 3-10**). These include the 148-acre Stokes Mortar site (FR001), part of which overlaps the northern extent of the cantonment, and the 75-mm Munitions site (FR004) in the southwest portion of the cantonment. The southern boundary of FR001 lies approximately 0.4 mile north of the Proposed Action. The FR004 site is immediately adjacent to an existing utility ROW, southwest of the intersection of Military Highway and Camp Bullis Road in the cantonment. However, FR004 received regulatory closure under RCRA following a munitions and explosives of concern removal action in 2016. Although removal actions also were conducted at the Stokes Mortar site in 2014 and 2016, it remains an active RCRA site due to the potential presence of additional munitions and explosives of concern and munitions debris. Both MMRP sites are subject to land use controls; however, neither would apply to the Proposed Action. JBSA-BUL has historically been used as an impact area,[11] and unexploded ordnance (UXO) has the potential to occur on the surface and subsurface throughout the entire Installation.

3.15.2 Environmental Consequences

The Air Force defines a significant effect from HAZMAT and hazardous waste within the ROI as one or more of the following:

- a substantial increase in the generation of HAZMAT and/or hazardous waste,
- an increase in exposure of persons to HAZMAT and/or hazardous waste, and
- an increased presence in the environment of HAZMAT and/or hazardous waste.

3.15.2.1 No Action Alternative

Under the No Action Alternative, wastewater operations on JBSA-BUL would continue in accordance with the status quo. JBSA-BUL and private-sector companies external to the Base would continue to manage HAZMAT and hazardous wastes in compliance with applicable management plans and federal, state, and local regulations.

[11] An impact area is an area having designated boundaries within the limits of which all ordnance will detonate or impact.

3.15.2.2 Alternative 1 – Camp Bullis Road

Hazardous Materials

Under Alternative 1, HAZMAT, such as oils, lubricants, paints, or similar products, would be temporarily stored and used at project sites during construction. Quantities would be limited to those required for the project, and construction contractors would manage them in accordance with applicable federal, state, and local regulations and procedures. Appropriate BMPs would be used to prevent pollutants from entering the environment and migrating via soil, groundwater, or surface water. JBSA would ensure that daily inspections of equipment are performed and appropriate spill-containment materials and storage containers are used to store fuel or other HAZMAT on the Base during the construction phase. Additionally, equipment maintenance activities would not be conducted on any project sites under Alternative 1.

Under Alternative 1, the USTs that lie within or adjacent to the utility ROW would either be removed in accordance with applicable federal, state, and local laws and regulations, or avoided by design. Therefore, with standard plans, procedures, and protocols in place during construction and operations activities under Alternative 1, potential effects from HAZMAT would be negligible.

Therefore, with standard management and control measures in place to address hazardous wastes generated from or encountered during construction and operations activities under Alternative 1, potential adverse effects would be short term and minor.

Pesticides

Implementation of Alternative 1 would not result in a change to the application of pesticides, herbicides, fungicides, insecticides, and rodenticides at JBSA-BUL. These activities would continue to be monitored under JBSA's *Integrated Pest Management Plan*.

Other Hazardous Materials

Under Alternative 1, construction activities would not involve or disturb any buildings or other structures that are known to contain HAZMAT, including ACM, LBP, or PCBs; however, the potential still exists for these materials to be present. Protective measures would be taken during demolition and removal of any structural materials associated with the existing WWTP. The Asbestos Program Officer (APO) would be informed during the project planning phase in order to review the status of the buildings in the asbestos database. If there is no asbestos survey, then a licensed asbestos consultant would conduct one prior to demolition. The Air Force would be responsible for all associated abatement costs, in accordance with JBSA Environmental Specifications Section 01 57 20, and must coordinate all contract sampling, analysis, and any planned abatement activities through the APO.

Hazardous Wastes

Under Alternative 1, construction activities would generate small quantities of hazardous waste. Contractors would manage waste in accordance with applicable requirements and management plans. Under Alternative 1, project-related hazardous waste would be segregated from non-hazardous waste, stored in appropriate containers, and transported by licensed contractors for disposal at a permitted facility in the San Antonio metropolitan area.

Any soils removed from the Installation would undergo analytical testing in accordance with JBSA Environmental Specifications Section 01 57 20. A copy of the results would be provided to the area-specific Environmental office to determine proper disposal. Soils would not be permitted to be removed until this determination has been completed. All excavated, nonhazardous soil would be reused on site or removed from the Installation at the completion of the project. No permanent stockpiling of soil is authorized on JBSA. Based on waste characterization, soil would be transported to a TCEQ-permitted disposal location approved by the 802d Civil Engineer Squadron/Civil, Environmental and Infrastructure Engineering. Prior to soil removal, the contractor would sample and test the soil for every 200 cubic yard of soil removed from

JBSA under the Proposed Action. All soils would be manifested and signed by an authorized JBSA Environmental Office representative. Under Alternative 1, effects would be long term and minor.

Environmental Restoration Program and Military Munitions Response Program Sites

Alternative 1 would not involve any activities directly within an ERP or MMRP site. The proposed wastewater conveyance line under Alternative 1 would have the potential to come into contact with MMRP site FR004 on the northwest side of Camp Bullis Road. Associated excavation and earthwork may be required in soils with concentrations of contaminants exceeding applicable regulatory criteria. In such an event, soils would be categorized as hazardous waste and removed for transportation to a permitted regional disposal facility. All workers involved and the general public in the vicinity of the site would be protected by engineering or administrative controls, as appropriate (see **Section 3.16** below). Soils characterized as nonhazardous, if not stockpiled on Base for reuse as backfill, would be transported off Base for disposal at a suitable location. Additionally, UXO clearance of the selected area may be necessary prior to beginning construction due to historic use of JBSA-BUL as an impact area. Therefore, with standard management and control measures in place to address potential hazardous wastes during soil removal from MMRP site FR004, potential adverse effects would be short term and minor.

Cumulative Effects

All activities in the San Antonio metropolitan area involving the use, transport, treatment, storage, and disposal of HAZMAT and hazardous waste would continue to be regulated under federal, state, and local laws and regulations. When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-BUL, no significant cumulative effects from HAZMAT and hazardous waste would be anticipated to occur with implementation of Alternative 1.

3.15.2.3 Alternative 2 – Shavano Highlands Subdivision

Hazardous Materials

Under Alternative 2, HAZMAT, such as oils, lubricants, paints, or similar products, would be temporarily stored and used at project sites during construction. Quantities would be limited to those required for the project, and construction contractors would manage them in accordance with applicable federal, state, and local regulations and procedures. Appropriate BMPs would be used to prevent pollutants from entering the environment and migrating via soil, groundwater, or surface water. JBSA would ensure that daily inspections of equipment are performed and appropriate spill-containment materials and storage containers are used to store fuel or other HAZMAT on the Base during the construction phase. Additionally, equipment maintenance activities would not be conducted on any project sites under Alternative 2.

No USTs lie within or adjacent to the proposed alignment under Alternative 2, and there would be no potential for impacts. Therefore, with standard plans, procedures, and protocols in place during construction and operations activities under Alternative 2, potential effects from HAZMAT would be negligible.

Additionally, the design and operation of the wastewater detention facility under Alternative 2 would comply with applicable federal and state regulations and standards for the involved HAZMAT and hazardous waste. Therefore, potential adverse effects from HAZMAT and hazardous waste under Alternative 2 would be minor in the short and long term.

Pesticides

Implementation of Alternative 2 would not result in a change to the application of pesticides, herbicides, fungicides, insecticides, and rodenticides at JBSA-BUL. These activities would continue to be monitored under JBSA's *Integrated Pest Management Plan*.

Other Hazardous Materials

Under Alternative 2, construction activities would not involve or disturb any buildings or other structures that are known to contain HAZMAT, including ACM, LBP, or PCBs; however, the potential still exists for these

materials to be present. Protective measures would be taken during demolition and removal of any structural materials associated with the existing WWTP. The APO would need to be informed during the project planning phase in order to review the status of the buildings in the asbestos database. If there is no asbestos survey, then a licensed asbestos consultant must conduct one prior to demolition. The Air Force would be responsible for all associated abatement costs, in accordance with JBSA Environmental Specifications Section 01 57 20 and must coordinate all contract sampling, analysis, and any planned abatement activities through the APO.

Hazardous Wastes

Potential effects from the use, accumulation, transport, storage, or disposal of HAZMAT and hazardous wastes under Alternative 2 would be similar to those described for Alternative 1.

As with Alternative 1, all excavated soil would be reused on site or removed from the Installation at the completion of the project. Any soils removed from the Installation would undergo analytical testing in accordance with JBSA Environmental Specifications Section 01 57 20. A copy of the results would be provided to the area-specific Environmental office to determine proper disposal. Soils would not be permitted to be removed until this determination has been completed. No permanent stockpiling of soil is authorized on JBSA. Based on waste characterization, soil would be transported to a TCEQ-permitted disposal location approved by the 802d Civil Engineer Squadron/Civil, Environmental and Infrastructure Engineering. Prior to soil removal, the contractor would sample and test the soil for every 200 cubic yard of soil removed from JBSA under the Proposed Action. All soils would be manifested and signed by an authorized JBSA Environmental Office representative. Under Alternative 2, effects would be long term and minor.

Environmental Restoration Program and Military Munitions Response Program Sites

Alternative 2 would not involve any activities directly within an ERP or MMRP site. The proposed wastewater conveyance line under Alternative 2 would not bisect or bypass any ERP sites or MMRP sites known to occur on JBSA-BUL. Adverse impacts would not be anticipated from implementation of Alternative 2. Additionally, UXO clearance of the selected route area may be necessary prior to beginning construction due to historic use of JBSA-BUL as an impact area.

Cumulative Effects

All activities in the San Antonio metropolitan area involving the use, transport, treatment, storage, and disposal of HAZMAT and hazardous waste would continue to be regulated under federal, state, and local laws and regulations. When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-BUL, no significant cumulative effects from HAZMAT and hazardous waste would be anticipated to occur with implementation of Alternative 2.

3.15.3 Best Management Practices and Mitigation Measures

The Air Force would implement the following BMPs for HAZMAT and hazardous waste:

- Comply with JBSA environmental specifications during construction activities.
- Adhere to the JBSA HWMP to minimize impacts from the handling and disposal of HAZMAT and ensure compliance with state and federal HAZMAT regulations.
- Properly handle, remove, and dispose of ACMs in accordance with Air Force, local, state, and federal regulations.
- Properly handle, remove, and dispose of LBPs in accordance with Air Force, local, state, and federal regulations.
- Properly handle, remove, and dispose of PCBs in accordance with Air Force, local, state, and federal regulations.

- Report spills of any regulated substances to the Edwards Aquifer Authority within 72 hours of the event.
- Properly handle and remove all hazardous and toxic substances used during construction, demolition, and renovation activities.

Failure to implement BMPs under the Proposed Action likely would result in adverse short- and long-term impacts to personnel due to exposure of materials that are known to be hazardous to humans.

No mitigation measures for HAZMAT and hazardous waste were identified by analysis.

3.16 HEALTH AND SAFETY

A safe environment is one in which there is no, or an optimally reduced, potential for death, serious bodily injury or illness, or property damage. Occupational safety and health (OSH) programs address the health and safety of people at work. These programs impose regulatory requirements for the benefit of employees and the public, including implementation of engineering and administrative practices that aim to reduce risks of illness, injury, death, and property damage.

The *Occupational Safety and Health Act* (29 USC §§ 651–678) is the primary federal statute for regulating the safety and health of workers in the US. It establishes worker-protection standards that must be followed to prevent and minimize potential safety and health risks. OSH regulations cover potential exposure to a wide range of chemical, physical, and biological hazards and ergonomic stressors. The regulations are designed to control these hazards by eliminating exposure via administrative or engineering controls, substitution, or the use of personal protective equipment (PPE). Many states are delegated authority to enforce OSHA regulations; however, Texas does not have its own occupational safety and health regulatory program (i.e., the federal rules govern workplace safety and health in the private sector).

The ROI for health and safety is JBSA-BUL and the larger San Antonio metropolitan area from which military personnel and contractors would travel to conduct work at or in the vicinity of the Base.

3.16.1 Existing Conditions

The health and safety of onsite military and civilian workers are safeguarded by numerous DoD and military branch-specific requirements designed to comply with standards issued by federal OSHA, USEPA, and state OSH agencies. These standards specify health and safety requirements, the amount and type of training required for workers, the use of PPE, administrative controls, engineering controls, and permissible exposure limits for workplace stressors. OSH requirements applicable to the Proposed Action would address workers and public health and safety during the involved construction and operational activities.

Health and safety hazards can often be identified and reduced or eliminated before an activity begins. Necessary elements for an accident-prone situation or environment include the presence of the hazard itself, together with the exposed (and possibly susceptible) population or public. The degree of exposure depends primarily on the proximity of the hazard to the population.

Hazards associated with the Proposed Action generally include transportation, construction, maintenance, and operational activities. Human-use areas associated with facility and infrastructure projects create potentially unsafe environments (e.g., noise, fire, or explosion due to a rapid oxidation process) for workers and/or members of the public. Noisy environments can also mask verbal or mechanical warning signals such as sirens, bells, or horns.

OSH is the responsibility of each employer, as applicable. Although such responsibilities vary by industry or employment sector, employer responsibilities generally include:

- review potentially hazardous workplace conditions;

- monitor exposure to workplace chemical (e.g., asbestos, lead, hazardous substances), physical (e.g., noise propagation, falls), and biological (e.g., infectious waste, wildlife, poisonous plants) agents, and other stressors;
- evaluate and recommend controls (e.g., prevention, administrative, engineering, and PPE) to ensure exposure is eliminated or adequately controlled; and
- perform occupational health physicals for those workers subject to the use of respiratory protection, engaged in hazardous waste work, asbestos, lead, or other work requiring medical monitoring.

On JBSA-BUL, all military and civilian personnel conducting work on the Base are subject to applicable OSH regulations, including those pertaining to the Proposed Action. Military personnel also oversee law enforcement, control access, and provide emergency response services at JBSA-BUL and, through numerous mutual-aid agreements, off the Base.

3.16.2 Environmental Consequences

The criteria used to determine the potential for a significant adverse impact on human and environmental health includes any work or operational activity carried out in non-compliance with applicable OSH regulations.

3.16.2.1 No Action Alternative

Under the No Action Alternative, wastewater operations on JBSA-BUL would continue in accordance with the status quo. All military and civilian personnel on JBSA-BUL or under contract for work related to JBSA-BUL would continue to be subject to federal OSH regulations. Because existing wastewater system components and infrastructure are in a deteriorated condition and treated wastewater effluent is currently applied to land via spray irrigation, implementation of the No Action Alternative would result in continued long-term, adverse effects to human and environmental health and safety at JBSA-BUL.

3.16.2.2 Alternative 1 – Camp Bullis Road

To comply with applicable health and safety regulations, Alternative 1 would require the preparation of a project-specific health and safety plan. The health and safety plan would contain guidance and direction to prevent or minimize potential risks in human-use areas. At a minimum, this plan would include emergency response and evacuation procedures; operational manuals; PPE recommendations (e.g., breathing and hearing protection); protocols and procedures for handling, storing, and disposing of HAZMAT and hazardous wastes; information on the effects and symptoms of potential exposures; and guidance with respect to hazard identification. The responsible party would also be required to submit each health and safety plan to JBSA for review and educate on-Base workers through daily briefings.

Under Alternative 1, construction activities, including removal of the existing WWTP, would create a potential risk for worker or public exposure to contaminated soils both on and off Base. Such an exposure could occur directly through contact with the contaminated media or indirectly via inhalation or ingestion of airborne particulate matter. However, any known or potentially contaminated soils or components of the existing WWTP infrastructure impacted under Alternative 1 would be subject to further assessment and/or sampling to determine whether concentrations exist above applicable regulatory thresholds. If necessary, an activity hazard analysis would be conducted to identify potential exposure risks specific to a site or area. The analysis would also recommend engineering and administrative controls protective of human health and the environment, as appropriate. All workers involved in construction activities would comply with applicable recommendations to include wearing PPE. Additional precautions may include wearing respirators, washing and disposing of clothing and equipment at project sites, and monitoring airborne contaminants. Additionally, project sites would be fenced and signage posted to further reduce safety risks to military personnel, visitors, or members of the general public.

All facilities and infrastructure associated with Alternative 1 would comply with standards pertaining to construction materials, leak protection, monitoring, and spill containment. Further, all hazardous and petroleum wastes generated on JBSA-BUL would be handled, stored, and disposed of in accordance with the Base's RCRA permit. Construction activities in the off-Base portion of Alternative 1 would also be subject to regulation and permitting under RCRA and related environmental laws. Compliance with current regulatory standards and management plans would ensure health and safety precautions remain in place post construction.

Alternative 1 would not pose an operational safety risk to the military mission of JBSA-BUL. As necessary, construction activities would be de-conflicted with restricted areas or safety zones in place for aircraft operations, firing ranges, or areas where explosives are detonated. Construction under Alternative 1 would only occur during normal daylight working hours (i.e., no light or glare would affect nighttime training and operations). Safety risks to or from military activities taking place concurrently with Alternative 1 construction activities would be manageable under established protocols and procedures.

Through adherence to project- and Base-specific health and safety measures, Alternative 1 would result in short-term, minor effects to human and environmental health and safety. Because existing wastewater system components and infrastructure are in a deteriorated condition and treated wastewater effluent is currently applied to land via spray irrigation, Alternative 1 would result in long-term, beneficial effects to human and environmental health and safety at JBSA-BUL.

Cumulative Effects

All construction activities in the San Antonio metropolitan area would continue to be regulated to ensure the health and safety of workers and the public. When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-BUL, potential cumulative effects to human and environmental health and safety would not be likely to occur under Alternative 1.

3.16.2.3 Alternative 2 – Shavano Highlands Subdivision

Potential effects to human and environmental health and safety under Alternative 2 would be the same as those described for Alternative 1. Overall, Alternative 2 would result in short-term, minor effects on human and environmental health and safety. Because existing wastewater system components and infrastructure are in a deteriorated condition and treated wastewater effluent is currently applied to land via spray irrigation, Alternative 2 also would result in long-term, beneficial effects to human and environmental health and safety at JBSA-BUL.

Cumulative Effects

All construction activities in the San Antonio metropolitan area would be regulated to ensure the health and safety of workers and the public. When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-BUL, potential cumulative effects to human and environmental health and safety would not be likely to occur under Alternative 2.

3.16.3 Best Management Practices and Mitigation Measures

No additional, project-specific BMPs or mitigation measures for health and safety were identified by analysis.

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APPENDIX A
INTERAGENCY/INTERGOVERNMENTAL COORDINATION FOR ENVIRONMENTAL PLANNING

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28 June 2022

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Dear Mr. Richardson

The United States Air Force (Air Force) is preparing an Environmental Assessment (EA) for the proposed construction of a wastewater conveyance line to connect Joint Base San Antonio (JBSA), Bullis (JBSA-BUL) to the San Antonio Water System (SAWS) in northern Bexar County, Texas (**Attachment 1**). Once connected to the SAWS, the Air Force further proposes to decommission and remove components of the existing wastewater treatment system on the Base. To account for possible environmental concerns, the Air Force seeks the input of your office.

Proposed Action

The Proposed Action would construct a wastewater line from the wastewater treatment plant (WWTP) site on JBSA-BUL to a SAWS connection point in the vicinity of Base. The route selected would inform the design of the Proposed Action and help determine additional requirements for construction. Once wastewater can be conveyed to the SAWS, the Proposed Action would also include the removal and closure of the WWTP and associated effluent storage ponds, pump house, and irrigation area. This portion of the Proposed Action would include environmental sampling and analysis, dismantlement and removal of structures, cutting and capping of below-ground infrastructure components, and restoration of the affected areas post-removal. The Air Force proposes to implement the Proposed Action from approximately 2025 to 2029.

Purpose and Need

The purpose of the Proposed Action is to provide JBSA-BUL with more efficient, reliable, and less-costly wastewater treatment services that can be sustained over the long term. Privatization of this utility would eliminate the operational and maintenance costs currently incurred by JBSA to treat and discharge wastewater effluent on the Base. It would also provide JBSA with flexibility to meet future demands for such services that are not currently known. Further, the Proposed Action would decommission and remove components of the existing

wastewater treatment system on JBSA-BUL, providing an opportunity to reuse these sites for another purpose.

The Proposed Action is needed to replace the aging infrastructure components of the wastewater system currently in operation at JBSA-BUL with a more efficient means of treatment and disposal. Under current conditions, continuance of wastewater operations would require substantial reinvestment to modernize the treatment and collection systems. The Proposed Action would also reduce the time and cost associated with wastewater system operations and maintenance.

Project Location

The proposed wastewater line would originate from the WWTP site on JBSA-BUL and terminate outside the Base at a SAWS connection point with sufficient capacity and flow rate to support the Proposed Action. The Air Force considered multiple route alternatives that would meet these requirements and selected two for further analysis in the EA. **Attachment 2** depicts the selected alternatives. The removal of the deactivated components of the wastewater treatment system would occur on and around the WWTP site.

Environmental Assessment

The EA will assess the potential environmental consequences of the Proposed Action and No Action Alternatives. Resource areas subject to analysis in the EA include air quality; natural and cultural resources; geology, topography, and soils; and water resources, among others. The EA will also examine the cumulative effects of the Proposed Action that, when combined with other reasonably foreseeable projects or actions, could result in potential adverse impacts on a regional scale.

So that we remain on schedule to complete the environmental impact analysis process in a timely manner, please provide your response to my point of contact for this matter, as provided below, no later than 30 days from receipt of this correspondence. Please send your response via postal mail or email (preferred) to:

ATTN: Ms. Monica Guerrero
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The Air Force appreciates your interest in and support of its military mission at JBSA-BUL. We thank you in advance for your assistance and look forward to your response.

Sincerely

ROBERSON.EDWARD.LEWIS.1124911636

Digitally signed by ROBERSON.EDWARD.LEWIS.1124911636
Date: 2022.06.23 11:53:02 -05'00'

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2 Attachments:
1. Map of Joint Base San Antonio, Bullis
2. Map of Sewer Line Route Alternatives

DEPARTMENT OF THE AIR FORCE
502D AIR BASE WING
JOINT BASE SAN ANTONIO

28 June 2022

Mr. Edward L. Roberson, P.E.
Chief, Environmental Management
802d CES/CEIE
1555 Gott Street
JBSA-Lackland Texas 78236-5645

Mark Wolfe
Texas Historical Commission
State Historic Preservation Office
1511 Colorado Street
Austin TX 78701

Dear Mr. Wolfe

The United States Air Force (Air Force) is preparing an Environmental Assessment (EA) for the proposed construction of a wastewater conveyance line to connect Joint Base San Antonio (JBSA), Bullis (JBSA-BUL) to the San Antonio Water System (SAWS) in northern Bexar County, Texas (**Attachment 1**). Once connected to the SAWS, the Air Force further proposes to decommission and remove components of the existing wastewater treatment system on the Base. To account for possible environmental concerns, the Air Force is engaging early with all potentially affected resource agencies as it formulates the undertaking. Accordingly, the Air Force seeks the input of the State Historic Preservation Office.

Proposed Action

The Proposed Action would construct a wastewater line from the wastewater treatment plant (WWTP) site on JBSA-BUL to a SAWS connection point in the vicinity of Base. The route selected would inform the design of the Proposed Action and help determine additional requirements for construction. Once connected to the SAWS, the Proposed Action would also include the removal and closure of the WWTP and associated effluent storage ponds, pump house, and irrigation area. This portion of the Proposed Action would include environmental sampling and analysis, dismantlement and removal of structures, cutting and capping of below-ground infrastructure components, and restoration of the affected areas post-removal. The Air Force proposes to implement the Proposed Action from approximately 2025 to 2029.

Pursuant to 36 *Code of Federal Regulations* (CFR) §§ 800.4(a) and (b), we request your assistance to identify and assess potential effects on historic properties that could result from our proposed undertaking. Further, we request your guidance to define an appropriate Area of Potential Effects (APE) in support of our effects determination for this undertaking under Section 106 of the *National Historic Preservation Act*.

Purpose and Need

The purpose of the Proposed Action is to provide JBSA-BUL with more efficient, reliable, and less-costly wastewater treatment services that can be sustained over the long term. Privatization of this utility would eliminate the operational and maintenance costs currently incurred by JBSA to treat and discharge wastewater effluent on the Base. It would also provide JBSA with flexibility to meet future demands for such services that are not currently known. Further, the Proposed Action would decommission and remove components of the existing wastewater treatment system on JBSA-BUL, providing an opportunity to reuse these sites for another purpose.

The Proposed Action is needed to replace the aging infrastructure components of the wastewater system currently in operation at JBSA-BUL with a more efficient means of treatment and disposal. Under current conditions, continuance of wastewater operations would require substantial reinvestment to modernize the treatment and collection systems. The Proposed Action would also reduce the time and cost associated with wastewater system operations and maintenance.

Project Location

The proposed wastewater line would originate from the WWTP site on JBSA-BUL and terminate outside the Base at a SAWS connection point with sufficient capacity and flow rate to support the Proposed Action. The Air Force considered multiple route alternatives that would meet these requirements and selected two for further analysis in the EA. **Attachment 2** depicts the selected alternatives in relation to known, below-ground cultural resources on JBSA-BUL. The removal of the deactivated components of the wastewater treatment system would occur on and around the WWTP site.

Environmental Assessment

The EA will assess the potential environmental consequences of the Proposed Action and No Action Alternatives. Resources or resource areas subject to analysis in the EA include air quality; natural and cultural resources; geology, topography, and soils; and water resources, among others. The EA will also examine the cumulative effects of the Proposed Action that, when combined with other reasonably foreseeable projects or actions, could result in potential adverse impacts on a regional scale.

So that we remain on schedule to complete the environmental impact analysis process in a timely manner, please provide your response to my point of contact for this matter, as provided below, no later than 30 days from receipt of this correspondence. Please send your response via postal mail or email (preferred) to:

ATTN: Ms. Dayna Cramer
802d CES/CEIEA
1555 Gott Street
JBSA Lackland TX 78236-5645
Email: dayna.cramer@us.af.mil

The Air Force appreciates your interest in and support of its military mission at JBSA-BUL. We look forward to receiving your input and guidance on our proposed undertaking and its potential to affect cultural resources on or in the vicinity of JBSA-BUL.

Sincerely

ROBERSON.EDWARD.LEWIS.1124911636

Digitally signed by ROBERSON.EDWARD.LEWIS.1124911636
Date: 2022.06.23 12:05:38 -05'00'

EDWARD L. ROBERSON, P.E.

2 Attachments:
1. Map of Joint Base San Antonio, Bullis
2. Map of Sewer Line Route Alternatives

DEPARTMENT OF THE AIR FORCE
502D AIR BASE WING
JOINT BASE SAN ANTONIO

28 June 2022

Mr. Michael D. Waldrop
JBSA Tribal Liaison
502 FSG/CD (Building 5000)
JBSA-Camp Bullis, Texas 78257

William Nelson Sr.
Chairman
Comanche Nation, Oklahoma
P.O. Box 908
Lawton OK 73502-0908

Dear Chairman Nelson Sr.

The United States Air Force (Air Force) is preparing an Environmental Assessment (EA) for the proposed construction of a wastewater conveyance line to connect Joint Base San Antonio (JBSA), Bullis (JBSA-BUL) to the San Antonio Water System (SAWS) in northern Bexar County, Texas (**Attachment 1**). Once connected to the SAWS, the Air Force further proposes to decommission and remove components of the existing wastewater treatment system on the Base. To account for possible environmental concerns, the Air Force is engaging early with all potentially affected Native American Tribes as it formulates the undertaking. Accordingly, the Air Force seeks the input of the Comanche Nation, Oklahoma.

Proposed Action

The Proposed Action would construct a wastewater line from the wastewater treatment plant (WWTP) site on JBSA-BUL to a SAWS connection point in the vicinity of the Base. The route selected would inform the design of the Proposed Action and help determine additional requirements for construction. Once wastewater can be conveyed to the SAWS, the Proposed Action would also include the removal and closure of the WWTP and associated effluent storage ponds, pump house, and irrigation area. This portion of the Proposed Action would include environmental sampling and analysis, dismantlement and removal of structures, cutting and capping of below-ground infrastructure components, and restoration of the affected areas post-removal. The Air Force proposes to implement the Proposed Action from approximately 2025 to 2029.

Pursuant to Title 36 *Code of Federal Regulations* (CFR) Part 800, we request your review of and input on our proposed undertaking. In particular, we are seeking any information that identifies properties of historic, religious, or cultural significance to the Comanche Nation, Oklahoma that could be affected by our undertaking. Should you wish to participate as a consulting party for this undertaking under Section 106 of the *National Historic Preservation Act*, please indicate so in response to this letter. Regardless, the Air Force will comply with the *Native American Graves Repatriation Act* by informing you of any inadvertent discovery of archaeological or human remains and consulting on their disposition.

Purpose and Need

The purpose of the Proposed Action is to provide JBSA-BUL with more efficient, reliable, and less-costly wastewater treatment services that can be sustained in the long term. Privatization of this utility would eliminate the operational and maintenance costs currently incurred by JBSA to treat and discharge wastewater effluent on the Base. It would also provide JBSA with flexibility to meet future demands for such services that are not currently known. Further, the Proposed Action would decommission and remove components of the existing wastewater treatment system on JBSA-BUL, providing an opportunity to reuse these sites for another purpose.

The Proposed Action is needed to replace the aging infrastructure components of the wastewater system currently in operation at JBSA-BUL with a more efficient means of treatment and disposal. Under current conditions, continuance of wastewater operations would require substantial reinvestment to modernize the treatment and collection systems. The Proposed Action would also reduce the time and cost associated with wastewater system operations and maintenance.

Project Location

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Environmental Assessment

The EA will assess the potential environmental consequences of the Proposed Action and No Action Alternatives. Resource areas subject to analysis in the EA include air quality; natural and cultural resources; geology, topography, and soils; and water resources, among others. The EA will also examine the cumulative effects of the Proposed Action that, when combined with other reasonably foreseeable projects or actions, could result in potential adverse impacts on a regional scale.

So that we remain on schedule to complete the environmental impact analysis process in a timely manner, please provide your response no later than 30 days from receipt of this correspondence. Please send your response via postal mail at the address above or via email (preferred) to michael.waldrop.1@us.af.mil.

The Air Force appreciates your interest in and support of its military mission at JBSA-BUL. We look forward to receiving your input and guidance on our proposed undertaking and its potential to affect cultural resources on or in the vicinity of JBSA-BUL.

Sincerely

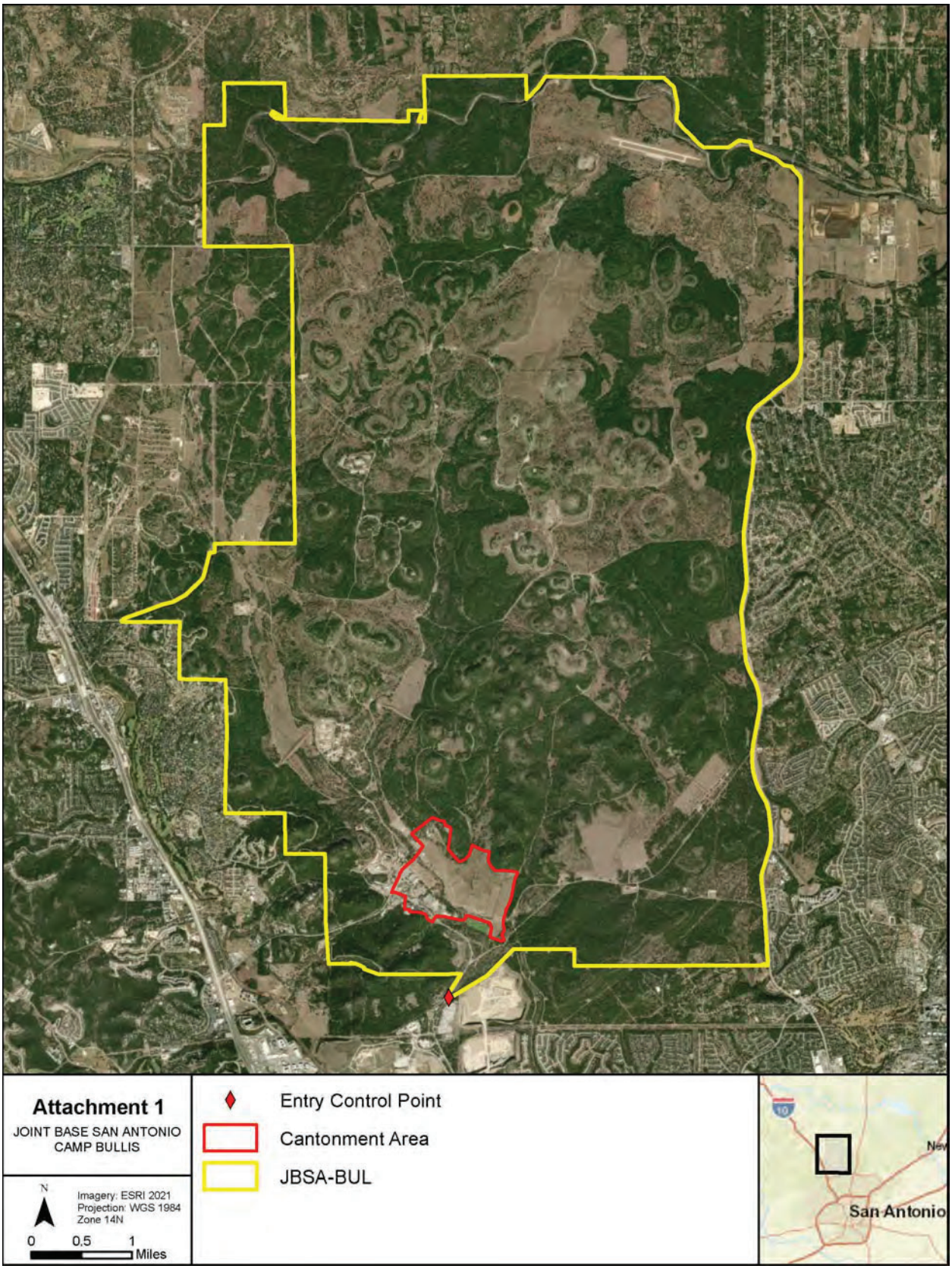
WALDROP.MICHAEL.DUANE.1160753451

Digitally signed by WALDROP.MICHAEL.DUANE.1160753451
Date: 2022.06.21 14:48:43 -05'00'

MICHAEL D. WALDROP

2 Attachments:
1. Map of Joint Base San Antonio, Bullis
2. Map of Sewer Line Route Alternatives

Attachment 1 – Map of Joint Base San Antonio, Bullis



Attachment 2 – Map of Sewer Line Route Alternatives

DEPARTMENT OF THE AIR FORCE
502D AIR BASE WING
JOINT BASE SAN ANTONIO

April 24, 2024

Rustin Tabor
802 CES/CEIEA
1555 Gott St.
Joint Base San Antonio
Lackland, TX 78236-

Karen Myers
Field Office Supervisor
US Fish and Wildlife Service
Austin Ecological Services Office
10711 Burnet Road, Suite 200
Austin TX 78758

Dear Ms. Myers,

Please find enclosed for your review, the Biological Assessment -Wastewater and Natural Gas Pipeline Construction Project at Joint Base San Antonio – Camp Bullis. A species list for the assessment was retrieved from the Information, Planning, and Consultation System. This letter also serves as our intent to initiate Formal Section 7 Consultation with the USFWS on this action.

We value the cooperative working relationship that our organizations have enjoyed, and we look forward to continuing to work with you to both conserve our natural resources and train our nation's fighting forces.

If you have any questions or need additional information, please contact is Shannon Carrasco, JBSA Natural Resource Specialist, at (210) 295-7873.

Sincerely,

RUSTIN T. TABOR
JBSA Natural Resources Manager

Attachment: Biological Assessment- Wastewater and Natural Gas Pipeline Construction Project at Joint Base San Antonio- Camp Bullis

Due to the size of the letter attachment, it is being made available upon request. For a copy of the *Biological Assessment-Wastewater and Natural Gas Pipeline Construction at Joint Base San Antonio-Camp Bullis*, contact Monica Guerrero, 802d Civil Engineer Squadron, Joint Base San Antonio, Lackland, Texas, monica.guerrero.2@us.af.mil

-----Original Message-----
From: Gray, Natasha A CIV USARMY CESWF (USA) <Natasha.A.Gray@usace.army.mil>
Sent: Friday, July 15, 2022 2:40 PM
To: GUERRERO, MONICA J GS-11 USAF AETC 802 CES/CEIEA
<monica.guerrero.2@us.af.mil>
Cc: Bartels, Brian C CIV USARMY CESWF (USA) <Brian.C.Bartels@usace.army.mil>
Subject: SWF-2022-00344 (JBSA-BUL WWTP to San Antonio Water System)

Dear Ms. Guerrero:

Thank you for your letter received July 14, 2022, concerning a proposal for the construction of a wastewater conveyance line to connect JBSA-BUL to the San Antonio Water System located in Bexar County, Texas. The project has been assigned Project Number SWF-2022-00344, please include this number in all future correspondence concerning this project.

Mr. Brian Bartels has been assigned as the regulatory project manager for your request and will be evaluating it as expeditiously as possible.

You may be contacted for additional information about your request. For your information, please refer to the Fort Worth District Regulatory Division homepage at http://www.swf.usace.army.mil/Missions/regulatory and particularly guidance on submittals at https://swf-apps.usace.army.mil/pubdata/environ/regulatory/introduction/submital.pdf and mitigation at https://www.swf.usace.army.mil/Missions/Regulatory/Permitting/Mitigation that may help you supplement your current request or prepare future requests.

If you have any questions about the evaluation of your submittal or would like to request a copy of one of the documents referenced above, please refer to our website at http://www.swf.usace.army.mil/Missions/Regulatory or contact Mr. Brian Bartels by telephone (817) 886-1742, or by email Brian.C.Bartels@usace.army.mil, and refer to your assigned project number. Please note that it is unlawful to start work without a Department of the Army permit if one is required.

Please help the regulatory program improve its service by completing the survey on the following website: http://corpsmapu.usace.army.mil/cm_apex/f?p=regulatory_survey

Brandon W. Mobley

Chief, Regulatory Division

-----Original Message-----
From: Brandon Ross (Parks) <Brandon.Ross@sanantonio.gov>
Sent: Wednesday, July 13, 2022 8:14 AM
To: GUERRERO, MONICA J GS-11 USAF AETC 802 CES/CEIEA <monica.guerrero.2@us.af.mil>
Cc: Grant Ellis (Parks) <Grant.Ellis@sanantonio.gov>; Kelsey Scherschel (Parks) <Kelsey.Scherschel@sanantonio.gov>; John Cantu (PWD) <John.Cantu@sanantonio.gov>
Subject: [Non-DoD Source] USAF Environmental Assessment for sewer line at Camp Bullis

Good morning Monica,

I've attached a letter I received regarding a wastewater line being built between Camp Bullis and one of two SAWS sewer lines, near Eisenhower Park.

Can you please let me know any additional information you have that would potentially cause impacts to park land and existing/future trail (see below)? For example, will this be an open-trench construction method? If so, how wide is the trench, and what would be done to protect park land and assets? Do you have a tree survey yet? I'd be particularly interested in understanding impacts to trees before making any definitive comments on the project.

Thanks in advance for your help,

Brandon Ross, AICP

COSA Parks and Recreation

brandon.ross@sanantonio.gov

Office (210) 207-6101
Cell (210) 215-8062

Jon Niermann, *Chairman*
Emily Lindley, *Commissioner*
Bobby Janecka, *Commissioner*
Toby Baker, *Executive Director*

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

July 20, 2022

Monica Guerrero
802d CES/CEIE
Environmental Compliance
1555 Gott Street, Building 5595
JBSA-Lackland, TX 78236

Via: **E-mail**

Re: **TCEQ NEPA Request #2022-104. Construction of Wastewater Conveyance Line. Bexar County.**

Dear Ms. Guerrero,

The Texas Commission on Environmental Quality (TCEQ) has reviewed the above-referenced project and offers the following comments:

In accordance with the general conformity regulations in 40 CFR Part 93, this proposed action will be reviewed for air quality impact. The proposed action is located in Bexar County, which is designated nonattainment for the ozone National Ambient Air Quality Standards (NAAQS) with a classification of marginal. Additionally, the United States Environmental Protection Agency has proposed to reclassify the area to moderate. General conformity requirements apply.

Volatile organic compounds (VOC) and nitrogen oxides (NOX) are precursor pollutants that lead to the formation of ozone. A general conformity demonstration may be required when the total projected direct and indirect VOC or NOX emissions from an applicable action are equal to or exceed the de minimis emissions level, which is 100 tons per year (tpy) for ozone NAAQS marginal and moderate nonattainment areas. The TCEQ looks forward to reviewing the draft emissions assessment for this proposed action.

We recommend the environmental assessment address actions that will be taken to prevent surface and groundwater contamination.

The proposed project is located within the Edwards Aquifer Contributing Zone, which is defined in Title 30, Texas Administrative Code, Chapter 213. Based on the nature of the proposed activities, pollution control measures would be required under these rules to protect the Edwards Aquifer. In developing the Environmental Assessment please address the Edwards Aquifer Protection rules (30 TAC 213), including water pollution abatement structures and other best management practices.

Any debris or waste disposal should be at an appropriately authorized disposal facility.

Thank you for the opportunity to review this project. If you have any questions, please contact the agency NEPA coordinator at (512) 239-2619 or NEPA@tceq.texas.gov

Sincerely,

Ryan Vise,
Division Director
External Relations

APPENDIX B
PUBLIC NOTICES

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SAN ANTONIO EXPRESS - NEWS
AFFIDAVIT OF PUBLICATION

STATE OF TEXAS:
COUNTY OF BEXAR

Before me, the undersigned authority, a Notary Public in and for the State of Texas, on this day personally appeared: Geena Garza, who after being duly sworn, says that she is the Bookkeeper of HEARST NEWSPAPERS, LLC - dba: SAN ANTONIO EXPRESS - NEWS, a newspaper published in Bexar County, Texas and that the publication, of which the annexed is a true copy, was published to wit:

Customer ID	Customer	Order ID	Publication	Pub Date
20031375	EAS	34209475	SAE Express-News	06/24/22
			SAE Express-News	06/25/22

NOTICE FOR EARLY PUBLIC REVIEW OF PROPOSED ACTIVITIES WITHIN FLOODPLAINS - UNITED STATES AIR FORCE

The United States Air Force (USAF) is inviting early public input on proposed activities at Joint Base San Antonio (JBSA), Bullis (BUL) with potential to affect floodplains and wetlands resources. The USAF is considering the construction of a wastewater conveyance line to connect JBSA-BUL to the San Antonio Water System (SAWS) in northern Bexar County, Texas. If constructed, wastewater from JBSA-BUL would discharge to the SAWS for conveyance to a municipal treatment facility. This would allow JBSA to divest its ownership in the existing wastewater treatment and collection system on JBSA-BUL, many components of which are outdated, inefficient, and in poor condition.

This proposed action would be implemented from approximately 2025 to 2029. To comply with the National Environmental Policy Act (NEPA), the USAF is preparing an Environmental Assessment (EA) to analyze the potential environmental impacts of its proposed plans. The Draft EA is anticipated to be released for public review and comment in the fall or winter of 2022.

Because the proposed action under consideration would affect or potentially affect floodplains and wetlands under USAF management, this early notice seeks public input on any practical alternatives to avoid or minimize adverse effects on these natural resources. Additional details will be made available in the forthcoming Draft EA for public review. The USAF plans to use the NEPA process to comply with Executive Orders (EOs) 11988, Floodplain Management; 13690, Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input; and 11990, Protection of Wetlands, respectively.

The USAF seeks your input with respect to potential effects on floodplains and wetlands that could result from the subject proposed action. Public comments received in response to this notice, as well as those received through public participation in the NEPA process, will assist the USAF in complying with its obligations under the EOs noted above.

Please address written comments to the USAF 802 CES/CEI, 1555 Gott Street, JBSA Lackland, TX 78236, or via email (preferred) to 802CES.CEIE.NEPATeam@us.af.mil.

ggeenagarza

Geena Garza
Bookkeeper

Sworn and subscribed to before me, this 29th day of June A.D. 2022

Notary public in and for the State of Texas

MARK RAYMOND PORTER
Notary Public, State of Texas
Comm. Expires 10-27-2025
Notary ID 133416864

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APPENDIX C
AIR CONFORMITY APPLICABILITY MODEL ANALYSIS

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AIR CONFORMITY APPLICABILITY MODEL REPORT
RECORD OF CONFORMITY ANALYSIS (ROCA)

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform an analysis to assess the potential air quality impact/s associated with the action in accordance with the Air Force Manual 32-7002, Environmental Compliance and Pollution Prevention; the Environmental Impact Analysis Process (EIAP, 32 CFR 989); and the General Conformity Rule (GCR, 40 CFR 93 Subpart B). This report provides a summary of the ACAM analysis.

a. Action Location:

Base: CAMP BULLIS
State: Texas
County(s): Bexar
Regulatory Area(s): San Antonio, TX

b. Action Title: New Wastewater Line and Wastewater System Decommissioning and Closure

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2025

e. Action Description:

The Proposed Action includes two main components: 1) the construction of a wastewater line from JBSA-BUL to a SAWS connection point in the vicinity of the Base; and 2) removal and closure of the WWTP, effluent storage ponds, co-located pump house used for spray irrigation, and the permitted irrigation area (Figure 2-1). Under the Proposed Action, construction of the wastewater line would occur from approximately 2025 through 2027; removal and closure of the deactivated existing wastewater treatment system components would occur from approximately 2028 to 2029.

Alternative 1 – Camp Bullis Road
Alternative 1 would construct a new force main of 1.1 miles in length from the package WWTP site along Military Highway toward Camp Bullis Road. A gravity main of 2 miles in length would then be constructed along Camp Bullis Road to I-10. The new gravity main would tie into the SAWS wastewater system 0.3 mile to the south along I-10. Wastewater conveyance under this alternative would require retrofitting an existing lift station on JBSA-BUL to support operations; however, the SAWS connection point would have sufficient capacity to support peak wastewater flows generated at the Base. Alternative 1 would require manhole installations along the gravity main portion of the route and horizontal boring installation with air and vacuum relief along other route segments. No additional ROW acquisition would likely be required under Alternative 1.

Alternative 2 – Shavano Highlands Subdivision
Alternative 2 would construct a new force main of 1 mile in length from the package WWTP site toward the southeast. This route would cross Wilkerson Road, parallel the southern extent of the effluent storage ponds, and turn toward the southeast before crossing Wilderness Road near the southern boundary of JBSA-BUL. The off-Base portion of Alternative 2 would then follow the Salado Creek Greenway for 0.3 mile to a connection point along the western perimeter of the Shavano Highlands subdivision, which is currently under development . Alternative 2 would convey wastewater to a SAWS treatment facility via the wastewater collection system of the subdivision. As such, this alternative would require construction of a 60,000-gallon-capacity detention facility to store excess flow from the Base above 0.18 mgd. Wastewater conveyance under this alternative would require retrofit of an existing lift station on JBSA-BUL to support operations. No additional ROW acquisition would likely be required under Alternative 2.

f. Point of Contact:

Name: Nick Sutton
Title: NEPA Project Manager
Organization: Environmental Assessment Services
Email: nsutton@easbio.com
Phone Number: (509) 375-4212

AIR CONFORMITY APPLICABILITY MODEL REPORT
RECORD OF CONFORMITY ANALYSIS (ROCA)

2. Analysis: Total combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action fully implemented) emissions. General Conformity under the Clean Air Act, Section 1.76 has been evaluated for the action described above according to the requirements of 40 CFR 93, Subpart B.

Based on the analysis, the requirements of this rule are: _____ applicable
__X__ not applicable

Conformity Analysis Summary:

2025

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
San Antonio, TX			
VOC	0.595	100	No
NOx	3.153	100	No
CO	4.437		
SOx	0.012		
PM 10	34.403		
PM 2.5	0.115		
Pb	0.000		
NH3	0.002		
CO2e	1163.4		

2026

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
San Antonio, TX			
VOC	0.595	100	No
NOx	3.153	100	No
CO	4.437		
SOx	0.012		
PM 10	34.403		
PM 2.5	0.115		
Pb	0.000		
NH3	0.002		
CO2e	1163.4		

2027

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
San Antonio, TX			
VOC	0.595	100	No
NOx	3.153	100	No
CO	4.437		
SOx	0.012		
PM 10	34.403		
PM 2.5	0.115		
Pb	0.000		
NH3	0.002		
CO2e	1163.4		

AIR CONFORMITY APPLICABILITY MODEL REPORT
RECORD OF CONFORMITY ANALYSIS (ROCA)

2028

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
San Antonio, TX			
VOC	0.615	100	No
NOx	3.258	100	No
CO	4.860		
SOx	0.012		
PM 10	7.106		
PM 2.5	0.118		
Pb	0.000		
NH3	0.002		
CO2e	1183.4		

2029

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
San Antonio, TX			
VOC	0.615	100	No
NOx	3.258	100	No
CO	4.860		
SOx	0.012		
PM 10	7.106		
PM 2.5	0.118		
Pb	0.000		
NH3	0.002		
CO2e	1183.4		

2030

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
San Antonio, TX			
VOC	0.000	100	No
NOx	0.000	100	No
CO	0.000		
SOx	0.000		
PM 10	0.000		
PM 2.5	0.000		
Pb	0.000		
NH3	0.000		
CO2e	0.0		

AIR CONFORMITY APPLICABILITY MODEL REPORT
RECORD OF CONFORMITY ANALYSIS (ROCA)

2031 - (Steady State)

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
San Antonio, TX			
VOC	0.000	100	No
NOx	0.000	100	No
CO	0.000		
SOx	0.000		
PM 10	0.000		
PM 2.5	0.000		
Pb	0.000		
NH3	0.000		
CO2e	0.0		

None of estimated emissions associated with this action are above the conformity threshold values established at 40 CFR 93.153 (b); Therefore, the requirements of the General Conformity Rule are not applicable.

_____ _____

Nick Sutton, NEPA Project Manager DATE

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location

Base: CAMP BULLIS
State: Texas
County(s): Bexar
Regulatory Area(s): San Antonio, TX

- Action Title: New Wastewater Line and Wastewater System Decommissioning and Closure

- Project Number/s (if applicable):

- Projected Action Start Date: 1 / 2025

- Action Purpose and Need:

The purpose of the Proposed Action is to provide JBSA-BUL with more efficient, reliable, and less-costly wastewater treatment services that can be sustained over the long term. Construction of a new wastewater line to convey effluent to the SAWS would accomplish multiple objectives in support of the military mission at JBSA-BUL. Privatization of this utility would eliminate JBSA's cost to operate and maintain the current treatment and collection system. It would also accommodate an increased demand for such services at JBSA-BUL should it be required to support future mission growth. Under SAWS management, JBSA would no longer be responsible for monitoring, process controls, maintenance, and operation of the current wastewater treatment system. This would result in time and cost savings to the benefit of the military mission.

The Proposed Action is needed to replace the aging infrastructure components of the wastewater system currently in operation at JBSA-BUL with a more efficient means of treatment and disposal. Currently, maintenance of a TPDES permit to authorize onsite wastewater treatment, discharge, and disposal requires regular funding and substantial technical resources to ensure the system continues to operate. Wastewater operations also increase potential risks to human health and the environment at JBSA-BUL. The Proposed Action would address these concerns and also provide flexibility for future mission growth in the developed portion of the Base.

- Action Description:

The Proposed Action includes two main components: 1) the construction of a wastewater line from JBSA-BUL to a SAWS connection point in the vicinity of the Base; and 2) removal and closure of the WWTP, effluent storage ponds, co-located pump house used for spray irrigation, and the permitted irrigation area (Figure 2-1). Under the Proposed Action, construction of the wastewater line would occur from approximately 2025 through 2027; removal and closure of the deactivated existing wastewater treatment system components would occur from approximately 2028 to 2029.

Alternative 1 – Camp Bullis Road
Alternative 1 would construct a new force main of 1.1 miles in length from the package WWTP site along Military Highway toward Camp Bullis Road. A gravity main of 2 miles in length would then be constructed along Camp Bullis Road to I-10. The new gravity main would tie into the SAWS wastewater system 0.3 mile to the south along I-10. Wastewater conveyance under this alternative would require retrofitting an existing lift station on JBSA-BUL to support operations; however, the SAWS connection point would have sufficient capacity to support peak wastewater flows generated at the Base. Alternative 1 would require manhole installations along the gravity main portion of the route and horizontal boring installation with air and vacuum relief along other route segments. No additional ROW acquisition would likely be required under Alternative 1.

Alternative 2 – Shavano Highlands Subdivision
Alternative 2 would construct a new force main of 1 mile in length from the package WWTP site toward the southeast. This route would cross Wilkerson Road, parallel the southern extent of the effluent storage ponds, and turn toward the southeast before crossing Wilderness Road near the southern boundary of JBSA-BUL. The off-Base portion of Alternative 2 would then follow the Salado Creek Greenway for 0.3 mile to a connection

point along the western perimeter of the Shavano Highlands subdivision, which is currently under development . Alternative 2 would convey wastewater to a SAWS treatment facility via the wastewater collection system of the subdivision. As such, this alternative would require construction of a 60,000-gallon-capacity detention facility to store excess flow from the Base above 0.18 mgd. Wastewater conveyance under this alternative would require retrofit of an existing lift station on JBSA-BUL to support operations. No additional ROW acquisition would likely be required under Alternative 2.

- Point of Contact

Name: Nick Sutton
Title: NEPA Project Manager
Organization: Environmental Assessment Services
Email: nsutton@easbio.com
Phone Number: (509) 375-4212

- Activity List:

Activity Type		Activity Title
2.	Construction / Demolition	Installation of New Wastewater Line
3.	Construction / Demolition	Removal of Existing WWTP Facilities

Emission factors and air emission estimating methods come from the United States Air Force's Air Emissions Guide for Air Force Stationary Sources, Air Emissions Guide for Air Force Mobile Sources, and Air Emissions Guide for Air Force Transitory Sources.

2. Construction / Demolition

2.1 General Information & Timeline Assumptions

- Activity Location

County: Bexar
Regulatory Area(s): San Antonio, TX

- Activity Title: Installation of New Wastewater Line

- Activity Description:

Camp Bullis Road Alternative - 3.4-mile-long WW line

- Activity Start Date

Start Month: 1
Start Month: 2025

- Activity End Date

Indefinite: False
End Month: 0
End Month: 2028

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	1.785323
SO_x	0.035458
NO_x	9.458858
CO	13.310170
PM 10	103.210483

Pollutant	Total Emissions (TONs)
PM 2.5	0.344668
Pb	0.000000
NH_3	0.006948
CO_2e	3490.3

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

2.1 Site Grading Phase

2.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 36
Number of Days: 0

2.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 269280
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	8
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	8
Tractors/Loaders/Backhoes Composite	2	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

2.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.197	000.002	000.094	003.149	000.003	000.003		000.024	00306.502
LDGT	000.208	000.003	000.168	003.545	000.005	000.004		000.026	00398.336
HDGV	000.890	000.006	000.817	013.497	000.022	000.020		000.051	00913.820
LDDV	000.059	000.001	000.080	003.473	000.003	000.002		000.008	00311.249
LDDT	000.064	000.001	000.119	002.357	000.003	000.003		000.009	00361.998
HDDV	000.101	000.004	002.293	001.540	000.042	000.038		000.032	01238.796
MC	002.758	000.003	000.620	012.221	000.023	000.020		000.054	00389.005

2.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

2.2 Trenching/Excavating Phase

2.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 36
Number of Days: 0

2.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 17952
Amount of Material to be Hauled On-Site (yd^3): 29920
Amount of Material to be Hauled Off-Site (yd^3): 29920

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.197	000.002	000.094	003.149	000.003	000.003		000.024	00306.502
LDGT	000.208	000.003	000.168	003.545	000.005	000.004		000.026	00398.336
HDGV	000.890	000.006	000.817	013.497	000.022	000.020		000.051	00913.820
LDDV	000.059	000.001	000.080	003.473	000.003	000.002		000.008	00311.249
LDDT	000.064	000.001	000.119	002.357	000.003	000.003		000.009	00361.998
HDDV	000.101	000.004	002.293	001.540	000.042	000.038		000.032	01238.796
MC	002.758	000.003	000.620	012.221	000.023	000.020		000.054	00389.005

2.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

3. Construction / Demolition

3.1 General Information & Timeline Assumptions

- Activity Location
County: Bexar
Regulatory Area(s): San Antonio, TX

- Activity Title: Removal of Existing WWTP Facilities

- Activity Description:
This component of the Proposed Action would decommission and seek regulatory closure to remove the main operational components of the wastewater system on JBSA-BUL that would be deactivated with connection to the SAWS.

- Activity Start Date
Start Month: 1
Start Month: 2028

- Activity End Date
Indefinite: False
End Month: 0
End Month: 2030

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	1.229472
SO_x	0.024382
NO_x	6.515552
CO	9.720502
PM 10	14.211726

Pollutant	Total Emissions (TONs)
PM 2.5	0.236687
Pb	0.000000
NH_3	0.004348
CO_2e	2366.7

3.1 Demolition Phase

3.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2028

- Phase Duration
Number of Month: 24
Number of Days: 0

3.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 7363
Height of Building to be demolished (ft): 20

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

3.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0336	0.0006	0.2470	0.3705	0.0093	0.0093	0.0030	58.539
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.197	000.002	000.094	003.149	000.003	000.003		000.024	00306.502
LDGT	000.208	000.003	000.168	003.545	000.005	000.004		000.026	00398.336
HDGV	000.890	000.006	000.817	013.497	000.022	000.020		000.051	00913.820
LDDV	000.059	000.001	000.080	003.473	000.003	000.002		000.008	00311.249
LDDT	000.064	000.001	000.119	002.357	000.003	000.003		000.009	00361.998
HDDV	000.101	000.004	002.293	001.540	000.042	000.038		000.032	01238.796
MC	002.758	000.003	000.620	012.221	000.023	000.020		000.054	00389.005

3.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (0.00042 * BA * BH) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)

BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

3.2 Site Grading Phase

3.2.1 Site Grading Phase Timeline Assumptions

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2028

- Phase Duration
Number of Month: 24
Number of Days: 0

3.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 57834
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

3.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.197	000.002	000.094	003.149	000.003	000.003		000.024	00306.502
LDGT	000.208	000.003	000.168	003.545	000.005	000.004		000.026	00398.336
HDGV	000.890	000.006	000.817	013.497	000.022	000.020		000.051	00913.820
LDDV	000.059	000.001	000.080	003.473	000.003	000.002		000.008	00311.249
LDDT	000.064	000.001	000.119	002.357	000.003	000.003		000.009	00361.998
HDDV	000.101	000.004	002.293	001.540	000.042	000.038		000.032	01238.796
MC	002.758	000.003	000.620	012.221	000.023	000.020		000.054	00389.005

3.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

3.3 Trenching/Excavating Phase

3.3.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2028

- Phase Duration
Number of Month: 24
Number of Days: 0

3.3.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 570
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

3.3.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.197	000.002	000.094	003.149	000.003	000.003		000.024	00306.502
LDGT	000.208	000.003	000.168	003.545	000.005	000.004		000.026	00398.336
HDGV	000.890	000.006	000.817	013.497	000.022	000.020		000.051	00913.820
LDDV	000.059	000.001	000.080	003.473	000.003	000.002		000.008	00311.249
LDDT	000.064	000.001	000.119	002.357	000.003	000.003		000.009	00361.998
HDDV	000.101	000.004	002.293	001.540	000.042	000.038		000.032	01238.796
MC	002.758	000.003	000.620	012.221	000.023	000.020		000.054	00389.005

3.3.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

AIR CONFORMITY APPLICABILITY MODEL REPORT
RECORD OF CONFORMITY ANALYSIS (ROCA)

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform an analysis to assess the potential air quality impact/s associated with the action in accordance with the Air Force Manual 32-7002, Environmental Compliance and Pollution Prevention; the Environmental Impact Analysis Process (EIAP, 32 CFR 989); and the General Conformity Rule (GCR, 40 CFR 93 Subpart B). This report provides a summary of the ACAM analysis.

a. Action Location:

Base: CAMP BULLIS
State: Texas
County(s): Bexar
Regulatory Area(s): San Antonio, TX

b. Action Title: New Wastewater Line and Wastewater System Decommissioning and Closure

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2025

e. Action Description:

The Proposed Action includes two main components: 1) the construction of a wastewater line from JBSA-BUL to a SAWS connection point in the vicinity of the Base; and 2) removal and closure of the WWTP, effluent storage ponds, co-located pump house used for spray irrigation, and the permitted irrigation area (Figure 2-1). Under the Proposed Action, construction of the wastewater line would occur from approximately 2025 through 2027; removal and closure of the deactivated existing wastewater treatment system components would occur from approximately 2028 to 2029.

Alternative 1 – Camp Bullis Road
Alternative 1 would construct a new force main of 1.1 miles in length from the package WWTP site along Military Highway toward Camp Bullis Road. A gravity main of 2 miles in length would then be constructed along Camp Bullis Road to I-10. The new gravity main would tie into the SAWS wastewater system 0.3 mile to the south along I-10. Wastewater conveyance under this alternative would require retrofitting an existing lift station on JBSA-BUL to support operations; however, the SAWS connection point would have sufficient capacity to support peak wastewater flows generated at the Base. Alternative 1 would require manhole installations along the gravity main portion of the route and horizontal boring installation with air and vacuum relief along other route segments. No additional ROW acquisition would likely be required under Alternative 1.

Alternative 2 – Shavano Highlands Subdivision
Alternative 2 would construct a new force main of 1 mile in length from the package WWTP site toward the southeast. This route would cross Wilkerson Road, parallel the southern extent of the effluent storage ponds, and turn toward the southeast before crossing Wilderness Road near the southern boundary of JBSA-BUL. The off-Base portion of Alternative 2 would then follow the Salado Creek Greenway for 0.3 mile to a connection point along the western perimeter of the Shavano Highlands subdivision, which is currently under development . Alternative 2 would convey wastewater to a SAWS treatment facility via the wastewater collection system of the subdivision. As such, this alternative would require construction of a 60,000-gallon-capacity detention facility to store excess flow from the Base above 0.18 mgd. Wastewater conveyance under this alternative would require retrofit of an existing lift station on JBSA-BUL to support operations. No additional ROW acquisition would likely be required under Alternative 2.

f. Point of Contact:

Name: Nick Sutton
Title: NEPA Project Manager
Organization: Environmental Assessment Services
Email: nsutton@easbio.com
Phone Number: (509) 375-4212

AIR CONFORMITY APPLICABILITY MODEL REPORT
RECORD OF CONFORMITY ANALYSIS (ROCA)

2. Analysis: Total combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action fully implemented) emissions. General Conformity under the Clean Air Act, Section 1.76 has been evaluated for the action described above according to the requirements of 40 CFR 93, Subpart B.

Based on the analysis, the requirements of this rule are: _____ applicable
__X__ not applicable

Conformity Analysis Summary:

2025

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
San Antonio, TX			
VOC	1.150	100	No
NOx	5.702	100	No
CO	8.478		
SOx	0.023		
PM 10	20.288		
PM 2.5	0.206		
Pb	0.000		
NH3	0.004		
CO2e	2195.1		

2026

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
San Antonio, TX			
VOC	1.150	100	No
NOx	5.702	100	No
CO	8.478		
SOx	0.023		
PM 10	20.288		
PM 2.5	0.206		
Pb	0.000		
NH3	0.004		
CO2e	2195.1		

2027

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
San Antonio, TX			
VOC	1.150	100	No
NOx	5.702	100	No
CO	8.478		
SOx	0.023		
PM 10	20.288		
PM 2.5	0.206		
Pb	0.000		
NH3	0.004		
CO2e	2195.1		

AIR CONFORMITY APPLICABILITY MODEL REPORT
RECORD OF CONFORMITY ANALYSIS (ROCA)

2028

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
San Antonio, TX			
VOC	0.615	100	No
NOx	3.258	100	No
CO	4.860		
SOx	0.012		
PM 10	7.106		
PM 2.5	0.118		
Pb	0.000		
NH3	0.002		
CO2e	1183.4		

2029

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
San Antonio, TX			
VOC	0.615	100	No
NOx	3.258	100	No
CO	4.860		
SOx	0.012		
PM 10	7.106		
PM 2.5	0.118		
Pb	0.000		
NH3	0.002		
CO2e	1183.4		

2030

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
San Antonio, TX			
VOC	0.000	100	No
NOx	0.000	100	No
CO	0.000		
SOx	0.000		
PM 10	0.000		
PM 2.5	0.000		
Pb	0.000		
NH3	0.000		
CO2e	0.0		

AIR CONFORMITY APPLICABILITY MODEL REPORT
RECORD OF CONFORMITY ANALYSIS (ROCA)

2031 - (Steady State)

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
San Antonio, TX			
VOC	0.000	100	No
NOx	0.000	100	No
CO	0.000		
SOx	0.000		
PM 10	0.000		
PM 2.5	0.000		
Pb	0.000		
NH3	0.000		
CO2e	0.0		

None of estimated emissions associated with this action are above the conformity threshold values established at 40 CFR 93.153 (b); Therefore, the requirements of the General Conformity Rule are not applicable.

_____ _____

Nick Sutton, NEPA Project Manager DATE

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location

Base: CAMP BULLIS
State: Texas
County(s): Bexar
Regulatory Area(s): San Antonio, TX

- Action Title: New Wastewater Line and Wastewater System Decommissioning and Closure

- Project Number/s (if applicable):

- Projected Action Start Date: 1 / 2025

- Action Purpose and Need:

The purpose of the Proposed Action is to provide JBSA-BUL with more efficient, reliable, and less-costly wastewater treatment services that can be sustained over the long term. Construction of a new wastewater line to convey effluent to the SAWS would accomplish multiple objectives in support of the military mission at JBSA-BUL. Privatization of this utility would eliminate JBSA's cost to operate and maintain the current treatment and collection system. It would also accommodate an increased demand for such services at JBSA-BUL should it be required to support future mission growth. Under SAWS management, JBSA would no longer be responsible for monitoring, process controls, maintenance, and operation of the current wastewater treatment system. This would result in time and cost savings to the benefit of the military mission.

The Proposed Action is needed to replace the aging infrastructure components of the wastewater system currently in operation at JBSA-BUL with a more efficient means of treatment and disposal. Currently, maintenance of a TPDES permit to authorize onsite wastewater treatment, discharge, and disposal requires regular funding and substantial technical resources to ensure the system continues to operate. Wastewater operations also increase potential risks to human health and the environment at JBSA-BUL. The Proposed Action would address these concerns and also provide flexibility for future mission growth in the developed portion of the Base.

- Action Description:

The Proposed Action includes two main components: 1) the construction of a wastewater line from JBSA-BUL to a SAWS connection point in the vicinity of the Base; and 2) removal and closure of the WWTP, effluent storage ponds, co-located pump house used for spray irrigation, and the permitted irrigation area (Figure 2-1). Under the Proposed Action, construction of the wastewater line would occur from approximately 2025 through 2027; removal and closure of the deactivated existing wastewater treatment system components would occur from approximately 2028 to 2029.

Alternative 1 – Camp Bullis Road
Alternative 1 would construct a new force main of 1.1 miles in length from the package WWTP site along Military Highway toward Camp Bullis Road. A gravity main of 2 miles in length would then be constructed along Camp Bullis Road to I-10. The new gravity main would tie into the SAWS wastewater system 0.3 mile to the south along I-10. Wastewater conveyance under this alternative would require retrofitting an existing lift station on JBSA-BUL to support operations; however, the SAWS connection point would have sufficient capacity to support peak wastewater flows generated at the Base. Alternative 1 would require manhole installations along the gravity main portion of the route and horizontal boring installation with air and vacuum relief along other route segments. No additional ROW acquisition would likely be required under Alternative 1.

Alternative 2 – Shavano Highlands Subdivision
Alternative 2 would construct a new force main of 1 mile in length from the package WWTP site toward the southeast. This route would cross Wilkerson Road, parallel the southern extent of the effluent storage ponds, and turn toward the southeast before crossing Wilderness Road near the southern boundary of JBSA-BUL. The off-Base portion of Alternative 2 would then follow the Salado Creek Greenway for 0.3 mile to a connection

point along the western perimeter of the Shavano Highlands subdivision, which is currently under development . Alternative 2 would convey wastewater to a SAWS treatment facility via the wastewater collection system of the subdivision. As such, this alternative would require construction of a 60,000-gallon-capacity detention facility to store excess flow from the Base above 0.18 mgd. Wastewater conveyance under this alternative would require retrofit of an existing lift station on JBSA-BUL to support operations. No additional ROW acquisition would likely be required under Alternative 2.

- Point of Contact

Name: Nick Sutton
Title: NEPA Project Manager
Organization: Environmental Assessment Services
Email: nsutton@easbio.com
Phone Number: (509) 375-4212

- Activity List:

Activity Type		Activity Title
2.	Construction / Demolition	Installation of New Wastewater Line
3.	Construction / Demolition	Removal of Existing WWTP Facilities
4.	Construction / Demolition	Construction of New WWTP Facilities

Emission factors and air emission estimating methods come from the United States Air Force's Air Emissions Guide for Air Force Stationary Sources, Air Emissions Guide for Air Force Mobile Sources, and Air Emissions Guide for Air Force Transitory Sources.

2. Construction / Demolition

2.1 General Information & Timeline Assumptions

- Activity Location

County: Bexar
Regulatory Area(s): San Antonio, TX

- Activity Title: Installation of New Wastewater Line

- Activity Description:

Shavano Highlands Subdivision Alternative 2 - 1.3-mile-long WW line

- Activity Start Date

Start Month: 1
Start Month: 2025

- Activity End Date

Indefinite: False
End Month: 0
End Month: 2028

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	1.502333
SO_x	0.030366
NO_x	7.752881
CO	11.235913
PM 10	39.614237

Pollutant	Total Emissions (TONs)
PM 2.5	0.283141
Pb	0.000000
NH_3	0.005107
CO_2e	2959.3

2.1 Site Grading Phase

2.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 36
Number of Days: 0

2.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 102960
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

2.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.197	000.002	000.094	003.149	000.003	000.003		000.024	00306.502
LDGT	000.208	000.003	000.168	003.545	000.005	000.004		000.026	00398.336
HDGV	000.890	000.006	000.817	013.497	000.022	000.020		000.051	00913.820
LDDV	000.059	000.001	000.080	003.473	000.003	000.002		000.008	00311.249
LDDT	000.064	000.001	000.119	002.357	000.003	000.003		000.009	00361.998
HDDV	000.101	000.004	002.293	001.540	000.042	000.038		000.032	01238.796
MC	002.758	000.003	000.620	012.221	000.023	000.020		000.054	00389.005

2.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

2.2 Trenching/Excavating Phase

2.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 36
Number of Days: 0

2.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 6864
Amount of Material to be Hauled On-Site (yd^3): 11440
Amount of Material to be Hauled Off-Site (yd^3): 11440

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.197	000.002	000.094	003.149	000.003	000.003		000.024	00306.502
LDGT	000.208	000.003	000.168	003.545	000.005	000.004		000.026	00398.336
HDGV	000.890	000.006	000.817	013.497	000.022	000.020		000.051	00913.820
LDDV	000.059	000.001	000.080	003.473	000.003	000.002		000.008	00311.249
LDDT	000.064	000.001	000.119	002.357	000.003	000.003		000.009	00361.998
HDDV	000.101	000.004	002.293	001.540	000.042	000.038		000.032	01238.796
MC	002.758	000.003	000.620	012.221	000.023	000.020		000.054	00389.005

2.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

3. Construction / Demolition

3.1 General Information & Timeline Assumptions

- Activity Location
County: Bexar
Regulatory Area(s): San Antonio, TX

- Activity Title: Removal of Existing WWTP Facilities

- Activity Description:
This component of the Proposed Action would decommission and seek regulatory closure to remove the main operational components of the wastewater system on JBSA-BUL that would be deactivated with connection to the SAWS.

- Activity Start Date
Start Month: 1
Start Month: 2028

- Activity End Date
Indefinite: False
End Month: 0
End Month: 2030

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	1.229472
SO_x	0.024382
NO_x	6.515552
CO	9.720502
PM 10	14.211726

Pollutant	Total Emissions (TONs)
PM 2.5	0.236687
Pb	0.000000
NH_3	0.004348
CO_2e	2366.7

3.1 Demolition Phase

3.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2028

- Phase Duration
Number of Month: 24
Number of Days: 0

3.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 7363
Height of Building to be demolished (ft): 20

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

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- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

3.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0336	0.0006	0.2470	0.3705	0.0093	0.0093	0.0030	58.539
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.197	000.002	000.094	003.149	000.003	000.003		000.024	00306.502
LDGT	000.208	000.003	000.168	003.545	000.005	000.004		000.026	00398.336
HDGV	000.890	000.006	000.817	013.497	000.022	000.020		000.051	00913.820
LDDV	000.059	000.001	000.080	003.473	000.003	000.002		000.008	00311.249
LDDT	000.064	000.001	000.119	002.357	000.003	000.003		000.009	00361.998
HDDV	000.101	000.004	002.293	001.540	000.042	000.038		000.032	01238.796
MC	002.758	000.003	000.620	012.221	000.023	000.020		000.054	00389.005

3.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (0.00042 * BA * BH) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)

BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

3.2 Site Grading Phase

3.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2028

- Phase Duration
Number of Month: 24
Number of Days: 0

3.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 57834
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

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3.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.197	000.002	000.094	003.149	000.003	000.003		000.024	00306.502
LDGT	000.208	000.003	000.168	003.545	000.005	000.004		000.026	00398.336
HDGV	000.890	000.006	000.817	013.497	000.022	000.020		000.051	00913.820
LDDV	000.059	000.001	000.080	003.473	000.003	000.002		000.008	00311.249
LDDT	000.064	000.001	000.119	002.357	000.003	000.003		000.009	00361.998
HDDV	000.101	000.004	002.293	001.540	000.042	000.038		000.032	01238.796
MC	002.758	000.003	000.620	012.221	000.023	000.020		000.054	00389.005

3.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

3.3 Trenching/Excavating Phase

3.3.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2028

- Phase Duration
Number of Month: 24
Number of Days: 0

3.3.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 570
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

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- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

3.3.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.197	000.002	000.094	003.149	000.003	000.003		000.024	00306.502
LDGT	000.208	000.003	000.168	003.545	000.005	000.004		000.026	00398.336
HDGV	000.890	000.006	000.817	013.497	000.022	000.020		000.051	00913.820
LDDV	000.059	000.001	000.080	003.473	000.003	000.002		000.008	00311.249
LDDT	000.064	000.001	000.119	002.357	000.003	000.003		000.009	00361.998
HDDV	000.101	000.004	002.293	001.540	000.042	000.038		000.032	01238.796
MC	002.758	000.003	000.620	012.221	000.023	000.020		000.054	00389.005

3.3.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

4. Construction / Demolition

4.1 General Information & Timeline Assumptions

- Activity Location
County: Bexar
Regulatory Area(s): San Antonio, TX

- Activity Title: Construction of New WWTP Facilities

- Activity Description:
Alternative 2 would convey wastewater to a SAWS treatment facility via the wastewater collection system of the subdivision. As such, this alternative would require construction of a 60,000-gallon-capacity detention facility to store excess flow from the Base.

- Activity Start Date
Start Month: 1
Start Month: 2025

- Activity End Date
Indefinite: False
End Month: 0
End Month: 2028

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	1.946488
SO_x	0.037512
NO_x	9.352560
CO	14.197111
PM 10	21.250864

Pollutant	Total Emissions (TONs)
PM 2.5	0.334691
Pb	0.000000
NH_3	0.006547
CO_2e	3626.2

4.1 Site Grading Phase

4.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 36
Number of Days: 0

4.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 57834
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

- Site Grading Default Settings
Default Settings Used: Yes

Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

4.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.197	000.002	000.094	003.149	000.003	000.003		000.024	00306.502
LDGT	000.208	000.003	000.168	003.545	000.005	000.004		000.026	00398.336
HDGV	000.890	000.006	000.817	013.497	000.022	000.020		000.051	00913.820
LDDV	000.059	000.001	000.080	003.473	000.003	000.002		000.008	00311.249
LDDT	000.064	000.001	000.119	002.357	000.003	000.003		000.009	00361.998
HDDV	000.101	000.004	002.293	001.540	000.042	000.038		000.032	01238.796
MC	002.758	000.003	000.620	012.221	000.023	000.020		000.054	00389.005

4.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

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$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

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4.2 Trenching/Excavating Phase

4.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 36
Number of Days: 0

4.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 570
Amount of Material to be Hauled On-Site (yd^3): 42
Amount of Material to be Hauled Off-Site (yd^3): 42

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

4.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.197	000.002	000.094	003.149	000.003	000.003		000.024	00306.502
LDGT	000.208	000.003	000.168	003.545	000.005	000.004		000.026	00398.336
HDGV	000.890	000.006	000.817	013.497	000.022	000.020		000.051	00913.820
LDDV	000.059	000.001	000.080	003.473	000.003	000.002		000.008	00311.249
LDDT	000.064	000.001	000.119	002.357	000.003	000.003		000.009	00361.998
HDDV	000.101	000.004	002.293	001.540	000.042	000.038		000.032	01238.796
MC	002.758	000.003	000.620	012.221	000.023	000.020		000.054	00389.005

4.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

4.3 Building Construction Phase

4.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 36
Number of Days: 0

4.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 7363
Height of Building (ft): 20
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

4.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0680	0.0013	0.4222	0.3737	0.0143	0.0143	0.0061	128.77
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0236	0.0006	0.0859	0.2147	0.0025	0.0025	0.0021	54.449
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.197	000.002	000.094	003.149	000.003	000.003		000.024	00306.502
LDGT	000.208	000.003	000.168	003.545	000.005	000.004		000.026	00398.336
HDGV	000.890	000.006	000.817	013.497	000.022	000.020		000.051	00913.820
LDDV	000.059	000.001	000.080	003.473	000.003	000.002		000.008	00311.249
LDDT	000.064	000.001	000.119	002.357	000.003	000.003		000.009	00361.998
HDDV	000.101	000.004	002.293	001.540	000.042	000.038		000.032	01238.796
MC	002.758	000.003	000.620	012.221	000.023	000.020		000.054	00389.005

4.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

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$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

4.4 Architectural Coatings Phase

4.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 36
Number of Days: 0

4.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 9300
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

4.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.197	000.002	000.094	003.149	000.003	000.003		000.024	00306.502
LDGT	000.208	000.003	000.168	003.545	000.005	000.004		000.026	00398.336
HDGV	000.890	000.006	000.817	013.497	000.022	000.020		000.051	00913.820
LDDV	000.059	000.001	000.080	003.473	000.003	000.002		000.008	00311.249
LDDT	000.064	000.001	000.119	002.357	000.003	000.003		000.009	00361.998
HDDV	000.101	000.004	002.293	001.540	000.042	000.038		000.032	01238.796
MC	002.758	000.003	000.620	012.221	000.023	000.020		000.054	00389.005

4.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

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$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons