# Draft
# Environment Assessment for Proposed Area Development Plan Projects at Joint Base San Antonio, Fort Sam Houston, Bexar County, Texas

**September 2022**

**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 Personal home addresses and phone numbers will not be published in the EA.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, as defined in 40 CFR 1501.5(f). In accordance with 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.

## ACCESSIBILITY NOTICE

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**COVER SHEET**
**Draft Environmental Assessment for**
**Proposed Area Development Plan Projects at Joint Base San Antonio, Fort Sam Houston, Texas**

a. *Responsible Agency: United States Air Force*

b. *Location: Joint Base San Antonio, Fort Sam Houston, 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*, §§ 4321–4347, 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; air quality; noise; earth, water, biological, and cultural resources; environmental justice and protection of children; infrastructure, transportation, and utilities; hazardous materials and wastes; and safety.

The purpose of the Proposed Action is to maintain current mission and mission support functions at Joint Base San Antonio-Fort Sam Houston (JBSA-FSH) through selected development actions and real-property improvements. With a limited amount of space available for land development, recapitalization and efficient land usage are critical to developing the built environment within the Installation. The Proposed Action is needed to address the condition and capability of facilities required to accomplish the mission. These real-property assets require maintenance, renovation, expansion, or replacement to remain operable and support future mission expansion. The Proposed Action would begin to address these deficiencies by implementing the selected projects in the short term (i.e., 2023–2027).

The analysis of the affected environmental and environmental consequences of implementing the Proposed Action concluded that by implementing standing environmental protection measures and best management practices, there would be no significant adverse impacts from the actions at JBSA-FSH on the environmental resources. JBSA-FSH is an active installation with equipment operations, demolition, and new construction actions currently underway as well as future development currently in the planning phase. Impacts associated with construction, demolition, and renovation would be minor; therefore, significant cumulative impacts are not anticipated with implementation of the Proposed Action when considered in conjunction with past, present, or reasonably foreseeable environmental trends or future actions at JBSA-FSH.

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# TABLE OF CONTENTS

## APPENDICES



## LIST OF FIGURES

## LIST OF TABLES

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# LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| 502 ABW | 502d Air Base Wing |
| ac | acre |
| ACAM | Air Conformity Applicability Model |
| ACM | asbestos-containing material |
| ACP | Access Control Point |
| ADP | Area Development Plan |
| AFB | Air Force Base |
| AFCEC | Air Force Civil Engineer Center |
| AFFF | Aqueous film forming foam |
| AFI | Air Force Instruction |
| AFMAN | Air Force Manual |
| Air Force | United States Air Force |
| AMP | Asbestos Management Plan |
| APE | Area of Potential Effect |
| AQCR | Air Quality Control Region |
| AST | above-ground storage tank |
| AW | American Water |
| BMP | best management practices |
| BRAC | Base Realignment and Closure |
| CAA | *Clean Air Act* |
| CATEX | Categorical Exclusion |
| CCD | Census County Division |
| CERCLA | *Comprehensive Environmental Response, Compensation, and Liability Act* |
| CEQ | Council on Environmental Quality |
| CFR | Code of Federal Regulations |
| CGP | construction general permit |
| $CO_2e$ | carbon dioxide equivalent |
| COB | County of Bexar |
| COSA | City of San Antonio |
| CWA | *Clean Water Act* |
| dBA | A-weighted decibel |
| DFAC | Dining Facility |
| DoD | Department of Defense |
| DoDI | Department of Defense Instruction |
| DSHS | Department of State Health Services |
| EA | Environmental Assessment |
| EAA | Edwards Aquifer Authority |
| EIAP | Environmental Impact Analysis Process |
| EIS | Environmental Impact Statement |
| EISA | *Energy Independence and Security Act* |
| ELPA | Eligible for the purposes of a program alternative |
| EO | Executive Order |
| EPN | early public notice |
| ESA | *Endangered Species Act* |
| ESQD | explosive safety quantity distance |
| °F | Fahrenheit |
| FEMA | Federal Emergency Management Agency |
| FFRMS | Federal Flood Risk Management Standard |
| FONPA | Finding of No Practicable Alternative |
| FONSI | Finding of No Significant Impact |
| FSH | Fort Sam Houston |
| $ft^2$ | square feet |
| GBI | Green Building Initiative |
| GHG | greenhouse gas |

| | |
|---|---|
| HAZMAT | hazardous material |
| HQ | Headquarters |
| HWMP | Hazardous Waste Management Plan |
| I | Interstate |
| ICRMP | Integrated Cultural Resources Management Plan |
| IDP | Installation Development Plan |
| IICEP | Interagency/Intergovernmental Coordination for Environmental Planning |
| INRMP | Integrated Natural Resources Management Plan |
| IPaC | Information for Planning and Consultation |
| ERP | Environmental Restoration Program |
| JBSA | Joint Base San Antonio |
| LBP | lead-based paint |
| LID | low-impact development |
| µg/m$^3$ | micrograms per cubic meter |
| MBTA | *Migratory Bird Treaty Act* |
| MEDCoE | US Army Medical Center of Excellence |
| MEDCOM | Army Medical Command |
| METC | Medical Education and Training Campus |
| MMRP | Military Munitions Response Program |
| MWR | morale, welfare, and recreation |
| NAAQS | National Ambient Air Quality Standards |
| NAVMISSA | Navy Medicine Information Systems Support Activity |
| NEPA | *National Environmental Policy Act* |
| NFA | no further action |
| NHLD | National Historic Landmark District |
| NHPA | *National Historic Preservation Act* |
| NMETC | Navy Medicine Education and Training Command |
| NOI | Notice of Intent |
| NPDES | National Pollutant Discharge Elimination System |
| NREI | National Register individually eligible |
| NRHP | Natural Register of Historic Places |
| NWS | National Weather Service |
| OSHA | Occupational Safety and Health Administration |
| PA | Programmatic Agreement |
| PBR | permit by rule |
| PCBs | polychlorinated biphenyls |
| PFAS | per- and polyfluoroalkyl substances |
| PFOA | perfluorooctanoic acid |
| PFOS | perfluorooctane sulfonate |
| PM | particulate matter |
| ppb | parts per billion |
| ppm | parts per million |
| PSD | Prevention of Significant Deterioration |
| PTE | potential to emit |
| POV | Privately Owned Vehicle |
| RCRA | *Resource Conservation and Recovery Act* |
| ROI | Region of Influence |
| SHPO | State Historic Preservation Office |
| SARA | San Antonio River Authority |
| SAWS | San Antonio Water System |
| SIP | state implementation plan |
| SPCC | Spill Prevention, Control, and Countermeasures |
| STAR | Storage Tank Accounting and Reporting |
| SWP3 | Stormwater Pollution Prevention Plan |
| TAC | *Texas Administrative Code* |
| TCEQ | Texas Commission on Environmental Quality |

| | |
|---|---|
| TCP | Traditional Cultural Property |
| TEMF | Tactical Equipment Maintenance Facility |
| TMDL | total maximum daily load |
| TPDES | Texas Pollutant Discharge Elimination System |
| tpy | tons per year |
| TSCA | *Toxic Substances Control Act* |
| TWDB | Texas Water Development Board |
| UFC | Unified Facilities Criteria |
| US | United States |
| USC | United States Code |
| USCB | United States Census Bureau |
| USDA | United States Department of Agriculture |
| USEPA | United States Environmental Protection Agency |
| USFWS | United States Fish and Wildlife Service |
| USGBC | United States Green Building Council |
| UST | underground storage tank |

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# CHAPTER 1 PURPOSE AND NEED FOR THE PROPOSED ACTION

## 1.1 INTRODUCTION

The United States (US) Air Force (Air Force) 502d Air Base Wing (502 ABW) at Joint Base San Antonio (JBSA) proposes to implement development projects at JBSA, Fort Sam Houston (JBSA-FSH) to maintain and modernize the Base. Situated approximately 4 miles northeast of downtown San Antonio in south-central Texas, JBSA-FSH primarily functions as a medical training site for the Army and Department of Defense (DoD) at-large. For planning purposes, JBSA-FSH is divided into five areas or districts: the Main Street, Corporate, Commercial, Medical Education and Training, and Service districts. The Air Force recently identified short-, mid-, and long-term facility and infrastructure requirements to sustain and improve the mission support functions of JBSA-FSH. These requirements are the subject of development recommendations put forth in Area Development Plans (ADPs), district-level plans that guide development activities across the Base. Together, the ADPs establish a framework and timeline for the future development of JBSA-FSH. The proposed development projects were selected from the short-term phase of three such ADPs for implementation within the next 5 years, from approximately 2023 to 2027. This Environmental Assessment (EA) evaluates the potential environmental, cultural, and socioeconomic effects of the proposed ADP projects at JBSA-FSH. The individual ADP projects are further described throughout this EA and collectively referred to as the "Proposed Action."

This EA is prepared in accordance with the *National Environmental Policy Act of 1969*, as amended (42 United States Code [USC] §§ 4321–4347 et seq.) (NEPA); 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, this EIAP complies with the prescriptive timeline and page limits for an EA. Other applicable provisions of 40 CFR Parts 1500–1508 are cited below. 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 Part 1506, and 40 CFR § 1507.4 provide purpose and direction for streamlining the NEPA process. CEQ memoranda (e.g., 6 March 2012) and guidance on modernizing the NEPA process (CEQ, 2003) 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 JOINT BASE SAN ANTONIO

A main objective of the DoD joint basing program is to combine the support functions of two or more DoD installations within a shared geography. JBSA was formed in 2010, merging the support functions of three geographically separate installations in and around the city of San Antonio, Texas (**Figure 1-1**). This joint basing action brought Lackland Air Force Base (AFB), Randolph AFB, and Fort Sam Houston (formerly an Army base) under the management of the Air Force. Camp Bullis, an Army training camp under Fort Sam Houston, also became part of the joint base. JBSA is currently the single largest entity in the DoD, accomplishing diverse missions such as training, flying, medical, cyber, and intelligence.

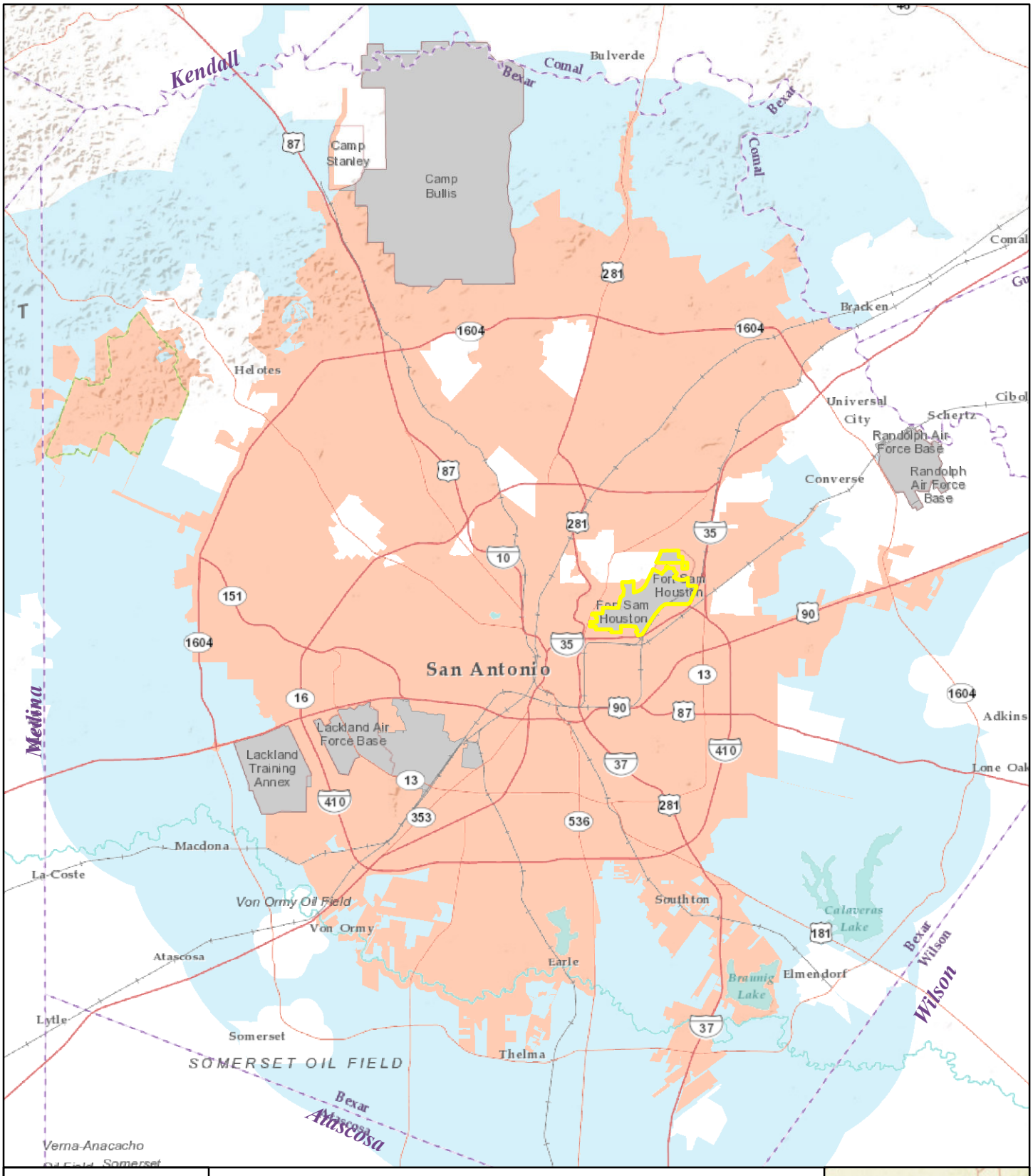



**FIGURE 1-1**
REGIONAL LOCATION

JBSA - Fort Sam Houston

Other JBSA Installations

City of San Antonio (COSA)

COSA Extraterritorial Jurisdiction


N

Imagery: ESRI 2021
Projection: WGS 1984
Zone 14N

Miles
0 2.5 5

### 1.2.1 Integrated Installation Planning

Department of Defense Instruction (DoDI) 4165.70, *Real Property Management* and Unified Facilities Criteria (UFC) 2-100-01, *Installation Master Planning,* prescribe the minimum requirements for development planning on military installations. Air Force Instruction (AFI) 32-1015*, Integrated Installation Planning*, describes and implements the development planning process for Air Force installations.

The *Joint Base San Antonio Installation Development Plan* (IDP), or "Master Plan" as defined in DoDI 4165.70, outlines a future vision for JBSA activities over the next 25 years. The IDP also sets forth a "blueprint" for the future development of JBSA to better integrate activities across the joint region. While development must conform to the IDP, ADPs require more detailed planning on a smaller scale. **Figure 1-2** depicts the planning elements combined and consolidated by the IDP, including the ADP.

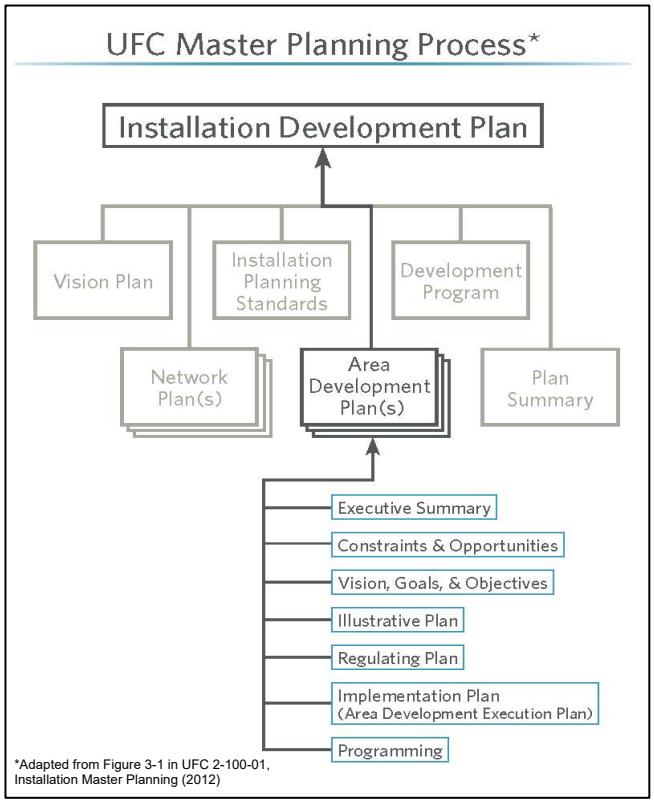



**Figure 1-2 UFC Master Planning Process**

## 1.3 JOINT BASE SAN ANTONIO, FORT SAM HOUSTON

JBSA-FSH consists of 2,900 acres of land generally bounded by Interstate (I) 35 to the south and east and US Highway 281 to the west. Known as the "Birthplace of Military Aviation" and "Home of Army Medicine," the Base is steeped in military history. In 2005, under the Base Realignment and Closure (BRAC) program, military medical training was consolidated at JBSA-FSH. This BRAC decision led to the establishment of the Medical Education and Training Campus (METC) in the central portion of the Base in 2011. Today, JBSA-FSH is home to eight headquarters (HQ)-level commands, including the HQ of the Army Medical Command (MEDCOM). Overall, JBSA-FSH provides medical and other support services to more than 160,000 military active-duty and civilian personnel, their families, and retirees residing in and around the San Antonio metropolitan area.

The military mission of JBSA-FSH is driven by the presence of Army MEDCOM and MEDCOM elements such as the US Army Medical Center of Excellence (MEDCoE), Dental Command, Veterinary Command, Brooke Army Medical Center, and Army Institute of Surgical Research. Other tenants of the Base include nonmedical organizations, including the HQ operations of the 502 ABW, Army Installation Management Command, Army North, and Army South. Non-DoD organizations such as the American Red Cross, Federal Bureau of Investigation, and San Antonio Police Department, also are tenants of JBSA-FSH.

The ADP projects included in the Proposed action would occur within three of the five JBSA-FSH planning districts: the Commercial District, the Medical Education and Training District (hereinafter, Training District), and the Service District (**Figure 1-3**). **Sections 1.3.1–1.3.4** briefly describe these districts.

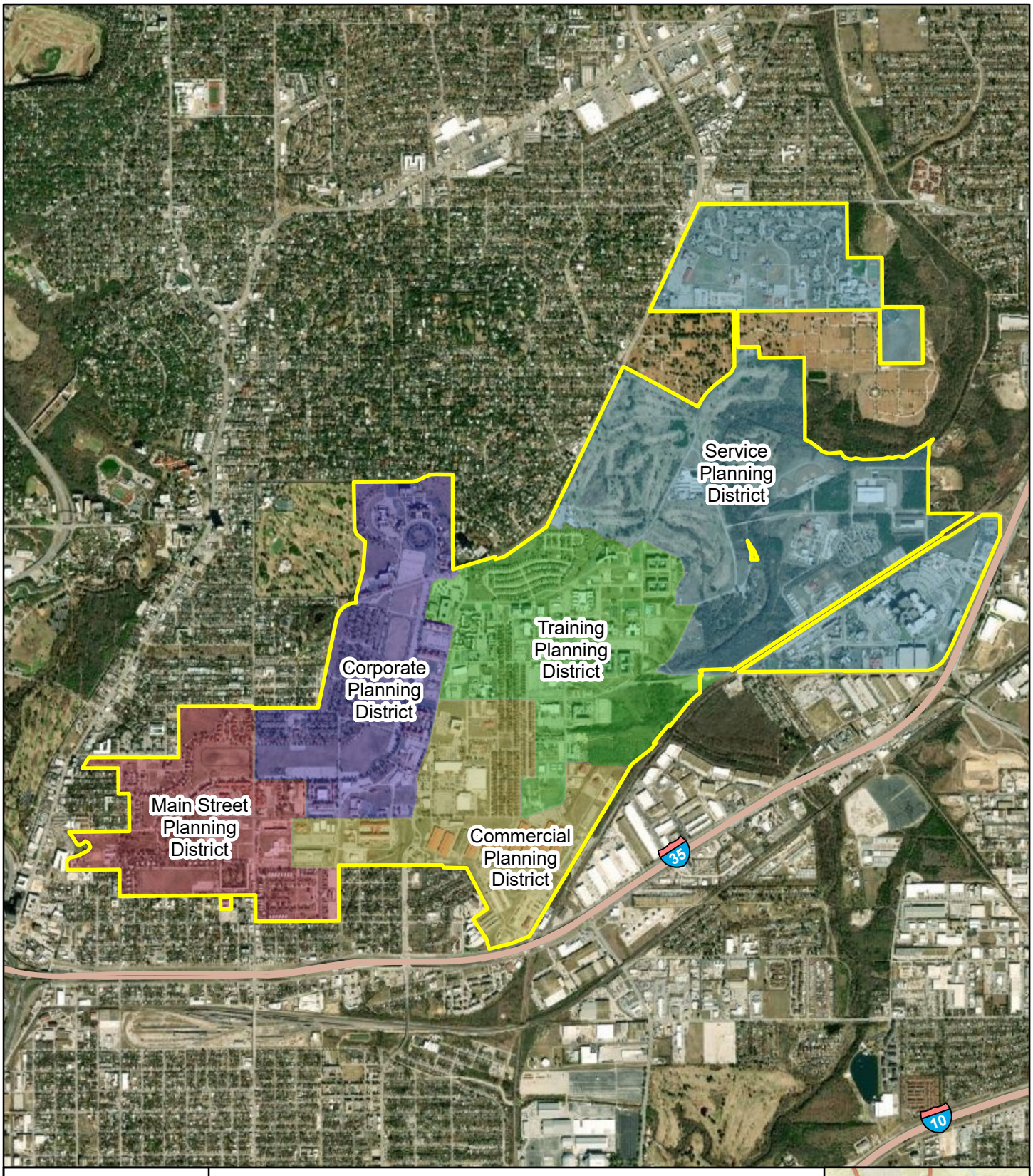



**FIGURE 1-3**
PLANNING DISTRICTS

JBSA-Fort Sam Houston

Miles
0 0.25 0.5
N
Imagery: ESRI 2021
Projection: WGS 1984, Zone 14N

### 1.3.1 Commercial District

JBSA-FSH's Commercial District consists of 370 acres of land in the south-central portion of the Base. This planning district lies between the Corporate District to the west-northwest and the Medical Education and Training District to the north-northeast. The perimeter of the Base bounds the district to the south and southeast. Access to the Commercial District is provided via Winfield Scott Road and the Walters Gate along the southern boundary; commercial vehicles access JBSA-FSH farther southeast via Jadwin Gate from Jadwin Road. Within the Commercial District, a network of mostly secondary roads provides traffic circulation.

The built environment is characterized by a mix of administrative, community-commercial, residential, and industrial land use. Community support facilities provide retail, childcare, entertainment, and similar services to the temporary and permanent population of JBSA-FSH, including residents of more than 120 single-family houses within the district itself. As managed by the 502 Logistics Readiness Squadron, the remaining portions of the district include warehouses, maintenance facilities, and open storage yards.

#### *1.3.1.1 Purpose of the Action*

The **purpose** of the Proposed Action in the Commercial District of JBSA-FSH is to maintain and improve mission support capabilities through selected development actions and real-property improvements. Modern facilities and infrastructure with sufficient capacity and capability are required for continued support of JBSA-FSH's military mission. As the DoD continues to consolidate its medical mission at the Base, the recapitalization or demolition of such facilities creates opportunity for infill development and more efficient space utilization to accommodate growth. For example, with limited space for expansion, the logistics and equipment maintenance and storage must be adequate to support future mission growth.

A secondary **purpose** of the Proposed Action is to maintain and improve quality of life within the Commercial District. This portion of JBSA-FSH is home to a large population of military personnel and their dependents. Many veterans in and around San Antonio also frequent the Commercial District. The preservation and enhancement of residential, community, and commercial areas are integral to the quality of life in the district. A well-connected, efficient transportation network; morale, welfare, and recreation (MWR) opportunities; convenience; safety; and land use compatibility, among other factors, contribute to qualify of life.

The Proposed Action would support these objectives in the short term by implementing the selected projects at JBSA-FSH from approximately 2023 to 2027, consistent with the *Commercial District Area Development Plan* (Air Force, 2018a).

#### *1.3.1.2 Need for the Action*

The Proposed Action is **needed** to address the condition and capability of facilities and infrastructure of the Commercial District. Many of these assets are outdated and in poor condition; others lack the functionality required to accomplish the mission. These real-property assets require maintenance, renovation, expansion, or replacement to remain operable and support future mission expansion. The Proposed Action would begin to address these deficiencies by implementing the selected projects in the short term.

The Proposed Action also is **needed** to maintain and improve the built and natural infrastructure of the Commercial District that contribute to quality of life. For example, roadways in the district are dilapidated and lack the capacity and connectivity to support safe, efficient, multi-modal transportation. Additionally, open space areas and MWR opportunities are limited by the configuration and density of the built environment. The Proposed Action would address these deficiencies and improve the quality of life in the Commercial District by implementing the selected short-term projects in a strategic, orderly, efficient, and sustainable manner.

### 1.3.2 Medical Education and Training District

The 522-acre Training District is situated in the central portion of JBSA-FSH. The Service, Commercial, and Corporate districts border the Training District clockwise from east to west; the perimeter of JBSA-FSH bounds the district to the north and southeast, respectively. Access to the district is provided by two gates, one along Schofield Road to the east, the other near the intersection of Winfield Scott Road and Harry Wurzbach Road to the northwest. Within the district, traffic primarily circulates by Garden Avenue, Schofield Road, William Hardee Road, Wilson Way, and Winfield Scott Road.

The built environment of the Training District is characterized by myriad land uses, most of which are associated with either MEDCoE or METC. These include various administrative, community, residential, industrial, medical, training, and recreational areas. Development in the eastern portion of the district is limited by the 100-year floodplains associated with Salado Creek, the major surface drainage feature of JBSA-FSH, and steep topography.

#### *1.3.2.1 Purpose of the Action*

The **purpose** of the Proposed Action is to maintain the joint mission of the Training District through selected development actions and real-property improvements. Maintaining and modernizing the mission support capabilities of the district requires a flexible approach to development, including recapitalization and reorganization of the built environment to create space for expansion and growth. With a limited amount of land available for development in the Training District, efficient space utilization and mission consolidation are central to accomplishing these objectives. A secondary **purpose** of the Proposed Action is to develop the Training District in a manner that provides flexibility to meet future mission growth, some of which is not yet known. New development must be sited to support more efficient operations and meet the unique and diverse mission support capabilities of the tenants in the Training District.

The Proposed Action would accomplish these objectives in the short term by implementing the selected projects at JBSA-FSH from approximately 2023 to 2027, consistent with the *Medical Education and Training District Area Development Plan* (Air Force, 2018b).

#### *1.3.2.2 Need for the Action*

The Proposed Action is **needed** to address the condition and capability of facilities and infrastructure of the Training District. Many buildings and infrastructure systems within the district are outdated and in poor condition; others lack the functionality required to accomplish the mission. These real-property assets require maintenance, renovation, expansion, or replacement to remain operable and support future mission growth. The Proposed Action would begin to address these deficiencies by implementing the selected projects in the short term.

The Proposed action is also **needed** to consolidate military operations in the Training District based on mission functions and dependencies. Developable land is currently limited in the district and not able to support future mission growth otherwise. With limited land available for development, additional space is needed for future mission expansion. The Proposed Action is needed to create space using a strategic and flexible approach to development that results in more efficient and sustainable operations.

### 1.3.3 Service District

The 1,189-acre Service District, the largest of JBSA-FSH's planning districts, encompasses the northeastern part of the Base. The northernmost area of the district appears separate from other portions of the Service District farther south-southwest; however, Nursery Road serves to connect these areas otherwise separated by the Fort Sam Houston National Cemetery between Winans Road and the Base's golf course. The Service District borders the Training District to the southwest but is mostly bounded by the perimeter of JBSA-FSH.

Land use in the Service District is similar to the Commercial and Training districts except in that Salado Creek and its riparian areas meander through the central portion of the district. As a result, a large amount of land in the Service District remains undeveloped with the built environment clustered in areas more conducive to development.

#### *1.3.3.1 Purpose of the Action*

The **purpose** of the Proposed Action in the Service District of JBSA-FSH is to maintain and improve mission support capabilities through selected development actions and real-property improvements. Modern facilities and infrastructure with sufficient capacity and capability are required for continued support of JBSA-FSH's military mission. As the DoD continues to consolidate its medical mission at the Base, new facilities and infrastructure will be required to support future mission growth. A secondary **purpose** of the Proposed Action is to use compact and infill development to preserve space for future mission growth, some of which is not yet known.

The Proposed Action would support these objectives in the short term by implementing the selected projects at JBSA-FSH from approximately 2023 to 2027, consistent with the *Service District Area Development Plan* (Air Force, 2018c).

#### *1.3.3.2 Need for the Action*

The Proposed Action is **needed** to address the condition and capability of facilities and infrastructure at the Service District. Many buildings and infrastructure systems are outdated and in poor condition; others lack the functionality required to accomplish the mission. These real-property assets require maintenance, renovation, expansion, or replacement to remain operable and support future mission expansion.

The Proposed Action also is **needed** to concentrate development in suitable areas and expand the built environment vertically. Such an approach is necessary in the Service District due to development constraints such as Salado Creek and its riparian buffer zones that meander through the district.

## 1.4 SCOPE OF THE ENVIRONMENTAL ASSESSMENT

The Air Force NEPA regulations at 32 CFR § 989.11 require an assessment of potential environmental impacts for Air Force projects recommended in a comprehensive plan such as an ADP. In accordance with 40 CFR § 1501.3, the Air Force determined the appropriate level for this analysis is an EA. 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).

This EA evaluates the potential environmental consequences of implementing the Proposed Action and Alternatives for short-term (i.e., from 2023 to 2027) ADP projects at JBSA-FSH. This EA serves as a basis for the Air Force to determine whether the selected ADP projects—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 would 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 and agreed upon mitigation for this purpose would be documented in the FONSI. Should the Proposed Action and Alternatives affect floodplains or wetlands subject to 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* (see **Section 1.7.1**), the Air Force would also prepare a Finding of No Practicable Alternative.

AFI 32-1015 requires a flexible approach to planning the future development of Air Force installations. Accordingly, the scope of this EA is designed for that purpose. The Air Force may decide to implement the full scope of the Proposed Action or implement a reduced scope of the Proposed Action. The ability to evolve and adapt the scope of the Proposed Action during the EIAP is necessary to address planning, design, and funding uncertainty associated with the Proposed Action. This decision-making flexibility is also needed to implement the Proposed Action in compliance with applicable environmental laws and regulations. For example, should one or more individual ADP project(s) require further environmental review, other ADP projects included in the Proposed Action could move forward to comply with NEPA.

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 conditions of each resource area, includes the environmental impacts analysis, and, when appropriate, recommends best practices and 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 be affected by the Proposed Action and Alternatives, now or in the future. Accordingly, the impact analyses in **Chapter 3** evaluate future actions that support the Air Force's decision-making process or have a reasonably close causal connection to the Proposed Action and Alternatives. To document and account for such potential effects, a Region of Influence (ROI) is defined for each resource area subject to analysis in this EA. Resource areas eliminated from further, more detailed analysis, as well as the rationale for eliminating those resource areas, are presented in **Section 3.1**.

## 1.5 DECISIONS 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 and 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 and, when appropriate, via categorical exclusion (CATEX)[1] as defined in 32 CFR Part 989, Appendix B.
- Implement a reduced scope of the Proposed Action as documented in a FONSI for this EA and, when appropriate, via CATEX as defined in 32 CFR Part 989, Appendix B.
- Publish a NOI in the *Federal Register* to prepare an EIS for the Proposed Action or one or more ADP project(s).

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

## 1.6 ENVIRONMENTAL IMPACT ANALYSIS PROCESS

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

### 1.6.1 Interagency and Intergovernmental Coordination and Consultation

Interagency and intergovernmental coordination for environmental planning (IICEP) is a federally mandated process for informing and coordinating with other governmental agencies regarding a federal proposed

[1] A CATEX refers to a category of actions that do not individually or cumulatively have the potential for significant effects on the environment and, therefore, do not require further environmental analysis (32 CFR § 989.13).

action. The Air Force complies with the IICEP mandate through the scoping[2] process (40 CFR § 1501.9) and public involvement (see 40 CFR 1506.6 and **Section 1.6.2** of this EA). The Air Force sent scoping letters dated **18 May 2022**, concerning the Proposed Action and Alternatives to **15** government agencies. Responses to the scoping letters were received by the following agencies:

- Texas Commission on Environmental Quality (TCEQ) – 10 June 2022
- Texas Parks & Wildlife Division (TPWD) – 8 June 2022

A list of agencies that received scoping letters and examples of IICEP correspondence are provided in **Appendix A**.

### 1.6.2 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 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 this 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 of the Draft EA and FONSI concluded on [XX MONTH] 2022. During the public comment period, the Draft EA and FONSI were made available for view or download online at: https://www.jbsa.mil/Resources/Environmental/. Additionally, printed copies of the Draft EA and FONSI were available by request and placed at the following local libraries for review:

- San Antonio Public Library, 600 Soledad Street, San Antonio
- Tobin Library at Oakwell, 4134 Harry Wurzbach Road, San Antonio
- Keith A. Campbell Library, 3011 Harney Path, JBSA Sam Houston

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

## 1.7 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.

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

The Air Force is working closely with relevant federal, state, and local agencies, as well as Native American Tribes, with purview over the Proposed Action. **Sections 1.7.1–1.7.4** summarize relevant environmental compliance requirements and their concurrency with this EA. Copies of relevant correspondence concerning these requirements are provided in **Appendix A**. These and other applicable environmental statutes and regulations are further described in **Chapter 3**.

### 1.7.1 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 (11 and 12 March 2022) and San Antonio Business Journal (11 March 2022) regarding the Proposed Action and its potential to affect floodplain and wetland resources on JBSA-FSH (**Appendix B**). No public comments in response to the EPN were received.

### 1.7.2 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 initiates 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-FSH. The PA also identifies development program activities that are "exempted" from Section 106 requirements.

This EA supports the Air Force's compliance with Section 106 by assisting to identify potential effects on cultural resources that could result from the Proposed Action. As more detailed project data becomes available, the Air Force would conduct Section 106 consultation on an individual project basis. If no historic properties are identified, or those present would not be affected, the Air Force would submit a "no adverse effects" determination to the SHPO for review and concurrence. Potentially affected historic properties would also be evaluated under Section 106 in consultation with the SHPO.

### 1.7.3 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.), and more recent federal policy directives.[3] DoDI 4710.02, *DOD Interactions with Federally Recognized Tribes*, describes and implements the DoD policy for engaging with tribal governments.

In accordance with AFI 90-2002, *Interactions with Federally Recognized Tribes*, the Air Force engages with federally recognized Native American Tribes that have potential historic or cultural affiliations to installation lands or lands under managed airspace. 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.

The Air Force sent scoping letters concerning the Proposed Action and Alternatives to three federally recognized Native American Tribes: Comanche Nation, Oklahoma; Mescalero Apache Tribe of the Mescalero Reservation; and Tonkawa Tribe of Oklahoma. No Tribal responses to the scoping letters were received.

Examples of IICEP scoping correspondence are provided in **Appendix A**.

### 1.7.4 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, otherwise defined and designated as "critical habitat" under the ESA.

As all formal consultations under ESA, Section 7, must be completed prior to the issuance of a NEPA decision document, federal agencies must 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. This EA constitutes an informal consultation under ESA, Section 7, for possible effects of the Proposed Action and Alternatives on threatened or endangered species known or with potential to occur at JBSA-FSH; no ESA-designated critical habitat is present on the Base.

By letter dated 18 May 2022, the Air Force informed the USFWS about the Proposed Action and Alternatives. On 15 July 2022, the Air Force initiated Section 7 consultation under the ESA for the Proposed Action using the USFWS' Information for Planning and Consultation (IPaC) tool. Basic information concerning the location and nature of the projects included in the Proposed Action was input into IPaC to obtain an official species list from the USFWS (**Appendix A**). The list identified threatened and endangered species and other protected species (e.g., migratory birds) with potential to be affected by the Proposed Action. This information was reviewed and incorporated into this EA where applicable.

## 1.8 Applicable Laws and Environmental Regulations

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

- *Clean Water Act* (33 USC § 1251 et seq.) (CWA)

[3] 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).

- *Resource Conservation and Recovery Act* (42 USC § 6901 et seq.) (RCRA)
- Section 438 of the *Energy Independence and Security Act* (Public Law 110-140) (EISA)
- *Comprehensive Environmental Response, Compensation, and Liability Act* (42 USC § 9601 et seq.) (CERCLA)
- Federal *Clean Air Act* (42 USC § 7401 et seq., as amended) (CAA)
- *Migratory Bird Treaty Act* (16 USC § 703 et seq.) (MBTA)
- *Toxic Substances Control Act* (15 USC Chapter 53 Subchapter I § 2601 et seq.) (TSCA)
- 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)

# CHAPTER 2 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

## 2.1 INTRODUCTION

The ADP projects defined as the Proposed Action were selected based on a reasonable likelihood that each would receive funding and could be implemented within approximately 5 years. Most of these projects were conceived prior to the ADP planning phases that concluded in 2019; however, in accordance with AFI 32-1015, the planning process continued thereafter. More recently, the Air Force determined these projects to be of a higher priority and ready for environmental review (40 CFR § 1502.5). These development actions and real-property improvements are therefore incorporated into the Proposed Action to support JBSA-FSH's military mission in the short term.

The ADP projects encompassed by the Proposed Action vary in scope from new construction, expansion, and demolition actions to repairs, renovations, and upgrades. The order, timing, and duration of the individual ADP projects would be determined, in part, by this EA. To provide a more comprehensive accounting of potential environmental effects for the multiple types of actions under the Proposed Action, this EA classifies the ADP projects into three general categories:

- **Construction** projects include new development and redevelopment for expansion of the existing built environment, including new buildings, building additions, and new or expanded infrastructure for operational support (e.g., parking and utilities).
- **Demolition** projects include the permanent removal of existing buildings and structures in support of new development or redevelopment, or to provide future land use flexibility.
- **Infrastructure** projects address deficient components of the existing built environment through repair, renovation, maintenance, or improvement actions. Infrastructure projects range from routine management actions (e.g., road, sidewalk, or utility system repairs or maintenance activities) to renovation or modernization of buildings for continued mission support.

As defined, the project categories provide a framework for analysis in the EA.

## 2.2 DESCRIPTION OF THE PROPOSED ACTION

The Proposed Action would implement a total of **35** short-term development actions and real-property improvements on JBSA-FSH from approximately 2023 to 2027. Of these projects, **29** would involve construction and demolition projects and **6** would involve infrastructure actions. **Sections 2.2.1–2.2.3** summarize the components of the Proposed Action within each JBSA-FSH planning district.

As part of the ADP's phasing plan, the Proposed Action would incorporate the planning considerations addressed in other elements of the ADP, as required by AFI 32-1015. For example, the Proposed Action would adhere to development standards for siting the new facilities and regulate design parameters such as height, scale, and orientation. Because the ADP conforms to the IDP, the Proposed Action also would incorporate elements of the IDP. When appropriate, the standards and component plans of the ADP and IDP are discussed and referenced throughout this EA.

The planning principles set forth in AFI 32-1015, and included in the IDP and ADP, are also incorporated into the Proposed Action by design. These principles set objectives for sustainable development, including guidelines and requirements for land, water, and energy conservation. Standards and requirements common to the "planning, design, construction, sustainment, restoration, and modernization of DoD-owned facilities" are included in the Proposed Action, as applicable.[4] These standards and requirements include:

[4] The UFC Program develops, maintains, and organizes all technical criteria and guide specifications for the DoD.

- UFC 1-200-02, *High Performance and Sustainable Building Requirements* (2016, as updated), and UFC 3-210-10, *Low Impact Development* (2015, as updated), in accordance with *Guiding Principles for Sustainable Federal Buildings and Associated Instructions* (CEQ, 2016) and implemented by AFI 32-1023, *Designing and Constructing Military Construction Projects*, and the Air Force Corporate Facilities Standards.
- US Green Building Council (USGBC) or Green Building Initiative (GBI) certification for applicable projects as required by the *Air Force Sustainable Design and Development Implementing Guidance Memorandum* (Air Force Civil Engineer Center [AFCEC], 2017; Air Force, 2011). Applicable projects include:
  - new buildings larger than 5,000 square feet ($ft^2$) with construction costs greater than $3 million; and
  - building renovations of more than 5,000 $ft^2$ with construction costs greater than $3 million and an estimated 50-percent replacement cost.

Under the Proposed Action, USGBC- or GBI-certified projects would meet the federal sustainability requirements as detailed in UFC 1-200-2. Green building designs and practices also would be incorporated into all other ADP projects (i.e., below the thresholds noted above) to the extent practicable.

As components of the IDP, installation facility standards and installation-wide plans, such as those for transportation, energy, and natural and cultural resources management, implement these design and development standards and requirements at the Base level. Those measures that serve to prevent or reduce adverse environmental impacts are incorporated into the Proposed Action by design and described in this EA, where appropriate.

### 2.2.1 Commercial District

The Proposed Action in the Commercial District would implement a total of **10** short-term development actions and real-property improvements from approximately 2023 to 2027. Of these projects, **nine** would involve construction/demolition projects and **one** would involve infrastructure actions (**Table 2-1**).

### 2.2.2 Training District

The Proposed Action in the Training District would implement a total of **17** short-term development actions and real-property improvements from approximately 2023 to 2027. Of these projects, **13** would involve construction/demolition projects and **4** would involve infrastructure actions (**Table 2-2**).

### 2.2.3 Service District

The Proposed Action in the Service District would implement a total of **eight** short-term development actions and real-property improvements from approximately 2023 to 2027. Of these projects, **seven** would involve construction/demolition projects and **one** would involve an infrastructure action (**Table 2-3**).

**Figures 2-1–2-3** show the locations of the ADP projects in the Commercial District, Training District, and Service District, respectively, under the Proposed Action.

**Table 2-1**
**List of Proposed ADP Projects for the Commercial District**

| Map ID[a] | Project | Approx. Size or Footprint[b] |
|---|---|---|
| **Construction and Demolition** | | |
| **C1** | Construct entertainment center, phase II (N). | 35,000 |
| **C2** | Construct Army lodging hotel; phases II & III (Sub-District North [N]). | 305,000 |
| **C3** | Resurface Ludington Road; construct cul-de-sac at the end of Ludington Road I. | 42,030 |
| **C4** | Construct entertainment center, phase I (N). | 52,000 |
| **D5** | Demolish B-2420, B-2434, and B-2540 (N).[c] | -160,546 |
| **C6** | Construct traffic circle (N). | 76,950 |
| **C7** | Construct TEMF(E). | 18,360 |
| **C8** | Construct fuel depot (E). | 100,000 |
| **D9** | Demolish B-350, B-2400, and B-2401 (N). | -191,170 |
| **Infrastructure** | | |
| **I1** | Provide trailer switch point; resurface existing pavement and provide fencing/lighting (S & E). | 3,560 |

Notes:
a Numerical and alphabetical Map IDs correspond with **Figure 2-1**.
b Approximate size in square feet unless noted otherwise.
c Notification of Demolition shall be submitted to Texas DSHS prior to demolition.
ac = acre(s); B = Building (e.g., Building 350 is B-350); DSHS= Department of State Health Services; E = East Campus; N = North Campus; S = South Campus; TEMF = Tactical Equipment Maintenance Facility

**Table 2-2**
**List of Proposed ADP Projects for the Training District**

| Map ID[a] | Project | Approx. Size or Footprint[b] |
|---|---|---|
| **Construction and Demolition** | | |
| **C10** | Construct sidewalks between B-3312 and B-3314 to DFAC (NE). | 2,300 |
| **C11** | Construct fence between North Housing Area and William Hardee Road (NW). | 1,300 |
| **C12** | Construct pedestrian bridge across Williams Way (NE). | 5,000 |
| **C13** | Construct sidewalk/path between 900s building block to sidewalk network east (NW). | 900 |
| **C14** | Construct covered areas for troop staging at B-1287 DFAC (NW). | 7,200 |
| **C15** | Construct sidewalk/path between 900s building block to DFAC (NW). | 900 |
| **C16** | Construct food inspection building and relocate operations from B-325 (NW). | 30,000 |
| **C17** | Construct single-bay POV wash rack (NW). | N/A |
| **C18/D18** | Demolish B-1111 and construct additional parking (NW).[c] | 3,166 |
| **C19/D19** | Demolish B-1158, B-1159, and B-1162; construct temporary facilities (S).[c] | 20,000 |
| **C20/D20** | Demolish B-1161 and construct temporary facilities (S). | 13,552 |
| **C21/D21** | Demolish B-1151, B-1152, B-1153, and B-1154 and construct temporary facilities (S). | 20,000 |
| **C22** | Construct two dormitory facilities. | 350,000 |
| **Infrastructure** | | |
| **I2** | Improve sidewalks and add sidewalk lighting (District-wide; NE). | N/A |
| **I3** | Repair and level athletic field (NE). | 180,000 |
| **I4** | Relocate Binz-Engleman ACP (NE). | 53,143 |
| **I5** | Renovate/convert B-1160 from housing to administrative facility (S). | 12,896 |

Notes:
a Numerical and alphabetical Map IDs correspond with **Figure 2-2**.
b Approximate size in square feet unless noted otherwise.
c Notification of Demolition shall be submitted to Texas DSHS prior to demolition.
ACP = Access Control Point; B = Building (e.g., Building 3312 is B-3312); DFAC = Dining Facility; NE = Northeast Campus; NW = Northwest Campus; POV = Privately Owned Vehicle; S = South Campus

**Table 2-3**
**List of Proposed ADP Projects for JBSA-FSH Services District**

| Map ID[a] | Project | Approx. Size or Footprint[b] |
|---|---|---|
| **Construction and Demolition** | | |
| **C23** | Construct military working dog facility. | 9,000 |
| **C24** | Expand/construct addition to school district elementary school gym. | 8,000 |
| **C25** | Construct Directed Energy Research Center; construct addition to TSRL. | 543,000 |
| **C26** | Construct new school district office. | 5,400 |
| **C27** | Construct new school district bus barns. | 21,000 |
| **C28** | Construct new school district arts and craft building. | 20,000 |
| **C29** | Construct new school district office athletic fields and parking lot. | 150,000 |
| **Infrastructure** | | |
| **I6** | Upgrade/improve youth soccer fields. | 150,000 |

Notes:
a Numerical and alphabetical Map IDs correspond with **Figure 2-3**.
b Approximate size in square feet unless noted otherwise.
TSRL = Tri-Services Research Lab

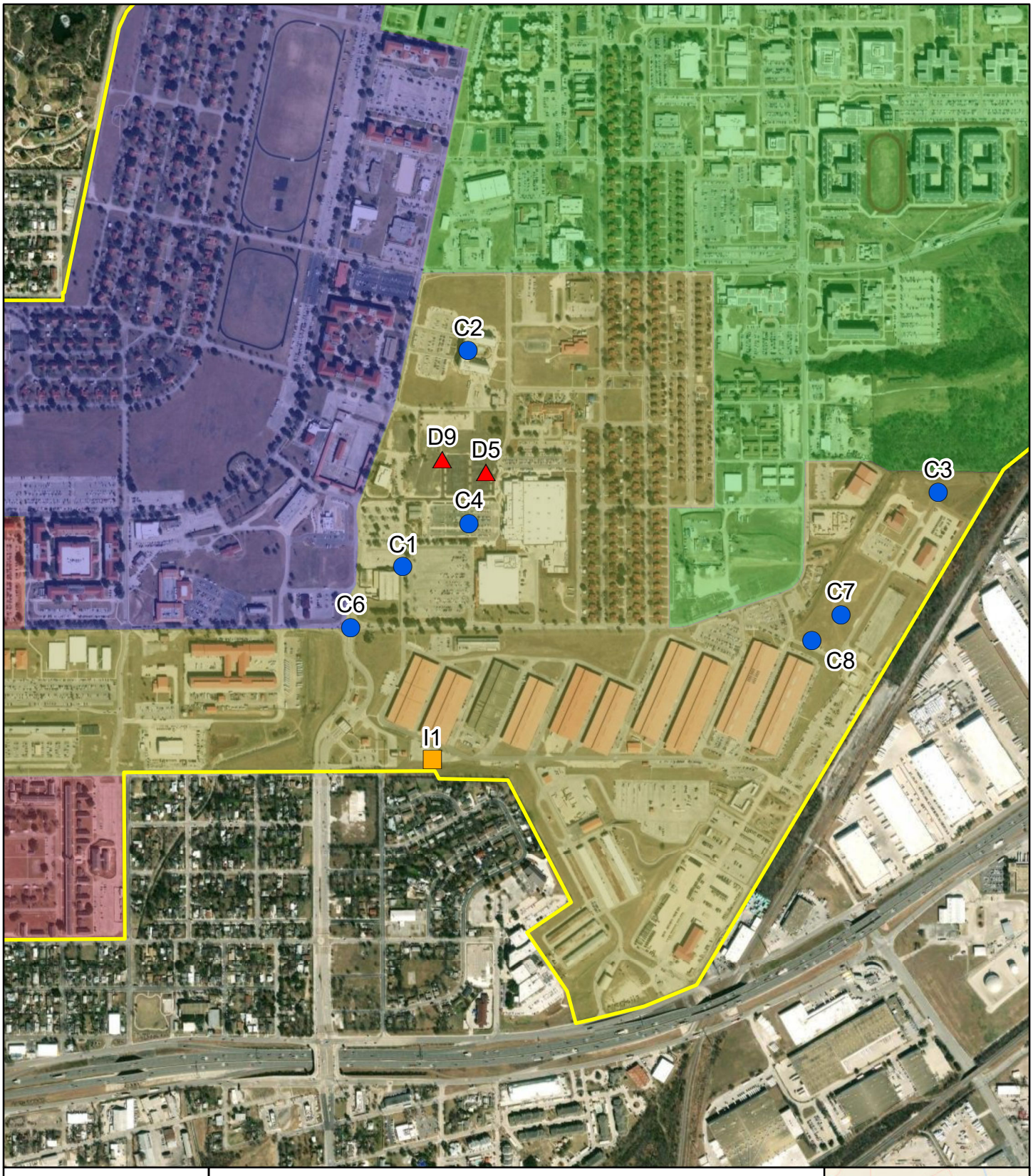


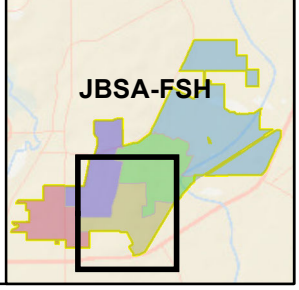

**FIGURE 2-1**
ADP PROJECTS – COMMERCIAL DISTRICT

N

Imagery: ESRI 2021
Projection: WGS 1984
Zone 14N

0 0.1 0.2 Miles

Construction
Demolition
Infrastructure
JBSA - Fort Sam Houston
Commercial Planning District



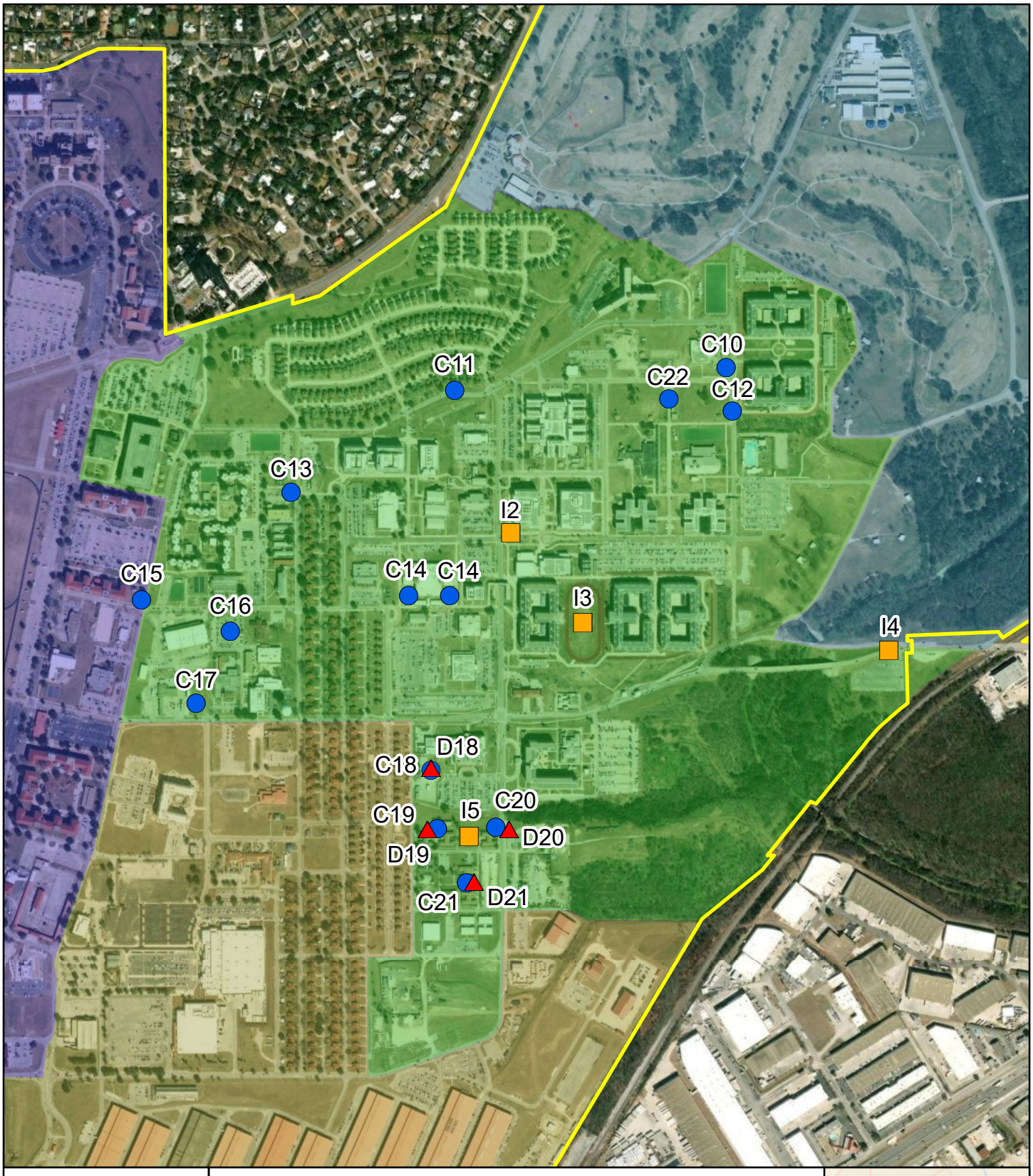
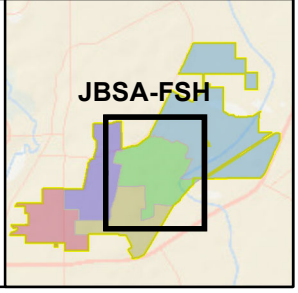



**FIGURE 2-2**
ADP PROJECTS – TRAINING DISTRICT

N
Imagery: ESRI 2021
Projection: WGS 1984
Zone 14N
0 0.1 0.2 Miles

Construction
Demolition
Infrastructure
JBSA - Fort Sam Houston
Medical, Education, and Training Planning District



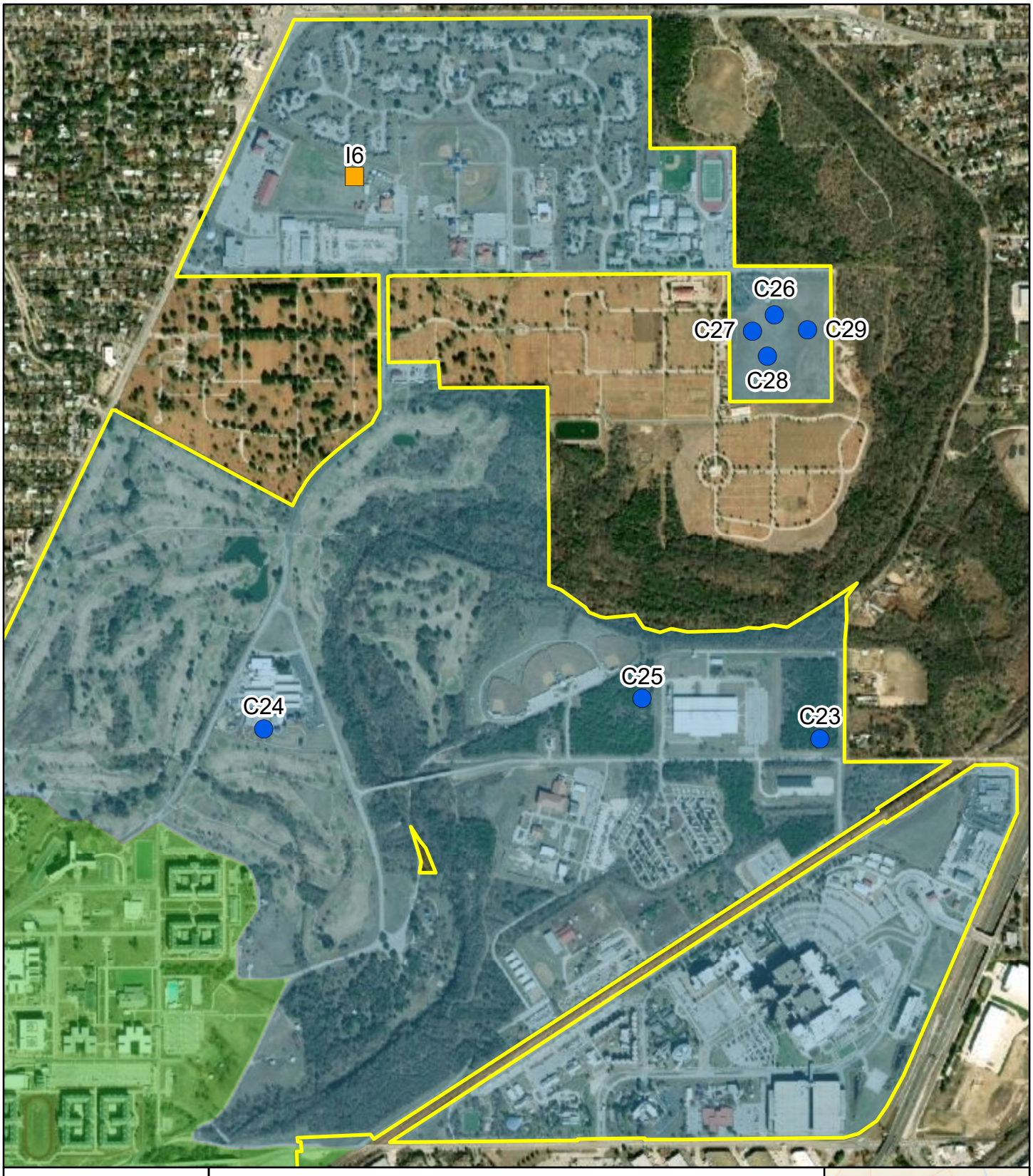
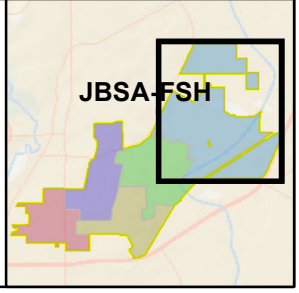



**FIGURE 2-3**
ADP PROJECTS –
SERVICE DISTRICT

N
Imagery: ESRI 2021
Projection: WGS 1984
Zone 14N
0 0.1 0.2
Miles

Construction
Infrastructure
JBSA - Fort Sam Houston
Service Planning District



## 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 Alternative Screening

Consistent with 32 CFR § 989.8(c),the following selection standards meet the purpose of and need for the Proposed Action at JBSA-FSH and were used to identify reasonable alternatives for analysis in the EA.

- Increase the amount of developable land through more efficient and functional land use.
- Preserve or enhance the quality of life of the military and civilian personnel and their dependents that train, work, and/or live on the Base, as well as for visitors of the Base (e.g., veterans).
- Avoid adverse effects on valued environmental and cultural resources, to the extent practicable.
- Comply with federal and Air Force mandates for sustainable design and development.
- Provide flexibility to respond to new or different missions or accommodate future growth.

Based on the screening criteria, the Air Force determined that only the Proposed Action (i.e., the full suite of proposed ADP projects) would meet the purpose and need, as defined by each JBSA-FSH planning district (see **Section 1.3**).

**Section 2.3.2** describes the alternatives considered but eliminated from detailed analysis for each JBSA-FSH planning district. **Section 2.3.3** discusses additional alternatives considered but eliminated from detailed analysis at an individual project level (i.e., since publication of the ADPs). **Section 2.3.4** describes the alternatives retained for more detailed analysis, including the No Action Alternative.

### 2.3.2 Alternatives Considered but Eliminated from Detailed Analysis

#### *2.3.2.1 Commercial District*

In 2018, as part of the ADP planning process, the Air Force evaluated alternatives to guide future development in the Commercial District of JBSA-FSH. Multiple development scenarios (i.e., alternatives) were considered and dismissed as being unable to meet current or future mission requirements. However, three alternatives under consideration were subject to further evaluation through a multi-day ADP planning workshop. During the workshop, participants developed screening criteria to assess whether the alternatives could be considered reasonable to sustain the mission support functions in this area of the Base. Each evaluated scenario or alternative, described below, presented a unique strategy and framework for the future development of the Commercial District.

- **Alternative 1 (Minimal Growth) –** Focus on the recapitalization of existing facility and infrastructure assets through repair, renovation, and expansion rather than demolition (i.e., minimal growth). These include sustainment, restoration, and modernization projects that maintain or improve the existing built environment with respect to mobility (i.e., vehicular and pedestrian), safety, logistics, and quality of life. **Alternative 1** also evaluates the consolidation of administrative support functions from separate buildings into a single facility and building conversion to increase warehouse space in the district.
- **Alternative 2 (Moderate Growth) –** Focus on mission consolidation and demolition (i.e., the current program of demolition and up to 10 additional demolitions) to create space and reduce dependency on off-Base leasing (i.e., moderate growth). Other projects under **Alternative 2** focus on increasing warehouse space and improving the local transportation network.

- **Alternative 3 (Maximum Growth) –** Implement a full suite of projects that focus on the vertical expansion of the built environment to improve housing, retail services, and other community support functions in the district (i.e., maximum growth). To achieve this objective, **Alternative 3** implements a more extensive program of demolition projects. This alternative demolishes housing and warehouse space and focuses new construction on vertical expansion to create more space for retail (e.g., entertainment) and community support (e.g., parks and recreation) functions.

It was concluded that only elements of **Alternative 3** would allow JBSA-FSH to sustain its mission over the long term. Therefore, Alternatives 1 and 2 were eliminated from further analysis.

#### *2.3.2.2 Training District*

In 2018, stakeholder participants in the ADP planning process for the Training District considered and evaluated future development scenarios for the district, as described above in **Section 2.3.2.1**. Each evaluated scenario or alternative, described below, presents a unique strategy and framework for the future development of the Training District.

- **Alternative 1 (Minimal Growth) –** Focus on the recapitalization of existing facility and infrastructure assets through repair, renovation, and expansion; only buildings previously listed for demolition may be removed (i.e., minimal growth). These include sustainment, restoration, and modernization projects that maintain or improve the existing built environment with respect to mobility (i.e., vehicular and pedestrian), safety, logistics, and quality of life. **Alternative 1** also evaluates troop movements through the district, including the safety and efficacy of various modes of transportation to identify opportunity to improve the district-wide multi-modal transportation network.
- **Alternative 2 (Moderate Growth) –** Focus on mission consolidation and a limited program of demolition projects (i.e., up to 10 facilities) to create space, enhance walkability, and fulfill immediate requirements for housing and training in the district (i.e., moderate growth). Other projects under **Alternative 2** focus on improving the existing built environment through renovation and expansion and quality of life through additional recreation space.
- **Alternative 3 (Maximum Growth) –** Implement a full suite of projects that focus on creating distinct campus areas centered on the METC and MEDCoE missions (i.e., maximum growth). To meet anticipated requirements for additional housing, administrative, HQ, and academic space within the district, **Alternative 3** implements a more extensive program of demolition projects. This alternative locates development based on the functional relationships of each major tenant activity; however, connectivity, aesthetics, safety, and other quality-of-life benefits are integrated across the campuses.

It was concluded that only elements of **Alternative 3** would allow JBSA-FSH to sustain its mission over the long term. Therefore, Alternatives 1 and 2 were eliminated from further analysis.

#### *2.3.2.3 Service District*

In 2018, stakeholder participants in the ADP planning process for the Service District considered and evaluated future development scenarios for the district, as described above in **Section 2.3.2.1**. Each evaluated scenario or alternative, described below, presents a unique strategy and framework for the future development of the Service District.

- **Alternative 1 (Minimal Growth) –** Focus on the recapitalization of existing facility and infrastructure assets through repair, renovation, and expansion while minimizing new construction and demolition.
- **Alternative 2 (Moderate Growth) –** Focus on mission consolidation and compact and infill development to meet new or expanded mission or mission support functions of the district.

Implement moderate new construction and demolition to achieve these objectives and avoid the natural resource constraints inherent to the district.

It was concluded that only elements of **Alternative 2** would allow JBSA-FSH to sustain its mission over the long term. Therefore, Alternative 1 was eliminated from further analysis.

### 2.3.3 Alternatives Retained for Detailed Analysis

The Proposed Action is the only reasonable alternative that would meet the Air Force's purpose and need. Therefore, the Proposed Action is retained for more detailed analysis in this EA, along with the No Action Alternative.

#### *2.3.3.1 No Action Alternative*

Under the No Action Alternative, the Air Force would not implement the ADP projects, and JBSA-FSH would continue to operate under current conditions. The facility and infrastructure assets of the Base would continue to degrade or become outdated. In the short term, training and operations would continue at JBSA-FSH in accordance with the status quo. Over time, the mission support capabilities of the Base would diminish along with its ability to support the future missions and requirements of its tenant activities.

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.

## 2.4 Summary of Environmental Consequences

The potential impacts under the Proposed Action and No Action Alternative are summarized in **Table 2-4**. The summary is based on information discussed in detail in **Chapter 3** of this EA and includes a concise definition of the issues addressed and the potential environmental impacts associated with each alternative.

**Table 2-4**
**Summary of Environmental Consequences**

| Resource Area | Proposed Action | No Action Alternative |
|---|---|---|
| Land Use | No significant adverse effects on land use. | No effects on land use. |
| Air Quality | No significant adverse effects to air quality criteria pollutant levels within San Antonio-New Braunfels metropolitan statistical area or Bexar County, Texas. | No effects on air quality. |
| Noise | No significant adverse effects on the noise environment around JBSA-FSH. | No effects on the noise environment. |
| Earth Resources | No significant adverse effects to earth resources within JBSA-FSH. | No effects on or from earth resources. |
| Water Resources | No significant adverse effects on water resources on or adjacent to JBSA-FSH. | No effects on water resources. |
| Biological Resources | No significant adverse effects on biological resources on or around JBSA-FSH. | No effects on biological resources. |
| Cultural Resources | No significant adverse effects on cultural resources at JBSA-FSH. | No effects on cultural resources. |
| Environmental Justice and Protection of Children | No significant adverse effects on disadvantaged minority or low-income populations of the San Antonio Central Census County Division. | No effects on environmental justice, including children. |
| Infrastructure, Transportation, and Utilities | Long-term beneficial impacts to utility or transportation infrastructure associated with JBSA-FSH. | No effects on infrastructure, transportation, or utilities. |
| Hazardous Materials and Waste | No significant adverse effects on or from hazardous materials and waste on JBSA-FSH. | No effects on hazardous materials and waste. |
| Safety | No significant adverse effects to ground and explosive safety at JBSA-FSH. | No effects to ground, explosive, or flight safety. |

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# CHAPTER 3 EXISTING CONDITIONS AND ENVIRONMENTAL CONSEQUENCES

This section describes the baseline resource conditions and environmental consequences of the Proposed Action and No Action Alternative.

The methodology used to analyze potential adverse effects that could result from the Proposed Action or No Action Alternative 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 3.5** through **3.15**.

## 3.1 FRAMEWORK FOR ANALYSIS

To provide a framework for the analyses in this EA, the Air Force defined a study area, or ROI, specific to each resource or sub-resource area. The ROIs delineate 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. For the purposes of analysis, 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 of the Proposed Action and the affected environment, both qualitative and quantitative thresholds were used as benchmarks to qualify effects that may require further Air Force management or mitigation.

This EA also considers effects of the Proposed Action when combined with past, present, and reasonably foreseeable future actions that could overlap with the Proposed Action on a regional and time scale (**Table 3-1**). Further, each resource analysis section (i.e., **Sections 3.5–3.15**) concludes with a cumulative effects analysis that considers the Proposed Action in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-FSH, as put forth in the JBSA-FSH ADPs for the Commercial District, Training District, and Service District (Air Force, 2018a, 2018b, 2018c) that have not yet been implemented at JBSA. These include various short-, mid-, and long-term phased ADP projects not included in the Proposed Action.

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

| Name | Description | Timeframe/ Duration | Approximate Distance from Proposed Action |
|---|---|---|---|
| Pedestrian and Bicycle Trail | Construct a 9,355-foot-long, 10-foot-wide multi-use trail. | Completed | N/A |
| Stationing Action | Station 362 NMETC and NAVMISSA personnel at JBSA-FSH. | Ongoing | N/A |
| Physical Training Trail Extension | Construct physical training and recreational trails within the Corporate District. | 2022 | N/A |
| Fitness Center Construction | Construct a 219,000-square-foot fitness center within the Corporate District. | 2023 | N/A |
| AT&T Drainage Project | Address erosion issues within an existing concrete channel and mitigate parking lot issues. | TBD | 1.5 mi |
| IH 35 – Widening | Widen I-35 to add lanes from North Walters Street to I-410 South along the eastern boundary of the Installation. | Within 4 Years | 0.25 mi |
| SL 368 – Highway Improvements | Make intersectional and operational improvements on State Loop 368/Broadway Street from I-35 to Mulberry along the northeastern boundary of the Installation. | Within 5–10 years | 0.25 mi |

Source: Air Force, 2014a, 2017a, 2021; County of Bexar [COB], 2022; Texas Department of Transportation, 2022
NMETC = Navy Medicine Education and Training Command; NAVMISSA = Navy Medicine Information Systems Support Activity; TBD = to be determined

## 3.2 Resources Eliminated from Detailed Analysis

CEQ regulations state that federal agencies should "identify and eliminate from detailed study the issues which are not significant, or which have been covered by prior environmental review" (40 CFR § 1501.9(f)(1)). Accordingly, the Air Force considered but eliminated from further analysis the following resources:

- **Airspace Management –** JBSA-Fort Sam Houston does not perform flight operations; therefore, airspace management has been eliminated from analysis.
- **Socioeconomics –** The Proposed Action would not increase the number of military personnel or training activities at JBSA-FSH from the current state. During construction, minor, beneficial effects on local economic conditions would likely result from increased expenditures (e.g., procurement of construction materials and temporary jobs) and incidental spending. No adverse socioeconomic effects would be anticipated.
- **Coastal Zone Management –** JBSA-FSH lies outside the jurisdiction of the federally approved Texas Coastal Zone Management Program.

## 3.3 Resources Carried Forward for Detailed Analysis

Based on the results of internal and external scoping (see **Section 1.7**), the following resources were carried forward for analysis: land use; air quality; noise; earth, water, biological, and cultural resources; environmental justice and protection of children; infrastructure, transportation, and utilities; hazardous materials and waste, and safety. To provide context for the resource analysis sections, **Section 3.4** briefly describes the environmental setting on and around JBSA-FSH.

## 3.4 ENVIRONMENTAL SETTING

San Antonio is centrally located in Bexar County, Texas. JBSA-FSH is located northeast of downtown San Antonio within the inner perimeter created by the I-410 Loop. The Installation sits in the northeast quadrant created by Highway 281 to the west and I-35 to the south. The entire Installation is within city limits, as well as part of the larger San Antonio-New Braunfels metropolitan statistical area.

## 3.5 LAND USE

Land use describes the natural or developed condition of a given parcel of land or area and the type of functions and structures it supports. Land use designations vary by jurisdiction, but commonly used terms include residential, commercial, industrial, agricultural, and recreation/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 the area within the JBSA-FSH Installation boundary.

### 3.5.1 Existing Conditions

The City of San Antonio Comprehensive Plan includes land within its municipal boundary and extraterritorial jurisdiction in unincorporated Bexar County. The plan establishes an overarching planning framework for the San Antonio metropolitan area and includes three main components: the Comprehensive Plan, Sustainability Plan, and Multimodal Transportation Plan. The Comprehensive Plan regulates and guides land use across the city through regional, functional, and more detailed sub-area plans applicable to specific geographies and functions. However, as a framework plan, it does not alter or negate land use plans for other jurisdictions within the city. With respect to development, Chapter 35 of the Municipal Code collates all associated ordinances to include zoning maps, subdivision regulations, and policies and plans (City of San Antonio [COSA], 2016).

As described in **Section 1.1**, JBSA-FSH is divided into five planning districts: Main Street, Corporate, Commercial, Training, and Service. JBSA-FSH as a whole contains nine land use categories across the five districts: Administration, Training, Industrial, Community Service, Housing, Industrial, Medical/Dental, Open Space/Buffer Zone, and Outdoor Recreation. The following text provides a brief summary of the land use types in the five planning districts. **Figures 3-1–3-3** illustrate the land use types in the three districts associated with the Proposed Action.

Land use in the Main Street Planning District is primarily residential in nature, featuring many of the historic homes for which JBSA-FSH is well known. The family housing is located on leased land, which limits future development in this area. A portion of the historic parade ground is also within the district, and much of the Main Street planning area has been designated as a historic district.

The Corporate District contains a multitude of facilities of mixed uses, including administrative facilities, housing facilities, portions of the parade field, and recreational fields. Large portions of this planning district are within the designated historic district. Historic facilities like the old Brooke Army Medical Center, and leased parcels limit future development opportunities.

The Commercial District in the southern corner of the Installation serves a community support function, containing the Commissary, Exchange, commercial support facilities, and housing. This district contains most of the warehouse and maintenance facilities on JBSA-FSH. Improvements to the infrastructure within this area are needed to improve walkability and overall development.

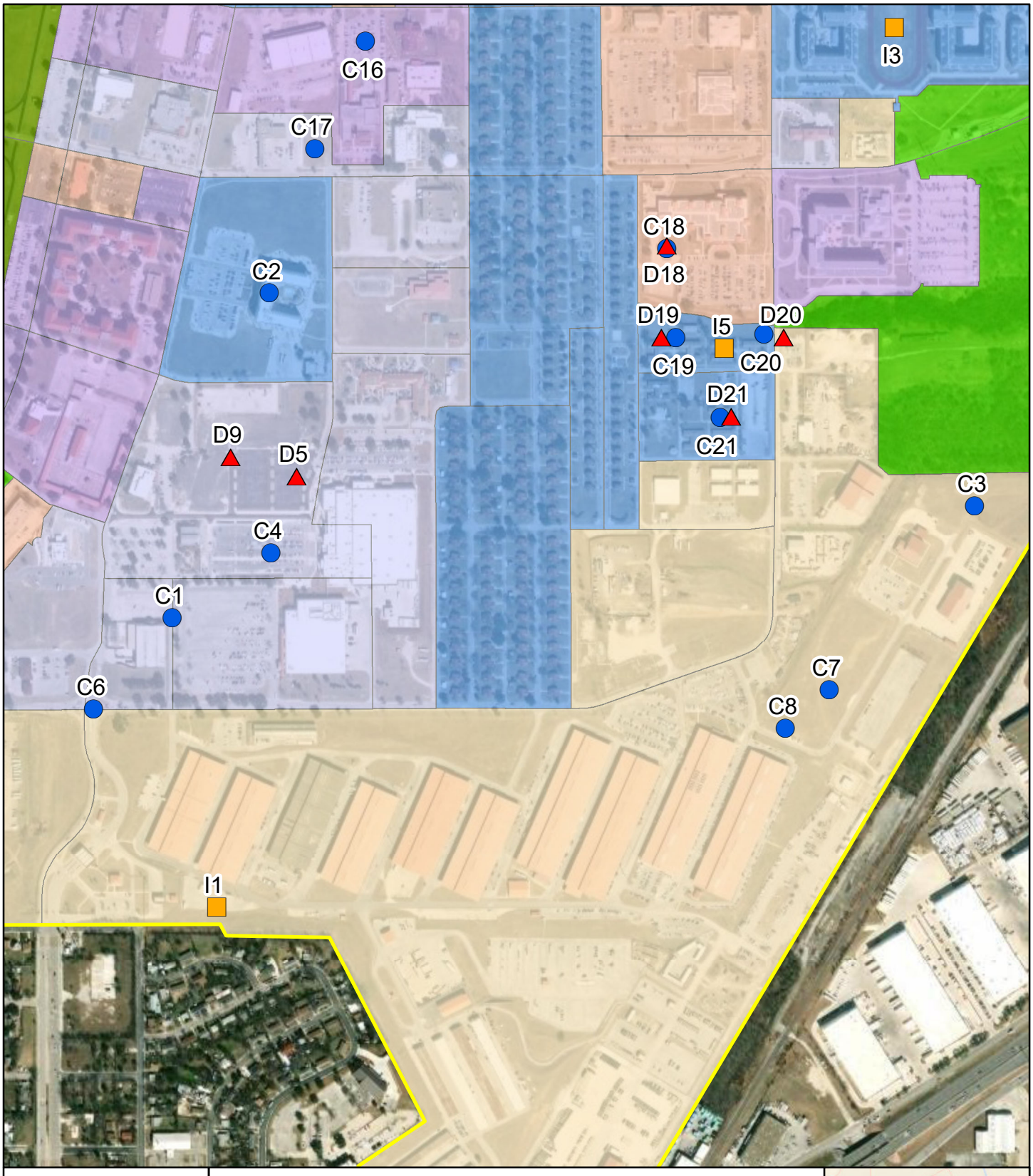


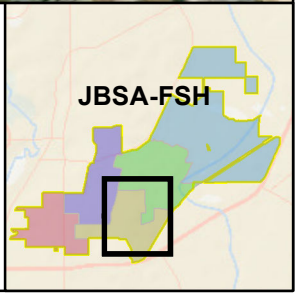

**FIGURE 3-1**
LAND USE –
COMMERCIAL DISTRICT

N

Imagery: ESRI 2021
Projection: WGS 1984
Zone 14N

0 0.05 0.1
Miles

- Construction
- Demolition
- Infrastructure
- JBSA - Fort Sam Houston
- Administration
- Industrial Use Area
- Community Service
- Housing
- Medical/Dental
- Open space/Buffer zone
- Outdoor Recreation



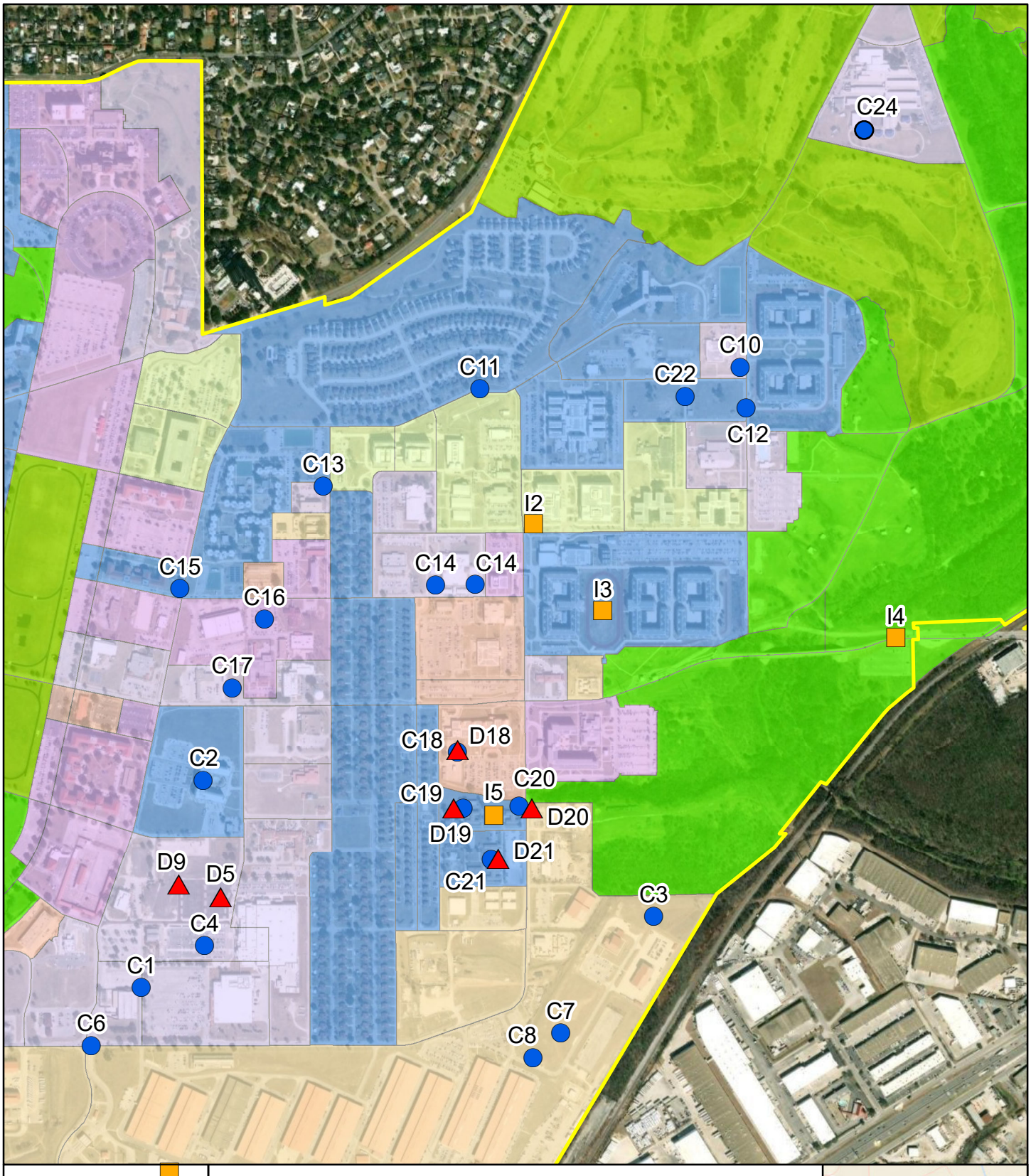



**FIGURE 3-2**
LAND USE –
TRAINING DISTRICT

N

Imagery: ESRI 2021
Projection: WGS 1984
Zone 14N

0 0.1 0.2 Miles

- Construction
- Demolition
- Infrastructure
- JBSA - Fort Sam Houston
- Administration
- Administration Training
- Community Service
- Housing
- Industrial Use Area
- Medical/Dental
- Open Space/Buffer Zone
- Outdoor Recreation

JBSA-FSH

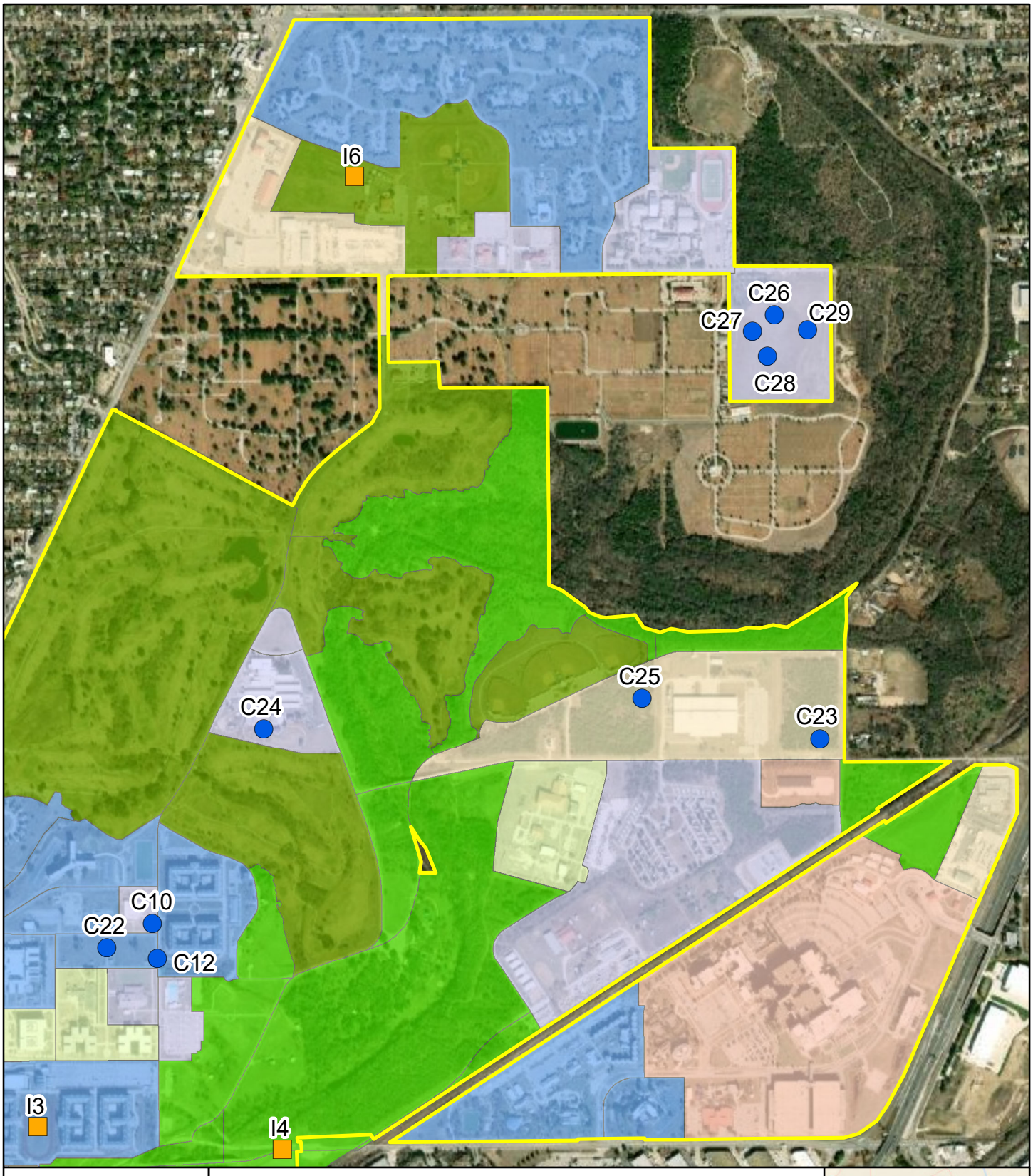



**FIGURE 3-3**
LAND USE –
SERVICE DISTRICT

N
Imagery: ESRI 2021
Projection: WGS 1984
Zone 14N
0 0.1 0.2
Miles

- Construction
- Infrastructure
- JBSA - Fort Sam Houston
- Administration - Training
- Outdoor Recreation
- Industrial Use Area
- Community Service
- Housing
- Medical/Dental
- Open space/Buffer zone

JBSA-FSH

The Training District is a joint-service environment that supports METC, the largest military medical training site in the world. This area includes two large medical campuses, the Army Medical Department and the METC, which support the MEDCOM.

The Service District is the largest planning district on the Installation. Family housing and support functions are located in the north, and the San Antonio Military Medical Center is in the southeastern corner; the Fort Sam Houston Golf Course makes up a large portion of the center of the district.

General land use goals for JBSA-FSH include limiting development surrounding the Base that would otherwise interfere with Base operations, maintaining and continuing the missions and objectives of JBSA-FSH and its training facilities, ensuring global readiness, and continuing to support community economics and growth (Air Force, 2018d).

**Land Use Restrictions**
JBSA-FSH lacks significant quantities of developable land and much of the land that is available is constrained. To preserve limited land resources, new buildings are recommended to be placed within existing developable land and in designated vacant parcels. The Service District is constrained for future development by the Salado Creek riparian buffer zones that meander through the district. Floodplain exists along the eastern section of Salado Creek in this area and major flooding occurs every 3 to 4 years. Development is discouraged within this area unless no practicable alternative exists for the siting of a project (Air Force, 2020b).

Storage and transportation of munitions have little impact on operations at JBSA-FSH. Munitions are currently stored in ways that require minimal explosive safety quantity distance (ESQD) restrictions. However, expanding missions may increase the need for ammunition storage and established ESQD arcs in the future (Air Force, 2018d).

## 3.5.2 Environmental Consequences

The Air Force defines a significant effect on 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
- 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, the Air Force would not implement the Proposed Action and land use on or around the proposed project sites would not change. The built environment of JBSA-FSH would continue to deteriorate and become outdated for military use. Future development program projects would not be precluded under the No Action Alternative.

### *3.5.2.2 Proposed Action*

Under the Proposed Action, construction, demolition, and infrastructure activities would occur within the existing boundaries of the Installation. The projects that would occur under the Proposed Action would be implemented in areas of compatible existing land use, which have been previously established. In addition, there would be minor beneficial long-term impacts with the implementation of the Proposed Action. Existing infrastructure within land use zones would be improved and would allow for JBSA-FSH to continue to meet its mission goals. New construction and stabilizing activities would continue to be designed to meet the land use needs of the Base.

Existing land use and land use compatibility under implementation of the Proposed Action would remain generally unchanged. No impacts to land use outside of the boundary of JBSA-FSH would be anticipated. The Proposed Action would be consistent with applicable land use plans and policies on and around JBSA-

FSH. Therefore, when considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-FSH, potential cumulative effects to land use would not be likely to occur.

### 3.5.3 Best Management Practices and Mitigation Measures

Multiple planning documents contributed to the development of the JBSA IDP and JBSA-FSH ADP for the three planning districts associated with the Proposed Action. No additional best management practices (BMPs) are recommended for land use beyond those previously incorporated in these planning documents.

No mitigation measures for potential effects on land use under the Proposed Action are recommended.

## 3.6 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 CAA, which set regulatory limits on air pollutants and helps ensure basic health and environmental protection from air pollution.

**Criteria Pollutants**

In accordance with CAA requirements, 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 in units of micrograms per cubic meter ($\mu g/m^3$). Regional air quality is a result of the types and quantities of atmospheric pollutants and pollutant sources in an area as well as surface topography and prevailing meteorological conditions.

The CAA directed the US Environmental Protection Agency (USEPA) to develop, implement, and enforce environmental regulations that would ensure clean and healthy ambient air quality. To protect public health and welfare, the USEPA developed National Ambient Air Quality Standards (NAAQS), numerical concentration-based standards, for pollutants that have been determined to impact human health and the environment and established both primary and secondary NAAQS under the provisions of the CAA. The primary NAAQS represent maximum levels of background air pollution that are considered safe, with an adequate margin of safety 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 coarse particulates equal to or less than 10 microns in diameter [$PM_{10}$] and fine particulates equal to or less than 2.5 microns in diameter), and lead (**Table 3-2**).

Ozone is not usually emitted directly into the air but is formed in the atmosphere by photochemical reactions involving sunlight and previously emitted pollutants, or "ozone precursors." These ozone precursors consist primarily of nitrogen oxides and volatile organic compounds that are directly emitted from a wide range of emission sources. For this reason, regulatory agencies limit atmospheric ozone concentrations by controlling volatile organic compound pollutants (also identified as reactive organic gases) and nitrogen oxides.

**Table 3-2**
**National Ambient Air Quality Standards**

| Pollutant | Primary/ Secondary[a,b] | Averaging Time | Level[c] | Form |
|---|---|---|---|---|
| Carbon monoxide | Primary | 8 hours | 9 ppm | Not to be exceeded more than once per year |
| | | 1 hour | 35 ppm | |
| Lead[d] | Primary and Secondary | Rolling 3-month average | 0.15 µg/m$^3$ | Not to be exceeded |
| Nitrogen dioxide[e] | Primary | 1 hour | 100 ppb | 98th percentile of 1-hour daily maximum concentrations, averaged over 3 years |
| | Primary and Secondary | 1 year | 53 ppb | Annual mean |
| Ozone[f] | Primary and Secondary | 8 hours | 0.070 ppm | Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years |
| Particle Pollution ($PM_{2.5}$) | Primary | 1 year | 12.0 µg/m$^3$ | Annual mean, averaged over 3 years |
| | Secondary | 1 year | 15.0 µg/m$^3$ | Annual mean, averaged over 3 years |
| | Primary and Secondary | 24 hours | 5 µg/m$^3$ | 98th percentile, averaged over 3 years |
| Particle Pollution ($PM_{10}$) | Primary and Secondary | 24 hours | 150 µg/m$^3$ | Not to be exceeded more than once per year on average over 3 years |
| Sulfur dioxide[g] | Primary | 1 hour | 75 ppb | 98th percentile of 1-hour daily maximum concentrations, averaged over 3 years |
| | Secondary | 3 hours | 0.5 ppm | Not to be exceeded more than once per year |

Source: USEPA NAAQS table
Notes:
a. Primary Standards: the levels of air quality necessary, with an adequate margin of safety to protect the public health. Each state must attain the primary standards no later than three years after that state's implementation plan is approved by the USEPA.
b. Secondary Standards: the levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
c. Concentrations are expressed first in units in which they were promulgated.
d. In areas designated nonattainment for the lead standards prior to the promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 µg/m$^3$ as a calendar quarter average) also remain in effect.
e. The level of the annual nitrogen dioxide standard is 0.053 ppm. It is shown here in terms of ppb for the purposes of clearer comparison to the 1-hour standard level.
f. Final rule signed 1 October 2015, and effective 28 December 2015. The previous (2008) ozone standards are not revoked and remain in effect for designated areas. Additionally, some areas may have certain continuing implementation obligations under the prior revoked 1-hour (1979) and 8-hour (1997) ozone standards.
g. The previous sulfur dioxide standards (0.14 ppm 24-hour and 0.03 ppm annual) will additionally remain in effect in certain areas: (1) any area for which it is not yet 1 year since the effective date of designation under the current (2010) standards, and (2) any area for which an implementation plan providing for attainment of the current (2010) standard has not been submitted and approved and which is designated nonattainment under the previous sulfur dioxide standards or is not meeting the requirements of a state implementation plan call under the previous sulfur dioxide standards (40 CFR § 50.4(3)). A SIP call is a USEPA action requiring a state to resubmit all or part of its SIP to demonstrate attainment of the required NAAQS.

µg/m$^3$ = micrograms per cubic meter; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; $PM_{10}$ = particulate matter less than or equal to 10 microns in diameter; ppb = parts per billion; ppm = parts per million

### 3.6.1 Existing Conditions

JBSA-FSH is located in Bexar County, Texas, and within the Metropolitan San Antonio Intrastate Air Quality Control Region (AQCR) (40 CFR § 81.40). The ROI for air quality is JBSA-FSH and its environs. Bexar County is currently designated as being in "marginal nonattainment" for ozone; however, the USEPA has announced a proposed action to move Bexar County from "marginal" to "moderate nonattainment" for ozone. If finalized, this new designation would mean that the San Antonio area will be required to comply with new USEPA air quality regulations and meet the ozone standard of 70 parts per billion (ppb) by 24

September 2024 (COSA, 2022). Bexar County is “in attainment” for all other criteria air pollutants and is designated as “in attainment” for all other criteria air pollutants.

JBSA-FSH operates under a synthetic minor permit, which is composed of multiple TCEQ-issued air permits by rule (PBR). A PBR is the state air authorization for activities that produce more than a *de minimis* level of emissions but less than New Source Review permitting options. Facilities operating under a PBR are required to monitor emissions and report the findings.

#### *3.6.1.1 Air Emission Sources at JBSA-FSH*

JBSA-FSH operates under multiple PBRs as specified in Title 30 of the *Texas Administrative Code*, Chapter 106 (30 TAC 106). There are numerous sources for air emissions at JBSA-FSH that contribute to the total emissions reported at the end of each calendar year. Emissions sources include but are not limited to the following:

- internal combustion sources; e.g., emergency generators (diesel fuel) and general-purpose generators (diesel fuel)
- external combustion sources; e.g., boilers, heaters, spray booth heaters and bake-off ovens
- abrasive blasting
- welding activities
- fuel storage tanks; e.g., jet fuel and diesel tanks
- gasoline delivery vessel testing and use
- vehicle refinishing
- surface and spray coating operations; e.g., surface and spray coating (paint booth) operations
- solvent cleaning (degreasing) operations and material usage; e.g., solvent cleaning equipment
- woodworking operations; e.g., dust-collection operations

#### *3.6.1.2 Regional Meteorology*

JBSA-FSH is in a region that has a transitional humid subtropical climate to a semi-arid climate featuring very hot, long, and humid summers and mild-to-cool winters. The geographic area that encompasses JBSA-FSH is subject to descending northern cold fronts in the winter that result in cool-to-cold nights that reach temperatures at or near freezing. In the spring and fall the region experiences high humidity and warm weather.

JBSA-FSH receives about a dozen subfreezing nights each year, typically accompanied by snow, sleet, or freezing rain; accumulation of snow is very rare. Winters may pass without any frozen precipitation at all, and up to a decade has passed between snowfalls in the past. According to the National Weather Service, there have been 32 instances of snowfall (a trace or more) in the city of San Antonio in the past 122 years (NWS, 2022).

In the geographic region of JBSA-FSH, July and August are the warmest months, with an average high of 95°F. The highest temperature ever recorded was 111°F on 5 September 2000. The average coolest month is January. The lowest recorded temperature ever was 0°F on 31 January 1949. Precipitation is highest in May, June, and October and flooding can occur. The average annual precipitation has been 29.03 inches, with a maximum of 52.28 inches and a minimum of 10.11 inches in one year.

### 3.6.1.3 General Conformity and Attainment

When a region or area meets NAAQS for a criteria pollutant, that region or area is classified as "attainment" for that pollutant. When a region or area fails to meet NAAQS for a criteria pollutant, that region or area 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 at the state level that lays out a pathway for how the state will comply with air quality standards. If air quality improves in region that is classified as nonattainment and the improvement results in the region meeting the criteria for classification as attainment, then that region is classified as a "maintenance" area.

Under the CAA, the General Conformity Rule requires proposed federal agency activities in designated nonattainment or maintenance areas (i.e., attainment areas reclassified from a prior nonattainment designation) 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 and are listed in tables contained in 40 CFR § 93.153(b)(1) and (2). for *de minimis* values for nonattainment areas and *de minimis* values for maintenance areas, respectively.

### 3.6.1.4 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 AQCRs designated as unclassified or in attainment with respect to the federal standards. 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, depending 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.

### 3.6.1.5 Greenhouse Gases

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 helps regulate the earth's temperature and contribute to global climate change. GHGs include water vapor, carbon dioxide, methane, nitrous oxide, ozone, and several hydrocarbons and chlorofluorocarbons. Each GHG has an estimated global warming potential, which is a function of its atmospheric lifetime and its 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 $CO_2e$ of 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 large 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)).

### 3.6.1.6 Operating Permits

The State of Texas has adopted the federal NAAQS. Pursuant to 30 TAC 122, the 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 (PTE), defined as the maximum

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

capacity of a stationary source to emit any air pollutant under its physical and operational design or configuration. PTE calculations determine whether a federal facility is defined as a "major source" under the CAA, requiring a Title V operating permit; however, some "non-major" or "minor source" federal owners or operators are subject to PBR requirements (see **Section 3.6.1**).

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 for dust suppression and measures to prevent airborne particulate matter during sandblasting or similar operations.

## 3.6.2 Environmental Consequences

### *3.6.2.1 Evaluation Criteria*

The environmental impact methodology for air quality impacts presented in this EA is derived from AF Manual 32-7002, *Environmental Compliance and Pollution Prevention* (February 2020). The Proposed Action is broken down into basic units. For example, a basic development project that consists of replacing a building with a new building could be broken down into demolition ($ft^2$), grading ($ft^2$), building construction ($ft^2$ and height), architectural coatings ($ft^2$), and paving ($ft^2$). These data are then input into the Air Force's Air Conformity Applicability Model (ACAM), which models emissions based on the inputs and estimates air emissions for each specific criteria and precursor pollutant, as defined in the NAAQS.

The calculated emissions are then compared against the applicable threshold based on the attainment status of the ROI. If the annual net increase in emissions from the project are below the applicable thresholds, then the Proposed Action and Alternatives are not considered significant and would not be subject to any further conformity determination. Assumptions of the model, methods, and detailed summary results are provided in **Appendix C** of this EA.

As previously stated, the ROI for this project is currently in marginal nonattainment for ozone as of the date of this EA; therefore, the *de minimis* value in 40 CFR § 93.153(b)(1) is used as the threshold for ozone precursors. The ROI is in attainment for all other NAAQS; therefore, the PSD value is used as a threshold for all other criteria pollutants other than lead. Due to the toxicity of lead, the use of the PSD threshold as an indicator of potential air quality impact insignificance is not protective of human health or the environment. Therefore, the *de minimis* value is used instead. The following thresholds are applicable for the Proposed Action and Alternatives:

- 100 tpy *de minimis* value for ozone precursors (volatile organic compounds and nitrogen oxides)
- 25 tpy *de minimis* value for lead
- 250 tpy PSD value for remaining criteria pollutants

### *3.6.2.2 No Action Alternative*

Under the No Action Alternative, the Air Force would not implement the Proposed Action, and air quality conditions on or around the proposed project sites would not change. The built environment of JBSA-FSH would continue to deteriorate and become outdated for military use. Future development program projects would not be precluded under the No Action Alternative.

### *3.6.2.3 Proposed Action*

The Proposed Action includes construction, demolition, and infrastructure projects at JBSA-FSH. The projects are in a conceptual phase and no construction schedule has been developed as of the writing of this EA. As such, the activities in the Proposed Action have been combined and entered into ACAM as five separate projects, each spanning one year. Under the Proposed Action, temporary construction workers

would support the individual construction projects, but no permanent, long-term increase to the population of JBSA-FSH is anticipated to occur.

**Table 3-3** summarizes the results of the ACAM analysis for JBSA-FSH for the duration of construction, demolition, and infrastructure projects under the Proposed Action. The table compares the cumulative emissions of regulated criteria pollutants under the Proposed Action (2023–2027) with their applicable annual PSD thresholds. No threshold would be reached with implementation of the Proposed Action.

The annual net increase in emissions projected indefinitely into the future (steady state) represents the annual long-term emissions anticipated after construction is complete. As shown on **Table 3-3**, the long-term, steady-state emissions would also be negligible when compared to the applicable threshold.

Emissions for $CO_2e$ do not have a regulatory threshold; however, estimated emissions for $CO_2e$ are presented in **Table 3-3** to demonstrate that $CO_2e$ emissions would also be low when compared to GHG emissions of 25,000 metric tons or more associated with large GHG sources.

Under the Proposed Action, 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 and the Metropolitan San Antonio AQCR. When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-FSH, potential cumulative effects to air quality would not be likely to occur.

**Table 3-3**
**ACAM Calculations for JBSA-FSH**

| Year | Pollutant | Action Emissions (ton/yr) | INSIGNIFICANCE INDICATOR | |
|---|---|---|---|---|
| | | | Indicator (ton/yr) | Exceedance (Yes or No) |
| | **NOT IN A REGULATORY AREA** | | | |
| 2023 | VOC | 4.394 | 100 | No |
| | NOx | 3.890 | 100 | No |
| | CO | 4.426 | 250 | No |
| | SOx | 0.012 | 250 | No |
| | $PM_{10}$ | 21.890 | 250 | No |
| | $PM_{2.5}$ | 0.167 | 250 | No |
| | Pb | 0.000 | 25 | No |
| | $NH_3$ | 0.004 | 250 | No |
| | $CO_2e$ | 1342.8 | N/A | N/A |
| 2024 | VOC | 4.435 | 100 | No |
| | NOx | 4.876 | 100 | No |
| | CO | 5.454 | 100 | No |
| | SOx | 0.020 | 250 | No |
| | $PM_{10}$ | 21.969 | 70 | No |
| | $PM_{2.5}$ | 0.246 | 250 | No |
| | Pb | 0.000 | 25 | No |
| | $NH_3$ | 0.004 | 250 | No |
| | $CO_2e$ | 2846.2 | N/A | N/A |
| 2025 | VOC | 4.479 | 100 | No |
| | NOx | 5.890 | 100 | No |
| | CO | 6.484 | 100 | No |
| | SOx | 0.027 | 250 | No |
| | $PM_{10}$ | 22.050 | 70 | No |
| | $PM_{2.5}$ | 0.327 | 250 | No |
| | Pb | 0.000 | 25 | No |
| | $NH_3$ | 0.004 | 250 | No |
| | $CO_2e$ | 4349.5 | N/A | N/A |

| Year | Pollutant | Action Emissions (ton/yr) | INSIGNIFICANCE INDICATOR | |
|---|---|---|---|---|
| | | | Indicator (ton/yr) | Exceedance (Yes or No) |
| 2026 | VOC | 4.548 | 100 | No |
| | NOx | 7.139 | 100 | No |
| | CO | 7.533 | 100 | No |
| | SOx | 0.035 | 250 | No |
| | $PM_{10}$ | 22.145 | 70 | No |
| | $PM_{2.5}$ | 0.421 | 250 | No |
| | Pb | 0.000 | 25 | No |
| | $NH_3$ | 0.004 | 250 | No |
| | $CO_2e$ | 5852.8 | N/A | N/A |
| 2027 | VOC | 4.617 | 100 | No |
| | NOx | 8.388 | 100 | No |
| | CO | 8.582 | 100 | No |
| | SOx | 0.042 | 250 | No |
| | $PM_{10}$ | 22.239 | 70 | No |
| | $PM_{2.5}$ | 0.516 | 250 | No |
| | Pb | 0.000 | 25 | No |
| | $NH_3$ | 0.004 | 250 | No |
| | $CO_2e$ | 7356.2 | N/A | N/A |
| 2028–Steady State | VOC | 0.343 | 100 | No |
| | NOx | 6.244 | 100 | No |
| | CO | 5.245 | 100 | No |
| | SOx | 0.037 | 250 | No |
| | $PM_{10}$ | 0.475 | 70 | No |
| | $PM_{2.5}$ | 0.475 | 250 | No |
| | Pb | 0.000 | 25 | No |
| | $NH_3$ | 0.000 | 250 | No |
| | $CO_2e$ | 7516.9 | N/A | N/A |

CO = carbon monoxide; $CO_2e$ = carbon dioxide equivalent; N/A = not applicable; $NH_3$ = ammonia; NOx = nitrogen oxides; Pb = lead; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; $PM_{10}$ = particulate matter less than or equal to 10 microns in diameter; $SO_2$ = sulfur dioxide; VOC = volatile organic compound

### 3.6.3 Best Management Practices and Mitigation Measures

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

- Comply with JBSA environmental specifications during construction projects.
- 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.
- Comply with state, federal, and Air Force air quality regulations for facility operations at new centers, hotels, fuel depots, and other buildings.

No mitigation measures for potential effects on air quality under the Proposed Action are recommended.

## 3.7 NOISE

Noise is undesirable or unwanted sound that interferes with verbal communication and hearing. Sound pressure level, described in decibels, is used to quantify sound intensity. Sound level measurements used to characterize sound levels sensed by the human ear are designated “A-weighted” decibels (dBA).

The *Noise Control Act of 1972* (Public Law 92-574) directs federal agencies to comply with applicable federal, state, and local noise control regulations. In 1974, the USEPA provided information suggesting continuous and long-term noise levels greater than 65 dBA are normally unacceptable for noise-sensitive receptors such as residences, schools, churches, and hospitals.

The ROI for land use includes JBSA-FSH.

### 3.7.1 Existing Conditions

Currently the main sources of noise at JBSA-FSH are the day-to-day operations, activities, maintenance, and industrial functions associated with the Installation, as well as ground equipment and vehicular transportation. The normal daily occurrence of these activities contributes to the ambient baseline for noise at JBSA-FSH. General Base upkeep and maintenance activities, as well as other planned actions undertaken by the Base, would generate detectable noise levels. Larger undertakings of JBSA-FSH may require engine maintenance, equipment usage, or construction and demolition activities. These activities would be considered typical for their noise-generating levels, and typically conducted during acoustical daytime hours.

In addition to day-to-day Base activities, JBSA-FSH's location in downtown San Antonio makes it susceptible to urban and city noise. Such day-to-day activities would be considered part of the baseline for noise analysis. Ambient city sources include construction, demolition, heavy machinery, and vehicular use. Most noise-generating activities also take pace during the daytime hours.

### 3.7.2 Environmental Consequences

#### *3.7.2.1 Evaluation Criteria*

When evaluating noise effects, several aspects are examined:

- the degree to which noise levels generated by training and operations, as well as 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.

An environmental analysis of noise includes the potential effects on the local population and estimates the extent and magnitude of the noise generated by the Proposed Action and Alternatives.

#### *3.7.2.2 No Action Alternative*

Under the No Action Alternative, the Air Force would not implement the Proposed Action, and noise conditions on or around the proposed project sites would not change. The built environment of JBSA-FSH would continue to deteriorate and become outdated for military use. Future development program projects would not be precluded under the No Action Alternative.

#### *3.7.2.3 Proposed Action*

Proposed projects under the Proposed Action would include construction, demolition, and infrastructure activities that would occur entirely within the boundaries of JBSA-FSH. The affected environment for noise effects from the Proposed Action and ongoing operations within 0.25 mile of the proposed projects.

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 3-4**).

**Table 3-4**
**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

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. Additionally, adherence to standard Air Force Occupational Safety and Health regulations that require hearing protection along with other personal protective equipment and safety training would minimize the risk of hearing loss to construction workers. Therefore, noise associated with construction and demolition projects under the Proposed Action would not cause any significant direct or indirect impacts on noise-sensitive receptors. When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-FSH, potential cumulative effects to the noise environment would not be likely to occur.

### 3.7.3 Best Management Practices and Mitigation Measures

No additional BMPs are recommended for noise beyond those currently in practice. No mitigation measures for potential effects from noise under the Proposed Action are recommended.

## 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.

Prime farmland, as defined by the US Department of Agriculture (USDA) in the *Farmland Protection Policy Act* (7 USC §§ 4201–4209), is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. (USDA,1993).

The ROI for earth resources is the Installation boundaries of JBSA-FSH.

### 3.8.1 Existing Conditions

#### *3.8.1.1 Geology*

JBSA-FSH is situated just south of the edge of the Edwards Plateau, which is part of the Great Plains physiographic province. A large, faulted limestone formation, the Balcones Escarpment, forms the southern and eastern portions of the Edwards Plateau. JBSA-FSH is located at the base of this escarpment and within the Blackland Prairie physiographic area. The geology underlying JBSA-FSH originated from several different geological periods. The area is underlain by limestones capped by alluvial sands, gravels, and silts

### *3.8.1.2 Topography*

Topography at JBSA-FSH is typified by characteristics associated with the Great Plains Province, specifically in the Blackland Prairie. The Blackland Prairie is dominated by rolling hills that vary in elevation from 700 to 1,000 feet above sea level (Air Force, 2020b). Most of the Installation is generally flat with slopes of 1 to 5 percent. Steeper topography is found in the central part of the Installation with areas of relief and lower elevation to the west toward the San Antonio River. The steepest elevations occur at Salado Creek and run alongside the river through the northeast portion of JBSA-FSH.

### *3.8.1.3 Soils*

**Table 3-5** summarizes the soils present at JBSA-FSH in relation to the Proposed Action, as shown in **Figures 3-4–3-6.**

**Table 3-5**
**Soil Types Associated with JBSA-FSH**

| Map Unit Symbol | Name | Slope | Drainage Rating | Acres in ROI | Percent of ROI |
|---|---|---|---|---|---|
| Fr | Loire clay loam | 0-2% | Well drained | 218.5 | 7.5 |
| HoD3 | Heiden-Ferris complex | 5-10% | Well drained | 303.0 | 10.4 |
| HsB | Houston black clay | 1-3% | Moderately well drained | 487.4 | 16.7 |
| HsC | Houston black clay | 3-5% | Moderately well drained | 2.5 | 0.1 |
| HtB | Branyon clay | 1-3% | Moderately well drained | 16.4 | 0.6 |
| HuB | Houston black gravelly clay | 1-3% | Moderately well drained | 226.0 | 7.8 |
| HuC | Houston black gravelly clay | 3-5% | Moderately well drained | 743.1 | 25.5 |
| LvA | Lewisville silty clay | 0-1% | Well drained | 443.5 | 15.2 |
| LvB | Lewisville silty clay | 3-5% | Well drained | 181.5 | 6.2 |
| TaB | Eckrant cobbly clay | 1-5% | Well drained | 10.7 | 0.4 |
| Tb | Eddy gravelly clay loam | 1-8% | Well drained | 28.4 | 1.0 |
| VcA | Sunev clay loam | 0-1% | Well drained | 70.2 | 2.4 |
| VaA | Sunev clay loam | 1-3% | Well drained | 183.6 | 6.3 |

Source: USDA, Natural Resources Conservation Service's Web Soil Survey Tool

Soils present at JBSA-FSH primarily consist of Houston black gravelly clays and Houston black clays, followed in quantity by Lewisville silty clays. Each of these soils is characterized by low slopes, efficient drainage, low erosion potential, and low-to-medium runoff potential. Runoff is limited and contained due to the gravel surface portion of the Houston black gravelly clays and Lewisville silty clays (USDA, 1966). Houston black clay experiences slightly more rapid runoff and a greater erosion potential than the other two soils due to a lower gravel content. Most soils at JBSA-FSH have been previously disturbed, highly urbanized, or developed and used for military purposes.

### *3.8.1.4 Prime Farmland*

Houston black gravelly clay, Houston black clay, and Lewisville silty clay are found at JBSA-FSH and are considered to have the potential to be prime farmland soils. However, agriculture and irrigation are not current operations at JBSA-FSH and are not planned for future operations. Given JBSA-FSH's historic use for military training, these soils would not be considered prime farmland or warrant future designation under the Farmland Protection Policy Act.

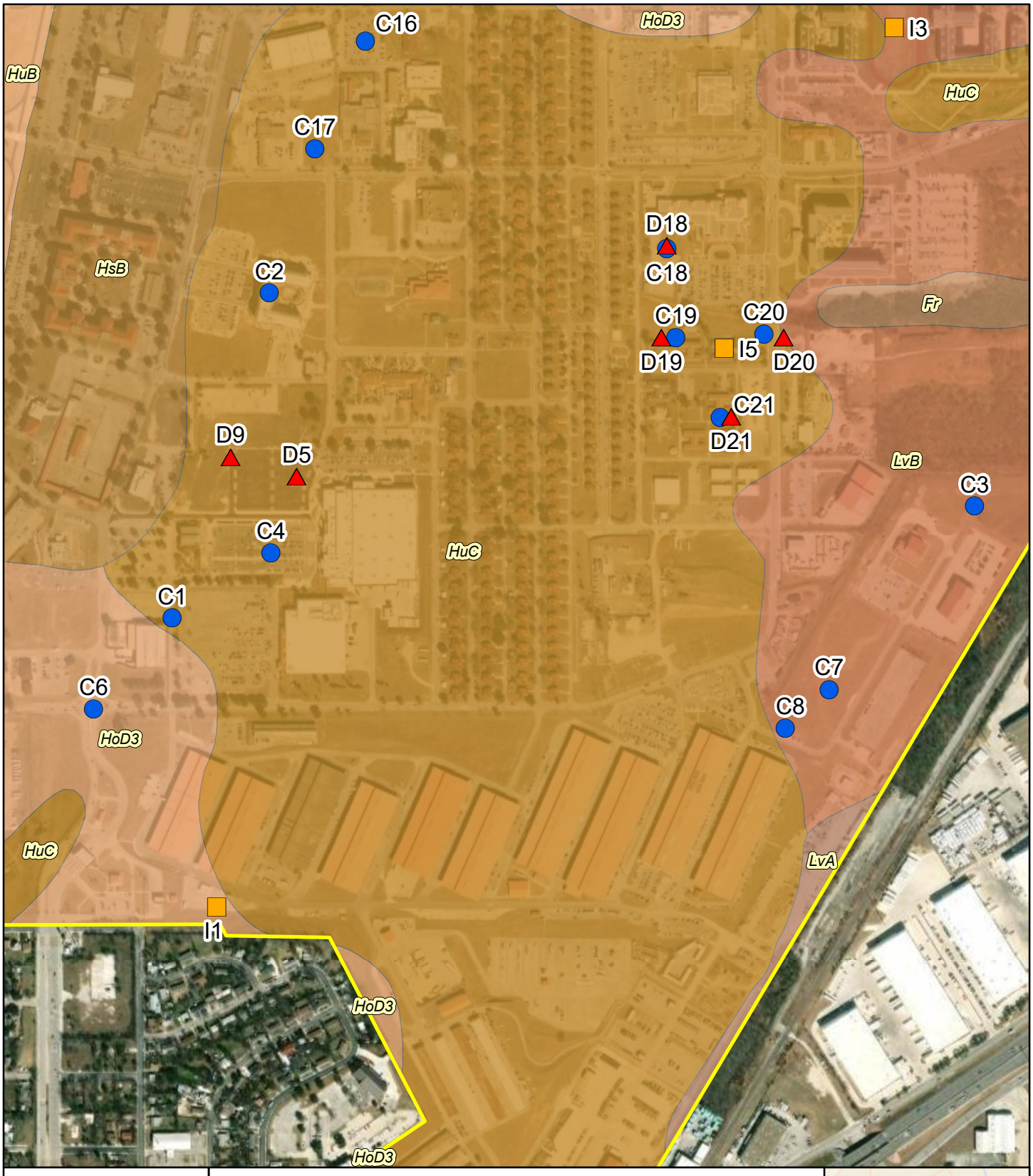



**FIGURE 3-4**
SOIL TYPES – COMMERCIAL DISTRICT

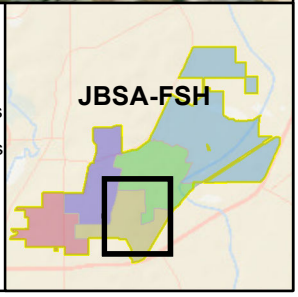
N

Imagery: ESRI 2021
Projection: WGS 1984
Zone 14N

0 0.05 0.1 Miles

- Construction
- Demolition
- Infrastructure
- JBSA - Fort Sam Houston

- HoD3 - Heiden-Ferris complex, 5 to 10 percent slopes
- HsB - Houston black clay, 1 to 3 percent slopes
- HuB - Houston black gravelly clay, 1 to 3 percent slopes
- HuC - Houston black gravelly clay, 3 to 5 percent slopes
- LvA - Lewisville silty clay, 0 to 1 percent slopes
- LvB - Lewisville silty clay, 1 to 3 percent slopes
- Fr - Loire clay loam, 0 to 2 percent slopes



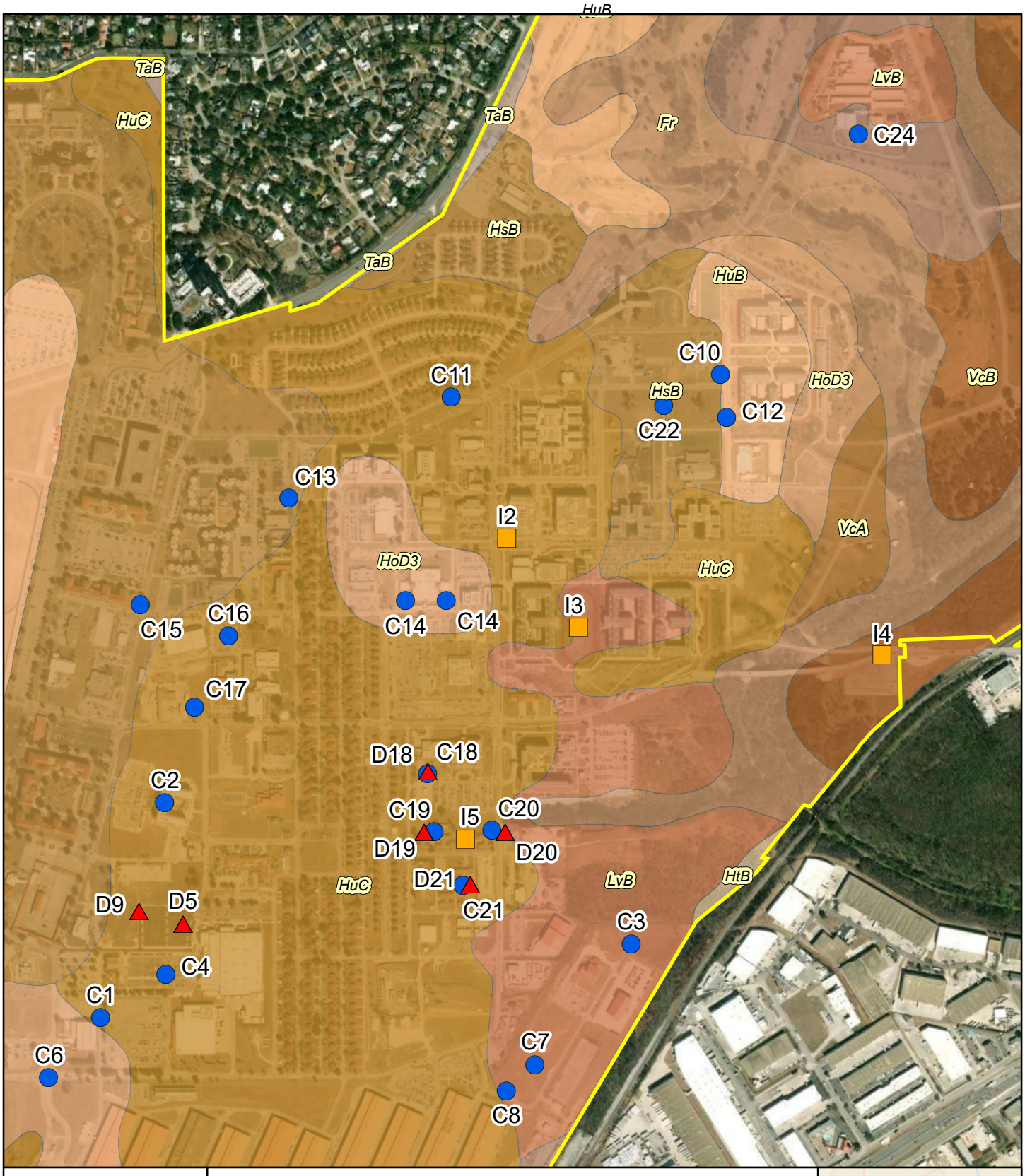


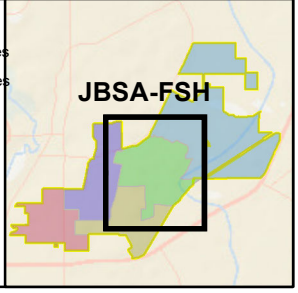

**FIGURE 3-5**
SOIL TYPES –
TRAINING DISTRICT

N

Imagery: ESRI 2021
Projection: WGS 1984
Zone 14N

0 0.1 0.2 Miles

- Construction
- Demolition
- Infrastructure
- JBSA - Fort Sam Houston
- HtB - Branyon clay, 1 to 3 percent slopes
- TaB - Eckrant cobbly clay, 1 to 5 percent slopes
- HoD3 - Heiden-Ferris complex, 5 to 10 percent slopes
- HsB - Houston black clay, 1 to 3 percent slopes
- HuB - Houston black gravelly clay, 1 to 3 percent slopes
- HuC - Houston black gravelly clay, 3 to 5 percent slopes
- LvA - Lewisville silty clay, 0 to 1 percent slopes
- LvB - Lewisville silty clay, 1 to 3 percent slopes
- Fr - Loire clay loam, 0 to 2 percent slopes
- VcA - Sunev clay loam, 0 to 1 percent slopes
- VcB - Sunev clay loam, 1 to 3 percent slopes



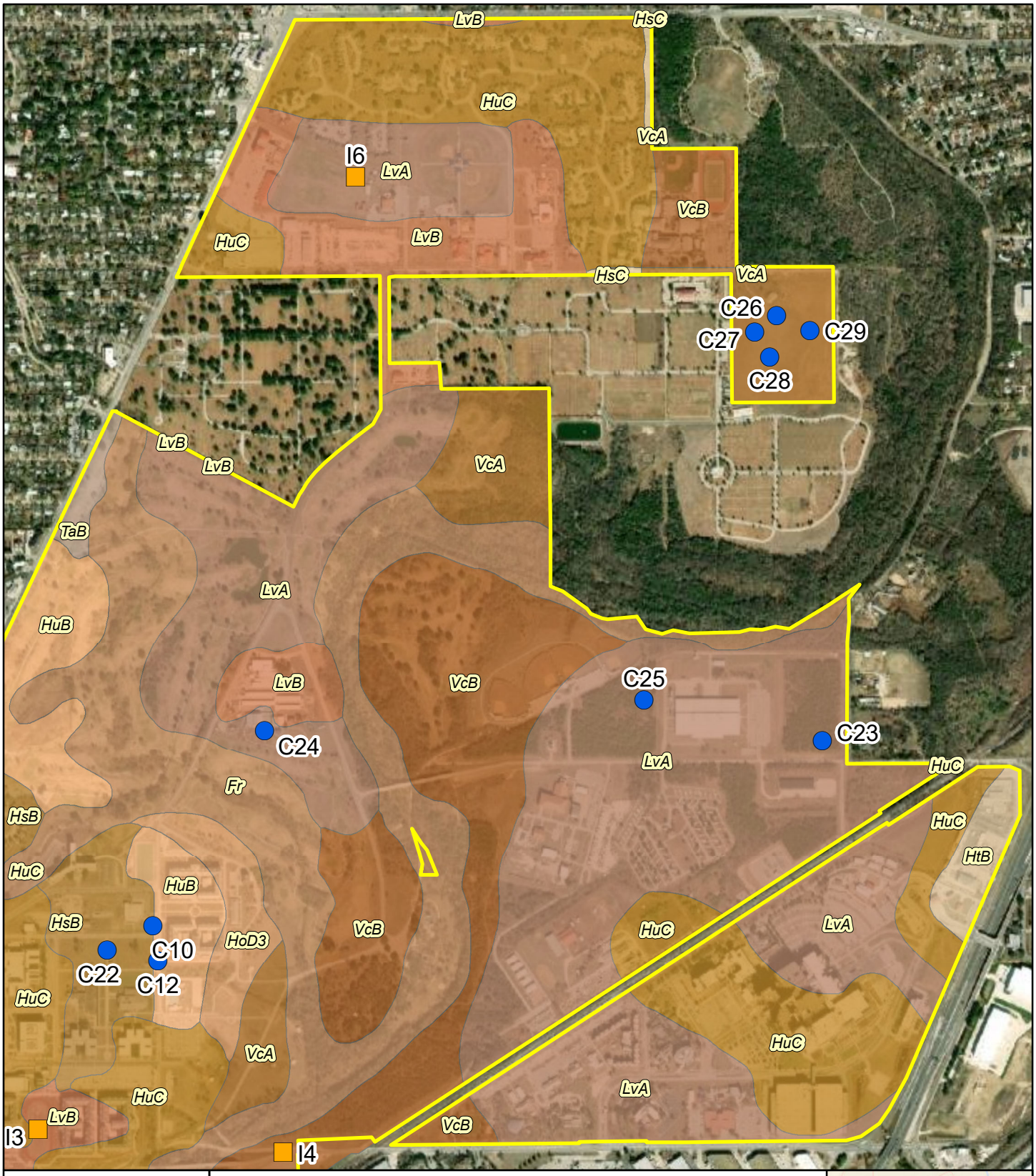


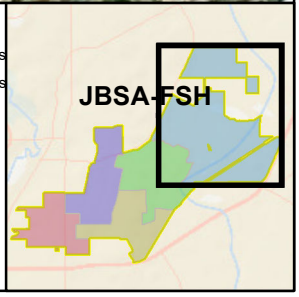

**FIGURE 3-6**
SOIL TYPES –
SERVICE DISTRICT

N

Imagery: ESRI 2021
Projection: WGS 1984
Zone 14N

0 0.1 0.2 Miles

- Construction
- Infrastructure
- JBSA - Fort Sam Houston
- HtB - Branyon clay, 1 to 3 percent slopes
- TaB - Eckrant cobbly clay, 1 to 5 percent slopes
- HoD3 - Heiden-Ferris complex, 5 to 10 percent slopes
- HsB - Houston black clay, 1 to 3 percent slopes
- HsC - Houston black clay, 3 to 5 percent slopes
- HuB - Houston black gravelly clay, 1 to 3 percent slopes
- HuC - Houston black gravelly clay, 3 to 5 percent slopes
- LvA - Lewisville silty clay, 0 to 1 percent slopes
- LvB - Lewisville silty clay, 1 to 3 percent slopes
- Fr - Loire clay loam, 0 to 2 percent slopes
- VcA - Sunev clay loam, 0 to 1 percent slopes
- VcB - Sunev clay loam, 1 to 3 percent slopes



## 3.8.2 Environmental Consequences

The Air Force defines a significant effect on 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, the Air Force would not implement the Proposed Action, and no earth resources on or around the proposed project sites would change. The built environment of JBSA-FSH would continue to deteriorate and become outdated for military use. Future development program projects would not be precluded under the No Action Alternative.

### *3.8.2.2 Proposed Action*

The Proposed Action would involve earthwork, including excavation, backfilling, and compacting of soils or fill materials on and immediately adjacent to the project sites. These activities would expose soils and increase their susceptibility to water and wind erosion. Inclement weather (e.g., rain or wind) could increase the probability and severity of these potential effects. The underlying geology of the area would not change under the Proposed Action.

The Proposed Action could alter soil structure, composition, and function during excavation and backfill activities. The soils at many project locations have been previously disturbed, developed, or used for military purposes. All project sites under the Proposed Action are generally suitable for development; however, the Air Force would validate soil conditions at each site prior to construction to address any limiting factors by management or design.

All construction or demolition projects likely would involve soil-disturbing activities. Of the 35 proposed ADP projects at JBSA-FSH, 27 would occur in areas consisting of three primary soil types: Houston black gravelly clay, Houston black clay, and Lewisville silty clays (**Figures 3-4–3-6**). These areas have slopes ranging from 0 to 5 percent, and the potential for runoff for these soil types and slopes is low. These soil types are well drained and the potential for erosion also is low in these areas. Implementation of the Proposed Action would not be anticipated to result in adverse effects to earth resources for any project in these locations.

Three projects within the Commercial District and Training District, Projects C6, C14, and I1, would occur in areas of Heiden-Ferris complex with 5–10-percent slopes (**Figures 3-4** and **3-5**). Water infiltration in this soil type is low and water permeability is very slow. The potential for erosion and runoff during soil-disturbing activities during roadwork and construction activities under the Proposed Action is high. The Air Force would address the potential for erosion and sedimentation in these areas through design and best practices.

Five projects across the Training District and Service District, Projects I4, C26, C27, C28, and C29, would occur in Sunev clay loam soils (**Figures 3-5** and **3-6**). Slopes in all project areas would be less than 3 percent; these soils are well drained with moderate permeability. The potential for erosion in these areas is low, and adverse impacts would not be anticipated from soil-disturbing activities associated with the Proposed Action.

Under the Proposed Action, potential adverse effects on soils, including soil loss, contamination, and structural alteration, would be managed at an individual project level. When implementation of a project would disturb 1 acre or more of land, the construction contractor would obtain and comply with a construction general permit (CGP) under the TCEQ-administered Texas Pollutant Discharge Elimination System (TPDES) program (see **Section 3.9.1.2**). The CGP would require the preparation, approval, and implementation of a site-specific Stormwater Pollution Prevention Plan (SWP3) prior to construction,

including appropriate structural and non-structural erosion, sediment, and waste control BMPs. Additional measures may include planning and operational considerations such as staging construction equipment and materials on existing gravel or paved surfaces or minimizing or restricting vehicle movements to select areas on JBSA-FSH.

During construction, crews would adhere to BMPs for soil erosion, as determined by the JBSA-FSH Natural Resources Officer, to minimize runoff potential. After placing and compacting reuse or fill soils, superficial soils would be graded to conform to local topography to maintain efficient drainage. Additionally, construction phasing under the Proposed Action would minimize potential adverse effects to soils. During implementation, project-specific measures would be taken and remain in place during all stages of the Proposed Action, resulting in negligible and temporary effects on soils in the ROI.

Under the Proposed Action, reasonably foreseeable development plans and projects within and around the San Antonio metropolitan area also would be subject to regulation 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 or from earth resources. Therefore, when considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-FSH, potential cumulative effects to earth resources would not be likely to occur.

### 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 projects.
- 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 mitigation measures for potential effects on or from earth resources were identified by analysis.

## 3.9 WATER RESOURCES

Water resources include surface waters such as streams and wetlands, groundwater, and associated features and functions that protect water quality (e.g., floodplains and stormwater management).

The ROI for water resources includes JBSA-FSH and areas downstream of the Proposed Action that are part of the Lower Salado Creek Watershed. Collectively, the ROI coincides with areas downstream of the Proposed Action that are within the San Antonio River Basin.

[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.

## 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. One of 23 basins in Texas, the San Antonio River Basin occupies a large swath of south-central Texas, draining portions of 14 Texas counties. The basin drains nearly all of Bexar County, where JBSA-FSH resides. This basin holds six major watersheds including the Headwaters Salado Creek and Headwaters San Antonio River Watersheds (USEPA, 2022a). Salado Creek is an intermittent tributary of the San Antonio River, draining approximately 216 square miles (Air Force, 2020b). JBSA-FSH's waterway drainage is further delineated into the Walzam Creek and Olmos Creek-San Antonio River sub-watersheds.

The Texas Water Development Board (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 that feeds into a state water plan prepared by the TWDB. Bexar County is part of the Region L regional water planning area.

### *3.9.1.2 Surface Waters and Water Quality*

**Surface Waters**
As defined in the CWA, surface waters, including streams, rivers, lakes, estuaries, coastal waters, and wetlands, can be defined as Waters of the US (USEPA, 2022a). Under the CWA, Waters of the US include:

- navigable waters;
- interstate waters;
- interstate waters used in interstate and/or foreign waters;
- tributaries of the above waters;
- territorial seas at the cyclical high tide mark; and
- wetlands adjacent to all the above.

For the purposes of this EA, wetlands are described separately in **Section 3.9.1.3** below. To the northeast of JBSA-FSH, Salado Creek flows generally north to south through the Installation (Figures **3-7–3-9**). The creek flows to the southwest and crosses through the northeast portion of the JBSA-FSH through the Training District and Service District. Salado Creek runs from northern Bexar County, meeting the San Antonio River near Buena Vista. A drainage ditch that acts as an eventual tributary for Salado Creek is located in the southwest corner of the Commercial District just to the west of the Walters Gate.

The San Antonio River runs north to south just to the west of the JBSA-FSH. The river does not pass into the Installation's boundaries, but drainage from the western side of JBSA-FSH flows to tributaries of this river, discussed below in **Section 3.9.1.4**.

**Water Quality**
Pursuant to the CWA, the 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, 2020b, 2021a).

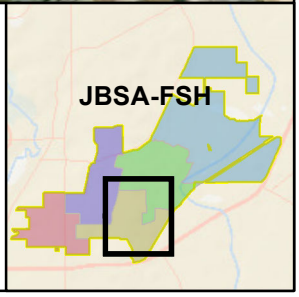

**FIGURE 3-7**
SURFACE WATERS AND FLOODPLAINS – COMMERCIAL DISTRICT

N

Imagery: ESRI 2021
Projection: WGS 1984
Zone 14N

0 0.05 0.1 Miles

Construction
Demolition
Infrastructure
Stream
JBSA - Fort Sam Houston



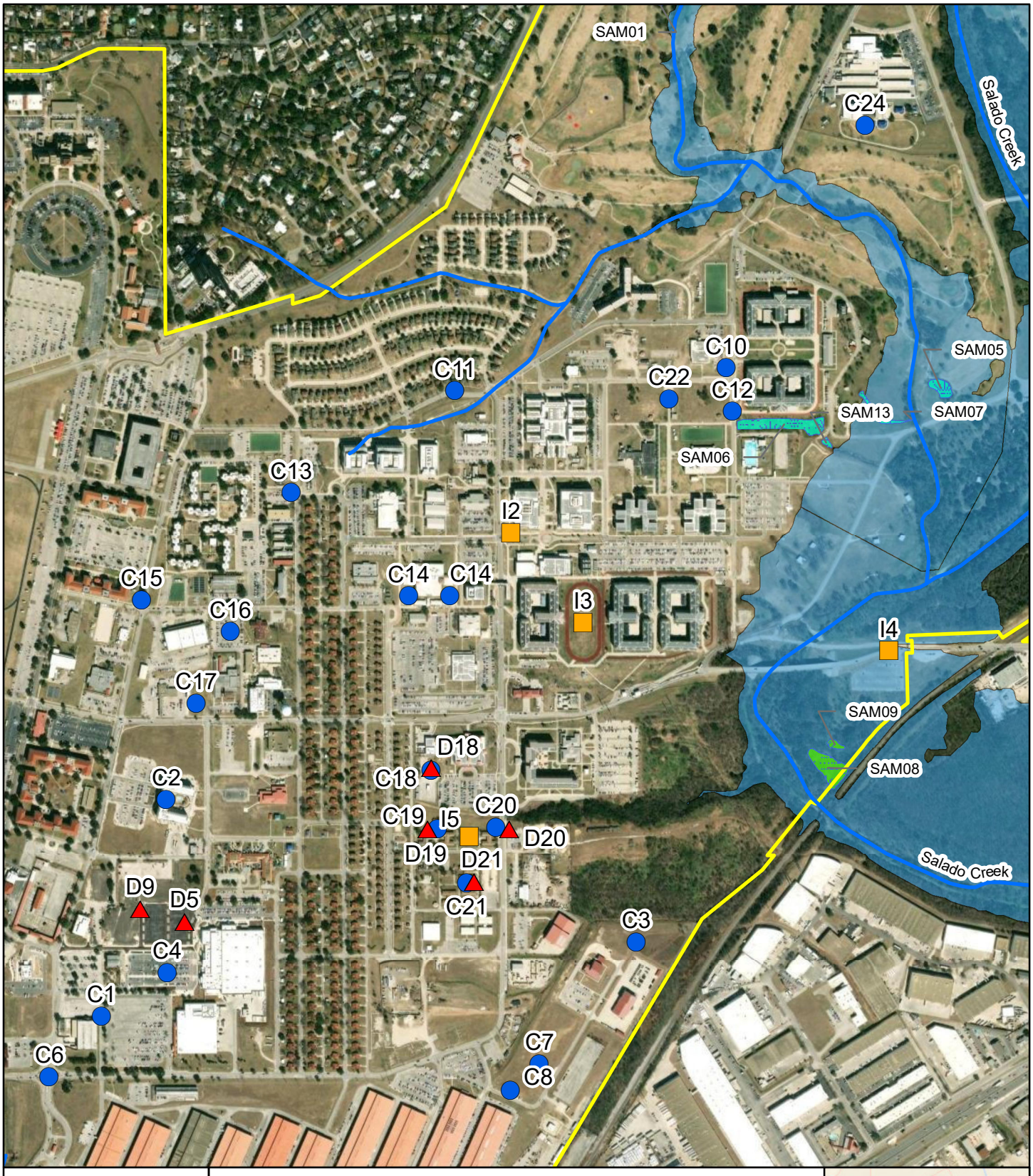



**FIGURE 3-8**
SURFACE WATERS AND FLOODPLAINS – TRAINING DISTRICT

N

Imagery: ESRI 2021
Projection: WGS 1984
Zone 14N

0 0.1 0.2 Miles

- Construction
- Demolition
- Infrastructure
- Stream
- JBSA - Fort Sam Houston
- Wetland - Forested
- Wetland - Emergent
- Zone AE

JBSA-FSH


**FIGURE 3-9**
SURFACE WATERS AND FLOODPLAINS – SERVICE DISTRICT

N

Imagery: ESRI 2021
Projection: WGS 1984
Zone 14N

0 0.1 0.2 Miles

- Construction
- Infrastructure
- Stream
- JBSA - Fort Sam Houston
- Wetland - Forested
- Wetland - Emergent
- Zone A
- Zone AE

JBSA-FSH

Under Section 303(d) of the CWA, the State of Texas is required to identify and develop a list of waterbodies (or waterbody segments) that are based on their intended use (e.g., swimming or fishing). Impaired waterbodies are those that are not in alignment 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. The TCEQ also implements a state-wide water quality sampling program for this purpose and requires sampling through the issuance of TPDES permits (USEPA, 2021).

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.

Both Salado Creek and the San Antonio River appear on the TCEQ 303(d) list as impaired waterways for impaired fish communities and macrobenthic communities (TCEQ, 2021a). Low oxygen concentrations in the waterbodies may harm fish and other aquatic life. Both streams are currently listed under 303(d) Category 5c, in which additional data or information will be collected and/or evaluated for one or more parameters before a management strategy is selected (TCEQ, 2020a).

#### *3.9.1.3 Wetlands*

The US Army Corps of Engineers (33 CFR § 328.3) and USEPA (40 CFR § 230.3) define wetlands as "… areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." Wetlands are a subset of Waters of the US, and those deemed "jurisdictional" are regulated under Section 404 of the CWA. When a federal agency proposed action requires a Section 404 wetlands permit, states are provided authority to enforce surface-water quality standards under Section 401 of the CWA by review of the proposed action and permit application. The natural-function benefits of wetlands include flood control, groundwater recharge, maintenance of biodiversity, wildlife habitat, recreational opportunities, and maintenance of water quality.

Wetlands and impoundments are located within JBSA-FSH. Impoundments are limited to small ponds and maintained golf course water features, which receive treated wastewater from off-site sources (Air Force, 2014b). JBSA-FSH contains 13 wetlands covering 7.84 acres (Air Force, 2020b); however, only 5 wetlands totaling 2.64 acres would be within 1,000 feet of proposed ADP projects (**Table 3-6**). These wetlands are in the Training District (**Figure 3-8**), generally following the areas containing floodplains associated with Salado Creek.

**Table 3-6**
**Wetlands within 1,000 feet of the Proposed Action**

| Class | Acres | Number of Wetlands | Percent of Total Wetlands |
|---|---|---|---|
| **Palustrine Wetlands** | | | |
| Emergent | 1.55 | 3 | 19.8 |
| Forested | 1.09 | 2 | 13.9 |
| **TOTAL** | **2.64** | **5** | **33.7** |

Source: JBSA, 2016

All five wetlands are classified as palustrine and make up approximately 33 percent of the total wetland acreage on JBSA-FSH Palustrine wetland systems include non-tidal wetlands that typically contain small

trees, shrubs, persistent emergent plants, emergent mosses, or lichens. Approximately 1.55 acres of the palustrine wetlands are classified as emergent, and 1.09 acres are classified as forested within 1,000 feet of the proposed ADP projects. Emergent wetlands are a class within these systems characterized by rooted, herbaceous plants that extend upward out of the water. Forested wetlands are primarily dominated by trees and vegetation that tolerate flooded conditions (Tetra Tech, 2016).

### *3.9.1.4 Stormwater Management*

Bexar County maintains a Stormwater Management Program that provides a roadmap for implementing stormwater quality management activities to improve runoff quality and maintain permit compliance. There are 1,602 acres of developed/urban land on JBSA-FSH, making up approximately 55 percent of the overall land use (Air Force, 2020b). Stormwater drains primarily north to south from the Base via Salado Creek into the Salado Creek Watershed. The western part of JBSA-FSH drains into a tributary of the San Antonio River; water from the western half of the Installation drains into the Upper San Antonio Watershed, and the southern and central portions drain into the City of San Antonio's stormwater drainage system (San Antonio River Authority [SARA], 2022). The existing stormwater infrastructure consists of a network of open channels, culverts, and storm sewers. Impoundments are located on the golf course as part of the course's water features (Air Force, 2020b).

Stormwater discharges from construction activities on JBSA-FSH 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 CGPs establish standard measures to prevent or minimize potential soil erosion and sedimentation from construction sites (TCEQ, 2021b).

Section 438 of the *Energy Independence and Security Act* (EISA) (42 USC § 17094) directs federal agencies to incorporate, to the maximum extent technically feasible, LID measures to maintain the pre-development hydrology of a site for projects involving 5,000 $ft^2$ or more of land disturbance. DoD technical criteria and requirements for compliance with Section 438 of EISA are provided in UFC 3-210-10, Change 1, *Low Impact Development*.

### *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 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 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 Zone X are either shaded to indicate the 500-year floodplain or unshaded to indicate a lower risk of flooding outside 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 avoid floodplains, to the maximum extent possible, when there is a practicable alternative. Where construction within the floodplain is unavoidable, development of a Finding of No Practicable Alternative (FONPA) document is required detailing no other alternatives. 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 constructed 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, 2022). In coordination with FEMA, SARA regulates floodplain use in Bexar County. The Authority also functions as a technical resource for floodplain management regionally.

On JBSA-FSH, 100-year floodplains, associated with Salado Creek and its tributaries, are in the central-to-northeast portion of the Base through the Training District and Service District (**Figures 3-8** and **3-9**). The Zone AE floodplain generally follows the path of Salado Creek and its tributaries north to south through the Base and are the predominant floodplain within the Installation boundary. Approximately 293 acres of Zone AE floodplain are located along a tributary of Salado Creek, which crosses north to south in the northeast corner of the Service District.

#### *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, 2022a). As defined by the TWDB, there are two “major” aquifers associated with Bexar County, the Trinity Aquifer and the Edwards (Balcones Fault Zone) Aquifer.

JBSA-FSH falls within the jurisdictional boundary of the Edwards Aquifer Authority (EAA). 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, and discharges to numerous springs throughout its reach. Because it primarily consists of partially dissolved limestone, the Edwards Aquifer is highly permeable. The water quality of the Edwards Aquifer is generally considered to be of a high quality and is primarily used as a source of potable water and agricultural irrigation; the City of San Antonio obtains approximately half of its water supply from the Edwards Aquifer (San Antonio Water System [SAWS], 2022). 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 (TWDB, 2022b, 2022c).

JBSA-FSH overlies a confined artesian zone of the Edwards Aquifer. Although the artesian zone falls within the jurisdictional boundary of the EAA, this area is not subject to any EAA rules or regulations (Air Force, 2020b).

The Edwards Aquifer is the primary source of water withdrawal for JBSA-FSH and has been designated by the USEPA as a sole-source aquifer. A sole-source aquifer supplies at least 50 percent of the drinking water for its service area with no feasible alternative (Air Force, 2020b).

### 3.9.2 Environmental Consequences

The Air Force defined a significant effect on 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;
- substantial changes to the volume, rate, or quality of stormwater discharges from a project site that degrade water quality, exceed pollutant TMDLs, and/or violate Section 438 of EISA, the conditions of JBSA-FSH's MS4 permit, or other applicable stormwater regulation or permit;
- development within a 100-year floodplain 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
- noncompliance with applicable stormwater management requirements, including erosion and sedimentation controls.

#### *3.9.2.1 No Action Alternative*

Under the No Action Alternative, the Air Force would not implement the Proposed Action, and no water resources on or around the proposed project sites would change. The built environment of JBSA-FSH would continue to deteriorate and become outdated for military use. Future development program projects would not be precluded under the No Action Alternative.

#### *3.9.2.2 Proposed Action*

**Watershed Management**
The Proposed Action would involve construction-related activities such grading and excavation. Some of these activities would occur within or immediately adjacent to water resources on JBSA-FSH. During construction, and for a period thereafter, soils would be exposed, increasing the potential for erosion and sedimentation of nearby surface waters. Short-term, negligible impacts would be expected during the construction period; no long-term, adverse impacts would be expected. The Proposed Action would not be anticipated to have significant adverse effects on the San Antonio River Basin.

When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-FSH, no significant cumulative effects on watershed management would be anticipated to occur with implementation of the Proposed Action.

**Surface Waters**
No surface waters would be directly impacted by implementation of the Proposed Action. Project activities would not occur within the footprint of existing surface waters and would not modify these resources directly. Exposed soils, project chemicals, solvents, and other construction materials, as well as surface-water runoff would be expected to occur during the proposed ADP projects; however, no significant impacts would be anticipated under the Proposed Action.

The implementation of BMPs to control surface runoff from construction activities would reduce sedimentation potential and minimize opportunities for surface-water contamination. Contractors would maintain construction laydown areas, and erosion potential would be minimized through BMPs, limiting the runoff potential into surface waters.

Long-term, adverse impacts to surface water would not be expected at JBSA-FSH. When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-FSH, no significant cumulative effects on surface waters would be anticipated to occur with implementation of the Proposed Action.

**Water Quality**

Under the Proposed Action, no projects would directly impact water quality at JBSA-FSH. Dependent on distance and localized environmental conditions such as erodibility and permeability of soils, slope, and imperviousness, stormwater runoff generated at the proposed ADP project sites may have the potential to indirectly impact downstream resources. The level of potential effects from sediments or contaminants transported overland in runoff and discharged to surface waters would depend on many factors.

However, the Air Force would prevent and reduce potential effects to the extent practicable by requiring that construction contractors obtain applicable TPDES permit(s), including a CGP for sites that individually or collectively disturb 1 or more acre of land. The CGP would identify measures to prevent and minimize stormwater discharges during construction and, when appropriate, require preparation of a TCEQ-approved SWP3. Because SWP3s and other TPDES stormwater requirements would be required for each individual project site under the Proposed Action, the measures would account for localized environmental conditions and other determinants of water quality. With these measures in place, potential adverse effects on surface waters from most of the involved projects would be minor and short term. Revegetation with native grasses, shrubs, and trees post-construction would ensure potential long-term effects do not occur or are negligible.

To comply with Section 438 of EISA, LID measures would be incorporated into the applicable projects of the Proposed Action to the maximum extent technically feasible. These design measures would help to maintain or restore stormwater runoff such as the temperature, rate, volume, and duration of surface flows. Each of the involved project sites would use an analysis of pre-development hydrology to establish a baseline condition and set design objectives for stormwater management. Under the Proposed Action, 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 JBSA-FSH).

Most proposed projects would occur in previously developed and highly industrial areas away from surface waters. Projects C26, C27, C28, and C29 would construct new facilities in a previously undeveloped portion of the Service District, approximately 0.25 mile from Salado Creek. Changes to overall water quality would be minimal and short term, centered around construction and demolition projects. BMPs to control surface runoff from construction activities would minimize the opportunities for sediment to contaminate stormwater and surface water.

Long-term, adverse impacts to water quality would not be expected at JBSA-FSH. When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-FSH, no significant cumulative effects on water quality would be anticipated to occur with implementation of the Proposed Action.

**Wetlands**

No project activities under the Proposed Action would directly impact the identified wetlands at JBSA-FSH. Project C12 would be located adjacent to an emergent wetland, SAM06 (**Figure 3-8**). Work would consist of constructing a pedestrian bridge across the nearby roadway. Work would not be likely to expand beyond the immediate footprint of the roadway bridge, and adverse impacts to the wetland would not be expected to occur. Additionally, the construction of a pedestrian bridge would provide pedestrian access across Williams Way, reducing the potential for pedestrian traffic to stray from approved paths to find a suitable road crossing, causing potential impacts to this wetland.

Potential effects on wetlands would be managed by project design and implementation of BMPs. Indirect impacts to wetlands would have the potential to occur as a result of water runoff, erosion, and sedimentation; however, the Air Force would attempt to minimize indirect impacts through the use of BMPs.

Long-term, adverse impacts to wetlands would not be expected at JBSA-FSH. When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-FSH, no significant cumulative effects on wetlands would be anticipated to occur with implementation of the Proposed Action.

**Stormwater Management**

The demolition of outdated structures coupled with the construction of new facilities under the Proposed Action would increase the amount of impermeable surface by approximately 1,000,000 $ft^2$. The Installation is already highly developed; however, this increase in impervious surface would potentially increase the amount of stormwater runoff. The Installation's infrastructure of channels, culverts, and storm sewers that lead to Salado Creek, San Antonio River, and the City of San Antonio stormwater drainage would have adequate capacity for the additional stormwater runoff. When considered in conjunction with other past, present, and reasonably foreseeable planned actions at JBSA-FSH, no significant cumulative effects on stormwater management would be anticipated to occur with implementation of the Proposed Action.

**Floodplains**

The Air Force has determined that Base infrastructure necessitates development within or near the 100-year floodplains at JBSA-FSH. When this occurs, alternative sites are considered to avoid or minimize potential adverse effects on floodplain resources. The planning process for this Proposed Action began with development of the ADP and discussions on where to site infrastructure, including issuance of an EPN specifically to solicit input on potential impacts to floodplains and wetlands from the Proposed Action (see **Appendix B**). The resultant location recommendations considered multiple factors, including mission, safety, and relevant environmental constraints. Only Project I4, the relocation of Binz-Engleman Access Control Point (ACP), would occur directly within a regulatory floodplain; no other projects under the Proposed Action would impact regulatory floodplains.

Project I4 would be located fully within the Zone AE floodplain, directly impacting approximately 1.22 acres. Project I4 was determined necessary to move the ACP gate closer to the Base perimeter, improving safety, security, and flow of traffic (Air Force, 2018b). The results of a floodplain analysis show that the proposed project would not be anticipated to increase the surface elevations and there would be no rise in the floodplain water levels from the ACP improvements associated with this action (Gonzalez De La Garza and Associates, LLC, 2013).

The Air Force evaluated additional options for project locations during the ADP planning process. However, the nature of the relocation project involves the construction or renovation of infrastructure specifically in place to traverse these areas. Due to various planning constraints and the complexity of other factors, such as land use and the military mission, no other practicable alternatives for siting these projects were identified under the Proposed Action.

No other projects at JBSA-FSH occur directly in floodplains. Potential impacts from construction or demolition activities within the mapped floodplains would be minimal, short term, and managed by implementation of BMPs. When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-FSH, no significant cumulative effects to floodplains would be anticipated to occur with implementation of the Proposed Action.

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. The FONPA also identifies and documents the measures the Air Force would take to avoid and minimize adverse effects.

**Groundwater**

Construction, demolition, and infrastructure activities associated with the Proposed Action would create the potential for contaminants to leach or discharge to groundwater of the Edwards Aquifer. All projects at JBSA-FSH would occur within the confined artesian zone of the Edwards Aquifer, which has a low potential for permeability of surface water; JBSA-FSH is not subject to any EAA rules or regulations. Therefore, contamination from surface- and stormwater runoff would be unlikely to have a significant adverse effect on the groundwater supply or quality in the ROI. With BMPs in place, potential adverse effects on groundwater resources under the Proposed Action would be minor and short term.

Under the Proposed Action, reasonably foreseeable development plans and projects within and around the San Antonio metropolitan area also would be subject to regulation under the NPDES permitting program. These regulatory compliance measures would serve to prevent or minimize potential effects on water

resources from development on a regional scale. Therefore, in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-FSH, potential cumulative effects on water resources would not be likely to occur.

### 3.9.3 Best Management Practices and Mitigation Measures

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

- Comply with JBSA environmental specifications during construction projects.
- Comply with Sections 404/401 of the CWA including any site-specific BMPs established through the permitting process.
- Construction sites are inspected for proper use and implementation of stormwater pollution prevention BMPs.
- Prior to construction, obtain an applicable TPDES permit to manage stormwater on a site-specific basis; prepare a TCEQ-approved SWP3 and submit an NOI as appropriate; and adhere to permit conditions during construction to minimize soil erosion, sedimentation, and compaction under the Proposed Action.
- Comply with Section 438 of EISA to maintain the pre-development hydrology of each applicable project site to the maximum extent technically feasible and 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 mitigation measures for potential effects on water resources under the Proposed Action are recommended.

## 3.10 Biological Resources

Biological resources include native or invasive 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-FSH (Air Force, 2020b). 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.

The ROI for biological resources includes JBSA-FSH and the immediately adjacent areas that contain sensitive or beneficial natural resources. No adverse impacts on biological resources would be anticipated beyond the ROI.

### 3.10.1 Existing Conditions

JBSA-FSH resides within the Texas Blackland Prairie ecoregion. An ecoregion is geographically defined by an area with similar atmospheric and environmental conditions. Texas Blackland Prairies is a subsection of the South Central Semi-Arid Prairies characterized by a mild, humid, and subtropical climate. The ecoregion is now urbanized but was historically covered in tallgrass prairies. Much of this land is low to moderate in grade and currently supports low wildlife and vegetative diversity.

#### *3.10.1.1 Vegetation*

Approximately 55 percent of total land area on JBSA-FSH is developed. Vegetation within these portions of the Base primarily consists of managed grasses and varying types of ornamental plants and trees, including native and non-native species. Maintained grass areas associated with the built environment typically support the military population working or living on the Base (e.g., community or recreational areas). Common vegetative species on JBSA-FSH include ball moss (*Tillandsia recurvata*), Bermuda grass (*Cynodon dactylon*), frostweed (*Verbesina virginica*), mistletoe (*Phoradendron tomentosum*), and Spanish moss (*Tillandsia usneoides*).

Undeveloped and unimproved lands on JBSA-FSH contain woodland and forest vegetation. These lands are primarily associated with the eastern portions of JBSA-FSH, in the Training District and Service District, and follow much of Salado Creek through the Installation (Air Force, 2020b).

#### *3.10.1.2 Wildlife Species and Habitat*

There is limited habitat availability for wildlife and fish species on JBSA-FSH because the majority of land on the Installation is developed. Impervious surfaces, infrastructure, and lack of vegetation require species to adapt to urban landscapes; however, habitat to support wildlife exists within the riparian areas that run along Salado Creek. The Installation contains both native and non-native species, including birds such as robins, sparrows, vultures, crows and hawks, and grackles; mammals such as bats, rabbits and squirrels, and coyotes; and various reptiles and amphibians. Installation-specific species are recorded in the appendices of the JBSA INRMP (Air Force, 2020b).

Non-native, nuisance species of wildlife and insects on JBSA-FSH are managed in accordance with JBSA's *Integrated Pest Management Plan* (Air Force, 2017b). BSA has implemented measures to reduce the attractiveness and suitability of habitat for non-native, nuisance species. The red imported fire ant (*Solenopsis invicta*) is the primary invertebrate pest species subject to management on JBSA-FSH.

#### *3.10.1.3 Threatened and Endangered Species*

Threatened and endangered species include plants and animals that receive protection under federal or state laws and regulations. These include the ESA and the Texas Parks and Wildlife Code (Title 5, Chapters 67 and 68). No plant or animal species protected under state or federal law are known to occur on or adjacent to JBSA-FSH; however, several species are known to exist in Bexar County and may be observed in the vicinity of the Base, especially along Salado Creek (**Table 3-7**).

Eleven federal- and/or state-listed species may be impacted by JBSA's withdrawal from the Edwards Aquifer. JBSA currently has one final Biological Opinion in place, *The Effects of JBSA Water Draw on Listed Species of the Edwards Aquifer* (Consultation No. 02ETAU00-2013-F-0060). The Biological Opinion pertains to water draw limits for all JBSA, including any new landscaping, and addresses effects of JBSA water withdrawal from the Edwards Aquifer on federally protected species. Under this Biological Opinion, JBSA must follow the *Critical Period Management Plan* for aquifer-dependent listed species.

Critical species habitat in Bexar County coincides with many cave-dwelling and insect species. These species have not been observed on JBSA-FSH; thus, further consideration of critical species habitat is not needed.

#### *3.10.1.4 Migratory Birds*

Migratory birds are protected under the MBTA as well as EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*. JBSA-FSH has limited habitat for birds within the developed portions of the Installation; however, habitat to support both year-round and migratory birds exists within the riparian areas that run along Salado Creek. Some protected birds may even use man-made structures and landscape for nesting. Migratory patterns would have the potential to overlap with JBSA-FSH. According to the USFWS'

*Birds of Conservation Concern 2021* and the JBSA INRMP appendices, no birds of conservation concern have been observed at JBSA-FSH (USFWS, 2021).

**Table 3-7**
**Threatened or Endangered Species within Bexar County, Texas**

| Common Name | Scientific Name | Federal Status | State Status |
|---|---|---|---|
| **Birds** | | | |
| Golden-cheeked warbler | *Setophaga chrysoparia* | E | E |
| Least tern | *Sterna antillarum* | E | E |
| Piping plover | *Charadrius melodus* | T | T |
| Red knot | *Calidris canutus rufa* | T | T |
| Whooping crane | *Grus americana* | E | E |
| Wood stork | *Mycteria americana* | E | T |
| Tropical parula | *Setophaga pitiayumi* | - | T |
| White-faced Ibis | *Plegadis chihi* | - | T |
| Zone-tailed hawk | *Buteo albonotatus* | - | T |
| **Amphibians** | | | |
| San Marcos salamander | *Eurycea nana* | T | T |
| Texas blind salamander | *Eurycea rathbuni* | E | E |
| **Reptiles** | | | |
| Texas horned lizard | *Phrynoxoma cornutum* | - | T |
| Texas indigo snake | *Drymarchon malanurus erebennus* | - | T |
| Texas tortoise | *Gopherus berlandieri* | - | T |
| Cagle's map turtle | *Graptemys caglei* | - | T |
| **Fish/Crustaceans** | | | |
| Fountain darter | *Etheostoma fonticol* | E | - |
| Peck's cave amphipod | *Stygobromus pecki* | E | - |
| Texas fatmucket | *Lampsilis bracteata* | C | - |
| Texas pimpleback | *Quadrula petrina* | C | - |
| Toothless blindcat | *Trogloglanis pattersoni* | - | T |
| Widemouth blindcat | *Satan eurystomus* | - | T |
| **Mammals** | | | |
| Black bear | *Ursus americanus* | - | T |
| White-nosed coati | *Nasua narica* | - | T |
| **Insects** | | | |
| Ground beetle [unnamed] | *Rhadine exilis* | E | - |
| Ground beetle [unnamed] | *Rhadine infernalis* | E | - |
| Comal Springs dryopid beetle | *Stygoparnus comalensis* | E | - |
| Comal Springs riffle beetle | *Heterelmis comalensis* | E | - |
| Helotes mold beetle | *Batrisodes venyivi* | E | - |
| Monarch butterfly | *Danaus plexippus* | C | - |
| **Arachnids** | | | |
| Braken bat cave meshweaver | *Cicurina venii* | E | - |
| Cokendolpher cave harvestman | *Texella cokendolpheri* | E | - |
| Government Canyon bat cave meshweaver | *Cicurina vespera* | E | - |
| Government Canyon bat cave spider | *Neoleptoneta microps* | E | - |
| Madla's cave meshweaver | *Cicurina madla* | E | - |
| Robber Baron cave meshweaver | *Cicurina baronia* | E | - |
| **Flowering Plants** | | | |
| Bracted twistflower | *Streptanthus bracteatus* | C | - |
| Texas wild-rice | *Zizania texana* | E | - |

Source: USFWS and TPWD correspondence in **Appendix A** of this EA.
C = Candidate; E = Endangered; F = Federal; S = State; SC = Special Concern; T = Threatened

## 3.10.2 Environmental Consequences

Potential adverse effects on biological resources would depend on factors unique to an individual or population of plant(s) or animal(s). These include the resource's value or importance to humans (e.g., commercial, recreational, ecological, and scientific); legal status under federal, state, or local law and/or international treaty; range and abundance across geography or jurisdiction; and vulnerability or sensitivity to a particular activity considering distance from source, exposure duration, and a myriad of other variables.

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

- mortality or diminishment of regionally or locally important plant or animal species;
- substantial amount of vegetation removal from riparian habitats;
- direct loss or substantial degradation of terrestrial (e.g., fragmentation) or aquatic (e.g., wetlands) habitats; and
- an adverse effect on the recovery of a federally listed or candidate species.

### *3.10.2.1 No Action Alternative*

Under the No Action Alternative, the Air Force would not implement the Proposed Action, and biological resources at JBSA-FSH would continue to be managed in accordance with the JBSA INRMP guidelines. The built environment of JBSA-FSH would continue to deteriorate and become outdated for military use. Future development program projects would not be precluded under the No Action Alternative.

### *3.10.2.2 Proposed Action*

Construction projects involving new buildings and structures have the potential to impact biological resources through new land disturbances. Infrastructure projects typically involve renovation and maintenance on existing buildings and structures and are less likely to create new disturbances and potential impacts.

**Vegetation**
Under the Proposed Action, effects to native or non-native plant species would be minimal. Although portions of JBSA-FSH remain undisturbed, the projects under the Proposed Action would occur in previously developed areas and any impacts to undisturbed vegetation would be short term and temporary. Minor impacts to the natural environment would occur through paving new roadway features in the Commercial District (Projects C3 and C6), installing sidewalks (Projects C10, C13, and C15) in the Training District, and constructing new facilities in all three planning districts. Impervious surface would increase by approximately 1,000,000 $ft^2$ and further reduce the vegetation by an equivalent amount. Approximately 550,000 $ft^2$ of this total would be associated with Projects C23 and C25 and take place in a forested area in the southeastern part of the Service District. The remaining actions would reduce the amount of maintained grasses within the developed areas by approximately 450,000 $ft^2$. Despite minor anticipated losses of vegetative cover that would occur under the Proposed Action, significant adverse impacts to the function of vegetation within the Installation would not be anticipated.

**Wildlife Species and Habitat**
Adverse effects to wildlife species and habitat would not be anticipated under the Proposed Action. JBSA-FSH is mostly developed and located in an urbanized environment not suitable for diverse species habitation. No long-term, adverse impacts to the wildlife present on the Installation would be expected.

**Threatened or Endangered Species**
Federally listed threatened or endangered species are not known to occur within the boundaries of the Installation; therefore, the Proposed Action at JBSA-FSH would be anticipated to have no effect on these species. Water consumption from Edwards Aquifer would not be anticipated to change substantially, and

the 11 federally and/or state-listed species within Edwards Aquifer would not be impacted by any minor changes.

The potential occurrence of state-listed species in the project area is primarily dependent upon the availability of suitable habitat; there would be the potential to encounter state-protected species within the undeveloped portions of JBSA-FSH along Salado Creek. These species could potentially include state-protected reptile species, such as the Texas horned lizard (*Phrynosoma cornutum*), Texas indigo snake (*Drymarchon malanurus erebennus*), Texas tortoise (*Gopherus berlandieri*), or the Cagle's map turtle (*Graptemys caglei*), all of which have been known to occur within Bexar County and may have suitable habitat within JBSA-FSH along Salado Creek. State-listed reptiles that are typically slow moving or unable to move due to cool temperatures are especially susceptible to being directly impacted during site preparation activities.

Small wildlife such as lizards, turtles, and snakes are susceptible to falling into open pits, excavations, and trenches left open and/or uncovered in a project area. The capture, trap, take, or killing of state-listed threatened and endangered animal species is unlawful unless expressly authorized under a USFWS- or TWPD-issued permit. The construction contractor would take measures to minimize interference, disturbance, or damage to wildlife species in areas where risk of encountering the species would be greater.

**Migratory Birds**

Environmental specifications would be followed for the protection of migratory birds due to the potential for migratory patterns to intersect with JBSA-FSH. The JBSA INRMP details construction restrictions in place to protect migratory birds during the bird breeding season, which generally occurs 1 March through 15 September. Restrictions during this period aim to reduce disturbance of bird habitat and include limitations on vegetation and brush removal, vehicle use, equipment locations and duration of use, and the use of chemical substances. Avoidance during this time would reduce the likelihood of an incidental take. Outside of the breeding season (16 August through 28 February), vegetation and brush removal and vehicle use are still restricted. Under the Proposed Action, construction and demolition activities would proceed under the terms of the existing restrictions in order to minimize the potential for impacts to migratory birds.

Under the Proposed Action, conservation laws and initiatives would continue to limit, control, or guide development in a manner that protects natural resources in the public interest. JBSA-FSH would continue to maintain and implement a USFWS-approved INRMP. These measures would ensure that biological resources on and around JBSA-FSH would be maintained at levels commensurate with the objectives of the natural resources management plans. Therefore, when considered in conjunction with other, past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-FSH, potential cumulative effects on biological resources would not be likely to occur.

### 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:

- Comply with JBSA environmental specifications during construction projects.
- Revegetate disturbed areas with native species; TPWD recommends incorporating pollinator conservations and management into revegetation and landscaping plans.
- Limit or avoid construction (e.g., tree removal or noise-intensive activities) within the nesting season of migratory birds observed on or near project sites.
- Design, construct, and maintain project-specific stormwater management features to the benefit of wildlife habitat, when applicable and possible.
- Paint all oak tree trimmings or accidental damage to reduce the spread of Oak Wilt.
- Limit vegetation trimming to fall and winter months.

- Follow JBSA *Critical Period Management Plan*.

No mitigation measures for potential effects on biological resources under the Proposed Action are recommended.

## 3.11 CULTURAL RESOURCES

Cultural resources are any prehistoric or historic district, site, building, structure, or object considered important to a culture or community for scientific, traditional, religious, or other purposes. These resources are protected and identified under several federal laws and EOs. Cultural resources include the following subcategories:

- Archaeological (i.e., prehistoric or historic sites where human activity has left physical evidence of that activity, but no structures remain standing);
- Architectural (i.e., buildings, structures, groups of structures, or designed landscapes that are of historic or aesthetic significance); and
- Traditional Cultural Properties (TCPs) (resources of traditional, religious, or cultural significance to Native American Tribes).

Significant cultural resources are those that have been listed on the National Register of Historic Places (NRHP) or determined to be eligible for listing. To be eligible for the NRHP, properties must be 50 years old and have national, state, or local significance in American history, architecture, archaeology, engineering, or culture. They must possess sufficient integrity of location, design, setting, materials, workmanship, feeling, and association to convey their historical significance, and meet at least one of four criteria for evaluation:

A Associated with events that have made a significant contribution to the broad patterns of our history

B Associated with the lives of persons significant in our past;

C Embody distinctive characteristics of a type, period, or method of construction, or represent the work of a master, or possess high artistic values, or represent a significant and distinguishable entity whose components may lack individual distinction; and/or

D Have yielded or be likely to yield information important in prehistory or history.

Properties that are less than 50 years old can be considered eligible for the NRHP under Criterion G if they possess exceptional historical importance. Those properties must also retain historic integrity and meet at least one of the four NRHP criteria (Criteria A, B, C, or D). The term “historic property” refers to National Historic Landmarks, NRHP-listed, and NRHP-eligible cultural resources.

Federal laws protecting cultural resources include the *Archaeological and Historic Preservation Act of 1960*, as amended (54 USC § 300101 et seq.), the *American Indian Religious Freedom Act of 1978* (42 USC § 1996), the *Archaeological Resources Protection Act of 1979*, as amended (16 USC §§ 470aa–470mm), the *Native American Graves Protection and Repatriation Act of 1990* (25 USC §§ 3001–3013), the NHPA, as amended through 2016, and associated regulations (36 CFR Part 800). The NHPA requires federal agencies to consider effects of federal undertakings on historic properties prior to making a decision or taking an action and integrate historic preservation values into their decision-making process. Federal agencies fulfill this requirement by completing the NHPA Section 106 consultation process, as set forth in 36 CFR Part 800. NHPA Section 106 also requires agencies to consult with federally recognized Native American Tribes with a vested interest in the undertaking. NHPA Section 106 requires all federal agencies to seek to avoid, minimize, or mitigate adverse effects to historic properties (36 CFR § 800.1(a)).

For cultural resources analysis, the ROI is defined by the APE. The APE is defined as the “geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of

historic properties, if any such properties exist" (36 CFR § 800.16(d)) and thereby diminish their historic integrity. The direct and indirect APE for JBSA-FSH for this EA includes 50 meters and 0.5-mile around each project location, respectively.

The ROI for cultural resources is commensurate with the APE for the Proposed Action. No adverse impacts on cultural resources would be anticipated beyond the ROI.

### 3.11.1 Existing Conditions

Under the NHPA, "significant" cultural resources are those listed or determined eligible for listing on the NRHP. Historic properties 50 years or older that have national, state, or local significance in American history, architecture, archaeology, engineering, or culture are potentially eligible for listing on the NRHP; however, properties less than 50 years old that possess exceptional historical importance may also qualify as eligible for listing.

Under the NHPA, a property or site to be listed or eligible for listing on the NRHP must possess sufficient integrity of location, design, setting, materials, workmanship, feeling, and association, and meet one or more of the NRHP significance criteria (54 USC § 302103).

Section 106 requires federal agencies to consider and assess the effects an undertaking may have on historic properties. It also requires federal agencies to consult with the SHPO to avoid, reduce, or minimize adverse effects. Further, federal agency consultations under Section 106 provide an opportunity for public involvement. The SHPO, federally recognized Native American Tribes, representatives of local governments, other federal agencies with jurisdiction related to the undertaking, and individuals and organizations with a demonstrated interest in the undertaking may participate in the Section 106 process as "consulting parties." Through the scoping process for this EA, these stakeholders were identified and invited to participate in the Section 106 and EIAP processes for the Proposed Action.

In accordance with 36 CFR Part 800, the Air Force fulfills its obligations under Section 106 at JBSA by PA with the Texas SHPO. The PA applies to operation, maintenance, and development activities on 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-FSH. The PA also identifies development program activities that are "exempted" from Section 106 requirements.

#### *3.11.1.1 Archaeological Resources*

Twelve archaeological sites have been identified in total across JBSA-FSH through survey. Seven of the sites are prehistoric, three are historic, and two are multicomponent. All 12 sites have been determined not eligible for listing in the NRHP through consultation with the Texas SHPO (Air Force, 2020c).

#### *3.11.1.2 Architectural Resources*

A large section of JBSA-FSH was recognized as a National Historic Landmark District (NHLD) in 1975 and was later designated as a National Historic District, recognizing the historic military significance of the facility beginning with its physical establishment in 1875 through 1924. The district encompasses the historic Quadrangle and Staff Post, the Infantry Post, and the Cavalry and Light Artillery Post on the western end of the Installation (**Figures 3-10–3-12**). There are 113 historic buildings and structures within the district (Air Force, 2018d). In addition to serving as contributing elements of the NHLD, four buildings are individually listed on the NRHP: Quadrangle, Pershing House, Post Chapel, and Brooke Army Medical Center (Air Force, 2020c).

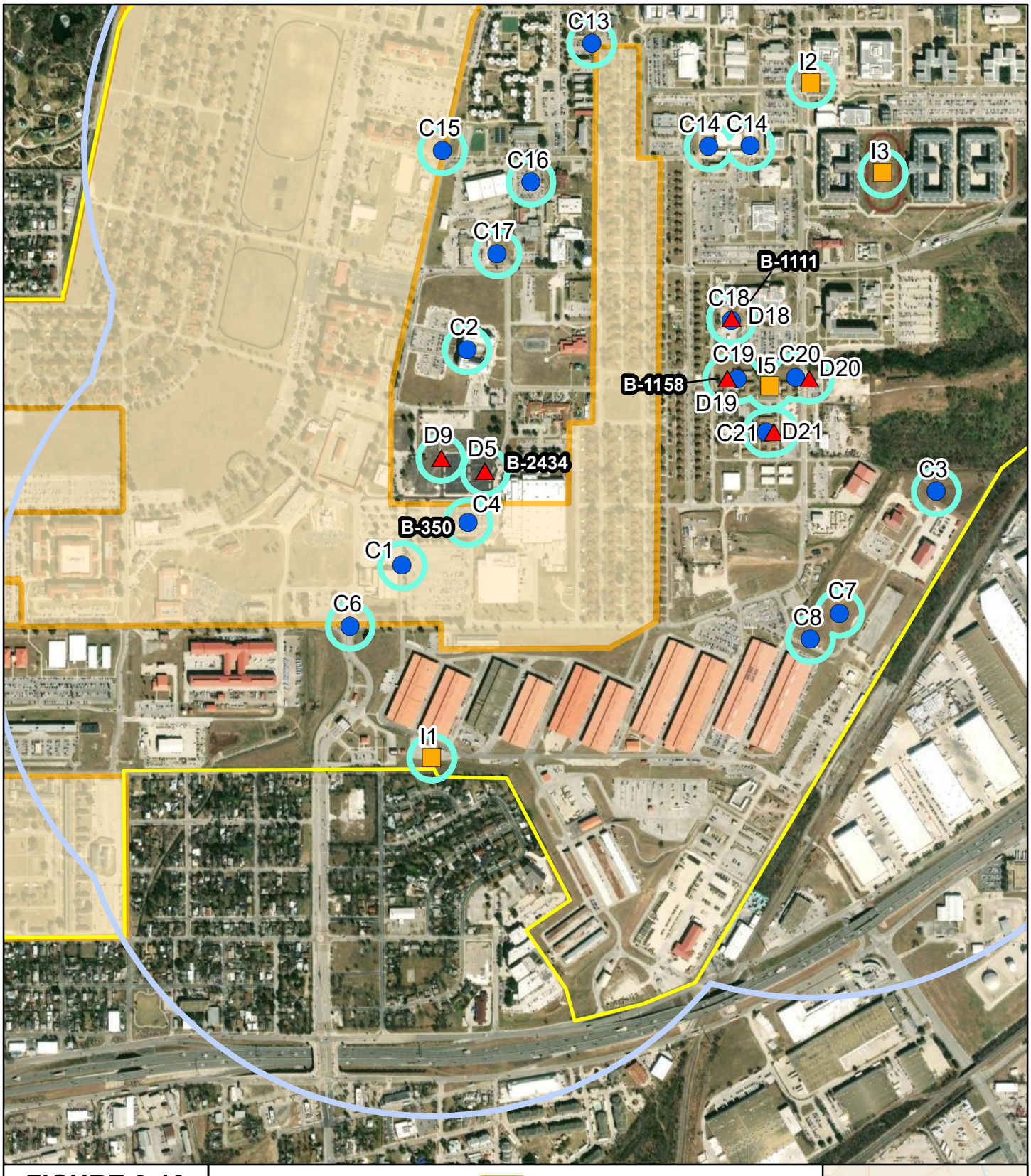



**FIGURE 3-10**
CULTURAL RESOURCES – COMMERCIAL DISTRICT

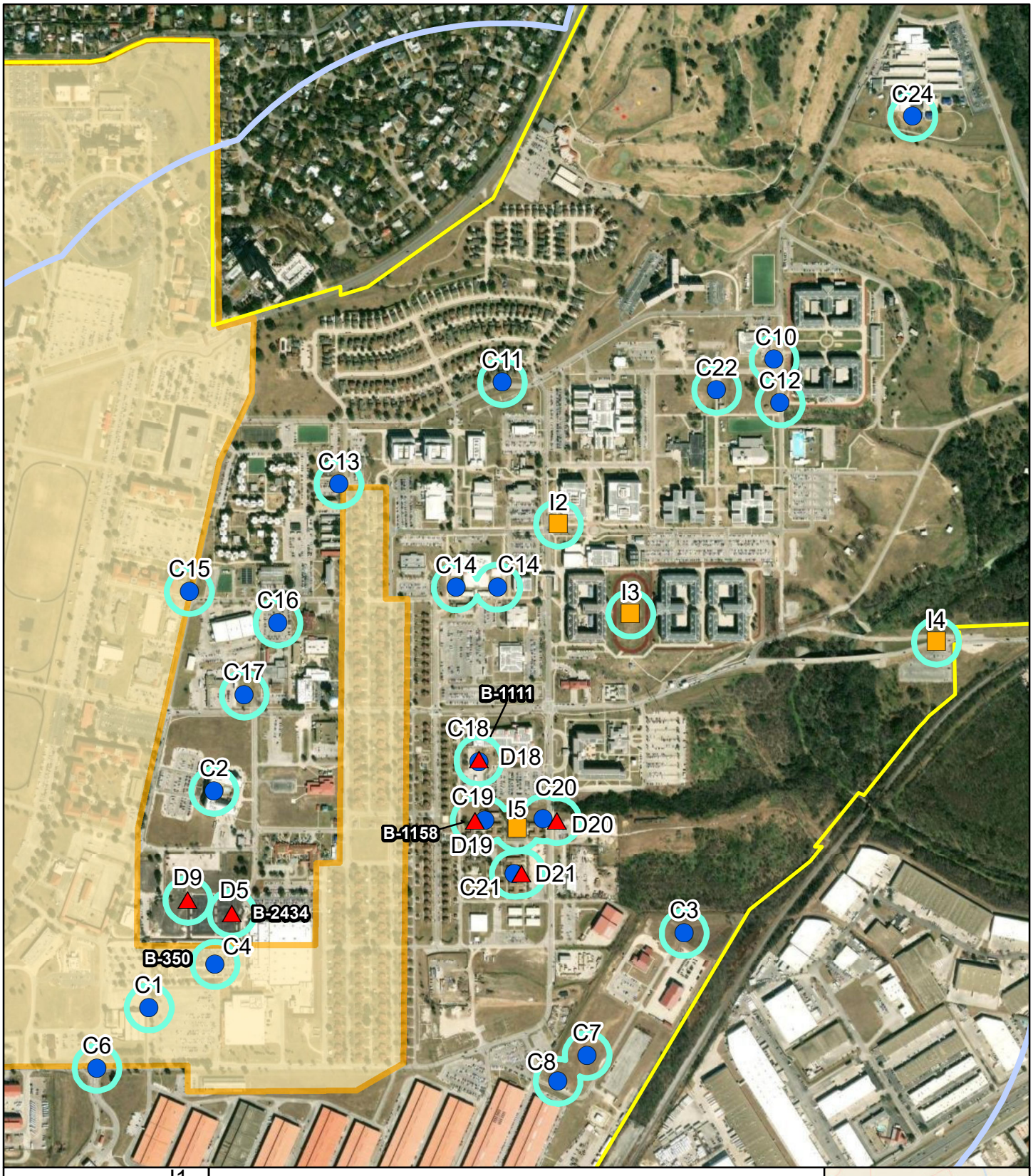



**FIGURE 3-11**
CULTURAL RESOURCES – TRAINING DISTRICT


**FIGURE 3-12**
CULTURAL RESOURCES – SERVICE DISTRICT

N

Imagery: ESRI 2021
Projection: WGS 1984
Zone 14N

0 0.1 0.2 Miles

Construction
Demolition
Infrastructure

JBSA - Fort Sam Houston
50-meter Direct APE
800-meter Indirect APE

JBSA-FSH

A draft nomination was prepared in 2002 for the expansion of the NHLD to include the New Post area (Geo-Marine, as cited in Air Force, 2020c). The nomination served as a management tool to clarify contributing and non-contributing properties within the NHLD and delineate a potential expanded area that encompasses the current Conservation District. While the SHPO did not accept the proposal to add the Conservation District to the established JBSA-FSH National Historic District, the integrity of the established district remains intact, and an independent stand-alone Conservation District was created. Conservation districts are not recognized NRHP nomenclature; the term acts as a precursor to district evaluation for eligibility (Air Force, 2020c). The Conservation District at JBSA-FSH is located in the northwestern portion of the Installation, and includes the old parade fields, housing, and other historic structures on the north side of Wilson Way.

Structures that fall outside the boundaries of the Historic District and the Conservation District, but that are individually eligible for the NRHP, are located primarily in the southeastern corner of the Installation.

A full inventory of the NRHP properties that are either individually eligible, listed, or contributing is recorded in the JBSA *Integrated Cultural Resources Management Plan* (ICRMP) appendices (Air Force, 2020c). JBSA Cultural Resources also maintains a list of properties that are reviewed as historic, despite not being listed on the NRHP.

#### *3.11.1.3 Historic Landscape*

Historic landscapes are important for maintaining features of historic properties that are not individually eligible but are still critical to defining the look and feel of a historic area. These features can include sidewalks, gazebos, curbs, fences, road alignments, or even the historic function of a property. The US Army Construction Engineering Research Laboratory, in collaboration with the University of Illinois at Champaign/Urbana, Department of Landscape Architecture, prepared a historic landscape management plan to guide future landscape planning to protect the historic fabric of the landscapes surrounding the Quadrangle, Staff Post, Infantry Post, Calvary and Artillery Post, and New Post.

For any proposed undertaking involving a National Historic Landmark property that the Air Force and SHPO determines does not meet the *Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation* and constitutes an "adverse effect" under 36 CFR § 800.5, the National Park System shall be invited to participate in consultation in compliance with 36 CFR § 800.10(c).

#### *3.11.1.4 Native American Sacred Sites and Properties of Traditional and Religious Cultural Importance*

Native American tribes identified as having a historical association with the JBSA area include four federally recognized tribes: Comanche Nation, Oklahoma; Mescalero Apache Tribe of the Mescalero Reservation, New Mexico; Tonkawa Tribe of Indians of Oklahoma; and Wichita and Affiliated Tribes (Wichita, Keechi, Waco, and Tawakonie), Oklahoma. Three tribes—Comanche Nation, Mescalero Apache, and Tonkawa—have been identified as having an interest in area activities and historic properties; the Air Force consults with them on federal actions occurring at JBSA.

JBSA-FSH began preparation of standard operating plans in 1999 in consultation with the tribes that have a potential cultural affiliation with the geographic region of the Installation. Consultation resulting in a formal agreement was completed in 2005 between the US Army and the federally recognized tribes. This agreement took the form of multiple NAGPRA-related standard operation plans (Air Force, 2020c). The Air Force maintains continued government-to-government communication to ensure compliance with applicable regulations.

### 3.11.2 Environmental Consequences

Adverse impacts on cultural resources might include physically altering, damaging, or destroying all or part of a resource; altering characteristics of the surrounding environment that contribute to the resource's

significance; introducing visual or audible elements that are out of character with the property or alter its setting; neglecting the resource to the extent that it deteriorates or is destroyed; or the sale, transfer, or lease of the property out of agency ownership (or control) without adequate enforceable restrictions or conditions to ensure preservation of the property's historic significance. For the purposes of this EA, an impact is considered significant if it alters the integrity of a NRHP-listed, eligible, or potentially eligible resource or potentially impacts TCPs.

Potential adverse impact(s) on cultural resources would include an "adverse effect" on above- or below-ground historic resources, as determined in consultation with the Texas Historical Commission under Section 106 of the NHPA.

### *3.11.2.1 No Action Alternative*

Under the No Action Alternative, the Air Force would not implement the Proposed Action, and cultural resources at JBSA-FSH would continue to be managed in accordance with the JBSA ICRMP guidelines. The built environment of JBSA-FSH would continue to deteriorate and become outdated for military use. Future development program projects would not be precluded under the No Action Alternative.

### *3.11.2.2 Proposed Action*

**Archaeological Resources**
No projects would occur within the direct APE of any identified archaeological resources under the Proposed Action. In the event of an unanticipated discovery of an archaeological resource during demolition or construction, ground-disturbing activities would be suspended, and a cultural resources meeting called to determine if an unanticipated discovery plan would be developed and implemented.

**Architectural Resources**
Projects C1, C4, and C6 would involve construction of new buildings and roadwork within the Conservation District (**Figure 3-10**). Construction of a roundabout and new structures would have the potential to alter the existing visual features of this district. Each of these projects would be required to have 35-percent design plans submitted to JBSA Cultural Management for approval prior to the start of any construction activity. Any potential for impacts to the Conservation District would be minimized through design and BMPs.

Project C2 would construct two phases of a new hotel just outside of the Conservation District; however, this location would be surrounded on three sides by the district boundaries. The Conservation District boundaries would be within approximately 0.1 mile of the project and fall within the indirect APE of the action (**Figure 3-10**). A consultation package was previously developed for this project and concurred upon by SHPO for project implementation.

Multiple individually eligible or contributing properties would be demolished under the Proposed Action (**Table 3-8**). Proposed Projects D5, D9, C18/D18, and C19/D19 would require SHPO consultation for the demolition of eligible buildings.

**Table 3-8**
**Individually Listed and Eligible Architectural Resources within Direct APE**

| Project ID | Building Number | Description | Year Built | Eligibility |
|---|---|---|---|---|
| D5 | 2434 | Administrative Office, Non-Air Force | 1972 | NREI |
| D9 | 350 | Exchange Sales Store | 1991 | NREI |
| C18/D18 | 1111 | Warehouse, Transit Cargo | 1967 | NREI |
| C19/D19 | 1158 | Technical Training Classroom | 1967 | NREI |

NREI = National Register individually eligible

The remaining projects under the Proposed Action would not involve individually historic properties and would not take place within the boundaries of historic districts. JBSA maintains a PA with the Texas SHPO for the management of cultural resources on its properties. The PA outlines procedures and protocols within and between the parties for this purpose, including the Section 106 consultations under the NHPA. The current PA is in effect through January 2023. Per the terms of the PA, Projects C3, C7, C8, C10, C11, C12, C13, C14, C15, C16, C17, C20/D20, C21/D21, C22, C23, C25, C26, C27, C28, C29, I2, I3, I4, I5, and I6 would require no further consultation with the SHPO. Implementation of these projects would be anticipated to have "No Effect" on architectural resources at JBSA-FSH.

The need for additional SHPO consultation would be evaluated on a project-level basis by JBSA Cultural Resources as individual ADP project plans are developed. The applicability of the existing PA and eligibility determinations would be considered, and where adverse effects to eligible resources could not be avoided, JBSA would develop mitigation measures acceptable to the SHPO. With the SHPO's acceptance of mitigation measures, individual Section 106 Memorandum of Agreement would not be needed under the PA.

**Historic Landscape**
Implementation of the Proposed Action would not be anticipated to cause direct or indirect adverse effects to the NHLD. Proposed projects would not be expected to alter the viewshed of these resources. It is anticipated the implementation of the Proposed Action would result in "No Effect" to historic landscape features at JBSA-FSH.

**Native American Sacred Sites and Properties of Traditional and Religious Cultural Importance**
No TCPs or sacred sites have been identified at JBSA-FSH; therefore, no effect to these properties would be anticipated. In the event of an unanticipated discovery of an archaeological resource during demolition or construction activities, ground-disturbing activities would be suspended, and a cultural resources meeting would be called to determine if an unanticipated discovery plan would be developed and implemented.

Under the Proposed Action, historic preservation laws and initiatives would continue to limit, control, or guide development in a manner that protects cultural resources in the public interest. JBSA-FSH 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 would continue to be evaluated and considered in planning for future actions that could affect such resources on or around JBSA-FSH. Therefore, when considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-FSH, potential cumulative effects on cultural resources would not be likely to occur.

### 3.11.3 Best Management Practices and Mitigation Measures

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

- Renovate historic properties listed or eligible for listing on the NRHP to meet the Secretary of the Interior standards, as applicable.
- Adhere to the stipulated procedures and protocols established within the PA between JBSA and the Texas SHPO for all project-related construction, demolition, and renovation activities.

No mitigation measures for potential effects on cultural resources have been identified at this time.

## 3.12 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* (2003), provides similar direction to federal agencies to address these risks when implementing a federal action.

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

The ROI for environmental justice and the protection of children is the San Antonio Central Census County District (CCD). The communities in the CCD would be most likely to receive a disproportionate share of impacts associated with the Proposed Action (e.g., traffic congestion, reduced water and air quality).

## 3.12.1 Existing Conditions

### *3.12.1.1 Environmental Justice*

The San Antonio Central CCD, in which JBSA-FSH is located, reports approximately 58.0 percent of the population as minority; this percentage is higher than that of surrounding Bexar County at 54.2 percent and higher than that of the state of Texas at 49.9 percent (**Table 3-9**). The San Antonio Central CCD reports 76.2 percent of the population as Hispanic or Latino, which is higher than that of Bexar County and the state of Texas, at 59.3 percent and 39.3 percent, respectively. Because the San Antonio Central CCD has a higher percentage of the population classified as minority and Hispanic or Latino compared to the surrounding jurisdictions, the area is considered to have environmental justice populations.

**Table 3-9**
**Total Population and Populations of Concern**

| Location | Total Population | Percent Minority | Percent Hispanic or Latino[a] | Percent Below Poverty | Percent Youth[b] | Percent Elderly |
|---|---|---|---|---|---|---|
| San Antonio Central CCD | 672,470 | **58.0%** | **76.2%** | **23.8%** | 25.4% | 13% |
| Bexar County | 2,009,324 | 54.2% | 59.3% | 15.6% | 25.5% | 12.1% |
| State of Texas | 29,145,505 | 49.9% | 39.3% | 14.2% | 25.8% | 12.5% |
| United States | 331,449,281 | 23.6% | 18.7% | 12.8% | 22.4% | 16% |

Source: USCB, 2021
Note:
a. Hispanic and Latino denote a place of origin.
b Percent youth are all persons under the age of 18.
c Bolded text indicates an environmental justice population.

The San Antonio Central CCD reports approximately 23.8 percent of the population as living below the poverty level, which is higher than that of Bexar County, the state of Texas, and the US at 15.6 percent, 14.2 percent, and 12.8 percent, respectively. The San Antonio Central CCD is considered to have an environmental justice population due to its comparatively higher percentage of the population that is below the poverty level relative to the surrounding jurisdictions.

### *3.12.1.2 Protection of Children*

The San Antonio Central CCD has a similar percentage of children under the age of 18, at 25.4 percent, compared to that of Bexar County and the state of Texas at 25.5 and 25.8 percent, respectively. The percentage of children in the San Antonio Central CCD is slightly higher than that of the US by approximately 3 percentage points. Overall, the percentage of children remained generally consistent between the ROI and the surrounding jurisdictions.

### 3.12.2 Environmental Consequences

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

#### *3.12.2.1 No Action Alternative*

Under the No Action Alternative, the Air Force would not implement the Proposed Action, and the existing demographic conditions would remain unchanged. The built environment of JBSA-FSH would continue to deteriorate and become outdated for military use. Future development program projects would not be precluded under the No Action Alternative.

#### *3.12.2.2 Proposed Action*

Under the Proposed Action, the construction, demolition, and infrastructure projects would occur entirely within the boundaries of JBSA-FSH and would not result in disproportionate impacts on minorities, low-income, and youth populations. These actions would not impact the availability of housing, education, or community resources to environmental justice populations. The projects included as part of the Proposed Action would accrue positive benefits to the military population, but those benefits would not translate to the minority or low-income populations adjacent to JBSA-FSH.

When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-FSH, cumulative effects on environmental justice and the protection of children would not be likely to occur.

### 3.12.3 Best Management Practices and Mitigation Measures

No BMPs to reduce potential effects on environmental justice communities and children under the Proposed Action were identified by analysis. No mitigation measures for potential effects on environmental justice communities and children are recommended.

## 3.13 INFRASTRUCTURE, TRANSPORTATION, AND UTILITIES

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. Infrastructure components include transportation and utility systems, solid waste management, and sanitary and storm sewers. The availability of infrastructure and its capacity to support more users, including future development of an area, are generally regarded as essential to continued economic growth.

Transportation is defined as the system of roadways, highways, and transit services that provide ingress/egress from or to a particular location, as well as access to regional goods and services. Utilities include electrical, potable water, sanitary sewage/wastewater, stormwater conveyance, and communications systems. Solid waste management primarily relates to landfill capacity for disposal of non-hazardous solid waste (e.g., construction waste) generated in an area or by a population. Stormwater infrastructure includes the man-made conveyance systems that function in tandem with natural drainages to collect and control the rate of surface runoff during and after a precipitation event. In urbanized areas, stormwater that is not discharged to a waterbody is conveyed to sanitary sewers (also considered utilities), systems that collect, move, and treat liquid waste prior to its discharge back into the environment.

The ROI for infrastructure and utilities is JBSA-FSH and the external infrastructure components and services relied upon to operate the Base.

## 3.13.1 Existing Conditions

### *3.13.1.1 Transportation*

JBSA-FSH is located in a highly urbanized area about 1 mile from downtown San Antonio in Bexar County, Texas. I-35 runs southwest to northeast along the southeastern border of the Installation. This interstate continues to the eastern side of the Base parallel to I-410, which loops around San Antonio. US Highway 281 runs north to south outside the western boundary of the Base. Several arterial roadways, including North Walters Street, North New Braunfels Avenue, Harry Wurzbach Road, and Binz-Engleman Road, connect the Base with the surrounding highways and communities in all directions. Primary roads on JBSA-FSH are Winfield Scott Road and Wilson Way. The main east-to-west roadway on the Base is Binz-Engelman Road, and the main north-to-south connection on the Base is Harry Wurzbach Road. The current road system limits multi-modal transportation and lacks pedestrian flow throughout the Installation. The ACP to JBSA-FSH is the Walters Street Gate (Air Force, 2018d).

The areas outside of JBSA-FSH include a mix of commercial, residential, and industrial uses that are served by an extensive sidewalk and public bus transportation system that connect to central San Antonio. On-Base options for public and pedestrian transportation are more limited, with only one available bus route and limited pedestrian connectivity available. Wider sidewalks are needed to encourage pedestrian traffic and to improve navigation across the Installation. Gate closures during peak hours have resulted in backups for several blocks and access is a challenge due to a lack of manned entry points. Lack of maintenance has left most roads on Base in poor condition. Difficult wayfinding also presents an issue to those navigating the Installation. Roadways across the Base are dilapidated and lack connectivity to support multi-modal transportation and ease of pedestrian mobility (Air Force, 2018d).

### *3.13.1.2 Electricity and Natural Gas*

Electricity on JBSA-FSH is provided by CPS Energy, a municipal natural gas and electric company owned by the City of San Antonio. One substation and two secondary substations provide service to the Installation. The capacity is considered sufficient to meet existing and anticipated future electricity needs. Natural gas to JBSA-FSH is provided by CPS Energy through a privatized network integrated into the surrounding urban natural gas network. The system capacity for natural gas meets existing mission requirements and offers opportunity for expansion (Air Force, 2018a).

### *3.13.1.3 Potable Water*

Potable water at JBSA-FSH is supplied by the Edwards Aquifer. As described in **Section 3.9.1.6**, the Edwards Aquifer is a sole-source aquifer for this region and supplies approximately 50 percent of the drinking water for this service area (Air Force, 2020b). The groundwater of the aquifer is primarily used as a source of potable water and for agricultural irrigation; the city of San Antonio obtains around half of its water supply from the Edwards Aquifer (SAWS, 2022). 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. A 2019 contract was awarded to American Water (AW) for a 50-year contract to privatize the water and wastewater utilities across JBSA, including JBSA-FSH. This contract provides the Installation with water supply, treatment, storage, and distribution (AW, 2022). Water storage on the installation is adequate to meet the current demand and has room to accommodate expansion (JBSA, 2018d).

### *3.13.1.4 Solid Waste Management*

Non-hazardous solid waste at JBSA-FSH is collected by a private contractor and disposed of off Base at the Covel Gardens Landfill or Tessman Road Landfill (owned by Republic Services), both of which have adequate capacity to meet current and future needs.

#### *3.13.1.5 Sanitary and Storm Sewer*

AW provides wastewater collection and treatment for JBSA-FSH. The condition of the system is considered adequate for current mission requirements. JBSA-FSH is drained primarily by Salado Creek; the southern and central portions of the Base drain to the City of San Antonio's stormwater drainage system. The stormwater systems are owned by the Installation up to the Base boundaries (Air Force, 2018d).

### 3.13.2 Environmental Consequences

The Air Force defines a significant effect on or from infrastructure, transportation, and utilities 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.

#### *3.13.2.1 No Action Alternative*

Under the No Action Alternative, the Air Force would not implement the Proposed Action, and the existing infrastructure, transportation, and utilities would remain unchanged. The built environment of JBSA-FSH would continue to deteriorate and become outdated for military use. Future development program projects would not be precluded under the No Action Alternative.

#### *3.13.2.2 Proposed Action*

**Transportation**
Under the Proposed Action, transportation systems at JBSA-FSH would be improved to support the goal of a well-connected, efficient transportation network.

In the Commercial District, Project C3 would result in beneficial effects to the transportation infrastructure through roadway resurfacing and cul-de-sac construction to allow for truck turnarounds. Project C6, located at the intersection of Wilson Way and Winfield Scott Road, would improve traffic conditions through the construction of a roundabout, which would reduce conflict points and improve vehicle flow as traffic enters the Installation from the main ACP at Walters Gate. In the Training District, Projects C10, C13, C15, and I2 would provide necessary improvements to infrastructure, such as widening the sidewalks, resulting in improved pedestrian flow and access. Project C12 would improve pedestrian safety through the construction of a pedestrian bridge over Williams Way, providing safe and efficient foot travel across the busy roadway.

During construction, temporary, minor, adverse impacts to transportation would be anticipated due to the increase in vehicles associated with construction, demolition, and infrastructure activities; local and regional roadways would be able to readily absorb construction-related traffic. Minor delays on or in the immediate vicinity of JBSA-FSH would be anticipated, but impacts on roadway capacity or condition would not be discernible. No permanent adverse impacts to transportation infrastructure would result from the Proposed Action and any increase in personnel, traffic, or equipment would be temporary and short term during the construction period. Long-term, beneficial impacts would be expected to occur for the transportation systems and pedestrian environment at JBSA-FSH under the Proposed Action.

**Electricity and Natural Gas**
Short-term, negligible, adverse impacts on the electrical distribution system could occur under the Proposed Action because the operation of newly constructed buildings may increase the demand on the system; however, energy-efficient construction to decrease energy consumption, consistent with EO 13693, *Planning for Federal Sustainability in the Next Decade* (2015), and cessation of operations at outdated and

inefficient buildings proposed for demolition would decrease the demand. Therefore, net changes in long-term demand would be anticipated to be minimal.

**Potable Water**
Short-term, negligible, adverse impacts on the potable water supply system would occur during construction and demolition when existing lines would be connected to new buildings or capped as appropriate. Long-term, negligible, adverse impacts would occur because the operation of the new buildings would increase the demand on the potable water supply system; however, the cessation of operations at demolished buildings would decrease the demand. Changes in demand would be minimal, and the potable water supply system has the capacity required to meet new demands.

**Solid Waste Management**
Short-term, minor, adverse impacts on solid waste management may occur with construction and demolition projects under the Proposed Action. The USEPA guidance on estimating solid waste from construction and demolition projects indicates that approximately 4.39 pounds per $ft^2$ of debris would be generated for each square foot of construction activity, and approximately 158 pounds per $ft^2$ would be generated from the demolition of existing facilities; this formula can be applied to the construction of both buildings and impervious surfaces (ICF, 2022). Using this formula, solid waste generated from all construction and demolition projects under the Proposed Action would be anticipated at 3,446 tons and 27,786 tons, respectively. Contractors would be required to comply with federal, state, and local regulations for the collection and disposal of solid waste generated under the Proposed Action, and all solid waste generated would be collected and transported off Base for disposal or recycling in accordance with Air Force Manual (AFMAN) 32-7002, *Environmental Compliance and Pollution Prevention*. The proposed projects would take place over a period of 5 years; therefore, the annual volume of solid waste would be reduced relative to the scenario of all demolitions occurring at the same time.

**Sanitary and Storm Sewer**
Short-term, negligible, adverse impacts on the sanitary sewer and wastewater treatment system would occur during construction and demolition when existing lines would be connected to new buildings or capped as appropriate. Long-term, negligible, adverse impacts would occur because the operation of the new buildings would increase the demand on the sanitary sewer and wastewater treatment system; however, the cessation of operations at demolished buildings would decrease the demand. Changes in demands would be minimal, and the sanitary sewer and wastewater treatment system has the capacity required to meet new demands.

Planned local transportation improvements outside of the Proposed Action would have the potential to temporarily disrupt traffic entering and exiting the Installation; however, these projects have the purpose of improving the transportation environment and would result in overall improvements. When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-FSH, potential cumulative effects on infrastructure, transportation, or utilities would not be likely to occur.

### 3.13.3 Best Management Practices and Mitigation Measures

No BMPs to reduce potential effects on or from infrastructure, transportation, or utilities under the Proposed Action were identified by analysis. No mitigation measures for potential effects on infrastructure, transportation, or utilities are recommended.

## 3.14 HAZARDOUS MATERIALS AND WASTES

The definition of “hazardous materials and waste” depends on regulatory context. That is, the criteria used to define the terms are often specific to an activity or location (49 CFR Part 172). Generally, hazardous materials (HAZMAT) and hazardous wastes are materials and substances determined to present risks to human health, safety, or the environment when they occur above certain concentrations or undergo a physical or chemical change. Exposure to such materials may also harm ecosystems, including plants,

animals, soil, water, and other natural resources. Localized environmental conditions may affect the extent of contamination from, or exposure to, HAZMAT and hazardous wastes.

CERCLA, as amended by the *Superfund Amendments and Reauthorization Act* and TSCA, defines HAZMAT as any substance with physical properties of ignitability, corrosivity, reactivity, or toxicity that might cause an increase in mortality, serious irreversible illness, and incapacitating reversible illness, or that might pose a substantial threat to human health or the environment. The Occupational Safety and Health Administration (OSHA) is responsible for the enforcement and implementation of federal laws and regulations pertaining to worker health and safety under 29 CFR Part 1910. OSHA also regulates HAZMAT in the workplace and ensures appropriate training.

The *Solid Waste Disposal Act*, as amended by RCRA, which was further amended by the *Hazardous and Solid Waste Amendments of 1984* (House Resolution 2867), defines hazardous wastes as any solid, liquid, contained gaseous, or semi-solid waste, or any combination of wastes, that pose a substantial present or potential hazard to human health or the environment. In general, both HAZMAT and hazardous wastes include substances that, because of their quantity, concentration, physical, chemical, or infectious characteristics, might present substantial danger to public health and welfare or the environment when released or otherwise improperly managed.

Air Force Policy Directive 32-70, *Environmental Considerations in Air Force Programs and Activities*, establishes the policy that the Air Force is committed to performing the following actions:

- Cleaning up environmental damage resulting from its past activities,
- Meeting all environmental standards applicable to its present operations,
- Planning its future activities to minimize environmental impacts,
- Responsibly managing the irreplaceable natural and cultural resources it holds in public trust, and
- Eliminating pollution from its activities wherever possible.

AFMAN 32-1067, *Water and Fuel Systems*, identifies compliance requirements for underground storage tanks (USTs) and above-ground storage tanks (ASTs), and associated piping, that store petroleum products and hazardous substances. Evaluation of HAZMAT and hazardous wastes focuses on USTs and ASTs as well as the storage, transport, and use of pesticides, fuels, oils, and lubricants. Evaluation might also extend to generation, storage, transportation, and disposal of hazardous wastes when such activity occurs at or near the project site of a proposed action. In addition to being a threat to humans, the improper release of HAZMAT and hazardous wastes can threaten the health and wellbeing of wildlife species, botanical habitats, soil systems, and water resources. In the event of HAZMAT or hazardous waste release, the extent of contamination will vary based on the type of soil, topography, weather conditions, and water resources.

AFMAN 32-7002 establishes procedures and standards that govern management of HAZMAT throughout the Air Force. It applies to all Air Force personnel who authorize, procure, issue, use, or dispose of HAZMAT, and to those who manage, monitor, or track any of those activities. Toxic substances might pose a risk to human health but are not regulated as contaminants under the hazardous waste statutes. Included in this category are asbestos-containing materials (ACMs), lead-based paint (LBP), radon, and polychlorinated biphenyls (PCBs). The presence of special hazards or controls over them might affect, or be affected by, a proposed action. Information on special hazards describing their locations, quantities, and condition assists in determining the significance of a Proposed Action.

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 Spill Prevention, Control, and Countermeasure (SPCC) plans to establish procedures, methods, and equipment requirements for response and cleanup actions (Subparts A, B, and C).

Through the Environmental Restoration Program (ERP) initiated in 1980, a subcomponent of the Defense Installation Restoration Program that became law under Superfund amendments and Reauthorization Act, each DoD Installation is required to identify, investigate, and clean up hazardous waste disposal or release sites. Remedial activities for ERP sites follow the Hazardous and Solid Waste Amendments under the RCRA Corrective Action Program. The ERP provides a uniform, thorough methodology to evaluate past disposal sites, control the migration of contaminants, minimize potential hazards to human health and the environment, and clean up contamination through a series of stages until it is decided that no further remedial action is warranted.

Also contained within the ERP is the Military Munitions Response Program (MMRP). This program was established by the DoD in 2001 to address munitions-related concerns from releases of unexploded ordnance, discarded military munitions, and munitions constituents. The program addresses non-operational range lands with suspected or known hazards which occurred before 2002 but are not already included within ERP site cleanup activity.

The ROI for potential HAZMAT and hazardous wastes effects is JBSA-FSH.

## 3.14.1 Existing Conditions

### *3.14.1.1 Hazardous Materials and Waste*

RCRA establishes the mandatory procedures and requirements for federal facilities that use, accumulate, transport, treat, store, or dispose of HAZMAT. Under RCRA, USEPA can grant authority to the state to establish and enforce its own hazardous waste management program, provided the state's requirements are no less stringent than the USEPA's (USEPA, 2021). In Texas, the TCEQ implements the RCRA program. Air Force policy requires installations to utilize CERCLA authority to meet state requirements for facilities that are not on the National Priorities List. The Texas Risk Reduction Program is a risk-based corrective action investigation and cleanup program established by TCEQ. JBSA incorporates this risk reduction process with CERCLA to adequately protect human health and the environment during investigation and remediation activities.

JBSA-FSH is classified as a large-quantity generator of hazardous waste (RCRA Site ID TX3214020429). Training operations, maintenance, and related industrial activities are the primary source of HAZMAT generated on Base. Examples of hazardous substances in use at JBSA-FSH include flammable and combustible liquids, acids, corrosives, caustics, anti-icing chemicals, compressed gases, solvents, paints, paint thinners, and pesticides. JBSA maintains a *Hazardous Waste Management Plan* (HWMP) for operations that involve handling, storage, transportation, and disposal of hazardous waste (JBSA, 2016). The HWMP also serves to document the processes and procedures for HAZMAT management at JBSA, as required to remain in compliance with RCRA (JBSA, 2019).

### *3.14.1.2 Asbestos, Lead-Based Paint, and Polychlorinated Biphenyls*

**Asbestos**

The Air Force manages asbestos in accordance with AFI 32-1001, *Civil Engineer Operations*, and applicable USEPA regulations (USEPA, 2022b). A significant number of buildings on JBSA-FSH date from the 1940s through the 1980s, during which time ACM were commonly used in construction. Nonfriable asbestos is not considered HAZMAT until it is 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. The JBSA *Asbestos Management Plan* focuses on in-place management of asbestos, meaning, where applicable, ACM can be left in place until there is a need for removal (i.e., due to conditions, renovation, demolition) (JBSA, 2021a). Conversely, buildings on the Installation have the capacity to contain friable asbestos, and disruption of these materials causes asbestos to become airborne, producing a risk of inhalation.

**Lead-Based Paint**

OSHA and USEPA have determined that human exposure to lead is an adverse health risk. Sources of exposure to lead are dust, soils, and 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 ppm). The Act also restricted the use of LBP in non-industrial facilities. The DoD implemented a ban on LBP use in 1978; therefore, it is possible that facilities constructed prior to or during 1978 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 they were banned in 1979. The Air Force manages PCBs in accordance with AFMAN 32-7002 as well as under USEPA regulations. The Air Force defines PCBs as any PCB-containing equipment or material, as defined in 40 CFR Part 761, with a concentration of more than 50 ppm. Buildings constructed prior to 1979, with a dependence on previous uses, potentially contain PCBs in various machinery and wiring.

### *3.14.1.3 Storage Tanks*

An inventory of ASTs and USTs is maintained at JBSA-FSH through the Storage Tank Accounting and Reporting database (JBSA, 2016). Storage tanks contain jet fuel, diesel fuel, used cooking oil, used oil, and unleaded gasoline. There are 81 ASTs and 38 USTs throughout JBSA-FSH (**Figures 3-13–3-15**) with capacities ranging from 55 gallons to 15,000 gallons (JBSA, 2016).

### *3.14.1.4 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 (USEPA, 2019). The JBSA IDP lists electromagnetic and radiation sources as a minor constraint to future development. Due to the low probability of radon levels exceeding the USEPA's guidance level of 4 picocuries per liter (HDR, 2017), radon is not further evaluated herein.

### *3.14.1.5 Per- and Polyfluoroalkyl Substances and Aqueous Film Forming Foam*

Per- and polyfluoroalkyl substances (PFAS) are a group of man-made chemicals that are employed in a wide variety of residential, commercial, and industrial uses and can be found in everyday items such as nonstick cookware, stain-resistant fabric and carpet, certain types of food packaging, and fire-fighting foam (AFCEC, n.d.). In 2016, USEPA announced advisory levels for two types of PFAS in drinking water: perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA).

The USEPA has not yet enacted specific regulatory standards for PFAS. However, continued research shows that there are potential human health risks associated with these substances, and regulatory standards are being considered (AFCEC, n.d.). Aqueous film forming foam (AFFF), which the Air Force began to use in the 1970s to extinguish petroleum-based fires, contains both PFOS and PFOA. In August of 2016, the Air Force began phasing out PFOS-based AFFF and other AFFF products and introduced newer, more environmentally friendly formulas. In August of 2017, the Air Force finished the phase out and completed the new foam delivery (AFCEC, n.d.).

All Air Force investigation and mitigation work relating to PFOS and PFOA is done in accordance with CERCLA, applicable state laws, and the USEPA's lifetime drinking water health advisory of 70 parts per trillion (AFCEC, n.d.). An evaluation of six potential release areas at JBSA-FSH was conducted in 2017. None of these locations required further evaluation. AFFF is not further evaluated herein (AFCEC, 2017).


**FIGURE 3-13**
HAZMAT SITES –
COMMERCIAL DISTRICT

N

Imagery: ESRI 2021
Projection: WGS 1984
Zone 14N

0 0.05 0.1
Miles

Construction
Demolition
Infrastructure
Storage Tanks

JBSA - Fort Sam Houston
ERP Landfill

JBSA-FSH

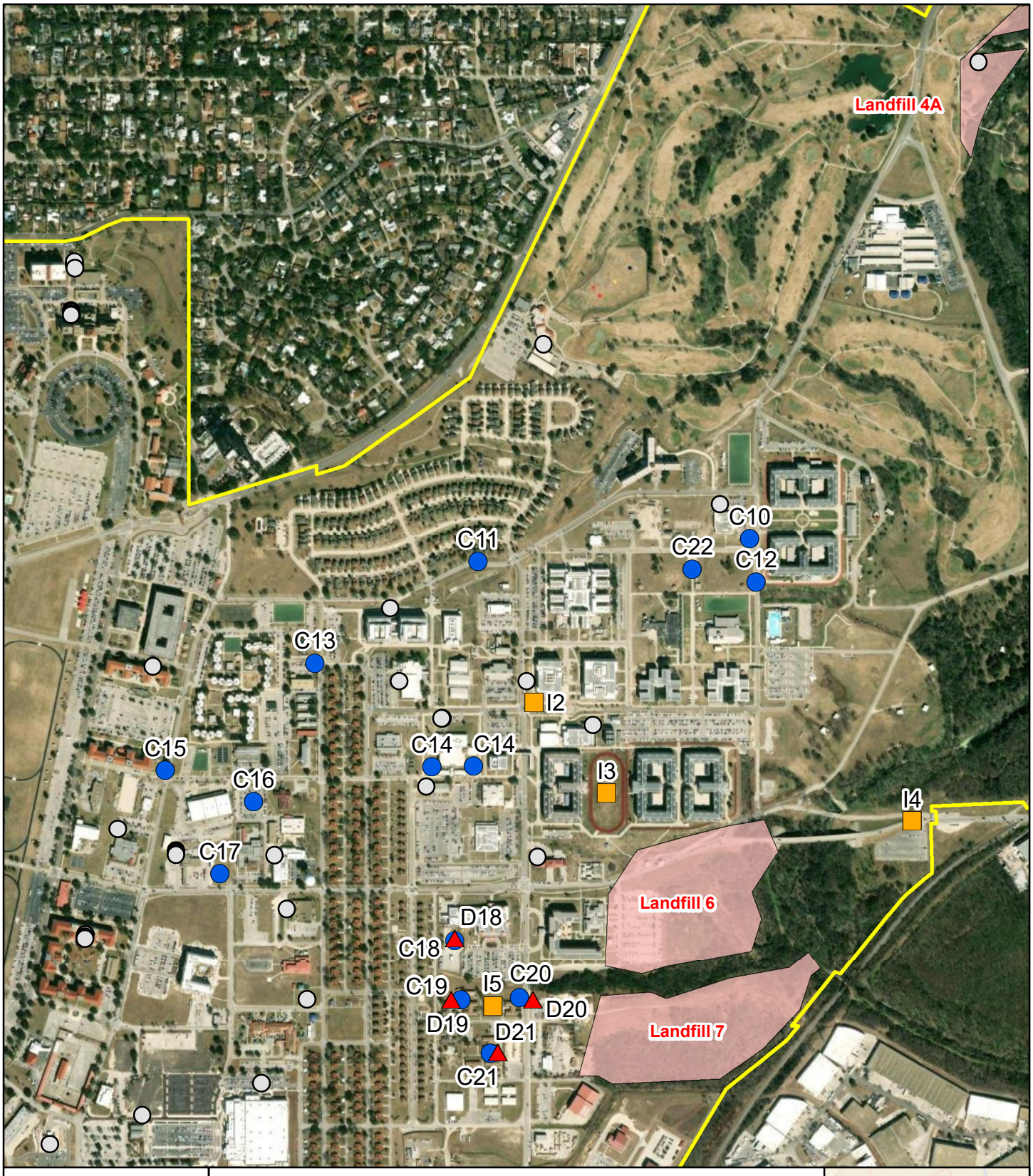



**FIGURE 3-14**
HAZMAT SITES –
TRAINING DISTRICT

Construction
Demolition
Infrastructure
Storage Tanks
ERP Landfill
JBSA - Fort Sam Houston

N
Imagery: ESRI 2021
Projection: WGS 1984
Zone 14N
0 0.1 0.2
Miles

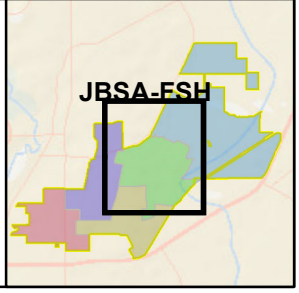
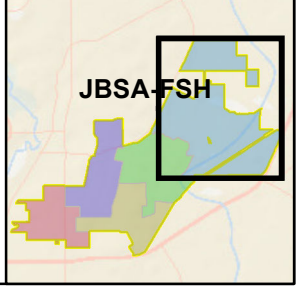



**FIGURE 3-15**
HAZMAT SITES – SERVICE DISTRICT

N
Imagery: ESRI 2021
Projection: WGS 1984
Zone 14N
0 0.1 0.2 Miles

Construction
Infrastructure
Storage Tanks
JBSA - Fort Sam Houston
ERP Landfill
MMRP Site



### *3.14.1.6 Environmental Restoration Program*

The ERP at JBSA-FSH was established in 1987 under the former Installation Restoration Program, leading to the identification of 26 ERP sites throughout the Installation. As of 2021, 23 of those sites are closed and designated "no further action" (NFA), and 3 are under long-term management (**Table 3-10**).

**Table 3-10**
**Active ERP Sites**

| Site | District | Status | Description |
|---|---|---|---|
| FTSH-26 (Landfill 8B, 10, and 12) | Service | Long-Term Management | This is an approximately 22-acre site consisting of three landfills that were primarily used for domestic waste and construction debris. Remedial actions have included well injections and erosion controls; land use controls have included fencing and signage. The site is currently limited to non-residential use and is closed under TCEQ RRS No. 2. |
| FTSH-29 (Landfill 4A, 6 and 7) | Service and Training | Long-Term Management | This is an approximately 60-acre site consisting of three landfills that were used for a variety of wastes. Remedial actions have included erosion controls; land use controls have included fencing and signage. The site is currently limited to non-residential use and is closed under TCEQ RRS No. 2. |
| FTSH-30 (Landfill 2, 3, 4B, and 5) | Service | Long-Term Management | This is an approximately 44-acre site consisting of four landfills that were used for a variety of wastes. Remedial actions have included regrading and fill; land use controls have included fencing and signage. The site is currently limited to non-residential use and is closed under TCEQ RRS No. 2. |

Source: US Army Environmental Command, 2010
RRS = Risk Reduction Standard; TCEQ = Texas Commission on Environmental Quality

### *3.14.1.7 Military Munitions Restoration Program*

MMRP sites are known or suspected to contain unexploded ordnance or munitions constituents, which are considered HAZMAT. The goal of the MMRP is to make munitions response areas safe for reuse in accordance with anticipated future land use and to protect human health and the environment. Eighteen MMRP sites designated NFA have been identified at JBSA-FSH (**Table 3-11**). One MMRP site at JBSA-FSH, Site AT018, is under long-term management within the Service District. Historically, this location was the site of combat training activities and small arms exercises. While no munitions or explosives of concern have been found, residential use of this land is restricted (COB, 2019).

**Table 3-11**
**Military Munitions Restoration Program Sites**

| Site | District | Status | Description |
|---|---|---|---|
| SR005 | Main Street | NFA | Staff post firing range |
| SR012 | Main Street | NFA | 200-yard rifle range |
| SR020 | Main Street | NFA | 200-yard rifle range TD |
| AT001 | Corporate | NFA | Chemical defense training area |
| AT009 | Commercial | NFA | Fire training area |
| SR022 | Commercial | NFA | Staff post firing range |
| FTSH-006-R-01 | Training | NFA | Chemical warfare demonstration avenue |
| FTSH-011-R-01 | Training | NFA | Salado Creek training area |
| AT018 | Service | LTM | Former trench warfare training area |
| FTSH-017-01 | Service | NFA | Stonewall Jackson Field |
| SR002 | Service | NFA | Dodd Field small arms range |
| SR008 | Service | NFA | Old Pershing range |
| SR010 | Service | NFA | Pentathlon range |

| Site | District | Status | Description |
|---|---|---|---|
| SR016 | Service | NFA | Pistol range |
| SR027 | Service | NFA | Pistol range |
| SS021 | Service | NFA | Dodd Field small range |
| XE015 | Service | NFA | Landfill 8B |
| XU013 | Service | NFA | Stonewall Jackson field |
| XU007 | Service | NFA | Closed Pershing field |

NFA = no further action; LTM = long-term management

## 3.14.2 Environmental Consequences

### *3.14.2.1 Evaluation Criteria*

Impacts on HAZMAT management would be considered adverse if the federal action resulted in noncompliance with applicable federal and state regulations or increased the amounts generated or procured beyond the current JBSA-FSH waste management procedures and capacities. Impacts on the ERP would be considered adverse if the federal action disturbed (or created) contaminated sites resulting in negative effects on human health or the environment.

### *3.14.2.2 No Action Alternative*

Under the No Action Alternative, the Air Force would not implement the Proposed Action, and JBSA-FSH would continue to operate as a large-quantity generator of hazardous waste under RCRA. HAZMAT management on Base would continue in accordance with relevant plans and applicable HAZMAT laws and regulations. The built environment of JBSA-FSH would continue to deteriorate and become outdated for military use. Future development program projects would not be precluded under the No Action Alternative.

### *3.14.2.3 Proposed Action*

**Hazardous Materials and Wastes**
Under the Proposed Action, the limited use of certain HAZMAT would be required during the construction, demolition, and infrastructure phases of the Proposed Action. Associated HAZMAT might include paints, welding gases, solvents, preservatives, sealants, and pesticides. Additionally, hydraulic fluids and petroleum products, such as diesel and gasoline, would be used in construction and demolition vehicles. Construction contractors would be responsible for monitoring HAZMAT exposure (JBSA, 2016).

Construction could unearth contaminants in environmental media not yet known or identified for management action. Even without a major release or discovery event, multiple minor releases of HAZMAT under the Proposed Action could potentially affect the environment or persons in the vicinity. All investigation derived waste or excess materials would be properly managed, segregated, sampled, profiled, and manifested in accordance with Section 3.1.4.1 of the JBSA Environmental Specification (JBSA, 2021b) based on waste characterization data reviewed by the 802 CES/CEIE (which, at a minimum, would be classified as “hazardous/non-hazardous solid waste”); all excess soil/waste materials must be manifested/transported to an approved TCEQ permitted disposal location approved by 802 CES/CEIE, (i.e., the Covel Gardens Landfill or Tessman Road Landfill).

If encountered, HAZMAT used or generated during construction or demolition would be handled, stored, and disposed of in accordance with federal, state, and local laws and regulations. All applicable permits for handling and disposal of HAZMAT would be obtained prior to starting construction or demolition activities. Construction and demolition work under the Proposed Action would be subject to the procedural requirements of the HWMP, SPCC plan, and other applicable management plans to prevent and minimize risks associated with contaminant release or transport in the environment. During construction or demolition, if HAZMAT is discovered, work in that location would stop until the potential contamination has been properly evaluated and addressed.

When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-FSH, no significant cumulative effects to HAZMAT and hazardous waste would be anticipated with implementation of the Proposed Action.

**Asbestos, Lead-Based Paint, and Polychlorinated Biphenyls**

Additional risk under the Proposed Action would be associated with improper handling of construction and building materials. Improper handling of these materials has the potential to adversely affect the state of HAZMAT at JBSA-FSH. Concerns of ACM, LBP, and PCBs are also associated with buildings on the Installation.

Facilities proposed for demolition or improvement/maintenance under the Proposed Action have the potential to contain these materials. Coordination with the Asbestos Program Officer would occur during the project planning phase review the status of the buildings in the asbestos database. If there is no asbestos survey, then the Asbestos Program Officer or a licensed asbestos consulting contractor must conduct a survey prior to construction or demolition (JBSA, 2021a).

Any proposed project that would involve disturbance of construction materials would require a HAZMAT survey, to include ACM, regardless of original construction date. A copy of laboratory results would be sent to the location-specific JBSA Environmental office for further review prior to project execution. The project proponent would need to issue a notification for all demolition actions, regardless if ACM is involved, and for renovations during which any identified ACM might be disturbed. JBSA Toxics personnel will provide any reports that are current. Otherwise, the HAZMAT surveys must be included in the project requirements document. JBSA would coordinate all contract sampling and analysis and any planned abatement activities through the 802d Civil Engineer Squadron, Environmental Compliance (802 CES/CEIEC).

Proposed Projects D5, I5, and C18/D18 would potentially disturb LBP and PCBs through either the demolition or renovation of the associated buildings identified in **Table 3-12**. With proper handling and development procedures, no significant effects on the HAZMAT and hazardous waste would be expected to occur under the Proposed Action. Removal of ACM, LBP, and PCBs during implementation of the Proposed Action would result in the beneficial impact of creating safer indoor spaces by avoiding future exposure. The JBSA HWMP and Asbestos Management Plan would be followed to mitigate exposure during implementation of the Proposed Action.

**Table 3-12**
**Buildings Included in the Proposed Action with Potential To Contain HAZMAT**

| Project # | District | Building # | Year Built | ACM[a] | LBP[b] | PCBs[c] |
|---|---|---|---|---|---|---|
| D5 | Commercial | 2420 | 1971 | No | Yes | Yes |
| I5 | Training | 1160 | 1967 | Yes | Yes | Yes |
| C18/D18 | Training | 1111 | 1967 | Yes | Yes | Yes |

a Buildings are likely to contain ACM. When disturbed, asbestos becomes airborne and is harmful to human health if inhaled. The JBSA Asbestos Management Plan (AMP) focuses on in-place management of ASM.
b Buildings or structures constructed before 1978 may contain LBP. Exposure to LBP is harmful to human health, particularly children.
c Buildings constructed prior to 1979 may contain PCBs in various machinery and wiring. Exposure to PCB concentrations exceeding 50 parts per million is harmful to human health.

When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-FSH, no significant cumulative effects to ACM, LBP, or PCBs would be anticipated with implementation of the Proposed Action.

**Storage Tanks**

Projects I2, C14, and C25 would be located within 50 meters of an existing storage tank (see **Figures 3-13–3-15**). Accordingly, construction contractors would be responsible for avoiding the tanks during construction and demolition activities. Work under the Proposed Action would not be expected to result in significant impacts. Any work involving the installation of new tanks for modification of existing tanks would require communication through the JBSA Tanks/Petroleum, Oil, and Lubricants Manager. As individual project

plans are developed and finalized, the 802d Civil Engineer Squadron/Center for Environmental Information and Education would be provided with a description of the work being performed and would be notified at least 30 days prior to commencing any removal or repair/modification to existing tank/equipment in order to minimize any impacts to existing storage tank infrastructure. JBSA Environmental (802 CES/CEIEC) would be notified of any tank systems or equipment containing 55 gallons or more of oil (i.e., transformers) that would be added, removed, replaced, upgraded, or closed. Additionally, modification, removal, or installation of any USTs or ASTs would comply with 30 TAC 334 and AFMAN 32-1067.

When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-FSH, no significant cumulative effects to storage tanks would be anticipated with implementation of the Proposed Action.

**Environmental Restoration Program Sites**

No significant effects to ERP sites would be anticipated under the Proposed Action as there are no ADP project sites within or in the vicinity of the landfill boundaries (see **Figures 3-13–3-15**). The applicable requirements and management plans would be in place and no contaminants are at concentrations that would pose a risk to construction workers. Impacts to ERP sites would not be anticipated under the Proposed Action.

When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-FSH, no significant cumulative effects to ERP sites would be anticipated with implementation of the Proposed Action.

**Military Munitions Restoration Program Sites**

No significant effects to MMRP sites would be anticipated under the Proposed Action as there are no ADP project sites within or in the vicinity of Site AT018.

All activities under the Proposed Action involving the use, transport, treatment, storage, and disposal of HAZMAT and hazardous wastes would continue to be regulated under federal, state, and local laws and regulations. Therefore, when considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-FSH, potential cumulative effects from HAZMAT and hazardous wastes would not be likely to occur.

### 3.14.3 Best Management Practices and Mitigation Measures

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

- Adhere to the JBSA HWMP to minimize impacts from the handling and disposal of hazardous substances and ensure compliance with state and federal HAZMAT regulations.
- Properly handle, remove, and dispose of ACM in accordance with Air Force, local, state, and federal regulations.
- Properly handle, remove, and dispose of LBP 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 EAA within 24 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 potential effects from HAZMAT and hazardous waste are recommended.

## 3.15 SAFETY

### 3.15.1 Definition of the Resource

This section discusses concerns associated with the ground and explosives safety. Ground safety considers issues associated with ground operations and maintenance activities that support unit operations. Explosives safety relates to the management and safe use of ordnance and munitions.

The ROI for safety is the JBSA-FSH Installation boundary.

### 3.15.2 Existing Conditions

Under 40 CFR § 989.27, the EIAP for a proposed action includes assessing direct and indirect impacts of the Proposed Action and Alternatives on the safety and health of Air Force employees and others at a worksite. Air Force Policy Directive 91-2, *Safety Programs* (2019), is implemented by AFI 91-202, *The US Air Force Mishap Prevention Program* (2022), which manages risks to protect Air Force personnel from occupational deaths, injuries, or illnesses and minimize loss of Air Force resources. These standards apply to all Air Force activities and adherence to the Air Force's Mishap Prevention Program ensures Air Force workplaces meet federal safety and health requirements.

Day-to-day operation and maintenance activities at JBSA-FSH are performed in accordance with applicable Air Force safety regulations, published Air Force Technical Orders, and standards prescribed by Air Force occupational and environmental safety, fire protection, and health program requirements. These are intended to reduce occupational risks to government personnel and contractors and to protect other individuals that reside on, visit, or are near the Installation.

#### *3.15.2.1 Ground Safety*

Ground safety concerns include ground and industrial operations, operational activities, and motor vehicle use. Accidents can occur from equipment operation, materials use, and building and equipment maintenance. Air Force safety programs for industrial activities, motor vehicle and equipment operation, and everyday operations are continuously refined as new activities and new information becomes available.

All construction contractors at JBSA-FSH must follow ground safety regulations and worker's compensation programs to avoid posing any risks to workers or personnel on or off Installation. Construction contractors are responsible for reviewing potentially hazardous workplace operations, monitoring exposure to workplace chemicals (e.g., lead, ACM, HAZMAT); physical hazards (e.g., noise propagation, slips, trips, falls); and biological agents (e.g., infectious waste, wildlife, poisonous plants). Construction contractors are required to recommend and evaluate controls (e.g., preventive, administrative, engineering) to ensure personnel are properly protected and to implement a medical surveillance program to perform occupational health physicals for those workers subject to any accidental chemical exposures.

#### *3.15.2.2 Explosives Safety*

Defense Explosives Safety Regulation 6055.09_AFMAN 91-201, *Explosives Safety Standards*, defines the guidance and procedures for munitions storage and handling. Munitions for training operations may include captive ordnance, defensive countermeasure chaff and flares, and gun ammunition with inert projectiles. All munitions are stored and maintained within facilities designed for the allowable types and amounts of explosives. All storage and handling of munitions is carried out by trained and qualified personnel and in accordance with Air Force-approved Technical Orders.

JBSA-FSH munitions are kept in an armored magazine container with minimal development restrictions (Air Force, 2018d). Because there are minimal environmental constraints associated with explosives safety on JBSA-FSH and no project actions involve modifying these resources, explosive safety is not further evaluated herein.

## 3.15.3 Environmental Consequences

### *3.15.3.1 Evaluation Criteria*

The Air Force assesses safety-related impacts from a proposed activity according to the potential to increase or decrease safety risks to personnel, the public, property, or the environment. Adverse impacts related to safety would occur if the Proposed Action resulted in Air Force OSHA criteria being exceeded or the improper implementation of established or proposed safety measures, creating unacceptable safety risk to personnel. Adverse impacts would occur if the activities:

- substantially increase risks associated with the safety of construction personnel, contractors, military personnel, or the local community;
- substantially hinder the ability to respond to an emergency; or
- introduce a new health or safety risk for which the Base is not prepared or does not have adequate management and response plans in place.

### *3.15.3.2 No Action Alternative*

Under the No Action Alternative, the Air Force would not implement the Proposed Action, and the existing safety conditions would remain unchanged. The built environment of JBSA-FSH would continue to deteriorate and become outdated for military use. In the long term, Future development program projects would not be precluded under the No Action Alternative.

### *3.15.3.3 Proposed Action*

**Ground Safety**
Construction and demolition activities can potentially expose personnel to health and safety hazards from heavy-equipment operation, HAZMAT and chemical use, and working in confined, poorly ventilated, and noisy environments. Therefore, short-term, negligible-to-minor impacts on contractor health and safety could occur during proposed construction and demolition projects under the Proposed Action. To minimize health and safety risks, contractors would be required to use appropriate personal protective equipment, establish and maintain site-specific health and safety programs for their employees, and follow all applicable OSHA regulations. Additionally, construction contractors at JBSA-FSH are required to follow ground safety regulations and worker's compensation programs to avoid risks to workers or personnel on or off Base.

Construction of a new fuel depot under Project C8 would increase the safety and storage of fuels, and additional resurfacing and repairs of roadways would improve ground safety and motor vehicle use conditions resulting in long-term, beneficial impacts to ground safety.

The proposed projects would result in minor, beneficial effects to ground safety. When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-FSH, potential cumulative effects to safety would not be likely to occur.

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# APPENDIX A
# INTERAGENCY AND INTERGOVERNMENTAL COORDINATION FOR ENVIRONMENTAL PLANNING

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DEPARTMENT OF THE AIR FORCE
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Dear Mr. Richardson

The United States Air Force (Air Force) is preparing an Environmental Assessment (EA) for proposed Area Development Plan (ADP) projects at Joint Base San Antonio, Fort Sam Houston (JBSA-FSH), Texas. The ADP projects identify and evaluate future development program requirements unique to three JBSA-FSH planning districts: the Commercial District, Medical Education and Training District (hereafter, "Training District"), and Service District (**Attachment 1**). 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 consultation with your office.

**Proposed Action**

The proposed ADP projects include a total of 35 short-term development actions and real property improvements that range in scope from new construction and demolition actions to repairs, renovations, and upgrades. Details of the Proposed Action are included in **Attachment 2**. The Air Force proposes to implement the projects from approximately 2023 to 2027. The intent of these projects is to provide improvements and infrastructure necessary to support the mission and mission support capabilities of JBSA-FSH and its tenant units. The proposed projects were identified as priorities for the Installation to maintain and improve the physical infrastructure of JBSA-FSH in support of military training and operations.

**Purpose and Need**

The purpose of the Proposed Action at JBSA-FSH is to develop, improve, and maintain JBSA-FSH to accommodate future mission growth. The Department of Defense is consolidating its military medical mission at JBSA-FSH to include education and training. JBSA-FSH also provides healthcare services to a large population of Veterans residing in and around the San Antonio metropolitan area. The Installation requires a development approach that retains its unique characteristics and results in land use that is compatible, connected, safe, and secure. A

secondary objective of the Proposed Action is to develop JBSA-FSH in a manner that provides flexibility to meet future mission requirements, some of which are not yet known.

The Proposed Action is needed to address the condition and capability of facilities and infrastructure at JBSA-FSH. Many buildings and infrastructure systems are outdated and in poor condition; others lack the functionality required to accomplish the mission. These real-property assets require maintenance, renovation, expansion, or replacement to sustain current operational levels and support future mission expansion. The Proposed Action is also needed to create space for and improve existing communal areas (e.g., recreation and leisure) on JBSA-FSH that contribute to quality of life.

**Project Location**

The Proposed Action would occur in the central and east-northeast portions of JBSA-FSH. **Attachment 3** depicts the projects under the Proposed Action as categorized for analysis in the EA.

**Environmental Assessment**

The EA will assess the potential environmental consequences associated with the Proposed Action and No Action Alternatives. Potential impacts identified during the initial planning stages include effects on air quality, infrastructure/utilities, biological resources, cultural resources, geological resources, and water resources. The EA will also examine the reasonably foreseeable environmental trends and planned actions that, when combined with the Proposed Action, could result in potential adverse cumulative effects on a regional scale. In support of this process, we request your input in identifying general or specific issues or areas of concern you believe should be addressed in the EA.

We intend to provide your agency with a copy of the Draft EA when the document is completed. Please inform us if additional copies are needed or if someone else within your agency other than you should receive the Draft EA.

Please reach out to my point of contact, provided below, on any issues or concerns you have in the development of this EA. We ask your assistance in identifying any issues or concerns of which we may be unaware, particularly those that may be affected by this proposal.

So that we remain on schedule to complete the environmental impact analysis process in a timely manner, please provide your response within 30 days from receipt of this correspondence. Please send your response via postal mail or email (preferred) to:

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The Air Force appreciates your interest in and support of its military mission at JBSA-FSH. We thank you in advance for your assistance and look forward to your response.

Sincerely

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Digitally signed by ROBERSON.EDWARD.LEWIS.1124911636
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3 Attachments:
1. Planning Districts Map for Joint Base San Antonio, Fort Sam Houston
2. Details of the Proposed Action
3. Proposed ADP Projects by Planning District

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Dear Mr. Wolfe

The United States Air Force (Air Force) is preparing an Environmental Assessment (EA) for proposed Area Development Plan (ADP) projects at Joint Base San Antonio, Fort Sam Houston (JBSA-FSH), Texas. The ADP projects identify and evaluate future development program requirements unique to three JBSA-FSH planning districts: the Commercial District, Medical Education and Training District (hereafter, "Training District"), and Service District (**Attachment 1**). 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 consultation with the State Historic Preservation Office.

**Proposed Action**

The EA will, as required by law and regulations, consider the potential impacts resulting from the implementation of installation development planning activities. The Proposed Action would involve facility construction, demolition, renovation, and maintenance and infrastructure construction and improvement. Pursuant to 36 Code of Federal Regulations §§ 800.4(a) and (b), we request your assistance defining the Area of Potential Effect (APE) and providing information on any historic properties located therein that may be affected by this proposed undertaking. Location maps of each alternative are attached for your review.

The proposed ADP projects include a total of 35 short-term development actions and real property improvements that range in scope from new construction and demolition actions to repairs, renovations, and upgrades. Details of the Proposed Action are included in **Attachment 2**. The Air Force proposes to implement the projects from approximately 2023 to 2027. The intent of these projects is to provide improvements and infrastructure necessary to support the mission and mission support capabilities of JBSA-FSH and its tenant units. The proposed projects were identified as priorities for the Installation to maintain and improve the physical infrastructure of JBSA-FSH in support of military training and operations.

**Purpose and Need**

The purpose of the Proposed Action at JBSA-FSH is to develop, improve, and maintain JBSA-FSH to accommodate future mission growth. The Department of Defense is consolidating its military medical mission at JBSA-FSH to include education and training. JBSA-FSH also provides healthcare services to a large population of Veterans residing in and around the San Antonio metropolitan area. The Installation requires a development approach that retains its unique characteristics and results in land use that is compatible, connected, safe, and secure. A secondary objective of the Proposed Action is to develop JBSA-FSH in a manner that provides flexibility to meet future mission requirements, some of which are not yet known.

The Proposed Action is needed to address the condition and capability of facilities and infrastructure at JBSA-FSH. Many buildings and infrastructure systems are outdated and in poor condition; others lack the functionality required to accomplish the mission. These real-property assets require maintenance, renovation, expansion, or replacement to sustain current operational levels and support future mission expansion. The Proposed Action is also needed to create space for and improve existing communal areas (e.g., recreation and leisure) on JBSA-FSH that contribute to quality of life.

**Project Location**

The Proposed Action would occur in the central and east-northeast portions of JBSA-FSH. **Attachment 3** depicts the projects under the Proposed Action as categorized for analysis in the EA.

**Environmental Assessment**

The EA will assess the potential environmental consequences associated with the Proposed Action and No Action Alternatives. Potential impacts identified during the initial planning stages include effects on air quality, infrastructure/utilities, biological resources, cultural resources, geological resources, and water resources. The EA will also examine the reasonably foreseeable environmental trends and planned actions that, when combined with the Proposed Action, could result in potential adverse cumulative effects on a regional scale. In support of this process, we request your input in identifying general or specific issues or areas of concern you believe should be addressed in the EA.

As a consultation, we would appreciate any input regarding concerns of potential effects of the Proposed Action on historic properties as well as assistance in defining the APE for the Proposed Action. We also intend to provide your agency with a copy of the Draft EA once the document is completed and welcome comments and input at that time as well. Please inform us if additional copies are needed or if someone else within your organization other than you should receive the Draft EA.

So that we remain on schedule to complete the environmental impact analysis process in a timely manner, please provide your response within 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
Dayna.cramer@us.af.mil

The Air Force appreciates your interest in and support of its military mission at JBSA-FSH. 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: 2022.05.17 14:16:01 -05'00'

EDWARD L. ROBERSON, P.E.

3 Attachments:
1. Planning Districts Map for Joint Base San Antonio, Fort Sam Houston
2. Details of the Proposed Action
3. Proposed ADP Projects by Planning District

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

18 May 2022

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

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

Dear Chairman Nelson Sr.

The United States Air Force (Air Force) is preparing an Environmental Assessment (EA) for proposed Area Development Plan (ADP) projects at Joint Base San Antonio, Fort Sam Houston (JBSA-FSH), Texas. The ADP projects identify and evaluate future development program requirements unique to three JBSA-FSH planning districts: the Commercial District, Medical Education and Training District (hereafter, "Training District"), and Service District (**Attachment 1**). To account for possible environmental concerns, the Air Force is engaging early with all potentially affected Native American Tribes as it formulates this undertaking. Accordingly, the Air Force seeks consultation with the Comanche Nation, Oklahoma.

**Proposed Action**

The proposed ADP projects include a total of 35 short-term development actions and real property improvements that range in scope from new construction and demolition actions to repairs, renovations, and upgrades. Details of the Proposed Action are included in **Attachment 2**. The Air Force proposes to implement the projects from approximately 2023 to 2027. The intent of these projects is to provide improvements and infrastructure necessary to support the mission and mission support capabilities of JBSA-FSH and its tenant units. The proposed projects were identified as priorities for the Installation to maintain and improve the physical infrastructure of JBSA-FSH in support of military training and operations.

Pursuant to Section 106 of the *National Historic Preservation Act* (NHPA), implementing regulations at 36 CFR Part 800, and Department of Defense (DOD) Instruction 4710.02, *DoD Interactions with Federally Recognized Tribes,* we would like to initiate government-to-government consultation on the Proposed Action. Pursuant to 36 CFR §§ 800.4(a) and (b), we request your assistance defining the Area of Potential Effect (APE) and information on any historic properties located therein that may be affected by the proposed undertaking. The Air Force desires to discuss the proposal in detail with you so that we may understand and consider any comments, concerns, and suggestions you may have. Pursuant to 36 CFR § 800.4(a)(4), we invite you to provide information on any properties of historic, religious,

or cultural significance that may be affected by our proposed undertaking. Regardless of whether the Comanche Nation, Oklahoma chooses to consult on this project, the Air Force will comply with the *Native American Graves Protection and Repatriation Act* by informing you of any inadvertent discovery of archaeological or human remains and consulting on their disposition. As this is a federal proposed undertaking, we are also seeking the input the Texas State Historic Preservation Office and other stakeholders with an expressed interest in these projects.

**Purpose and Need**

The purpose of the Proposed Action at JBSA-FSH is to develop, improve, and maintain JBSA-FSH to accommodate future mission growth. The DOD is consolidating its military medical mission at JBSA-FSH to include education and training. JBSA-FSH also provides healthcare services to a large population of Veterans residing in and around the San Antonio metropolitan area. The Installation requires a development approach that retains its unique characteristics and results in land use that is compatible, connected, safe, and secure. A secondary objective of the Proposed Action is to develop JBSA-FSH in a manner that provides flexibility to meet future mission requirements, some of which are not yet known.

The Proposed Action is needed to address the condition and capability of facilities and infrastructure at JBSA-FSH. Many buildings and infrastructure systems are outdated and in poor condition; others lack the functionality required to accomplish the mission. These real-property assets require maintenance, renovation, expansion, or replacement to sustain current operational levels and support future mission expansion. The Proposed Action is also needed to create space for and improve existing communal areas (e.g., recreation and leisure) on JBSA-FSH that contribute to quality of life.

**Project Location**

The Proposed Action would occur in the central and east-northeast portions of JBSA-FSH. **Attachment 3** depicts the projects under the Proposed Action as categorized for analysis in the EA.

**Environmental Assessment**

The EA will assess the potential environmental consequences associated with the Proposed Action and No Action Alternatives. Potential impacts identified during the initial planning stages include effects on air quality, infrastructure/utilities, biological resources, cultural resources, geological resources, and water resources. The EA will also examine the reasonably foreseeable environmental trends and planned actions that, when combined with the Proposed Action, could result in potential adverse cumulative effects on a regional scale. In support of this process, we request your input in identifying general or specific issues or areas of concern you believe should be addressed in the EA. As a government-to-government consultation, we would appreciate any input you have to identify properties of cultural and religious significance that may be located within the APE for this action and regarding concerns of potential effects of the Proposed Action on significant cultural resources. We also intend to provide the Comanche Nation, Oklahoma with a copy of the Draft EA once the document is completed and welcome comments and input at that time as well. Please inform us if additional copies are needed or if someone else within your organization other than you should receive the Draft EA.

So that we remain on schedule to complete the environmental impact analysis process in a timely manner, please provide your response within 30 days from receipt of this correspondence. Please send your response via postal mail or email (preferred) to michael.waldrop.1@us.af.mil.

The Air Force appreciates your interest in and support of its military mission at JBSA-FSH. We thank you in advance for your assistance and look forward to your response.

Sincerely

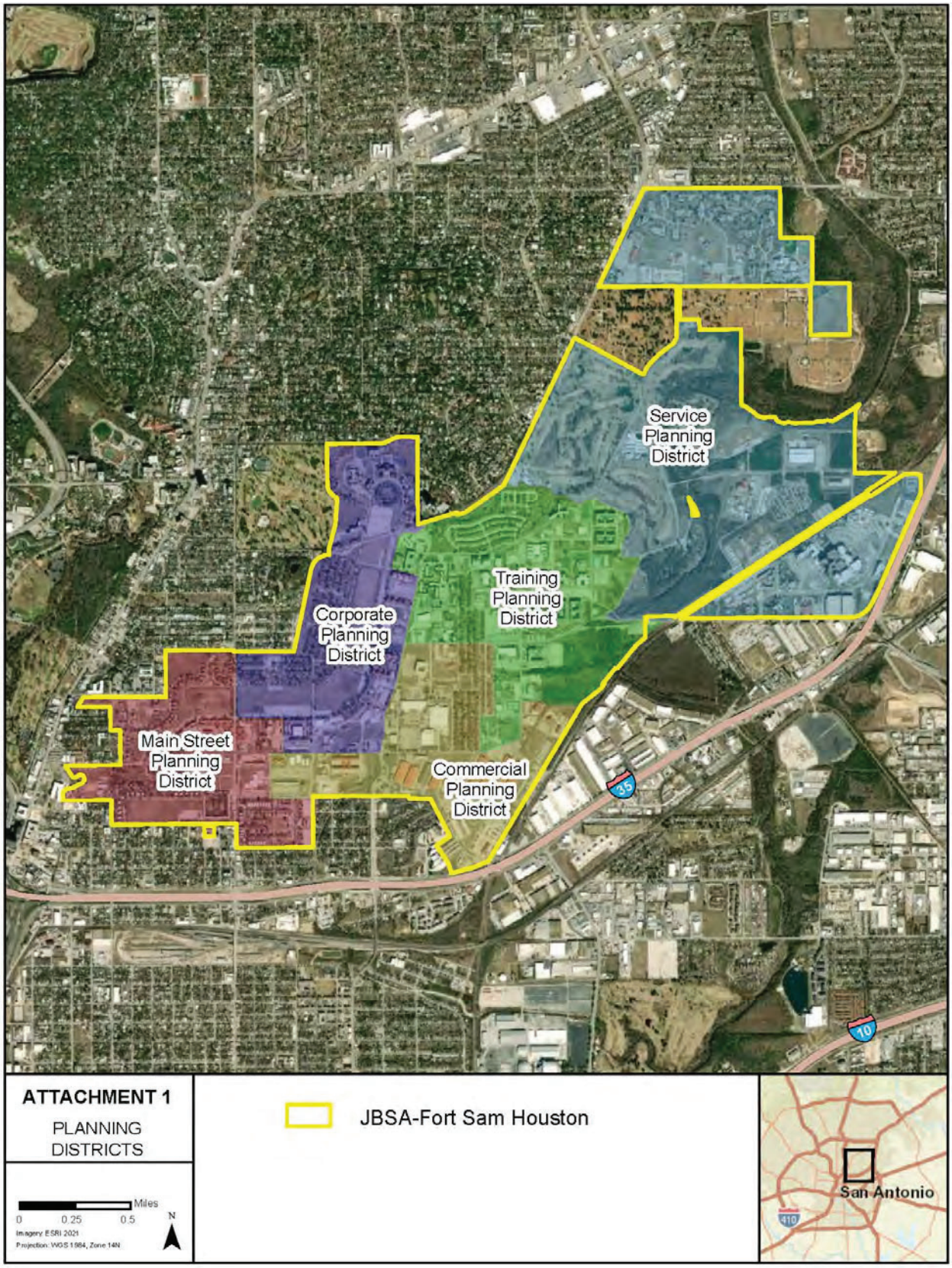
WALDROP.MICHAEL.DUANE.1160753451

Digitally signed by WALDROP.MICHAEL.DUANE.1160753451
Date: 2022.04.26 14:55:44 -05'00'

MICHAEL D. WALDROP

3 Attachments:
1. Planning Districts Map for Joint Base San Antonio, Fort Sam Houston
2. Details of the Proposed Action
3. Proposed ADP Projects by Planning District

Attachment 1 – Planning Districts Map for Joint Base San Antonio, Fort Sam Houston



# Attachment 2 – Details of the Proposed Action

## List of Proposed ADP Projects for the Commercial District

| Map ID[a] | Project | Approx. Size or Footprint[b] |
|---|---|---|
| **Construction and Demolition** | | |
| **C1** | Construct entertainment center, phase II (N). | 35,000 |
| **C2** | Construct Army lodging hotel; phases II & III (Sub-District North [N]). | 305,000 |
| **C3** | Resurface Ludington Road; construct cul-de-sac at the end of Ludington Road (E). | 42,030 |
| **C4** | Construct entertainment center, phase I (N). | 52,000 |
| **D5** | Demolish B-2420, B-2434, and B-2540 (N). | -160,546 |
| **C6** | Construct traffic circle (N). | 76,950 |
| **C7** | Construct TEMF (E). | 18,360 |
| **C8** | Construct fuel depot (E). | |
| **D9** | Demolish B-350, B-2400, and B-2401 (N). | -191,170 |
| **Infrastructure** | | |
| **I1** | Provide trailer switch point; resurface existing pavement and provide fencing/lighting (S & E). | 3,560 |

Notes:
a Numerical and alphabetical Map IDs correspond with **Attachment 3-1**.
b Approximate size in square feet unless noted otherwise.
ac = acre(s); B = Building (e.g., Building 350 is B-350); E = East Campus; N = North Campus; TEMF = Tactical Equipment Maintenance Facility

## List of Proposed ADP Projects for the Training District

| Map ID[a] | Project | Approx. Size or Footprint[b] |
|---|---|---|
| **Construction and Demolition** | | |
| **C10** | Construct sidewalks between B-3312 and B-3314 to DFAC (NE). | 2,300 |
| **C11** | Construct fence between North Housing Area and William Hardee Road (NW). | 1,300 |
| **C12** | Construct pedestrian bridge across Williams Way (NE). | |
| **C13** | Construct sidewalk/path between 900s building block to sidewalk network east (NW). | 900 |
| **C14** | Construct covered areas for troop staging at B-1287 DFAC (NW). | 7,200 |
| **C15** | Construct sidewalk/path between 900s building block to DFAC (NW). | 900 |
| **C16** | Construct food inspection building and relocate operations from B-325 (NW). | 30,000 |
| **C17** | Construct single-bay POV wash rack (NW). | |
| **C18/D18** | Demolish B-1111 and construct additional parking (NW). | 3,166 |
| **C19/D19** | Demolish B-1158, B-1159, and B-1162; construct temporary facilities (S). | 4,889 |
| **C20/D20** | Demolish B-1161 and construct temporary facilities (S). | 13,552 |
| **C21/D21** | Demolish B-1151, B-1152, B-1153, and B-1154 and construct temporary facilities (S). | 20,000 |
| **C22** | Construct two dormitory facilities. | 350,000 |
| **Infrastructure** | | |
| **I2** | Improve sidewalks and add sidewalk lighting (District-wide; NE). | |
| **I3** | Repair and level athletic field (NE). | |
| **I4** | Relocate Binz-Engleman ACP (NE). | |
| **I5** | Renovate/convert B-1160 from housing to administrative facility (S). | 12,896 |

Notes:
a Numerical and alphabetical Map IDs correspond with **Attachment 3-2**.
b Approximate size in square feet unless noted otherwise.
ACP = Access Control Point; B = Building (e.g., Building 3312 is B-3312); DFAC = Dining Facility; NE = Northeast Campus; NW = Northwest Campus; POV = Privately Owned Vehicle; S = South Campus

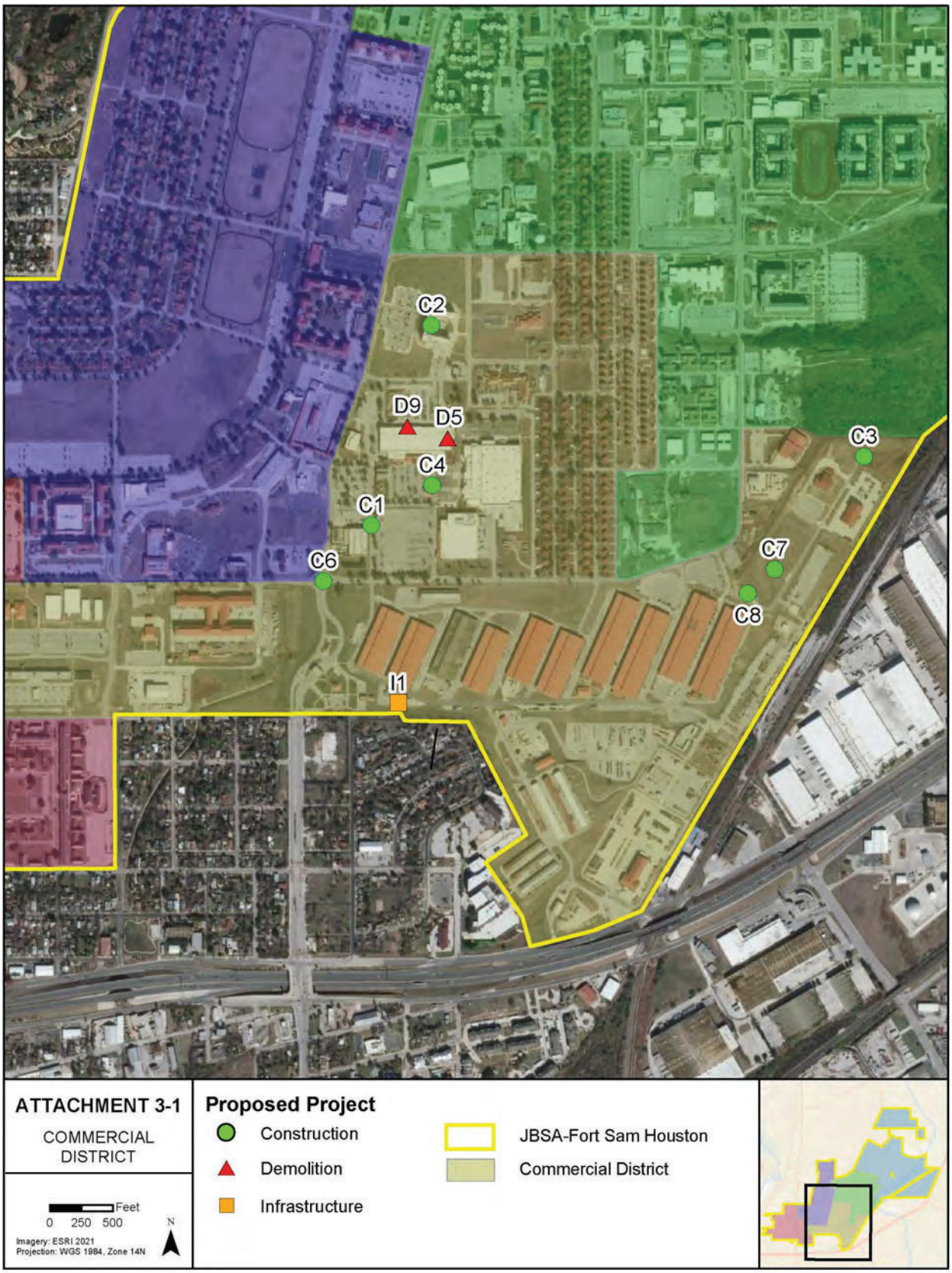
# Attachment 2 – Details of the Proposed Action

**List of Proposed ADP Projects for the Services District**

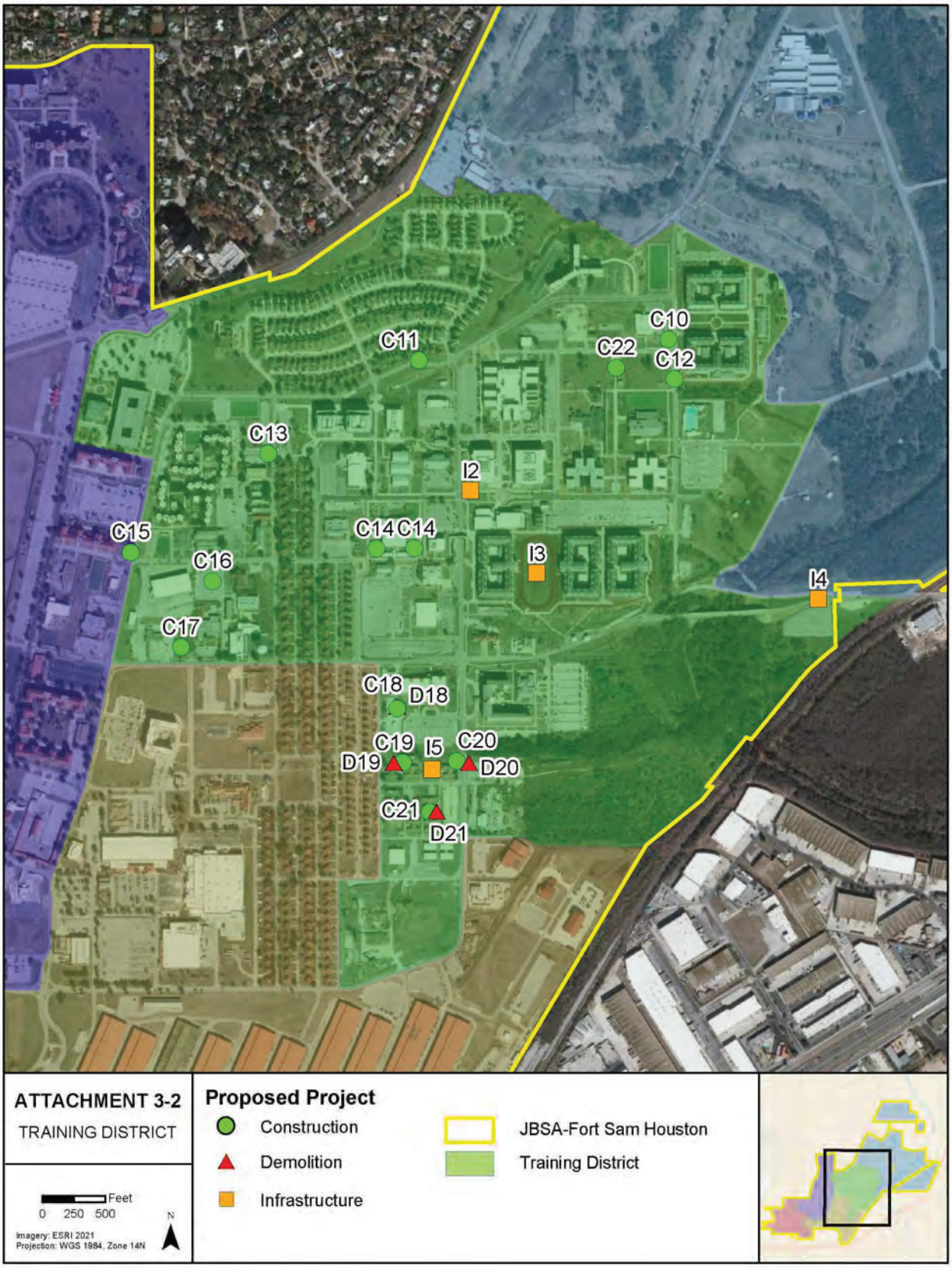
| Map ID[a] | Project | Approx. Size or Footprint[b] |
|---|---|---|
| **Construction and Demolition** | | |
| **C23** | Construct military working dog facility. | 9,000 |
| **C24** | Expand/construct addition to school district elementary school gym. | 8,000 |
| **C25** | Construct Directed Energy Research Center; construct addition to TSRL. | 543,000 |
| **C26** | Construct new school district office. | 5,400 |
| **C27** | Construct new school district bus barns. | 21,000 |
| **C28** | Construct new school district arts and craft building. | 20,000 |
| **C29** | Construct new school district office athletic fields and parking lot. | |
| **Infrastructure** | | |
| **I6** | Upgrade/improve youth soccer fields. | |

Notes:
a Numerical and alphabetical Map IDs correspond with **Attachment 3-3**.
b Approximate size in square feet unless noted otherwise.
TSRL = Tri-Services Research Lab

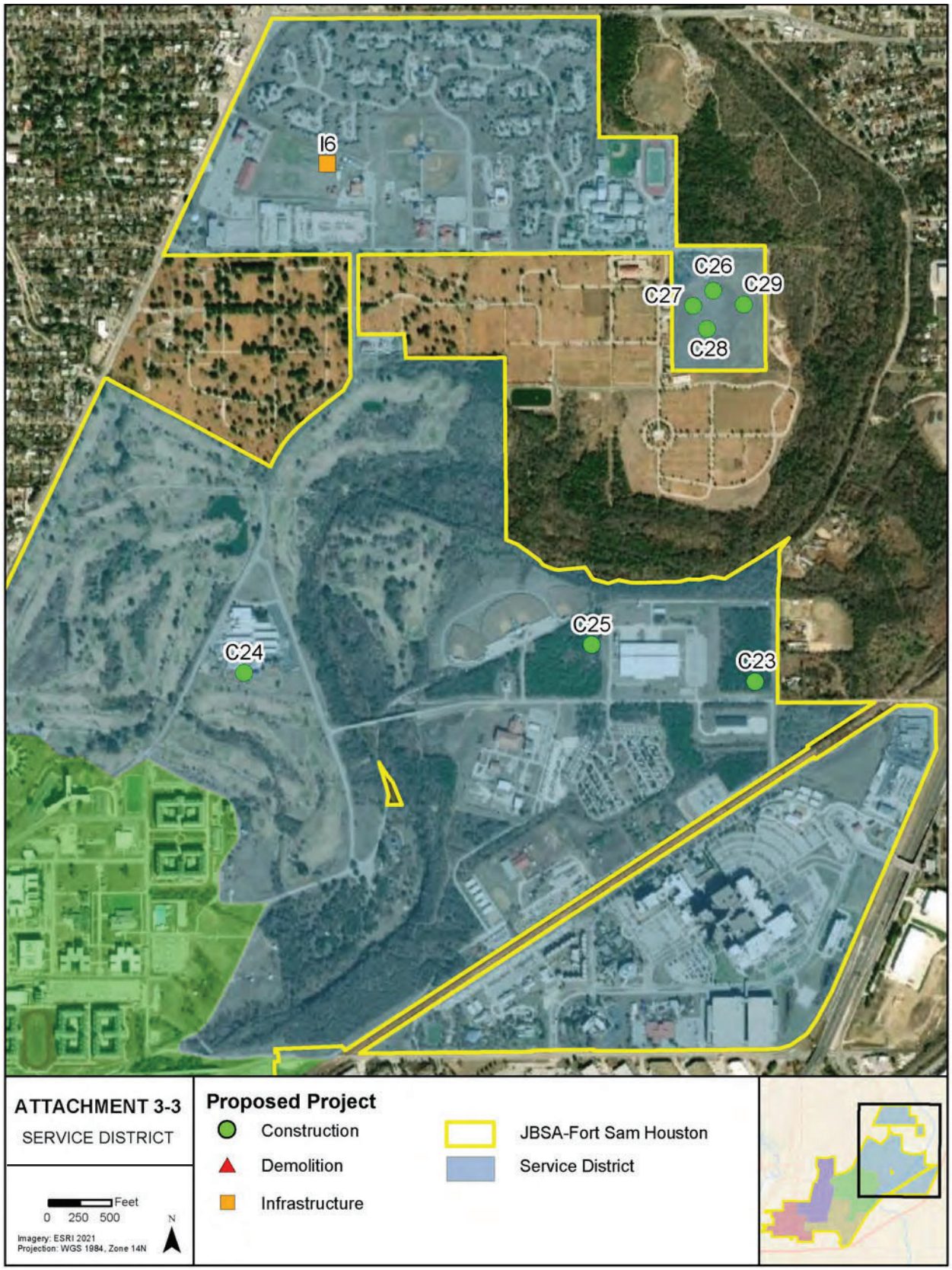
Attachment 3 – Proposed ADP Projects by Planning District



Attachment 3 – Proposed ADP Projects by Planning District



Attachment 3 – Proposed ADP Projects by Planning District



# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

June 10, 2022

Sarah Otto
Environmental Compliance
U.S. Air Force
1555 Gott Street, Building 5595
JBSA-Lackland, TX 78236

Via: **E-mail**

Re: **TCEQ NEPA Request #2022-073. Area Development Plan (ADP) Projects (JBSA-FSH). Bexar County.**

Dear Ms. Otto,

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 was reviewed for potential air quality impact. The proposed action is located in Bexar County, which is designated nonattainment for the 2015 Eight-Hour Ozone National Ambient Air Quality Standard (NAAQS) with a classification of marginal. Additionally, the EPA has proposed to reclassify Bexar County to moderate nonattainment. 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 general conformity de minimis emissions level, which is 100 tons per year for ozone NAAQS marginal and moderate nonattainment areas. The TCEQ looks forward to reviewing the draft EA for this proposed project when it is completed.

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

Any debris or waste disposal should be at an appropriately authorized disposal facility. If the facility intends to store hazardous waste for more than 90 days, they need to coordinate with our Waste Permits Division to seek authorization prior to storage.

The Remediation Division recommends that the environmental assessment considers all Fort Sam Houston records related to the military munitions response program (MMRP) sites and deed notices before beginning any activities involving ground disturbance such as near the BAMC area, and Landfill 8B. These two areas are known to contain or possibly contain subsurface munitions debris (MD) and/or munitions and explosives of concern (MEC) as result of historic activities. The deed notices also outline the protocol to follow in the event MD and/or MEC is encountered on the property.

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

TEXAS PARKS & WILDLIFE

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Commissioners

Arch "Beaver" Aplin, III
Chairman
Lake Jackson

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Cleveland

Paul L. Foster
El Paso

Anna B. Galo
Laredo

Jeffery D. Hildebrand
Houston

Robert L. "Bobby" Patton, Jr.
Fort Worth

Travis B. "Blake" Rowling
Dallas

Lee M. Bass
Chairman-Emeritus
Fort Worth

T. Dan Friedkin
Chairman-Emeritus
Houston

Carter P. Smith
Executive Director

June 8, 2022

ATTN: Sarah Otto
802d CES/CEIE-Environmental Compliance
1555 Gott Street, Building 5595
JBSA-Lackland, TX 78236

RE: United States Air Force Environmental Assessment evaluating proposed Area Development Plan, Joint Base San Antonio, Fort Sam Houston, Bexar County, Texas

Dear Ms. Otto:

Texas Parks and Wildlife Department (TPWD) received the review request regarding the proposed project referenced above. The United States Air Force (Air Force) is preparing an Environmental Assessment (EA) to evaluate the potential environmental impacts associated with the project.

## Project Description

The proposed Area Development Project (ADP) would include 35 short-term development actions and real property improvements ranging in scope from new construction and demolition to repairs, renovations, and upgrades. The components of the project would occur within the Commercial District, Medical Education and Training District (Training District), and Service District on Joint Base San Antonio, Fort Sam Houston (JBSA-FSH). The majority of proposed ADP construction, demolition, and infrastructure improvement projects would occur in heavily developed, previously disturbed areas.

TPWD staff reviewed the information provided and offers the following comments and recommendations.

## General Construction Recommendation

TPWD provides the following beneficial management practices (BMP) to assist in project planning.

**Recommendation:** TPWD recommends the judicious use and placement of sediment control fence to exclude wildlife from discrete construction areas, when applicable. In many cases, sediment control fence placement for the purposes of controlling erosion and protecting water quality can be modified minimally to also provide the benefit of excluding wildlife access to construction areas. The exclusion fence should be buried at least six inches and be at least 24 inches high. The exclusion fence should be maintained for the life of the project and only removed after the construction is completed and

4200 SMITH SCHOOL ROAD
AUSTIN, TEXAS 78744-3291
512.389.4800
www.tpwd.texas.gov

disturbed areas have been revegetated with site-specific native species. Construction personnel should be encouraged to examine the inside of exclusion areas daily to determine if any wildlife species have been trapped inside the areas of impact and provide safe egress opportunities prior to initiation of construction activities.

**Recommendation:** TPWD recommends that any open trenches or excavation areas (e.g., for buried electrical lines, water or wastewater pipelines) be covered overnight and/or inspected every morning to ensure no wildlife species have been trapped. For open trenches and excavated areas that cannot be covered overnight, escape ramps fashioned from soil or boards should be installed at an angle of less than 45 degrees (1:1) in the trenches to allow wildlife to climb out on their own.

**Recommendation:** For soil stabilization and/or revegetation of disturbed areas, TPWD recommends erosion and seed/mulch stabilization materials that avoid entanglement hazards to snakes and other wildlife species. TPWD recommends the use of no-till drilling, hydromulching and/or hydroseeding due to a reduced risk to wildlife.

**Recommendation:** Because the mesh found in many erosion control blankets or mats pose an entanglement hazard to wildlife, TPWD recommends avoiding the use of plastic mesh matting. If erosion control blankets or mats containing netting must be used, the netting should be loosely woven, natural fiber material where the mesh design allows the threads to move, therefore allowing expansion of the mesh openings. Plastic mesh matting and hydromulch containing microplastics should be avoided.

**Recommendation:** For encounters with rare species that will not readily leave a work area, TPWD recommends an authorized individual translocate the animal. Translocations of reptiles should be the minimum distance possible from the work area. Ideally, individuals to be relocated should be transported to the closest suitable habitat outside of the active construction area; preferably within 100 to 200 yards and not greater than one mile from the capture site. State-listed species may only be handled by persons with appropriate authorization from the TPWD Wildlife Permits Office. For more information regarding Wildlife Permits, please contact the Wildlife Permits Office at (512) 389-4647.

## Impacts to Vegetation/Wildlife Habitat

Some proposed projects would require the removal of vegetation including trees (e.g., to construct military working dog facility, Direct Energy Research Center). There were minimal details provided on vegetation removal or proposed revegetation/landscaping; therefore, TPWD has provided the following recommendations to assist in project planning.

> **Recommendation:** TPWD recommends reducing the amount of vegetation proposed for clearing if possible and minimizing clearing native vegetation, particularly mature, mast producing native trees and shrubs, and riparian vegetation, to the greatest extent practicable. After the proposed project components have been completed, TPWD recommends restoring vegetation on the sites, particularly around administrative or residential buildings. Revegetation or post-construction landscaping plans should focus on native plant species. Colonization by invasive species, particularly invasive grasses and weeds, should be actively prevented. Vegetation management should include removing invasive species early on while allowing existing native plants to revegetate disturbed areas. TPWD recommends referring to the Lady Bird Johnson Wildflower Center Native Plant Database for regionally adapted native species that would be appropriate for landscaping and revegetation.

*Landscaping for Monarch Butterflies and Pollinators*

Significant declines in the population of migrating monarch butterflies (*Danaus plexippus*) have led to widespread concern about this species and the long-term persistence of the North American monarch migration. As part of an international conservation effort, TPWD has developed the *Texas Monarch and Native Pollinator Conservation Plan*. One of the broad categories of action in the plan is to augment larval feeding and adult nectaring opportunities.

> **Recommendation:** TPWD recommends incorporating pollinator conservation and management into revegetation and landscaping plans. TPWD recommends revegetation efforts include planting or seeding native milkweed (*Asclepias* spp.) and nectar plants as funding and seed availability allow. Information about monarch biology, migration, and butterfly gardening can be found on the Monarch Watch website. Information related to pollinator conservation in Texas, including planting recommendations, are available in the TPWD publication *Management Recommendations for Native Insect Pollinators in Texas* (available online).

Additional information and guidance regarding pollinator conservation can be found in the U.S. Air Force Pollinator Conservation Reference Guide (2017).

## Federal Regulations

*Migratory Bird Treaty Act*

The Migratory Bird Treaty Act (MBTA) prohibits taking, attempting to take, capturing, killing, selling, purchasing, possessing, transporting, and importing of migratory birds, their eggs, parts, or nests, except when specifically authorized by the Department of the Interior. This protection applies to most native bird species, including ground nesting species. The U.S. Fish and Wildlife Service (USFWS) Migratory Bird Office can be contacted at (505) 248-7882 for more information on potential impacts to migratory birds.

**Recommendation:** TPWD recommends the EA evaluate potential impacts to nesting birds in proposed project areas. Potential adverse impacts to nesting birds can be avoided or minimized by scheduling vegetation clearing to occur outside of the general bird nesting season (March 15 through September 15). If disturbance within the project areas must be scheduled to occur during the nesting season, TPWD recommends any vegetation to be impacted (trees, shrubs, and grasses) or bare ground where occupied nests may be located should be surveyed for active nests by a qualified biologist prior to clearing. Nest surveys should be conducted no more than five days prior to scheduled clearing in order to maximize the detection of active nests, including recently constructed nests. If active nests are observed during surveys, TPWD recommends a 100-foot radius buffer of vegetation remain around nests until eggs have hatched and the young have fledged; however, the size of the buffer zone is dependent on various factors and can be coordinated with the local or regional USFWS office.

## State Regulations

*Parks and Wildlife Code – Chapter 64, Birds*

Texas Parks and Wildlife Code (PWC), section 64.002, regarding the protection of nongame birds, provides that no person may catch, kill, injure, pursue, or possess a bird that is not a game bird. PWC section 64.003, regarding destroying nests or eggs, provides that, no person may destroy or take the nests, eggs, or young and any wild game bird, wild bird, or wild fowl. PWC chapter 64 does not allow for incidental take.

Although not documented in the Texas Natural Diversity Database (TXNDD), many bird species which are not listed as *threatened* or *endangered* are protected by chapter 64 of the PWC and are known to be year-round or seasonal residents or seasonal migrants through the proposed project area.

> **Recommendation:** Please review the *Federal Regulations: Migratory Bird Treaty Act* section above for recommendations as they are applicable for compliance with Chapter 64 of the Parks and Wildlife Code.

*Parks and Wildlife Code, Section 68.015*

PWC regulates state-listed threatened and endangered animal species. The capture, trap, take, or killing of state-listed threatened and endangered animal species is unlawful unless expressly authorized under a permit issued by the USFWS or TPWD. A copy of *TPWD Guidelines for Protection of State-Listed Species*, which includes a list of penalties for take of species, can be found on the TPWD Wildlife Habitat Assessment Program website. As indicated above, state-listed species may only be handled by persons with appropriate authorization from the TPWD Wildlife Permits Office.

The potential occurrence of state-listed species in the project area is primarily dependent upon the availability of suitable habitat. Direct impacts to high quality or suitable habitat therefore are directly proportional to the magnitude and potential to directly impact state-listed species. State-listed reptiles that are typically slow moving or unable to move due to cool temperatures are especially susceptible to being directly impacted (i.e., crushing by heavy equipment) during site preparation activities. Small wildlife such as lizards, turtles, and snakes are susceptible to falling into open pits, excavations, trenches, etc. left open and/or uncovered in a project area.

Please be aware that determining the actual presence of a species in a given area depends on many variables including daily and seasonal activity cycles, environmental activity cues, preferred habitat, transiency and population density (both wildlife and human). The absence of a species can be demonstrated only with great difficulty and then only with repeated negative observations, taking into account all the variable factors contributing to the lack of detectable presence.

> **Recommendation:** TPWD recommends reviewing the most current TPWD annotated county lists of rare species for Bexar County. The annotated county lists are available online at the TPWD Wildlife Diversity website. Environmental documents prepared for the project should include an inventory of existing natural resources within the project area. Specific evaluations should

be designed to predict project impacts upon these natural resources including potential impacts to state-listed species.

I appreciate the opportunity to review and comment on this project. Please contact me at (361) 431-6003 or **russell.hooten@tpwd.texas.gov** if we may be of further assistance.

Sincerely,

Russell Hooten
Wildlife Habitat Assessment Program
Wildlife Division

/rh 48574

**References**

USFWS. 2017. *U.S. Air Force Pollinator Conservation Reference Guide*, Air Force Civil Engineer Center, San Antonio, TX, 182 pp. + Appendix A (Species maps and profiles) and B (Restoration and landscaping information).

# United States Department of the Interior

FISH AND WILDLIFE SERVICE
Austin Ecological Services Field Office
10711 Burnet Road, Suite 200
Austin, TX 78758-4460
Phone: (512) 490-0057 Fax: (512) 490-0974

In Reply Refer To: July 15, 2022
Project Code: 2022-0064010
Project Name: Proposed Area Development Plan (ADP) Projects at Joint Base San Antonio, Fort Sam Houston (JBSA-FSH)

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)

(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

**Migratory Birds**: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see https://www.fws.gov/birds/policies-and-regulations.php.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures see https://www.fws.gov/birds/bird-enthusiasts/threats-to-birds.php.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/birds/policies-and-regulations/executive-orders/e0-13186.php.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

# Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

**Austin Ecological Services Field Office**
10711 Burnet Road, Suite 200
Austin, TX 78758-4460
(512) 490-0057

# Project Summary

Project Code: 2022-0064010
Event Code: None
Project Name: Proposed Area Development Plan (ADP) Projects at Joint Base San Antonio, Fort Sam Houston (JBSA-FSH)
Project Type: Military Development
Project Description: The proposed ADP projects vary from new construction, expansion, and demolition actions to repairs, renovations, and upgrades. These projects can be classified into three general categories:

1) Construction - Projects include new development and redevelopment for expansion of the existing built environment, including new buildings, building additions, and new or expanded facilities for operational support.

2) Demolition - Projects include the temporary or permanent removal of existing buildings and structures in support of new development or redevelopment.

3) Infrastructure. Repair, renovation, maintenance, or improvement actions ranging from routine management actions (e.g., road, sidewalk, or utility system repairs or maintenance activities) to building renovation or modernization.

In total, 35 development actions and real property improvements are proposed at JBSA-FSH from approximately 2023 to 2027.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@29.46234855,-98.43563238718085,14z


Counties: Bexar County, Texas

# Endangered Species Act Species

There is a total of 21 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Note that 2 of these species should be considered only under certain conditions.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

---

1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

## Birds

| NAME | STATUS |
|---|---|
| Golden-cheeked Warbler *Setophaga chrysoparia*<br>No critical habitat has been designated for this species.<br>Species profile: https://ecos.fws.gov/ecp/species/33 | Endangered |
| Piping Plover *Charadrius melodus*<br>Population: [Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered.<br>There is **final** critical habitat for this species. The location of the critical habitat is not available.<br>This species only needs to be considered under the following conditions:<br>▪ Wind Energy Projects<br>Species profile: https://ecos.fws.gov/ecp/species/6039 | Threatened |
| Red Knot *Calidris canutus rufa*<br>There is **proposed** critical habitat for this species. The location of the critical habitat is not available.<br>This species only needs to be considered under the following conditions:<br>▪ Wind Energy Projects<br>Species profile: https://ecos.fws.gov/ecp/species/1864 | Threatened |

## Amphibians

| NAME | STATUS |
|---|---|
| San Marcos Salamander *Eurycea nana*<br>There is **final** critical habitat for this species. The location of the critical habitat is not available.<br>Species profile: https://ecos.fws.gov/ecp/species/6374 | Threatened |
| Texas Blind Salamander *Eurycea rathbuni*<br>No critical habitat has been designated for this species.<br>Species profile: https://ecos.fws.gov/ecp/species/5130 | Endangered |

## Fishes

| NAME | STATUS |
|---|---|
| Fountain Darter *Etheostoma fonticola*<br>There is **final** critical habitat for this species. The location of the critical habitat is not available.<br>Species profile: https://ecos.fws.gov/ecp/species/5858 | Endangered |

## Insects

| NAME | STATUS |
|---|---|
| [no Common Name] Beetle *Rhadine exilis*<br>There is **final** critical habitat for this species. The location of the critical habitat is not available.<br>Species profile: https://ecos.fws.gov/ecp/species/6942 | Endangered |
| [no Common Name] Beetle *Rhadine infernalis*<br>There is **final** critical habitat for this species. The location of the critical habitat is not available.<br>Species profile: https://ecos.fws.gov/ecp/species/3804 | Endangered |
| Comal Springs Dryopid Beetle *Stygoparnus comalensis*<br>There is **final** critical habitat for this species. The location of the critical habitat is not available.<br>Species profile: https://ecos.fws.gov/ecp/species/7175 | Endangered |
| Comal Springs Riffle Beetle *Heterelmis comalensis*<br>There is **final** critical habitat for this species. The location of the critical habitat is not available.<br>Species profile: https://ecos.fws.gov/ecp/species/3403 | Endangered |
| Helotes Mold Beetle *Batrisodes venyivi*<br>There is **final** critical habitat for this species. The location of the critical habitat is not available.<br>Species profile: https://ecos.fws.gov/ecp/species/1149 | Endangered |
| Monarch Butterfly *Danaus plexippus*<br>No critical habitat has been designated for this species.<br>Species profile: https://ecos.fws.gov/ecp/species/9743 | Candidate |

## Arachnids

| NAME | STATUS |
|---|---|
| Braken Bat Cave Meshweaver *Cicurina venii*<br>There is **final** critical habitat for this species. The location of the critical habitat is not available.<br>Species profile: https://ecos.fws.gov/ecp/species/7900 | Endangered |
| Cokendolpher Cave Harvestman *Texella cokendolpheri*<br>There is **final** critical habitat for this species. The location of the critical habitat is not available.<br>Species profile: https://ecos.fws.gov/ecp/species/676 | Endangered |
| Government Canyon Bat Cave Meshweaver *Cicurina vespera*<br>There is **final** critical habitat for this species. The location of the critical habitat is not available.<br>Species profile: https://ecos.fws.gov/ecp/species/7037 | Endangered |
| Government Canyon Bat Cave Spider *Tayshaneta microps*<br>There is **final** critical habitat for this species. The location of the critical habitat is not available.<br>Species profile: https://ecos.fws.gov/ecp/species/553 | Endangered |
| Madla Cave Meshweaver *Cicurina madla*<br>There is **final** critical habitat for this species. The location of the critical habitat is not available.<br>Species profile: https://ecos.fws.gov/ecp/species/2467 | Endangered |
| Robber Baron Cave Meshweaver *Cicurina baronia*<br>There is **final** critical habitat for this species. The location of the critical habitat is not available.<br>Species profile: https://ecos.fws.gov/ecp/species/2361 | Endangered |

## Crustaceans

| NAME | STATUS |
|---|---|
| Peck's Cave Amphipod *Stygobromus (=Stygonectes) pecki*<br>There is **final** critical habitat for this species. The location of the critical habitat is not available.<br>Species profile: https://ecos.fws.gov/ecp/species/8575 | Endangered |

## Flowering Plants

| NAME | STATUS |
|---|---|
| Bracted Twistflower *Streptanthus bracteatus*<br>There is **proposed** critical habitat for this species. The location of the critical habitat is not available.<br>Species profile: https://ecos.fws.gov/ecp/species/2856 | Proposed Threatened |
| Texas Wild-rice *Zizania texana*<br>There is **final** critical habitat for this species. The location of the critical habitat is not available.<br>Species profile: https://ecos.fws.gov/ecp/species/805 | Endangered |

## Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

## IPaC User Contact Information

Agency: Army Corps of Engineers
Name: Nicholas Sutton
Address: 350 Hills St
Address Line 2: Suite 112
City: Richland
State: WA
Zip: 99354
Email nsutton@easbio.com
Phone: 6789382429

## Lead Agency Contact Information

Lead Agency: Air Force

# APPENDIX B
# PUBLIC NOTICES

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**NOTICE FOR EARLY PUBLIC REVIEW OF A PROPOSED ACTIVITIES WITHIN FLOODPLAINS – UNITED STATES AIR FORCE**

The U.S. Air Force (USAF) is inviting early public input on proposed activities at Joint Base San Antonio (JBSA) with potential to affect floodplains and wetlands resources. The USAF is proposing to implement various development and modernization projects on the four primary military basesthat comprise JBSA: Bullis, Lackland, Randolph, and Sam Houston. The proposed projects were identified as part of JBSA's integrated installation (master) planning process as being of a high priority for JBSA to continue its military mission and mission support functions within and around the San Antonio, Texas metropolitan area. More specifically, the projects were recommended as short-term phase components in area development plans (ADPs) prepared for different geographic areas on each JBSA base. The ADPs are sub-component plans of JBSA's installation development plan (IDP), a region-level plan that guides future development across all JBSA real property assets.

The proposed development actions and improvements under consideration by the USAF at JBSA range in scope from new construction and demolition to repairs, renovations, and upgrades. The USAF proposes to implement these projects in phases from approximately 2023 to 2027. To comply with the National Environmental Policy Act (NEPA), the USAF is preparing environmental assessments (EAs) for the proposed actions at each JBSA military base to analyze the potential environmental impacts of its development plans. The Draft EAs will be made available for public review and comment in the summer and fall of 2022.

Because select projects under consideration at each military base 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. As the projects are currently in the pre-planning stage, additional details will be made available in the forthcoming Draft EAs for public

review. The USAF plans to use these NEPA processes 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.

Accordingly, the USAF seeks your input with respect to potential effects on floodplains and wetlands that could result from the proposed actions at JBSA. Public comments received in response to this notice, as well as those received through public participation in the NEPA processes currently underway, will assist the USAF to comply 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, via email (preferred) to 802CES.CEIE.NEPATeam@us.af.mil.

# HEARST

**MEDIA SOLUTIONS**

San Antonio Express News | ExpressNews.com | mySA.com

**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 | 34187271 | SAE Express-News | 03/11/22 |
| | | | SAE Express-News | 03/12/22 |

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Geena Garza
**Geena Garza**
**Bookkeeper**

**Sworn and subscribed to before me, this** 15th **day of** Mar. **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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Attn: Advertising AR Department
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San Antonio, TX 78297

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34187271

# AFFIDAVIT OF PUBLICATION

I am a regular employee of American City Business Journals and have personal knowledge of the publication information described in this Affidavit of Publication. The Notice for Early Public Review attached below was published under United States Air Force in the following issues of the San Antonio Business Journal: 3/11/22.

**NOTICE FOR EARLY PUBLIC REVIEW OF A PROPOSED ACTIVITIES WITHIN FLOODPLAINS – UNITED STATES AIR FORCE**

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

Michael Wall

(Signature)

PRINTED NAME: Michael Wall
who provided a Washington DL

State of Florida
County of Miami-Dade

March 28th, 2022

I certify that I know or have satisfactory evidence (1) that Michael Wall signed this Affidavit of Publication, (2) that he or she acknowledged that he or she signed this Affidavit of Publication and (3) that he or she acknowledged it to be his or her free and voluntary act for the uses and purposes mentioned therein.

(Notary's Signature)

Printed Name: Samer Gorrin Vazquez

NOTARY PUBLIC • STATE OF FLORIDA •

SAMER GORRIN VAZQUEZ
Notary Public - State of Florida
Commission # HH17982
Expires on July 6, 2024

Notarized online using audio-video communication

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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:** FORT SAM
**State:** Texas
**County(s):** Bexar
**Regulatory Area(s):** San Antonio, TX

**b. Action Title:** Proposed ADP Improvments at JBSA-FSH

**c. Project Number/s (if applicable):** N/A

**d. Projected Action Start Date:** 1 / 2023

**e. Action Description:**

Full implimentation or no action alternative.

**f. Point of Contact:**


**Name:** Rebecca Steely
**Title:** Environmental Planner
**Organization:** Environmental Assessment Services, LLC
**Email:** Rebecca.Steely@easbio.com
**Phone Number:** (585)410-1110


**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:**

**2023**

| Pollutant | Action Emissions (ton/yr) | GENERAL CONFORMITY | |
|---|---|---|---|
| | | Threshold (ton/yr) | Exceedance (Yes or No) |
| San Antonio, TX | | | |
| **VOC** | 4.362 | 100 | No |
| **NOx** | 4.051 | 100 | No |
| **CO** | 4.559 | | |
| **SOx** | 0.013 | | |
| **PM 10** | 18.028 | | |
| **PM 2.5** | 0.179 | | |
| **Pb** | 0.000 | | |
| **NH3** | 0.004 | | |
| **CO2e** | 1534.7 | | |

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

## 2024

| Pollutant | Action Emissions (ton/yr) | GENERAL CONFORMITY | |
|---|---|---|---|
| | | Threshold (ton/yr) | Exceedance (Yes or No) |
| San Antonio, TX | | | |
| **VOC** | 4.397 | 100 | No |
| **NOx** | 4.925 | 100 | No |
| **CO** | 5.492 | | |
| **SOx** | 0.020 | | |
| **PM 10** | 18.098 | | |
| **PM 2.5** | 0.249 | | |
| **Pb** | 0.000 | | |
| **NH3** | 0.004 | | |
| **CO2e** | 2903.4 | | |

## 2025

| Pollutant | Action Emissions (ton/yr) | GENERAL CONFORMITY | |
|---|---|---|---|
| | | Threshold (ton/yr) | Exceedance (Yes or No) |
| San Antonio, TX | | | |
| **VOC** | 4.435 | 100 | No |
| **NOx** | 5.828 | 100 | No |
| **CO** | 6.429 | | |
| **SOx** | 0.027 | | |
| **PM 10** | 18.171 | | |
| **PM 2.5** | 0.322 | | |
| **Pb** | 0.000 | | |
| **NH3** | 0.004 | | |
| **CO2e** | 4272.2 | | |

## 2026

| Pollutant | Action Emissions (ton/yr) | GENERAL CONFORMITY | |
|---|---|---|---|
| | | Threshold (ton/yr) | Exceedance (Yes or No) |
| San Antonio, TX | | | |
| **VOC** | 4.458 | 100 | No |
| **NOx** | 6.255 | 100 | No |
| **CO** | 6.787 | | |
| **SOx** | 0.029 | | |
| **PM 10** | 18.203 | | |
| **PM 2.5** | 0.354 | | |
| **Pb** | 0.000 | | |
| **NH3** | 0.004 | | |
| **CO2e** | 4785.6 | | |

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

## 2027

| Pollutant | Action Emissions (ton/yr) | GENERAL CONFORMITY | |
|---|---|---|---|
| | | Threshold (ton/yr) | Exceedance (Yes or No) |
| San Antonio, TX | | | |
| **VOC** | 4.443 | 100 | No |
| **NOx** | 5.971 | 100 | No |
| **CO** | 6.549 | | |
| **SOx** | 0.028 | | |
| **PM 10** | 18.182 | | |
| **PM 2.5** | 0.333 | | |
| **Pb** | 0.000 | | |
| **NH3** | 0.004 | | |
| **CO2e** | 4443.8 | | |

## 2028 - (Steady State)

| Pollutant | Action Emissions (ton/yr) | GENERAL CONFORMITY | |
|---|---|---|---|
| | | Threshold (ton/yr) | Exceedance (Yes or No) |
| San Antonio, TX | | | |
| **VOC** | 0.195 | 100 | No |
| **NOx** | 3.553 | 100 | No |
| **CO** | 2.985 | | |
| **SOx** | 0.021 | | |
| **PM 10** | 0.270 | | |
| **PM 2.5** | 0.270 | | |
| **Pb** | 0.000 | | |
| **NH3** | 0.000 | | |
| **CO2e** | 4278.0 | | |

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.

_____ _____

Rebecca Steely , Environmental Planner DATE

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# DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

## 1. General Information

**- Action Location**

**Base:** FORT SAM
**State:** Texas
**County(s):** Bexar
**Regulatory Area(s):** San Antonio, TX

**- Action Title:** Proposed ADP Improvments at JBSA-FSH

**- Project Number/s (if applicable):** N/A

**- Projected Action Start Date:** 1 / 2023

**- Action Purpose and Need:**

The purpose of the Proposed Action is to maintain its current mission capabilities through selected development actions and real-property improvements. As an active military airfield, requires modern facilities and infrastructure to carry out its mission and mission support functions. New or improved facilities connected by more integrated, networked utility and infrastructure systems would provide with mission-essential capabilities and operational security.

The Proposed Action is needed to address the condition and capability of facilities and infrastructure. Many buildings and infrastructure systems are outdated and in poor condition; others lack the functionality required to accomplish the mission. These real-property assets require maintenance, renovation, expansion, or replacement to remain operable and support future mission expansion. The Proposed Action would begin to address these deficiencies by implementing the selected projects in the short term.

See DOPAA for additional information

**- Action Description:**

Full implimentation or no action alternative.

**- Point of Contact**


**Name:** Rebecca Steely
**Title:** Environmental Planner
**Organization:** Environmental Assessment Services, LLC
**Email:** Rebecca.Steely@easbio.com
**Phone Number:** (585)410-1110


**- Activity List:**

| Activity Type | | Activity Title |
|---|---|---|
| 2. | Construction / Demolition | Year 1- proposed ADP Projects |
| 3. | Construction / Demolition | Year 2 - Proposed ADP Projects |
| 4. | Construction / Demolition | Year 3- Proposed ADP Projects |
| 5. | Construction / Demolition | Year 4 - Proposed ADP Projects |
| 6. | Construction / Demolition | Year 5 - Proposed ADP Projects |
| 7. | Heating | year 1 |
| 8. | Heating | Year 2 |
| 9. | Heating | Year 3 |
| 10. | Heating | year 4 |
| 11. | Heating | Year 5 |

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.

# DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

## 2. Construction / Demolition

### 2.1 General Information & Timeline Assumptions

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

**- Activity Title:** Year 1- proposed ADP Projects

**- Activity Description:**
Proposed projects

**- Activity Start Date**
**Start Month:** 1
**Start Month:** 2023

**- Activity End Date**
**Indefinite:** False
**End Month:** 12
**End Month:** 2023

**- Activity Emissions:**

| Pollutant | Total Emissions (TONs) |
|---|---|
| VOC | 4.341306 |
| $SO_x$ | 0.010877 |
| $NO_x$ | 3.672297 |
| CO | 4.240290 |
| PM 10 | 17.999159 |

| Pollutant | Total Emissions (TONs) |
|---|---|
| PM 2.5 | 0.149991 |
| Pb | 0.000000 |
| $NH_3$ | 0.004390 |
| $CO_2e$ | 1078.4 |
| | |

### 2.1 Demolition Phase

#### 2.1.1 Demolition Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 1
**Start Quarter:** 1
**Start Year:** 2023

**- Phase Duration**
**Number of Month:** 3
**Number of Days:** 0

#### 2.1.2 Demolition Phase Assumptions

**- General Demolition Information**
**Area of Building to be demolished ($ft^2$):** 81244
**Height of Building to be demolished (ft):** 14

**- Default Settings Used:** Yes

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

**- Construction Exhaust (default)**

| Equipment Name | Number Of Equipment | Hours Per Day |
|---|---|---|
| Concrete/Industrial Saws Composite | 1 | 8 |
| Excavators Composite | 3 | 8 |
| Rubber Tired Dozers Composite | 1 | 1 |
| Tractors/Loaders/Backhoes Composite | 2 | 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 |

### 2.1.3 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 | 0.0382 | 0.0006 | 0.2766 | 0.3728 | 0.0127 | 0.0127 | 0.0034 | 58.549 |
| **Excavators Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0614 | 0.0013 | 0.2820 | 0.5096 | 0.0117 | 0.0117 | 0.0055 | 119.71 |
| **Rubber Tired Dozers Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.1830 | 0.0024 | 1.2623 | 0.7077 | 0.0494 | 0.0494 | 0.0165 | 239.49 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0364 | 0.0007 | 0.2127 | 0.3593 | 0.0080 | 0.0080 | 0.0032 | 66.879 |

**- 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 | 000.265 | 000.002 | 000.200 | 003.208 | 000.006 | 000.005 | | 000.023 | 00325.859 |
| LDGT | 000.340 | 000.003 | 000.357 | 004.561 | 000.008 | 000.007 | | 000.024 | 00421.180 |
| HDGV | 000.737 | 000.005 | 000.984 | 015.455 | 000.018 | 000.016 | | 000.045 | 00783.227 |
| LDDV | 000.095 | 000.003 | 000.134 | 002.768 | 000.004 | 000.004 | | 000.008 | 00318.007 |
| LDDT | 000.236 | 000.004 | 000.383 | 004.740 | 000.007 | 000.006 | | 000.008 | 00451.951 |
| HDDV | 000.440 | 000.013 | 004.473 | 001.638 | 000.165 | 000.152 | | 000.028 | 01512.371 |
| MC | 002.730 | 000.003 | 000.697 | 012.599 | 000.026 | 000.023 | | 000.054 | 00395.818 |

### 2.1.4 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

## 2.2 Site Grading Phase

### 2.2.1 Site Grading Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 2
**Start Quarter:** 1
**Start Year:** 2023

**- Phase Duration**
**Number of Month:** 3
**Number of Days:** 0

### 2.2.2 Site Grading Phase Assumptions

**- General Site Grading Information**
**Area of Site to be Graded ($ft^2$):** 589357
**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 |
|---|---|---|
| Excavators Composite | 1 | 8 |
| Graders Composite | 1 | 8 |
| Other Construction Equipment Composite | 1 | 8 |
| Rubber Tired Dozers Composite | 1 | 8 |
| Scrapers Composite | 2 | 8 |
| Tractors/Loaders/Backhoes Composite | 3 | 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 |

# DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

### 2.2.3 Site Grading Phase Emission Factor(s)

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

| **Excavators Composite** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0614 | 0.0013 | 0.2820 | 0.5096 | 0.0117 | 0.0117 | 0.0055 | 119.71 |
| **Graders Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0757 | 0.0014 | 0.4155 | 0.5717 | 0.0191 | 0.0191 | 0.0068 | 132.91 |
| **Other Construction Equipment Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0483 | 0.0012 | 0.2497 | 0.3481 | 0.0091 | 0.0091 | 0.0043 | 122.61 |
| **Rubber Tired Dozers Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.1830 | 0.0024 | 1.2623 | 0.7077 | 0.0494 | 0.0494 | 0.0165 | 239.49 |
| **Scrapers Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.1640 | 0.0026 | 1.0170 | 0.7431 | 0.0406 | 0.0406 | 0.0148 | 262.85 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0364 | 0.0007 | 0.2127 | 0.3593 | 0.0080 | 0.0080 | 0.0032 | 66.879 |

**- 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 | 000.265 | 000.002 | 000.200 | 003.208 | 000.006 | 000.005 | | 000.023 | 00325.859 |
| LDGT | 000.340 | 000.003 | 000.357 | 004.561 | 000.008 | 000.007 | | 000.024 | 00421.180 |
| HDGV | 000.737 | 000.005 | 000.984 | 015.455 | 000.018 | 000.016 | | 000.045 | 00783.227 |
| LDDV | 000.095 | 000.003 | 000.134 | 002.768 | 000.004 | 000.004 | | 000.008 | 00318.007 |
| LDDT | 000.236 | 000.004 | 000.383 | 004.740 | 000.007 | 000.006 | | 000.008 | 00451.951 |
| HDDV | 000.440 | 000.013 | 004.473 | 001.638 | 000.165 | 000.152 | | 000.028 | 01512.371 |
| MC | 002.730 | 000.003 | 000.697 | 012.599 | 000.026 | 000.023 | | 000.054 | 00395.818 |

### 2.2.4 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

## 2.3 Trenching/Excavating Phase

### 2.3.1 Trenching / Excavating Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 8
**Start Quarter:** 1
**Start Year:** 2023

**- Phase Duration**
**Number of Month:** 3
**Number of Days:** 0

### 2.3.2 Trenching / Excavating Phase Assumptions

**- General Trenching/Excavating Information**
**Area of Site to be Trenched/Excavated ($ft^2$):** 680
**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)

**- 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 |

### 2.3.3 Trenching / Excavating Phase Emission Factor(s)

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

| **Excavators Composite** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0614 | 0.0013 | 0.2820 | 0.5096 | 0.0117 | 0.0117 | 0.0055 | 119.71 |
| **Graders Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0757 | 0.0014 | 0.4155 | 0.5717 | 0.0191 | 0.0191 | 0.0068 | 132.91 |
| **Other Construction Equipment Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0483 | 0.0012 | 0.2497 | 0.3481 | 0.0091 | 0.0091 | 0.0043 | 122.61 |
| **Rubber Tired Dozers Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.1830 | 0.0024 | 1.2623 | 0.7077 | 0.0494 | 0.0494 | 0.0165 | 239.49 |
| **Scrapers Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.1640 | 0.0026 | 1.0170 | 0.7431 | 0.0406 | 0.0406 | 0.0148 | 262.85 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0364 | 0.0007 | 0.2127 | 0.3593 | 0.0080 | 0.0080 | 0.0032 | 66.879 |

**- 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 | 000.265 | 000.002 | 000.200 | 003.208 | 000.006 | 000.005 | | 000.023 | 00325.859 |
| LDGT | 000.340 | 000.003 | 000.357 | 004.561 | 000.008 | 000.007 | | 000.024 | 00421.180 |
| HDGV | 000.737 | 000.005 | 000.984 | 015.455 | 000.018 | 000.016 | | 000.045 | 00783.227 |
| LDDV | 000.095 | 000.003 | 000.134 | 002.768 | 000.004 | 000.004 | | 000.008 | 00318.007 |
| LDDT | 000.236 | 000.004 | 000.383 | 004.740 | 000.007 | 000.006 | | 000.008 | 00451.951 |
| HDDV | 000.440 | 000.013 | 004.473 | 001.638 | 000.165 | 000.152 | | 000.028 | 01512.371 |
| MC | 002.730 | 000.003 | 000.697 | 012.599 | 000.026 | 000.023 | | 000.054 | 00395.818 |

### 2.3.4 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

## 2.4 Building Construction Phase

### 2.4.1 Building Construction Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 4
**Start Quarter:** 1
**Start Year:** 2023

**- Phase Duration**
**Number of Month:** 6
**Number of Days:** 0

### 2.4.2 Building Construction Phase Assumptions

**- General Building Construction Information**
**Building Category:** Office or Industrial
**Area of Building ($ft^2$):** 320248
**Height of Building (ft):** 14
**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 | 7 |
| Forklifts Composite | 2 | 7 |
| Generator Sets Composite | 1 | 8 |
| Tractors/Loaders/Backhoes Composite | 1 | 8 |
| Welders Composite | 3 | 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 |

### 2.4.3 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 | 0.0754 | 0.0013 | 0.5027 | 0.3786 | 0.0181 | 0.0181 | 0.0068 | 128.79 |
| **Forklifts Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0258 | 0.0006 | 0.1108 | 0.2145 | 0.0034 | 0.0034 | 0.0023 | 54.454 |
| **Generator Sets Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0320 | 0.0006 | 0.2612 | 0.2683 | 0.0103 | 0.0103 | 0.0028 | 61.065 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0364 | 0.0007 | 0.2127 | 0.3593 | 0.0080 | 0.0080 | 0.0032 | 66.879 |
| **Welders Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0242 | 0.0003 | 0.1487 | 0.1761 | 0.0067 | 0.0067 | 0.0021 | 25.657 |

**- 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 | 000.265 | 000.002 | 000.200 | 003.208 | 000.006 | 000.005 | | 000.023 | 00325.859 |
| LDGT | 000.340 | 000.003 | 000.357 | 004.561 | 000.008 | 000.007 | | 000.024 | 00421.180 |
| HDGV | 000.737 | 000.005 | 000.984 | 015.455 | 000.018 | 000.016 | | 000.045 | 00783.227 |
| LDDV | 000.095 | 000.003 | 000.134 | 002.768 | 000.004 | 000.004 | | 000.008 | 00318.007 |
| LDDT | 000.236 | 000.004 | 000.383 | 004.740 | 000.007 | 000.006 | | 000.008 | 00451.951 |
| HDDV | 000.440 | 000.013 | 004.473 | 001.638 | 000.165 | 000.152 | | 000.028 | 01512.371 |
| MC | 002.730 | 000.003 | 000.697 | 012.599 | 000.026 | 000.023 | | 000.054 | 00395.818 |

### 2.4.4 Building Construction Phase Formula(s)

**- 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

# DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

**- 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

# DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

## 2.5 Architectural Coatings Phase

### 2.5.1 Architectural Coatings Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 8
**Start Quarter:** 1
**Start Year:** 2023

**- Phase Duration**
**Number of Month:** 3
**Number of Days:** 0

### 2.5.2 Architectural Coatings Phase Assumptions

**- General Architectural Coatings Information**
**Building Category:** Non-Residential
**Total Square Footage ($ft^2$):** 320248
**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 |

### 2.5.3 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 | 000.265 | 000.002 | 000.200 | 003.208 | 000.006 | 000.005 | | 000.023 | 00325.859 |
| LDGT | 000.340 | 000.003 | 000.357 | 004.561 | 000.008 | 000.007 | | 000.024 | 00421.180 |
| HDGV | 000.737 | 000.005 | 000.984 | 015.455 | 000.018 | 000.016 | | 000.045 | 00783.227 |
| LDDV | 000.095 | 000.003 | 000.134 | 002.768 | 000.004 | 000.004 | | 000.008 | 00318.007 |
| LDDT | 000.236 | 000.004 | 000.383 | 004.740 | 000.007 | 000.006 | | 000.008 | 00451.951 |
| HDDV | 000.440 | 000.013 | 004.473 | 001.638 | 000.165 | 000.152 | | 000.028 | 01512.371 |
| MC | 002.730 | 000.003 | 000.697 | 012.599 | 000.026 | 000.023 | | 000.054 | 00395.818 |

### 2.5.4 Architectural Coatings Phase Formula(s)

**- Worker Trips Emissions per Phase**
$VMT_{WT} = (1 * WT * PA) / 800$

$VMT_{WT}$: 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

## 2.6 Paving Phase

### 2.6.1 Paving Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 10
**Start Quarter:** 1
**Start Year:** 2023

**- Phase Duration**
**Number of Month:** 3
**Number of Days:** 0

### 2.6.2 Paving Phase Assumptions

**- General Paving Information**
**Paving Area ($ft^2$):** 421686.5

**- Paving 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 |
|---|---|---|
| Pavers Composite | 1 | 8 |
| Paving Equipment Composite | 2 | 6 |
| Rollers Composite | 2 | 6 |

**- 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 |

### 2.6.3 Paving Phase Emission Factor(s)

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

| **Excavators Composite** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0614 | 0.0013 | 0.2820 | 0.5096 | 0.0117 | 0.0117 | 0.0055 | 119.71 |
| **Graders Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0757 | 0.0014 | 0.4155 | 0.5717 | 0.0191 | 0.0191 | 0.0068 | 132.91 |
| **Other Construction Equipment Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0483 | 0.0012 | 0.2497 | 0.3481 | 0.0091 | 0.0091 | 0.0043 | 122.61 |
| **Rubber Tired Dozers Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.1830 | 0.0024 | 1.2623 | 0.7077 | 0.0494 | 0.0494 | 0.0165 | 239.49 |
| **Scrapers Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.1640 | 0.0026 | 1.0170 | 0.7431 | 0.0406 | 0.0406 | 0.0148 | 262.85 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0364 | 0.0007 | 0.2127 | 0.3593 | 0.0080 | 0.0080 | 0.0032 | 66.879 |

**- 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 | 000.265 | 000.002 | 000.200 | 003.208 | 000.006 | 000.005 | | 000.023 | 00325.859 |
| LDGT | 000.340 | 000.003 | 000.357 | 004.561 | 000.008 | 000.007 | | 000.024 | 00421.180 |
| HDGV | 000.737 | 000.005 | 000.984 | 015.455 | 000.018 | 000.016 | | 000.045 | 00783.227 |
| LDDV | 000.095 | 000.003 | 000.134 | 002.768 | 000.004 | 000.004 | | 000.008 | 00318.007 |
| LDDT | 000.236 | 000.004 | 000.383 | 004.740 | 000.007 | 000.006 | | 000.008 | 00451.951 |
| HDDV | 000.440 | 000.013 | 004.473 | 001.638 | 000.165 | 000.152 | | 000.028 | 01512.371 |
| MC | 002.730 | 000.003 | 000.697 | 012.599 | 000.026 | 000.023 | | 000.054 | 00395.818 |

### 2.6.4 Paving Phase Formula(s)

**- 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**

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

$VMT_{VE}$: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area ($ft^2$)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards ( 1 $yd^3$ / 27 $ft^3$)
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

**- Off-Gassing Emissions per Phase**
$VOC_P = (2.62 * PA) / 43560$

$VOC_P$: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area ($ft^2$)
43560: Conversion Factor square feet to acre (43560 ft2 / $acre)^2$ / acre)

# 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:** Year 2 - Proposed ADP Projects

**- Activity Description:**
See ADP

**- Activity Start Date**
**Start Month:** 1
**Start Month:** 2024

**- Activity End Date**
**Indefinite:** False
**End Month:** 12
**End Month:** 2024

**- Activity Emissions:**

| Pollutant | Total Emissions (TONs) |
|---|---|
| VOC | 4.313418 |
| $SO_x$ | 0.010877 |
| $NO_x$ | 3.409405 |
| CO | 4.218765 |
| PM 10 | 17.983273 |

| Pollutant | Total Emissions (TONs) |
|---|---|
| PM 2.5 | 0.134105 |
| Pb | 0.000000 |
| $NH_3$ | 0.004390 |
| $CO_2e$ | 1078.4 |
| | |

### 3.1 Demolition Phase

#### 3.1.1 Demolition Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 1
**Start Quarter:** 1
**Start Year:** 2024

**- Phase Duration**
**Number of Month:** 3
**Number of Days:** 0

#### 3.1.2 Demolition Phase Assumptions

**- General Demolition Information**
**Area of Building to be demolished ($ft^2$):** 81244
**Height of Building to be demolished (ft):** 14

**- Default Settings Used:** Yes

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

**- Construction Exhaust (default)**

| Equipment Name | Number Of Equipment | Hours Per Day |
|---|---|---|
| Concrete/Industrial Saws Composite | 1 | 8 |
| Excavators Composite | 3 | 8 |
| Rubber Tired Dozers Composite | 1 | 1 |
| Tractors/Loaders/Backhoes Composite | 2 | 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 |

### 3.1.3 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 | 0.0357 | 0.0006 | 0.2608 | 0.3715 | 0.0109 | 0.0109 | 0.0032 | 58.544 |
| **Excavators Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0584 | 0.0013 | 0.2523 | 0.5090 | 0.0100 | 0.0100 | 0.0052 | 119.71 |
| **Rubber Tired Dozers Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.1747 | 0.0024 | 1.1695 | 0.6834 | 0.0454 | 0.0454 | 0.0157 | 239.47 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0348 | 0.0007 | 0.1980 | 0.3589 | 0.0068 | 0.0068 | 0.0031 | 66.875 |

**- 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 | 000.265 | 000.002 | 000.200 | 003.208 | 000.006 | 000.005 | | 000.023 | 00325.859 |
| LDGT | 000.340 | 000.003 | 000.357 | 004.561 | 000.008 | 000.007 | | 000.024 | 00421.180 |
| HDGV | 000.737 | 000.005 | 000.984 | 015.455 | 000.018 | 000.016 | | 000.045 | 00783.227 |
| LDDV | 000.095 | 000.003 | 000.134 | 002.768 | 000.004 | 000.004 | | 000.008 | 00318.007 |
| LDDT | 000.236 | 000.004 | 000.383 | 004.740 | 000.007 | 000.006 | | 000.008 | 00451.951 |
| HDDV | 000.440 | 000.013 | 004.473 | 001.638 | 000.165 | 000.152 | | 000.028 | 01512.371 |
| MC | 002.730 | 000.003 | 000.697 | 012.599 | 000.026 | 000.023 | | 000.054 | 00395.818 |

### 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:** 2
**Start Quarter:** 1
**Start Year:** 2024

**- Phase Duration**
**Number of Month:** 3
**Number of Days:** 0

### 3.2.2 Site Grading Phase Assumptions

**- General Site Grading Information**
**Area of Site to be Graded ($ft^2$):** 589357
**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 |
|---|---|---|
| Excavators Composite | 1 | 8 |
| Graders Composite | 1 | 8 |
| Other Construction Equipment Composite | 1 | 8 |
| Rubber Tired Dozers Composite | 1 | 8 |
| Scrapers Composite | 2 | 8 |
| Tractors/Loaders/Backhoes Composite | 3 | 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 |

### 3.2.3 Site Grading Phase Emission Factor(s)

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

| **Excavators Composite** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0584 | 0.0013 | 0.2523 | 0.5090 | 0.0100 | 0.0100 | 0.0052 | 119.71 |
| **Graders Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0714 | 0.0014 | 0.3708 | 0.5706 | 0.0167 | 0.0167 | 0.0064 | 132.90 |
| **Other Construction Equipment Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0461 | 0.0012 | 0.2243 | 0.3477 | 0.0079 | 0.0079 | 0.0041 | 122.61 |
| **Rubber Tired Dozers Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.1747 | 0.0024 | 1.1695 | 0.6834 | 0.0454 | 0.0454 | 0.0157 | 239.47 |
| **Scrapers Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.1564 | 0.0026 | 0.9241 | 0.7301 | 0.0368 | 0.0368 | 0.0141 | 262.83 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0348 | 0.0007 | 0.1980 | 0.3589 | 0.0068 | 0.0068 | 0.0031 | 66.875 |

**- 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 | 000.265 | 000.002 | 000.200 | 003.208 | 000.006 | 000.005 | | 000.023 | 00325.859 |
| LDGT | 000.340 | 000.003 | 000.357 | 004.561 | 000.008 | 000.007 | | 000.024 | 00421.180 |
| HDGV | 000.737 | 000.005 | 000.984 | 015.455 | 000.018 | 000.016 | | 000.045 | 00783.227 |
| LDDV | 000.095 | 000.003 | 000.134 | 002.768 | 000.004 | 000.004 | | 000.008 | 00318.007 |
| LDDT | 000.236 | 000.004 | 000.383 | 004.740 | 000.007 | 000.006 | | 000.008 | 00451.951 |
| HDDV | 000.440 | 000.013 | 004.473 | 001.638 | 000.165 | 000.152 | | 000.028 | 01512.371 |
| MC | 002.730 | 000.003 | 000.697 | 012.599 | 000.026 | 000.023 | | 000.054 | 00395.818 |

### 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:** 8
**Start Quarter:** 1
**Start Year:** 2024

**- Phase Duration**
**Number of Month:** 3
**Number of Days:** 0

### 3.3.2 Trenching / Excavating Phase Assumptions

**- General Trenching/Excavating Information**
**Area of Site to be Trenched/Excavated ($ft^2$):** 680
**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)

**- 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)**

| **Excavators Composite** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0584 | 0.0013 | 0.2523 | 0.5090 | 0.0100 | 0.0100 | 0.0052 | 119.71 |
| **Graders Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0714 | 0.0014 | 0.3708 | 0.5706 | 0.0167 | 0.0167 | 0.0064 | 132.90 |
| **Other Construction Equipment Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0461 | 0.0012 | 0.2243 | 0.3477 | 0.0079 | 0.0079 | 0.0041 | 122.61 |
| **Rubber Tired Dozers Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.1747 | 0.0024 | 1.1695 | 0.6834 | 0.0454 | 0.0454 | 0.0157 | 239.47 |
| **Scrapers Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.1564 | 0.0026 | 0.9241 | 0.7301 | 0.0368 | 0.0368 | 0.0141 | 262.83 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0348 | 0.0007 | 0.1980 | 0.3589 | 0.0068 | 0.0068 | 0.0031 | 66.875 |

**- 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 | 000.265 | 000.002 | 000.200 | 003.208 | 000.006 | 000.005 | | 000.023 | 00325.859 |
| LDGT | 000.340 | 000.003 | 000.357 | 004.561 | 000.008 | 000.007 | | 000.024 | 00421.180 |
| HDGV | 000.737 | 000.005 | 000.984 | 015.455 | 000.018 | 000.016 | | 000.045 | 00783.227 |
| LDDV | 000.095 | 000.003 | 000.134 | 002.768 | 000.004 | 000.004 | | 000.008 | 00318.007 |
| LDDT | 000.236 | 000.004 | 000.383 | 004.740 | 000.007 | 000.006 | | 000.008 | 00451.951 |
| HDDV | 000.440 | 000.013 | 004.473 | 001.638 | 000.165 | 000.152 | | 000.028 | 01512.371 |
| MC | 002.730 | 000.003 | 000.697 | 012.599 | 000.026 | 000.023 | | 000.054 | 00395.818 |

### 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

## 3.4 Building Construction Phase

### 3.4.1 Building Construction Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 4
**Start Quarter:** 1
**Start Year:** 2024

**- Phase Duration**
**Number of Month:** 6
**Number of Days:** 0

### 3.4.2 Building Construction Phase Assumptions

**- General Building Construction Information**
**Building Category:** Office or Industrial
**Area of Building ($ft^2$):** 320248
**Height of Building (ft):** 14
**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 | 7 |
| Forklifts Composite | 2 | 7 |
| Generator Sets Composite | 1 | 8 |
| Tractors/Loaders/Backhoes Composite | 1 | 8 |
| Welders Composite | 3 | 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 |

### 3.4.3 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 | 0.0715 | 0.0013 | 0.4600 | 0.3758 | 0.0161 | 0.0161 | 0.0064 | 128.78 |
| **Forklifts Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0246 | 0.0006 | 0.0973 | 0.2146 | 0.0029 | 0.0029 | 0.0022 | 54.451 |
| **Generator Sets Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0303 | 0.0006 | 0.2464 | 0.2674 | 0.0091 | 0.0091 | 0.0027 | 61.061 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0348 | 0.0007 | 0.1980 | 0.3589 | 0.0068 | 0.0068 | 0.0031 | 66.875 |
| **Welders Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0227 | 0.0003 | 0.1427 | 0.1752 | 0.0059 | 0.0059 | 0.0020 | 25.653 |

**- 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 | 000.265 | 000.002 | 000.200 | 003.208 | 000.006 | 000.005 | | 000.023 | 00325.859 |
| LDGT | 000.340 | 000.003 | 000.357 | 004.561 | 000.008 | 000.007 | | 000.024 | 00421.180 |
| HDGV | 000.737 | 000.005 | 000.984 | 015.455 | 000.018 | 000.016 | | 000.045 | 00783.227 |
| LDDV | 000.095 | 000.003 | 000.134 | 002.768 | 000.004 | 000.004 | | 000.008 | 00318.007 |
| LDDT | 000.236 | 000.004 | 000.383 | 004.740 | 000.007 | 000.006 | | 000.008 | 00451.951 |
| HDDV | 000.440 | 000.013 | 004.473 | 001.638 | 000.165 | 000.152 | | 000.028 | 01512.371 |
| MC | 002.730 | 000.003 | 000.697 | 012.599 | 000.026 | 000.023 | | 000.054 | 00395.818 |

### 3.4.4 Building Construction Phase Formula(s)

**- 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

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**- 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

# DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

## 3.5 Architectural Coatings Phase

### 3.5.1 Architectural Coatings Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 8
**Start Quarter:** 1
**Start Year:** 2024

**- Phase Duration**
**Number of Month:** 3
**Number of Days:** 0

### 3.5.2 Architectural Coatings Phase Assumptions

**- General Architectural Coatings Information**
**Building Category:** Non-Residential
**Total Square Footage ($ft^2$):** 320248
**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 |

### 3.5.3 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 | 000.265 | 000.002 | 000.200 | 003.208 | 000.006 | 000.005 | | 000.023 | 00325.859 |
| LDGT | 000.340 | 000.003 | 000.357 | 004.561 | 000.008 | 000.007 | | 000.024 | 00421.180 |
| HDGV | 000.737 | 000.005 | 000.984 | 015.455 | 000.018 | 000.016 | | 000.045 | 00783.227 |
| LDDV | 000.095 | 000.003 | 000.134 | 002.768 | 000.004 | 000.004 | | 000.008 | 00318.007 |
| LDDT | 000.236 | 000.004 | 000.383 | 004.740 | 000.007 | 000.006 | | 000.008 | 00451.951 |
| HDDV | 000.440 | 000.013 | 004.473 | 001.638 | 000.165 | 000.152 | | 000.028 | 01512.371 |
| MC | 002.730 | 000.003 | 000.697 | 012.599 | 000.026 | 000.023 | | 000.054 | 00395.818 |

### 3.5.4 Architectural Coatings Phase Formula(s)

**- Worker Trips Emissions per Phase**
$VMT_{WT} = (1 * WT * PA) / 800$

$VMT_{WT}$: 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

## 3.6 Paving Phase

### 3.6.1 Paving Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 10
**Start Quarter:** 1
**Start Year:** 2024

**- Phase Duration**
**Number of Month:** 3
**Number of Days:** 0

### 3.6.2 Paving Phase Assumptions

**- General Paving Information**
**Paving Area ($ft^2$):** 421686.5

**- Paving 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 |
|---|---|---|
| Pavers Composite | 1 | 8 |
| Paving Equipment Composite | 2 | 6 |
| Rollers Composite | 2 | 6 |

**- 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 |

### 3.6.3 Paving Phase Emission Factor(s)

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

| **Excavators Composite** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0584 | 0.0013 | 0.2523 | 0.5090 | 0.0100 | 0.0100 | 0.0052 | 119.71 |
| **Graders Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0714 | 0.0014 | 0.3708 | 0.5706 | 0.0167 | 0.0167 | 0.0064 | 132.90 |
| **Other Construction Equipment Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0461 | 0.0012 | 0.2243 | 0.3477 | 0.0079 | 0.0079 | 0.0041 | 122.61 |
| **Rubber Tired Dozers Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.1747 | 0.0024 | 1.1695 | 0.6834 | 0.0454 | 0.0454 | 0.0157 | 239.47 |
| **Scrapers Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.1564 | 0.0026 | 0.9241 | 0.7301 | 0.0368 | 0.0368 | 0.0141 | 262.83 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0348 | 0.0007 | 0.1980 | 0.3589 | 0.0068 | 0.0068 | 0.0031 | 66.875 |

**- 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 | 000.265 | 000.002 | 000.200 | 003.208 | 000.006 | 000.005 | | 000.023 | 00325.859 |
| LDGT | 000.340 | 000.003 | 000.357 | 004.561 | 000.008 | 000.007 | | 000.024 | 00421.180 |
| HDGV | 000.737 | 000.005 | 000.984 | 015.455 | 000.018 | 000.016 | | 000.045 | 00783.227 |
| LDDV | 000.095 | 000.003 | 000.134 | 002.768 | 000.004 | 000.004 | | 000.008 | 00318.007 |
| LDDT | 000.236 | 000.004 | 000.383 | 004.740 | 000.007 | 000.006 | | 000.008 | 00451.951 |
| HDDV | 000.440 | 000.013 | 004.473 | 001.638 | 000.165 | 000.152 | | 000.028 | 01512.371 |
| MC | 002.730 | 000.003 | 000.697 | 012.599 | 000.026 | 000.023 | | 000.054 | 00395.818 |

### 3.6.4 Paving Phase Formula(s)

**- 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**

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

$VMT_{VE}$: Vehicle Exhaust Vehicle Miles Travel (miles)

PA: Paving Area ($ft^2$)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards ( 1 $yd^3$ / 27 $ft^3$)
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

**- Off-Gassing Emissions per Phase**
$VOC_P = (2.62 * PA) / 43560$

$VOC_P$: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area ($ft^2$)
43560: Conversion Factor square feet to acre (43560 ft2 / $acre)^2$ / acre)

# 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:** Year 3- Proposed ADP Projects

**- Activity Description:**
Year 3

**- Activity Start Date**
**Start Month:** 1
**Start Month:** 2025

**- Activity End Date**
**Indefinite:** False
**End Month:** 12
**End Month:** 2025

**- Activity Emissions:**

| Pollutant | Total Emissions (TONs) |
|---|---|
| VOC | 4.289010 |
| $SO_x$ | 0.010877 |
| $NO_x$ | 3.175252 |
| CO | 4.200344 |
| PM 10 | 17.969233 |

| Pollutant | Total Emissions (TONs) |
|---|---|
| PM 2.5 | 0.120065 |
| Pb | 0.000000 |
| $NH_3$ | 0.004390 |
| $CO_2e$ | 1078.3 |
| | |

### 4.1 Demolition Phase

#### 4.1.1 Demolition Phase Timeline Assumptions

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

**- Phase Duration**
**Number of Month:** 3
**Number of Days:** 0

#### 4.1.2 Demolition Phase Assumptions

**- General Demolition Information**
**Area of Building to be demolished ($ft^2$):** 81244
**Height of Building to be demolished (ft):** 14

**- Default Settings Used:** Yes

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

**- Construction Exhaust (default)**

# DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

| Equipment Name | Number Of Equipment | Hours Per Day |
|---|---|---|
| Concrete/Industrial Saws Composite | 1 | 8 |
| Excavators Composite | 3 | 8 |
| Rubber Tired Dozers Composite | 1 | 1 |
| Tractors/Loaders/Backhoes Composite | 2 | 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 |

### 4.1.3 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 |
| **Excavators Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0559 | 0.0013 | 0.2269 | 0.5086 | 0.0086 | 0.0086 | 0.0050 | 119.70 |
| **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 | 000.265 | 000.002 | 000.200 | 003.208 | 000.006 | 000.005 | | 000.023 | 00325.859 |
| LDGT | 000.340 | 000.003 | 000.357 | 004.561 | 000.008 | 000.007 | | 000.024 | 00421.180 |
| HDGV | 000.737 | 000.005 | 000.984 | 015.455 | 000.018 | 000.016 | | 000.045 | 00783.227 |
| LDDV | 000.095 | 000.003 | 000.134 | 002.768 | 000.004 | 000.004 | | 000.008 | 00318.007 |
| LDDT | 000.236 | 000.004 | 000.383 | 004.740 | 000.007 | 000.006 | | 000.008 | 00451.951 |
| HDDV | 000.440 | 000.013 | 004.473 | 001.638 | 000.165 | 000.152 | | 000.028 | 01512.371 |
| MC | 002.730 | 000.003 | 000.697 | 012.599 | 000.026 | 000.023 | | 000.054 | 00395.818 |

### 4.1.4 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

## 4.2 Site Grading Phase

### 4.2.1 Site Grading Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 2
**Start Quarter:** 1
**Start Year:** 2025

**- Phase Duration**
**Number of Month:** 3
**Number of Days:** 0

### 4.2.2 Site Grading Phase Assumptions

**- General Site Grading Information**
**Area of Site to be Graded ($ft^2$):** 589357
**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 |
|---|---|---|
| Excavators Composite | 1 | 8 |
| Graders Composite | 1 | 8 |
| Other Construction Equipment Composite | 1 | 8 |
| Rubber Tired Dozers Composite | 1 | 8 |
| Scrapers Composite | 2 | 8 |
| Tractors/Loaders/Backhoes Composite | 3 | 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 Site Grading Phase Emission Factor(s)

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

| **Excavators Composite** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0559 | 0.0013 | 0.2269 | 0.5086 | 0.0086 | 0.0086 | 0.0050 | 119.70 |
| **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 |
| **Scrapers Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.1495 | 0.0026 | 0.8387 | 0.7186 | 0.0334 | 0.0334 | 0.0134 | 262.81 |
| **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 | 000.265 | 000.002 | 000.200 | 003.208 | 000.006 | 000.005 | | 000.023 | 00325.859 |
| LDGT | 000.340 | 000.003 | 000.357 | 004.561 | 000.008 | 000.007 | | 000.024 | 00421.180 |
| HDGV | 000.737 | 000.005 | 000.984 | 015.455 | 000.018 | 000.016 | | 000.045 | 00783.227 |
| LDDV | 000.095 | 000.003 | 000.134 | 002.768 | 000.004 | 000.004 | | 000.008 | 00318.007 |
| LDDT | 000.236 | 000.004 | 000.383 | 004.740 | 000.007 | 000.006 | | 000.008 | 00451.951 |
| HDDV | 000.440 | 000.013 | 004.473 | 001.638 | 000.165 | 000.152 | | 000.028 | 01512.371 |
| MC | 002.730 | 000.003 | 000.697 | 012.599 | 000.026 | 000.023 | | 000.054 | 00395.818 |

### 4.2.4 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

## 4.3 Trenching/Excavating Phase

### 4.3.1 Trenching / Excavating Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 8
**Start Quarter:** 1
**Start Year:** 2025

**- Phase Duration**
**Number of Month:** 3
**Number of Days:** 0

### 4.3.2 Trenching / Excavating Phase Assumptions

**- General Trenching/Excavating Information**
**Area of Site to be Trenched/Excavated ($ft^2$):** 680
**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**

# DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

**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 |

### 4.3.3 Trenching / Excavating Phase Emission Factor(s)

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

| **Excavators Composite** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0559 | 0.0013 | 0.2269 | 0.5086 | 0.0086 | 0.0086 | 0.0050 | 119.70 |
| **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 |
| **Scrapers Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.1495 | 0.0026 | 0.8387 | 0.7186 | 0.0334 | 0.0334 | 0.0134 | 262.81 |
| **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 | 000.265 | 000.002 | 000.200 | 003.208 | 000.006 | 000.005 | | 000.023 | 00325.859 |
| LDGT | 000.340 | 000.003 | 000.357 | 004.561 | 000.008 | 000.007 | | 000.024 | 00421.180 |
| HDGV | 000.737 | 000.005 | 000.984 | 015.455 | 000.018 | 000.016 | | 000.045 | 00783.227 |
| LDDV | 000.095 | 000.003 | 000.134 | 002.768 | 000.004 | 000.004 | | 000.008 | 00318.007 |
| LDDT | 000.236 | 000.004 | 000.383 | 004.740 | 000.007 | 000.006 | | 000.008 | 00451.951 |
| HDDV | 000.440 | 000.013 | 004.473 | 001.638 | 000.165 | 000.152 | | 000.028 | 01512.371 |
| MC | 002.730 | 000.003 | 000.697 | 012.599 | 000.026 | 000.023 | | 000.054 | 00395.818 |

### 4.3.4 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

## 4.4 Building Construction Phase

### 4.4.1 Building Construction Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 4
**Start Quarter:** 1
**Start Year:** 2025

**- Phase Duration**
**Number of Month:** 6
**Number of Days:** 0

### 4.4.2 Building Construction Phase Assumptions

**- General Building Construction Information**
**Building Category:** Office or Industrial
**Area of Building ($ft^2$):** 320248
**Height of Building (ft):** 14
**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 | 7 |
| Forklifts Composite | 2 | 7 |
| Generator Sets Composite | 1 | 8 |
| Tractors/Loaders/Backhoes Composite | 1 | 8 |
| Welders Composite | 3 | 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 |

### 4.4.3 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 |
| **Generator Sets Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0287 | 0.0006 | 0.2329 | 0.2666 | 0.0080 | 0.0080 | 0.0025 | 61.057 |
| **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 |
| **Welders Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0214 | 0.0003 | 0.1373 | 0.1745 | 0.0051 | 0.0051 | 0.0019 | 25.650 |

**- 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 | 000.265 | 000.002 | 000.200 | 003.208 | 000.006 | 000.005 | | 000.023 | 00325.859 |
| LDGT | 000.340 | 000.003 | 000.357 | 004.561 | 000.008 | 000.007 | | 000.024 | 00421.180 |
| HDGV | 000.737 | 000.005 | 000.984 | 015.455 | 000.018 | 000.016 | | 000.045 | 00783.227 |
| LDDV | 000.095 | 000.003 | 000.134 | 002.768 | 000.004 | 000.004 | | 000.008 | 00318.007 |
| LDDT | 000.236 | 000.004 | 000.383 | 004.740 | 000.007 | 000.006 | | 000.008 | 00451.951 |
| HDDV | 000.440 | 000.013 | 004.473 | 001.638 | 000.165 | 000.152 | | 000.028 | 01512.371 |
| MC | 002.730 | 000.003 | 000.697 | 012.599 | 000.026 | 000.023 | | 000.054 | 00395.818 |

### 4.4.4 Building Construction Phase Formula(s)

**- 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

# DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

**- 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

# DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

## 4.5 Architectural Coatings Phase

### 4.5.1 Architectural Coatings Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 8
**Start Quarter:** 1
**Start Year:** 2025

**- Phase Duration**
**Number of Month:** 3
**Number of Days:** 0

### 4.5.2 Architectural Coatings Phase Assumptions

**- General Architectural Coatings Information**
**Building Category:** Non-Residential
**Total Square Footage ($ft^2$):** 320248
**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 |

### 4.5.3 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 | 000.265 | 000.002 | 000.200 | 003.208 | 000.006 | 000.005 | | 000.023 | 00325.859 |
| LDGT | 000.340 | 000.003 | 000.357 | 004.561 | 000.008 | 000.007 | | 000.024 | 00421.180 |
| HDGV | 000.737 | 000.005 | 000.984 | 015.455 | 000.018 | 000.016 | | 000.045 | 00783.227 |
| LDDV | 000.095 | 000.003 | 000.134 | 002.768 | 000.004 | 000.004 | | 000.008 | 00318.007 |
| LDDT | 000.236 | 000.004 | 000.383 | 004.740 | 000.007 | 000.006 | | 000.008 | 00451.951 |
| HDDV | 000.440 | 000.013 | 004.473 | 001.638 | 000.165 | 000.152 | | 000.028 | 01512.371 |
| MC | 002.730 | 000.003 | 000.697 | 012.599 | 000.026 | 000.023 | | 000.054 | 00395.818 |

### 4.5.4 Architectural Coatings Phase Formula(s)

**- Worker Trips Emissions per Phase**
$VMT_{WT} = (1 * WT * PA) / 800$

$VMT_{WT}$: 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

## 4.6 Paving Phase

### 4.6.1 Paving Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 10
**Start Quarter:** 1
**Start Year:** 2025

**- Phase Duration**
**Number of Month:** 3
**Number of Days:** 0

### 4.6.2 Paving Phase Assumptions

**- General Paving Information**
**Paving Area ($ft^2$):** 421686.5

**- Paving 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 |
|---|---|---|
| Pavers Composite | 1 | 8 |
| Paving Equipment Composite | 2 | 6 |
| Rollers Composite | 2 | 6 |

**- 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 |

### 4.6.3 Paving Phase Emission Factor(s)

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

| **Excavators Composite** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0559 | 0.0013 | 0.2269 | 0.5086 | 0.0086 | 0.0086 | 0.0050 | 119.70 |
| **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 |
| **Scrapers Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.1495 | 0.0026 | 0.8387 | 0.7186 | 0.0334 | 0.0334 | 0.0134 | 262.81 |
| **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 | 000.265 | 000.002 | 000.200 | 003.208 | 000.006 | 000.005 | | 000.023 | 00325.859 |
| LDGT | 000.340 | 000.003 | 000.357 | 004.561 | 000.008 | 000.007 | | 000.024 | 00421.180 |
| HDGV | 000.737 | 000.005 | 000.984 | 015.455 | 000.018 | 000.016 | | 000.045 | 00783.227 |
| LDDV | 000.095 | 000.003 | 000.134 | 002.768 | 000.004 | 000.004 | | 000.008 | 00318.007 |
| LDDT | 000.236 | 000.004 | 000.383 | 004.740 | 000.007 | 000.006 | | 000.008 | 00451.951 |
| HDDV | 000.440 | 000.013 | 004.473 | 001.638 | 000.165 | 000.152 | | 000.028 | 01512.371 |
| MC | 002.730 | 000.003 | 000.697 | 012.599 | 000.026 | 000.023 | | 000.054 | 00395.818 |

### 4.6.4 Paving Phase Formula(s)

**- 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**

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

$VMT_{VE}$: Vehicle Exhaust Vehicle Miles Travel (miles)

PA: Paving Area ($ft^2$)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards ( 1 $yd^3$ / 27 $ft^3$)
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

**- Off-Gassing Emissions per Phase**
$VOC_P = (2.62 * PA) / 43560$

$VOC_P$: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area ($ft^2$)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)$^2$ / acre)

# DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

## 5. Construction / Demolition

### 5.1 General Information & Timeline Assumptions

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

**- Activity Title:** Year 4 - Proposed ADP Projects

**- Activity Description:**
Year 4 projects

**- Activity Start Date**
**Start Month:** 1
**Start Month:** 2026

**- Activity End Date**
**Indefinite:** False
**End Month:** 12
**End Month:** 2026

**- Activity Emissions:**

| Pollutant | Total Emissions (TONs) |
|---|---|
| VOC | 4.289010 |
| $SO_x$ | 0.010877 |
| $NO_x$ | 3.175252 |
| CO | 4.200344 |
| PM 10 | 17.969233 |

| Pollutant | Total Emissions (TONs) |
|---|---|
| PM 2.5 | 0.120065 |
| Pb | 0.000000 |
| $NH_3$ | 0.004390 |
| $CO_2e$ | 1078.3 |
| | |

### 5.1 Demolition Phase

#### 5.1.1 Demolition Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 1
**Start Quarter:** 1
**Start Year:** 2026

**- Phase Duration**
**Number of Month:** 3
**Number of Days:** 0

#### 5.1.2 Demolition Phase Assumptions

**- General Demolition Information**
**Area of Building to be demolished ($ft^2$):** 81244
**Height of Building to be demolished (ft):** 14

**- Default Settings Used:** Yes

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

**- Construction Exhaust (default)**

# DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

| Equipment Name | Number Of Equipment | Hours Per Day |
|---|---|---|
| Concrete/Industrial Saws Composite | 1 | 8 |
| Excavators Composite | 3 | 8 |
| Rubber Tired Dozers Composite | 1 | 1 |
| Tractors/Loaders/Backhoes Composite | 2 | 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 |

### 5.1.3 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 |
| **Excavators Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0559 | 0.0013 | 0.2269 | 0.5086 | 0.0086 | 0.0086 | 0.0050 | 119.70 |
| **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 | 000.265 | 000.002 | 000.200 | 003.208 | 000.006 | 000.005 | | 000.023 | 00325.859 |
| LDGT | 000.340 | 000.003 | 000.357 | 004.561 | 000.008 | 000.007 | | 000.024 | 00421.180 |
| HDGV | 000.737 | 000.005 | 000.984 | 015.455 | 000.018 | 000.016 | | 000.045 | 00783.227 |
| LDDV | 000.095 | 000.003 | 000.134 | 002.768 | 000.004 | 000.004 | | 000.008 | 00318.007 |
| LDDT | 000.236 | 000.004 | 000.383 | 004.740 | 000.007 | 000.006 | | 000.008 | 00451.951 |
| HDDV | 000.440 | 000.013 | 004.473 | 001.638 | 000.165 | 000.152 | | 000.028 | 01512.371 |
| MC | 002.730 | 000.003 | 000.697 | 012.599 | 000.026 | 000.023 | | 000.054 | 00395.818 |

### 5.1.4 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

## 5.2 Site Grading Phase

# DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

### 5.2.1 Site Grading Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 2
**Start Quarter:** 1
**Start Year:** 2026

**- Phase Duration**
**Number of Month:** 3
**Number of Days:** 0

### 5.2.2 Site Grading Phase Assumptions

**- General Site Grading Information**
**Area of Site to be Graded ($ft^2$):** 589357
**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 |
|---|---|---|
| Excavators Composite | 1 | 8 |
| Graders Composite | 1 | 8 |
| Other Construction Equipment Composite | 1 | 8 |
| Rubber Tired Dozers Composite | 1 | 8 |
| Scrapers Composite | 2 | 8 |
| Tractors/Loaders/Backhoes Composite | 3 | 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 |

### 5.2.3 Site Grading Phase Emission Factor(s)

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

| **Excavators Composite** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0559 | 0.0013 | 0.2269 | 0.5086 | 0.0086 | 0.0086 | 0.0050 | 119.70 |
| **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 |
| **Scrapers Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.1495 | 0.0026 | 0.8387 | 0.7186 | 0.0334 | 0.0334 | 0.0134 | 262.81 |
| **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 | 000.265 | 000.002 | 000.200 | 003.208 | 000.006 | 000.005 | | 000.023 | 00325.859 |
| LDGT | 000.340 | 000.003 | 000.357 | 004.561 | 000.008 | 000.007 | | 000.024 | 00421.180 |
| HDGV | 000.737 | 000.005 | 000.984 | 015.455 | 000.018 | 000.016 | | 000.045 | 00783.227 |
| LDDV | 000.095 | 000.003 | 000.134 | 002.768 | 000.004 | 000.004 | | 000.008 | 00318.007 |
| LDDT | 000.236 | 000.004 | 000.383 | 004.740 | 000.007 | 000.006 | | 000.008 | 00451.951 |
| HDDV | 000.440 | 000.013 | 004.473 | 001.638 | 000.165 | 000.152 | | 000.028 | 01512.371 |
| MC | 002.730 | 000.003 | 000.697 | 012.599 | 000.026 | 000.023 | | 000.054 | 00395.818 |

### 5.2.4 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

## 5.3 Trenching/Excavating Phase

### 5.3.1 Trenching / Excavating Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 8
**Start Quarter:** 1
**Start Year:** 2026

**- Phase Duration**
**Number of Month:** 3
**Number of Days:** 0

### 5.3.2 Trenching / Excavating Phase Assumptions

**- General Trenching/Excavating Information**
**Area of Site to be Trenched/Excavated ($ft^2$):** 680
**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**

# DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

**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 |

### 5.3.3 Trenching / Excavating Phase Emission Factor(s)

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

| **Excavators Composite** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0559 | 0.0013 | 0.2269 | 0.5086 | 0.0086 | 0.0086 | 0.0050 | 119.70 |
| **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 |
| **Scrapers Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.1495 | 0.0026 | 0.8387 | 0.7186 | 0.0334 | 0.0334 | 0.0134 | 262.81 |
| **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 | 000.265 | 000.002 | 000.200 | 003.208 | 000.006 | 000.005 | | 000.023 | 00325.859 |
| LDGT | 000.340 | 000.003 | 000.357 | 004.561 | 000.008 | 000.007 | | 000.024 | 00421.180 |
| HDGV | 000.737 | 000.005 | 000.984 | 015.455 | 000.018 | 000.016 | | 000.045 | 00783.227 |
| LDDV | 000.095 | 000.003 | 000.134 | 002.768 | 000.004 | 000.004 | | 000.008 | 00318.007 |
| LDDT | 000.236 | 000.004 | 000.383 | 004.740 | 000.007 | 000.006 | | 000.008 | 00451.951 |
| HDDV | 000.440 | 000.013 | 004.473 | 001.638 | 000.165 | 000.152 | | 000.028 | 01512.371 |
| MC | 002.730 | 000.003 | 000.697 | 012.599 | 000.026 | 000.023 | | 000.054 | 00395.818 |

### 5.3.4 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

## 5.4 Building Construction Phase

### 5.4.1 Building Construction Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 4
**Start Quarter:** 1
**Start Year:** 2026

**- Phase Duration**
**Number of Month:** 6
**Number of Days:** 0

### 5.4.2 Building Construction Phase Assumptions

**- General Building Construction Information**
**Building Category:** Office or Industrial
**Area of Building ($ft^2$):** 320248
**Height of Building (ft):** 14
**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 | 7 |
| Forklifts Composite | 2 | 7 |
| Generator Sets Composite | 1 | 8 |
| Tractors/Loaders/Backhoes Composite | 1 | 8 |
| Welders Composite | 3 | 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 |

### 5.4.3 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 |
| **Generator Sets Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0287 | 0.0006 | 0.2329 | 0.2666 | 0.0080 | 0.0080 | 0.0025 | 61.057 |
| **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 |
| **Welders Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0214 | 0.0003 | 0.1373 | 0.1745 | 0.0051 | 0.0051 | 0.0019 | 25.650 |

**- 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 | 000.265 | 000.002 | 000.200 | 003.208 | 000.006 | 000.005 | | 000.023 | 00325.859 |
| LDGT | 000.340 | 000.003 | 000.357 | 004.561 | 000.008 | 000.007 | | 000.024 | 00421.180 |
| HDGV | 000.737 | 000.005 | 000.984 | 015.455 | 000.018 | 000.016 | | 000.045 | 00783.227 |
| LDDV | 000.095 | 000.003 | 000.134 | 002.768 | 000.004 | 000.004 | | 000.008 | 00318.007 |
| LDDT | 000.236 | 000.004 | 000.383 | 004.740 | 000.007 | 000.006 | | 000.008 | 00451.951 |
| HDDV | 000.440 | 000.013 | 004.473 | 001.638 | 000.165 | 000.152 | | 000.028 | 01512.371 |
| MC | 002.730 | 000.003 | 000.697 | 012.599 | 000.026 | 000.023 | | 000.054 | 00395.818 |

### 5.4.4 Building Construction Phase Formula(s)

**- 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**

$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

$VMT_{VE}$: 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

## 5.5 Architectural Coatings Phase

# DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

### 5.5.1 Architectural Coatings Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 8
**Start Quarter:** 1
**Start Year:** 2026

**- Phase Duration**
**Number of Month:** 3
**Number of Days:** 0

### 5.5.2 Architectural Coatings Phase Assumptions

**- General Architectural Coatings Information**
**Building Category:** Non-Residential
**Total Square Footage ($ft^2$):** 320248
**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 |

### 5.5.3 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 | 000.265 | 000.002 | 000.200 | 003.208 | 000.006 | 000.005 | | 000.023 | 00325.859 |
| LDGT | 000.340 | 000.003 | 000.357 | 004.561 | 000.008 | 000.007 | | 000.024 | 00421.180 |
| HDGV | 000.737 | 000.005 | 000.984 | 015.455 | 000.018 | 000.016 | | 000.045 | 00783.227 |
| LDDV | 000.095 | 000.003 | 000.134 | 002.768 | 000.004 | 000.004 | | 000.008 | 00318.007 |
| LDDT | 000.236 | 000.004 | 000.383 | 004.740 | 000.007 | 000.006 | | 000.008 | 00451.951 |
| HDDV | 000.440 | 000.013 | 004.473 | 001.638 | 000.165 | 000.152 | | 000.028 | 01512.371 |
| MC | 002.730 | 000.003 | 000.697 | 012.599 | 000.026 | 000.023 | | 000.054 | 00395.818 |

### 5.5.4 Architectural Coatings Phase Formula(s)

**- Worker Trips Emissions per Phase**
$VMT_{WT} = (1 * WT * PA) / 800$

$VMT_{WT}$: 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

## 5.6 Paving Phase

### 5.6.1 Paving Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 10
**Start Quarter:** 1
**Start Year:** 2026

**- Phase Duration**
**Number of Month:** 3
**Number of Days:** 0

### 5.6.2 Paving Phase Assumptions

**- General Paving Information**
**Paving Area ($ft^2$):** 421686.5

**- Paving 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 |
|---|---|---|
| Pavers Composite | 1 | 8 |
| Paving Equipment Composite | 2 | 6 |
| Rollers Composite | 2 | 6 |

**- 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 |

### 5.6.3 Paving Phase Emission Factor(s)

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

| **Excavators Composite** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0559 | 0.0013 | 0.2269 | 0.5086 | 0.0086 | 0.0086 | 0.0050 | 119.70 |
| **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 |
| **Scrapers Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.1495 | 0.0026 | 0.8387 | 0.7186 | 0.0334 | 0.0334 | 0.0134 | 262.81 |
| **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 | 000.265 | 000.002 | 000.200 | 003.208 | 000.006 | 000.005 | | 000.023 | 00325.859 |
| LDGT | 000.340 | 000.003 | 000.357 | 004.561 | 000.008 | 000.007 | | 000.024 | 00421.180 |
| HDGV | 000.737 | 000.005 | 000.984 | 015.455 | 000.018 | 000.016 | | 000.045 | 00783.227 |
| LDDV | 000.095 | 000.003 | 000.134 | 002.768 | 000.004 | 000.004 | | 000.008 | 00318.007 |
| LDDT | 000.236 | 000.004 | 000.383 | 004.740 | 000.007 | 000.006 | | 000.008 | 00451.951 |
| HDDV | 000.440 | 000.013 | 004.473 | 001.638 | 000.165 | 000.152 | | 000.028 | 01512.371 |
| MC | 002.730 | 000.003 | 000.697 | 012.599 | 000.026 | 000.023 | | 000.054 | 00395.818 |

### 5.6.4 Paving Phase Formula(s)

**- 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**

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

$VMT_{VE}$: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area ($ft^2$)
0.25: Thickness of Paving Area (ft)

(1 / 27): Conversion Factor cubic feet to cubic yards ( 1 $yd^3$ / 27 $ft^3$)
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

**- Off-Gassing Emissions per Phase**
$VOC_P = (2.62 * PA) / 43560$

$VOC_P$: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area ($ft^2$)
43560: Conversion Factor square feet to acre (43560 ft2 / $acre)^2$ / acre)

# DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

## 6. Construction / Demolition

### 6.1 General Information & Timeline Assumptions

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

**- Activity Title:** Year 5 - Proposed ADP Projects

**- Activity Description:**
year 5

**- Activity Start Date**
**Start Month:** 1
**Start Month:** 2027

**- Activity End Date**
**Indefinite:** False
**End Month:** 12
**End Month:** 2027

**- Activity Emissions:**

| Pollutant | Total Emissions (TONs) |
|---|---|
| VOC | 4.289010 |
| $SO_x$ | 0.010877 |
| $NO_x$ | 3.175252 |
| CO | 4.200344 |
| PM 10 | 17.969233 |

| Pollutant | Total Emissions (TONs) |
|---|---|
| PM 2.5 | 0.120065 |
| Pb | 0.000000 |
| $NH_3$ | 0.004390 |
| $CO_2e$ | 1078.3 |
| | |

### 6.1 Demolition Phase

#### 6.1.1 Demolition Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 1
**Start Quarter:** 1
**Start Year:** 2027

**- Phase Duration**
**Number of Month:** 3
**Number of Days:** 0

#### 6.1.2 Demolition Phase Assumptions

**- General Demolition Information**
**Area of Building to be demolished ($ft^2$):** 81244
**Height of Building to be demolished (ft):** 14

**- Default Settings Used:** Yes

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

**- Construction Exhaust (default)**

# DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

| Equipment Name | Number Of Equipment | Hours Per Day |
|---|---|---|
| Concrete/Industrial Saws Composite | 1 | 8 |
| Excavators Composite | 3 | 8 |
| Rubber Tired Dozers Composite | 1 | 1 |
| Tractors/Loaders/Backhoes Composite | 2 | 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 |

### 6.1.3 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 |
| **Excavators Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0559 | 0.0013 | 0.2269 | 0.5086 | 0.0086 | 0.0086 | 0.0050 | 119.70 |
| **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 | 000.265 | 000.002 | 000.200 | 003.208 | 000.006 | 000.005 | | 000.023 | 00325.859 |
| LDGT | 000.340 | 000.003 | 000.357 | 004.561 | 000.008 | 000.007 | | 000.024 | 00421.180 |
| HDGV | 000.737 | 000.005 | 000.984 | 015.455 | 000.018 | 000.016 | | 000.045 | 00783.227 |
| LDDV | 000.095 | 000.003 | 000.134 | 002.768 | 000.004 | 000.004 | | 000.008 | 00318.007 |
| LDDT | 000.236 | 000.004 | 000.383 | 004.740 | 000.007 | 000.006 | | 000.008 | 00451.951 |
| HDDV | 000.440 | 000.013 | 004.473 | 001.638 | 000.165 | 000.152 | | 000.028 | 01512.371 |
| MC | 002.730 | 000.003 | 000.697 | 012.599 | 000.026 | 000.023 | | 000.054 | 00395.818 |

### 6.1.4 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

## 6.2 Site Grading Phase

# DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

### 6.2.1 Site Grading Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 2
**Start Quarter:** 1
**Start Year:** 2027

**- Phase Duration**
**Number of Month:** 3
**Number of Days:** 0

### 6.2.2 Site Grading Phase Assumptions

**- General Site Grading Information**
**Area of Site to be Graded ($ft^2$):** 589357
**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 |
|---|---|---|
| Excavators Composite | 1 | 8 |
| Graders Composite | 1 | 8 |
| Other Construction Equipment Composite | 1 | 8 |
| Rubber Tired Dozers Composite | 1 | 8 |
| Scrapers Composite | 2 | 8 |
| Tractors/Loaders/Backhoes Composite | 3 | 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 |

### 6.2.3 Site Grading Phase Emission Factor(s)

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

| **Excavators Composite** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0559 | 0.0013 | 0.2269 | 0.5086 | 0.0086 | 0.0086 | 0.0050 | 119.70 |
| **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 |
| **Scrapers Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.1495 | 0.0026 | 0.8387 | 0.7186 | 0.0334 | 0.0334 | 0.0134 | 262.81 |
| **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 | 000.265 | 000.002 | 000.200 | 003.208 | 000.006 | 000.005 | | 000.023 | 00325.859 |
| LDGT | 000.340 | 000.003 | 000.357 | 004.561 | 000.008 | 000.007 | | 000.024 | 00421.180 |
| HDGV | 000.737 | 000.005 | 000.984 | 015.455 | 000.018 | 000.016 | | 000.045 | 00783.227 |
| LDDV | 000.095 | 000.003 | 000.134 | 002.768 | 000.004 | 000.004 | | 000.008 | 00318.007 |
| LDDT | 000.236 | 000.004 | 000.383 | 004.740 | 000.007 | 000.006 | | 000.008 | 00451.951 |
| HDDV | 000.440 | 000.013 | 004.473 | 001.638 | 000.165 | 000.152 | | 000.028 | 01512.371 |
| MC | 002.730 | 000.003 | 000.697 | 012.599 | 000.026 | 000.023 | | 000.054 | 00395.818 |

### 6.2.4 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

## 6.3 Trenching/Excavating Phase

### 6.3.1 Trenching / Excavating Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 8
**Start Quarter:** 1
**Start Year:** 2027

**- Phase Duration**
**Number of Month:** 3
**Number of Days:** 0

### 6.3.2 Trenching / Excavating Phase Assumptions

**- General Trenching/Excavating Information**
**Area of Site to be Trenched/Excavated ($ft^2$):** 680
**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**

# DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

**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 |

### 6.3.3 Trenching / Excavating Phase Emission Factor(s)

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

| **Excavators Composite** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0559 | 0.0013 | 0.2269 | 0.5086 | 0.0086 | 0.0086 | 0.0050 | 119.70 |
| **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 |
| **Scrapers Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.1495 | 0.0026 | 0.8387 | 0.7186 | 0.0334 | 0.0334 | 0.0134 | 262.81 |
| **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 | 000.265 | 000.002 | 000.200 | 003.208 | 000.006 | 000.005 | | 000.023 | 00325.859 |
| LDGT | 000.340 | 000.003 | 000.357 | 004.561 | 000.008 | 000.007 | | 000.024 | 00421.180 |
| HDGV | 000.737 | 000.005 | 000.984 | 015.455 | 000.018 | 000.016 | | 000.045 | 00783.227 |
| LDDV | 000.095 | 000.003 | 000.134 | 002.768 | 000.004 | 000.004 | | 000.008 | 00318.007 |
| LDDT | 000.236 | 000.004 | 000.383 | 004.740 | 000.007 | 000.006 | | 000.008 | 00451.951 |
| HDDV | 000.440 | 000.013 | 004.473 | 001.638 | 000.165 | 000.152 | | 000.028 | 01512.371 |
| MC | 002.730 | 000.003 | 000.697 | 012.599 | 000.026 | 000.023 | | 000.054 | 00395.818 |

### 6.3.4 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

## 6.4 Building Construction Phase

### 6.4.1 Building Construction Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 4
**Start Quarter:** 1
**Start Year:** 2027

**- Phase Duration**
**Number of Month:** 6
**Number of Days:** 0

### 6.4.2 Building Construction Phase Assumptions

**- General Building Construction Information**
**Building Category:** Office or Industrial
**Area of Building ($ft^2$):** 320248
**Height of Building (ft):** 14
**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 | 7 |
| Forklifts Composite | 2 | 7 |
| Generator Sets Composite | 1 | 8 |
| Tractors/Loaders/Backhoes Composite | 1 | 8 |
| Welders Composite | 3 | 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 |

### 6.4.3 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 |
| **Generator Sets Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0287 | 0.0006 | 0.2329 | 0.2666 | 0.0080 | 0.0080 | 0.0025 | 61.057 |
| **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 |
| **Welders Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0214 | 0.0003 | 0.1373 | 0.1745 | 0.0051 | 0.0051 | 0.0019 | 25.650 |

**- 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 | 000.265 | 000.002 | 000.200 | 003.208 | 000.006 | 000.005 | | 000.023 | 00325.859 |
| LDGT | 000.340 | 000.003 | 000.357 | 004.561 | 000.008 | 000.007 | | 000.024 | 00421.180 |
| HDGV | 000.737 | 000.005 | 000.984 | 015.455 | 000.018 | 000.016 | | 000.045 | 00783.227 |
| LDDV | 000.095 | 000.003 | 000.134 | 002.768 | 000.004 | 000.004 | | 000.008 | 00318.007 |
| LDDT | 000.236 | 000.004 | 000.383 | 004.740 | 000.007 | 000.006 | | 000.008 | 00451.951 |
| HDDV | 000.440 | 000.013 | 004.473 | 001.638 | 000.165 | 000.152 | | 000.028 | 01512.371 |
| MC | 002.730 | 000.003 | 000.697 | 012.599 | 000.026 | 000.023 | | 000.054 | 00395.818 |

### 6.4.4 Building Construction Phase Formula(s)

**- 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**

$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

$VMT_{VE}$: 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

## 6.5 Architectural Coatings Phase

# DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

### 6.5.1 Architectural Coatings Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 8
**Start Quarter:** 1
**Start Year:** 2027

**- Phase Duration**
**Number of Month:** 3
**Number of Days:** 0

### 6.5.2 Architectural Coatings Phase Assumptions

**- General Architectural Coatings Information**
**Building Category:** Non-Residential
**Total Square Footage ($ft^2$):** 320248
**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 |

### 6.5.3 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 | 000.265 | 000.002 | 000.200 | 003.208 | 000.006 | 000.005 | | 000.023 | 00325.859 |
| LDGT | 000.340 | 000.003 | 000.357 | 004.561 | 000.008 | 000.007 | | 000.024 | 00421.180 |
| HDGV | 000.737 | 000.005 | 000.984 | 015.455 | 000.018 | 000.016 | | 000.045 | 00783.227 |
| LDDV | 000.095 | 000.003 | 000.134 | 002.768 | 000.004 | 000.004 | | 000.008 | 00318.007 |
| LDDT | 000.236 | 000.004 | 000.383 | 004.740 | 000.007 | 000.006 | | 000.008 | 00451.951 |
| HDDV | 000.440 | 000.013 | 004.473 | 001.638 | 000.165 | 000.152 | | 000.028 | 01512.371 |
| MC | 002.730 | 000.003 | 000.697 | 012.599 | 000.026 | 000.023 | | 000.054 | 00395.818 |

### 6.5.4 Architectural Coatings Phase Formula(s)

**- Worker Trips Emissions per Phase**
$VMT_{WT} = (1 * WT * PA) / 800$

$VMT_{WT}$: 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

## 6.6 Paving Phase

### 6.6.1 Paving Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 10
**Start Quarter:** 1
**Start Year:** 2027

**- Phase Duration**
**Number of Month:** 3
**Number of Days:** 0

### 6.6.2 Paving Phase Assumptions

**- General Paving Information**
**Paving Area ($ft^2$):** 421686.5

**- Paving 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 |
|---|---|---|
| Pavers Composite | 1 | 8 |
| Paving Equipment Composite | 2 | 6 |
| Rollers Composite | 2 | 6 |

**- 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 |

### 6.6.3 Paving Phase Emission Factor(s)

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

| **Excavators Composite** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0559 | 0.0013 | 0.2269 | 0.5086 | 0.0086 | 0.0086 | 0.0050 | 119.70 |
| **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 |
| **Scrapers Composite** | | | | | | | | |
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.1495 | 0.0026 | 0.8387 | 0.7186 | 0.0334 | 0.0334 | 0.0134 | 262.81 |
| **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 | 000.265 | 000.002 | 000.200 | 003.208 | 000.006 | 000.005 | | 000.023 | 00325.859 |
| LDGT | 000.340 | 000.003 | 000.357 | 004.561 | 000.008 | 000.007 | | 000.024 | 00421.180 |
| HDGV | 000.737 | 000.005 | 000.984 | 015.455 | 000.018 | 000.016 | | 000.045 | 00783.227 |
| LDDV | 000.095 | 000.003 | 000.134 | 002.768 | 000.004 | 000.004 | | 000.008 | 00318.007 |
| LDDT | 000.236 | 000.004 | 000.383 | 004.740 | 000.007 | 000.006 | | 000.008 | 00451.951 |
| HDDV | 000.440 | 000.013 | 004.473 | 001.638 | 000.165 | 000.152 | | 000.028 | 01512.371 |
| MC | 002.730 | 000.003 | 000.697 | 012.599 | 000.026 | 000.023 | | 000.054 | 00395.818 |

### 6.6.4 Paving Phase Formula(s)

**- 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**

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

$VMT_{VE}$: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area ($ft^2$)
0.25: Thickness of Paving Area (ft)

(1 / 27): Conversion Factor cubic feet to cubic yards ( 1 $yd^3$ / 27 $ft^3$)
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

**- Off-Gassing Emissions per Phase**
$VOC_P = (2.62 * PA) / 43560$

$VOC_P$: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area ($ft^2$)
43560: Conversion Factor square feet to acre (43560 ft2 / $acre)^2$ / acre)

# DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

## 7. Heating

### 7.1 General Information & Timeline Assumptions

**- Add or Remove Activity from Baseline?** Add

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

**- Activity Title:** year 1

**- Activity Description:**
Year 1

**- Activity Start Date**
**Start Month:** 9
**Start Year:** 2023

**- Activity End Date**
**Indefinite:** Yes
**End Month:** N/A
**End Year:** N/A

**- Activity Emissions:**

| Pollutant | Emissions Per Year (TONs) |
|---|---|
| VOC | 0.062534 |
| $SO_x$ | 0.006822 |
| $NO_x$ | 1.136977 |
| CO | 0.955061 |
| PM 10 | 0.086410 |

| Pollutant | Emissions Per Year (TONs) |
|---|---|
| PM 2.5 | 0.086410 |
| Pb | 0.000000 |
| $NH_3$ | 0.000000 |
| $CO_2e$ | 1368.8 |
| | |

### 7.2 Heating Assumptions

**- Heating**
**Heating Calculation Type:** Heat Energy Requirement Method

**- Heat Energy Requirement Method**
**Area of floorspace to be heated ($ft^2$):** 239004.2
**Type of fuel:** Natural Gas
**Type of boiler/furnace:** Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
**Heat Value (MMBtu/$ft^3$):** 0.00105
**Energy Intensity (MMBtu/$ft^2$):** 0.0999

**- Default Settings Used:** Yes

**- Boiler/Furnace Usage**
**Operating Time Per Year (hours):** 900 (default)

### 7.3 Heating Emission Factor(s)

**- Heating Emission Factors (lb/1000000 scf)**

| VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | Pb | $NH_3$ | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| 5.5 | 0.6 | 100 | 84 | 7.6 | 7.6 | | | 120390 |

### 7.4 Heating Formula(s)

**- Heating Fuel Consumption $ft^3$ per Year**

$FC_{HER}$= HA * EI / HV / 1000000

$FC_{HER}$: Fuel Consumption for Heat Energy Requirement Method
HA: Area of floorspace to be heated ($ft^2$)
EI: Energy Intensity Requirement ($MMBtu/ft^2$)
HV: Heat Value ($MMBTU/ft^3$)
1000000: Conversion Factor

**- Heating Emissions per Year**

$HE_{POL}$= FC * $EF_{POL}$ / 2000

$HE_{POL}$: Heating Emission Emissions (TONs)
FC: Fuel Consumption
$EF_{POL}$: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

## 8. Heating

### 8.1 General Information & Timeline Assumptions

**- Add or Remove Activity from Baseline?** Add

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

**- Activity Title:** Year 2

**- Activity Description:**
Year 2

**- Activity Start Date**
**Start Month:** 9
**Start Year:** 2024

**- Activity End Date**
**Indefinite:** Yes
**End Month:** N/A
**End Year:** N/A

**- Activity Emissions:**

| Pollutant | Emissions Per Year (TONs) |
|---|---|
| VOC | 0.062534 |
| $SO_x$ | 0.006822 |
| $NO_x$ | 1.136977 |
| CO | 0.955061 |
| PM 10 | 0.086410 |

| Pollutant | Emissions Per Year (TONs) |
|---|---|
| PM 2.5 | 0.086410 |
| Pb | 0.000000 |
| $NH_3$ | 0.000000 |
| $CO_2e$ | 1368.8 |
| | |

### 8.2 Heating Assumptions

# DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

**- Heating**
**Heating Calculation Type:** Heat Energy Requirement Method

**- Heat Energy Requirement Method**
**Area of floorspace to be heated ($ft^2$):** 239004.2
**Type of fuel:** Natural Gas
**Type of boiler/furnace:** Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
**Heat Value ($MMBtu/ft^3$):** 0.00105
**Energy Intensity ($MMBtu/ft^2$):** 0.0999

**- Default Settings Used:** Yes

**- Boiler/Furnace Usage**
**Operating Time Per Year (hours):** 900 (default)

## 8.3 Heating Emission Factor(s)

**- Heating Emission Factors (lb/1000000 scf)**

| VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | Pb | $NH_3$ | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| 5.5 | 0.6 | 100 | 84 | 7.6 | 7.6 | | | 120390 |

## 8.4 Heating Formula(s)

**- Heating Fuel Consumption $ft^3$ per Year**
$FC_{HER} = HA * EI / HV / 1000000$

$FC_{HER}$: Fuel Consumption for Heat Energy Requirement Method
HA: Area of floorspace to be heated ($ft^2$)
EI: Energy Intensity Requirement ($MMBtu/ft^2$)
HV: Heat Value ($MMBTU/ft^3$)
1000000: Conversion Factor

**- Heating Emissions per Year**
$HE_{POL} = FC * EF_{POL} / 2000$

$HE_{POL}$: Heating Emission Emissions (TONs)
FC: Fuel Consumption
$EF_{POL}$: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

# DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

## 9. Heating

### 9.1 General Information & Timeline Assumptions

**- Add or Remove Activity from Baseline?** Add

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

**- Activity Title:** Year 3

**- Activity Description:**
Year 3

**- Activity Start Date**
**Start Month:** 9
**Start Year:** 2025

**- Activity End Date**
**Indefinite:** Yes
**End Month:** N/A
**End Year:** N/A

**- Activity Emissions:**

| Pollutant | Emissions Per Year (TONs) |
|---|---|
| VOC | 0.062534 |
| $SO_x$ | 0.006822 |
| $NO_x$ | 1.136977 |
| CO | 0.955061 |
| PM 10 | 0.086410 |

| Pollutant | Emissions Per Year (TONs) |
|---|---|
| PM 2.5 | 0.086410 |
| Pb | 0.000000 |
| $NH_3$ | 0.000000 |
| $CO_2e$ | 1368.8 |
| | |

### 9.2 Heating Assumptions

**- Heating**
**Heating Calculation Type:** Heat Energy Requirement Method

**- Heat Energy Requirement Method**
**Area of floorspace to be heated ($ft^2$):** 239004.2
**Type of fuel:** Natural Gas
**Type of boiler/furnace:** Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
**Heat Value ($MMBtu/ft^3$):** 0.00105
**Energy Intensity ($MMBtu/ft^2$):** 0.0999

**- Default Settings Used:** Yes

**- Boiler/Furnace Usage**
**Operating Time Per Year (hours):** 900 (default)

### 9.3 Heating Emission Factor(s)

**- Heating Emission Factors (lb/1000000 scf)**

| VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | Pb | $NH_3$ | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| 5.5 | 0.6 | 100 | 84 | 7.6 | 7.6 | | | 120390 |

## 9.4 Heating Formula(s)

**- Heating Fuel Consumption $ft^3$ per Year**

$FC_{HER}$= HA * EI / HV / 1000000

$FC_{HER}$: Fuel Consumption for Heat Energy Requirement Method
HA: Area of floorspace to be heated ($ft^2$)
EI: Energy Intensity Requirement ($MMBtu/ft^2$)
HV: Heat Value ($MMBTU/ft^3$)
1000000: Conversion Factor

**- Heating Emissions per Year**

$HE_{POL}$= FC * $EF_{POL}$ / 2000

$HE_{POL}$: Heating Emission Emissions (TONs)
FC: Fuel Consumption
$EF_{POL}$: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

# DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

## 10. Heating

### 10.1 General Information & Timeline Assumptions

**- Add or Remove Activity from Baseline?** Remove

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

**- Activity Title:** year 4

**- Activity Description:**
Year 4

**- Activity Start Date**
**Start Month:** 9
**Start Year:** 2026

**- Activity End Date**
**Indefinite:** Yes
**End Month:** N/A
**End Year:** N/A

**- Activity Emissions:**

| Pollutant | Emissions Per Year (TONs) |
|---|---|
| VOC | -0.054695 |
| $SO_x$ | -0.005967 |
| $NO_x$ | -0.994447 |
| CO | -0.835336 |
| PM 10 | -0.075578 |

| Pollutant | Emissions Per Year (TONs) |
|---|---|
| PM 2.5 | -0.075578 |
| Pb | 0.000000 |
| $NH_3$ | 0.000000 |
| $CO_2e$ | -1197.2 |
| | |

### 10.2 Heating Assumptions

**- Heating**
**Heating Calculation Type:** Heat Energy Requirement Method

**- Heat Energy Requirement Method**
**Area of floorspace to be heated ($ft^2$):** 209043
**Type of fuel:** Natural Gas
**Type of boiler/furnace:** Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
**Heat Value ($MMBtu/ft^3$):** 0.00105
**Energy Intensity ($MMBtu/ft^2$):** 0.0999

**- Default Settings Used:** Yes

**- Boiler/Furnace Usage**
**Operating Time Per Year (hours):** 900 (default)

### 10.3 Heating Emission Factor(s)

**- Heating Emission Factors (lb/1000000 scf)**

| VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | Pb | $NH_3$ | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| 5.5 | 0.6 | 100 | 84 | 7.6 | 7.6 | | | 120390 |

## 10.4 Heating Formula(s)

**- Heating Fuel Consumption $ft^3$ per Year**

$FC_{HER}$= HA * EI / HV / 1000000

$FC_{HER}$: Fuel Consumption for Heat Energy Requirement Method
HA: Area of floorspace to be heated ($ft^2$)
EI: Energy Intensity Requirement ($MMBtu/ft^2$)
HV: Heat Value ($MMBTU/ft^3$)
1000000: Conversion Factor

**- Heating Emissions per Year**

$HE_{POL}$= FC * $EF_{POL}$ / 2000

$HE_{POL}$: Heating Emission Emissions (TONs)
FC: Fuel Consumption
$EF_{POL}$: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

# DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

## 11. Heating

### 11.1 General Information & Timeline Assumptions

**- Add or Remove Activity from Baseline?** Add

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

**- Activity Title:** Year 5

**- Activity Description:**
Year 5

**- Activity Start Date**
**Start Month:** 9
**Start Year:** 2027

**- Activity End Date**
**Indefinite:** Yes
**End Month:** N/A
**End Year:** N/A

**- Activity Emissions:**

| Pollutant | Emissions Per Year (TONs) |
|---|---|
| VOC | 0.062534 |
| $SO_x$ | 0.006822 |
| $NO_x$ | 1.136977 |
| CO | 0.955061 |
| PM 10 | 0.086410 |

| Pollutant | Emissions Per Year (TONs) |
|---|---|
| PM 2.5 | 0.086410 |
| Pb | 0.000000 |
| $NH_3$ | 0.000000 |
| $CO_2e$ | 1368.8 |
| | |

### 11.2 Heating Assumptions

**- Heating**
**Heating Calculation Type:** Heat Energy Requirement Method

**- Heat Energy Requirement Method**
**Area of floorspace to be heated ($ft^2$):** 239004.2
**Type of fuel:** Natural Gas
**Type of boiler/furnace:** Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
**Heat Value ($MMBtu/ft^3$):** 0.00105
**Energy Intensity ($MMBtu/ft^2$):** 0.0999

**- Default Settings Used:** Yes

**- Boiler/Furnace Usage**
**Operating Time Per Year (hours):** 900 (default)

### 11.3 Heating Emission Factor(s)

**- Heating Emission Factors (lb/1000000 scf)**

| VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | Pb | $NH_3$ | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| 5.5 | 0.6 | 100 | 84 | 7.6 | 7.6 | | | 120390 |

## 11.4 Heating Formula(s)

**- Heating Fuel Consumption $ft^3$ per Year**

$FC_{HER}$= HA * EI / HV / 1000000

$FC_{HER}$: Fuel Consumption for Heat Energy Requirement Method
HA: Area of floorspace to be heated ($ft^2$)
EI: Energy Intensity Requirement ($MMBtu/ft^2$)
HV: Heat Value ($MMBTU/ft^3$)
1000000: Conversion Factor

**- Heating Emissions per Year**

$HE_{POL}$= FC * $EF_{POL}$ / 2000

$HE_{POL}$: Heating Emission Emissions (TONs)
FC: Fuel Consumption
$EF_{POL}$: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons