# Draft
# Hurlburt Field Gates Reconstruction Environmental Assessment (EA)

Hurlburt Field, Florida | August 2022

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# Draft

# Hurlburt Field Gates Reconstruction Environmental Assessment (EA)

Hurlburt Field, Florida

PREPARED FOR:

**Department of the Air Force**

*August 2022*

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# Draft Finding of No Significant Impact/Finding of No Practicable Alternative

The 1st Special Operations Civil Engineer Squadron (1 SOCES), Hurlburt Field, Florida, and Headquarters Air Force Special Operations Command (HQ AFSOC) propose regulatory compliance actions for the access gates at Hurlburt Field, Florida. This Environmental Assessment (EA) was prepared pursuant to provisions of the National Environmental Policy Act (NEPA), Title 42 United States Code (U.S.C.) Sections (§§) 4321 to 4347, implemented by the Council on Environmental Quality (CEQ) Regulations, Title 40, Code of Federal Regulations (CFR) §§ 1500-1508, 32 CFR § 989, and the CEQ revised regulations for implementing NEPA (September 14, 2020); the United States Air Force (USAF)-implementing regulations for NEPA, and the Environmental Impact Analysis Process (EIAP) (32 133 CFR § 989), as amended.

## Purpose of and Need for Action

**Purpose and Need (EA § 1.3, page 1-2):** The purpose of the action is to provide and maintain Entry Control Facilities and Access Control Points (ECF/ACP) that are adequate to secure Hurlburt Field from unauthorized access and to intercept contraband. Also, the projects will help maximize vehicular traffic flow to and from the installation by ensuring the proper level of access control and safety for all Department of Defense (DoD) personnel, visitors, and commercial traffic to the installation. Hurlburt Field needs regulatory compliant ECF/ACP that permit security forces to perform the required functions of visitor processing, vehicle registration, ID checks, privately owned vehicle (POV) inspections, and commercial/large vehicle inspections in a safe and secure working environment. Minimum standards for achieving the need for regulatory compliant ECF/ACP at Hurlburt Field are defined within U.S. Air Force (USAF) guidance, Unified Facilities Criteria (UFC), and other DoD approved safety and security publications.

This EA, incorporated by reference into this Finding of No Significant Impact (FONSI)/Finding of No Practicable Alternative (FONPA), analyzes the potential environmental consequences of activities associated with each of the above gate access projects and provides environmental protection measures to avoid or reduce adverse environmental impacts.

## Description of Proposed Action and Alternatives

### Proposed Action (EA § 2.2, page 2-1)

*Proposed Action:* The Proposed Action addresses the reconstruction of five existing Hurlburt Field access gates. The Main Gate, East Gate, and the Soundside Gate are primarily used for processing of POVs. Kerwood Gate is currently not in use with no permanent gatehouse facilities. It is used only in emergency situations. The Commercial Vehicle Inspection (CVI) Gate is primarily used for inspection and processing of commercial deliveries. All facility improvements would be designed as permanent construction. The projects would include all necessary utilities, site improvements, road pavements, communications infrastructure, passive security infrastructure, and emergency backup generators. All existing gatehouses and identification (ID) check stations, canopies, road pavement, and utilities would be removed or modified.

### Alternative 1 (EA § 2.5, page 2-30)

Alternative 1 addresses all of the reconstruction, demolitions, and facility improvements of the existing access gates at Hurlburt Field as identified in the Proposed Action, except the Kerwood Gate. The Kerwood Gate project could be implemented later if and when it becomes operationally required. Existing methods to mitigate the compliance deficiencies of the Antiterrorism and Force Protection (AT/FP) requirements (UFC 4-022-01) would continue (e.g., speed bumps/humps, etc.) with respect to the Kerwood Gate.

**No-Action Alternative (EA § 2.5, page 2-30):** The No-Action Alternative maintains the status quo of current gate access facilities, as reconstruction of these access gates would not occur at Hurlburt Field. Existing methods to mitigate the compliance deficiencies of the AT/FP requirements (UFC 4-022-01) would continue (e.g., speed bumps/humps, etc.).

## Environmental Consequences

### Environmental Consequences (EA § 3, pages 3-1 to 3-9)

Environmental analyses focused on the following areas: Air Quality, Geologic Resources, Water Resources, Biological Resource, Cultural Resources, Land Use, Noise Environment, Hazardous Materials and Waste, and Infrastructure. Overall, environmental analyses did not identify any significant impacts to any of the above resources. In addition, no significant cumulative impacts caused by implementation of the Proposed Action were identified when combined with other past, present, and reasonably foreseeable actions occurring at or in proximity to Hurlburt Field.

### Air Quality (EA § 3.1, p. 3-6 to 3-9)

Temporary increases in $NO_X$, CO, $SO_2$, VOCs, PM-10, PM-2.5, and $CO_2e$ are primarily resultant from construction that is presumed to be completed by 2025. Following this temporary construction and growth, the long-term operations of the constructed facilities are expected to have no permanent effects to the ambient air quality from this alternative. The estimated annual steady state air emissions from the Proposed Action would be equivalent to the current existing baseline emissions for the installation. The limited annual emissions of GHGs would not likely contribute to global warming to any discernible extent. Potential changes to local temperature and precipitation patterns as a result of ongoing global climate change would not affect the ability to implement the Proposed Action. Overall, there would be no long-term significant impacts on ambient air quality from facility construction and no significant impacts on ambient air quality from continued facility operations by implementing the Proposed Action.

### Geologic Resources (EA § 3.2, p. 3-9 to 3-18)

Potential impacts to soil resources would be limited to ground-disturbing activities, including site preparation, road, facility construction, and demolition. These activities would take place on previously disturbed soils and open spaces known to be capable of supporting such development. Minor and localized impacts to soils are expected to occur. The soils in open space are capable of supporting development; however, most new construction would be on disturbed soils. Construction actions by earthmoving and other construction activities would be minor and localized to the project footprint. Negligible impacts to topography and geological hazards are expected to occur, as there would not be significant alteration to surface landforms or subsurface features. Therefore, long-term potential impacts on geological resources resulting from construction activities under the Proposed Action would be negligible.

### Water Resources (EA § 3.3, p. 3-19 to 3-27)

While a majority of the construction footprints at the gate locations are within already developed land, additional acreage is required to allow for creation of serpentine approach lane(s) that will force vehicles to slow down before reaching the gates as well as other AT/FP infrastructure. The additional land needed to create safe approach lanes to access gates has been minimized to the greatest extent possible. For the purposes of calculating acreage impacts, a 10-foot buffer impact area was included around the project limits shown for each of the gates.

As guided by Executive Order (EO) 11990, Protection of Wetlands, and Air Force Instruction (AFI) 32-7064, Integrated Natural Resources Management, the USAF hereby provides notice of the potential for wetland impacts. Implementation of the Proposed Action for each of the projects would result in the total loss of approximately 0.14 acre of wetlands for all projects. Loss of wetland acreage may require an Environmental Resource Permit from the Northwest Florida Water Management District, as well as a U.S. Army Corps of Engineers (USACE) Clean Water Act (CWA) Section 404(b) permit. In addition to small areas of wetlands that would be removed, there would be some encroachment into 25-foot wetland buffers (0.83 acre) from State and Federal jurisdictional wetlands set aside under a memorandum of agreement (MOA) with the Florida Department of Environmental Protection (FDEP) and authorized by the USACE in the MOA with FDEP.

As guided by EO 11988, Floodplain Management, the USAF hereby provides notice of proposed reconstruction within the 100-year floodplain (1.62 acres). Much of the Hurlburt Field acreage lies within the 100-year floodplain due to its location and elevation. In order to comply with EO 11988, Hurlburt Field would design structures to reduce the risk of severe damage from flooding. Additionally, as Hurlburt Field is heavily developed, it provides minimal flood control for downriver areas. Therefore, the proposed projects would not contribute to any measurable loss with regard to flood control capacity.

Since designs for the construction of the proposed gates is similar to the infrastructure currently present, no additional groundwater withdrawals are anticipated as a result of the Proposed Action. No net increases in groundwater demand would be associated with landscaping irrigation of the new construction. In order to minimize irrigation requirements, the construction facility would utilize, to the greatest extent possible, landscaping techniques involving species from the approved list of trees, shrubs, grasses, aquatics, groundcovers, and accents identified in the Hurlburt Field Landscape Development Plan (Hurlburt Field 2009a). Overall, implementation of the Proposed Action would have no effect on groundwater.

No long-term adverse impacts on the coastal zone are expected from the implementation of the Proposed Action. Short-term, adverse impacts from soil disturbance could create nonpoint source water pollution; however, Hurlburt Field would utilize best management practices (BMPs) to reduce the chance of impacts. No visual impacts on the coastal zone are anticipated. With coordination, utilization of BMPs, and proper permitting and mitigation, the implementation of the Proposed Action would be consistent with the Florida Coast Management Plan (FCMP) and Coastal Zone Management Act (CZMA). Overall, there would be minor, long-term impacts on water resources as a result of implementing the Proposed Action.

## Biological Resources (EA § 3.4, p. 3-28 to 3-55)

The proposed gates would be constructed in five separate locations. The plant communities impacted and the extent of each proposed impact have been accessed. Based on the development footprints for the gates, the majority of the natural vegetation within the project limits would be permanently impacted (5.38 acres). No natural areas would be substantially fragmented (i.e., separated into multiple parcels) by the Proposed Action. Rather, small portions of natural areas along the edges of already developed areas would be impacted.

Wildlife that currently utilize nearby habitats within this area would be able to move to other similar areas on and off the installation. This loss of habitat utilization would not affect the viability of any native species. While wildlife that occurs on Hurlburt Field are accustomed to human activity such as aircraft noise, vehicular traffic, and human presence, construction noise does not occur regularly and therefore has a possibility to impact wildlife. The animals would likely vacate the area during construction events; however, once construction has ceased, they would return to the general area. As construction activity would be temporary, no decrease in population levels would occur based on disturbance. Therefore, construction of the gates would have short-term, minor, adverse impacts on wildlife.

The new construction is not anticipated to disturb or displace any protected species, as none have been documented in the vicinity of the Proposed Action. If any protected species were documented during the Proposed Action, coordination with the appropriate Federal and State agencies would occur. Indirect impacts on protected species could include loss or decline in the foraging/hunting habitat for transient species such as birds. However, this potential loss or decline in habitat would be negligible compared to similar existing habitats located within and outside the installation.

Implementation of the Proposed Action would result in minor impacts on natural communities. The Proposed Action would have short-term, minor, adverse impacts on wildlife. The Proposed Action would have negligible impacts on protected species. A no-effect determination has been made because no protected species are present. Overall, there would be no significant impacts on biological resources as a result of implementing the Proposed Action.

## Cultural Resources (EA § 3.5, p. 3-55 to 3-61)

No known archaeological sites are located within the Areas of Protentional Effects (APEs) of any of the gate renovation projects. The proposed project will be reviewed by the Hurlburt Field Installation Management Chief, along with support from the Eglin AFB Installation Support Section Cultural Resources Program Manager, in accordance with the standard operating procedures (SOPs) contained in the 2021 Integrated Cultural Resources Management Plan (ICRMP), and through consultation with the Florida State Historic Preservation Office (SHPO) and appropriate Native American tribes. If, through those consultations, supplemental archaeological surveys are determined to be needed, then they would be conducted within the construction footprint of the new facilities construction to identify any unrecorded archaeological sites. As a result, no archaeological resources would be adversely impacted from the implementation of the Proposed Action.

As part of the gate upgrades and reconfiguration, existing built environment would be removed, including old roadways and paving, recreational fields, fencing, ancillary structures lacking facility numbers, and five facilities with facility numbers. All the facilities with facility numbers date from 2001 to 2014 and have not been evaluated for the National Register of Historical Places (NRHP). The structures that are not 45 years old or older do not fall within the Cold War Era and are not anticipated to be eligible under Criteria Consideration G. As a result, no direct impacts on historic architectural resources are anticipated. No known historic architectural resources eligible for the NRHP are located within the visual APE of any of the gate upgrade projects. No visual impacts on the historic architectural resources are anticipated from the implementation of the Proposed Action. As a result, no impacts on architectural resources that are eligible for inclusion in the NRHP are anticipated from the implementation of the Proposed Action.

Neither of the two previously identified cemeteries at Hurlburt Field are located within the footprint or visual APEs of any of the five gate project areas. As a result, no impacts on cemeteries are anticipated from the implementation of the Proposed Action.

No sacred sites or Traditional Cultural Properties (TCPs) have been identified within Hurlburt Field during previous consultation with Native American tribes. As a result, no previously identified sacred sites or TCPs are located within any of the five gate upgrades and reconfiguration APEs. Additional site-specific consultations with Native American tribes to identify any potential TCPs or properties of religious or cultural significance will be conducted as part of the NEPA process. Consultation with Native American tribes will be completed prior to project implementation. All information provided by Native American tribes during the course of consultation will be considered in the resulting EA. As a result, no impacts on Native American Sacred Sites and TCPs are anticipated from the implementation of the Proposed Action.

If prehistoric or historic artifacts, such as pottery or ceramics, projectile points, dugout canoes, metal implements, historic building materials, or any other physical remains that could be associated with Native American, early European, or American settlement are encountered at any time within the project site area, the permitted project would cease all activities involving subsurface disturbance in the vicinity of the discovery.

**Land Use (EA § 3.6, p. 3-61 to 3-74):** The Proposed Action would result in relocation and construction of a new, larger Main Gate complex to the west of the existing facility, which would result in changes to the outdoor recreation and open space land uses in that area. An area characterized as natural vegetation, and two ballfields would be removed to accommodate the new construction and operation of the gate complex, which would result in a long-term, minor adverse impact to the outdoor recreation land use. Although there would be adverse impacts to outdoor recreation land uses west of the existing Main Gate, the impacts would be mitigated by open space that would be created to separate the gate complex and the outdoor recreation area.

The only land affected by the reconstruction of the East Gate would be open space. With the realignment of the road and construction of a new gate complex, there would be removal of pavement and facilities, which would be restored back to open space. The expansion and reconstruction of the existing CVI Gate area are not expected to extend into the outdoor recreation land (Hurlburt Golf Course) to the north or the open space south of the gate. The existing gate complex would be demolished and replaced with a compliant commercial vehicle inspection facility on the same site. There would be long-term, minor adverse impacts to a small area of stormwater drainage ditch/open space on the north side of the gate.

Construction of the Kerwood gate complex would require relocation of administrative functions in Building 91025 to a new facility in the same area, then demolition of Building 91025 would be required. The relocation of functions in Building 91025 would not adversely affect the land use relationships or compatibility in this area. There would be long-term, minor adverse impacts to open space from the new entry/egress road alignment and construction of an entry road leading to the administrative compound directly to the east of the gate complex.

The reconstruction of the Southside Gate would result in demolition of the existing gate complex and replaced with a new gatehouse, ID check stations, and canopy. There would be a minor relocation of the gate facilities and road alignment at the roundabout that would result in long-term, negligible impacts to open space to the west. Construction of new access gate would be compatible with on-base neighboring land use areas to the east. Overall, the Proposed Action would result in no significant impacts on land uses in the vicinity of the project area.

## Noise Environment (EA § 3.7, p. 3-74 to 3-78)

The Proposed Action would result in the reconstruction of a new facility, which would result in short-term, negligible increases in noise to the outdoor recreation and open space land uses in that area. These areas have been exposed to vehicle traffic for many years, and there would be open space and vegetation between the gate complex and the outdoor recreation area to provide some buffer to the short-term construction and long-term traffic noise. Noise from construction activities would only occur during the period of construction. Overall, there would be no significant noise impacts to off-base residential neighborhoods. Overall, the Proposed Action would result in no significant impacts on the noise environment in the vicinity of the project areas.

## Hazardous Waste (EA § 3.8, p. 3-78 to 3-80)

Implementation of the Proposed Action would have short-term, negligible, adverse impacts as a result of hazardous materials and waste. Facility Asbestos Management (ACM) and Lead-Based Paint (LBP) tests should be conducted on any structures prior to demolition. If ACM/LBP materials are discovered, they will be handled and disposed of properly. Management of disturbed soils would follow the State of Florida Generic Permit for Stormwater Discharge from Large and Small Construction Activities (2003), including a Notice of Intent (NOI) filed prior to commencing construction activities. The use of hazardous materials during construction (equipment fuel, paints and thinners, and other construction liquids) would be coordinated with the Hazardous Materials Pharmacy (HAZMART) and 1 SOCES to prevent any release to the environment. All contractors should maintain a copy of the Hazardous Waste Management Plan (HWMP) and spill procedures.

The Main, East, CVI, and Kerwood Gates are not located on or in proximity to any Environmental Restoration Program Areas of Concern; therefore, no existing hazardous waste site would be impacted by construction activities. There is an Installation Restoration Program (IRP) site adjacent to the Soundside Gate site, likely resulting from fueling operations at the nearby dock. During design, the government should consult with the IRP program manager at AFCEC and FDEP to characterize and avoid any land use controls (LUCs) near the gate or limits to digging. The concept for the Soundside Gate avoids this adjacent area. If the methods described above are followed, the Proposed Action would have negligible impacts on hazardous materials and waste.

**Infrastructure (EA § 3.9, p. 3-83 to 3-89):** All required utilities serve the existing access gate project areas. The existing utility systems would be capped as needed and extended to the proposed relocation of the gate complex. There is adequate capacity in all systems to accommodate construction and operation of the new gate complex. With the construction, there would be an increase of approximately one to two personnel at the gate during peak hours, which would result in a negligible increase in utility usage. Stormwater management would be accommodated through construction of detention basins. Overall, there would be no significant impacts on the utility systems.

All required utilities serve the existing Kerwood Road project area. The existing utility systems would be capped as needed and extended to the proposed gate complex. There is adequate capacity in all systems to accommodate construction and operation of the new Kerwood Gate complex. The gatehouse facilities, which include two ID check lanes, would be new to the project area and would result in approximately three to four personnel at the gate during peak hours. This would result in a long-term, negligible increase in utility usage in the project area, which includes the administrative area to the east. Stormwater management would be accommodated by surface drainage swales and inlets, and because the Proposed Action would result in a minor increase in impervious surfaces, there would be a long-term, minor increase in stormwater runoff. Overall, there would be no significant impacts on the utility systems.

Implementation of the Proposed Action would have short-term, minor, adverse impacts on transportation infrastructures and traffic flow during the period of construction. Most construction activities would be west of the existing gate and could be accomplished with minor impacts to existing traffic and gate operations, which would be maintained during construction. There would be temporary, minor increases in construction-related traffic as construction workers access the site and construction materials and equipment are delivered. Some sections of traffic areas could experience road closures or diversions during construction. Following the completion of roadway and gatehouse construction, there would be moderate, short-term adverse impacts while the new complex is reconnected.

Completion of the new entry road and gatehouse would result in long-term, moderate beneficial impacts on the traffic patterns and congestion at the gates.

## Summary of Findings

The analyses of the affected environment and environmental consequences of implementing the Proposed Action and Alternatives presented in the EA concluded that implementing environmental protection and management actions, as discussed in Section 4.0 of the EA, Hurlburt Field, the actions proposed in the EA would be in compliance with all terms and conditions and reporting requirements for implementation of reasonable and prudent measures stipulated by the United States Fish and Wildlife Service (USFWS). This includes Section 7 of the Endangered Species Act (ESA); with the conditions stipulated in Section 106 of the National Historic Preservation Act (NHPA); and implementing regulations (36 Code of Federal Regulations [CFR] Part 800), the Migratory Bird Treaty Act, and the Coastal Zone Management Act. Consultation with the USFWS, in accordance with Section 7 of the ESA, will be completed with respect to any projects within the gate access areas prior to beginning any construction.

The EA concluded that no significant adverse effects would occur on the following resources as a result of implementing the Proposed Action: air quality, geologic resources, water resources, biological resources, cultural resources, land use, noise environment, hazardous materials, and waste, and infrastructure. No significant adverse cumulative impacts would result from activities associated with the Proposed Action for each of the projects when considered with past, present, or reasonably foreseeable future projects at or in proximity to Hurlburt Field.

## Finding of No Practicable Alternative

Per 32 CFR §989.14(g), there are no practicable alternatives to avoid wetlands and construction within the 100-year floodplain. To address deficiencies of function and capability in the access gates and facilities at Hurlburt Field that arise through obsolescence, deterioration, and evolving needs, the removal of wetlands in several areas of the cantonment is necessary. In order to reconstruct the gate accesses, construction within the 100-year floodplain is unavoidable. Other alternatives were reviewed during the EA development process under the requirements of NEPA but were eliminated from further detailed analysis in the EA because they did not meet the stated purpose of and need for the action, were not practicable, or would have led to greater overall environmental impact. The only practicable alternative is described in the Proposed Action above. For the reasons stated in the EA, the dismissed Alternatives are not practicable alternatives for avoiding the potential wetland impacts. I, therefore, find that there is no practicable alternative to implementing the Proposed Action within the 100-year floodplain and wetlands.

## Finding of No Significant Impact

Based on my review of the facts and analyses contained in the attached EA, conducted under the provisions of NEPA, CEQ Regulations, and 32 CFR Part 989, I conclude that none of the five gate access projects analyzed as part of this EA would have a significant environmental impact, either by itself or cumulatively with other projects at Hurlburt Field. Accordingly, an Environmental Impact Statement is not required. The signing of this Finding of No Significant Impact completes the environmental impact analysis process.

________________________________________ Date ________________________

**JOCELYN J. SCHERMERHORN, Colonel, USAF**

**Commander 1st Special Operations Wing, and**

**Installation Commander Hurlburt Field**

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# GLOSSARY OF ABBREVIATIONS AND ACRONYMS

| | |
|---|---|
| ACM | Asbestos-Containing Material |
| ACP | Access Control Point |
| ADP | Area Development Plan |
| AFB | Air Force Base |
| AFI | Air Force Instruction |
| AFSOC | Air Force Special Operations Command |
| AIRFA | American Indian Religion Freedom Act |
| APE | Area of Protentional Effects |
| ARPA | Archaeological Resources Protection Act |
| AT/FP | Antiterrorism and Force Protection |
| BMPs | Best Management Practices |
| C&D | Construction and Demolition |
| CalEEMod | California Emissions Estimator Model |
| CEQ | Council on Environmental Quality |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| CFC | Chlorofluorocarbons |
| CFR | Code of Federal Regulations |
| CO | Carbon Monoxide |
| $CO_2e$ | Carbon Dioxide Equivalent |
| CPP | Comprehensive Planning Platform |
| CVI | Commercial Vehicle Inspection |
| CWA | Clean Water Act |
| CZMA | Coastal Zone Management Act |
| CZMP | Coastal Zone Management Plan |
| dB | Decibels |
| dBA | A-weighted Decibels |
| DoT | Department of Transportation |
| DNE | Determined Not Eligible |
| DNL | Day-Night Average A-weighted Sound Level |
| DoD | Department of Defense |
| EA | Environmental Assessment |
| ECF/ACP | Entry Control Facilities and Access Control Points |
| EIAP | Environmental Impact Analysis Process |
| EIS | Environmental Impact Statement |

| | |
|---|---|
| EO | Executive Order |
| EPA | Environmental Protection Agency |
| ESA | Endangered Species Act |
| ESC | Erosion and Sediment Control Plan |
| FAC | Florida Administrative Code |
| FCMP | Florida Coast Management Plan |
| FDEP | Florida Department of Environmental Protection |
| FEMA | Federal Emergency Management Agency |
| FICUN | Federal Interagency Committee on Urban Noise |
| FNAI | Florida Natural Area Inventory |
| FONPA | Finding of No Practical Alternative |
| FONSI | Finding of No Significant Impact |
| GHG | Greenhouse Gas |
| GWLs | Groundwater Levels |
| HAZMART | Hazardous Materials Pharmacy |
| HFC | Hydrofluorocarbons |
| HQ | Headquarters |
| HWMP | Hazardous Waste Management Plan |
| HUD | U.S. Department of Housing and Urban Development |
| ICRMP | Integrated Cultural Resources Management Plan |
| ID | Identification |
| INRMP | Integrated Natural Resources Management Plan |
| kVA | Kilovolt-Ampere |
| LBP | Lead-based Paint |
| LF | Linear Feet |
| LID | Low-Impact Design |
| LUC | Land Use Controls |
| MAP | Management Action Plan |
| MBTA | Migratory Bird Treaty Act |
| MOA | Memorandum of Agreement |
| MS4 | Municipal Separate Storm Sewer System |
| MSGP | Multi-Sector Generic Permit |
| MW | Megawatts |
| MWR | Morale, Welfare, and Recreation |
| NAAQS | National Ambient Air Quality Standards |

| | |
|---|---|
| NAGPRA | Native American Graves and Repatriation Act |
| NAR | Not Assessed Routinely |
| NEPA | National Environmental Policy Act |
| NEV | Not Been Evaluated |
| NFA | No Further Action |
| NHPA | National Historic Preservation Act |
| $NO_2$ | Nitrogen Dioxide |
| NOA | Notice of Availability |
| NPDES | National Pollutant Discharge Elimination System |
| NPS | National Park Service |
| NRHP | National Register of Historical Places |
| NWFWMD | Northwest Florida Water Management District |
| NWI | National Wetlands Inventory |
| NWPR | Navigable Waters Protection Rule |
| $O_3$ | Ozone |
| OSHA | Occupational Safety and Health Administration |
| Pb | Lead |
| PM | Particulate Matter |
| ppb | Parts per billion |
| QD | Quantity Distance |
| RCRA | Resource Conservation and Recovery Act |
| RHA | Rivers and Harbors Act |
| RTE | Rare, Threatened, and Endangered |
| SDDCTEA | US Army Military Surface Deployment and Distribution Command Transportation Engineering Agency |
| SDP | Sub-Area Development Plan |
| SF | Square Feet |
| SFHA | Special Flood Hazard Area |
| SHPO | State Historic Preservation Office |
| $SO_2$ | Sulfur Dioxide |
| SOCES | Special Operations Civil Engineer Squadron |
| SOW | Special Operations Wing |
| SWMP | Stormwater Management Plan |
| SY | Square Yards |
| T&E | Threatened & Endangered |
| TCP | Traditional Cultural Property |

| | |
|---|---|
| tpy | Tons per year |
| UFA | Upper Floridian Aquifer |
| UFC | Unified Facilities Criteria |
| USACE | U.S. Army Corps of Engineers |
| USAF | United States Air Force |
| USDA | U.S. Department of Agriculture |
| USFWS | U.S. Fish and Wildlife Service |
| VOC | Volatile Organic Compound |
| WWTP | Wastewater Treatment Plant |

# 1 Purpose of and Need for Action

## 1.1 Introduction

The 1st Special Operations Civil Engineer Squadron (1 SOCES), Hurlburt Field, Florida, and Headquarters Air Force Special Operations Command (HQ AFSOC) propose regulatory compliance actions for the access gates at Hurlburt Field, Florida. This Environmental Assessment (EA) was prepared in accordance with the National Environmental Policy Act (NEPA); the Council on Environmental Quality (CEQ) Regulations for Implementing NEPA (Title 40 Code of Federal Regulations [CFR] §§ 1500-1508); CEQ revised regulations for implementing NEPA (September 14, 2020); the United States Air Force (USAF)-implementing regulations for NEPA, and the Environmental Impact Analysis Process (EIAP) (32 CFR § 989), as amended. This EA is organized into six sections, plus appendices.

- **Section 1** of the EA provides background information, the project location, and the purpose and need for the Proposed Action.
- **Section 2** describes the Proposed Action and alternatives, including the No Action Alternative.
- **Section 3** describes the existing conditions of the potentially affected environment and identifies the environmental consequences of all alternatives.
- **Section 4** includes environmental management requirements and actions.
- **Section 5** provides the names of the preparers for this EA.
- **Section 6** lists the references used in the preparation of this document.

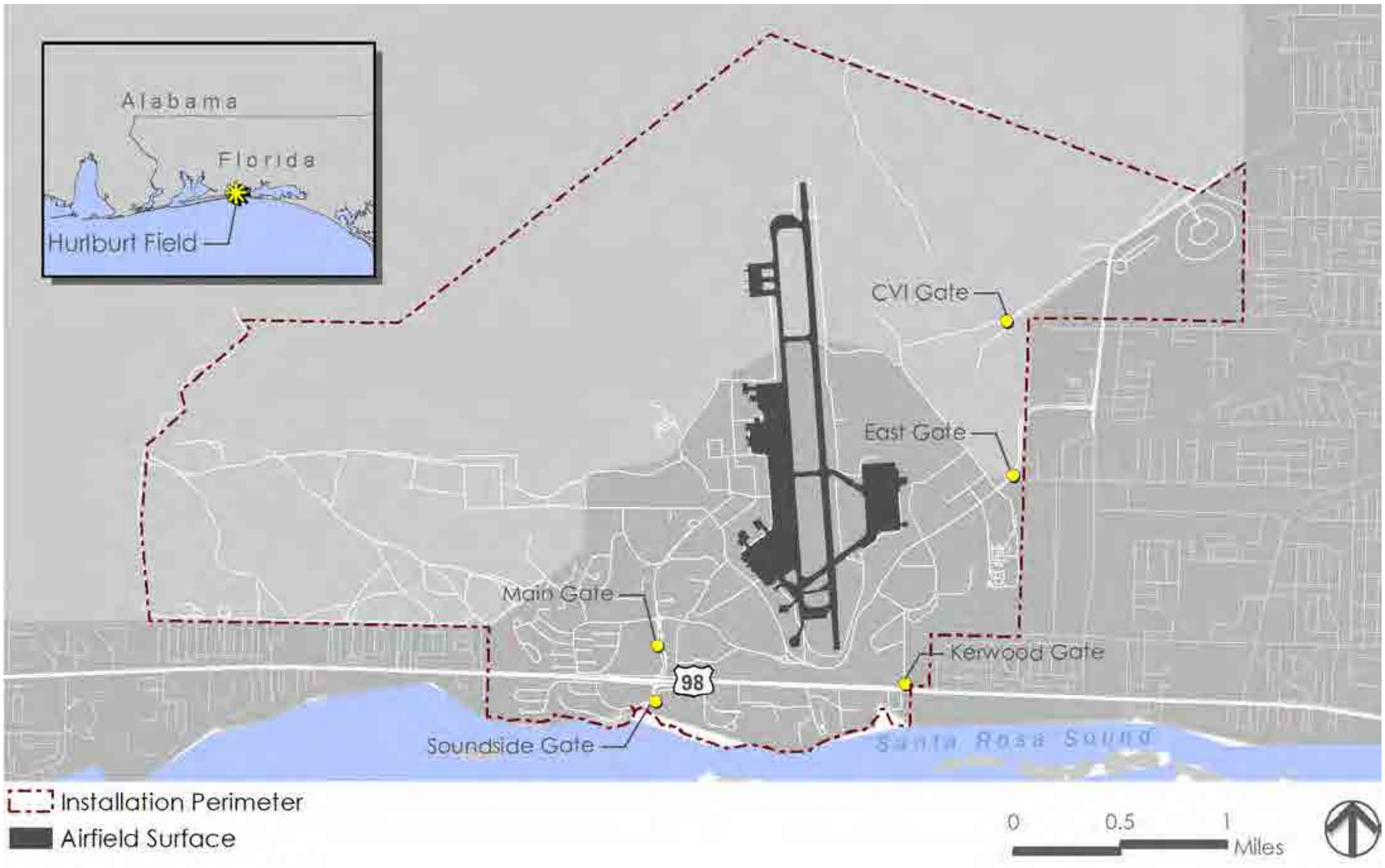
## 1.2 Location and Background

Hurlburt Field is in the Florida Panhandle, 35 miles east of Pensacola, Florida, and occupies approximately 6,634 acres of land within the installation perimeter. It was established in the 1940s and has hosted a variety of missions and aircraft types throughout its history. Hurlburt Field is home to the 1 Special Operations Wing (SOW), HQ AFSOC, and other tenant organizations and has four operational access gates at Hurlburt Field, including the Main Gate, East Gate, Commercial Vehicle Inspection (CVI) Gate, Soundside Gate, and a gate on Kerwood Road (**Figure 1.1**).

The intent of the 1 SOCES and HQ AFSOC is to streamline NEPA compliance and facilitate the installation development process by evaluating the potential impacts on the natural and human environment of the projects proposed for execution at Hurlburt Field. These projects are introduced in Section 2.2 below.

The information presented in this document should serve as the basis for deciding whether the proposed action would significantly impact the natural or human environments. If the proposed action results in a significant impact, an environmental impact statement (EIS) should be required. A Finding of No Significant Impact (FONSI) would be appropriate if no significant impacts occur. A Finding of No Practicable Alternative (FONPA) and a FONSI would be prepared if the execution of any of the proposed actions would involve “construction” in a wetland as defined in Executive Order (EO) 11990, Protection of Wetlands, or action in a floodplain under EO 11988, Floodplain Management as amended by EO 13690, Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input.

**Figure 1.1: Hurlburt Field and Access Gate Locations**




## 1.3 Purpose of and Need for Compliant Entry Control Facilities and Access Control Points

An action aims to provide and maintain Entry Control Facilities and Access Control Points (ECF/ACP) that are adequate to secure Hurlburt Field from unauthorized access and intercept contraband. Also, the projects would help maximize vehicular traffic flow to and from the installation by ensuring the proper level of access control and safety for all Department of Defense (DoD) personnel, visitors, and commercial traffic to the installation. Hurlburt Field needs regulatory compliant ECF/ACP that permit security forces to perform the required functions of visitor processing, vehicle registration, ID checks, privately owned vehicle inspections, and commercial/large vehicle inspections in a safe and secure working environment. Minimum standards for achieving the need for regulatory compliant ECF/ACP at Hurlburt Field are defined within Air Force guidance, Unified Facilities Criteria (UFC), and other DoD-approved safety and security publications. Currently, none of the five ECF/ACP at Hurlburt Field fully comply with these standards.

## 1.4 Interagency/Intergovernmental Coordination and Consultations

### 1.4.1 Interagency Coordination and Consultations

Scoping is an early and open process for developing the breadth of issues addressed in this EA and identifying significant concerns related to the Proposed Action. Per the requirements of the Intergovernmental Cooperation Act of 1968 (42 U.S.C. 4231(a)) and EO 12372, Intergovernmental Review of Federal Programs, federal, state, and local agencies with jurisdiction that could be affected by the proposed actions should be notified during the development of this EA. Appendix A (Interagency and Government-Government Coordination and Consultations) contains the list of agencies that should be consulted during this analysis, along with copies of any correspondence.

### 1.4.2 Government-to-Government Consultations

EO 13175, Consultation and Coordination with Indian Tribal Governments, directs federal agencies to coordinate and consult with Native American tribal governments whose interests might be directly and substantially affected by activities on federally administered lands. Consistent with that EO, DoD Instruction 4710.02, Interactions with Federally-Recognized Tribes, and AFI 90-2002, Air Force Interaction with Federally-Recognized Tribes, federally recognized tribes historically affiliated with the Hurlburt Field geographic region should be invited to consult on all proposed undertakings that have a potential to affect properties of cultural, historical, or religious significance. The tribal consultation process is directed by Section 106 of the National Historic Preservation Act. It is distinct from NEPA consultation or the interagency coordination process and requires separate notification of all relevant tribes. The timelines for tribal consultation are also distinct from those of other consultations. The Native American tribal governments that would be coordinated or consulted regarding these actions are listed in Appendix A (Interagency and Government-to-Government Coordination and Consultation).

### 1.4.3 Other Agency Consultations

Per the requirements of Section 106 of the National Historic Preservation Act (NHPA) and corresponding implementing regulations (36 CFR Part 800), Section 7 of the Endangered Species Act (ESA) and corresponding implementing regulations, as well as the Coastal Zone Management Act (CZMA), findings of effect and request for concurrence would be transmitted to the Florida State Historic Preservation Officer (SHPO), the U.S. Fish and Wildlife Service (USFWS), and the Florida Coastal Management Program, Florida Department of Environmental Protection (FDEP). Correspondence regarding the findings, as well as concurrence and resolution of any adverse effect, would be included in Appendix A (Interagency and Government-to-Government Coordination and Consultation).

## 1.5 Public and Agency Review of Environmental Assessment

A Notice of Availability (NOA) of the Draft EA, a FONSI, or a FONPA, if applicable, would be published in the newspapers of record (listed below), announcing the availability of the EA for review. The NOA should invite the public to review and comment on the Draft EA. The public and agency review period is 30 days, with the Florida State Clearinghouse having a review period of up to 60 days. Once the EA has been approved and the EA process is concluded, an NOA of the approved FONSI/FONPA should be published in the newspaper of record. The public and agency comments should be provided in Appendix A, and the NOA should be provided in Appendix B.

- Newspapers of record:
  - Northwest Florida Daily News, 2 Eglin Pkwy NE, Fort Walton Beach, FL 32548
  - Gulf Breeze News, P.O. Box 1414, Harbourtown Suite 35, Gulf Breeze, FL 32562
  - Navarre Press, 7502 Harvest Village Ct, Navarre, FL 32566

An electronic copy of the Draft EA and FONSI/FONPA would be made available for review at:

- Mary Esther Public Library, 100 Hollywood Boulevard W, Mary Esther, FL 32569
- Fort Walton Beach Public Library, 185 Miracle Strip Parkway SE, Fort Walton Beach, FL 32548

## 1.6 Decision to Be Made

This EA is a planning and decision-making tool to guide Hurlburt Field leadership in implementing the Proposed Action in a manner consistent with Air Force standards for environmental stewardship. It evaluates whether the Proposed Action would significantly impact the human or natural environments. If significant impacts are identified, Hurlburt Field would undertake mitigation to reduce impacts below the level of significance, prepare an EIS addressing the Proposed Action, or abandon the Proposed Action.

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# 2 Description of the Proposed Action and Alternatives

## 2.1 Introduction

Guidance for complying with NEPA requires an assessment of potentially effective and reasonably feasible alternatives for the implementation of the Proposed Action. This section describes the Proposed Action and alternatives, including the No-Action Alternative. Below are details of the Proposed Action and the No-Action Alternative and a description of alternatives that were considered but eliminated from further analysis. The Proposed Action and the No-Action Alternative will be addressed in this EA.

## 2.2 Proposed Action

The Proposed Action addresses the five existing Hurlburt Field access gates. The Main Gate, East Gate, and the Soundside Gate are primarily used to process personal vehicles. Kerwood Gate is currently a gate with no permanent gatehouse facilities and is used only in emergencies. The CVI Gate is used for the inspection and processing of commercial deliveries. All facility improvements would be designed as permanent construction. The projects would include all necessary utilities, site improvements, road pavements, communications infrastructure, passive security infrastructure, and an emergency backup generator. All existing gatehouses, ID check stations, canopies, road pavement, and utilities would be removed or modified.

**Project 1: Reconstruction of the Main Gate**

The Main Gate reconstruction project (**Figures 2.1** and **2.2**) includes the construction of a serpentine entry road, seven ID check stations, and a gatehouse building totaling 972 square feet (SF). A 9,163-SF canopy would shelter the gatehouse and ID check stations on the four inbound traffic lanes. The gatehouse area would include two personal vehicle search areas, a parking space for a security forces chase vehicle, and four parking spaces for security forces personnel. There would be a vehicle rejection lane prior to the gatehouse, a vehicle rejection lane beyond the gatehouse, and three outbound lanes. The installation perimeter fence north of the Main Gate would be realigned to meet security requirements. Utility and communication connections would be provided. A pad with utility stubs would be constructed for the potential construction of an overwatch tower at a later date.

The Main Gate project would include the removal of 16,975 square yards (SY), which is most of the existing entry road extending from U.S. 98 to the existing gatehouse, ID check stations, and canopy. The former CVI structure would be removed. Other removals would include 1,993 linear feet (LF) of the installation perimeter fence, a cluster of large trees to the west of the existing entry road, and the gatehouse. Two baseball fields would be removed, and the recreational functions relocated. All utility infrastructure associated with the existing Main Gate complex and roadway would be removed.

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**Figure 2.1: Main Gate Project Limits**

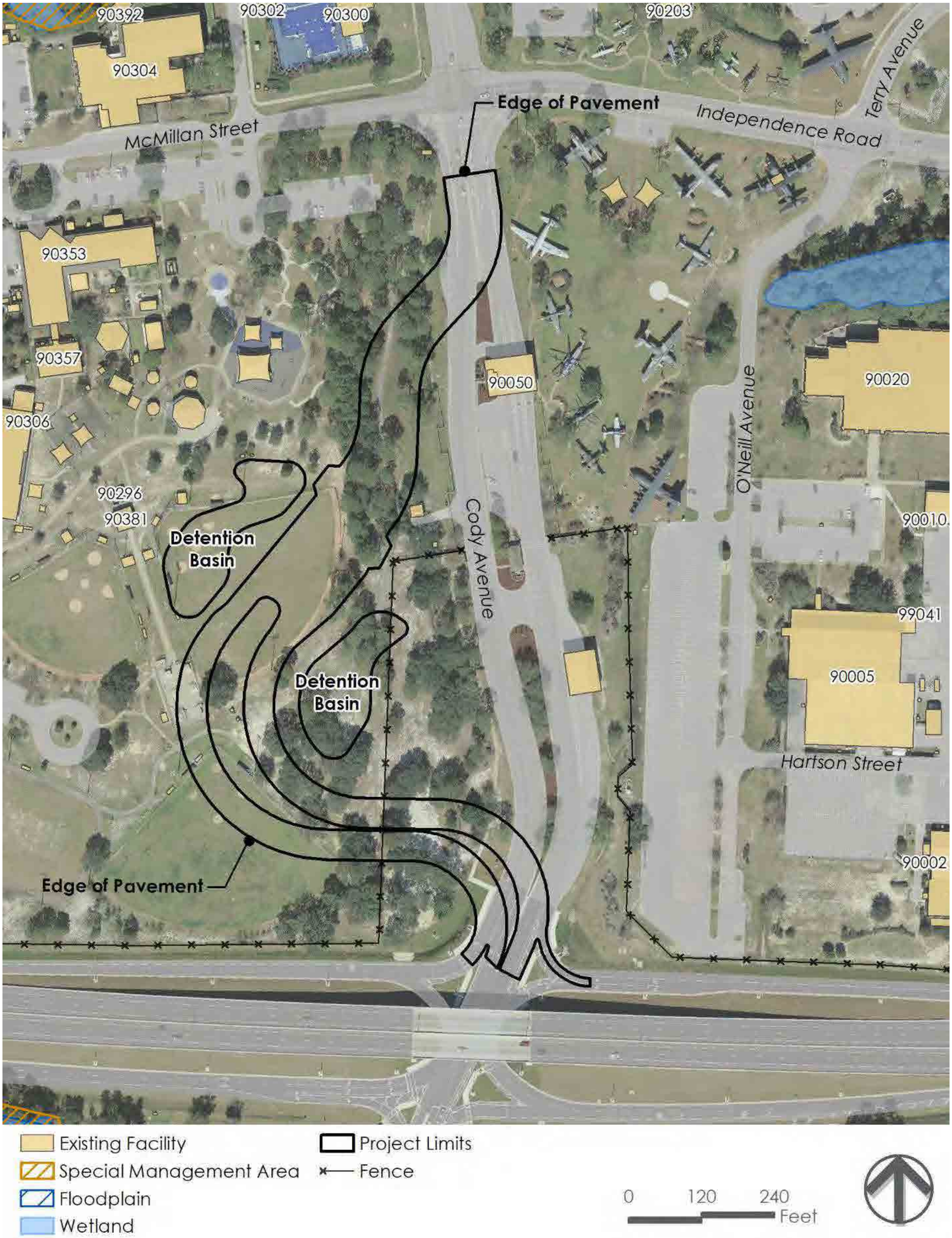

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**Figure 2.2: Main Gate Rendering**

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**Project 2: Reconstruction of the East Gate**

The East Gate reconstruction project (**Figures 2.3** and **2.4**) would be similar to the Main Gate, but because the traffic volume is less than the Main Gate, the proposed facilities are slightly smaller and would have fewer ID check stations. The proposed East Gate reconstruction project would include a serpentine entry road, five ID check stations, and a gatehouse building totaling 900 SF. The canopy sheltering the gatehouse, ID check stations, and three inbound lanes would be 7,315 SF; there would be two outbound lanes. The gatehouse area would include two personal vehicle search areas, a parking space for a security forces chase vehicle, and four parking spaces for security forces personnel. There would be a vehicle rejection lane prior to the gatehouse and a vehicle rejection lane beyond the gatehouse. The installation perimeter fence north of the East Gate would be realigned to meet security requirements. Utility and communication connections would be provided.

The East Gate project would include the removal of 10,322 SY of the existing entry road, the gatehouse, ID check stations, and canopy. All utility infrastructure associated with the existing East Gate complex and roadway would be removed.

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**Figure 2.3: East Gate Project Limits**

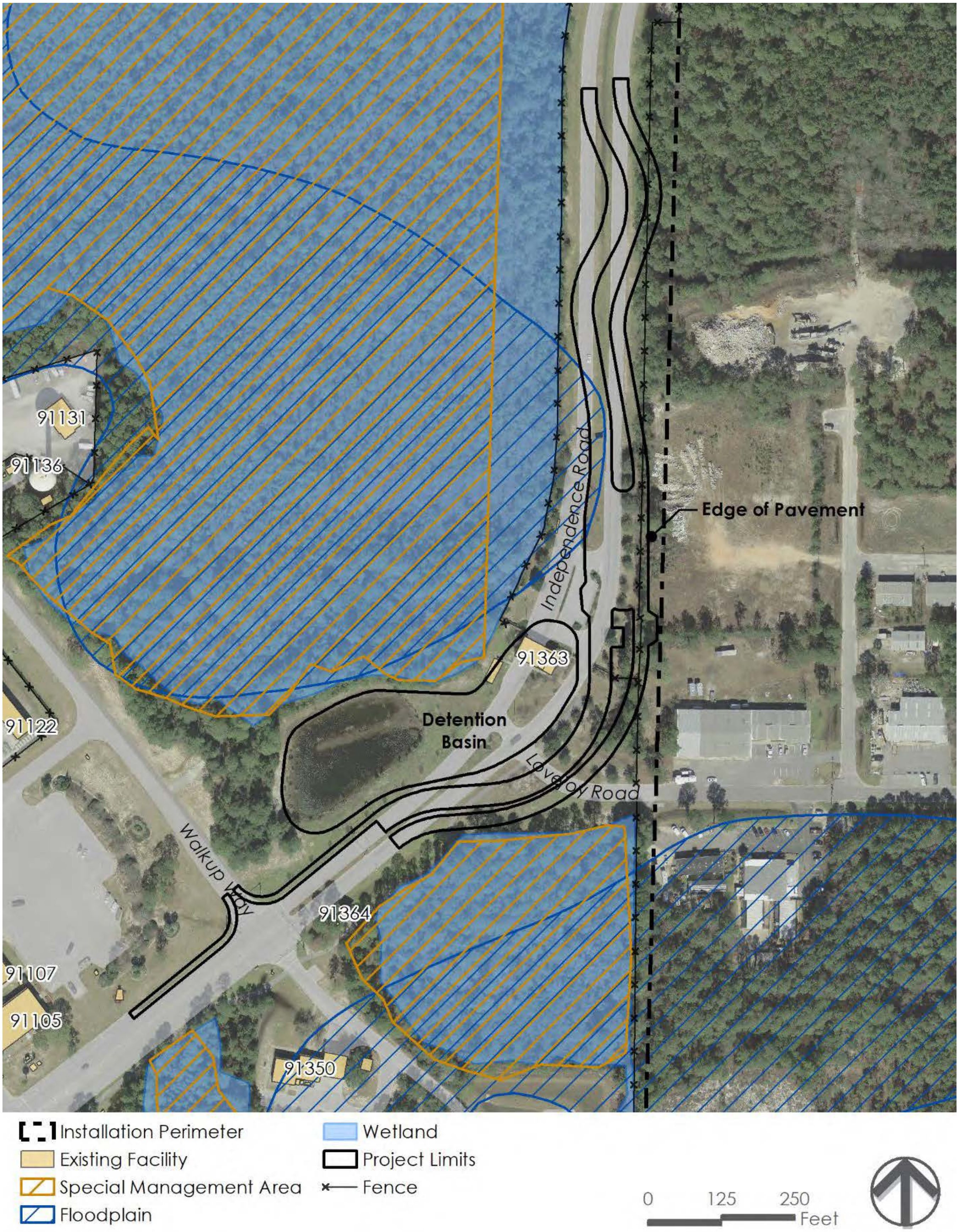

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**Figure 2.4: East Gate Rendering**

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**Project 3: Reconstruction of the Commercial Vehicle Inspection Gate**

The proposed CVI Gate reconstruction project (**Figures 2.5** and **2.6**) would include a serpentine entry road, an inspection building including administrative space, a driver waiting area, a holding area, a dog kennel, and two vehicle inspection bays. The CVI facility would be 5,400 SF, with one outbound lane. The entry road leading to the CVI would be one lane wide. A commercial vehicle queuing area would accommodate approximately four large commercial vehicles. Also, there would be two lanes leading to the inspection bays and a third bypass lane extending around the facility. The CVI area would include an outbound vehicle search area. There would be 10 parking spaces for security forces personnel, personal vehicles, and vehicles waiting to escort commercial vehicles into the installation. There would be a vehicle rejection lane prior to the gatehouse and a vehicle rejection lane beyond the gatehouse. A new final denial barrier would be constructed at 695 LF from the CVI to create a response time that meets requirements. Utility and communication connections would be provided.

The CVI Gate reconstruction would require the removal of 4,973 SY of the existing entry road and all existing structures. The CVI function would need to be closed during construction and inspections conducted at a different location. The existing detention basin would be relocated. The existing final denial barrier would be removed.

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**Figure 2.5: Commercial Vehicle Inspection Gate Project Limits**

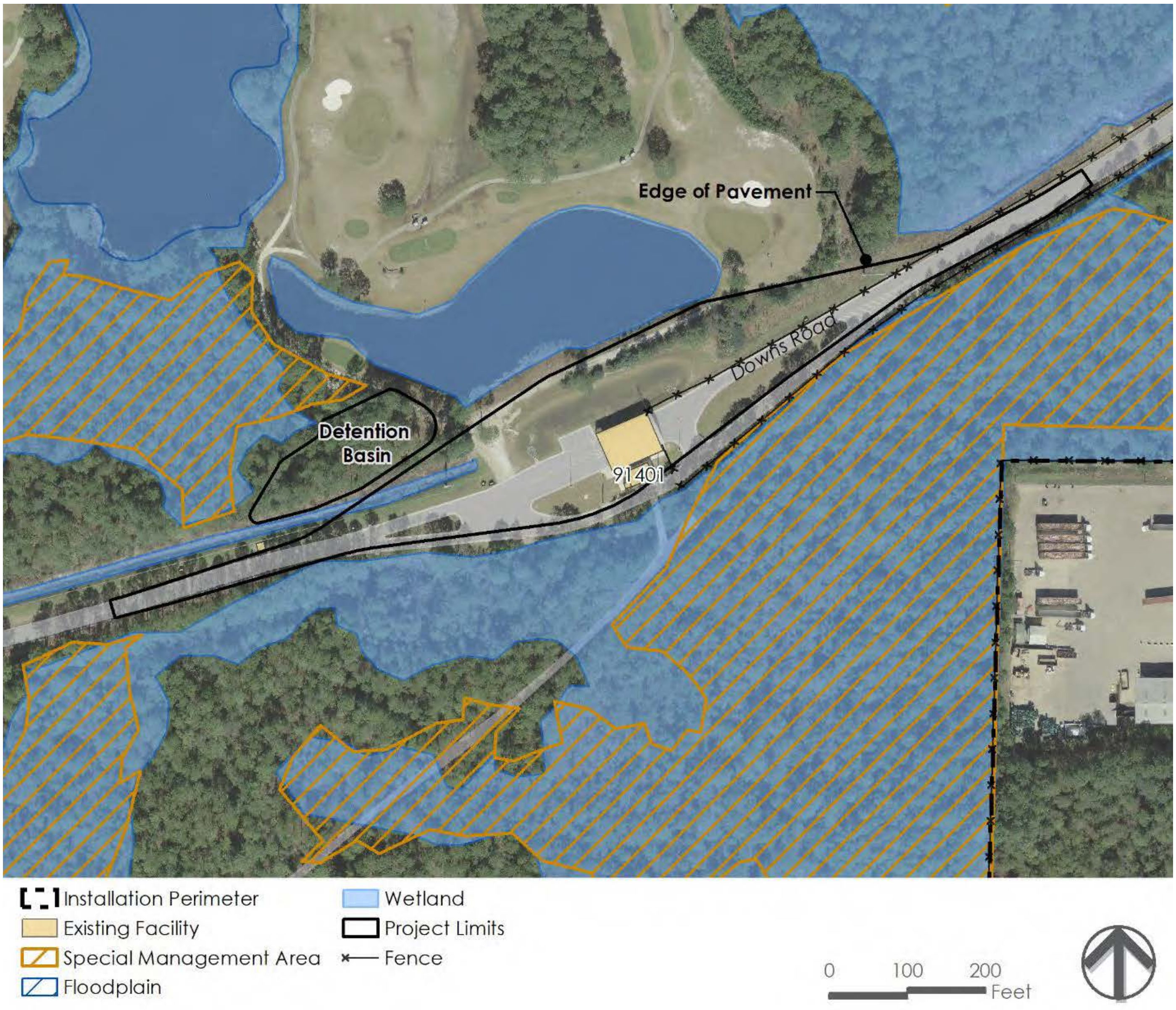

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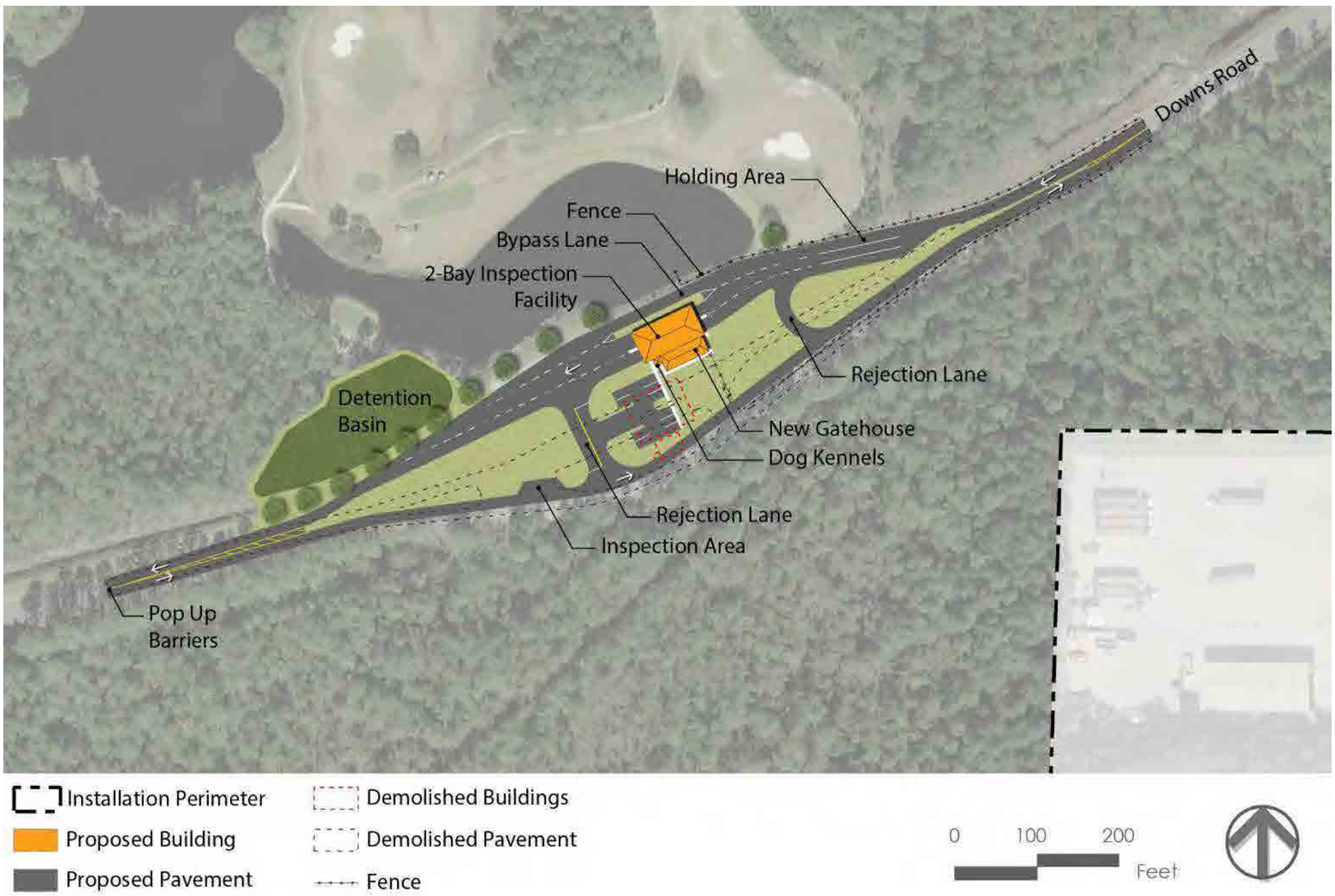
**Figure 2.6: Commercial Vehicle Inspection Gate Rendering**



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**Project 4: Reconstruction of the Kerwood Gate**

The proposed Kerwood Gate reconstruction project (**Figures 2.7** and **2.8**) would include three ID check stations and a gatehouse building totaling 756 SF. A 6,000-SF canopy would shelter the gatehouse and ID check stations on the two inbound traffic lanes. The gatehouse area would include two personal vehicle search areas, a parking space for a security forces chase vehicle, and four parking spaces for security forces personnel. There would be a vehicle rejection lane prior to the gatehouse, a vehicle rejection lane beyond the gatehouse, and two outbound lanes. A 49-SF overwatch would be constructed north of the gate complex.

The entry road from U.S. 98 to the gatehouse would be a 550-foot serpentine road. One rejection lane would accommodate large vehicles before the gate, and one after the gatehouse would allow vehicles to exit the gate. A five-foot-wide concrete sidewalk would provide pedestrian access from U.S. 98 to the gatehouse and extend north to the final denial barrier. The pedestrian connection would transition to two 6-foot-wide asphalt bike lanes adjacent to Kerwood Road from the final denial barrier to the recreation trail at Howie Walters Road.

A new, single-entry road to the facilities east of the Kerwood Gate would be constructed north of the gatehouse and beyond the final denial barriers. New perimeter fencing (1,133 LF) would be constructed from the intersection of Kerwood Road and U.S. 98 to the proposed gatehouse at the Kerwood ACP. An electric motor-operated gate would be constructed on the south side of the gatehouse area, and a second swing gate would be located at the intersection with U.S. 98. These gates would be supplemented with bollards and used to restrict base access when the Kerwood Gate is closed. The parking lot and the two entry roads on the west side of the study area would be removed, and the parking capacity would be relocated to the facility compound east of the Kerwood Gate. Another small parking lot in the compound would be removed, and spaces would be relocated to allow for the construction of the entry road. Personal vehicle parking spaces would be constructed in the facility compound east of the proposed Kerwood Gate to replace parking removed due to the construction of the gate complex. New asphalt pavement would total 13,596 SY.

Pavement removals would include portions of Kerwood Road and entry roads leading to nearby facilities to the east. In addition to the driveway leading to Building 91025, the entire parking lot on the west side of Kerwood Road would be removed. Kerwood Road would be milled from the gatehouse to the Howie Walters Road intersection; the driveways leading from the community center area would be realigned, and old pavement would be removed. Pavement removals would total 7,675 SY. Milled pavement would total 2,531 SY.

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Figure 2.7: Kerwood Gate Project Limits

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**Figure 2.8: Kerwood Gate Rendering**

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**Project 5: Reconstruction of the Soundside Gate**

The Soundside Gate serves residential, community service, recreational, and industrial functions on the south side of U.S. 98 and does not have the volume of traffic that the Main Gate or the East Gate process. Because of the lower volume of vehicle traffic, the proposed gatehouse would be slightly smaller and have fewer ID check stations. The proposed Soundside Gate reconstruction project (**Figures 2.9** and **2.10**) would include an entry road, a gatehouse building, and ID check stations totaling 756 SF. The canopy sheltering the gatehouse, ID check station, and two inbound lanes would be 3,312 SF; there would be one outbound lane. The gatehouse area would include two personal vehicle search areas, a parking space for a security forces chase vehicle, and three parking spaces for security forces personnel. There would be a vehicle rejection lane beyond the gatehouse. The roundabout immediately south of the Soundside Gate would be reconstructed to meet turning radius requirements for commercial vehicles, and new final denial barriers constructed. Utility and communication connections would be provided.

The Soundside Gate project would require the removal of 3,916 SY of the existing entry road and roundabout, the existing gatehouse, ID check station, and canopy. All utility infrastructure associated with the existing Soundside Gate complex and roadway would be removed.

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**Figure 2.9: Soundside Gate Project Limits**

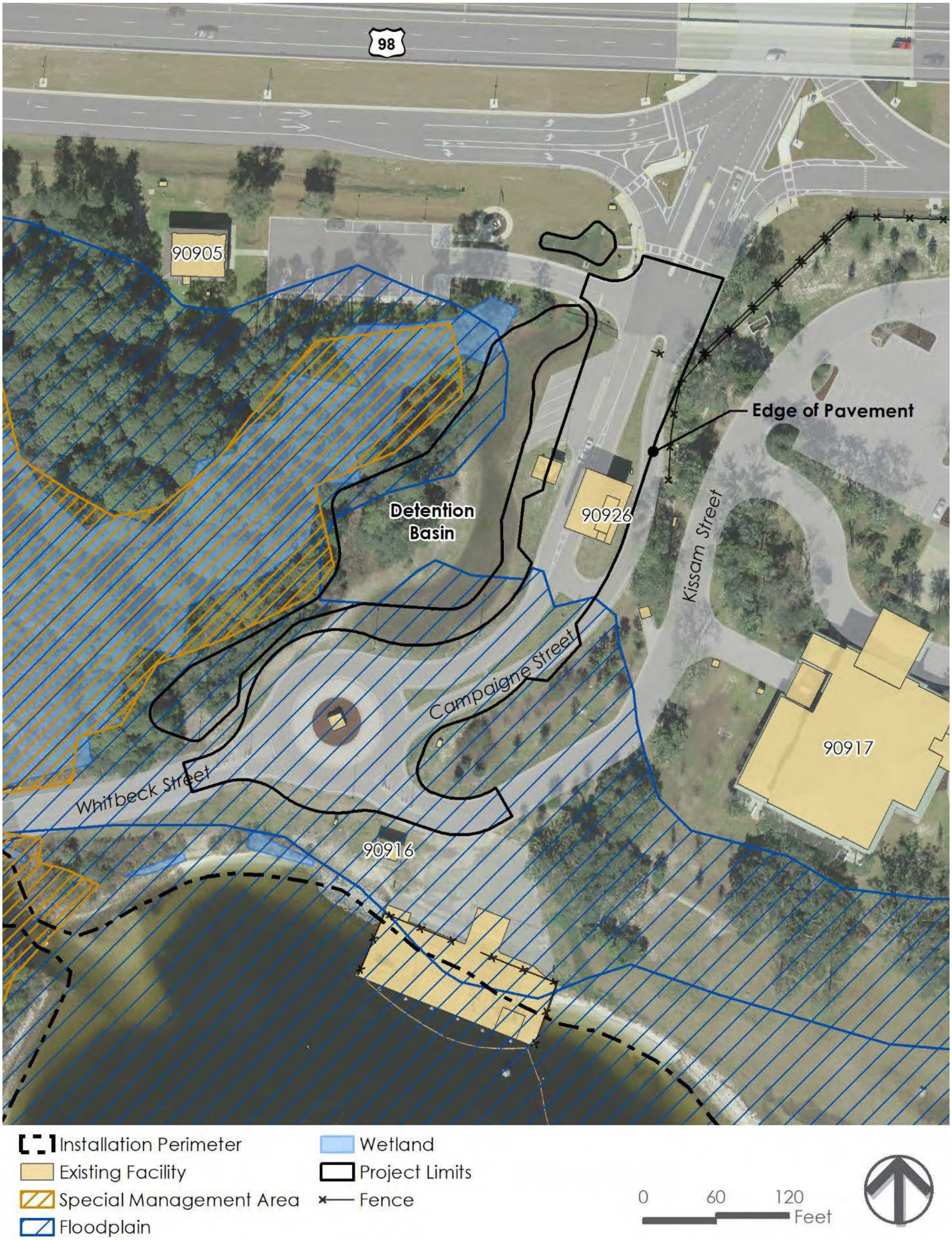

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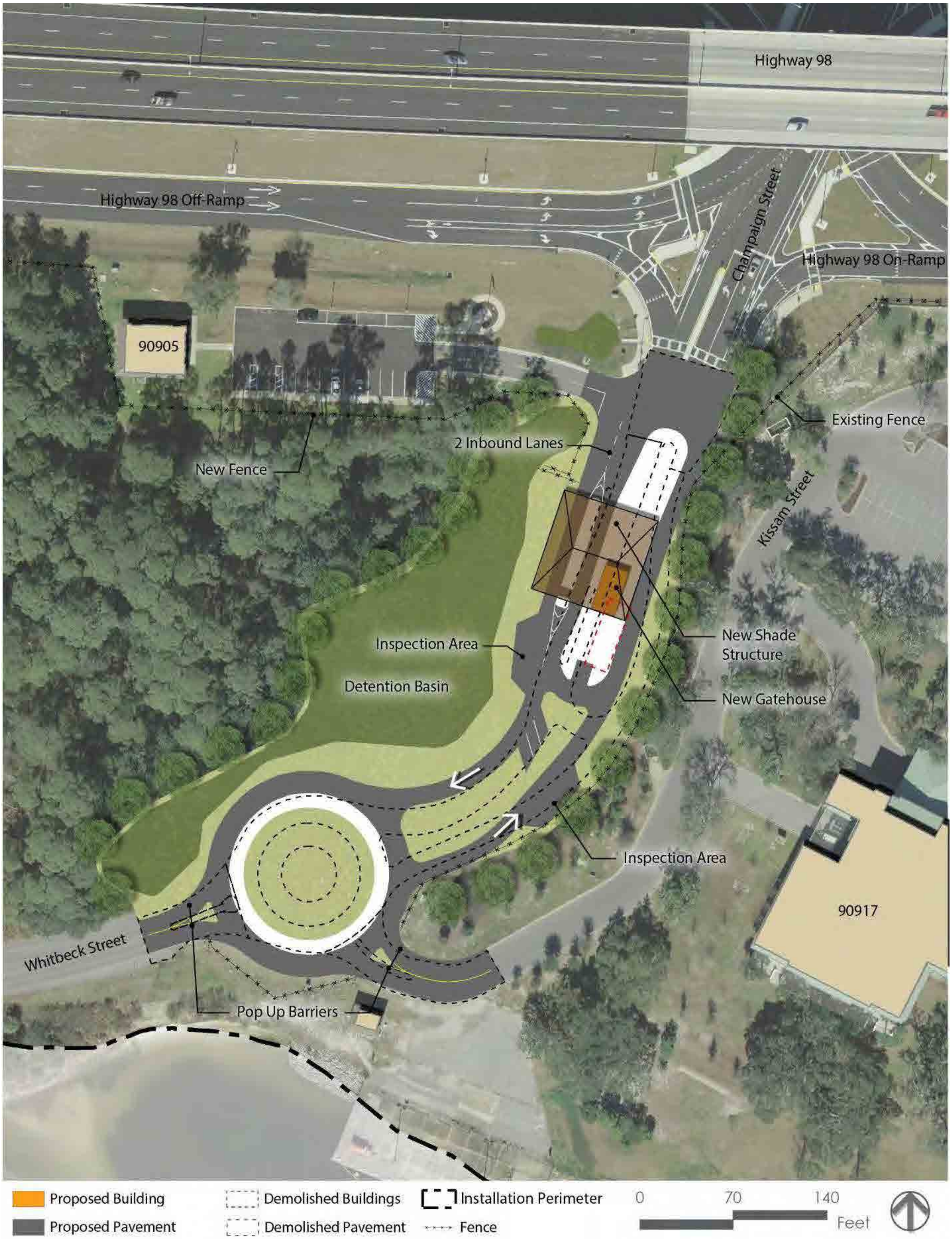
**Figure 2.10: Soundside Gate Rendering**



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## 2.3 Selection Criteria for Alternatives to the Proposed Action

NEPA's implementing regulations guide the consideration of alternatives to a Federally Proposed Action and require an objective evaluation of reasonable alternatives. To be considered reasonable, an alternative must be suitable for decision making, capable of implementation, and sufficiently satisfactory with respect to meeting the Purpose and Need for the action. Only the alternatives that meet the Purpose and Need, and are determined to be reasonable, would require detailed analysis. Potential alternatives considered reasonable for meeting the Purpose and Need were evaluated against the following selection criteria:

The new ECF/ACP is required to be constructed in a manner that:

- Avoids Mission Interference
    - Secures Hurlburt Field from unauthorized access and intercepts contraband
    - Helps maximize vehicular traffic flow to and from the installation by ensuring the proper level of access control and safety for all DoD personnel, visitors, and commercial traffic to the installation
    - Permits security forces to perform the required functions of visitor processing, vehicle registration, ID checks, privately owned vehicle inspections, and commercial/large vehicle inspections
- Minimizes Wetland and Floodplain Construction
    - Minimizes disturbance of wetlands and floodplains during construction
    - Minimizes post-construction, permanent impacts to wetlands and floodplains
- Reduces Safety Violations
    - Meets applicable DoD antiterrorism/force protection (AT/FP) criteria, consistent with UFC 4-010-01, *DoD Minimum Antiterrorism Standards for Buildings, and the Air Force Installation Force Protection Guide*
    - Meets the current UFC 4-022-01, *Entry Control Facilities Access Control Points*
    - Aligns with implementation guidance from the U.S. Army Military Surface Deployment and Distribution Command Transportation Engineering Agency (SDDCTEA), Pamphlet 55-15, *Traffic and Safety Engineering for Better Entry Control Facilities*
- Avoids Land Use Incompatibilities
    - Consistent with the Hurlburt Field Installation Comprehensive Planning Platform (CPP), multiple Area Development Plans (ADP) and Sub-area Development Plans (SDP) guide the development of planning
    - Functionally compatible with existing land uses
    - Compatible with adjacent land use, so there are no threats to public health and safety

## 2.4 Alternatives Considered but Eliminated from Detailed Analyses

Besides the Proposed Action, no other reasonable alternatives were identified that would meet the Purpose and Need of the Proposed Action for the Main Gate, East Gate, CVI Gate, Kerwood Gate, and Soundside Gate. Specifically, there were no feasible alternative locations for constructing new access gates that could meet the selection criteria presented in Section 2.3.

- **Former Access Gate South of U.S. 98**. The former gate for the Soundside housing area was decommissioned when the Soundside Gate opened. Reusing that former alignment for a gate complex that meets requirements would result in wetland impacts. The vehicular circulation pattern from this location would also be problematic for large commercial vehicles accessing the Soundside Club, an AFSOC operations facility, the marine terminal fuel off-loading facility, and recently constructed family housing east of the gate. Because of the traffic circulation concerns and impacts to wetlands, this alternative was dismissed from consideration in this EA.

- **Construction/Special Event Access Gate South of U.S. 98.** There is an undeveloped emergency/special event access gate on the south side of U.S. 98 and further east of the existing Soundside Gate. This gate is in a poor location because it is close to the on- and off-ramps leading from U.S. 98 to the Hurlburt Main Gate. Adding an intersection in proximity to the on- and off-ramps would create traffic safety hazards on U.S. 98. The circulation pattern of the road system from this location would also be problematic for family housing west of the gate. Because of the traffic safety and congestion concerns, this alternative was dismissed from consideration in this EA.
- **Former Construction Access Gate North of U.S. 98.** The former construction gate that intersects U.S. 98 from the north side of the highway is in the runway clear zone, and constructing facilities in this area would not meet airfield safety requirements. This site has the same problems as the emergency gate on the south side of U.S. 98, including a poor location near the Hurlburt Field entrance. A gate at this location would also create safety hazards on U.S. 98. Because of the airfield safety requirements and traffic safety concerns, this alternative was dismissed from consideration in this EA.
- **West Gate.** The potential for a gate on the west end of Hurlburt Field was analyzed in an EA in 2014. In the EA, it was determined there would be risks associated with munitions storage QD arcs, natural resource constraints associated with Threatened and Endangered Species habitat, adverse impacts to off-base residential development, and traffic flow on U.S. 98. This alternative was dismissed from consideration in this EA because there are too many operational, natural resource, off-base residential, and traffic flow constraints to make a new gate in this area viable.
- **North Gate.** A North Gate concept has been considered and determined not feasible for the foreseeable future. The proposed North Gate was intended to be located at the north end of a new entry road extending from the central portion of the installation. Currently, there are no roads on base or off base to the north to make this connection. This gate complex would only be viable if a U.S. 98 bypass would be constructed north of Hurlburt Field through Eglin AFB. The natural resource constraints and significant issues with Eglin AFB operations make this option extremely unlikely for the foreseeable future, so it was dismissed from consideration in this EA.

## 2.5 Alternatives Carried Forward for Analysis

### Proposed Action

As described in Section 2.2, the Proposed Action is carried forward for analysis in this EA.

### Alternative 1: Proceed with the Proposed Action as described in Section 2.2 except for the Kerwood Gate

The Kerwood Gate is currently not in use. The gate project could be implemented later when it becomes operationally required. Existing methods to mitigate the compliance deficiencies of the AT/FP requirements (UFC 4-022-01) would continue (e.g., speed bumps/humps, etc.) with respect to the Kerwood Gate.

## 2.6 No-Action Alternative

Under the No-Action Alternative, the proposed reconstruction of access gates would not occur at Hurlburt Field. Existing methods to mitigate the compliance deficiencies of the AT/FP requirements (UFC 4-022-01) would continue (e.g., speed bumps/humps, etc.).

# 3 Affected Environment

This EA primarily focuses on the components of the environment that would be affected by the implementation of the five proposed access gates, which are located on Hurlburt Field. Resources that could be affected include air quality, noise, land use, geology, topography and soils, water resources (floodplains, wetlands, and waters of the U.S., groundwater, and coastal zone), biological resources (natural communities, wildlife, and protected species), cultural resources (archaeological resources, architectural resources, cemeteries, sacred sites, and Traditional Cultural Property [TCPs]), infrastructure (utilities and transportation), hazardous materials, and wastes. These resources are described and evaluated in this EA.

**Resources Dismissed from Further Analysis**

Resource topics not carried forward for analysis in this EA are described below:

**Airspace**

The proposed actions discussed in this EA do not involve modifications to the airspace or the introduction or changing of aircraft assigned to Hurlburt Field. Airspace addresses the safe, orderly, and compatible use of the nation's airspace through a system of flight rules and regulations, airspace management actions, and air traffic control procedures. Therefore, the Proposed Action and Alternatives in this EA would not affect airspace, and a detailed analysis of this resource has not been carried forward.

**Prime Farmland**

There are no areas designated as prime farmland at Hurlburt Field. Therefore, the Proposed Action and Alternatives would not affect prime farmland, and a detailed analysis of this resource has not been carried forward.

**Safety**

The proposed actions would not introduce unusual safety hazards to construction and demolition projects. All proposed actions would involve the inherent risks associated with the construction and demolition of access gates; however, all applicable state, federal, and Air Force regulations would be followed. Typical safeguards during construction and demolition work would include site fencing to eliminate the possibility of base personnel or children entering an active work site and standard safety practices as directed by the Occupational Safety and Health Administration (OSHA) for construction work areas. Safety standards and procedures for access gate construction projects at Hurlburt Field would be applied. Where individual projects would incur worker safety risks due to potential exposure to hazardous waste, compliance with OSHA safety requirements for workers and proper handling of hazardous waste would be the contractor's responsibility for each project. The Proposed Action and Alternatives in this EA would not affect worker safety, so a detailed analysis of this resource has not been carried forward.

**Socioeconomics/Environmental Justice/Protection of Children**

Socioeconomics are the primary attributes and resources associated with the human environment, particularly population characteristics and economic activity. Socioeconomic activity typically encompasses employment, household income, and industrial or commercial growth. Changes in these fundamental socioeconomic indicators can result in changes to additional socioeconomic indicators, such as housing availability and the provision of public services; however, the proposed actions would not have any effect on most attributes described above to the local community.

Except for the realignment of a small portion of the entry roads outside of the installation perimeter, all elements of the Proposed Action are limited to land inside the perimeter fence of Hurlburt Field. No population growth or decrease is associated with the action, no off-base population, and on-base family housing is in direct proximity to the access gates. There would be no significant impacts on environmental justice or the protection of children because of implementing the Proposed Action or Alternatives, so a detailed analysis of these resource topics has not been carried forward.

The construction and demolition activities for all proposed actions would provide financial benefits to the businesses selected to perform the construction and demolition functions. Still, the overall impact of the proposed actions on the socioeconomics of the larger Okaloosa County economy would be short-term, beneficial, but negligible. The financial benefits would last only during the period of construction and demolition. If the No-Action Alternative were selected, there would be a short-term, adverse but negligible impact on the Okaloosa County economy. There would be no significant impacts on the local or regional economy due to implementing the Proposed Action or Alternatives, so a detailed analysis of this resource topic has not been carried forward.

## 3.1 Air Quality

### 3.1.1 Definition of the Resource

The U.S. Environmental Protection Agency (EPA) established National Ambient Air Quality Standards (NAAQS) for specific pollutants of concern to the health and welfare of the general public. Ambient air quality standards are classified as "primary" or "secondary." The major pollutants of concern, or criteria pollutants, are carbon monoxide (CO), sulfur dioxide ($SO_2$), nitrogen dioxide ($NO_2$), ozone ($O_3$), particulate matter less than 10 microns (PM-10), particulate matter less than 2.5 microns (PM-2.5), and lead (Pb). NAAQS represent the maximum levels of background pollution that are considered safe, with an adequate margin of safety, to protect public health and welfare. The Florida Department of Environmental Protection (FDEP) has adopted the federal NAAQS as their ambient air quality standards for Florida. The NAAQS are included in **Table 3.1**.

Areas that do not meet these NAAQS standards are called non-attainment areas; areas that meet both primary and secondary standards are known as attainment areas. The Federal Conformity Final Rule (40 CFR Parts 51 and 93) specifies criteria or requirements for conformity determinations for federal projects. The Federal Conformity Rule was first promulgated in 1993 by the EPA, following the passage of Amendments to the Clean Air Act in 1990. The rule mandates that a conformity analysis must be performed when a federal action generates air pollutants in a region designated as a non-attainment or maintenance area for one or more NAAQS.

A conformity analysis is used to determine whether a federal action meets the requirements of the General Conformity rule. The analysis requires the responsible federal agency to evaluate the nature of a proposed action and associated air pollutant emissions and calculate emissions resulting from the proposed action. If emissions exceed established limits, known as *de minimis* thresholds, the proponent must implement appropriate mitigation measures.

**Table 3.1: National Ambient Air Quality Standards**

| Pollutant | Primary Standards | | Secondary Standards | |
|---|---|---|---|---|
| | Level | Averaging Time | Level | Averaging Time |
| Carbon Monoxide (CO) | 9 ppm (10 mg/m³) | 8-hour (1) | None | None |
| | 35 ppm (40 mg/m³) | 1-hour (1) | None | None |
| Lead (Pb) | 0.15 µg/m³ (2) | Rolling 3-month average | Same as Primary | Same as Primary |
| | 1.5 µg/m³ | Quarterly Average | Same as Primary | Same as Primary |
| Nitrogen Dioxide ($NO_2$) | 53 ppb (3) | Annual (arithmetic average) | Same as Primary | Same as Primary |
| | 100 ppb | 1-hour (4) | None | None |
| Particulate Matter (PM-10) | None | Annual | Same as Primary | Same as Primary |
| | 150 µg/m³ | 24-hour (5) | Same as Primary | Same as Primary |
| Particulate Matter (PM-2.5) | 12.0 µg/m³ | Annual (6) (arithmetic average) | 15.0 µg/m³ | Annual (6) (arithmetic average) |
| | 35 µg/m³ | 24-hour (7) | Same as Primary | Same as Primary |
| Ozone ($O_3$) | 0.075 ppm (2008 std) | 8-hour (8) | Same as Primary | Same as Primary |
| | 0.070 ppm (2015 std) | 8-hour (9) | Same as Primary | Same as Primary |
| | 0.12 ppm | 1-hour (10) | Same as Primary | Same as Primary |
| Sulfur Dioxide ($SO_2$) | 75 ppb (11) | 1-hour | 0.5 ppm | 3-hour (1) |

Source: EPA 2016

Units of measure for the standards are parts per million (ppm) by volume, parts per billion (ppb – 1 part in 1,000,000,000) by volume, milligrams per cubic meter of air (mg/m³), and micrograms per cubic meter of air (µg/m³).

(1) Not to be exceeded more than once per year.

(2) Final rule signed October 15, 2008.

(3) The official level of the annual $NO_2$ standard is 0.053 ppm, equal to 53 ppb, which is shown here for a more precise comparison to the 1-hour standard.

(4) To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 100 ppb (effective January 22, 2010).

(5) Not to be exceeded more than once yearly, on average over 3 years.

(6) To attain this standard, the 3-year average of the weighted annual mean PM-2.5 concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m³.

(7) To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m³ (effective December 17, 2006).

(8) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm (effective May 27, 2008).

(9) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.070 ppm (effective December 28, 2015).

[10] (a) The EPA revoked the 1-hour ozone standard in all areas, although some areas have continuing obligations under that standard ("anti-backsliding").
(b) The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is $\leq 1$.

[11] Final rule signed June 2, 2010. To attain this standard, the 3-year average of the 99th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 75 ppb.

Hurlburt Field is in the Florida Panhandle within Okaloosa County. According to the EPA's Non-attainment Areas for Criteria Pollutants (Green Book) publication, nearly all of Florida, including Okaloosa County, is considered to be in attainment for all criteria pollutants. Therefore, the General Conformity rule does not apply, nor are there any requirements posed by FDEP for a conformity analysis of the proposed action.

Although General Conformity does not apply, the National Environmental Policy Act (NEPA) still requires the proponent to evaluate the significance of the emissions increases. In determining the effects of the proposed actions, the resulting potential emissions for all compounds per year would be compared to significance levels. The Air Force Air Quality Environmental Impact Analysis Process (EIAP) Guide – Fundamentals, Volume 1 (U.S. Air Force [USAF] 2019), Chapter 6, specifies the significance threshold for USAF proposed actions. The EIAP Guide states, "Given the General Conformity *de minimis* threshold values are the maximum net change action can acceptably emit in non-attainment and maintenance areas. These [*sic*] threshold values would also be a conservative indicator that an action's emissions within an attainment area would also be acceptable. In other words, if the threshold is acceptable in non-attainment areas, it must be more than acceptable in an attainment area. If the worst-case annual emissions estimate for each pollutant of concern is below the corresponding *de minimis* threshold values, further assessment is unwarranted. Evaluation is complete upon completing a Record of Air Analysis (ROAA) to document the conclusion."

Air quality impacts from the proposed actions would be significant if emissions met the following criteria:

- Increase ambient air pollution concentrations above the NAAQS.
- Contribute to existing violations of the NAAQS.
- Interfere with or delay timely attainment of the NAAQS.
- Impair visibility within federally mandated Prevention of Significant Deteriorations Class I areas.
- Exceed 100 tons per year (tpy) for all criteria pollutants, except lead, for which a significance criterion of 25 tpy is established.

#### 3.1.1.1 Greenhouse Gasses and Climate Change

NEPA mandates that federal agencies assess a proposed action's potential impact on air quality, including greenhouse gas (GHG) emissions as a regulated pollutant. The Council on Environmental Quality (CEQ) has issued and rescinded multiple guidance documents for federal agencies regarding GHGs at the direction of various Executive Orders. Federal agencies should also consider the potential effects of climate change on a proposed action and its environmental impacts per the Air Force Air Quality EIAP Guide – Fundamentals, Volume 1 (USAF 2019) and CEQ guidance.

Global climate change refers to a change in the average weather on the earth. GHGs are gases that trap heat in the atmosphere. They include water vapor, carbon dioxide ($CO_2$), methane ($CH_4$), nitrous oxide ($N_2O$), fluorinated gases including chlorofluorocarbons (CFC), hydrofluorocarbons (HFC), halons, and ground-level $O_3$ (California Energy Commission 2007). Major GHG-producing sectors include transportation, utilities (coal and gas power plants), industry/manufacturing, agriculture, and commercial/residential. End-use sector sources of GHG emissions in 2019 include transportation (29%), electricity generation (25%), industry (23%), agriculture (10%), and commercial/ residential (13%) (EPA, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 – 2019*, 2021).

#### 3.1.1.2 GHG Threshold of Significance

CEQ provided draft guidelines for determining meaningful GHG decision-making analysis. CEQ issued final guidance on August 1, 2016, that stated agencies should consider the potential effects of a proposed action on climate change by addressing GHG emissions and the effects of climate change on a proposed action and its environmental impacts (CEQ 2016). While the final rule does not include a quantified threshold of significance, the draft guidance for this rule stated that if the proposed action would be reasonably anticipated to cause direct emissions of 25,000 metric tons (27,557 U.S. tons) or more of $CO_2$ GHG emissions on an annual basis, agencies should consider this an indicator that a quantitative and qualitative assessment may be meaningful to decision-makers and the public. For long-term actions with annual direct emissions of less than 25,000 metric tons (27,557 U.S. tons) of $CO_2$, CEQ encourages federal agencies to consider whether the action's long-term emissions should receive a similar analysis. CEQ does not propose this as an indicator of a threshold of significant effects but rather as an indicator of a minimum level of GHG emissions that may warrant some description in the appropriate NEPA analysis for agency actions involving direct emissions of GHGs (CEQ 2014).

The 2019 Draft GHG Guidance was proposed by CEQ for public comment but was never finalized. However, the final guidance issued by CEQ on August 1, 2016, was withdrawn on April 5, 2017, under Executive Order 13873. The 2019 Draft NEPA Guidance on Consideration of Greenhouse Gas Emissions, published June 26, 2019, would replace the final guidance CEQ issued on August 1, 2016. The 2019 Draft Guidance compelled agencies to quantify a proposed action's projected direct and reasonably foreseeable indirect GHG emissions when the amount is substantial enough to warrant quantification and when it is practicable to quantify them using available data and GHG quantification tools. When quantification of GHG emissions was not reasonably practicable, the agency should include a qualitative analysis (CEQ 2019).

On January 20, 2021, in response to requirements detailed in Executive Order 13990, CEQ rescinded the 2019 Draft GHG Guidance and was directed to review, revise, and update its 2016 GHG Guidance. In the interim, agencies are to consider all available tools and resources in assessing their proposed actions' GHG emissions and climate change effects, including, as appropriate and relevant, the 2016 GHG Guidance (CEQ 2021).

Therefore, until official Department of Defense (DoD) and USAF policy and guidance are established, air quality NEPA assessments must still include an assessment of GHGs using the USAF's interim guidance. As detailed in Section 7.0 – Greenhouse Gas & Climate Change Assessment of the May 2019 USAF EIAP – Volume 1, all air quality NEPA assessments must include the following items:

- GHG Emissions Assessments: GHGs are treated like any other air pollutant under Air Quality EIAP; however, there are no thresholds to apply to an indication of significance.
- Significance Indication Analysis: GHG annual emissions of each action/alternative are to be compared against each other in a relative comparison analysis to establish the relative significance of each.
- CEQ Guidance Discussion: The effects of climate change on a proposed action and/or the environment may be included to address and document that an informed decision-making process was followed.

### 3.1.2 Affected Environment

Regional attainment status designations are defined in 40 CFR Part 81, Subpart C. This region is classified as Attainment/Unclassifiable for all criteria pollutants.

### 3.1.3 Environmental Consequences

#### *3.1.3.1 Analysis Approach*

This Air Quality Analysis aims to evaluate the potential impacts on ambient air quality from the proposed actions. Criteria pollutant and greenhouse gas emissions from proposed installation construction activities and post-construction installation activities are expected to result from the following activities:

- Direct stationary source emissions (emergency generators) from new facilities
- Indirect mobile source emissions from commuting workers and delivery vehicles during construction (on-road vehicles)
- Direct mobile source emissions from construction equipment (off-road equipment)
- Fugitive dust emissions from land disturbance (construction) and vehicles traveling on unpaved roads

A list of emissions-generating equipment and activities was developed, by project and by alternative, from the information provided in Sections 1 and 2 of this EA. Expected usage quantities (mileage, operating hours, etc.) were taken directly from Sections 1 and 2 of this EA, if available, or were otherwise estimated using best professional judgment. In developing calculation methodologies for these different emissions sources, the following resources were utilized:

- Air Conformity Applicability Model (ACAM) Quick Start Guide, Version 5.0 (July 2017)
- Air Emissions Guide for Air Force Transitory Sources (June 2020; USAF 2020), Chapter 4
- Air Emissions Guide for Air Force Mobile Sources (June 2020; USAF 2020), Chapter 5
- Air Emissions Guide for Air Force Stationary Sources (June 2020; USAF 2020), Chapters 2, 3, and 21
- California Emissions Estimator Model (CalEEMod) Software Version 2020.4.0 Users Guide, Appendix C
- Mass balance and best professional judgment, where necessary

Pollutants considered in this EA are $SO_2$ and other compounds (oxides of sulfur or $SO_x$); volatile organic compounds (VOC), which are precursors to $O_3$; nitrogen oxides ($NO_x$), which are also precursors to $O_3$ and include $NO_2$ and other compounds; CO; PM-10; PM-2.5; and Pb. These criteria pollutants are generated by the types of activities (construction and mobile source operations) associated with the proposed action.

In determining the effects of the proposed action, the resulting potential emissions for all compounds per year would be compared to significance levels. The Air Force Air Quality EIAP Guide – Fundamentals Volume 1 (USAF 2019) and Volume II – Advanced Assessments (USAF 2020) were referenced to perform evaluations of threshold significance. As described in the EIAP Guide – Volume 1, General Conformity thresholds can be used as a general indicator for air quality NEPA assessments. These threshold values are a conservative indicator that an action's emissions within an attainment area would be acceptable. As indicated in the Air Force Air Quality EIAP Guide, Volume II – Advanced Assessments (USAF 2020), "If the worst-case annual emissions estimate for each pollutant of concern is below the corresponding *de minimis* threshold values, this indicates that further assessment is unwarranted. Evaluation is complete upon completing a Record of Air Analysis (ROAA) to document the conclusion."

Because the area surrounding the base in Florida is in attainment for all pollutants, General Conformity does not apply; therefore, the significance threshold for all criteria pollutant emissions is the General Conformity *de minimis* thresholds: 100 tons per year (from both mobile and stationary sources), except for Pb, for which the criteria is 25 tons per year.

#### *3.1.3.2 Proposed Action*

The Proposed Action includes reconstructing five access gates at Hurlburt Field: Main Gate, East Gate, CVI Gate, Soundside Gate, and Kerwood Gate.

Implementing the Proposed Action would have short-term, adverse impacts on ambient air quality. It is assumed that one gate would be closed and reconstructed in a single year, with construction starting in CY 2022. To model air quality impacts, the assumption was made that the Main Gate would be reconstructed first in 2022, East Gate in 2023, CVI Gate in 2024, Soundside Gate in 2025, and finally, the Kerwood Gate in 2026. Additional project assumptions are presented in Appendix C.

As required to conduct an air analysis, project-specific information is put into ACAM. A Record of Air Analysis report generated from ACAM for the Proposed Action is included in Appendix D, which provides the regulatory documentation needed for air quality compliance with NEPA requirements. Additionally, a Detailed ACAM Report (an in-depth calculation report) for the Proposed Action is included in Appendix E, which provides documentation for regulatory verification.

**Table 3.2** summarizes the total estimated net emissions from this proposed action and determines its significance with construction activities starting in CY2022.

**Table 3.2: Summary of Net Emissions (Tons/Year) from Proposed Activities- Proposed Action- Hurlburt Field, 5 Access Gate Reconstructions**

| | CY 2022 | CY 2023 | CY 2024 | CY 2025 | CY 2026 | CY 2027 (Steady State) | Significance Threshold | Significant Impact? (Yes/No) |
|---|---|---|---|---|---|---|---|---|
| VOC | **0.365** | 0.220 | 0.187 | 0.141 | 0.160 | 0.000 | 100 | No |
| $NO_x$ | **1.564** | 0.802 | 0.678 | 0.553 | 0.458 | 0.000 | 100 | No |
| CO | **1.612** | 0.981 | 0.933 | 0.833 | 0.728 | 0.000 | 100 | No |
| $SO_x$ | **0.004** | 0.003 | 0.002 | 0.002 | 0.002 | 0.000 | 100 | No |
| PM 10 | **10.852** | 3.323 | 3.009 | 0.765 | 0.622 | 0.000 | 100 | No |
| PM 2.5 | **0.064** | 0.032 | 0.026 | 0.020 | 0.016 | 0.000 | 100 | No |
| Pb | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 25 | No |
| $NH_3$ | **0.002** | 0.001 | 0.001 | 0.001 | 0.001 | 0.000 | 100 | No |
| $CO_2e$ | **425.6** | 250.2 | 224.6 | 201.8 | 162.0 | 0.0 | N/A | No |

*Note: Bold is the "Worst-case Emissions" level for each pollutant of concern.*

The greatest annual (calendar year) emissions for each pollutant of concern form the basis of the analysis. Emissions were calculated by ACAM from the start of the action (CY 2022) annually until the direct and indirect emissions have been shown to have reached a steady-state (i.e., no increase or decrease from the previous year) (USAF, EPAP Guide – Vol 1, 2019). Construction activities are presumed to continue into 2026, and a steady-state net increase of emissions is to be achieved by 2027.

The Proposed Action would have short-term, adverse impacts on ambient air quality. Temporary increases in $NO_x$, CO, $SO_2$, VOCs, PM-10, PM-2.5, and carbon dioxide equivalent ($CO_2e$) primarily result from construction that is presumed to be completed by 2026. Following this temporary construction and growth, the long-term operations of the constructed facilities are expected to have no permanent effects on the ambient air quality from this alternative. The estimated annual steady-state air emissions from the Proposed Action would be equivalent to the existing baseline emissions for the installation. The limited annual emissions of GHGs would not likely contribute to global warming to any discernible extent. Potential changes to local temperature and precipitation patterns due to ongoing global climate change would not affect the ability to implement the Proposed Action. Overall, implementing the Proposed Action would have no significant long-term impacts on ambient air quality from facility construction and no significant impacts on ambient air quality from continued facility operations.

As detailed in the EIAP Guide – Volume 2, the General Conformity *de minimis* values provide a definitive go/no-go first-level criterion for air quality impact significance for General Conformity Applicability Analyses. Below *de minimis* indicates a "Clearly (definitively) Insignificant Impact." As such, the Proposed Action is considered insignificant (too trivial or minor) to merit consideration of adverse impacts on health or safety.

### *3.1.3.3 Alternative*

Alternative 1 includes reconstructing four access gates at Hurlburt Field: Main Gate, East Gate, CVI Gate, and Soundside Gate.

Implementation of Alternative 1 would have short-term, adverse impacts on ambient air quality. It is assumed that one gate would be closed and reconstructed in a single year. Additional project assumptions are presented in Appendix C.

As required to conduct an air analysis, project-specific information is put into ACAM. A Record of Air Analysis report generated from ACAM for Alternative 1 is included in Appendix F, which provides the regulatory documentation needed for air quality compliance with NEPA requirements. Additionally, a Detailed ACAM Report (an in-depth calculation report) for Alternative 1 is included in Appendix G, which provides documentation for regulatory verification.

**Table 3.3** provides a summary of total estimated net emissions from this proposed action and a determination of its significance with construction activities starting in CY2022.

**Table 3.3: Summary of Net Emissions (Tons/Year) from Proposed Activities- Alternatives**

| Pollutant | CY 2022 | CY 2023 | CY 2024 | CY 2025 | CY 2026 (Steady State) | Significance Threshold | Significant Impact? (Yes/No) |
|---|---|---|---|---|---|---|---|
| VOC | **0.365** | 0.220 | 0.187 | 0.141 | 0.000 | 100 | No |
| $NO_x$ | **1.564** | 0.802 | 0.678 | 0.553 | 0.000 | 100 | No |
| CO | **1.612** | 0.981 | 0.933 | 0.833 | 0.000 | 100 | No |
| $SO_x$ | **0.004** | 0.003 | 0.002 | 0.002 | 0.000 | 100 | No |
| PM 10 | **10.852** | 3.323 | 3.009 | 0.765 | 0.000 | 100 | No |
| PM 2.5 | **0.064** | 0.032 | 0.026 | 0.020 | 0.000 | 100 | No |
| Pb | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 25 | No |
| $NH_3$ | **0.002** | 0.001 | 0.001 | 0.001 | 0.000 | 100 | No |
| $CO_2e$ | **425.6** | 250.2 | 224.6 | 201.8 | 0.0 | N/A | No |

*Note: Bold is the "Worst-case Emissions" level for each pollutant of concern.*

The greatest annual (calendar year) emissions for each pollutant of concern form the basis of the analysis. Emissions were calculated by ACAM from the start of the action (CY 2022) annually until the direct and indirect emissions have been shown to have reached a steady-state (i.e., no increase or decrease from the previous year) (USAF, EPAP Guide – Vol 1, 2019). Construction activities are presumed to continue into 2025, and a steady-state net increase in emissions is to be achieved by 2026.

Alternative 1, which omits the reconstruction of the Kerwood Gate, would have short-term, adverse impacts on ambient air quality. Temporary increases in $NO_x$, CO, $SO_2$, VOCs, PM-10, PM-2.5, and $CO_2e$ result primarily from construction that is presumed to be completed by 2025. Following this temporary construction and growth, the long-term operations of the constructed facilities are expected to have no permanent effects on the ambient air quality from this alternative. The estimated annual steady-state air emissions from Alternative 1 would be equivalent to the current existing baseline emissions for the installation. The limited annual emissions of GHGs would not likely contribute to global warming to any discernible extent. Potential changes to local temperature and precipitation patterns due to ongoing global climate change would not affect the ability to implement Alternative 1. Overall, there would be no significant long-term impacts on ambient air quality from facility construction and no significant impacts on ambient air quality from continued facility operations by implementing Alternative 1.

As detailed in the EIAP Guide – Volume 2, the General Conformity *de minimis* values provide a definitive go/no-go first-level criterion for air quality impact significance for General Conformity Applicability Analyses. Below *de minimis* indicates a "Clearly (definitively) Insignificant Impact." As such, the Alternative 1 action is considered insignificant (too trivial or minor) to merit consideration of adverse impacts on health or safety.

#### *3.1.3.4 No Action Alternative*

The No-Action Alternative maintains the status quo of current base facilities. No entrance gates would be reconstructed at the facility, and existing facilities would continue to be used. There would be no net increase in emissions over the existing baseline emissions for the installation. Implementation of the No-Action Alternative would have no short-term or long-term adverse impacts on ambient air quality, and GHGs would not likely contribute to global warming to any discernible extent.

## 3.2 Geologic Resources

### 3.2.1 Definition of the Resource

Geological resources consist of surface and subsurface materials and their properties. Geological resources included in this assessment are soils, topography, and geologic hazards.

- **Topography.** Topology is the change in elevation over the surface of a land area. The topography includes surface elevations, slope, and distinct physiographic features (e.g., valleys, mountains) and their influence on human activities, as well as natural- and human-made changes to landforms.
- **Soils.** Soils are unconsolidated materials overlying bedrock or another geologic parent material. Soils are typically described in terms of their complex type, slope, physical characteristics, and relative compatibility or constraining properties regarding construction activities and land use types.
- **Geologic Hazards.** Geologic hazards are natural geologic events that can cause damage or loss of property and life. Geologic hazards of concern at and near Hurlburt Field include karsts, sinkholes, and earthquakes.

### 3.2.1.1 Affected Environment

The topography of Hurlburt Field consists of level to rolling terrain with upland areas separated by depressional and riverine/bay forested wetlands. The topography ranges from sea level along the Santa Rosa Sound shoreline to approximately 40 feet above mean sea level along the installation's northeast perimeter. Slopes range from zero to eight percent (Hurlburt 2015). Hurlburt Field does not contain sinkholes and is considered to be located in an area with no reasonable expectancy of earthquake damage.

According to the Okaloosa County soil survey, completed in 1995 by the U.S. Department of Agriculture (USDA), the soils of Hurlburt Field are derived from sedimentary deposits of fluvial and marine origin. Most soils are sandy and have low fertility. The soil density is relatively low, reflecting the high permeability of the surface soils and the relatively low direct runoff in the area. The seasonal high water table is generally two to three feet below the surface from November to April, resulting in moderate to severe development constraints due to wetness and the caving of cut banks. Hydric soils may have a seasonal high water table, ranging from two feet below the surface to standing water at the surface. Erosion potential for all soils is considered slight due to the relatively level topography, except along Santa Rosa Sound, where it is moderate.

**Geologic Hazards**

Geologic hazards, including earthquakes, karsts, and sinkholes are uncommon in the panhandle and Okaloosa County. The U.S. Geological Society lists the panhandle of Florida as the lowest hazard area for earthquakes.

**Main Gate**

The predominant soil in the Main Gate project area is defined as Urban Land (**Figure 3.1**), a soil type that does not have available descriptive or analytical information because it represents disturbed materials of various origins. It is located in developed areas beneath and surrounding buildings and roadways. The secondary soil type is located west of the existing Main Gate and is defined as the Chipley and Hurricane Complex. This soil complex is poorly drained and occurs on slopes of zero to five percent.

**East Gate**

Most of the East Gate project area soils are hydric (wetland) soil types (**Figure 3.2**). The predominant soil in the East Gate project area is Rutlege Sand. This soil is depressional and very poorly drained. The Chipley and Hurricane Complex is poorly drained and occurs on lands with minor slopes of zero to five percent. Leon Sand is a soil that is poorly drained and also occurs on nearly level terrain. Dorovan Muck soil is very poorly drained and occurs on nearly level terrain. Hydric soils are discussed in more detail in the Water Resources section of this EA.

**Commercial Vehicle Inspection Gate**

Most of the CVI Gate project area soils consist of the Chipley and Hurricane Complex (**Figure 3.2**). This soil complex is poorly drained and occurs on slopes of zero to five percent. The Rutlege Sand soil series is a hydric soil that is depressional and very poorly drained. A portion of this soil is adjacent to the existing CVI to the northwest, extending up to the Down's Road alignment.

**Kerwood Gate**

Most of the Kerwood Gate project area, including the nearby administrative functions, is located on Kureb Sand soils, which are well-drained and generally occur on slopes of zero to eight percent (**Figure 3.3**). A small portion of the project area includes Resota Sand, a soil type that is moderately well-drained and generally occurs on slopes of zero to five percent. On the north end of the project area is Dorovan Muck soils, which are very poorly drained and occur on nearly level terrain.

**Soundside Gate**

The soil distribution at the Soundside Gate is similar to the Main Gate complex (**Figure 3.1**). The predominant soil in the Main Gate project area is defined as Urban Land, typically disturbed by development. It is located in developed areas beneath and surrounding buildings and roadways. The secondary soil type is located south of the existing Soundside Gate and is defined as the Chipley and Hurricane Complex. This soil complex is poorly drained and occurs on slopes of zero to five percent.

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**Figure 3.1: Main Gate and Southside Gate Soils**

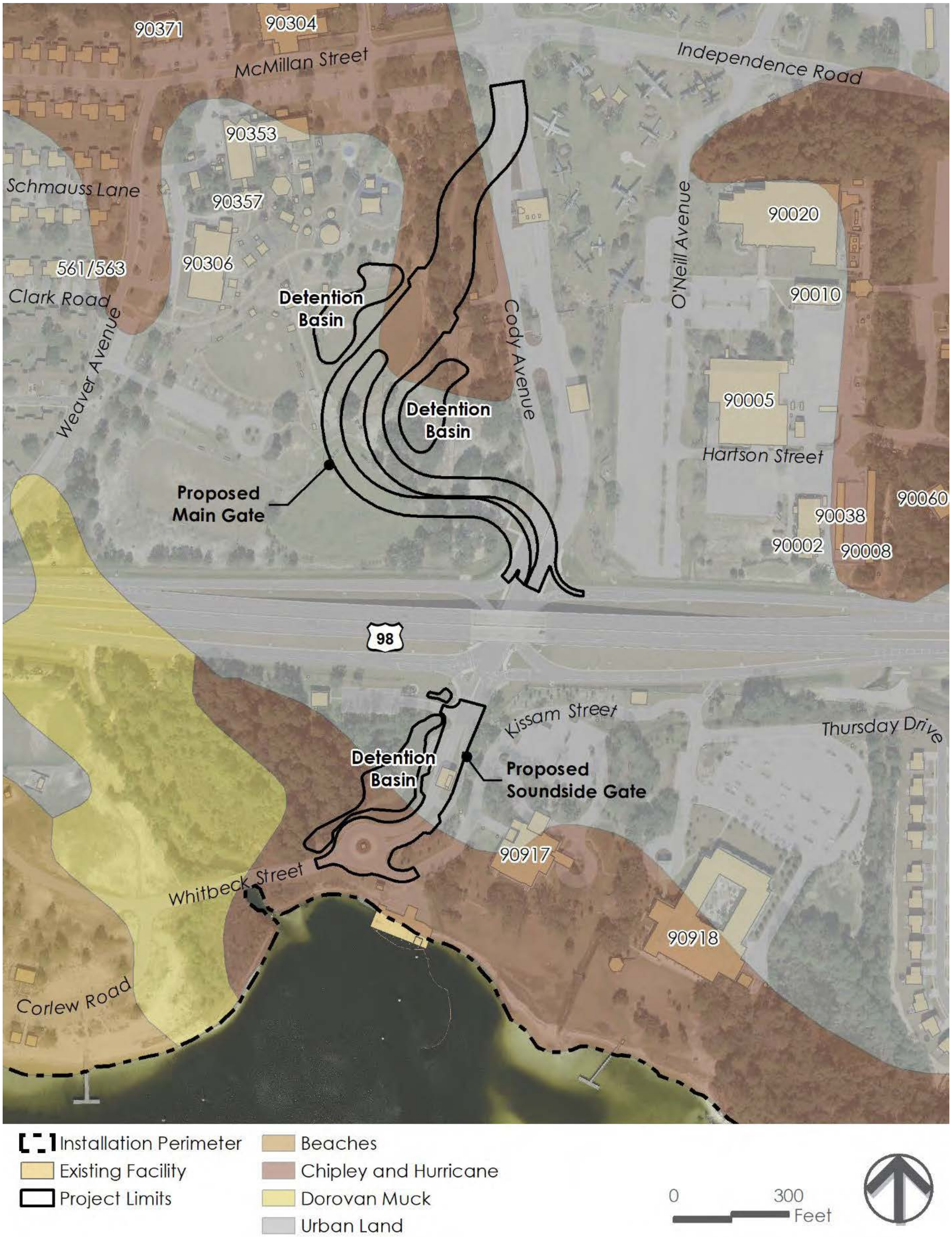

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**Figure 3.2: East Gate and CVI Gate Soils**

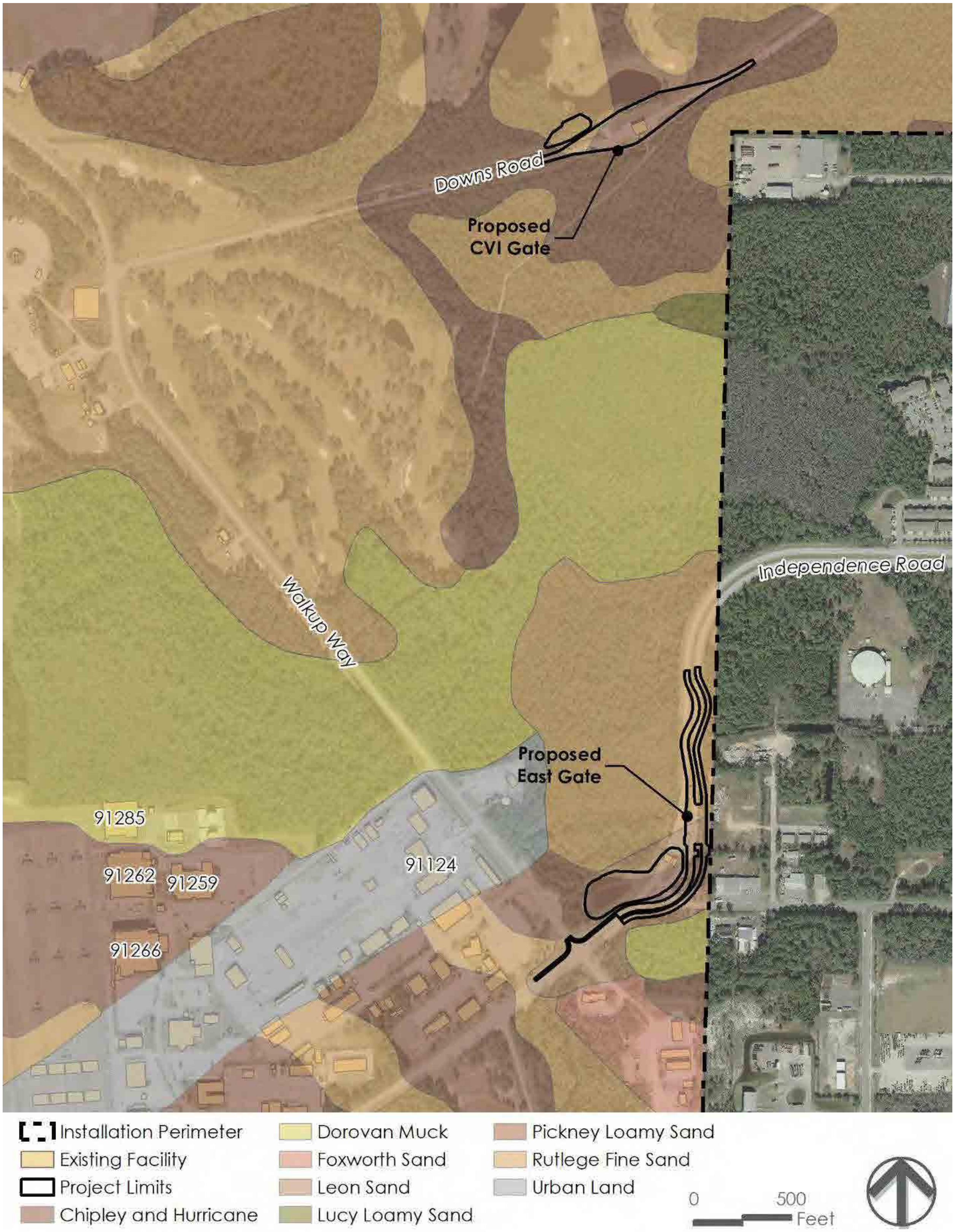

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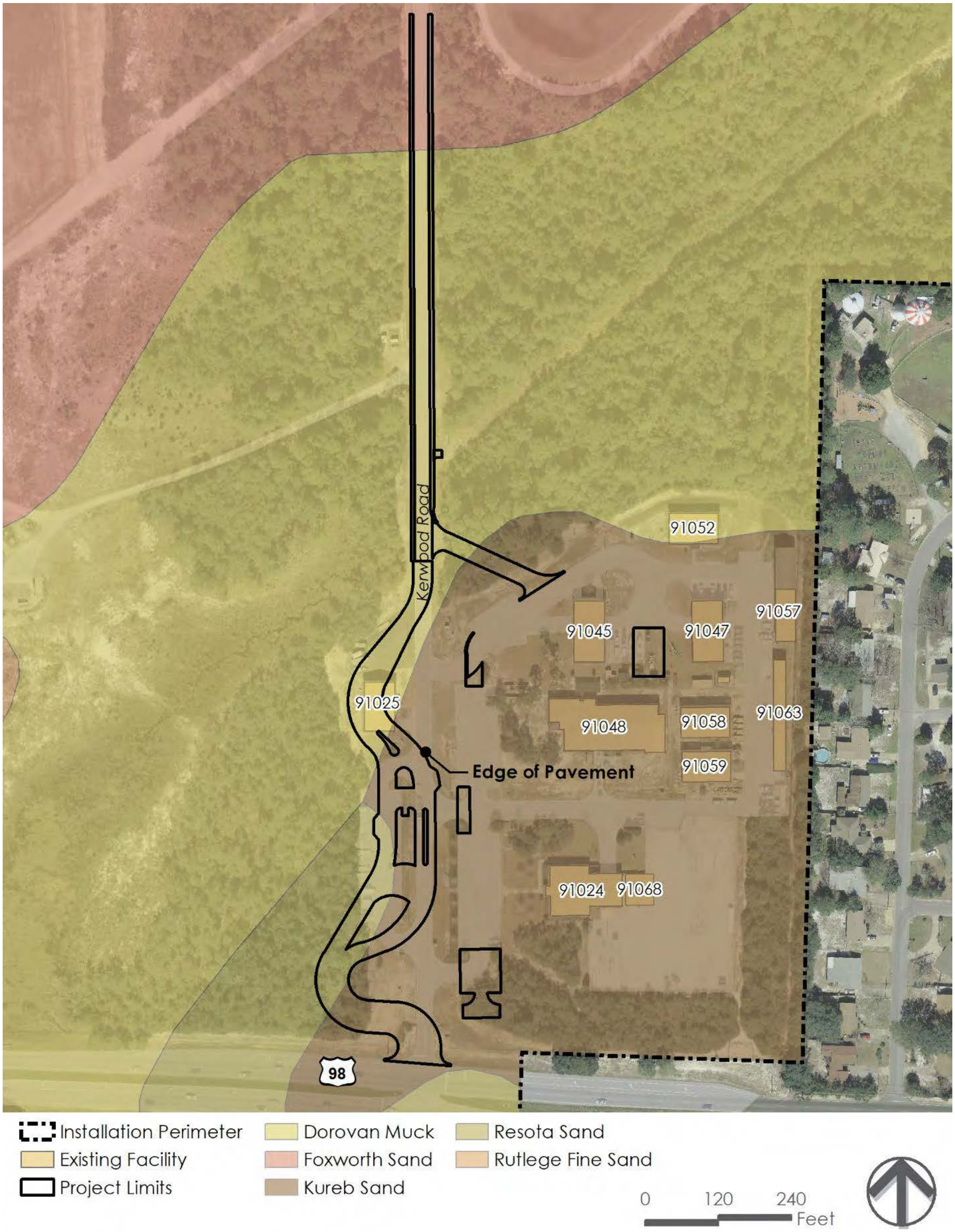
**Figure 3.3: Kerwood Gate Soils**



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### 3.2.2 Environmental Consequences

#### *3.2.2.1 Analysis Approach*

The following thresholds were used to determine if an impact on geological resources would be significant:

- Increase potential occurrences of erosion and siltation
- Expose people or structures to significant geological hazards

#### *3.2.2.2 Proposed Action*

##### 3.2.2.2.1 Soils

Potential impacts to soil resources would be limited to ground-disturbing activities, including site preparation, road, facility construction, and demolition. These activities would take place on previously disturbed soils and open spaces known to be capable of supporting such development. Minor and localized impacts on soils are expected to occur.

**Main Gate**

The area of disturbance for the Main Gate complex and associated road pavement would occur on Urban Land and the Chipley and Hurricane Complex, which pose no severe constraints to development. Although soils would be disturbed by earthmoving and other construction activities, impacts on soil resources would be minor and localized to the project footprint.

**East Gate**

The area of disturbance would take place on previously disturbed soils and open space. The soils in open space can support development; however, new construction could be required to overcome the conditions of hydric soils. Construction actions by earthmoving and other construction activities would be minor and localized to the project footprint, which is intended to minimize construction on hydric soils.

**Commercial Vehicle Inspection Gate**

Ground-disturbing activities would occur on previously disturbed soils along Downs Road and open space. The soils in open space can support development; however, most new construction would be on disturbed soils. Some new construction could be required to overcome the conditions of hydric soils on the north side of Downs Road. Construction actions by earthmoving and other construction activities would be minor and localized to the project footprint, which is intended to minimize construction on hydric soils.

**Kerwood Gate**

The disturbance would occur on previously disturbed soils along Kerwood Road, the administrative area, and undisturbed open space. The soils in the open space on the west side of the project area can support development; however, most new construction would be on disturbed soils. Construction actions by earthmoving and other construction activities would be minor and localized to the project footprint.

**Southside Gate**

The project would impact a small area of open space. The soils in the open space on the west side of the project area can support limited road expansion and roundabout expansion. Most new construction would be on disturbed soils. Ground-disturbing activities would occur on previously disturbed soils along Campaigne Street and the roundabout south of the gate. Construction actions by earthmoving and other construction activities would be minor and localized to the project footprint, which is intended to minimize construction on soils in the open space to the west.

### 3.2.3 Topography and Geological Hazards

#### *3.2.3.1 All Access Gates*

Negligible impacts to topography and geological hazards are expected to occur, as there would not be a significant alteration to surface landforms or subsurface features. Therefore, potential long-term impacts to geological resources resulting from construction activities under the Proposed Action would be negligible.

#### *3.2.3.2 Alternative 1*

**Main, East, CVI, and Soundside Gates**

Under Alternative 1, impacts on geological resources would be the same as under the Proposed Action except for Kerwood Gate. Because Kerwood Gate would not be constructed, the minor to negligible impacts to geological resources that would have been expected under the Proposed Action would not occur.

#### *3.2.3.3 No-Action Alternative*

Under the No-Action Alternative, the proposed reconstruction of access gates would not occur at Hurlburt Field. Existing methods would continue to mitigate the compliance deficiencies of the AT/FP requirements (UFC 4-022-01). Therefore, the No-Action Alternative would not affect geological resources.

## 3.3 Water Resources

### 3.3.1 Definition of the Resources

Water resources include those waters above and below the surface of the Earth. Water resources for this EA include floodplains (drainage basins), wetlands (and waters of the U.S.), surface water, groundwater, and coastal zone management. Surface and groundwater resources are protected by federal and state laws and regulations, including the Clean Water Act (CWA) [Sections 401, 402, and 303(d)], the Safe Drinking Water Act, Section 438 of the Energy Independence and Security Act, and the USEPA's National Pollutant Discharge Elimination System (NPDES), administered by the FDEP. The following sections describe each water resource, including the regulation tied to them and the extent and condition of these resources at Hurlburt Field.

#### *3.3.1.1 Wetlands, Waters of the United States, and Surface Water*

Wetlands are defined as "those 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 generally include swamps, marshes, bogs, and similar areas" (33 CFR § 328.3[b]) (USACE 1986). Wetlands are transitional areas of land between well-drained uplands and permanently flooded or aquatic systems. Their soils are typically hydric, and the water table is commonly at or near the land surface for much of the year. Wetlands filter water to remove nutrients, contaminants, and sediment, thereby improving water quality. They recharge water supplies, reduce flood risk because of storage capacity, and provide critical habitat for fish and wildlife.

Surface water is water collected on the ground. It is any body of water on land's surface and includes natural features such as wetlands, swamps, streams, rivers, ponds, lakes, marshes, bayous, and oceans. Man-made surface waters include impoundments, canals, drainage ditches, and stormwater catchments (but not necessarily waters of the U.S).

Under the Navigable Waters Protection Rule (NWPR) of 2020, "waters of the United States" are defined as 1) The territorial seas and waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including waters which are subject to the ebb and flow of the tide; 2) tributaries; 3) lakes and ponds, and impoundments of jurisdictional waters; and 4) adjacent wetlands (33 CFR Section 328). Federal jurisdiction is established under the CWA if a waterbody meets this definition. The 2020 NWPR is currently being revised to the more stringent pre-2015 ruling. The following sections will provide additional insight into the new NWPR and other regulations regarding wetlands, including waters of the U.S. and the existing state of wetlands at Hurlburt Field.

**<u>Section 401 of the Clean Water Act</u>**

Section 401 of the CWA requires state certification of all Federal licenses and permits in which there is a "discharge of fill material into navigable waters." In this case, a water quality certification from the issuing state, the FDEP, is required before issuing the relevant federal license or permit. The certification process is used to determine whether an activity, as described in the federal license or permit, would impact established site-specific water quality standards. The most common federal license or permit requiring certification is the USACE CWA § 404 Permit.

**<u>Section 402 of the Clean Water Act</u>**

The NPDES program was created by § 402 of the CWA. This program authorizes the USEPA to issue permits for the point-source discharge of pollutants into waters of the U.S. The NPDES permitting program controls water pollution by regulating point sources that discharge pollutants into the waters of the U.S.

Hurlburt Field is classified as a Phase II Municipal Separate Storm Sewer System (MS4), which is defined as a system of publicly-owned conveyance(s) and includes roads, curbs, gutters, swales, or ditches that discharge to surface waters of the state, and is designed or used solely for collecting or conveying stormwater (Hurlburt Field 2008c). As a Phase II MS4, Hurlburt Field operates under an FDEP NPDES *Generic Permit for Discharge of Stormwater from Phase II MS4s* (FDEP 2003). Hurlburt Field implements a Stormwater Management Plan (SWMP) to comply with the requirements of this permit. Hurlburt Field also operates under an FDEP NPDES *Multi-Sector Generic Permit for Stormwater Discharge Associated with Industrial Activity* (MSGP). The MSGP regulates stormwater associated with industrial activity. Hurlburt Field implements a Stormwater Pollution Prevention Plan (SWPPP) to comply with the requirements of this permit. The SWPPP aims to prevent or reduce pollutants at the source that stormwater discharges can convey.

Stormwater from construction sites that would result in a disturbance of one acre or more is regulated under the FDEP NPDES *Generic Permit for Stormwater Discharge from Large and Small Construction Activities* (FDEP 2015; stormwater construction permit). Hurlburt Field obtains stormwater construction permits and implements associated SWPPPs for construction and other land disturbance activities requiring such permits.

**<u>Section 404 of the Clean Water Act</u>**

The USACE, through its permit program, regulates the discharge of dredged or fill material into waters of the U.S., including wetlands, pursuant to § 404 of the CWA. In addition, the USEPA has regulatory oversight of the USACE permit program, allowing the agency under § 404c to veto USACE–issued permits where there are unacceptable environmental impacts. As defined in 33 CFR § 328.3:

(a) The term *waters of the U.S.* means:

(1) All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;

(2) All interstate waters, including interstate wetlands;

(3) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation, or destruction of which could affect interstate or foreign commerce including any such waters:

(i) Which are or could be used by interstate or foreign travelers for recreational or other purposes; or

(ii) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or

(ii) Which are or could be used for industrial purposes by industries in interstate commerce;

(4) All impoundments of waters otherwise defined as waters of the U.S. under the definition;

(5) Tributaries of waters identified in paragraphs (a) (1) through (4) of this section;

(6) The territorial seas;

(7) Wetlands adjacent to waters (other than waters that are themselves wetlands) are identified in paragraphs (a) (1) through (6) of this section.

Recent changes have been made to the (NWPR). Notable changes that depart from the 2020 NWPR and would return to the pre-2015 rule include (EPA 2021):

- Ephemeral waters are considered tributaries and jurisdictional if they can be determined to have a significant nexus to navigable waters. A significant nexus requires that the tributary "significantly affect the chemical, physical, or biological integrity of other covered waters more readily understood as 'navigable.'"
- The term "adjacency" would be expanded to include a broader definition of when a wetland is considered adjacent to waters of the U.S. and thus jurisdictional. Adjacency would again include consideration of subsurface hydrologic connections.
- Certain artificial water bodies have the potential to be considered jurisdictional based on related environmental factors and the determination of a significant nexus. These artificial waterbodies may include such features as stormwater control systems and ditches.

**Section 10 of the Rivers and Harbors Act of 1899**

Section 10 of the Rivers and Harbors Act of 1899 (RHA) regulates structures or work in or affecting navigable waters. Navigable waters under this statute are defined as "those waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce," (33 CFR § 329.4) (USACE 1986). The USACE implements a permit program to evaluate impacts on navigable waters and their navigable capacity under § 10 (jointly with § 404 of the CWA when a discharge of fill material is also involved). Regulated structures include such objects as buoys, piers, docks, bulkheads, and jetties, while work includes dredging or filling activities.

**EO 11990 – Protection of Wetlands**

EO 11990 directs federal agencies to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the values of wetlands for federally funded projects (U.S. President 1977a). Federal Emergency Management Agency (FEMA) regulations for complying with EO 11990 are found in 44 CFR § 9, Floodplain Management and Protection of Wetlands (1980).

**Air Force Instruction (AFI) 32-7064**

AFI 32-7064 is an internal regulatory device that directs installations to develop and maintain current inventories of wetlands to plan for long-term protection or mitigation.

#### *3.3.1.2 Floodplains and Stormwater*

Floodplains are lands bordering rivers and streams that are typically dry but are covered with water during floods. They occur in both inland and coastal areas. The risk of flooding typically hinges on local topography, the frequency of precipitation events, the size of the watershed above the floodplain, and in the case of coastal areas, storm surge intensity. The direct function of a floodplain is to absorb water and energy from storms. Indirect benefits are groundwater recharge from stormwater absorption, nutrient cycling, waste disposal, carbon sequestration, wildlife habitat, vegetative diversity, and aesthetic qualities.

**EO 11988, Floodplain Management**

EO 11988 requires federal agencies to avoid direct or indirect support or development within or affecting the one percent annual chance Special Flood Hazard Area (SFHA) (i.e., the 100-year floodplain) whenever there is a practicable alternative for Critical Actions within the 0.2 percent annual chance SFHA, i.e., the 500-year floodplain). EO 11988 further directs all federal agencies to refrain from conducting, supporting, or allowing actions in floodplains unless it is the only practicable alternative. FEMA's regulations for complying with EO 11988 are found in 44 CFR Part 9, Floodplain Management and Protection of Wetlands (1980).

**Municipal Separate Storm Sewer System (MS4) permit FLR04E002**

MS4 FLR04E002 is a base-wide permit that instructs all work to be done in a manner that controls erosion and prevents stormwater pollution.

#### *3.3.1.3 Groundwater*

Groundwater is classically defined as subsurface water that occurs beneath the water table in soils and geologic formations that are fully saturated (i.e., the pore spaces in the subsurface materials are filled with water). It is part of the hydrologic cycle, originating as precipitation that infiltrates or seeps into the subsurface. It then moves toward surface water bodies, where it discharges to complete the hydrologic cycle.

Many facilities and all family housing units use potable water from the Floridan aquifer for lawn watering and irrigation. The potable water system at Hurlburt is permitted and regulated through the FDEP, under the authority of Chapter 403, Part IV, Florida Statutes. FDEP also monitors and regulates drinking water standards under the authority of Chapter 62.550, FAC.

#### *3.3.1.4 Coastal Zone Management*

Coastal Zone Management includes those coastal lands or water uses governed by the FDEP pursuant to the Federal CZMA. The outer boundary of Florida's coastal zone is the limit of state waters. Hurlburt Field is approximately three nautical miles from the Atlantic Ocean coast of Florida and nine nautical miles away from the Gulf of Mexico side coast of Florida.

The CZMA (16 U.S.C. 1451 et seq., as amended) was enacted to preserve, protect, develop, and, where possible, restore and enhance the resources of the nation's coastal zone. Federal agency activities affecting a state's coastal zone must be consistent to the maximum extent practicable with the enforceable policies of the state's coastal management program. The CZMA allows coastal states to develop a Coastal Zone Management Plan (CZMP) whereby it designates permissible land and water use within the state's coastal zone. The Florida Coastal Management Program (FCMP) was approved by NOAA in 1981 and is codified in Chapter 380, Part II, Florida Statutes. FCMP consists of a network of 24 Florida statutes administered by eight state agencies and five water management districts. Coordination of the program is managed by FDEP.

FDEP is given the authority by Congress to review certain federal activities that have reasonably foreseeable effects on any land use, water use, or natural resources in its coastal zone to ensure that the federal actions are consistent with the enforceable policies of Florida's federally approved FCMP. This authority is referred to as "federal consistency." Some examples of "coastal land or water uses" include public access, recreation, fishing, historic or cultural preservation, development, energy infrastructure and use, hazards management, marinas, floodplain management, scenic and aesthetic enjoyment, and resource creation or restoration.

A CZMA review of federal agency activities is conducted and proceeds with the submittal of either a Consistency Determination or a Negative Determination. As detailed in 15 CFR 930, state agencies, such as the FCMP, have 60 days from receipt of this document to concur with or object to a Consistency Determination or request an extension in writing. The federal agency may presume state agency concurrence if the state agency's response is not received within 60 days from receipt of the federal agency's Consistency Determination and supporting information.

### 3.3.2 Affected Environment

#### *3.3.2.1 Wetlands- Existing Conditions*

**Survey & Delineation**

All state and federal jurisdictional wetlands on Hurlburt Field were delineated by Woolpert, Inc., and approved by USACE and FDEP (Woolpert 1998). USACE recertified the delineations in 2004 without any revisions to the wetland boundaries. Based on these delineations, there are approximately 3,431 acres (52 percent of the total area) of wetlands on Hurlburt Field. Wetlands are scattered throughout Hurlburt Field and are extensive in the northwestern and northeastern parts of the installation.

Again in 2010 and 2011, nearly 3,000 acres of the landward extent of waters of the U.S. and waters of the State of Florida were surveyed and delineated by Woolpert, Inc. These wetlands are hydrologically connected to East Bay Swamp (a tributary to Santa Rosa Sound), smaller unnamed tributaries to Santa Rosa Sound, or directly to Santa Rosa Sound—a traditionally navigable waterway used for recreational and commercial boat traffic. Seven additional acres of isolated wetlands under only Florida jurisdiction (waters of the state) were also delineated. Wetlands found at the base included wet flatwoods, wet prairies, bay swamps, depression marshes, blackwater streams, floodplain swamps, tidal marshes, and basin swamps (Hurlburt Field 2012).

In 2011, USACE, Jacksonville District staff conducted a field and office review of the delineated wetlands. Based on that effort, USACE issued a jurisdictional determination on 25 July 2012 denoting which wetlands and waters in the inspection area are federally jurisdictional. In 2011, FDEP staff conducted a field and office review of the delineated wetlands. Based on that effort, the FDEP issued a Notice of Agency Action on 29 December 201,1 denoting which wetlands and waters in the inspection area are state-jurisdictional.

**Classification**

Wetlands on Hurlburt Field are classified in accordance with the USFWS's National Wetlands Inventory (NWI) classification system as described in *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979). The most common types of wetlands on Hurlburt Field are cypress-gum swamps/cypress domes, shrub wetlands, and herbaceous wetlands. Most of these wetlands are contiguous with East Bay Swamp. The most dominant wetland types on Hurlburt Field are Palustrine Forested and Palustrine Scrub/Shrub. Other wetland types on Hurlburt Field include Palustrine Emergent and Estuarine.

Surface waters on Hurlburt Field consist of the East Bay Swamp, East Bay River, Turtle Creek, Live Oak Creek, Hurlburt Lake, small golf course ponds, and other man-made surface waters, including impoundments, drainage ditches, and stormwater catchments.

**Memorandum of Agreement**

Hurlburt Field strives to minimize impacts on wetlands and other natural resources to the maximum extent allowable to meet its mission requirements. Under a Memorandum of Agreement (MOA) with FDEP, signed in 2000, Hurlburt Field agreed to preserve 2,886 acres of wetlands and 266.3 acres of uplands as mitigation for unavoidable wetland impacts incurred by multiple permitted projects.

The wetland and upland preservation mitigation that Hurlburt Field agreed to under the MOA with FDEP was also authorized by USACE Permit No. 1999-00679.

Under the MOA with FDEP and the USACE permit, Hurlburt Field agreed to provide acceptable mitigation for impacts on the preserved wetlands/uplands if the proposed impacts are necessary due to national security concerns and are therefore unavoidable. Any impacts on designated preserved wetlands would likely require a mitigation ratio twice as high as that for non-preserved wetlands.

**Water Bodies**

The largest water body is the 25-acre Hurlburt Lake, which receives flow from several interconnected golf course ponds, overland flow, seepages, and springs. The vast majority of the other ponded areas also occur in or adjacent to the golf course and/or northeast of the flight line (Hurlburt Field 2015b). Approximately two square miles of the East Bay Swamp lie within Hurlburt Field's boundaries, overlapping the installation in a 0.25- to 0.5-mile-wide stretch of land along its northern and western borders. Approximately 3.6 miles of the East Bay River occur within the installation's boundaries. Turtle Creek is the middle channel of the East Bay Swamp. The union of Turtle Creek with East Bay River occurs on installation property about 0.5 miles from the western border. Live Oak Creek is the northern fork of East Bay Swamp.

#### *3.3.2.2 Floodplains*

Many areas of a 100-year floodplain exist throughout the installation. As expected, there is a strong correlation between those areas mapped as wetlands and the 100-year floodplain. The areas northwest and northeast of the main cantonment area of Hurlburt Field contain the majority of 100-year floodplain lands. However, there are scattered isolated pockets of 100-year floodplain east and west of the airfield, and a floodplain/storm surge fringe exists where the installation borders Santa Rosa Sound (Hurlburt Field 2015b).

Hurlburt Field is generally divided into two drainage basins or watershed regions. The northern two-thirds of the installation predominantly drains north and northwest into East Bay Swamp, while the southern third drains surface waters southward into Santa Rosa Sound. Surface waters in East Bay Swamp and East Bay River flow westward into East Bay. Man-made drainage ditches direct surface water flow (usually intermittent) into wetlands and watersheds to the north or south. Many of these drainages are intercepted by stormwater retention basins, and at least five small drainages divert surface waters from the main cantonment area south to Santa Rosa Sound. A very small region of land adjacent to the golf course drains eastward into Cinco Bayou and, after that, into Choctawhatchee Bay (Hurlburt Field 2015b).

#### *3.3.2.3 Groundwater*

Hurlburt Field is underlain by a surficial sand and gravel aquifer, which includes the Citronelle Formation, and the Floridan aquifer of interbedded limestones and dolomite, which is approximately 500 to 600 feet below the surface. The primary water supply source at Hurlburt Field is the upper Floridan aquifer, which averages more than 1,000 feet in thickness and produces well yields from several hundred to over 10,000 gallons per minute. The water tends to be hard but typically does not exceed drinking water standards for nitrate, fluoride, sodium, and chloride, though iron levels may occasionally exceed such standards. From the late 1990s and continuing through 2011, Florida experienced frequent and extended periods of below-normal rainfall, with resulting declines in groundwater levels (GWLs) in the Upper Floridan Aquifer (UFA) (FSNW 2015). Should this trend continue, increases in saltwater intrusions and decreases in water storage along Santa Rosa Sound are possible (Hurlburt Field 2015b).

The shallow sand and gravel aquifer ranges in thickness from approximately 150 feet in the east to around 200 feet near the center of the installation. Yields of more than 300 gallons per minute are possible in the central producing zone just southeast of Hurlburt Field. Groundwater quality is generally good. It usually meets state and federal drinking water quality standards. It is classified by the State of Florida as G-II, meaning it is designated for potable use and comes from an aquifer with a total dissolved solids content of less than 10,000 milligrams per liter. Water quality from the aquifer requires treatment before potable water use due to relatively high iron and tannin levels and a low pH (Hurlburt Field 2015b). The sand and gravel aquifer is not used for public water supply at Hurlburt Field. Groundwater from the sand and gravel aquifer is used at Hurlburt Field for landscape irrigation. Hurlburt Field uses a network of more than 100 independently operated, shallow, small diameter wells to meet irrigation needs across the installation. Withdrawals are authorized by Northwest Florida Water Management District (NWFWMD) Individual Water Use Permit No. 19910115 (NWFWMD 2010). This permit authorizes the permittee to make a combined average annual withdrawal of 466,000 gallons of water per day, a maximum combined withdrawal of 1,370,000 gallons during a single day, and a combined monthly withdrawal of 24,470,000 gallons.

#### *3.3.2.4 Coastal Zone Management*

Based on Florida's geography and the state program's legal basis, the entire state of Florida is included within the coastal zone. Geographically, Florida has low land elevation, a generally high water table, and an extensive coastline with many rivers emptying into coastal waters. Few places in Florida are more than 70 miles from either the Atlantic Ocean or the Gulf of Mexico. The result is an interrelationship between the land and coastal waters, making it difficult to establish a boundary that excludes inland areas. Because of this interrelationship, the state boundaries include the entire area encompassed by the state’s 67 counties and territorial seas. All of Hurlburt Field is within Florida’s Coastal Zone, as defined by the FCMP. While Federal lands such as Hurlburt Field are statutorily excluded from Florida’s coastal zone, Federal approval of the FCMP elicits Section 307 of the CZMA and mandates that activities on Federal lands that can potentially affect coastal resources or uses on non-Federal lands comply with the maximum extent practicable with the enforceable policies of the FCMP. Florida’s Coastal Zone Management Program includes the 24 enforceable policies (statutory authorities) incorporated into the Federally approved FCMP.

### 3.3.3 Environmental Consequences

#### *3.3.3.1 Proposed Action*

While most of the construction footprints at the gate locations are already developed land, additional acreage is required to create serpentine approach lane(s) that would force vehicles to slow down before reaching the gates and other AT/FP infrastructure. The additional land needed to create safe approach lanes to access gates has been minimized to the greatest extent possible. To calculate acreage impacts, a 10-foot buffer impact area was included around the project limits shown for each of the gates.

##### 3.3.3.1.1 Wetlands

**Main and East Gates**

No wetlands previously designated by the FDEP or USACE would be impacted due to the East and Main Gate projects. Overall, implementing the Proposed Action would have no effect on wetlands.

**CVI, Kerwood, Soundside Gates**

Small portions of wetlands would be impacted due to the CVI Gate, Kerwood Gate, and Soundside Gate projects (**Figures 3.4, 3.5, 3.6**). Approximately 0.08 acres of wetlands constituting a wet roadside ditch would be removed due to the CVI Gate construction. Less than one acre of wetlands would be removed from Kerwood (0.04 acre) and Soundside Gate construction (0.02 acre). Ultimately, 0.14 acres of wetland would be removed due to the Proposed Action (**Table 3.4**).

In addition to small areas of wetlands that would be removed, there would be some encroachment into 25-foot wetland buffers from State and Federal jurisdictional wetlands set aside in the MOA with FDEP. The CVI, Kerwood, and Soundside Gates would result in small areas of encroachment into the 25-foot buffers. The reconstruction of the CVI would result in a 0.58-acre encroachment of the wetland buffer on the north side of Downs Road. In addition to removing a small area of wetlands for the construction of a short entry road leading to the administration facilities, adding pedestrian lanes on either side of Kerwood Road would only result in a 0.12-acre encroachment of the 25-foot wetland buffer. No wetlands would be removed north of the developed area around the gate complex. Expansion of the stormwater detention pond immediately west of the Soundside Gate would result in an 0.13-acre encroachment on a 25-foot wetlands buffer. Ultimately, there would be an encroachment on 0.83 acres of wetland buffer due to the Proposed Action (**Table 3.4**).

Consequently, Environmental Resource Permits (ERPs) for the Proposed Action could be required from NWFWMD, and Section 404 Permits would be required from USACE to maintain compliance with state and federal regulations. In addition to state and federal regulations, environmental conservation (as it relates to wetlands) would be required to align with the Air Force Manual 32-7003 and Air Force civil engineer design standards (UFC 3-201-01). Overall, implementing the Proposed Action would have a negligible to minor, long-term effect on wetlands.

#### 3.3.3.1.2 Floodplains

**<u>Main, CVI, and Kerwood Gate</u>**

No floodplains would be impacted due to the Main, CVI, and Kerwood Gate projects. Overall, implementing the Proposed Action would have no effect on floodplains.

**<u>East and Soundside Gates</u>**

The Proposed Action would encroach into the 100-year floodplain of the East Gate with the potential to remove 0.2 acres (**Figure 3.4**) and would result in the removal of 1.42 acres of the 100-year floodplain at the Soundside Gate (**Figure 3.5**). In total, 1.62 acres of the floodplain would be impacted due to the Proposed Action. A construction activity permit under Florida Administrative Code Rule (F.A.C.) 62-621 with a corresponding stormwater pollution plan would be required for disturbance of one acre or more of area (see Section 4.0 Management Action for additional details). An ERP under F.A.C. Rule 62-330 would be required to modify the existing stormwater management system currently under F.A.C. 62-25 permit number 186766-003-RG. All construction would comply with the base-wide MS4 permit (FLR04E002). Overall, implementing the Proposed Action would have a moderate, long-term effect on floodplains.

#### 3.3.3.1.3 Groundwater

**<u>All Access Gates</u>**

Since designs for the construction of the proposed gates is similar to the infrastructure that is currently present, no additional groundwater withdrawals are anticipated as a result of the Proposed Action. No net increases in groundwater demand would be associated with landscaping irrigation of the new construction. To minimize irrigation requirements, the construction facility would utilize, to the greatest extent possible, landscaping techniques involving species from the approved list of trees, shrubs, grasses, aquatics, groundcovers, and accents identified in the Hurlburt Field Landscape Development Plan (Hurlburt Field 2009a). Overall, implementation of the Proposed Action would have no effect on groundwater.

#### 3.3.3.1.4 Coastal Zone

**<u>All Access Gates</u>**

No long-term adverse impacts on the coastal zone are expected from implementing the Proposed Action. Short-term, adverse impacts from soil disturbance could create nonpoint source water pollution; however, Hurlburt Field would utilize best management practices (BMPs) to reduce the chance of impacts. No visual impacts on the coastal zone are anticipated.

With coordination, utilization of BMPs, and proper permitting and mitigation, implementing the Proposed Action would be consistent with the FCMP and CZMA. Overall, there would be minor, long-term impacts on water resources due to implementing the Proposed Action (**Table 3.4**).

**Table 3.4: Proposed Action Impacts on Water Resources**

| Project | Wetlands/Wetland Buffer only | Floodplains | Groundwater | Coastal Zone |
|---|---|---|---|---|
| Main Gate | 0 | 0 | 0 | 0 |
| East Gate | 0 | 0.2 | 0 | 0 |
| Soundside Gate | 0.02/0.13 | 1.42 | 0 | 0 |
| Kerwood Gate | 0.04/0.12 | 0 | 0 | 0 |
| CVI Gate | 0.08/0.58 | 0 | 0 | 0 |
| **Total:** | **0.14/0.83** | **1.62** | **0** | **0** |

### *3.3.3.2 Alternative 1*

**Main, East, CVI, and Soundside Gates**

Under Alternative 1, impacts on wetland resources at the Main, East, CVI, and Soundside Gates and regulatory requirements would be the same as under the Proposed Action. Because the Kerwood Gate would not be constructed, there would be 0.04 fewer acres of wetland impacts. Overall, implementing Alternative 1 would cause only minor, adverse impacts to wetlands.

#### 3.3.3.2.1 Floodplains

Under Alternative 1, impacts on floodplains and regulatory requirements would be the same as under the Proposed Action.

#### 3.3.3.2.2 Groundwater

Under Alternative 1, impacts on groundwater resources would be the same as under the Proposed Action. There would be no effect on groundwater.

#### 3.3.3.2.3 Coastal Zone

Under Alternative 1, impacts on the coastal zone and regulatory requirements at the Main, East, CVI, and Soundside Gates would be the same as under the Proposed Action. Because Kerwood Gate would not be constructed, the short-term adverse impacts from soil disturbance would not occur to the coastal zone in that area.

Overall, there would be minor, long-term impacts on water resources due to implementing Alternative 1 (**Table 3.5**). The difference between the Proposed Action and Alternative 1 as it relates to impacts on water resources would be negligible, with a 0.04-acre difference in wetlands (less) impacted with Alternative 1. Floodplains, groundwater, and coastal zone resources would be impacted the same with or without the inclusion of the Kerwood Gate. With coordination, utilization of BMPs, and proper permitting and mitigation, implementing Alternative 1 would be consistent with the FCMP and CZMA.

**Table 3.5: Alternative 1 Impacts on Water Resources (Acres)**

| Project | Wetlands | Floodplains | Groundwater | Coastal Zone |
|---|---|---|---|---|
| Main Gate | 0 | 0 | 0 | 0 |
| East Gate | 0 | 0.2 | 0 | 0 |
| Soundside Gate | 0.02 | 1.42 | 0 | 0 |
| CVI Gate | 0.08 | 0 | 0 | 0 |
| **Total:** | **0.1** | **1.62** | **0** | **0** |

#### *3.3.3.3 No-Action Alternative*

Under the No-Action Alternative, none of the access gate projects at Hurlburt Field would be executed. No development or land alterations would occur in the proposed project area. Implementation of the No-Action Alternative would not impact the 100-year floodplain, wetlands, groundwater, or the coastal zone. Overall, no significant impacts on water resources would be associated with the No-Action Alternative.

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**Figure 3.4: CVI Gate Water Resources**

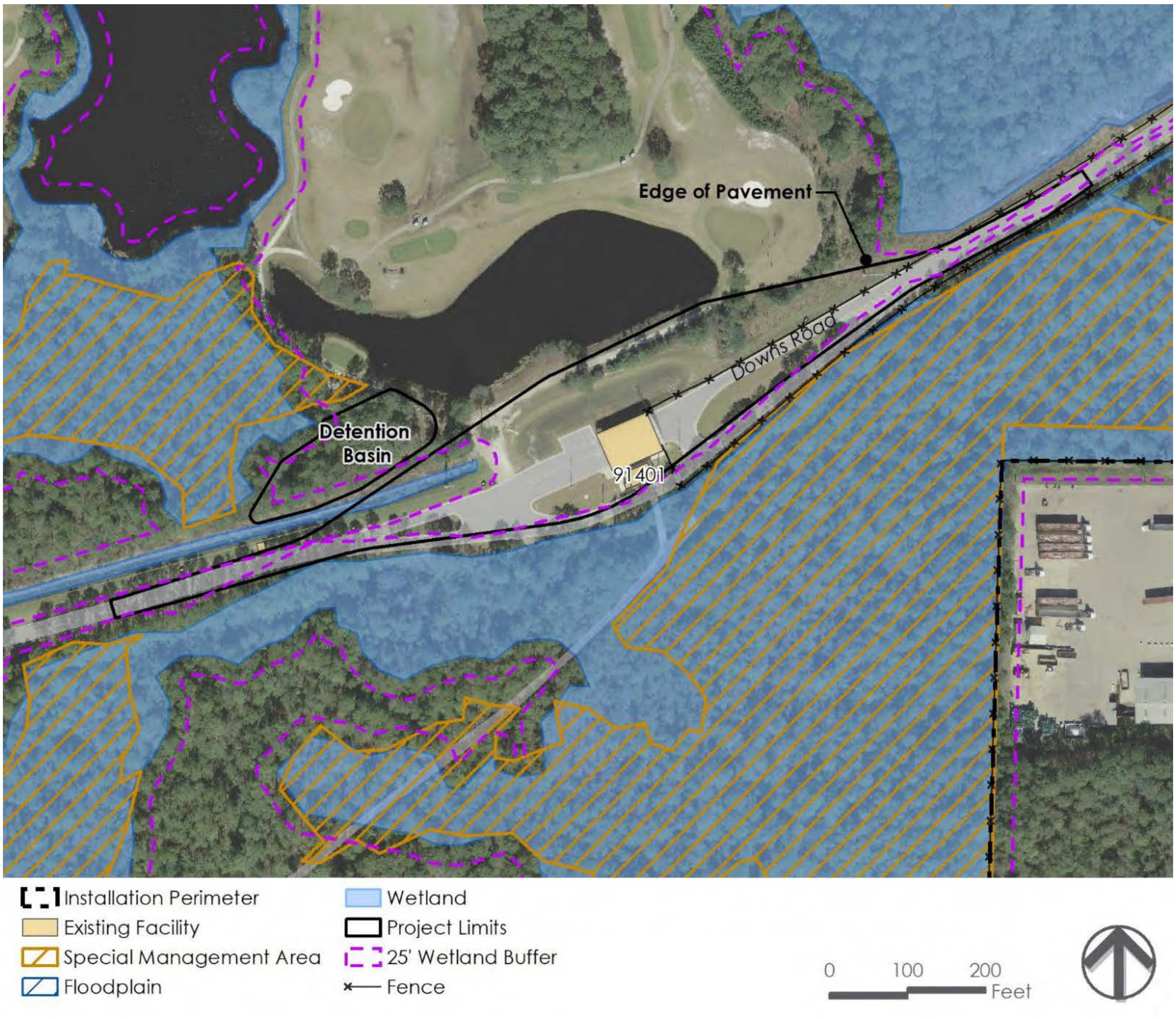

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**Figure 3.5: Kerwood Gate Water Resources**

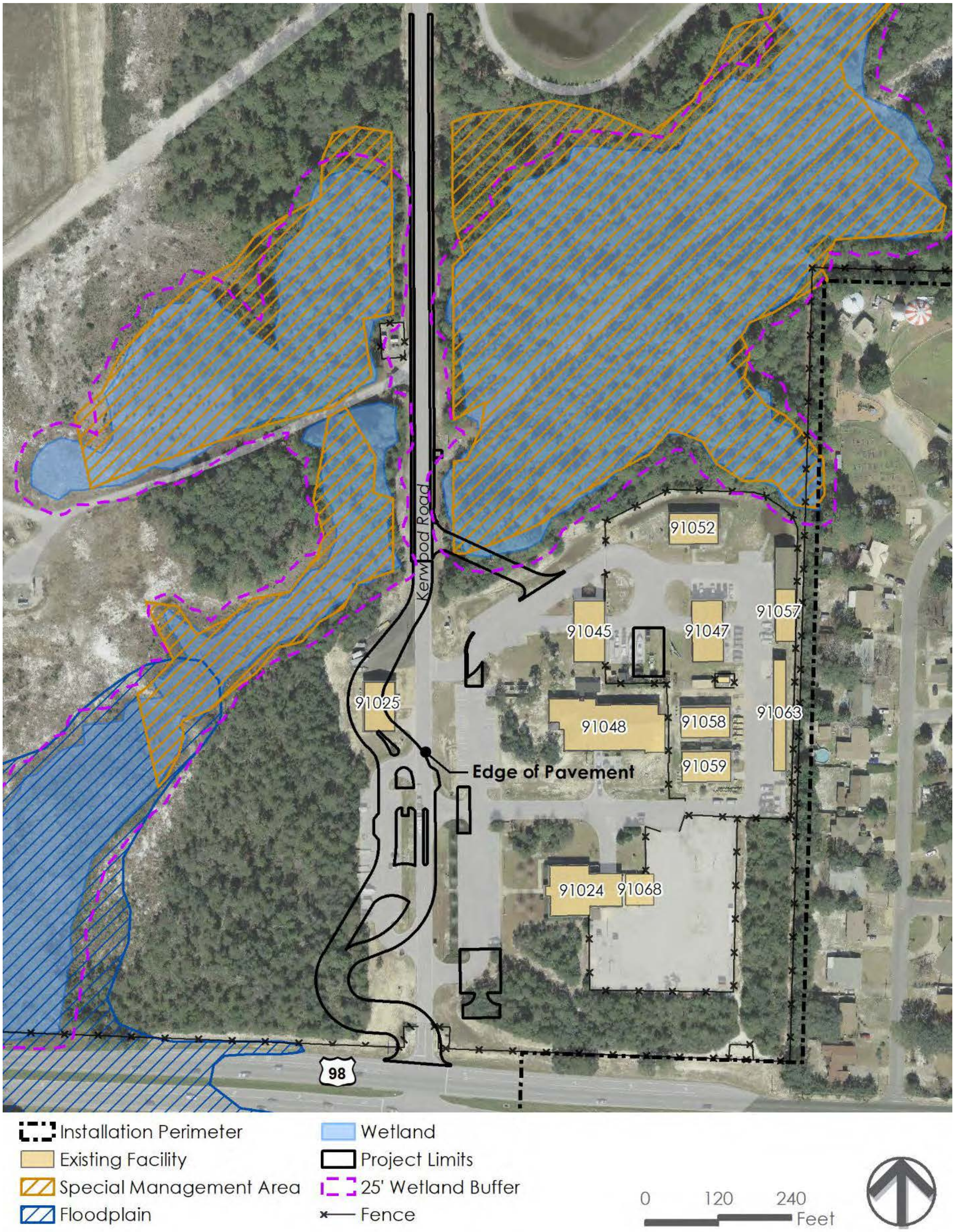

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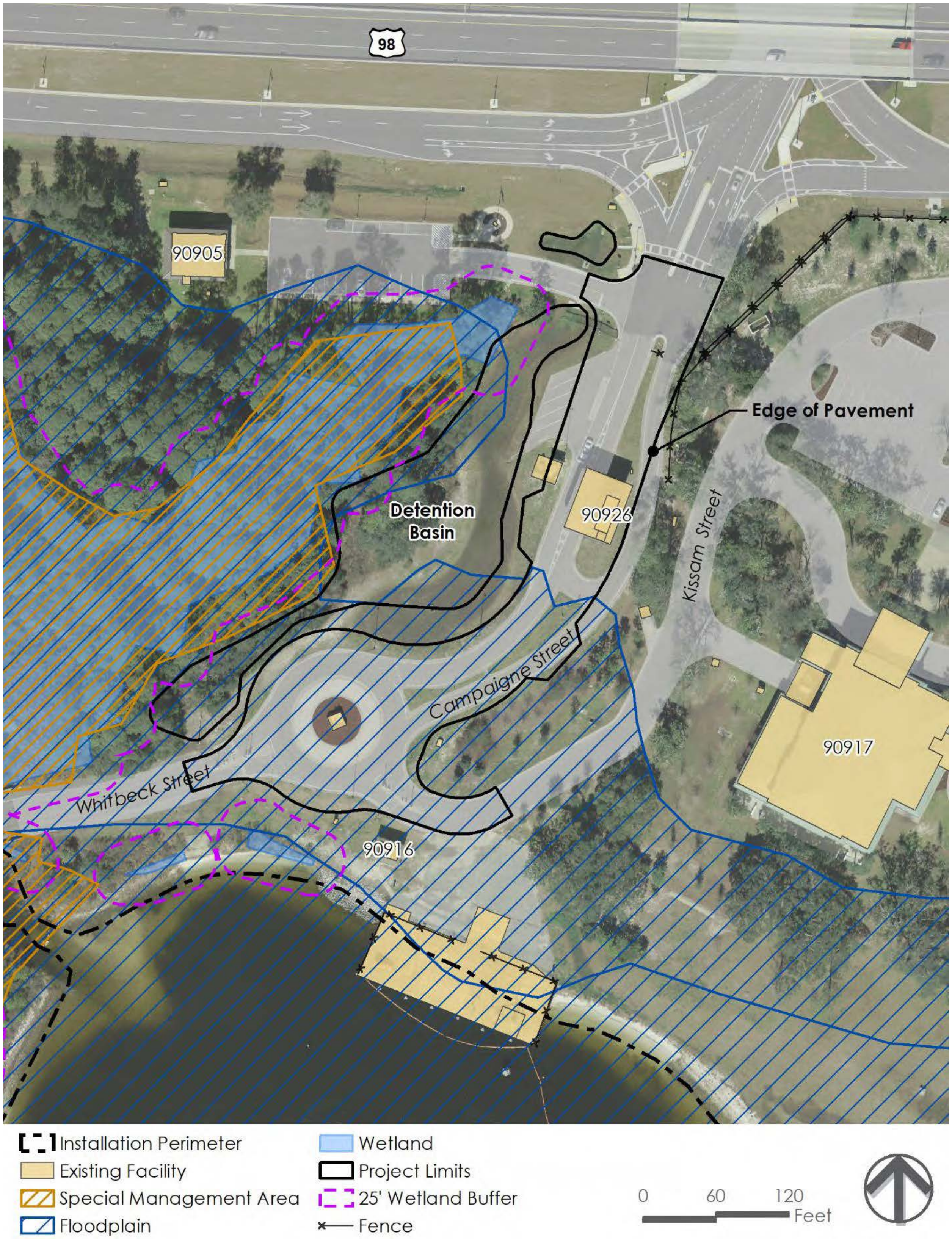
**Figure 3.6: Soundside Gate Water Resources**



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## 3.4 Biological Resources

### 3.4.1 Definition of the Resource

Biological resources analyzed in this EA include the plants, animals, and habitats that occur or have the potential to occur at Hurlburt Field and be affected by the Proposed Action.

**Wildlife**

The Migratory Bird Treaty Act (MBTA) makes it illegal to take, possess, import, export, transport, sell, purchase, barter, or offer for sale any migratory bird or the parts, nests, or eggs of such a bird except under the terms of a valid Federal permit (50 CFR 10.13). EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds, was issued on January 10, 2001. The EO directs federal agencies that take actions that either directly or indirectly affect migratory birds to develop a Memorandum of Understanding (MOU) and to work with the USFWS and other federal agencies to promote the conservation of migratory bird populations.

***§ 703 of the Migratory Bird Treaty Act (MBTA) of 1918***

The Migratory Bird Treaty Act implements various treaties and conventions between the U.S., Canada, Japan, Mexico, and the former Soviet Union to protect migratory birds. Unless permitted by regulations, the MBTA states that it is "unlawful to pursue, hunt, take, capture or kill; attempt to take, capture, or kill; possess, offer to or sell, barter, purchase, deliver or cause to be shipped, exported, imported, transported, carried or received any migratory bird, part, nest, egg or product, manufactured or not. Subject to limitations in the MBTA, the Secretary of the Interior may adopt regulations determining the extent to which, if at all, hunting, taking, capturing, killing, possessing, selling, purchasing, shipping, transporting, or exporting of any migratory bird, part, nest, or egg would be allowed, having regard for temperature zones, distribution, abundance, economic value, breeding habits, and migratory flight patterns".

***EO 13186 Responsibilities of Federal Agencies to Protect Migratory Birds***

Migratory bird conventions impose substantive obligations on the United States to conserve migratory birds and their habitats. Through the MBTA, the United States has implemented these migratory bird conventions. This EO directs executive departments and agencies to take certain actions to further implement the MBTA.

***Fish and Wildlife Coordination Act***

The Fish and Wildlife Coordination Act (1934) authorizes the Secretaries of Agriculture and Commerce to provide assistance to and cooperate with federal and state agencies to protect, rear, stock, and increase the supply of game and fur-bearing animals, as well as to study the effects of domestic sewage, trade wastes, and other polluting substances on wildlife. The Act also directs the Bureau of Fisheries (now known as the FWC) to use impounded waters for fish-culture stations and migratory-bird resting and nesting areas. It requires consultation with FWC before constructing any new dams to provide for fish migration. In addition, this Act authorizes the preparation of plans to protect wildlife resources, the completion of wildlife surveys on public lands, and acceptance by the federal agencies of funds or lands for related purposes, provided that land donations receive the consent of the state in which they are located.

**Protected Species and Habitats**

Sensitive biological resources are defined as those plant and animal species listed as Threatened or Endangered or proposed as such by the USFWS. Plant and animal species that are federally listed as Endangered or Threatened are afforded legal protection under the ESA of 1973. Florida's imperiled species are fish and wildlife species that meet the criteria to be listed as Federally Endangered, Federally Threatened, state threatened or Species of Special Concern (FAC Rule 68A-27.003). While the USFWS has primary responsibility for Florida species that are Federally Endangered or

Threatened, the Florida Fish and Wildlife Conservation Commission (FWC) works in partnership with USFWS to help conserve these species.

***<u>Endangered Species Act of 1973</u>***

The ESA is the primary legal driver for protecting and managing federally listed threatened and endangered (T&E) species. The ESA is intended to conserve the ecosystems upon which T&E species depend and provide a program for conserving such T&E species. In addition, the ESA requires that installations having listed species develop specific plans for preserving these species and their habitats.

Section 7 of the ESA outlines the obligations of federal agencies pertaining to the ESA, including the duties to conserve and refrain from jeopardizing species and their habitat. In preparation for a biological assessment, Section 7 requires agencies to determine if listed species are present within or in close proximity to an action area and if the action may potentially affect the listed species. Section 7 of the ESA requires that each federal agency consult with the USFWS and/or the National Marine Fisheries Service on proposed actions that the federal agency determines may affect federally-listed T&E species. Consultation with the USFWS, in accordance with Section 7 of the ESA, would be completed for any projects within the IDP before beginning any construction. AFI 32-7064 further requires that all installations must prepare and maintain a current inventory of T&E species and their habitats as part of the installation habitat inventory.

## 3.4.2 Affected Environment

### *3.4.2.1 Natural Communities*

The Florida Natural Areas Inventory (FNAI) typically conducts periodic surveys (approximately every 5 years) of the natural resources found on Hurlburt Field (Surdick 2009). Results from the last FNAI survey (Surdick 2009) identified a variety of upland, wetland, coastal, and other natural communities across Hurlburt Field (Figures 3.7 through 3.11). Although FNAI surveys took place in 2020 for listed, rare, and invasive species, the natural community surveys won't be conducted until 2022 (USAF 2020).

### *3.4.2.2 Upland Communities*

Florida land cover classifications have identified the following upland and coastal upland communities as occurring on Hurlburt Field: Upland Hardwood Forest, High Pine and Scrub, Coastal Scrub, Pine Flatwoods and Dry Prairie, Mesic Flatwoods, Scrubby Flatwoods, Mixed Hardwood-Coniferous, Shrub and Brushland, Maritime Hammock, and Sand Beach (Florida Fish and Wildlife Conservation Commission [FWC] and FNAI 2016). Upland communities identified by the 2009 FNAI survey included mesic flatwoods, sandhill, scrub, and scrubby flatwoods (Surdick 2009). The majority of these upland habitats are dominated by similar vegetation, including slash pine (*Pinus elliottii*), long-leaf pine (*Pinus palustris*), sand pine (*Pinus clausa*), live oak (*Quercus virginiana*), turkey oak (*Quercus laevis*), sand live oak (*Quercus geminata*), Chapman's oak (*Quercus chapmanii*), southern magnolia (*Magnolia grandiflora*), saw palmetto (*Serenoa repens*), staggerbush (*Lyonia ferruginea*), and wiregrass (*Aristida stricta*).

The majority of upland communities are found in the western and northeastern portions of the installation. In addition, the beachside portion of Hurlburt Field has many upland areas.

## Figure 3.7: Main Gate Vegetation

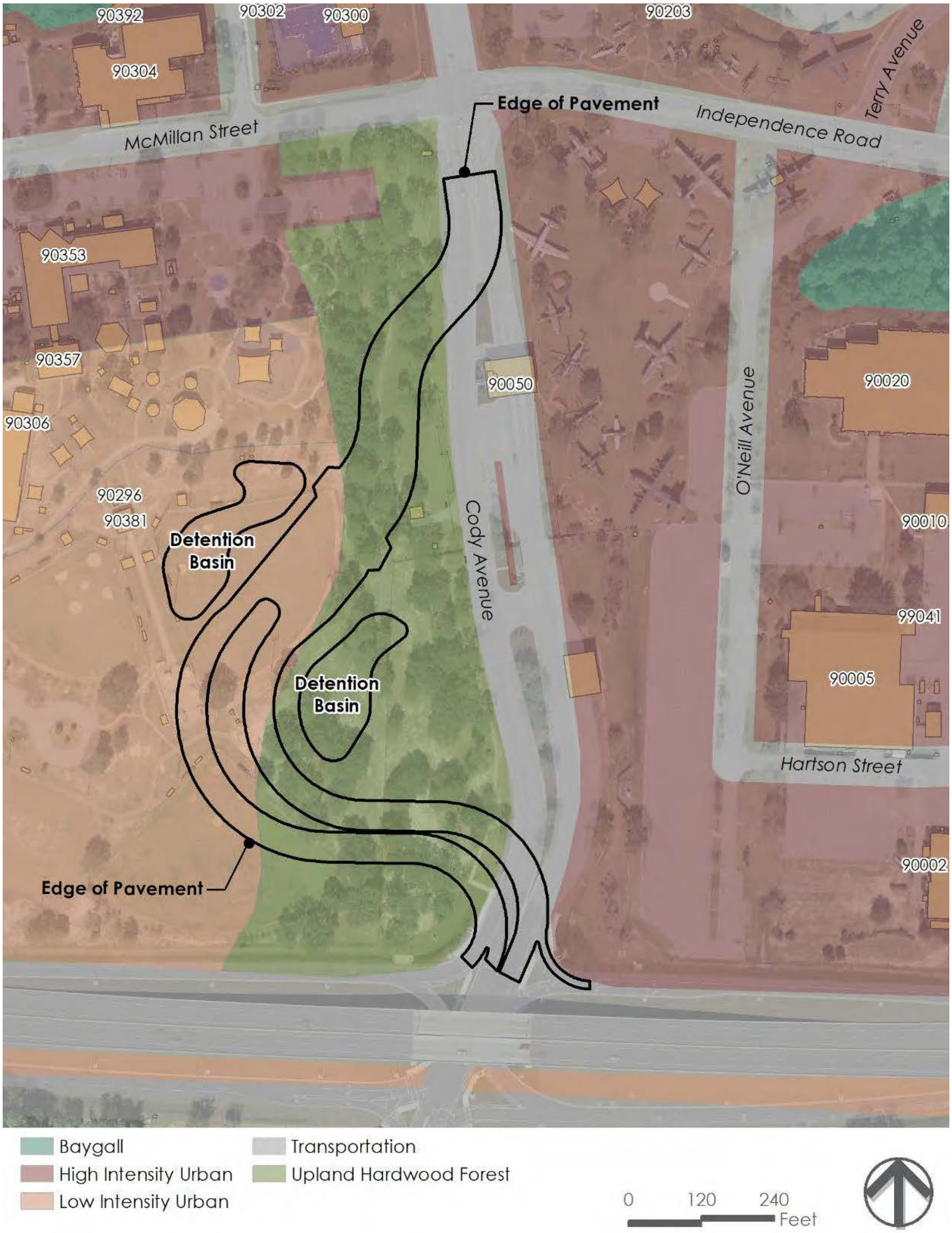

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**Figure 3.8: East Gate Vegetation**

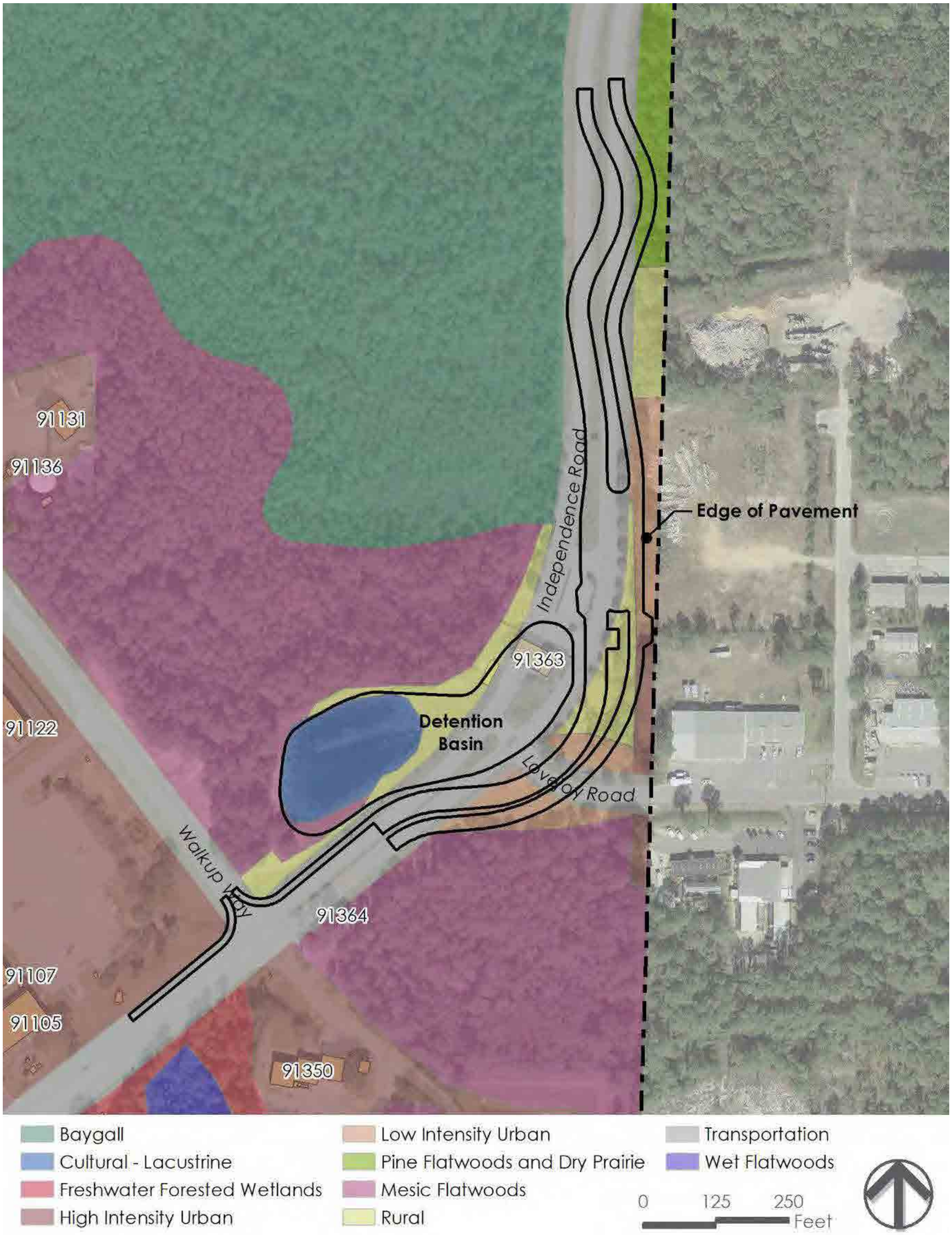

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**Figure 3.9: CVI Gate Vegetation**

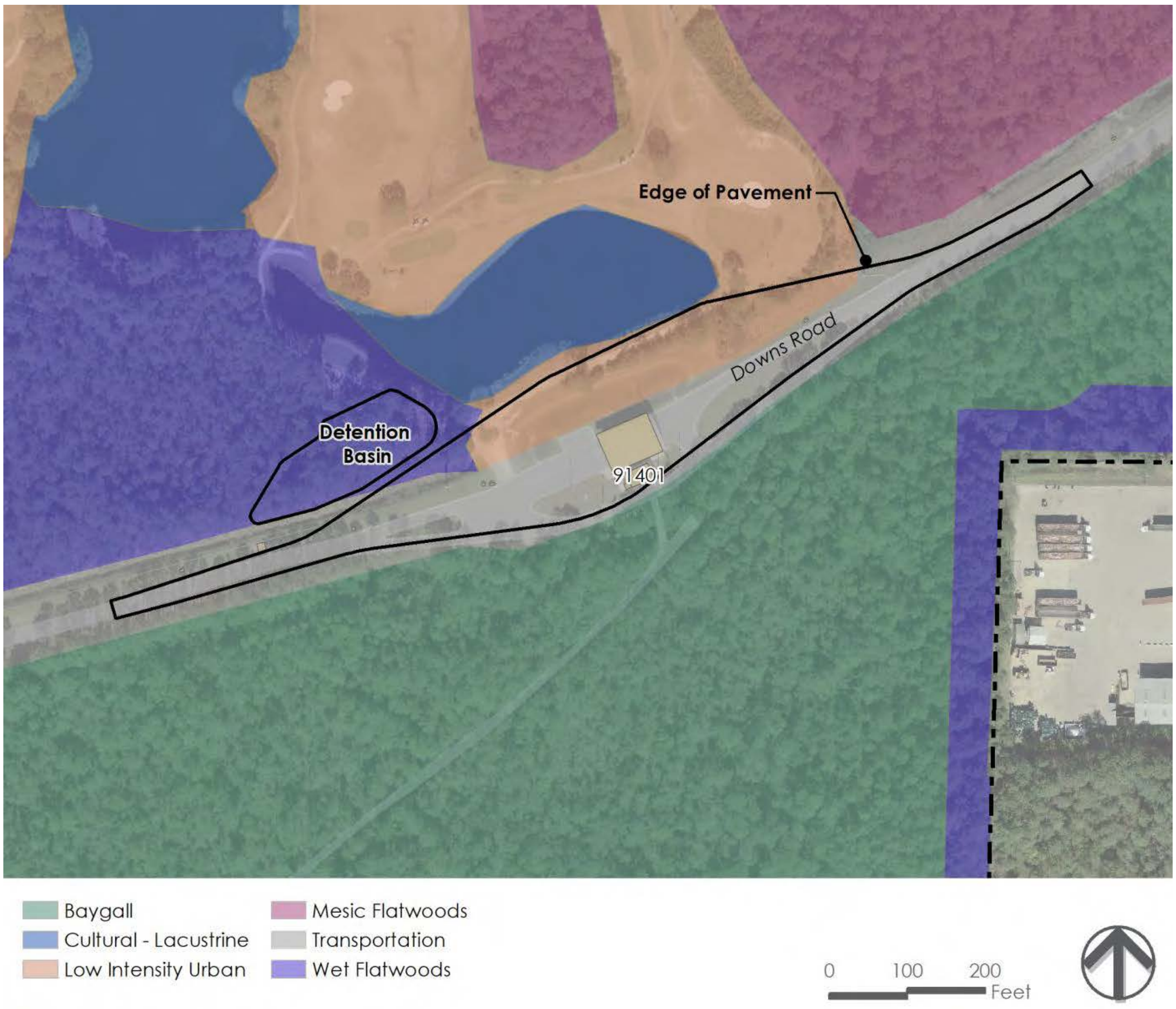

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Figure 3.10: Kerwood Gate Vegetation

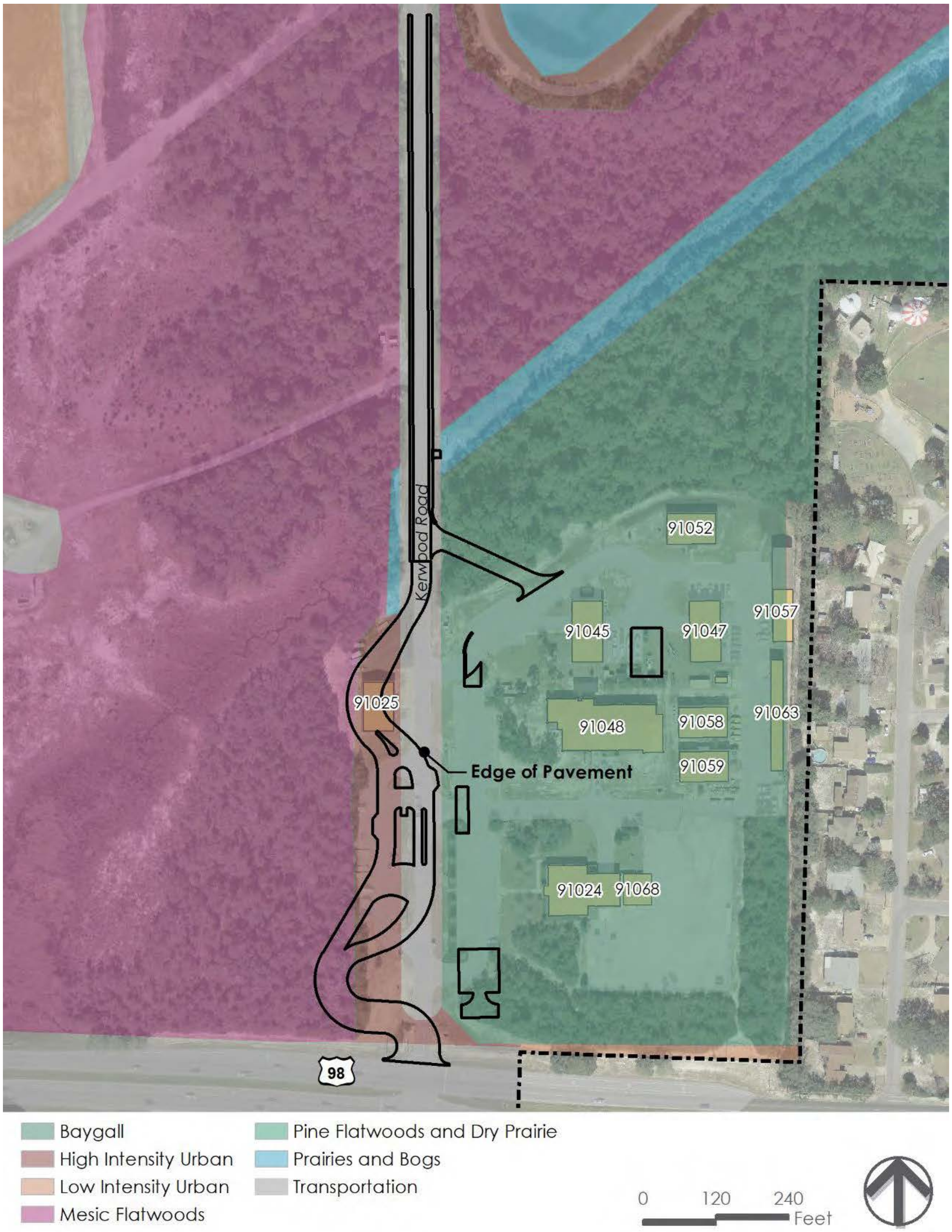

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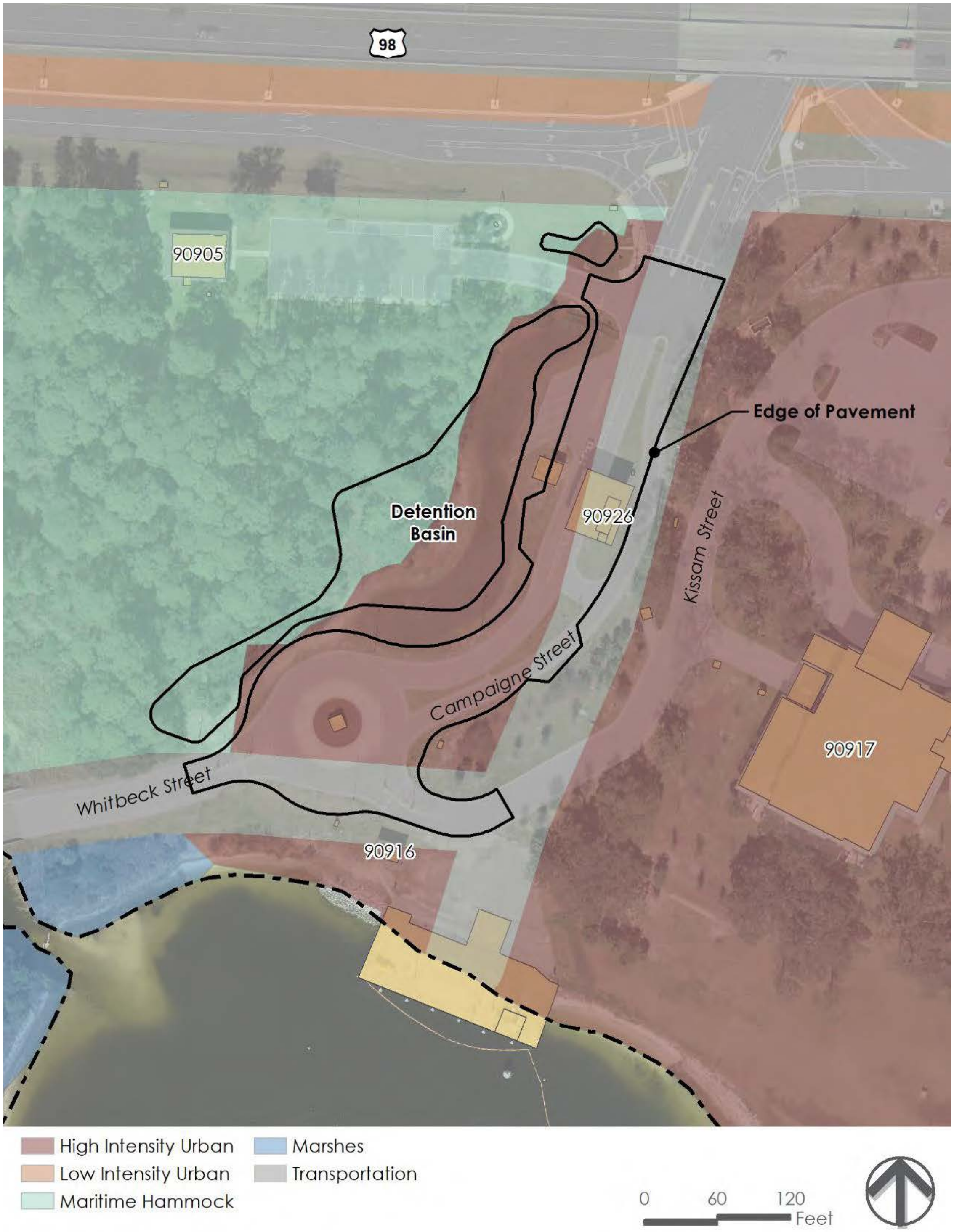
**Figure 3.11: Soundside Gate Vegetation**



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## Wetland Communities

The following wetland and aquatic communities have been identified as occurring on Hurlburt Field: Freshwater Non-Forested Wetlands, Prairies and Bogs, Marshes, Freshwater Forested Wetlands, Dome Swamp, Floodplain Swamp, Wet Flatwoods, Baygall, Natural and Man-Made Lakes and Ponds, Rivers and Streams, Estuarine, Salt Marsh, and Tidal Flats (FWC and FNAI 2016). These habitats vary from being forested with hardwoods and conifers to being dominated by herbaceous plants or comprising open water. Non-aquatic wetland habitats identified during the 2009 FNAI survey are baygall, bottomland forest, depression marsh, dome swamp, floodplain swamp, maritime hammock, and wet prairie (Surdick 2009).

Vegetation in forested wetland communities includes bald cypress (*Taxodium distichum*), pond cypress (*Taxodium ascendens*), black gum (*Nyssa aquatica*), sweet bay (*Magnolia virginiana*), swamp bay (*Persea palustris*), black titi (*Cliftonia monophylla*), swamp cyrilla (*Cyrilla racemiflora*), wax myrtle (*Morella cerifera*), red maple (*Acer rubrum*), dahoon (*Ilex cassine*), fetterbush (*Lyonia lucida*), sweet gallberry (*Ilex coriacea*), and common gallberry (*Ilex glabra*). Marshes may contain sand cordgrass (*Spartina bakeri*), sawgrass (*Cladium jamaicense*), maidencane (*Panicum hemitomon*), arrowhead (*Sagittaria lancifolia*), bladderworts (*Utricularia* spp.), pickerelweed (*Pontederia cordata*), buttonbush (*Cephalanthus occidentalis*), spikerushes (*Eleocharis* spp.), flatsedges (*Cyperus* spp.), soft rush (*Juncus effusus*), beaksedges (*Rhynchospora* spp.), cattails (*Typha* spp.), and common reed (*Phragmites australis*). The majority of wetland communities are found in the northern half of the installation.

## Wildlife

The varieties of habitats found on Hurlburt Field support a rich diversity of wildlife. Because large portions of Hurlburt Field are undeveloped, the habitats found here represent undisturbed natural areas in the Florida Panhandle, generally in decline due to development and urban growth.

**Table 3.6** summarizes some of the fish and wildlife species typically found within the installation. This table serves only as a reference and is in no way a comprehensive list or inventory.

**Table 3.6: Select List of Fish and Wildlife Species Found on Hurlburt Field**

| Common Name | Scientific Name |
|---|---|
| **Mollusk** | |
| Oyster | *Crassostrea virginica* |
| Periwinkles | *Littorina irrorata* |
| **Fish** | |
| Longnose killifish | *Fundulus similis* |
| Sheepshead minnow | *Cyprinodon variegatus* |
| **Reptiles and Amphibians** | |
| Eastern diamondback rattlesnake | *Crotalus adamanteus* |
| Garter snake | *Thamnophis sirtalis* |
| Coachwhip | *Masticophis flagellum* |
| Black racer | *Coluber constrictor* |
| Pygmy rattlesnake | *Sistrurus miliarus* |
| Cottonmouth | *Agkistridon piscivorus* |
| Six-lined racerunner | *Cnemidophorus sexlineatus* |
| Slender glass lizard | *Ophisaurus attenuates* |
| Green anole | *Anolis carolinensis* |
| Five-lined skink | *Eumeces fasciatus* |
| American alligator | *Alligator mississipiensis* |
| Common snapping turtle | *Chelydra serpentine* |
| Eastern box turtle | *Terrapene carolina* |

| Common Name | Scientific Name |
|---|---|
| Pine barrens tree frog | *Hyla andersonii* |
| **Birds** | |
| Bobwhite quail | *Colinus virginianus* |
| Great horned owl | *Bubo virginianus* |
| Bachman's sparrow | *Aimophila aestivalis* |
| Wood duck | *Aix sponsa* |
| Red-winged blackbird | *Agelaius phoenicius* |
| Least tern | *Sterna albifrons* |
| Great egret | *Egretta alba* |
| Cooper's hawk | *Accipiter cooperi* |
| Southeastern American kestrel | *Falco sparverius paulus* |
| Northern parula | *Parula americana* |
| Great blue heron | *Ardea herodias* |
| Belted kingfisher | *Megaceryle alcyon* |
| Red-shouldered hawk | *Buteo lineatus* |
| **Mammals** | |
| Florida black bear | *Ursus americanus floridanus* |
| Fox squirrel | *Sciurus niger* |
| Eastern cottontail | *Sylvilagus floridanus* |
| White-tailed deer | *Castor canadensis* |
| Southeastern pocket gopher | *Geomys pinetus* |
| Raccoon | *Procyon lotor* |
| Gray fox | *Urocyon cinereoargenteus* |
| Red fox | *Vulpes vulpes* |
| Cotton rat | *Sigmodon hispidus* |
| Opossum | *Didelphis virginina* |
| Eastern mole | *Scalopus aquaticus* |
| Cotton mouse | *Peromyscus gossypinus* |
| River otter | *Lutra canadensis* |
| American beaver | *Castor canadensis* |

*Hurlburt Field 2020*

**<u>Protected Species and Habitats</u>**

Due to the diversity and quality of natural habitats found on Hurlburt Field and the large, undeveloped expanses, Hurlburt Field is home to numerous federally and state-listed rare, threatened, and endangered (RTE) species. Regular surveys for and management of several of these species are outlined in the installation's Integrated Natural Resources Management Plan (INRMP) (USAF 2020).

The 2020 FNAI survey updated the list of RTE plant and animal species found on Hurlburt Field. A total of 16 RTE plant species and 16 RTE animal species have been identified on Hurlburt Field during FNAI surveys from 1996 to 2020 (USAF 2020). Of these species, six terrestrial or semi-terrestrial species have been given a federal protection status: American alligator (*Alligator mississippiensis*), reticulated flatwoods salamander (*Ambystoma bishopi*), green sea turtle (*Chelonia mydas*), monarch butterfly (*Danaus plexippus*), gopher tortoise (*Gopherus polyphemus*), and red-cockaded woodpecker (*Picoides borealis*). Federally listed species observed to occur in the sound along Hurlburt Field's coastline but not included in the 2009 or 2020 FNAI survey include Gulf sturgeon (*Acipenser oxyrinchus desotoi)* and West Indian manatee (*Trichechus manatus*).

**Table 3.7** outlines the RTE species noted on Hurlburt Field from various survey efforts since 1996 (Hurlburt Field 2020). The majority of these species have been observed in the western and northern areas of Hurlburt Field. Many of the listed plant species are wetland or aquatic species. Gopher tortoises, red-cockaded woodpeckers, and reticulated flatwoods salamanders are found in the western portion of the installation. Least terns (*Sterna antillarum*) used to be attracted to the gravel rooftops at Hurlburt Field, but the replacement of these rooftops with metal rooftops (2014-15) has caused least terns to cease coming to the installation (USAF 2020). Monarch butterflies (*Danaus plexippus*) were recently listed as a Candidate species (17 December 2020) and are most likely to occur wherever host plants or nectar sources occur (USFWS 2021).

**Table 3.7: T&E Plants and Animals Known to Occur on Hurlburt Field**

| Common Name | Scientific Name | Federal Rank (USFWS) | State Status (FWC or FDACS) | Global/State Rank Definitions (FNAI) |
|---|---|---|---|---|
| **Plants** | | | | |
| Pineland wild indigo | *Baptisia calycosa* var. *villosa* | N | LT | G3T3/S3 |
| Curtiss' sandgrass | *Calamovilfa curtissii* | N | LT | G3/S3 |
| Many-flowered grass-pink | *Calopogon multiflorus* | N | LT | G2G3/S2S3 |
| Fragrant pogonia | *Cleistesiopsis oricamporum* | N | LE | N/N |
| Spoon-leaf sundew | *Drosera intermedia* | N | LT | N/N |
| Pine lily | *Lilium catesbaei* | N | N | N/N |
| Panhandle lily | *Lilium iridollae* | N | LE | N/N |
| Southern twayblade | *Listeria australis* | N | LT | N/N |
| West Florida cowlily | *Nuphar lutea* ssp. *ulvacea* | N | N | G5T2/S2 |
| Yellow butterwort | *Pinguicula lutea* | N | LT | N/N |
| Chapman's butterwort | *Pinguicula planifolia* | N | LT | N/N |
| White fringed orchid | *Platanthera blephariglottis* var. *conspicua* | N | LT | N/N |
| rose pogonia | *Pogonia ophioglossoides* | N | LT | N/N |
| White top pitcher-plant | *Sarracenia luecophylla* | N | LE | N/N |
| Parrot pitcher-plant | *Sarracenia psittacina* | N | LT | N/N |
| Gulf purple pitcher-plant | *Sarracenia rosea* | N | LT | N/N |
| **Animals** | | | | |
| American alligator | *Alligator mississippiensis* | SAT | FT (S/A) | G5/S4 |
| Reticulated flatwoods salamander | *Ambystoma bishopi* | LE | LE | G2/S2 |
| Green sea turtle | *Chelonia mydas* | LT | FT | GS/S2S3 |
| Monarch butterfly | *Danaus plexippus* | C | N | N/N |
| Reddish egret | *Egretta rufescens* | N | ST | G4/S2 |
| Tricolored heron | *Egretta tricolor* | N | N | G5/S4 |
| Gopher tortoise | *Gopherus polyphemus* | N | LT | G3/S3 |
| Bald eagle | *Haliaeetus leucocephalus* | N | N | G5/S3 |
| Yellow-crowned night heron | *Nyctanassa violacea* | N | N | G5/S3 |
| Black-crowned night heron | *Nycticorax nycticorax* | N | N | G5/S3 |
| Osprey | *Pandion haliaetus* | N | N | G5/S3S4 |
| Bachman's sparrow | *Peucaea aestivalis* | N | N | G3/S3 |
| Red-cockaded woodpecker | *Picoides borealis* | LE | FE | G3/S2 |
| Coal skink | *Plestiodon anthracinus* | N | N | G5/S3 |
| Least tern | *Sterna antillarum* | N | ST | G4/S3 |
| Florida black bear | *Ursus americanus floridanus* | N | N | G5T4/S4 |

Source: USAF 2020

**Federal Legal Status**

C Candidate: a species under consideration for official listing for which there is sufficient information to support listing

LE Endangered: a species in danger of extinction throughout all or a significant portion of its range

LT Threatened: a species likely to become Endangered in the foreseeable future throughout all or a significant portion of its range

N Not currently listed, nor currently being considered for listed as Endangered or Threatened

SAT Treated as Threatened due to similarity of appearance to a species that is federally listed such that enforcement personnel have difficulty attempting to differentiate between the listed and unlisted species

**State Legal Status**

**Animals:**

FE Listed as Endangered Species at the federal level by USFWS

FT Listed as Threatened Species at the federal level by USFWS

ST State Threatened: species, subspecies, or isolated population which is acutely vulnerable to environmental alteration, declining in number at a rapid rate, or whose range or habitat is decreasing in the area at a rapid rate and as a consequence is destined or very likely to become an endangered species in the foreseeable future

FT (S/A) Federal Threatened due to similarity of appearance

N Not currently listed, nor currently being considered for listing

**Plants:**

LE Endangered: species of plants native to Florida that are in imminent danger of extinction within the state, the survival of which is unlikely if the causes of a decline in the number of plants continue; includes all species determined to be Endangered or Threatened pursuant to the U.S. ESA

LT Threatened: species native to the state that are in rapid decline in the number of plants within the state but which have not decreased in number to cause them to be Endangered

N Not currently listed, nor currently being considered for listing

**FNAI Global Rank Definitions**

G1 Critically imperiled globally because of extreme rarity (5 or fewer occurrences or less than 1000 individuals) or because of extreme vulnerability to extinction due to some natural or man-made factor

G2 Imperiled globally because of rarity (6 to 20 occurrences or less than 3000 individuals) or because of vulnerability to extinction due to some natural or man-made factor

G3 Either very rare and local throughout its range (21-100 occurrences or less than 10,000 individuals), or found locally in a restricted range, or vulnerable to extinction from other factors

G4 Apparently secure globally (may be rare in parts of the range)

G5 Demonstrably secure globally

G#G# Range of rank; insufficient data to assign a specific global rank

G#T# Rank of a taxonomic subgroup such as subspecies or variety; the G portion of the rank refers to the entire species, and the T portion refers to the subgroup; T# has the same definition as G#

VU Vulnerable

N Not current listed

**FNAI State Rank Definitions**

S# Follows the same system and has the same definitions as global ranks, except they apply only to Florida

### 3.4.3 Environmental Consequences

#### *3.4.3.1 Analysis Approach*

The following thresholds were used to determine if an impact on biological resources would be significant:

- Impacts on native communities would be detectable, and species would be expected to be outside the natural range of variability for long periods or in perpetuity;
- Population numbers or structure, genetic variability, and other demographic factors for species might have significant, short-term declines, with long-term population numbers significantly depressed;
- Frequent responses to disturbance by some individuals would be expected, with negative impacts on feeding, reproduction, or other factors resulting in a long-term decrease in population levels;
- Loss of habitat might affect the viability of at least some native species; or
- Actions could jeopardize the continued existence of a federally listed species within or outside Hurlburt Field boundaries.

Consultation with the USFWS, in accordance with Section 7 of the ESA, would be completed with respect to any projects under the Proposed Action before beginning any construction.

#### *3.4.3.2 Proposed Action*

##### 3.4.3.2.1 All Access Gates

**Natural Communities**

The proposed gates would be constructed in five separate locations. Based on the development footprints for the gates, the majority of the natural vegetation within the project limits would be permanently impacted (5.38 acres). No natural areas would be substantially fragmented (i.e., separated into multiple parcels) by the Proposed Action. Rather, small portions of natural areas along the edges of already developed areas would be impacted. The plant communities impacted and the extent of each proposed impact are provided in Table 3.8.

**Table 3.8: Proposed Impacts to Plan Communities (Proposed Action)**

| Proposed Action | Plant Community | Area of Proposed Impact (acres) | | |
|---|---|---|---|---|
| | | Pavement | Detention Pond | Total |
| Main Gate | High/Low Intensity Urban | 1.64 | 0.57 | 2.21 |
| | Upland Hardwood Forest | 2.70 | 0.51 | 3.21 |
| East Gate | High/Low Intensity Urban | 0.77 | - | 0.77 |
| | Pine Flatwoods | 0.18 | - | 0.18 |
| | Mesic Flatwoods | 0.02 | 0.07 | 0.09 |
| | Rural | 0.42 | 0.26 | 0.68 |
| | Cultural - Lacustrine | - | 0.83 | 0.83 |
| Commercial Vehicle Inspection (CVI) Gate | Low Intensity Urban | 0.93 | - | 0.93 |
| | Wet Flatwoods | 0.11 | 0.45 | 0.56 |
| | Cultural - Lacustrine | 0.02 | - | 0.02 |
| Kerwood Gate | High Intensity Urban | 0.96 | - | 0.96 |
| | Baygall | 0.69 | - | 0.69 |
| | Mesic Flatwoods | 0.33 | - | 0.33 |
| | Prairies and Bogs | 0.01 | - | 0.01 |
| Soundside Gate | High Intensity Urban | 0.87 | 0.37 | 1.24 |
| | Maritime Hammock | 0.02 | 0.29 | 0.31 |

Under the Proposed Action, there is no practicable alternative to constructing the gates in small portions of these natural communities. The proposed project limits, plus a 10-foot buffer, were placed over existing gate locations to calculate natural community impacts. For the most part, disturbed, already-developed areas are impacted (59 percent of proposed impacts). The amount of maritime hammock, baygall, and mesic flatwoods communities displaced under the Proposed Action would be relatively small. It would have a minor effect on the overall area of these habitat types, both on-base and locally. The Proposed Action would have a minor, long-term adverse impact on natural communities; the impact that the Proposed Action would have on natural communities would not be significant.

**Wildlife**

Wildlife that currently utilizes nearby habitats within this area would be able to move to other similar areas on and off the installation. This loss of habitat utilization would not affect the viability of any native species. While wildlife on Hurlburt Field is accustomed to human activity such as aircraft noise, vehicular traffic, and human presence, construction noise does not occur regularly and, therefore, can impact wildlife. The animals would likely vacate the area during construction events; however, once construction has ceased, they would return to the general area. As construction activity would be temporary, no decrease in population levels would occur based on disturbance. Therefore, the construction of the gates would have short-term, minor, adverse impacts on wildlife.

**Protected Species**

The new construction is not anticipated to disturb or displace any protected species as none have been documented in the vicinity of the Proposed Action (pers. comm. – L. Ketzler). If any protected species were documented during the Proposed Action, coordination with the appropriate federal and state agencies would occur. Indirect impacts on protected species could include loss or decline in foraging/hunting habitat for transient species such as birds. However, this potential loss or decline in habitat would be negligible compared to similar existing habitats located within and outside the installation.

Implementation of the Proposed Action would result in minor impacts on natural communities. The Proposed Action would have short-term, minor, adverse impacts on wildlife. The Proposed Action would have negligible impacts on protected species.

A no-effect determination has been made since no protected species are present. Overall, there would be no significant impacts on biological resources as a result of implementing the Proposed Action.

### *3.4.3.3 Alternative 1*

#### 3.4.3.3.1 Main, East, CVI, and Soundside Gates

**Natural Communities**

The proposed gates would be constructed in four locations. The natural communities impacted and the extent of each proposed impact are provided in **Table 3.9**. Natural vegetation within the project limits would be permanently impacted (4.35 acres). No natural areas would be substantially fragmented (i.e., separated into multiple parcels) by the Proposed Action. Rather, small portions of natural areas along the edges of already developed areas would be impacted.

**Table 3.9: Proposed Impacts to Plant Communities (Alternative 1)**

| Proposed Action | Plant Community | Area of Proposed Impact (acres) | | |
|---|---|---|---|---|
| | | Pavement | Detention Pond | Total |
| Main Gate | High/Low Intensity Urban | 1.64 | 0.57 | 2.21 |
| | Upland Hardwood Forest | 2.70 | 0.51 | 3.21 |
| East Gate | High/Low Intensity Urban | 0.77 | - | 0.77 |
| | Pine Flatwoods | 0.18 | - | 0.18 |
| | Mesic Flatwoods | 0.02 | 0.07 | 0.09 |
| | Rural | 0.42 | 0.26 | 0.68 |
| | Cultural - Lacustrine | - | 0.83 | 0.83 |
| Commercial Vehicle Inspection (CVI) Gate | Low Intensity Urban | 0.93 | - | 0.93 |
| | Wet Flatwoods | 0.11 | 0.45 | 0.56 |
| | Cultural - Lacustrine | 0.02 | - | 0.02 |
| Soundside Gate | High Intensity Urban | 0.87 | 0.37 | 1.24 |
| | Maritime Hammock | 0.02 | 0.29 | 0.31 |

Alternative 1 would have a minor, long-term adverse impact on natural communities; the impact that Alternative 1 would have on natural communities would not be significant. Similar to the Proposed Action, there is no practicable alternative to constructing the gates in small portions of these natural communities. The proposed project limits plus a 10-foot buffer were placed over existing gate locations to calculate natural community impacts. For the most part, disturbed already developed areas are impacted (61 percent). The area of the maritime hammock community that would be displaced under Alternative 1 would be relatively small. It would have a minor effect on the overall area of these habitat types, both on-base and locally.

**Wildlife**

Under Alternative 1, impacts on wildlife resources would be the same as under the Proposed Action except for Kerwood Gate. Because Kerwood Gate would not be constructed, the short-term, minor, adverse impacts on wildlife that would have been expected under the Proposed Action would not occur.

**Protected Species**

Under Alternative 1, impacts on protected species would be the same as under the Proposed Action. There would be negligible impacts on protected species.

A no-effect determination has been made since no protected species are present. Overall, there would be no significant impacts on biological resources as a result of implementing Alternative 1.

#### *3.4.3.4 No-Action Alternative*

Under the No-Action Alternative, the proposed reconstruction of access gates would not occur at Hurlburt Field. Existing methods would continue to mitigate the compliance deficiencies of the AT/FP requirements (UFC 4-022-01). Therefore, the No-Action Alternative would not affect natural communities, wildlife, or protected species.

A no-effect determination has been made since there would be no project implemented. Overall, there would be no significant impacts on biological resources as a result of implementing the No-Action Alternative.

## 3.5 Cultural Resources

Cultural Resources include historic properties, as defined by the National Historic Preservation Act (NHPA); cultural items, as defined by the Native American Graves and Repatriation Act (NAGPRA); archaeological resources, as defined by the Archaeological Resources Protection Act (ARPA); sites and sacred objects are afforded access under the American Indian Religious Freedom Act (AIRFA); and archaeological collections along with their associated records, as defined in 36 CFR 79, Curation of Federally Owned and Administered Archeological Collections.

The 2021 Hurlburt Field Integrated Cultural Resources Management Plan (ICRMP) provides guidance on how to identify, evaluate, and treat cultural resources on Hurlburt Field managed lands, and integrate cultural resources management with mission activities and other Hurlburt Field management programs (USAF, 2021). Development and approval requirements for the ICRMP are included in Air Force Policy Directive 32-70, *Environmental Quality*, and AFI 32-7065, *Cultural Resources Management*. The Hurlburt Installation Management Chief has primary responsibility for the management of cultural resources at Hurlburt Field, including evaluation of potential impacts to cultural resources by proposed actions. If the Proposed Action is determined to have cultural resources impact potential, the Hurlburt Field Installation Management Chief, along with support from the Eglin Air Force Base (AFB) Installation Support Section (ISS) Cultural Resources Program Manager, coordinates the action with the Florida State Historic Preservation Office (SHPO) and the Federally Recognized Tribes. If the Proposed Action is determined to adversely affect a historic property, a plan to avoid or mitigate the impact is developed and implemented in consultation with the SHPO.

### 3.5.1 Definition of the Resource

***National Historic Preservation Act***

The NHPA instructs Federal agencies to take a leadership role in the preservation of the nation's historic resources and to make informed decisions about the administration of federally owned or controlled historic properties. As a result, the NHPA and its implementing regulations provide the basis for Hurlburt Field's overall cultural resources management policy. Historic properties are defined by the NHPA as any prehistoric or historic district site, building, structure, or object included in, or eligible for inclusion in the National Register of Historical Places (NRHP), including artifacts, records, and material remains relating to the district, site, building, structure, or object (National Park Service

[NPS] 2006a). To be considered eligible for the NRHP, a property would need to possess integrity of location, design, setting, materials, workmanship, feeling, and association, and it must also meet at least one of the following four criteria (NPS, 2002):

- Be associated with events that made a significant contribution to the broad pattern of our history;
- Be associated with the lives of significant persons in our past;
- Embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- Have yielded, or be likely to yield, information important in history or prehistory.

In order to assure adequate historical perspective and to avoid judgements based on current or popular trends, a 50-year period was established as a guide for evaluating historic resources worthy of preservation to be included within the NRHP. As a result, typically only properties that are 50 years old or older are evaluated for their inclusion on the NRHP. The National Register Criteria Consideration G provides for the recognition of historic places within the past 50 years, provided that it is of exceptional importance at the national, state, or local level (Sherfy and Luce, 1998). For Military installations, including Hurlburt Field, Cold War Era structures are commonly evaluated under Criteria Consideration G even though they may yet not be at least 50 years old.

A Traditional Cultural Property (TCP) is a specific type of historic property eligible for inclusion in the NRHP because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining and continuing the cultural identity of the community (Parker and King, 1998). Given the broad range in types of historic properties, they can often include other types of cultural resources such as cultural items, archaeological resources, sacred sites, and archaeological collections.

***Native American Graves and Repatriation Act (NAGPRA)***

NAGPRA was enacted to ensure the protection and rightful disposition of Native American cultural items located on federal or Native American lands in the federal government's possession or control. Cultural items, as defined by NAGPRA are human remains, both associated and unassociated funerary objects, sacred objects, and objects of cultural patrimony or objects that have an ongoing historical, traditional, or cultural importance to a Native American group or culture (NPS, 2006b).

***Archaeological Resources Protection Act***

The ARPA updates and refines a previously enacted piece of legislation, the Antiquities Act, and establishes a permitting system for the excavation or removal of archaeological resources by qualified researchers, as well as legal penalties for the unauthorized excavation, removal, damage, alteration, or defacement of any archaeological resource over 100 years old on federal lands. Archaeological resources, as defined by the ARPA, consist of any material remains of past human life or activities that are of archaeological interest and are at least 100 years old. Such items include, but are not limited to, pottery, basketry, bottles, weapons, weapon projectiles, tools, structures or portions of structures, pit houses, rock paintings, rock carvings, intaglios, graves, human skeletal remains, or any portion or piece of those items (NPS, 2006c).

***American Indian Religious Freedom Act***

The AIRFA provides federal protection of traditional Native American religious freedoms. A subsequent EO 13007 defines Indian Sacred Sites as any specific, discrete, narrowly delineated location on federal land determined to be sacred by virtue of its established religious significance or its ceremonial use by a Native American religion. This determination must be made by a Native American tribe or Native American individual deemed an appropriately authoritative representative of a Native American religion who has first informed the federal land-owning agency of such a site's existence. (NPS, 1996).

***Curation of Federally Owned and Administered Archeological Collections, 36 CFR 79***

These regulations were implemented in 1990 as required by the NHPA, the Reservoir Salvage Act, and the ARPA, and provide minimum standards for the long-term management and care of archaeological collections, including any associated records or reports related to the collection. It also establishes the responsibility of Federal agencies to fund the long-term care of collections recovered on lands that they own or manage. Archaeological collections are defined by 36 CFR Part 79 as material remains excavated or removed during a survey or other study of a prehistoric or historic resource, as well as the associated records prepared or assembled in connection with the survey, excavation, or other study. Material remains are artifacts, objects, specimens and other physical evidence excavated or removed in connection with efforts to locate, evaluate, document, study, preserve, or recover a prehistoric or historic resource (U.S. Government Printing Office, 2016).

### *3.5.1.1 Affected Environment*

Thirty-nine cultural resources investigations have been conducted on Hurlburt Field property according to the 2021 ICRMP. Early review of the proposed Gate Reconstruction preliminary plans indicated that cultural resources investigations have been conducted in the vicinity of all the gate projects with specific surveys conducted for both the East Gate area and Main Gate area within the projects' APE. Archeological surveys are currently being conducted across the installation with completion anticipated in the next few months. The previously conducted surveys and preliminary results of the ongoing surveys would be reviewed to determine if they have adequate coverage of the APEs of each of the Gate Reconstruction components.

The 39 previously conducted investigations have resulted in 95 architectural properties and 17 archaeological sites identified and evaluated for their inclusion on the NRHP. Five of the 17 archaeological sites have been determined to be eligible for the NRHP and are considered historic properties as defined above. These five sites comprise a multiple property district of which they are determined to be a contributing element to the district which is eligible for the NRHP (NREC). Three additional archaeological sites are considered potentially eligible for the NRHP and would require additional submittal and consultation for their eligibility to be determined. The remaining eight archaeological sites were determined not eligible (DNE) for the NRHP and are not considered historic properties as defined above. These include two archaeological sites within the footprint for the Kerwood Gate replacement. Both of the sites consisted of single artifacts, and both are not considered significant cultural resources.

All of the 95 architectural properties that have been identified and evaluated were DNE for the NRHP and are not considered historic properties. Through consultation, 223 of the 559 real property facilities present on Hurlburt Field property have been DNE for the NRHP. This leaves 336 real property facilities on Hurlburt Field property that have not been evaluated (NEV) for their NRHP eligibility. These NEV facilities include 91 ancillary facilities not assessed routinely (NAR) that need to be submitted for SHPO consultation and review; 82 Cold War era facilities that still require evaluation, consultation, and concurrence with the SHPO; and 173 facilities consisting of post-Cold War era buildings not requiring evaluation at this time. As part of the gate upgrades and reconfiguration, existing built environments would be removed including old roadways and paving, recreational fields, fencing, ancillary structures lacking facility number, and facilities within the old gate footprint. Table **3.10** summarizes the structures with facility numbers that would be removed for each of the projects included in the Proposed Action.

**Table 3.10: Structures to be Removed**

| Facility Number | Date of Construction | Current Use/Function | NRHP Eligibility Status |
|---|---|---|---|
| **Main Gate** | | | |
| 90050 | 2001 | TRAFFIC CHK HSE (2 buildings) | DNE |
| **East Gate** | | | |
| 91363 | 2004 | TRAFFIC CHK HSE | DNE |
| **CVI Gate** | | | |
| 91401 | 2014 | TRAFFIC CHK HSE | DNE |
| **Kerwood Gate** | | | |
| 91025 | 2008 | TBD (former Training Facility) | DNE |
| **Southside Gate** | | | |
| 90926 | 2008 | TRAFFIC CHK HSE | DNE |
| **DNE – Determined Not Eligible** | | | |

All the structures to be removed are less than 45 years old and fall outside of the Cold War Era time frame. Consultation with Florida Department of State, Division of Historical Resources indicated that they concurred with the finding that the five facilities listed in the above table that are slated for demolition do not meet the criteria for listing in the NRHP. No known historic properties, archaeological or architectural, are within the construction footprints of any of the project components.

### 3.5.2 Environmental Consequences

#### 3.5.2.1.1 Analysis Approach

In addition to the significance criteria established at the beginning of this section, the following thresholds were used to determine if an impact on cultural resources would be significant:

Once historic properties have been identified, an eligibility determination would be made according to the criteria set forth in NHPA. The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and must also meet at least one of four criteria (NPS 2002) identified previously (see Definition of Resource – NHPA above).

Significance evaluation is the process by which resources are assessed relative to significance criteria for scientific or historic research, for the public, and for traditional cultural groups. Only cultural resources determined to be significant (i.e., eligible for the NRHP) are protected under the NHPA.

Analysis of potential impacts to cultural resources considers both direct and indirect impacts. Direct impacts may occur by (a) physically altering, damaging, or destroying all or part of a resource; (b) altering the characteristics of the surrounding environment that contribute to resource significance; (c) introducing visual, audible, or atmospheric elements out of character with the property or alter its setting; or (d) neglecting the resource to the extent that it is deteriorated or destroyed. Aboveground or architectural resources such as structures are more sensitive to changes in the characteristics of the surrounding environment and the introduction of visual, audible or atmospheric elements out of character of the property or setting. Because of this, the APE of architectural or aboveground resources is extended to include a 0.5-mile visual APE.

Direct impacts can be assessed by identifying the types and locations of Proposed Action and determining the exact locations of cultural resources that could be affected. Indirect impacts primarily result from the effects of project-induced population increases and the resultant need to develop new housing areas, utilities services, and other support functions necessary to accommodate population growth. These activities and facilities' subsequent use can disturb or destroy cultural resources.

### *3.5.2.2 Proposed Action*

#### 3.5.2.2.1 All Access Gates

**Archaeological Sites**

No known archaeological sites are located within the APEs of any of the gate renovation projects. The proposed project will be reviewed by the Hurlburt Field Installation Management Chief along with support from the Eglin AFB ISS Cultural Resources Program Manager in accordance with the SOPs contained in the 2021 ICRMP, and through consultation with the Florida SHPO and appropriate Native American Tribes. As part of the ongoing consultation with the Native American Tribes, the Tribal Historic Preservation Office of the Seminole Tribe of Florida identified a site of religious-cultural importance in the vicinity of the Kerwood Gate. Given the proximity of the sensitive resource, the Tribal Historic Preservation Office requested that a professional bioarchaeologist monitor all ground distributing activities conducted in the vicinity of the resource near the Kerwood Gate in case the resource extends into the current project area and potential cultural items of religious or cultural significance are inadvertently discovered during construction. The presence of a bioarchaeologist would ensure protection of any resources that are inadvertently discovered during construction. SOP 7.4 of the 2021 *U.S. Air Force Integrated Cultural Resource Management Plan, Hurlburt Field* outlines the procedures to follow in the event of an inadvertent discovery of cultural material and NAGPRA-related cultural items or remains during the course of construction. If an inadvertent discovery is made during construction, SOP 7.4 will be followed to minimize any adverse effects on cultural resources. As a result, no archaeological resources would be adversely impacted from the implementation of the Proposed Action.

**Architectural Resources**

As part of the gate upgrades and reconfiguration, existing built environment would be removed including old roadways and paving, recreational fields, fencing, ancillary structures lacking facility numbers, and five facilities with facility numbers. All the facilities with facility numbers date from 2001 to 2014. The structures are not 45 years old or older, do not fall within the Cold War Era and are not anticipated to be eligible under Criteria Consideration G. As a result, these structures were found to be not eligible for listing in the NRHP. The Florida Department of State, Historic Preservation Division concurred with these findings in a letter dated May 31, 2022. No direct impacts to historic architectural resources are anticipated. No known historic architectural resources eligible for the NRHP are located within the visual APE of the any of the gate upgrade projects. No visual impacts to the historic architectural resources are anticipated from the implementation of the Proposed Action. As a result, no impacts on architectural resources that are eligible for inclusion in the NRHP are anticipated from the implementation of the Proposed Action.

**Cemeteries**

Neither of the two previously identified cemeteries at Hurlburt Field are located within the footprint or visual APEs of any of the five gate project areas. As a result, no impacts on cemeteries are anticipated from the implementation of the Proposed Action.

**Sacred Sites and TCPs**

No sacred sites or TCPs have been identified within Hurlburt Field during previous consultation with Native American Tribes. As a result, no previously identified sacred sites or TCPs are located within any of the five-gate upgrade and reconfiguration APEs. Additional site-specific consultations with Native American tribes to identify any potential TCPs or properties of religious or cultural significance will be conducted as part of the NEPA process. Consultation with Native American tribes will be completed prior to project implementation. All information provided by Native American tribes during the course of consultation will be considered in the resulting EA. As part of the ongoing consultation with the Native American Tribes, the Tribal Historic Preservation Office of the Seminole Tribe of Florida identified a site of religious-cultural importance in the vicinity of the Kerwood Gate. Mitigation measures for this sensitive resource are presented under Archaeological Sites section above and would be followed to minimize any adverse effects to cultural resources during construction.  As a result, no impacts on Native American Sacred Sites and TCPs are anticipated from the implementation the Proposed Action.

If prehistoric or historic artifacts, such as pottery or ceramics, projectile points, dugout canoes, metal implements, historic building materials, or any other physical remains that could be associated with Native American, early European, or American settlement are encountered at any time within the project site area, the permitted project would cease all activities involving subsurface disturbance in the vicinity of the discovery and SOP 7.4 of the 2021 ICMRMP will be followed to minimize any adverse effects on cultural resources . In this event, the applicant would contact the Florida Department of State, Division of Historical Resources, Compliance Review Section at (850)-245-6333. Project activities would not resume without verbal and/or written authorization. In the event that unmarked human remains are encountered during permitted activities, all work shall stop immediately, and the proper authorities notified in accordance with Section 872.05, Florida Statutes. Further clarifications would be provided by Mercedes Harrold, Historic Preservationist, by email at Mercedes.Harrold@dos.myflorida.com, or by telephone at 850.245.6342 or 800.847.7278.

Implementation of the Proposed Action would result in no effects on archaeological resources, architectural resources, cemeteries, sacred sites, or TCPs. Overall, there would be no significant effects on cultural resources as a result of implementing the Proposed Action.

### *Alternative 1*

#### Main, East, CVI, and Soundside Gates

**Archaeological Sites**

The impacts on archaeological resources would be similar as the Proposed Action. Since the Kerwood Gate is not included in Alternative 1, there would be no potential for impacts to the sensitive resources identified by the Tribal Historic Preservation Office of the Seminole Tribe of Florida.  As a result, no additional mitigation measures would be required for this alternative

**Architectural Resources**

The impacts would be similar to the Proposed Action, though Project 4, Reconstruction of the Kerwood Gate, would not be included within this alternative. As a result, a smaller amount of the existing built environment would be removed, including old roadways and paving, recreational fields, fencing, ancillary structures lacking facility numbers, and four facilities with facility numbers. Like the Proposed Action, all of the facilities with facility numbers date from 2001 to 2014 and have been determined to be not eligible for the NRHP.  The Florida Department of State, Historic Preservation Division concurred on these findings in a letter dated May 31, 2022. As a result, no direct impacts to historic architectural resources are anticipated. No known historic architectural resources eligible for the NRHP are located within the visual APE of the any of the gate upgrade projects. No visual impacts to the historic architectural resources are anticipated from the implementation of the Proposed Action. As a result, no impacts on architectural resources eligible for inclusion in the NRHP are anticipated from the implementation of Alternative 1.

**Cemeteries**

The potential impacts to cemeteries would be the same as the Proposed Action

**Sacred Sites and TCPs**

The potential impacts to sacred sites and TCPs would be the same as the Proposed Action.  Since the Kerwood Gate is not included in Alternative 1, there would be no potential for impacts to the sensitive resources identified by the Tribal Historic Preservation Office of the Seminole Tribe of Florida.  As a result, no additional mitigation measures would be required for this alternative.

Implementation of Alternative 1 would result in no effects on archaeological resources, architectural resources, cemeteries, sacred sites, or TCPs. Overall, there would be no significant effects on cultural resources as a result of implementing Alternative 1.

*No-Action Alternative*

Under the No-Action Alternative, no construction of additional infrastructure nor demolition of existing infrastructure would occur. As a result, the gates would continue to operate with use at the current baseline levels. Compliance with the SOPs provided in the 2021 ICRMP ensures that the current configuration and operation of the gates does not have an adverse impact on archaeological resources, architectural or aboveground resources, cemeteries, sacred sites, or TCPs.

Implementation of the No-Action Alternative would result in no adverse effects on archaeological resources, architectural resources, cemeteries, sacred sites, or TCPs. Overall, there would be no significant adverse effects on cultural resources as a result of implementing the No-Action Alternative.

## 3.6 Land Use

### 3.6.1 Definition of the Resource

The term land use refers to real property classifications that indicate undeveloped land or developed human activity occurring within a specified area of the installation. Land use planning promotes orderly growth and compatible uses among adjacent areas. Hurlburt Field utilizes the Hurlburt Field Installation Comprehensive Planning Platform (CPP), multiple Area Development Plans (ADP), and Sub-area Development Plans (SDP) to guide development for planning districts throughout the installation.

The location and extent of the proposed actions need to be evaluated for their potential effects on a project site, and adjacent land uses as established in the Hurlburt Field CPP, ADPs, and SDPs. Factors to be considered include the proposed action's compliance with the plan's future land use and form-based code regulations, existing land use at each project site, the types of land uses on adjacent parcels and their proximity to the proposed actions.

### 3.6.2 Affected Environment

**Main Gate**

Cody Avenue is the entry road from U.S. 98 to the Main Gate. Cody Avenue is the dividing line between the Town Center District to the west and the West Side District to the east. The land adjacent to the existing Main Gate complex is open space, which provides some buffer between the entry road and the land uses beyond (**Figure 3.12**). Land uses to the east are open space buffer and outdoor recreation. Administrative facilities are located to the east, beyond the open space buffer and outdoor recreation. The outdoor recreation area is a ballfield complex. Community service land uses west of the outdoor recreation complex include a Child Development Center, playgrounds, and picnic shelters. The Hurlburt Field Aquatic Center is on the northwest corner of the Cody Avenue and Independence Road intersection, north of the gatehouse. The northeast corner of that intersection is the location of another community service land use, the Hurlburt Field Chapel. The Hurlburt Field Memorial Air Park is an outdoor recreation land use northeast of the Main Gate complex. The Hurlburt Field CPP and other planning documents do not identify any changes to land use in the Main Gate Area. There are no off-base land uses in proximity to the Cody Avenue/U.S. 98 interchange or the Main Gate.

**East Gate**

The East Gate complex is within the Eastside District of Hurlburt Field and is bordered by open space to the north, west, and south (**Figure 3.13**). The land to the east is private property occupied by industrial land use. The open space to the south is a buffer between the East Gate and on-base industrial land uses. There are no facility construction projects in proximity to the East Gate identified in the Hurlburt Field CPP or other planning studies.

**Commercial Vehicle Inspection Gate**

The CVI Gate is located on the northeast portion of Hurlburt Field within the Hurlburt Field East Side District. This area is isolated from most facilities on the installation. The land to the south of the CVI Gate is open space (**Figure 3.14**). The land immediately to the north of the gate is the Hurlburt Field Golf Course, which is an outdoor recreation land use. There are no facility construction projects in proximity to the CVI Gate identified in the Hurlburt Field CPP or other planning studies. Private property occupied by a small industrial operation is approximately 500 feet east of the proposed CVI Gate site.

**Kerwood Gate**

Kerwood Road intersects with U.S. 98 to the south and Howie Walters Road to the north. The land uses in the vicinity of the Kerwood Road, and U.S. 98 intersection include administrative facilities and indoor and outdoor storage (**Figure 3.15**). Land use to the north of the administrative facilities is open space. There are no facility construction projects in proximity to the Kerwood Gate identified in the Hurlburt Field CPP, but a Planning Charrette Report (PCR) prepared for the proposed Kerwood Gate identified the relocation of an administration facility (Building 91025) to allow construction of the new access gate. The proposed facility relocation would be to the east of the Kerwood Gate location and compatible with existing functions and land use in that area. There are no off-base land uses in the immediate vicinity of the proposed Kerwood Gate area.

**Soundside Gate**

The Soundside Gate provides access to family housing, industrial, administrative, community commercial, and outdoor recreation land uses south of U.S. 98. The land uses/functions in the vicinity of the Soundside Gate include the Hurlburt Field Marine Terminal, an industrial land use immediately south of the gate and community commercial (**Figure 3.16**). The family housing and outdoor recreation land uses are separated from the gate complex by open space. There are no facilities or changes to land use proposed in the vicinity of the Soundside Gate, and there are no off-base land uses in the vicinity of the Soundside Gate.

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**Figure 3.12: Main Gate Land Use**

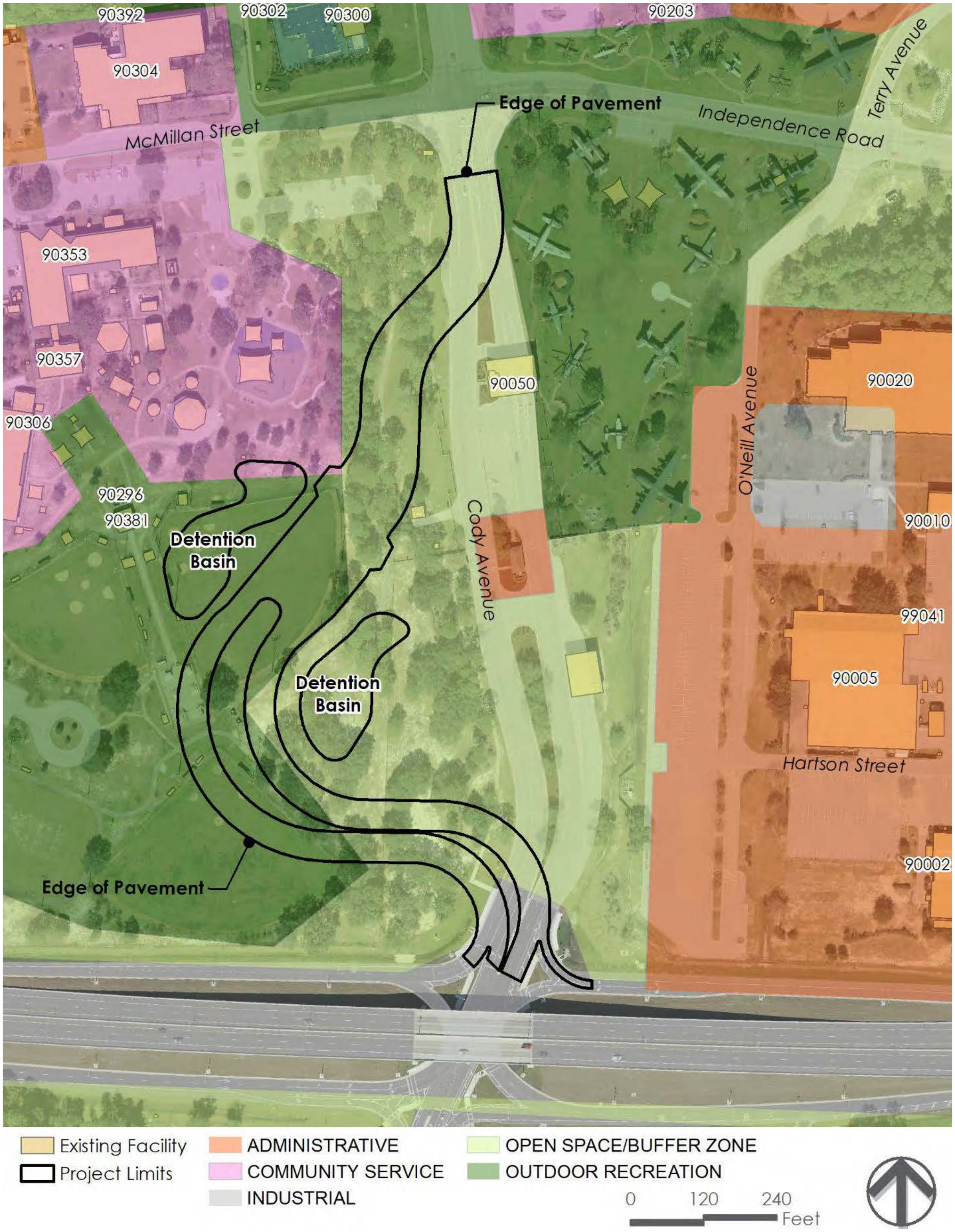

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**Figure 3.13: East Gate Land Use**

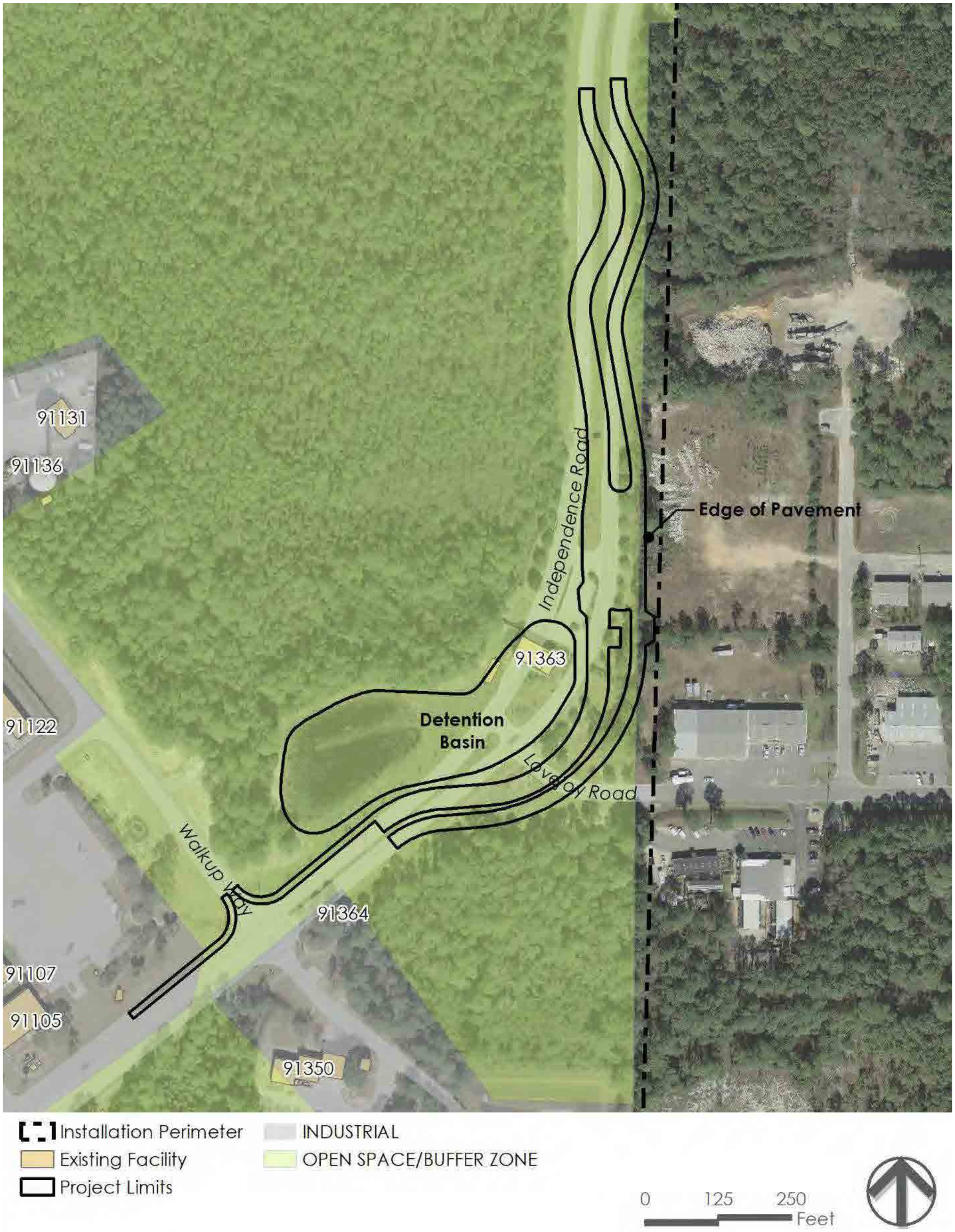

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**Figure 3.14: CVI Gate Land Use**

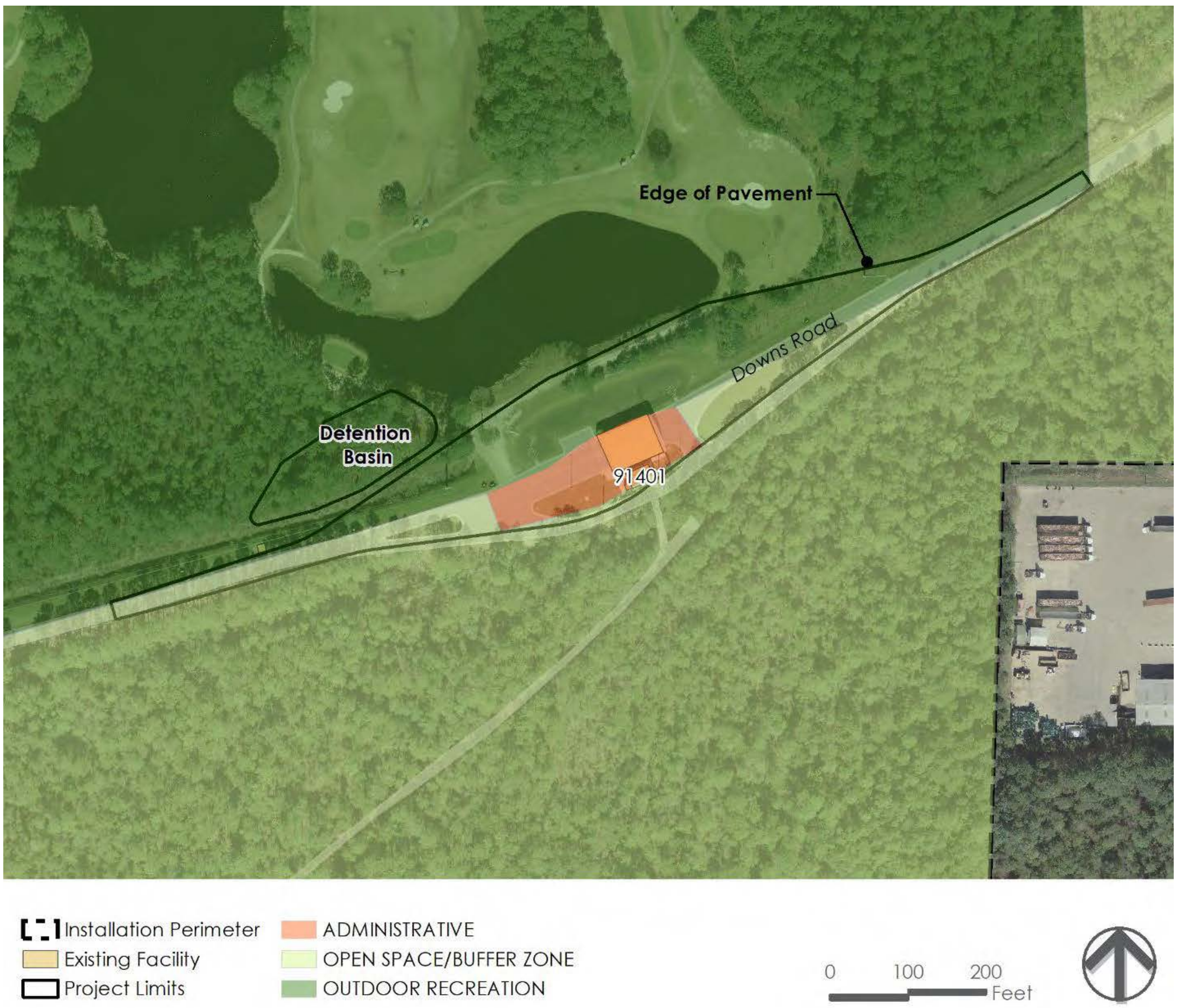

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Figure 3.15: Kerwood Gate Land Use

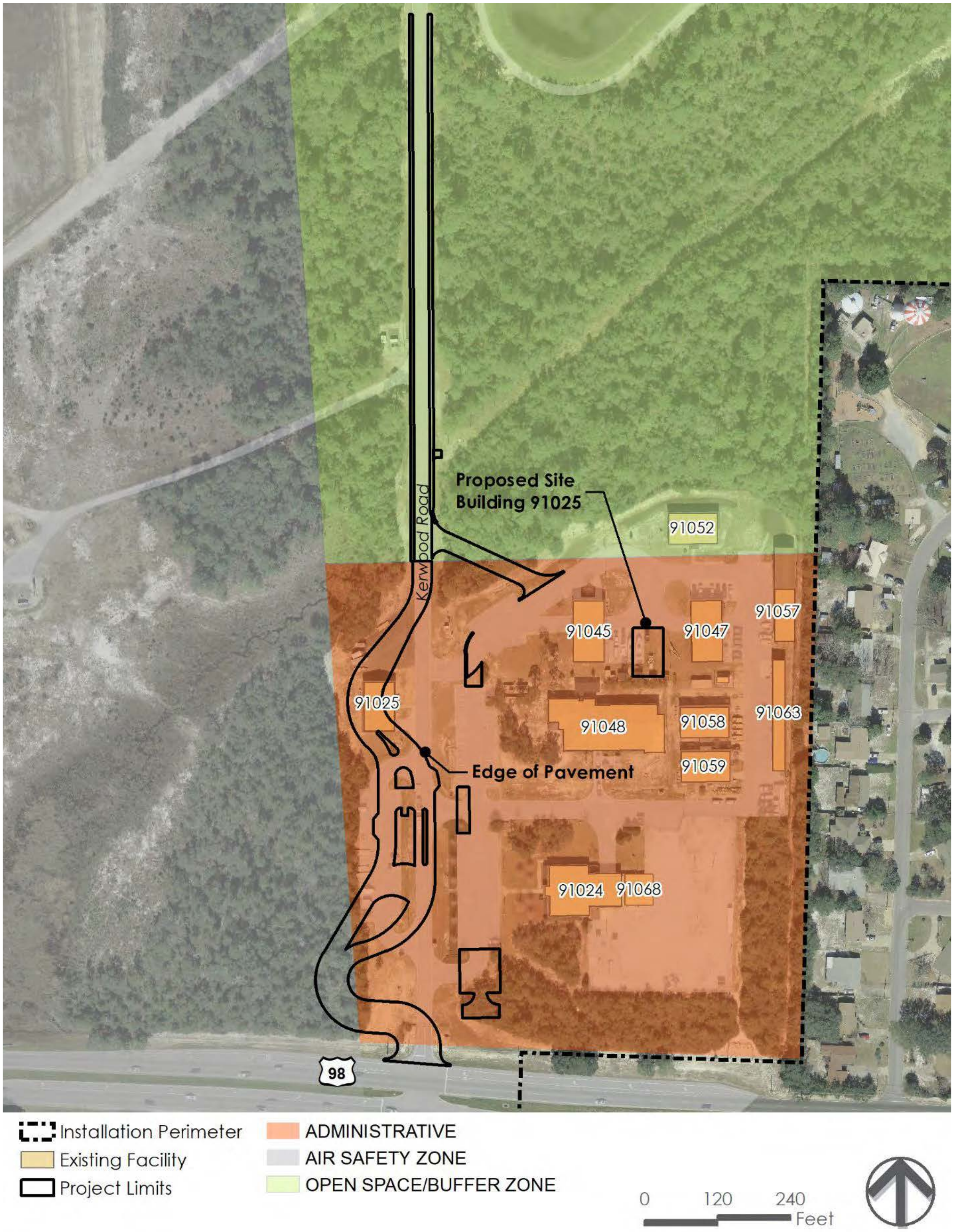

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**Figure 3.16: Soundside Gate Land Use**

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## 3.6.3 Environmental Consequences

### *3.6.3.1 Analysis Approach*

The following thresholds were used to determine if an impact on land use would be considered significant:

- Be inconsistent with the Hurlburt Field CPP, applicable ADP, or SDP
- Disrupt or be functionally incompatible with existing land uses
- Be incompatible with adjacent land uses to the extent that threatens public health and safety

### *3.6.3.2 Proposed Action*

**Main Gate**

The Proposed Action would result in the relocation and construction of a new, larger Main Gate complex to the west of the existing facility, which would result in changes to the outdoor recreation and open space land uses in that area. An area characterized as natural vegetation and two ballfields would be removed to accommodate the new construction and operation of the gate complex, which would result in a long-term, minor adverse impact on outdoor recreation land use. Although there would be adverse impacts to outdoor recreation land uses west of the existing Main Gate, the impacts would be mitigated by open space that would be created to separate the gate complex and the outdoor recreation area. There would be the potential for expansion of the Hurlburt Field Memorial Air Park on the land formerly occupied by the entry road and Main Gate, which would benefit that outdoor recreation area. Although two ballfields would be removed from the ballfield complex, construction of the new access gate and roadway would be compatible with on-base neighboring land use areas. The Proposed Action would have no significant impact on other land uses in the vicinity.

**East Gate**

The only land affected by the Proposed Action would be open space. With the realignment of the road and construction of a new gate complex, pavement and facilities would be removed, which would be restored back to open space. Open space would include expansion of the existing stormwater detention feature, which would be a long-term, beneficial impact on that area of the project site; however, this would be balanced by the new gate construction and pavement realignment, which would eliminate some open space. Construction of the new access gate would be compatible with on- and off-base neighboring land use areas. Overall, the Proposed Action would have no significant impact on other land uses in the vicinity.

**Commercial Vehicle Inspection Gate**

The Proposed Action would result in the expansion of the existing CVI Gate area, but the gate reconstruction is not expected to extend into the outdoor recreation land (Hurlburt Golf Course) to the north or the open space south of the gate. The existing gate complex would be demolished and replaced with a compliant commercial vehicle inspection facility on the same site. There would be long-term, minor adverse impacts to a small area of stormwater drainage ditch/open space on the north side of the gate. Construction of the new access gate would be compatible with on and off-base neighboring land use areas, so overall, there would be no significant impacts on outdoor recreation and open space resources.

**Kerwood Gate**

The Proposed Action would result in the construction of a fully compliant access control point with a new gate complex at the Kerwood Road and U.S. 98 intersection. Construction of the gate complex would require relocation of administrative functions in Building 91025 to a new facility in the same area; then, demolition of Building 91025 would be required. The relocation of functions in Building 91025 would not adversely affect the land use relationships or compatibility in this area. There would be long-term, minor adverse impacts to open space from the new entry/egress road alignment and construction of an entry road leading to the administrative compound directly to the east of the gate complex. Construction of the new access gate would be compatible with on-base neighboring land use areas. The gate complex would meet installation design requirements, resulting in long-term, minor impacts on the administrative compound. Overall, the Proposed Action would result in no significant impacts to land uses in the vicinity of the project area.

**Southside Gate**

The Proposed Action would result in the demolition of the existing gate complex and replacement with a new gatehouse, ID check stations, and canopy. A minor relocation of the gate facilities and road alignment at the roundabout would result in long-term, negligible impacts to open space to the west. Construction of a new access gate would be compatible with on-base neighboring land use areas to the east. Overall, the Proposed Action would result in no significant impacts to land uses in the vicinity of the project area.

#### *3.6.3.3 Alternative 1*

##### 3.6.3.3.1 Main, East, CVI, and Soundside Gates

Under Alternative 1, impacts to land use areas would be the same as under the Proposed Action, except for the Kerwood Gate area. Because Kerwood Gate would not be constructed, impacts to the administrative land use in the vicinity of that project area that would have been expected under the Proposed Action would not occur.

#### *3.6.3.4 No-Action Alternative*

Under the No-Action Alternative, the proposed reconstruction of access gates would not occur at Hurlburt Field. Existing methods to mitigate compliance deficiencies of access gates established in UFC 4-022-01 would continue. Therefore, the No-Action Alternative would not affect land use.

## 3.7 Noise

### 3.7.1 Definition of the Resource

Noise is commonly defined as an unwanted or unwelcome sound. Sound is measured with instruments that record instantaneous sound levels in decibels (dB). Sound level measurements used to characterize sound levels that the human ear can sense are designated as “A-weighted decibels” (dBA). “A-weighted” denotes the adjustment of the frequency content of a noise event to represent the way in which the average human ear responds to the noise event. All sound levels analyzed in this EA are A-weighted.

Noise levels used to characterize community noise effects from such activities as aircraft or building construction are measured in the day-night average A-weighted sound level (DNL). The DNL metric accounts for the greater noise annoyance during nighttime hours. It is calculated by averaging hourly sound levels for a 24-hour period and adding a weighting factor to the nighttime values.

### 3.7.2 Regulatory Setting

Acceptable noise levels have been established by the U.S. Department of Housing and Urban Development (HUD) for construction activities in residential areas (HUD 1984):

- **Acceptable** (not exceeding 65 dBA) – The noise exposure may be of some concern, but common building construction would make the indoor environment acceptable, and the outdoor environment would be reasonably pleasant for recreation and play.
- **Normally Unacceptable** (above 65 but not greater than 75 dBA) – The noise exposure is more severe; barriers may be necessary between the site and prominent noise sources to make the outdoor environment acceptable; special building construction may be necessary to ensure people indoors are sufficiently protected from outdoor noise.
- **Unacceptable** (greater than 75 dBA) – The noise exposure at the site is so severe that the construction costs to make the indoor noise environment acceptable may be prohibitive, and the outdoor environment would still be unacceptable.

Typical day-night average outdoor noise levels (**Table 3.11**) range from 50 dBA in a quiet, residential setting to 88 dBA for a 3rd-floor apartment in a major city next to a freeway.

As a general rule, noise generated by a stationary noise source, or "point source," would decrease by approximately 6 dBA over hard surfaces and 9 dBA over soft surfaces for each doubling of the distance. For example, if a noise source produces a noise level of 85 dBA at a reference distance of 50 feet over a hard surface, then the noise level would be 79 dBA at a distance of 100 feet from the noise source, 73 dBA at a distance of 200 feet, and so on.

Based on data presented in the USEPA publication, Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances (USEPA 1971), outdoor construction noise levels range from 78 dBA to 89 dBA, approximately 50 feet from a typical construction site. Noise levels at 50 feet from a source decrease by approximately 3 dBA over a hard, unobstructed surface (such as asphalt) and by approximately 4.5 dBA over a soft surface (such as vegetation). **Table 3.12** presents typical noise levels (dBA at 50 feet from source) estimated by USEPA for the main phases of outdoor construction.

**Table 3.11: Typical Outdoor Noise Levels**

| Day-Night Noise Level | Location |
|---|---|
| 50 dBA | Residential area in a small town or quiet suburban area |
| 55 dBA | Suburban residential area |
| 60 dBA | Urban residential area |
| 65 dBA | Noisy urban residential area |
| 70 dBA | Very noisy urban residential area |
| 80 dBA | City noise (downtown of major metropolitan area) |
| 88 dBA | 3rd-floor apartment in a major city next to a freeway |

**Table 3.12: Typical Noise Levels 50 Feet from the Noise Source for Outdoor Construction Activities**

| Day-Night Noise Level | Location |
|---|---|
| 84 dBA | Ground Clearing |
| 89 dBA | Excavation, Grading |
| 78 dBA | Foundations |
| 85 dBA | Structural |
| 89 dBA | Finishing |

Source: USEPA 1971

#### *3.7.2.1 Affected Environment*

The primary sources of noise at Hurlburt Field are airfield operations, industrial activities, vehicular traffic, and construction. The noise guidelines established for land use planning at Hurlburt Field are similar to those published in the June 1980 Federal Interagency Committee on Urban Noise (FICUN) publications. Based on these guidelines, the maximum acceptable noise level for most residential land uses is considered to be 65 dBA DNL (Hurlburt Field 2009).

A sensitive noise receptor is defined as a location or facility where people involved in indoor or outdoor activities may be subject to stress or considerable interference from noise (USEPA 1971). Locations include residential dwellings, hospitals, educational facilities, libraries, and parks or other outdoor recreational areas.

**Main Gate**

Noise-sensitive areas in proximity to the Main Gate project site include the Morale, Welfare, and Recreation (MWR) outdoor recreation ballfields and parks directly west of the existing Main Gate. A Hurlburt Field Child Development Center is on the west side of the outdoor recreation complex. The Hurlburt Field Memorial Air Park is directly east of the existing Main Gate, and the base Chapel is located northeast of the existing Main Gate. These noise-sensitive areas have been in proximity to the existing Main Gate and exposed to levels of noise associated with vehicle traffic for many years. No sensitive noise receptors are located off base and in proximity to the Main Gate.

**East Gate**

The land uses within the vicinity of the East Gate are open space and industrial, which are not sensitive to noise. The off-base land uses in the vicinity of the East Gate are also industrial functions.

**Commercial Vehicle Inspection Gate**

The on-base land uses within the vicinity of the CVI Gate include open space and industrial, which are not sensitive land uses to noise, and the Hurlburt Field golf course, which is noise sensitive. The off-base land uses in the vicinity of the CVI Gate are privately-owned industrial functions and are less sensitive to noise.

**Kerwood Gate**

The Kerwood Road project area is near the U.S. 98 corridor, a high-volume/high-speed, four-lane road. In addition to the daily noise associated with highway traffic, the project area is east of the Hurlburt Field airfield, and although the project area is beyond the 65 dBA DNL noise contour, there is some noticeable noise from airfield operations. The land use in the project area is administrative, which meets the standards of land use compatible with airfield operations. There are off-base residential dwellings, which have sensitivity to noise over 600 feet to the east of the Kerwood Gate site.

**Soundside Gate**

The Soundside Gate project area is directly south of the U.S. 98 corridor, which generates traffic noise throughout the day. Land uses in the project area include open space and industrial, which are not sensitive to noise impacts and are community commercial with limited sensitivity to noise. There are no off-base sensitive noise receptors in proximity to the Southside Gate.

### 3.7.3 Environmental Consequences

#### *3.7.3.1 Analysis Approach*

The following thresholds were used to determine if an impact on land use would be considered significant:

- Conflict with applicable federal, state, interstate, or local noise control regulations; or
- Result in continuous and long-term noise levels at 85 dB and above, which is the threshold of hearing damage with prolonged exposure

#### *3.7.3.2 Proposed Action*

**Main Gate**

The Proposed Action would result in the relocation and construction of a new, larger Main Gate complex to the west of the existing facility, resulting in short-term, negligible increases in noise to the outdoor recreation and open space land uses in that area. These areas have been exposed to vehicle traffic for many years, and there would be open space and vegetation between the gate complex and the outdoor recreation area to provide some buffer to the short-term construction and long-term traffic noise. The Proposed Action would not result in significant noise impacts to other land uses in the vicinity of the Main Gate.

**East Gate**

The Proposed Action would result in relocation and a small expansion of the East Gate complex. There are no on-base noise-sensitive land uses in proximity to the gate. The only land adjacent to the Proposed Action would be open space and the nearby off-base industrial land use, which are not sensitive to noise levels associated with road traffic or short-term construction. The industrial land use is a construction company that has been in proximity to the East Gate for years. Overall, there would be no significant impact on noise-sensitive land uses in the project area.

**Commercial Vehicle Inspection Gate**

The Proposed Action would result in an expansion of the existing CVI Gate area, but the expansion would not extend into the outdoor recreation (Hurlburt Field golf course) land to the north or the open space south of the gate. The open space and industrial functions south of the CVI are not noise sensitive. The Hurlburt Field golf course to the north of the CVI is noise sensitive; however, it has been in proximity to the CVI for several years, and with that knowledge, there may be less sensitivity by golfers to the noise associated with CVI operations. Overall, there would be no significant noise impacts on the golf course.

**Kerwood Gate**

The Proposed Action would result in the construction of a fully compliant access gate at the Kerwood Road and U.S. 98 intersection. Construction of the gate complex would require relocation of administrative functions in Building 91025 to a new facility in the same area; then, demolition of Building 91025 would be required. These actions would result in short-term, adverse noise impacts to the administration campus and the off-base residential area east of the installation. The Kerwood Gate area is in proximity to U.S. 98 and its associated traffic noise and is exposed to low-level noise from airfield operations; however, the construction of the road and gatehouse would also result in short-term noise impacts to the administration compound and off-base residential neighborhood to the east. Noise from construction activities would only be during the period of construction. Operation of the new gate in this location would result in long-term, minor noise impacts to the administration compound and negligible impacts to the off-base residential neighborhood. Overall, there would be no significant noise impacts on the administration campus or the off-base residential neighborhood.

**Soundside Gate**

The Proposed Action would result in short-term, negligible noise impacts during the period of construction and long-term, negligible noise impacts from gate operations to community commercial land use east of the gate. The minor relocation of the gate facilities and road realignment at the roundabout south of the gate would have no noise impact on the open space to the west. Overall, there would be no significant noise impacts on the community's commercial land use to the east.

#### *3.7.3.3 Alternative 1*

##### 3.7.3.3.1 Main, East, CVI, and Soundside Gates

Under Alternative 1, impacts on noise-sensitive resources would be the same as under the Proposed Action, except for the Kerwood Gate area. Because Kerwood Gate would not be constructed, impacts to the administrative land use in the vicinity of the project area that would have been expected under the Proposed Action would not occur.

#### *3.7.3.4 No-Action Alternative*

Under the No-Action Alternative, the proposed reconstruction of access gates would not occur at Hurlburt Field. Existing methods to mitigate compliance deficiencies of access gates established in UFC 4-022-01 would continue. Therefore, the No-Action Alternative would not affect noise-sensitive facilities or land use.

## 3.8 Hazardous Waste

### 3.8.1 Definition of Resource

Under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act, Resource Conservation and Recovery Act (RCRA), and Toxic Substances and Control Act, hazardous materials are defined as any substance with the physical properties of ignitability, corrosivity, reactivity, or toxicity capable of causing an increase in mortality, serious irreversible illness, incapacitating reversible illness, or a substantial threat to human health or the environment. Hazardous waste is defined as any solid, semisolid, liquid, or gaseous waste or combination thereof that poses a substantial present or potential hazard to human health or the environment. Asbestos-containing materials (ACM) and lead-based paint (LBP) are also included as special hazards requiring special handling for demolition and disposal.

### 3.8.2 Affected Environment

#### *3.8.2.1 Hazardous Materials Management*

In accordance with AFMAN 32-7002, *Environmental Compliance and Pollution Prevention*, Hurlbut Field manages hazardous materials procured, issued, used, and disposed of on-base through the 1st Special Operations Civil Engineering Squadron Environmental Element (1 SOCES/CEIE) Hazardous Waste Management Plan (HWMP). The Hazardous Materials Pharmacy (HAZMAT) procures and dispenses all hazardous materials brought on base and maintains a system to track inventory from origination through use on base until disposal. The Hazardous Waste Program Manager, appointed by 1 SOCES/CEIE, administers the HWMP and acts as the single point of contact with the USEPA and the FDEP regarding hazardous materials and waste.

All outside contractors on base are required to abide by the rules and requirements of the HWMP and coordinate the import and use of hazardous materials on base through the 1 SOCES/CEIE.

### *3.8.2.2 Hazardous Waste Management*

AFMAN 32-7002, *Environmental Compliance and Pollution Prevention*, establishes the requirements for waste management at Hurlburt Field. Waste generated at Hurlburt Field is classified as nonhazardous solid waste and/or hazardous waste, both of which are removed for off-site disposal by a contractor. Nonhazardous solid waste, including construction and demolition (C&D) waste, is disposed of at one of approximately 10 C&D landfills or four Class I municipal solid waste landfills within 50 miles of Hurlburt Field. Recyclable materials are separated from solid waste and removed off base by a contractor.

**Asbestos-Containing Materials**

ACM is regulated by FDEP, EO 12088, and AFMAN 32-7002, *Environmental Compliance and Pollution Prevention*. ACM is abated in active facilities and removed following regulatory requirements before facility demolition. The Asbestos Management and Operations Plan (Hurlburt Field 2021) establishes procedures for the removal and abatement of ACM in facilities on base. Before any renovation or demolition of facilities, an accredited asbestos inspector must perform surveys for ACM to determine the presence and type of ACM that might be present.

The Contractor shall provide a NOTICE OF ASBESTOS RENOVATION OR DEMOLITION, DEP Form 62-257.900(1), to the Florida Department of Environmental Protection at least 10 business days prior to renovation of a facility involving the removal of a threshold amount of regulated ACM or any demolition of a facility regardless of whether or not asbestos is present. Florida Administrative Code 62-257.200 defines demolition as "wrecking or taking out of any load-supporting structural member of a facility together with any related handling operations or the intentional burning of any facility." FDEP requires asbestos surveys for demolition actions, as defined by FAC 62-6257.200, ensured to the budget accordingly. The 1 SOCES/CEIE-appointed Toxic Substance Program Manager must be contacted prior to any asbestos or demolition work.

**Lead-Based Paint (LBP)**

LBP is managed by *Air Force Policy and Guidance on Lead-based Paint in Facilities* (1993). Hurlburt Field manages LBP according to the Lead-based Paint Management Plan (2005), which requires all facilities constructed prior to 1985 to be tested for LBP prior to renovation or demolition. Any LBP-containing surface to be impacted would be abated according to applicable Federal, state, and local regulations to prevent health hazards.

### *3.8.2.3 Environmental Restoration Program*

The Environmental Restoration Program is established to assess, manage, and restore sites and facilities on-base impacted by the release of hazardous materials or wastes to the environment. The release could be historical due to activities in the past that were not regulated according to current standards, such as landfills, discarded munitions, unexploded ordnance, and fuel storage leaks. Or it could be the result of a temporal release due to equipment malfunction or a facility accident. The Environmental Restoration Program's response to a hazardous material or waste release corresponds with the requirements of CERCLA to mitigate and restore the impacted environment such that no additional risk to human health or safety remains for the intended future use of the impacted site and the requirements of RCRA to manage the handling of hazardous materials on-base.

The Hurlburt Field Environmental Restoration Program Management Action Plan (MAP) has identified 49 areas on base, of which 16 are identified as requiring further action (Hurlburt Field 2013; **Figure 3.17**). Some Environmental Restoration Program sites have been closed with no further action (NFA) required; others have been closed in place with Land Use Controls (LUCs) put in place to restrict future use of the sites to prevent human contact with hazardous materials. Others are currently in the process of remediation to remove hazardous contaminants to a level deemed protective of human health and safety. For sites with LUCs in place, any disturbance of soils or groundwater on those sites requires a special construction waiver from 1 SOCES and notification and approval from FDEP. There is an AOC located near the proposed Soundside Gate site. No AOCs are located on or near the other four proposed action sites.

### 3.8.3 Environmental Consequences

#### *3.8.3.1 Proposed Action*

##### 3.8.3.1.1 All Access Gates

Implementation of the Proposed Action would have short-term, negligible, adverse impacts as a result of hazardous materials and waste. ACM and LBP tests should be conducted on any structures prior to demolition. If ACM/LBP materials are discovered, they would be handled and disposed of properly. Management of disturbed soils would follow the State of Florida Generic Permit for Stormwater Discharge from Large and Small Construction Activities (2003), including an NOI filed before commencing construction activities. The use of hazardous materials during construction (equipment fuel, paints and thinners, and other construction liquids) would be coordinated with the HAZMART and 1 SOCES to prevent any release to the environment. All contractors should maintain a copy of the HWMP and spill procedures.

The Main, East, CVI, and Kerwood gates are not located on or in proximity to any Environmental Restoration Program AOCs; therefore, no existing hazardous waste site would be impacted by construction activities.

An Installation Restoration Program site adjacent to the Soundside Gate site likely results from fueling operations at the nearby dock. During design, the government should consult with the IRP program manager at AFCEC and FDEP to characterize and avoid any LUCs near the gate or limits to digging. The concept for the Soundside gate avoids this adjacent area. If the methods described above are followed, the Proposed Action would have negligible impacts on hazardous materials and waste.

#### *3.8.3.2 Alternative 1*

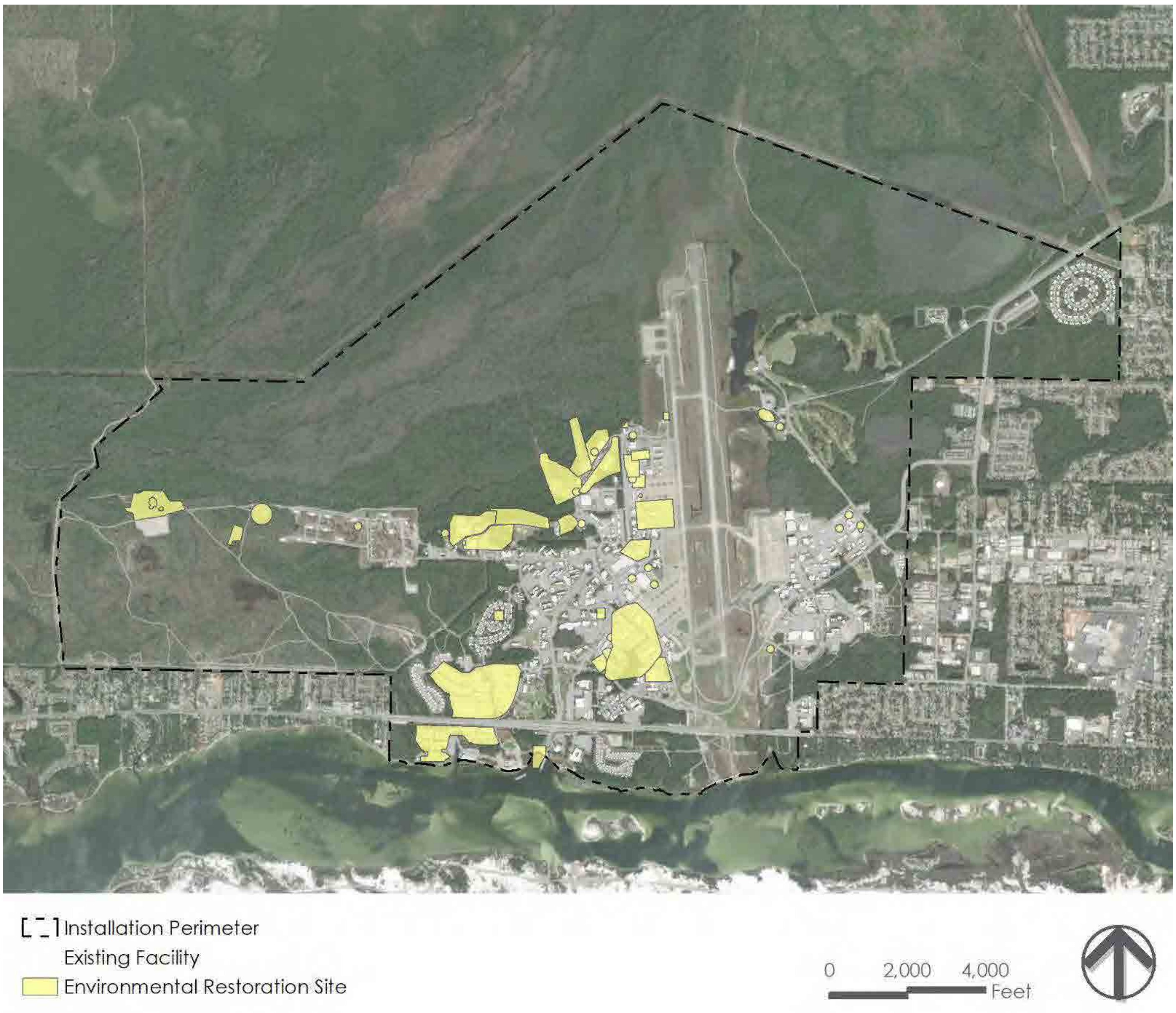
Under Alternative 1, impacts on hazardous waste and materials would be the same as under the Proposed Action. Because Kerwood Gate would not be constructed, the short-term, negligible, adverse impacts as a result of hazardous waste and materials that would have been expected from construction activities at the Kerwood Gate would not occur.

Under Alternative 1, the potential impact on Environmental Restoration Program AOCs would be the same as under the Proposed Action.

#### *3.8.3.3 No-Action Alternative*

Under the No-Action Alternative, the five Hurlburt Gates would not be reconstructed. No development or land alterations of any kind would occur in the proposed project area. Therefore, the No-Action Alternative for Hurlburt Gates would not affect hazardous materials and waste.

**Figure 3.17: Environmental Restoration Sites**



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## 3.9 Infrastructure

### 3.9.1 Definition of the Resource

Infrastructure is the basic facilities and services needed for the functioning of an installation. The availability of Hurlburt Field infrastructure and its capacity to support growth are essential to the sustainment of installation operations. All utility systems and roads serve the existing project areas. The infrastructure components to be discussed in this section include communications, electrical, natural gas, sanitary sewer, stormwater, liquid fuel, and transportation systems.

### 3.9.2 Affected Environment

#### *3.9.2.1 Utilities*

All required utility systems serve the existing project areas. The infrastructure components to be discussed in this section include electrical, natural gas, potable water, sanitary sewer, stormwater, and liquid fuels.

**Electrical Power**

Gulf Power Company supplies electrical power to Hurlburt Field. The distribution system consists primarily of aboveground transmission lines. Gulf Power owns the incoming transmission line to the substation; Hurlburt Field owns the installation's medium- and low-voltage distribution lines and is responsible for maintenance and repairs. There are two substations on the installation, each with 28,000-kilovolt-ampere (kVA) for a total power capacity of 56 megawatts (MW). Each substation can provide power to the entire installation, providing redundancy within the system. There is substantial electrical capacity available for the installation.

**Natural Gas**

Okaloosa Gas supplies natural gas to Hurlburt Field. Okaloosa Gas operates the system lines on the installation up to the regulator, and Hurlburt Field is responsible for systems within the buildings. Natural gas is used at the installation primarily for hot water and heating facilities. Okaloosa Gas is responsible for expansion on the installation, and capacity is considered adequate.

**Potable Water**

Water used on Hurlburt Field comes from on-base wells, with potable water drawn from the Floridan Aquifer (757- to 876-foot-deep wells) and non-potable water for irrigation pumped from the shallower Surficial Aquifer. Water from the Floridan Aquifer is of high quality, requiring only filtering and chlorination before use. The installation’s water supply system is capable of extracting and processing 1.6 million gallons per day (gpd), which exceeds peak potable water demand.

**Sanitary Sewer**

Hurlburt Field discharges all industrial wastewater and all domestic wastewater (with the exception of the Commando Village housing area) to the Base Wastewater Treatment Plant (WWTP). The Base WWTP, which has a design capacity of 1.0 million gpd, is currently operating below that capacity. Domestic wastewater from Commando Village is discharged to the Okaloosa County WWTP.

**Stormwater**

Stormwater on Hurlburt Field is transported by various methods, including natural drainage features, underground concrete pipes, channels, drainage swales, and retention basins. The northern two-thirds of the installation discharges stormwater to the north and northwest into East Bay Swamp, while the southern portion drains southward into Santa

Rosa Sound. A limited amount of runoff discharges to the east. Hurlburt Field is classified as a Phase II MS4 and operates under an FDEP NPDES Generic Permit for Discharge of Stormwater from Phase II MS4s. Hurlburt Field implements a Stormwater Management Plan (SWMP) to comply with the requirements of this permit. Stormwater from construction sites that would result in a disturbance of one acre or more is regulated under the FDEP NPDES Generic Permit for Stormwater Discharge from Large and Small Construction Activities. More details on regulatory requirements are provided in the Water Resources section of this EA.

**Liquid Fuels**

Liquid fuels at Hurlburt Field are utilized along the flightline for aviation operations, secure compounds for government vehicles, and commercial gas stations for personal vehicles. Smaller volumes of liquid fuels are used for backup generators at many facilities at Hurlburt, including access gates.

#### *3.9.2.2 Transportation*

U.S. Highway 98 is an east-west roadway in the area that serves as the primary access roadway to Hurlburt Field. It is a four-lane divided principal arterial with a posted speed limit of 45 mph that separates the base between the installation’s Soundside Gate area and the Main Gate. The Main Gate is the primary gate for traffic originating west of Hurlburt Field. Therefore, inbound traffic is from the west and peaks in the morning (AM), and outbound traffic is from the east and peaks in the evening (PM). The Soundside Gate is directly south of the Main Gate and the U.S. 98 interchange and provides access to family housing, community commercial, and industrial functions.

Martin Luther King Jr. Boulevard provides access to the northeastern area of the main installation through the CVI gate, and Freedom Way provides access to the eastern side of the main installation through the East Gate. Independence Road circulates much of the base traffic, connecting the western and eastern areas. The CVI Gate opened in 2014 to relocate commercial vehicle traffic away from the Main Gate. The East Gate serves motorists from the east, including the Mary Esther and Fort Walton Beach areas. Kerwood Road provides access to an administrative compound and a closed gate at U.S. 98 used for emergencies and as a back-up gate when needed.

##### 3.9.2.2.1 Main Gate

**Electrical**

The existing main electrical distribution is a 7,200 /12,470-volt system with #500 mcm cables, with each phase in its own conduit. The medium voltage cables feeding the existing gatehouse transformer have the capacity to accommodate current operations at the Main Gate.

**Natural Gas**

Natural gas is provided to the gate complex by a line that currently parallels Cody Avenue. Capacity is adequate to accommodate current operations at the Main Gate.

**Potable Water**

The line providing potable water to the existing gatehouse connects to a main line that parallels Cody Avenue. The water supply is adequate to accommodate current operations at the Main Gate.

Sanitary Sewer: The gravity-fed sanitary sewer lines that serve the gatehouse connect to the main line that parallels Cody Avenue, then runs east to connect with the system serving the administrative area in that location. The capacity of the existing sanitary sewer lines is adequate to accommodate current operations at the Main Gate.

**Stormwater**

The current stormwater drainage system at the existing Main Gate drains to inlets via surface runoff on the roads and stormwater drainage ditches.

**Liquid Fuels**

A backup generator provides emergency power to the existing gatehouse and canopy. The backup generator stores several hundred gallons of diesel fuel and has the capacity to provide emergency power to current operations at the gate.

**Transportation**

Colby Avenue, the entry road leading to the Main Gate from the U.S. 98 interchange and the Soundside area, funnels over 50 percent of the inbound traffic to Hurlburt Field. There are three inbound lanes leading to the gate and ID check stations. The road expands to four lanes after the gate to create two through lanes and right and left-turn lanes at the Independence Road intersection, which is a short distance from the ID check stations. There is inbound traffic congestion during AM peak hours. Still, the reconstruction of the U.S. 98 and Colby Avenue interchange a few years ago has reduced some of the congestion leading into the Main Gate as well as congestion on the eastbound lanes of U.S. 98. During non-peak hours, there is typically no traffic congestion. Inbound gate traffic may be funneled into one or two lanes. There are four outbound lanes at the Main Gate and much less congestion just beyond the gate during peak evening traffic. Due to a school that directly accesses U.S. 98 and other off-base land uses, there is significant traffic congestion for vehicles traveling west on U.S. 98 during peak PM hours. This congestion extends onto the outbound lanes from Hurlburt Field Main Gate as it slows down vehicles exiting the installation. There is minor congestion for eastbound lanes on U.S. 98 during PM peak hours.

### *3.9.2.3 East Gate*

**Electrical**

The existing main electrical distribution serving the East Gate is the same as the distribution system for the Main Gate. The medium voltage cables feeding the existing gatehouse transformer extend along Independence Road and have adequate capacity to accommodate current operations at the gate.

**Natural Gas**

Natural gas is not provided nor needed to accommodate current operations at the gate.

**Potable Water**

The line providing potable water to the existing gatehouse connects to Independence Road's main line. The water supply is adequate to accommodate current operations at the gate.

**Sanitary Sewer**

The gravity-fed sanitary sewer lines that serve the East Gate connect to the main line that also parallels Independence Road. The capacity of the existing sanitary sewer lines is adequate to accommodate current operations at the gate.

**Stormwater**

Stormwater management at the East Gate consists of surface drainage swales and inlets leading to a detention pond northwest of the gatehouse.

**Liquid Fuels**

A backup generator provides emergency power to the existing gatehouse and canopy. The existing backup generator and liquid fuel supply have the capacity to provide emergency power to current operations at the gate. The backup generator stores several hundred gallons of diesel fuel.

**Transportation**

Freedom Way is the entry road leading to the East Gate from Martin Luther King, Jr. Boulevard in Mary Esther. The two-lane Freedom Way funnels traffic into two vehicle processing lanes at the gate. The two lanes extend beyond the gate and become Independence Road, a two-lane, major arterial connecting Hurlburt's east side to the west side. Similar to the Main Gate, congestion in both inbound lanes are common in the AM peak hours. Congestion outbound in the PM peak hours is not common at the gate but is common at the Freedom Way and Martin Luther King, Jr. Boulevard intersection, approximately one-half mile east of the gate.

### *3.9.2.4 Commercial Vehicle Inspection Gate*

**Electrical**

Overhead electric power lines parallel Downs Road and serve the CVI. The medium voltage cables feeding the existing CVI transformer have adequate capacity to accommodate current operations at the gate.

**Natural Gas**

The existing natural gas line is adequate to accommodate current operations at the gate.

**Sanitary Sewer**

The CVI's sanitary sewer connects to the main line east of the project area. The main line extends to the installation's wastewater treatment plant. The existing sanitary sewer lines are adequate to accommodate current operations at the gate.

**Stormwater**

Stormwater management at the CVI consists of inlets leading to a dry detention pond immediately north of the CVI and surface drainage swales that parallel the north side of Downs Road.

**Liquid Fuels**

A backup generator provides emergency power to the existing gatehouse and canopy and stores several hundred gallons of diesel fuel. The existing backup generator The existing backup generator and liquid fuel supply have the capacity to provide emergency power to current operations at the gate.

**Transportation**

The CVI is in the northeast portion of Hurlburt Field and is accessed by Downs Road, a long, straight, single inbound lane road. This lane separates into two lanes at the CVI for commercial vehicle inspections. This gate is dedicated to commercial vehicle inspections, and few personal vehicles enter the installation through this gate. Because the CVI is the primary location for commercial vehicle inspections, there is congestion along the single-lane entry road in the morning peak hours. Still, there is typically no congestion from late morning through the end of the day. Downs Road continues as a single inbound lane until it intersects with Walkup Way. From that point, drivers can access their destination on the installation. There is much less outbound commercial vehicle traffic at the CVI because those inbound inspected vehicles can exit from any other gate after their deliveries.

### 3.9.2.5 *Kerwood Gate*

**Electrical**

The existing main electrical distribution in the project area is a three-phase, 15,000-volt system with three #250 mcm cables, with each phase in its own conduit. The existing distribution system has the capacity to accommodate current operations in the administrative area. A Gulf Power overhead power distribution line extends through the site but does not feed any of the Hurlburt Field loads.

**Natural Gas**

The natural gas main line runs along the east side of Kerwood Road from a valve station on the northeast corner of the U.S. 98 and Kerwood Road intersection. There is the adequate natural gas capacity to accommodate current operations in the administrative area.

**Potable Water**

A 16-inch ductile iron water main crosses the project area west of Kerwood Road. This water main originates at a potable water well outside Hurlburt Field's western boundary and extends through the eastern portion of Hurlburt Field. There is a looped water line servicing all the existing facilities in the project area. The system has adequate capacity to accommodate current operations in the administrative area.

**Sanitary Sewer**

Sanitary sewer serves the administrative functions in the project area and consists of an eight-inch PVC gravity sewer main located between Buildings 91024 and 91048. This gravity main connects to a pump station located northeast of Building 91025. There is a four-inch PVC force main that exits this pump station and heads north along Kerwood Road. The existing sanitary sewer infrastructure has capacity to accommodate current operations in the administrative area.

**Stormwater**

Stormwater drainage in the Kerwood Road project area consists of inlets leading to a series of small detention basins/swales throughout the administrative area.

**Liquid Fuels**

There are no backup generators requiring liquid fuel to accommodate current operations in the administrative area.

**Transportation**

The Kerwood Gate is not a functioning vehicle processing gate. It is only used in emergencies or as a backup gate when required. The Kerwood Gate was used during the period of construction for the U.S. 98 and Colby Avenue interchange but then closed after project completion. Because this gate is closed, there is no daily inbound or outbound traffic at this location.

### 3.9.2.6 *Soundside Gate*

**Electrical**

The existing main electrical distribution in the project area is the same as the Main Gate and Kerwood Road areas. The capacity of the existing medium voltage distribution system is adequate to accommodate current operations at the gate.

**Natural Gas**

Natural gas is not provided to the Soundside Gate and is not required to support current operations.

**Sanitary Sewer**

The sanitary sewer line servicing the existing gatehouse connects to other lines serving other facilities in the general vicinity. The existing sanitary sewer infrastructure is adequate to accommodate current operations at the gate.

**Stormwater**

Stormwater drainage at the Soundside Gate project area consists of surface drainage toward the detention pond immediately to the west of the gate and some surface swales leading toward the shoreline.

**Liquid Fuels**

A backup generator provides emergency power to the existing gatehouse and canopy. The existing backup generator and liquid fuel supply have the capacity to provide emergency power to current operations at the gate.

**Transportation**

The Soundside Gate is located immediately south of the U.S. 98 and Colby Avenue interchange and is the only vehicle processing gate that serves low-density land use such as family housing, outdoor recreation, community commercial, and industrial functions. Two inbound lanes at the Soundside gate merge into one lane after the gatehouse. Campaigne Street extends to a roundabout that provides access to Whitbeck Street to the west and Kissam Street to the east. The current roundabout is very compact and does not meet turning radius requirements for larger commercial vehicles. Traffic volumes are low at this gate. With the exception of an occasional event at the Soundside Club, the gate does not experience notable congestion during morning or afternoon peak hours.

#### *3.9.2.7 Environmental Consequences*

The following thresholds were used to determine if an impact on utilities would be significant:

- Increase demands on utility systems in such a way that existing systems cannot accommodate those demands
- Non-compliance with local, state, or federal laws and regulations
- Constitute a substantial risk to human health or the environment

The following thresholds were used to determine if an impact on transportation would be significant:

- Increase traffic on the installation and local roads in such a way that they would not be able to accommodate the additional vehicles
- Non-compliance with local, state, or federal laws and regulations
- Constitute a substantial risk to human health or the environment

### 3.9.3 Utilities

#### *3.9.3.1 Proposed Action*

##### 3.9.3.1.1 Main, East, CVI Soundside Gates

All required utilities serve the existing access gate project areas. The existing utility systems would be capped as needed and extended to the proposed relocation of the gate complex. All systems have adequate capacity to accommodate the construction and operation of the new gate complex. With the construction, there would be an increase of approximately one to two personnel at the gate during peak hours, which would result in a negligible increase in utility usage. Stormwater management would be accommodated through the construction of detention basins. Overall, there would be no significant impacts on the utility systems.

##### 3.9.3.1.2 Kerwood Gate

All required utilities serve the existing Kerwood Road project area. The existing utility systems would be capped as needed and extended to the proposed gate complex. All systems have adequate capacity to accommodate the construction and operation of the new Kerwood Gate complex. The gatehouse facilities, which include two ID check lanes, would be new to the project area and would result in approximately three to four personnel at the gate during peak hours. This would result in a long-term, negligible increase in utility usage in the project area, which includes the administrative area to the east. Stormwater management would be accommodated by surface drainage swales and inlets. Because the Proposed Action would result in a minor increase in impervious surfaces, there would be a long-term, minor increase in stormwater runoff. Overall, there would be no significant impacts on the utility systems.

#### *3.9.3.2 Alternative 1*

##### 3.9.3.2.1 Main, East, CVI, and Soundside Gates

Under Alternative 1, impacts to utilities would be the same as under the Proposed Action, except for the Kerwood Gate area. Because Kerwood Gate would not be constructed, impacts to the utility systems in the vicinity of the project area that would have been expected under the Proposed Action would not occur.

#### *3.9.3.3 No-Action Alternative*

Under the No-Action Alternative, the proposed reconstruction of access gates would not occur at Hurlburt Field. Existing methods to mitigate compliance deficiencies of access gates established in UFC 4-022-01 would continue. Therefore, the No-Action Alternative would not affect utility systems in the project area or base-wide.

### 3.9.4 Transportation

#### *3.9.4.1 Proposed Action*

##### 3.9.4.1.1 Main Gate

Implementation of the Proposed Action would have short-term, minor, adverse impacts on transportation infrastructures and traffic flow during the period of construction. Most construction activities would be west of the existing gate and could be accomplished with minor impacts to existing traffic and gate operations, which would be maintained during construction. There would be temporary, minor increases in construction-related traffic as construction workers access the site and construction materials and equipment are delivered. Some sections of Cody Avenue could experience road closures or diversions during construction. Following most roadway and gatehouse construction completion, there would be moderate, short-term adverse impacts while the new complex is connected to the northern and southern ends of Cody Avenue. Completion of the new entry road and gatehouse would result in long-term, moderate beneficial impacts on the traffic patterns and congestion at the Main Gate.

Another factor in determining the effects of Colby Avenue realignment and Main Gate construction is if the proposed CVI gate construction project occurred prior to the Main Gate project. If the construction of the CVI project would occur before the Main Gate project, then the CVI operations could be relocated to the original CVI facility, which is still located on Cody Avenue, near the Main Gate. No road construction activities would have to be completed to relocate CVI operations for the short term. Still, minor improvements to the existing CVI facility on Colby Avenue would likely be necessary. If this occurs, and commercial vehicle traffic has to be diverted to the Main Gate, then there would be short-term, minor adverse impacts to traffic entering the Main Gate during the period of construction of the CVI in the northeast portion of the installation.

Following completion of the CVI construction project, commercial vehicles would enter the installation at that location and would no longer affect traffic at the Main Gate. Overall, there would be short-term minor adverse to long-term beneficial impacts on traffic patterns due to the Proposed Action. Because inbound and outbound traffic impacts are expected to remain the same from preconstruction to postconstruction, no significant adverse, long-term change to the level of service to off-base roadways in the project area is expected.

##### 3.9.4.1.2 East Gate

Implementation of the Proposed Action would have short-term, moderate, adverse impacts on traffic and gate operations during the construction period because the proposed roadway and gate construction would have to be accomplished within the existing footprint of Freedom Way and the East Gate. During construction, there would be temporary, minor increases in construction-related traffic as construction workers access the site and construction materials and equipment are delivered. Some sections of Freedom Way would experience road closures or diversions during construction; however, some level of traffic would be maintained throughout the period of construction. Following some roadway and gatehouse construction completion, there would be moderate, short-term adverse impacts while the new complex is connected to Freedom Way. Completion of the realigned entry road and gatehouse project would result in long-term, moderate beneficial impacts on the traffic patterns, congestion, and gatehouse operations at the East Gate. Because inbound and outbound traffic impacts are expected to remain the same from preconstruction to postconstruction, no significant adverse, long-term change to the level of service to off-base roadways in the project area is expected.

##### 3.9.4.1.3 Commercial Vehicle Inspection Gate

Because the footprint of the CVI and Downs Road is so narrow, existing operations at the CVI gates would not be maintained during the entire construction project. This could require relocation of the CVI functions back to the Main Gate during the period of construction. Diverting commercial vehicle traffic to the Main Gate during construction would have short-term, minor, adverse impacts on traffic and Main Gate operations during the construction period. No road construction activities would have to be completed to relocate CVI operations for the short term. During the period of construction for the CVI, Downs Road would be closed west of the installation’s wastewater treatment plant, and traffic would not be maintained. Following completion of the Proposed Action, there would be long-term, beneficial impacts on traffic patterns and gatehouse operations at the CVI Gate and the Main Gate. Because inbound and outbound traffic impacts are expected to remain the same from preconstruction to postconstruction, no significant adverse, long-term change to the level of service to off-base roadways in the project area is expected.

##### 3.9.4.1.4 Kerwood Gate

Implementation of the Proposed Action would first require constructing a new facility to replace Building 91025, which is in the administration compound to the east of the proposed gate complex. Following the construction of the new facility, Building 91025 would be demolished. Construction and demolition would result in short-term, minor adverse impacts to existing administrative operations in that area. Following the demolition of Building 91025, then road and gatehouse construction would be initiated. Access to the administration compound to the east of the proposed Kerwood Gate would be maintained during the new gate construction. During the Kerwood Gate construction period, there would be short-term, minor impacts on traffic moving to and from the administration compound. Implementation of the Proposed Action would result in a new access gate for Hurlburt Field and long-term, minor benefits to overall gate operations, traffic patterns, and congestion reduction at the installation. Minor changes to the intersection with Howie Walters Road would result in minor, beneficial impacts on traffic circulation at that intersection. Because inbound and outbound traffic impacts are expected to remain the same from preconstruction to postconstruction, no significant adverse, long-term change to the level of service to off-base roadways in the project area is expected.

##### 3.9.4.1.5 Soundside Gate

Implementation of the Proposed Action would require maintenance of traffic through the gate area during road realignment and reconstruction of the gatehouse. There would be a short-term, minor adverse impact to traffic flow through the Soundside Gate during the period of construction, but the Proposed Action would result in long-term, minor benefits to the traffic pattern at the Soundside access gate and the ability for larger, commercial vehicles to safely maneuver through the roundabout south of the gatehouse. Because inbound and outbound traffic impacts are expected to remain the same from preconstruction to postconstruction, no significant adverse, long-term change to the level of service to off-base roadways in the project area is expected.

#### *3.9.4.2 Alternative 1*

##### 3.9.4.2.1 Main, East, CVI, and Soundside Gates

Under Alternative 1, impacts on traffic patterns and gatehouse operations for the Main Gate, East Gate, CVI, and Soundside Gate would be the same as under the Proposed Action. The exception is for the Kerwood Gate area. Because Kerwood Gate would not be constructed, impacts to traffic patterns and gatehouse operations along the Kerwood Road corridor that would have been expected under the Proposed Action would not occur.

#### *3.9.4.3 No-Action Alternative*

Under the No-Action Alternative, the proposed reconstruction of access gates would not occur at Hurlburt Field. Existing methods to mitigate compliance deficiencies of access gates established in UFC 4-022-01 would continue. Therefore, the No-Action Alternative would not affect traffic patterns and gatehouse operations in the project areas or base-wide.

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# 4 Management Actions

The following is a list of regulations, plans, permits, and management actions associated with the reconstruction of access gates at Hurlburt Field. The environmental impact analysis process for this EA identified the need for these requirements, and the Proponent of the Proposed Action is responsible for implementing these management actions.

Completion and adherence to the following regulations, plans, and permits would be required for the Proposed Action:

- Hurlburt Field Erosion and Sediment Control Plan
- Incorporation of an SWPPP and NOI into the final design plans as required
- ESA Section 7 consultation with USFWS as appropriate for all proposed activities
- FDEP NPDES permit
- CZMA Consistency Determination

## 4.1 Air Quality

Construction activities shall comply with all the applicable requirements in the Hurlburt Field Title V permit.

- Construction/access roads would be routinely watered to reduce fugitive dust emissions during the construction phases of the Proposed Action.
- All construction equipment would be maintained in proper working condition according to the manufacturer's specifications; vehicles would be maintained and inspected on a weekly basis to ensure good operating conditions.
- During construction activities, vehicles should not idle for long periods, and equipment should be shut down when not in use.

## 4.2 Biological Resources

- Before construction activities, coordination with the Hurlburt Field Natural Resources Section shall be conducted.
- Based on coordination with the Hurlburt Field Natural Resources Section, a qualified biologist may be required to conduct surveys for sensitive species, including the gopher tortoise, red-cockaded woodpecker, and the eastern indigo snake.
- If a red-cockaded woodpecker tree is located within a project area, an ESA Section 7 consultation shall be conducted.
- A qualified biologist shall monitor all construction activities.
- If a sensitive species is located during a field survey or during construction activities within a project area, a qualified biologist shall remove the species in accordance with accepted protocols or monitor the species as it moves out of the project area on its own.
- Tree clearing of any species shall be coordinated with the Hurlburt Field Natural Resources Section.
- If woody vegetation is to be removed (i.e., cutting of trees and shrubs), a T&E wildlife survey should occur 1 to 2 weeks prior to the vegetation removal. T&E surveys would be completed by the Hurlburt Field Natural Resources Section.

- To avoid the spread of invasive plant species, all equipment used for vegetation removal and/or soil clearing should be cleaned of plant material prior to the transport of equipment to the project area. Additionally, equipment should be cleaned of plant material after use and before being transported off-site.
- Any postconstruction landscaping (e.g., planting of lawns and trees) should utilize native grass and tree species. Planted trees and shrubs should be native to the Florida panhandle and not be known as bear attractants.

## 4.3 Cultural Resources

- Prior to construction activities, coordination with the Hurlburt Field Cultural Resources Manager shall be conducted.
- If through coordination with the Hurlburt Field Cultural Resources Manager, it is determined that supplemental archeological resource surveys of the project areas are required, they shall be conducted in adherence to the Hurlburt Field ICRMP, which implements all Air Force policies and federal laws and regulations.
- A professional bioarcheologist will monitor all ground disturbing activities conducting in the vicinity of the resource near the Kerwood Gate project site. This is done in case the resource extends into the current project area and potential cultural items of religious or cultural significance are inadvertently discovered during construction.
- Any contractor and subcontractor utilized for construction projects would be instructed on procedures to follow in case previously unknown archaeological resources are uncovered during construction. If previously unknown and significant archaeological resources are unearthed during construction, work would be stopped in the discovery area. The Hurlburt Field Cultural Resources Manager would then implement SOP 7.4 of the 2021 Hurlburt Field ICRPM and Consult with the SHPO and appropriate parties. If impacts on significant resources could not be avoided by redesign, mitigating measures would be developed in consultation.

## 4.4 Hazardous Materials and Wastes

- Hazardous wastes and materials shall be managed per Air Force policies and state and federal regulations.
- Refueling of machinery would be completed following accepted guidelines, and all vehicles would have drip pans beneath them during storage to contain minor spills and drips.
- No heavy equipment refueling, or storage would occur within 100 feet of any drainage.
- Demolition material would need to be coordinated with FDEP to learn specifics regarding what would be removed when it would be removed, and where the waste would be landfilled.
- Reuse as much of the removed concrete/asphalt for some other purpose or project. The contractor would be encouraged to use the existing recycling center in proximity to the East Gate.

## 4.5 Infrastructure, Utilities, and Transportation

- Coordination with all utility providers shall be required prior to any ground-disturbing activities to minimize potential conflicts between utility systems during construction and to ensure the adequate capacity of each infrastructure system is provided.
- Coordination with the Florida Department of Transportation (DoT) shall be required prior to any ground-disturbing activities at the Kerwood Gate project area to ensure traffic is safely maintained along U.S. 98 during construction and post-construction.

- Coordination to have all fuel removed from the generator tanks prior to removal. Encourage contractors to use the fuel during demolition/construction activities. Another option would be to transfer the fuel into the installation's 250-gallon "totes."
- Backup generator fuel tanks larger than 450 gallons will require a permit.

## 4.6 Noise

- Construction would primarily occur during normal weekday business hours.
- Heavy equipment mufflers would be properly maintained and in good working order.
- Construction personnel, particularly equipment operators, shall wear adequate personal hearing protection to limit exposure to high levels of noise associated with construction activities and airfield operations as needed.
- Construction equipment would not be permitted to idle for long periods.

## 4.7 Geology, Topography, Soils

- Prepare an Erosion and Sediment Control Plan (ESC) for each project area.
- BMPs would be implemented to reduce or eliminate impacts from soil erosion.

## 4.8 Water Resources

- To minimize the amount of ground disturbance, staging and stockpiling areas would be located in previously disturbed sites to the extent possible. All staging and stockpiling areas would be returned to pre-construction conditions following construction.
- All equipment used on the project would be maintained in a clean and well-functioning state to avoid or minimize contamination from mechanical fluids. All equipment would be checked daily.
- Regular site inspections shall be conducted during the implementation of the Proposed Action at all project areas to ensure erosion control measures were installed correctly and are functioning effectively.
- Appropriate stormwater management measures that could include silt fences, temporary earthen berms, temporary water bars, sediment traps, or other equivalent measures (including installing erosion control measures around the perimeter of the construction staging area) shall be installed prior to implementation of the Proposed Action.
- Incorporate low-impact design (LID) into the site design.
- Upon completion of the Proposed Action, all disturbed areas not supporting new facilities or pavements would be revegetated with appropriate native vegetation.
- All work would be done in a manner that controls erosion and prevents stormwater pollution to comply with the base-wide MS4 permit FLR04E002 (PREIAP).
- A construction activity permit under Florida Administrative Code Rule (F.A.C.) 62-621 with a stormwater pollution plan would be required for disturbance of 1 acre or more of area (PREIAP).
- The construction contractor would implement stormwater and erosion control BMPs as appropriate and perform the following activities:

  - Install and maintain straw waddles, silt fences, or similar erosion mitigation devices along the construction footprint perimeters before, during, and throughout the construction process to avoid soil runoff. Special attention would be given to problem erosion areas and water sources
  - Include site-specific management requirements for erosion and sediment control in permits and site plan designs.
  - Maintain at least a 100-foot vegetated buffer between construction sites and surface waters.
  - Reduce erosion using rough grade or terrace slopes.
  - Identify areas of existing vegetation that would be retained and not disturbed through construction.
  - Designate a "staging area" for repairs, maintenance, and use of construction equipment (e.g., cement mixers) to contain any chemicals, solvents, or toxic materials and prevent them from entering surface waters.
  - Stabilize construction site entrances using stone and geotextile (filter fabric) approved by the Florida DoT.
  - Inspect BMPs on a weekly basis and after rain events.
- Incorporated Okaloosa County Land Development Code BMPs shall be followed to the extent feasible.

# 5 List of Preparers

| Name | Agency / Organization | Discipline / Expertise | Experience | Role in Preparing Access Gates EA |
|---|---|---|---|---|
| David Helter | Woolpert, Inc. | Engineering and Master Planning | 30 years of Engineering and Master Planning | Project Manager |
| Will Ballard | Woolpert, Inc. | Environmental and Master Planning | 32 years of Environmental and Master Planning | Phase Manager, Section preparations: Land Use, Noise, Geological Resources, Infrastructure |
| Daniel Wheeler | Woolpert, Inc. | Landscape Architecture and Master Planning | 7 years of Environmental and Master Planning | EA graphics, Section preparations: Geological Resources |
| Keegan Anderson | Woolpert, Inc | Transportation | 7 years of Transportation Planning | Section preparations: Transportation |
| Amanda MacRitchie | Woolpert, Inc. | Report Production/Technical Editor | 19 years of Technical Editing Experience | Technical editing |
| Jennifer Dembiczak | Woolpert, Inc. | Technical Writer/Editor | 22 years of Technical Content experience | Technical editing |
| Dennis Peters | Gulf South Research Corporation | NEPA Compliance | 38 years of Environmental Planning and EA/EIS studies | Project Manager, EA preparation, Section preparations: Water Resources |
| John Lindemuth | Gulf South Research Corporation | Cultural Resources Management | 27 years of Cultural Resources and NEPA studies | Section preparation: Cultural Resources |
| Steve Oivanki | Gulf South Research Corporation | Environmental Compliance | 34 years of Environmental Compliance and EA/EIS studies | Section preparations: Geology and Soils, Hazardous Materials and Waste |
| Will Breeden | MSE Group, Inc. | Air Quality Compliance | 15 years of air quality modeling and experience | Section preparation: Air Quality |
| Todd Wilkinson | Gulf South Research Corporation | Natural Resources Management | 25 years of Natural Resources and NEPA studies | Section preparation: Biological Resources |

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# Appendix A Interagency and Government-to-Government Coordination and Consultation

### Coordination with Native American Tribal Governments

- Miccosukee Tribe of Indians of Florida
- Muscogee (Creek) Nation
- Poarch Band of Creek Indians
- Seminole Nation of Oklahoma
- Seminole Tribe of Florida
- Thlopthlocco Tribal Town

### Interagency Coordination

- Florida State Clearinghouse
- Florida State Historic Preservation Officer, Division of Historic Resources
- City of Fort Walton Beach
- City of Mary Esther
- Okaloosa County Department of Growth Management
- Okaloosa County Department of Public Works
- Okaloosa-Walton Transportation Planning Organization
- U.S. Anny Corps of Engineers, Pensacola Regulatory Office 41
- Federal Emergency Management Agency Region IV, Southeast
- USFWS Region 4, Ecological Services Field Office

## Zumwald, Joe

**From:** THPO Compliance <THPOCompliance@semtribe.com>
**Sent:** Wednesday, May 11, 2022 1:19 PM
**To:** Zumwald, Joe
**Subject:** RE: 1st Special Operations Wing (1 SOW), Air Force Special Operations Command (AFSOC), Hurlburt Field, Florida - Environmental Assessment (EA) for Hurlburt Field Gate Reconstruction

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SEMINOLE TRIBE OF FLORIDA
TRIBAL HISTORIC PRESERVATION OFFICE

TRIBAL HISTORIC PRESERVATION OFFICE
SEMINOLE TRIBE OF FLORIDA
30290 JOSIE BILLIE HIGHWAY
PMB 1004
CLEWISTON, FL 33440
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TRIBAL OFFICERS
MARCELLUS W. OSCEOLA JR.
CHAIRMAN
MITCHELL CYPRESS
VICE CHAIRMAN
LAVONNE ROSE
SECRETARY
PETER A. HAHN
TREASURER

May 11, 2022

Mr. Joseph F. Zumwald, AICP
Program Director, Senior Planner, Federal
Woolpert
4454 Idea Center Boulevard
Dayton, OH 45430
Office: 937.531.1320
Mobile: 937.609.5174
Email: joe.zumwald@woolpert.com

**Subject:** *Hurlburt Field Florida - Environmental Assessment (EA) for Hurlburt Field Gate Reconstruction Project, Okaloosa County, Florida.*
**THPO Compliance Tracking Number:** 0033603

**In order to expedite the THPO review process:**

1. Please correspond via email and provide documents as attachments (a THPO FTP site is available for large files),
2. Please send all emails to THPOCompliance@semtribe.com,
3. Please reference the THPO Compliance Tracking Number if one has been assigned.

Dear Mr. Zumwald,

Thank you for contacting the Seminole Tribe of Florida – Tribal Historic Preservation Office (STOF-THPO) Compliance Section regarding the *Hurlburt Field Florida - Environmental Assessment (EA) for Hurlburt Field Gate Reconstruction Project, Okaloosa County, Florida.*

[redacted] We have reviewed the documents that you provided, in addition to the Florida Master Site File (FMSF) and the STOF Compliance Database. Pursuant to Section 106 of the National Historic Preservation Act and its implementing authority, (36 CFR 800) and to the National Environmental Policy Act and its implementing authority (Title 40 CFR §§ 1500-1508) we would like to provide the following comment(s)/request(s):

- Generally, we have no objection to the proposed actions. [redacted] In order to help ensure that burials are avoided we request that a professional bioarchaeologist monitor all ground disturbing activities [redacted] The bioarchaeologist should have a graduate level degree and extensive field and laboratory analysis experience. We also request that prior to any construction activities you have a clear unanticipated discoveries plan in place.

.

We appreciate your efforts to protect and preserve cultural resources important to the Seminole Tribe of Florida. Please notify us if any archaeological, historical, or burial resources are inadvertently discovered during project implementation and feel free to contact us with any questions or concerns.

Respectfully,

Bradley M. Mueller

Bradley M. Mueller, MA, *Compliance Review Specialist*
Compliance Review Section,
Tribal Historic Preservation Office,
Heritage and Environment Resources Office,
Seminole Tribe of Florida,
30290 Josie Billie Hwy, PMB 1004
Clewiston, FL 33440
Office: 863-983-6549 ext 12245
Fax: 863-902-1117
Email: bradleymueller@semtribe.com

---

**From:** Zumwald, Joe <Joe.Zumwald@Woolpert.com>
**Sent:** Tuesday, May 10, 2022 4:36 PM
**To:** THPO Compliance <THPOCompliance@semtribe.com>; Danielle Simon <daniellesimon@semtribe.com>
**Cc:** ADKINS, DEREK N GS-12 USAF AFSOC 1 SOCES/CEN <derek.adkins@us.af.mil>
**Subject:** 1st Special Operations Wing (1 SOW), Air Force Special Operations Command (AFSOC), Hurlburt Field, Florida - Environmental Assessment (EA) for Hurlburt Field Gate Reconstruction



Ms. Mullins and Ms. Simon:

RE: Description of Proposed Action and Alternatives (DOPAA) for the proposed Hurlburt Field Access Gates Reconstruction

Thank you for your time and attention to the attached documents.

Very Respectfully,

**Joseph F. Zumwald, AICP**
Program Director, Senior Planner | Federal
D: 937.531.1320 | M: 937.609.5174
joe.zumwald@woolpert.com

**Woolpert**
4454 Idea Center Boulevard | Dayton, OH 45430
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LinkedIn

**Ballard, Will**

| | |
|---|---|
| **From:** | State_Clearinghouse <State.Clearinghouse@dep.state.fl.us> |
| **Sent:** | Monday, May 16, 2022 7:44 AM |
| **To:** | Ballard, Will |
| **Subject:** | SAI# FL202205139495C |

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To: Will Ballard,

Re: Florida State Clearinghouse Project Review

Project SAI#: FL202205139495C
Date Received: 05/10/22
Project Description: DEPARTMENT OF DEFENSE, DEPARTMENT OF THE AIR FORCE, ENVIRONMENTAL ASSESSMENT (EA) HURLBURT FIELD ACCESS GATES, HURLBURT FIELD, OKALOOSA COUNTY, FLORIDA.

The Florida State Clearinghouse has received the above-referenced project and has forwarded it to the appropriate state agencies for review. Please refer to the State Application Identifier (SAI) number in all correspondence with the Florida State Clearinghouse regarding this project. Applicants should expect to receive their State Clearance Letter 30-60 days from the received date. Additional information can be found at http://dep.state.fl.us/secretary/oip/state_clearinghouse/manual2.htm.

Please submit all future project applications and correspondence by email to state.clearinghouse@dep.state.fl.us. If your submittal is too large to send via email or if you need other assistance, contact Chris Stahl at (850) 717-9076.

**From:** Stahl, Chris <Chris.Stahl@FloridaDEP.gov>
**Sent:** Thursday, July 7, 2022 9:37 AM
**To:** Ballard, Will <Will.Ballard@Woolpert.com>
**Cc:** State_Clearinghouse <State.Clearinghouse@dep.state.fl.us>
**Subject:** State Clearance Letter for FL202205139495C- Environmental Assessment (EA) Hurlburt Field Access Gates, Hurlburt Field, Okaloosa County, Florida

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July 7, 2022

Will Ballard
Woolpert
343 Fountains Parkway, Suite 100
Fairview Heights, Illinois 62208

RE: Department of Defense, Department of the Air Force, Environmental Assessment (EA) Hurlburt Field Access Gates, Hurlburt Field, Okaloosa County, Florida
SAI # FL202205139495C

Dear Will:

Florida State Clearinghouse staff has reviewed the proposal under the following authorities: Presidential Executive Order 12372; § 403.061(42), Florida Statutes; the Coastal Zone Management Act, 16 U.S.C. §§ 1451-1464, as amended; and the National Environmental Policy Act, 42 U.S.C. §§ 4321-4347, as amended.

According to the supplied drawings and narrative, an Environmental Resource Permit may be required if construction will take place in wetlands. In addition, a stormwater Individual ERP permit will be required, per 62-330.020, F.A.C., if the proposed project includes the addition of more than 4,000 sq. ft. of impervious surface subject to vehicular activity or 9,000 sq. ft. total. This includes areas where existing impervious surfaces are removed and replaced. For any future guidance for this project, please contact the Department's Northwest District office for permit determinations by emailing drawings to epost.nwdwf@floridadep.gov.

If prehistoric or historic artifacts, such as pottery or ceramics, projectile points, dugout canoes, metal implements, historic building materials, or any other physical remains that could be associated with Native American, early European, or American settlement are encountered at any time within the project site area, the permitted project shall cease all activities involving subsurface disturbance in the vicinity of the discovery. The applicant shall contact the Florida Department of State, Division of Historical Resources, Compliance Review Section at (850)-245-6333. Project activities shall not resume without verbal and/or written authorization. In the event that unmarked human remains are encountered during permitted activities, all work shall stop immediately and the proper authorities notified in accordance with Section 872.05, Florida Statutes. If you have any questions, please contact Rachel Thompson, Historic Sites Specialist, by email at Rachel.Thompson@dos.myflorida.com, or by telephone at 850.245.6453 or 800.847.7278.

Based on the information submitted and minimal project impacts, the state has no objections to the subject project and, therefore, it is consistent with the Florida Coastal Management Program (FCMP). Thank you for the opportunity to review the proposed plan. If you have any questions or need further assistance, please don't hesitate to contact me at (850) 717-9076.

Sincerely,

*Chris Stahl*

Chris Stahl, Coordinator
Florida State Clearinghouse
Florida Department of Environmental Protection
3900 Commonwealth Blvd., M.S. 47
Tallahassee, FL 32399-2400
ph. (850) 717-9076
Chris.Stahl@floridadep.gov

Dep Customer Survey

FLORIDA DEPARTMENT *of* STATE

**RON DESANTIS**
Governor

**CORD BYRD**
Secretary of State

May 31, 2022

Mr. Steven M. Loken
Deputy Base Civil Engineer Squadron
1st Special Operations Civil Engineer Squadron
415 Independence Road
Hurlburt Field, Florida 32544-5244

Re: DHR Project File No.: 2022-3080
*Proposed Environmental Assessment for the Hurlburt Field Entry Control Facilities and Access Control Points*
Hurlburt Field, Okaloosa County

Dear Mr. Loken:

The Florida State Historic Preservation Officer reviewed the referenced project in accordance with Section 106 of the *National Historic Preservation Act of 1966*, as amended, and its implementing regulations in *36 CFR Part 800: Protection of Historic Properties.*

This office concurs with your finding that the five facilities proposed for demolition (90050 - Main Gate, 91363 - East Gate, 91401 - Commercial Inspection Gate, 91025 - Kerwood Gate, and 90926 - Soundside Gate) do not appear to meet the criteria for listing in the *National Register*.

We look forward to receiving and reviewing the draft environmental assessment when it becomes available.

If you have any questions concerning our comments, please contact Scott Edwards, Historic Preservationist, by electronic mail *scott.edwards@dos.myflorida.com*, or at 850.245.6333 or 800.847.7278.

Sincerely,

Kelly L Chase
For
Timothy A. Parsons, Ph.D.
Director, Division of Historical Resources
and State Historic Preservation Officer

**Division of Historical Resources**
**R.A. Gray Building • 500 South Bronough Street• Tallahassee, Florida 32399**
**850.245.6300 • 850.245.6436 (Fax) • FLHeritage.com**

# Appendix B Notice of Availability

(Pending)

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# Appendix C Air Conformity Application Model Assumptions

Project Assumptions and Details

## C.1 Project Summary

Based on the descriptions detailed in the Description of the Proposed Action and Alternatives (DOPAA), the following (simplified) alternatives were evaluated in the Air Conformity Application Model (ACAM) model.

**Table C.1 Description of the Proposed Action and Alternatives**

| Alternative | Description |
|---|---|
| **Proposed Action** | Proposed Action: Reconstruction of Five Access Gates – Main Gate, East Gate, Commercial Vehicle Inspection (CVI) Gate, Soundside Gate, and Kerwood Gate.<br>**Project 1: Reconstruction of the Main Gate**<br>• Demolish existing entrance gate, associated roadway, and gate buildings.<br>• Construct new entrance gate reconfigured in same location, to include gatehouse, ID check stations, canopy, and associated roadways.<br>**Project 2: Reconstruction of the East Gate**<br>• Demolish existing entrance gate, associated roadway, and gate buildings.<br>• Construct new entrance gate reconfigured in same location, to include gatehouse, ID check stations, canopy, and associated roadways.<br>**Project 3: Reconstruction of the CVI Gate**<br>• Demolish existing entrance gate, associated roadway, and gate buildings.<br>• Construct new entrance gate reconfigured in same location, to include 5,400 SF inspection building (with administrative space) gatehouse, ID check stations, canopy, and associated roadways.<br>**Project 4: Reconstruction of the Kerwood Gate**<br>• Demolish existing entrance gate, associated roadway, and gate buildings.<br>• Construct new entrance gate reconfigured in same location, to include gatehouse, ID check stations, canopy, and associated roadways.<br>**Project 5: Reconstruction of the Soundside Gate**<br>• Demolish existing entrance gate, associated roadway, and gate buildings.<br>• Construct new entrance gate reconfigured in same location, to include gatehouse, ID check stations, canopy, and associated roadways. |
| **1** | Reconstruction of Four Access Gates – Main Gate, East Gate, CVI Gate, and Soundside Gate.<br>**Project 1: Reconstruction of the Main Gate**<br>• -Demolish existing entrance gate, associated roadway, and gate buildings.<br>• -Construct new entrance gate reconfigured in same location, to include gatehouse, ID check stations, canopy, and associated roadways.<br>**Project 2: Reconstruction of the East Gate**<br>• -Demolish existing entrance gate, associated roadway, and gate buildings.<br>• -Construct new entrance gate reconfigured in same location, to include gatehouse, ID check stations, canopy, and associated roadways.<br>**Project 3: Reconstruction of the CVI Gate**<br>• -Demolish existing entrance gate, associated roadway, and gate buildings.<br>• -Construct new entrance gate reconfigured in same location, to include 5,400 SF inspection building (with administrative space) gatehouse, ID check stations, canopy, and associated roadways.<br>**Project 4: Reconstruction of the Soundside Gate** |

| | |
|---|---|
| | • -Demolish existing entrance gate, associated roadway, and gate buildings.<br>• -Construct new entrance gate reconfigured in same location, to include gatehouse, ID check stations, canopy, and associated roadways. |
| No Action Alternative | |

As detailed by the U.S. Air Force's (USAF) Air Force Air Quality Environmental Impact Analysis Process (EIAP) Guide – Fundamentals, Volume 1 of 2, dated May 2019, the proposed actions do not qualify for Categorical Exemption (CATEX) and require a Level II quantitative assessment. ACAM must be used for Level II assessments throughout the USAF. ACAM provides a simplified emission modeling that is adequate for a General Conformity Applicability Assessment and cursory NEPA assessment for air quality. If the assessment indicates no significant impact to air quality, the findings are documented through ACAM automated reports that will be included in the overall EIAP document.

In performing a Level II assessment, the emissions form all activities/sources associated with the action are "netted" on an annual basis. Only emissions resulting from the project or action under review are included, not emissions from the entire facility. Based on the typical activities at a USAF installation, activities associated with this action include construction/demolition. No additional emissions-generating equipment is anticipated beyond the current existing baseline emissions-generating equipment for the installation.

## C.2 Construction/Demolition Emissions

The following table is provided in the USAF EIAP Guide – Fundamentals, Volume 1 of 2, which summarizes the various phases of construction/demolition that are considered and the emissions classes for each group.

**Table C.2: Summary of Construction Phases and Their Emission Classes**

| Phase | Unique Phase Emission Classes | | | | | |
|---|---|---|---|---|---|---|
| | Fugitive Dust | Construction Exhaust | Vehicle Exhaust | Worker Trips | Vendor Trips | Off-Gassing |
| Demolition | X | X | X | X | | |
| Site Grading | X | X | X | X | | |
| Trenching/Excavation | X | X | X | X | | |
| Building Construction | | X | X | X | X | |
| Architectural Coatings | | | | X | | X |
| Paving (Asphalt) | | X | X | X | | X |

Source: USAF Air Quality EIAP Guide Vol 1 (2019), Table 6-3.

Based on ACAM Requirements, inputs for the model were developed for the proposed alternative as described in the following sections.

## C.3 Proposed Action – Construction

Per the information provided on the DOPAA, the reconstructed access gates are planned for locations that are currently developed with the existing entrance gates, with the Main Gate extending into an area previously used for baseball fields.

### C.3.1 Schedule, Timeline Assumptions

**Phase Start Date**

A tentative schedule was presented in the July 2019 Entry Control Points and Perimeter – User Requirements Document, which was assumed as the approximate start date for schedule inputs to ACAM for Proposed Action. It was further assumed that the Kerwood Gate Task would be performed in a manner similar to the schedules of the other projects in the subsequent year.

Construction phases subsequent to demolition were adjusted to the approximate project phase length of the previous phase, to build a continuous project construction schedule beginning in February of the given year for each access gate.

**Phase Duration**

Project phase duration was estimated using the California Emissions Estimator Model CalEEMod, Appendix D, Table 3.1. Existing building demolition area was calculated separately from existing driveway/roadway demolition area, which in turn separately determined applicable "Project Acres" for each action that correlates to phase length estimates. The ACAM input included adjustment for working and non-working days, as required.

Trenching/Excavation phase duration was estimated to be 10 days based on reasonable estimates for excavation of detention basins, where proposed.

**Table C.3: Summary of ACAM Inputs - Timeline Assumptions – Proposed Action**

| Phase | ACAM Inputs – Timeline Assumptions | |
|---|---|---|
| | Phase Start Date | Phase Duration |
| **Project: Main Gate** | | |
| Demolition – Buildings | February 2022 | 14 Days |
| Demolition - Roadways | February 2022 | 1 Month, 0 Days |
| Site Grading | March 2022 | 2 Months, 0 Days |
| Trenching/Excavation | May 2022 | 10 Days |
| Building Construction | May 2022 | 4 Months, 0 Days |
| Architectural Coatings | August 2022 | 7 Days |
| Paving (Asphalt) | August 2022 | 21 Days |
| **Project: East Gate** | | |
| Demolition – Buildings | February 2023 | 14 Days |
| Demolition - Roadways | February 2023 | 1 Month, 7 Days |
| Site Grading | March 2023 | 1 Month, 0 Days |
| Trenching/Excavation | April 2023 | 14 Days |
| Building Construction | April 2023 | 4 Months, 20 Days |
| Architectural Coatings | August 2023 | 7 Days |
| Paving (Asphalt) | August 2023 | 14 Days |

| Phase | ACAM Inputs – Timeline Assumptions | |
|---|---|---|
| | Phase Start Date | Phase Duration |
| **Project: Commercial Vehicle Inspection Gate** | | |
| Demolition – Buildings | February 2024 | 14 Days |

| | | |
|---|---|---|
| Demolition - Roadways | February 2024 | 1 Month, 7 Days |
| Site Grading | March 2024 | 1 Month, 0 Days |
| Trenching/Excavation | April 2024 | 14 Days |
| Building Construction | April 2024 | 4 Months, 20 Days |
| Architectural Coatings | August 2024 | 7 Days |
| Paving (Asphalt) | August 2024 | 14 Days |
| **Project: Soundside Gate** | | |
| Demolition – Buildings | February 2025 | 14 Days |
| Demolition - Roadways | February 2025 | 1 Month, 7 Days |
| Site Grading | March 2025 | 14 Days |
| Trenching/Excavation | March 2025 | 14 Days |
| Building Construction | March 2025 | 4 Months, 20 Days |
| Architectural Coatings | August 2025 | 7 Days |
| Paving (Asphalt) | August 2025 | 14 Days |
| **Project: Kerwood Gate** | | |
| Demolition – Buildings | February 2026 | 14 Days |
| Demolition - Roadways | February 2026 | 1 Month, 7 Days |
| Site Grading | March 2026 | 14 Days |
| Trenching/Excavation | Not Applicable | Not Applicable |
| Building Construction | March 2026 | 4 Months, 20 Days |
| Architectural Coatings | August 2026 | 7 Days |
| Paving (Asphalt) | August 2026 | 14 Days |

### C.3.2 Construction Phase Assumptions

**Demolition Phase**

The Area of Building to be demolished was estimated from scaled measurements of the figures presented in the DOPAA for each project.

The Height of Building to be demolished assumption was based on the Code Reference detailed in the 2019 Hurlburt Field Entry Control Points and Perimeter – User Requirements Document, that stated minimum building clearance of 17.5 feet was required. The Height of Building to be demolished for all entry gate canopies is assumed to be 25 feet.

**Site Grading Phase**

The Area of Site to be Graded was estimated from scaled measurements of the figures presented in the DOPAA for each project. The area was assumed to include the demolished existing roadways and buildings, as well as proposed roadways, building footprints, and other areas of construction outlined on the drawings. It is assumed that no material will be hauled on-site or off-site as part of the grading activities.

**Trenching/Excavating Phase**

The Area of Site to be Trenched/Excavated was estimated from scaled measurements of the figures presented in the DOPAA for projects with proposed detention basins. Based on Florida Department of Environmental Protection guidance documents, the maximum depth of 12 feet was assumed for all detention basins. The volume of soil to be excavated was calculated by multiplying the area of the detention basin by assumed maximum depth and was converted to cubic yards for input in ACAM.

For project areas with existing detention basins located within the proposed expanded detention basin, the area of the existing basin was excluded from the volume calculations.

**Building Construction Phase**

Building Categories were assumed to be commercial for all projects. The Area of Building was provided by the DOPAA. The Height of Building was assumed to be 25 feet for all buildings, as previously noted.

**Architectural Coatings Phase**

Building Categories were assumed to be non-residential for all projects. The Total Square Footage was assumed to be the same as the Area of Building for the Building Construction Phase.

**Paving Phase**

The Paving Area was estimated from scaled measurements of the figures presented in the DOPAA for each project. The area was assumed to include the proposed roadways, parking areas, and other associated driveways and features outlined on the drawings.

**Table C.4: Summary of ACAM Inputs – Phase Assumptions – Proposed Action**

| Phase | ACAM Inputs – Phase Assumptions | | | |
|---|---|---|---|---|
| | Phase Start Date | | Phase Duration | |
| **Project: Main Gate** | | | | |
| Demolition – Buildings | Area of Building to be Demolished (ft$^2$) | 8,236 | Height of Building to be Demolished (ft) | 25 |
| Demolition - Roadways | Area of Building to be Demolished (ft$^2$) | 143,566 | Height of Building to be Demolished (ft) | 1 |
| Site Grading | Area of Site to be Graded (ft$^2$) | 530,767 | | |
| Trenching/Excavation | Area of Site to be Trenched/Excavated (ft$^2$) | 46,989 | Amount of Material to be Hauled Off-Site (yd$^3$) | 20,884 |
| Building Construction | Area of Building (ft$^2$) | 9,163 | Height of Building (ft$^2$) | 25 |
| Architectural Coatings | Total Square Footage (ft$^2$) | 9,163 | | |
| Paving (Asphalt) | Paving Area (ft$^2$) | 181,786 | | |
| **Project: East Gate** | | | | |
| Demolition – Buildings | Area of Building to be Demolished (ft$^2$) | 3,345 | Height of Building to be Demolished (ft) | 25 |
| Demolition - Roadways | Area of Building to be Demolished (ft$^2$) | 93,991 | Height of Building to be Demolished (ft) | 1 |
| Site Grading | Area of Site to be Graded (ft$^2$) | 305,248 | | |

| Phase | ACAM Inputs – Phase Assumptions | | | |
|---|---|---|---|---|
| | Phase Start Date | | Phase Duration | |
| Trenching/Excavation | Area of Site to be Trenched/Excavated ($ft^2$) | 47,223 | Amount of Material to be Hauled Off-Site ($yd^3$) | 20,988 |
| Building Construction | Area of Building ($ft^2$) | 7,135 | Height of Building ($ft^2$) | 25 |
| Architectural Coatings | Total Square Footage ($ft^2$) | 7,135 | | |
| Paving (Asphalt) | Paving Area ($ft^2$) | 110,589 | | |
| **Project: Commercial Vehicle Inspection Gate** | | | | |
| Demolition – Buildings | Area of Building to be Demolished ($ft^2$) | 3,624 | Height of Building to be Demolished (ft) | 25 |
| Demolition - Roadways | Area of Building to be Demolished ($ft^2$) | 56,191 | Height of Building to be Demolished (ft) | 1 |
| Site Grading | Area of Site to be Graded ($ft^2$) | 287,644 | | |
| Trenching/Excavation | Area of Site to be Trenched/Excavated ($ft^2$) | 19,837 | Amount of Material to be Hauled Off-Site ($yd^3$) | 8,816 |
| Building Construction | Area of Building ($ft^2$) | 5,400 | Height of Building ($ft^2$) | 25 |
| Architectural Coatings | Total Square Footage ($ft^2$) | 5,400 | | |
| Paving (Asphalt) | Paving Area ($ft^2$) | 118,337 | | |
| **Project: Soundside Gate** | | | | |
| Demolition – Buildings | Area of Building to be Demolished ($ft^2$) | 2,448 | Height of Building to be Demolished (ft) | 25 |
| Demolition - Roadways | Area of Building to be Demolished ($ft^2$) | 44,757 | Height of Building to be Demolished (ft) | 1 |
| Site Grading | Area of Site to be Graded ($ft^2$) | 127,779 | | |
| Trenching/Excavation | Area of Site to be Trenched/Excavated ($ft^2$) | 29,594 | Amount of Material to be Hauled Off-Site ($yd^3$) | 13,152 |
| Building Construction | Area of Building ($ft^2$) | 3,312 | Height of Building ($ft^2$) | 25 |
| Architectural Coatings | Total Square Footage ($ft^2$) | 3,312 | | |
| Paving (Asphalt) | Paving Area ($ft^2$) | 54,724 | | |
| **Project: Kerwood Gate** | | | | |
| Demolition – Buildings | Area of Building to be Demolished ($ft^2$) | 4,060 | Height of Building to be Demolished (ft) | 25 |
| Demolition - Roadways | Area of Building to be Demolished ($ft^2$) | 60,553 | Height of Building to be Demolished (ft) | 1 |
| Site Grading | Area of Site to be Graded ($ft^2$) | 124,558 | | |
| Trenching/Excavation | Area of Site to be Trenched/Excavated ($ft^2$) | N/A | Amount of Material to be Hauled Off-Site ($yd^3$) | N/A |
| Building Construction | Area of Building ($ft^2$) | 6,049 | Height of Building ($ft^2$) | 25 |
| Architectural Coatings | Total Square Footage ($ft^2$) | 6,049 | | |
| Paving (Asphalt) | Paving Area ($ft^2$) | 116,104 | | |

Default settings for emissions factors and emissions estimating methods within ACAM were used for all projects.

## C.4 Alternative 1 – Construction

Alternative 1 includes reconstruction of four access gates, identically to Proposed Action, but omits the reconstruction at the Kerwood Gate.

As in Proposed Action, per the information provided on the DOPAA, the reconstructed access gates are planned for locations that are currently developed with the existing entrance gates, with the Main Gate extending into an area previously used for baseball fields.

### C.4.1 Schedule, Timeline Assumptions

**Phase Start Date**

A tentative schedule was presented in the July 2019 Entry Control Points and Perimeter – User Requirements Document, which was assumed as the approximate start date for schedule inputs to ACAM for Alternative 1.

Construction phases subsequent to demolition were adjusted to the approximate project phase length of the previous phase, to build a continuous project construction schedule beginning in February of the given year for each access gate.

**Phase Duration**

Project phase duration was estimated using the California Emissions Estimator Model (CalEEMod), Appendix D, Table 3.1. Existing building demolition area was calculated separately from existing driveway/roadway demolition area, which in turn separately determined applicable “Project Acres” for each action that correlates to phase length estimates. The ACAM input included adjustment for working and non-working days, as required.

Trenching/Excavation phase duration was estimated to be 10 days based on reasonable estimates for excavation of detention basins, where proposed.

**Table C.5: Summary of ACAM Inputs - Timeline Assumptions – Alternative 1**

| Phase | ACAM Inputs – Timeline Assumptions | |
|---|---|---|
| | Phase Start Date | Phase Duration |
| **Project: Main Gate** | | |
| Demolition – Buildings | February 2022 | 14 Days |
| Demolition - Roadways | February 2022 | 1 Month, 0 Days |
| Site Grading | March 2022 | 2 Months, 0 Days |
| Trenching/Excavation | May 2022 | 10 Days |
| Building Construction | May 2022 | 4 Months, 0 Days |
| Architectural Coatings | August 2022 | 7 Days |
| Paving (Asphalt) | August 2022 | 21 Days |
| **Project: East Gate** | | |
| Demolition – Buildings | February 2023 | 14 Days |
| Demolition - Roadways | February 2023 | 1 Month, 7 Days |
| Site Grading | March 2023 | 1 Month, 0 Days |
| Trenching/Excavation | April 2023 | 14 Days |
| Building Construction | April 2023 | 4 Months, 20 Days |
| Architectural Coatings | August 2023 | 7 Days |
| Paving (Asphalt) | August 2023 | 14 Days |
| **Project: Commercial Vehicle Inspection Gate** | | |
| Demolition – Buildings | February 2024 | 14 Days |
| Demolition - Roadways | February 2024 | 1 Month, 5 Days |
| Site Grading | March 2024 | 1 Month, 0 Days |
| Trenching/Excavation | April 2024 | 14 Days |
| Building Construction | April 2024 | 4 Months, 20 Days |
| **Phase** | **ACAM Inputs – Timeline Assumptions** | |
| | **Phase Start Date** | **Phase Duration** |
| Architectural Coatings | August 2024 | 7 Days |
| Paving (Asphalt) | August 2024 | 14 Days |
| **Project: Soundside Gate** | | |
| Demolition – Buildings | February 2025 | 14 Days |
| Demolition - Roadways | February 2025 | 1 Month, 7 Days |
| Site Grading | March 2025 | 14 Days |
| Trenching/Excavation | March 2025 | 14 Days |
| Building Construction | March 2025 | 4 Months, 20 Days |
| Architectural Coatings | August 2025 | 7 Days |
| Paving (Asphalt) | August 2025 | 14 Days |

### C.4.2 Construction Phase Assumptions

**Demolition Phase**

The Area of Building to be demolished was estimated from scaled measurements of the figures presented in the DOPAA for each project.

The Height of Building to be demolished assumption was based on the Code Reference detailed in the 2019 Hurlburt Field Entry Control Points and Perimeter – User Requirements Document, that stated minimum building clearance of 17.5 feet was required. The Height of Building to be demolished for all entry gate canopies is assumed to be 25 feet.

## Site Grading Phase

The Area of Site to be Graded was estimated from scaled measurements of the figures presented in the DOPAA for each project. The area was assumed to include the demolished existing roadways and buildings, as well as proposed roadways, building footprints, and other areas of construction outlined on the drawings. It is assumed that no material will be hauled on-site or off-site as part of the grading activities.

## Trenching/Excavating Phase

The Area of Site to be Trenched/Excavated was estimated from scaled measurements of the figures presented in the DOPAA for projects with proposed detention basins. Based on Florida Department of Environmental Protection guidance documents, the maximum depth of 12 feet was assumed for all detention basins. The volume of soil to be excavated was calculated by multiplying the area of the detention basin by assumed maximum depth and was converted to cubic yards for input in ACAM.

For project areas with existing detention basins located within the proposed expanded detention basin, the area of the existing basin was excluded from the volume calculations.

## Building Construction Phase

Building Categories were assumed to be commercial for all projects. The Area of Building was provided by the DOPAA. The Height of Building was assumed to be 25 feet for all buildings, as previously noted.

Architectural Coatings Phase – Building Categories were assumed to be non-residential for all projects. The Total Square Footage was assumed to be the same as the Area of Building for the Building Construction Phase.

## Paving Phase

The Paving Area was estimated from scaled measurements of the figures presented in the DOPAA for each project. The area was assumed to include the proposed roadways, parking areas, and other associated driveways and features outlined on the drawings.

**Table C.6: Summary of ACAM Inputs – Phase Assumptions – Alternative 1**

| Phase | ACAM Inputs – Phase Assumptions | | | |
|---|---|---|---|---|
| | Phase Start Date | | Phase Duration | |
| **Project: Main Gate** | | | | |
| Demolition – Buildings | Area of Building to be Demolished ($ft^2$) | 8,236 | Height of Building to be Demolished (ft) | 25 |
| Demolition - Roadways | Area of Building to be Demolished ($ft^2$) | 143,566 | Height of Building to be Demolished (ft) | 1 |
| Site Grading | Area of Site to be Graded ($ft^2$) | 530,767 | | |
| Trenching/Excavation | Area of Site to be Trenched/Excavated ($ft^2$) | 46,989 | Amount of Material to be Hauled Off-Site ($yd^3$) | 20,884 |
| Building Construction | Area of Building ($ft^2$) | 9,163 | Height of Building ($ft^2$) | 25 |
| Architectural Coatings | Total Square Footage ($ft^2$) | 9,163 | | |
| Paving (Asphalt) | Paving Area ($ft^2$) | 181,786 | | |
| **Project: East Gate** | | | | |
| Demolition – Buildings | Area of Building to be Demolished ($ft^2$) | 3,345 | Height of Building to be Demolished (ft) | 25 |
| Demolition - Roadways | Area of Building to be Demolished ($ft^2$) | 93,991 | Height of Building to be Demolished (ft) | 1 |

| Phase | ACAM Inputs – Phase Assumptions | | | |
|---|---|---|---|---|
| | Phase Start Date | | Phase Duration | |
| Site Grading | Area of Site to be Graded ($ft^2$) | 305,248 | | |
| Trenching/Excavation | Area of Site to be Trenched/Excavated ($ft^2$) | 47,223 | Amount of Material to be Hauled Off-Site ($yd^3$) | 20,988 |
| Building Construction | Area of Building ($ft^2$) | 7,135 | Height of Building ($ft^2$) | 25 |
| Architectural Coatings | Total Square Footage ($ft^2$) | 7,135 | | |
| Paving (Asphalt) | Paving Area ($ft^2$) | 110,589 | | |
| **Project: Commercial Vehicle Inspection Gate** | | | | |
| Demolition – Buildings | Area of Building to be Demolished ($ft^2$) | 3,624 | Height of Building to be Demolished (ft) | 25 |
| Demolition - Roadways | Area of Building to be Demolished ($ft^2$) | 56,191 | Height of Building to be Demolished (ft) | 1 |
| Site Grading | Area of Site to be Graded ($ft^2$) | 287,644 | | |
| Trenching/Excavation | Area of Site to be Trenched/Excavated ($ft^2$) | 19,837 | Amount of Material to be Hauled Off-Site ($yd^3$) | 8,816 |
| Building Construction | Area of Building ($ft^2$) | 5,400 | Height of Building ($ft^2$) | 25 |
| Architectural Coatings | Total Square Footage ($ft^2$) | 5,400 | | |
| Paving (Asphalt) | Paving Area ($ft^2$) | 118,337 | | |
| **Project: Soundside Gate** | | | | |
| Demolition – Buildings | Area of Building to be Demolished ($ft^2$) | 2,448 | Height of Building to be Demolished (ft) | 25 |
| Demolition - Roadways | Area of Building to be Demolished ($ft^2$) | 44,757 | Height of Building to be Demolished (ft) | 1 |
| Site Grading | Area of Site to be Graded ($ft^2$) | 127,779 | | |
| Trenching/Excavation | Area of Site to be Trenched/Excavated ($ft^2$) | 29,594 | Amount of Material to be Hauled Off-Site ($yd^3$) | 13,152 |
| Building Construction | Area of Building ($ft^2$) | 3,312 | Height of Building ($ft^2$) | 25 |
| Architectural Coatings | Total Square Footage ($ft^2$) | 3,312 | | |
| Paving (Asphalt) | Paving Area ($ft^2$) | 54,724 | | |

Default settings for emissions factors and emissions estimating methods within ACAM were used for all projects.

## C.5 Operational Emissions

Once completed, it is assumed that the reconstructed access gates will have primarily electric-powered on-site appliances, which is the current operational configuration and would not result in any additional operational emissions.

Emergency power is currently provided to the existing access gates, and it is assumed that the existing emergency generators will be reused for the reconstructed access gates as indicated in the DOPAA. If new emergency generators are provided for the reconstructed access gates, it is assumed that they will conform to EPA emissions standards as required by federal rule and will either meet or be lower than emissions levels from the existing equipment due to more stringent federal requirements on newer equipment. It is assumed that the emergency power generators will continue to be exercised and operated per facility standard procedures. As such, emergency power at the reconstructed access control gates will not result in additional operational emissions.

# Appendix D Air Conformity Application Model Report Proposed Action

## D.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:** HURLBURT FIELD

**State:** Florida

**County(s):** Okaloosa

**Regulatory Area(s):** NOT IN A REGULATORY AREA

**b. Action Title:** HURLBURT FIELD ACCESS GATE RECONSTRUCTION

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

**d. Projected Action Start Date:** 2 / 2022

**e. Action Description:**

The need for reconstruction of the access gates at Hurlburt Field is to provide and maintain ECF/ACP that are adequate to secure Hurlburt Field from unauthorized access and intercept contraband while maximizing vehicular traffic flow to and from the installation by ensuring the proper level of access control and safety for all DoD personnel, visitors, and commercial traffic to the installation. The new ECF/ACP are required to be constructed in a manner that:

- Meets applicable DoD antiterrorism/force protection (AT/FP) criteria, consistent with UFC 4-010-01, DoD Minimum Antiterrorism Standards for Buildings and the Air Force Installation Force Protection Guide
- Meets the current UFC 4-022-01, Entry Control Facilities Access Control Points
- Aligns with implementation guidance from the US Army Military Surface Deployment and Distribution Command Transportation Engineering Agency (SDDCTEA), Pamphlet 55-15, Traffic and Safety Engineering for Better Entry Control Facilities
- Permits security forces to perform the required functions of visitor processing, vehicle registration, ID checks, privately owned vehicle inspections, and commercial/large vehicle inspections

**f. Point of Contact:**

**Name:** Taylor Boyko

**Title:** Project Scientist

**Organization:** MSE Group, LLC

**Email:** tboyko@msegroup.com

**Phone Number:** 910.777.5265

## D.2 Air Impact Analysis

Based on the attainment status at the action location, the requirements of the General Conformity Rule are:

_____ applicable

__X__ not applicable

Total net direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the start of the action through achieving "steady state" (i.e., net gain/loss upon action fully implemented) emissions. The ACAM analysis used the latest and most accurate emission estimation techniques available; all algorithms, emission factors, and methodologies used are described in detail in the USAF Air Emissions Guide for Air Force Stationary Sources, the USAF Air Emissions Guide for Air Force Mobile Sources, and the USAF Air Emissions Guide for Air Force Transitory Sources.

"Insignificance Indicators" were used in the analysis to provide an indication of the significance of potential impacts to air quality based on current ambient air quality relative to the National Ambient Air Quality Standards (NAAQSs). These insignificance indicators are the 250 ton/year (yr) Prevention of Significant Deterioration (PSD) major source threshold for actions occurring in areas that are "Clearly Attainment" (i.e., not within 5% of any NAAQS) and the GCR de minimis values (25 ton/yr for lead and 100 ton/yr for all other criteria pollutants) for actions occurring in areas that are "Near Nonattainment" (i.e., within 5% of any NAAQS). These indicators do not define a significant impact; however, they do provide a threshold to identify actions that are insignificant. Any action with net emissions below the insignificance indicators for all criteria pollutant is considered so insignificant that the action will not cause or contribute to an exceedance on one or more NAAQSs. For further detail on insignificance indicators see chapter 4 of the Air Force Air Quality Environmental Impact Analysis Process (EIAP) Guide, Volume II - Advanced Assessments.

The action's net emissions for every year through achieving steady state were compared against the Insignificance Indicator and are summarized below.

### D.2.1 Analysis Summary:

**2022**

| Pollutant | Action Emissions (ton/yr) | INSIGNIFICANCE INDICATOR | |
|---|---|---|---|
| | | Indicator (ton/yr) | Exceedance (Yes or No) |
| Not in a Regulatory Area | | | |
| **VOC** | 0.365 | 250 | No |
| **NOx** | 1.564 | 250 | No |
| **CO** | 1.612 | 250 | No |
| **SOx** | 0.004 | 250 | No |
| **PM 10** | 10.852 | 250 | No |
| **PM 2.5** | 0.064 | 250 | No |
| **Pb** | 0.000 | 25 | No |
| **NH3** | 0.002 | 250 | No |
| **CO2e** | 425.6 | | |

**2023**

| Pollutant | Action Emissions (ton/yr) | INSIGNIFICANCE INDICATOR | |
|---|---|---|---|
| | | Indicator (ton/yr) | Exceedance (Yes or No) |
| **Not in a Regulatory Area** | | | |
| **VOC** | 0.220 | 250 | No |
| **NOx** | 0.802 | 250 | No |
| **CO** | 0.981 | 250 | No |
| **SOx** | 0.003 | 250 | No |
| **PM 10** | 3.323 | 250 | No |
| **PM 2.5** | 0.032 | 250 | No |
| **Pb** | 0.000 | 25 | No |
| **NH3** | 0.001 | 250 | No |
| **CO2e** | 250.2 | | |

**2024**

| Pollutant | Action Emissions (ton/yr) | INSIGNIFICANCE INDICATOR | |
|---|---|---|---|
| | | Indicator (ton/yr) | Exceedance (Yes or No) |
| **Not in a Regulatory Area** | | | |
| **VOC** | 0.187 | 250 | No |
| **NOx** | 0.678 | 250 | No |
| **CO** | 0.933 | 250 | No |
| **SOx** | 0.002 | 250 | No |
| **PM 10** | 3.009 | 250 | No |
| **PM 2.5** | 0.026 | 250 | No |
| **Pb** | 0.000 | 25 | No |
| **NH3** | 0.001 | 250 | No |
| **CO2e** | 224.6 | | |

**2025**

| Pollutant | Action Emissions (ton/yr) | INSIGNIFICANCE INDICATOR | |
|---|---|---|---|
| | | Indicator (ton/yr) | Exceedance (Yes or No) |
| **Not in a Regulatory Area** | | | |
| **VOC** | 0.141 | 250 | No |
| **NOx** | 0.553 | 250 | No |
| **CO** | 0.833 | 250 | No |
| **SOx** | 0.002 | 250 | No |
| **PM 10** | 0.765 | 250 | No |
| **PM 2.5** | 0.020 | 250 | No |
| **Pb** | 0.000 | 25 | No |
| **NH3** | 0.001 | 250 | No |
| **CO2e** | 201.8 | | |

**2026**

| Pollutant | Action Emissions (ton/yr) | INSIGNIFICANCE INDICATOR | |
|---|---|---|---|
| | | Indicator (ton/yr) | Exceedance (Yes or No) |
| **Not in a Regulatory Area** | | | |
| **VOC** | 0.160 | 250 | No |
| **NOx** | 0.458 | 250 | No |
| **CO** | 0.728 | 250 | No |
| **SOx** | 0.002 | 250 | No |
| **PM 10** | 0.622 | 250 | No |
| **PM 2.5** | 0.016 | 250 | No |
| **Pb** | 0.000 | 25 | No |
| **NH3** | 0.001 | 250 | No |
| **CO2e** | 162.0 | | |

**2027 - (Steady State)**

| Pollutant | Action Emissions (ton/yr) | INSIGNIFICANCE INDICATOR | |
|---|---|---|---|
| | | Indicator (ton/yr) | Exceedance (Yes or No) |
| **Not in a Regulatory Area** | | | |
| **VOC** | 0.000 | 250 | No |
| **NOx** | 0.000 | 250 | No |
| **CO** | 0.000 | 250 | No |
| **SOx** | 0.000 | 250 | No |
| **PM 10** | 0.000 | 250 | No |
| **PM 2.5** | 0.000 | 250 | No |
| **Pb** | 0.000 | 25 | No |
| **NH3** | 0.000 | 250 | No |
| **CO2e** | 0.0 | | |

None of estimated annual net emissions associated with this action are above the insignificance indicators, indicating no significant impact to air quality. Therefore, the action will not cause or contribute to an exceedance on one or more NAAQSs. No further air assessment is needed.

__________________________________________ __________________

**Taylor Boyko, Project Scientist** Date

# Appendix E Air Conformity Application Model Details Proposed Action

## 1. General Information

**- Action Location**

**Base:** HURLBURT FIELD
**State:** Florida
**County(s):** Okaloosa
**Regulatory Area(s):** NOT IN A REGULATORY AREA

**- Action Title:** HURLBURT FIELD ACCESS GATE RECONSTRUCTION

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

**- Projected Action Start Date:** 2 / 2022

**- Action Purpose and Need:**

The purpose for reconstruction of the access gates at Hurlburt Field is to address deficiencies in antiterrorism and force protection (AT/FP) requirements for each of the five Entry Control Facilities and Access Control Points (ECF/ACP). The existing roadway geometry at each gate permits undesirable approach speeds to the entry control facilities and does not allow adequate response by security forces personnel to stop a vehicle speeding past the ECF/ACP. The current access gate layouts also do not adequately provide for dedicated vehicle inspection, vehicle parking, vehicle rejection points, and gatehouse/ID check stations for security forces personnel. These deficiencies would be resolved through the construction of new facilities and infrastructure, and the demolition of obsolete facilities and infrastructure. Left unaddressed, these deficiencies degrade the ability of the installation to meet required Air Force and Department of Defense (DoD) AT/FP standards at its ECF/ACP to support current and future mission requirements.

**- Action Description:**

The need for reconstruction of the access gates at Hurlburt Field is to provide and maintain ECF/ACP that are adequate to secure Hurlburt Field from unauthorized access and intercept contraband while maximizing vehicular traffic flow to and from the installation by ensuring the proper level of access control and safety for all DoD personnel, visitors, and commercial traffic to the installation. The new ECF/ACP are required to be constructed in a manner that:

- Meets applicable DoD antiterrorism/force protection (AT/FP) criteria, consistent with UFC 4-010-01, DoD Minimum Antiterrorism Standards for Buildings and the Air Force Installation Force Protection Guide
- Meets the current UFC 4-022-01, Entry Control Facilities Access Control Points
- Aligns with implementation guidance from the US Army Military Surface Deployment and Distribution Command Transportation Engineering Agency (SDDCTEA), Pamphlet 55-15, Traffic and Safety Engineering for Better Entry Control Facilities
- Permits security forces to perform the required functions of visitor processing, vehicle registration, ID checks, privately owned vehicle inspections, and commercial/large vehicle inspections

**- Point of Contact**

**Name:** Taylor Boyko
**Title:** Project Scientist
**Organization:** MSE Group, LLC
**Email:** tboyko@msegroup.com
**Phone Number:** 910.777.5265

**- Activity List:**

| | Activity Type | Activity Title |
|---|---|---|
| 2. | Construction / Demolition | Main Gate Reconstruction - Part 1 |
| 3. | Construction / Demolition | Main Gate Reconstruction - Part 2 |
| 4. | Construction / Demolition | East Gate - Part 1 |
| 5. | Construction / Demolition | East Gate - Part 2 |
| 6. | Construction / Demolition | Commercial Vehicle Inspection Gate - Part 1 |
| 7. | Construction / Demolition | Commercial Vehicle Inspection Gate - Part 2 |
| 8. | Construction / Demolition | Soundside Gate - Part 1 |
| 9. | Construction / Demolition | Soundside Gate - Part 2 |
| 10. | Construction / Demolition | Kerwood Gate - Part 1 |
| 11. | Construction / Demolition | Kerwood Gate - Part 2 |

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

## 2. Construction / Demolition

### 2.1 General Information & Timeline Assumptions

**- Activity Location**
**County:** Okaloosa
**Regulatory Area(s):** NOT IN A REGULATORY AREA

**- Activity Title:** Main Gate Reconstruction - Part 1

**- Activity Description:**
Reconstruct main gate. Part 1 of 2. Includes building demo.

**- Activity Start Date**
**Start Month:** 2
**Start Month:** 2022

**- Activity End Date**
**Indefinite:** False
**End Month:** 2
**End Month:** 2022

**- Activity Emissions:**

| Pollutant | Total Emissions (TONs) |
|---|---|
| VOC | 0.006149 |
| $SO_x$ | 0.000110 |
| $NO_x$ | 0.041551 |
| CO | 0.048275 |
| PM 10 | 0.045046 |

| Pollutant | Total Emissions (TONs) |
|---|---|
| PM 2.5 | 0.001777 |
| Pb | 0.000000 |
| $NH_3$ | 0.000085 |
| $CO_2e$ | 11.3 |
| | |

## 2.1 Demolition Phase

### 2.1.1 Demolition Phase Timeline Assumptions

**- Phase Start Date**

**Start Month:** 2
**Start Quarter:** 1
**Start Year:** 2022

**- Phase Duration**

**Number of Month:** 0
**Number of Days:** 14

### 2.1.2 Demolition Phase Assumptions

**- General Demolition Information**

**Area of Building to be demolished ($ft^2$):** 8236
**Height of Building to be demolished (ft):** 25

**- 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 |
| Rubber Tired Dozers Composite | 1 | 1 |
| Tractors/Loaders/Backhoes Composite | 2 | 6 |

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

**- Vehicle Exhaust Vehicle Mixture (%)**

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

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

**- Worker Trips Vehicle Mixture (%)**

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

### 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 | 0.0410 | 0.0006 | 0.2961 | 0.3743 | 0.0148 | 0.0148 | 0.0037 | 58.556 |
| **Rubber Tired Dozers Composite** | | | | | | | | |
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.1919 | 0.0024 | 1.3611 | 0.7352 | 0.0536 | 0.0536 | 0.0173 | 239.51 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.0383 | 0.0007 | 0.2301 | 0.3598 | 0.0095 | 0.0095 | 0.0034 | 66.884 |

**- 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 | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 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

## 3. Construction / Demolition

### 3.1 General Information & Timeline Assumptions

**- Activity Location**
**County:** Okaloosa
**Regulatory Area(s):** NOT IN A REGULATORY AREA

**- Activity Title:** Main Gate Reconstruction - Part 2

**- Activity Description:**
Reconstruct main gate. Part 2 of 2. Road demo and all reconstruction.

**- Activity Start Date**
**Start Month:** 2
**Start Month:** 2022

**- Activity End Date**
**Indefinite:** False
**End Month:** 9
**End Month:** 2022

**- Activity Emissions:**

| Pollutant | Total Emissions (TONs) |
|---|---|
| VOC | 0.358532 |
| $SO_x$ | 0.004161 |
| $NO_x$ | 1.522312 |
| CO | 1.563690 |
| PM 10 | 10.807370 |

| Pollutant | Total Emissions (TONs) |
|---|---|
| PM 2.5 | 0.062594 |
| Pb | 0.000000 |
| $NH_3$ | 0.001435 |
| $CO_2e$ | 414.3 |
| | |

### 3.1 Demolition Phase

### 3.1.1 Demolition Phase Timeline Assumptions

**- Phase Start Date**

**Start Month:** 2
**Start Quarter:** 1
**Start Year:** 2022

**- Phase Duration**

**Number of Month:** 1
**Number of Days:** 0

### 3.1.2 Demolition Phase Assumptions

**- General Demolition Information**

**Area of Building to be demolished ($ft^2$):** 143566
**Height of Building to be demolished (ft):** 1

**- 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 |
| Rubber Tired Dozers Composite | 1 | 1 |
| 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 |

### 3.1.3 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 | 0.0410 | 0.0006 | 0.2961 | 0.3743 | 0.0148 | 0.0148 | 0.0037 | 58.556 |
| **Rubber Tired Dozers Composite** | | | | | | | | |
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.1919 | 0.0024 | 1.3611 | 0.7352 | 0.0536 | 0.0536 | 0.0173 | 239.51 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.0383 | 0.0007 | 0.2301 | 0.3598 | 0.0095 | 0.0095 | 0.0034 | 66.884 |

**- 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 | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 3.1.4 Demolition Phase Formula(s)

**- Fugitive Dust Emissions per Phase**

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

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/$ft^3$)
BA: Area of Building to be demolished ($ft^2$)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

**- Construction Exhaust Emissions per Phase**

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

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

**- Vehicle Exhaust Emissions per Phase**

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

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

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

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

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

## 3.2 Site Grading Phase

### 3.2.1 Site Grading Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 3
**Start Quarter:** 1
**Start Year:** 2022

**- Phase Duration**
**Number of Month:** 2
**Number of Days:** 0

### 3.2.2 Site Grading Phase Assumptions

**- General Site Grading Information**
**Area of Site to be Graded ($ft^2$):** 530767
**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 | 0.0648 | 0.0013 | 0.3170 | 0.5103 | 0.0136 | 0.0136 | 0.0058 | 119.72 |
| **Graders Composite** | | | | | | | | |
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.0806 | 0.0014 | 0.4657 | 0.5731 | 0.0217 | 0.0217 | 0.0072 | 132.92 |
| **Other Construction Equipment Composite** | | | | | | | | |
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.0507 | 0.0012 | 0.2785 | 0.3488 | 0.0105 | 0.0105 | 0.0045 | 122.61 |
| **Rubber Tired Dozers Composite** | | | | | | | | |
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.1919 | 0.0024 | 1.3611 | 0.7352 | 0.0536 | 0.0536 | 0.0173 | 239.51 |
| **Scrapers Composite** | | | | | | | | |
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.1723 | 0.0026 | 1.1176 | 0.7579 | 0.0447 | 0.0447 | 0.0155 | 262.87 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.0383 | 0.0007 | 0.2301 | 0.3598 | 0.0095 | 0.0095 | 0.0034 | 66.884 |

- **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 | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 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:** 5
**Start Quarter:** 1
**Start Year:** 2022

**- Phase Duration**

**Number of Month:** 0
**Number of Days:** 10

#### 3.3.2 Trenching / Excavating Phase Assumptions

**- General Trenching/Excavating Information**

**Area of Site to be Trenched/Excavated ($ft^2$):** 46989
**Amount of Material to be Hauled On-Site ($yd^3$):** 0
**Amount of Material to be Hauled Off-Site ($yd^3$):** 20884

**- 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 Equipment 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 | 0.0648 | 0.0013 | 0.3170 | 0.5103 | 0.0136 | 0.0136 | 0.0058 | 119.72 |
| **Graders Composite** | | | | | | | | |
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.0806 | 0.0014 | 0.4657 | 0.5731 | 0.0217 | 0.0217 | 0.0072 | 132.92 |

| Other Construction Equipment Composite | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.0507 | 0.0012 | 0.2785 | 0.3488 | 0.0105 | 0.0105 | 0.0045 | 122.61 |
| **Rubber Tired Dozers Composite** | | | | | | | | |
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.1919 | 0.0024 | 1.3611 | 0.7352 | 0.0536 | 0.0536 | 0.0173 | 239.51 |
| **Scrapers Composite** | | | | | | | | |
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.1723 | 0.0026 | 1.1176 | 0.7579 | 0.0447 | 0.0447 | 0.0155 | 262.87 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.0383 | 0.0007 | 0.2301 | 0.3598 | 0.0095 | 0.0095 | 0.0034 | 66.884 |

**- 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 | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 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:** 5
**Start Quarter:** 1
**Start Year:** 2022

**- Phase Duration**

**Number of Month:** 4
**Number of Days:** 0

### 3.4.2 Building Construction Phase Assumptions

**- General Building Construction Information**

**Building Category:** Commercial or Retail
**Area of Building ($ft^2$):** 9163
**Height of Building (ft):** 25
**Number of Units:** N/A

**- Building Construction Default Settings**

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

**- Construction Exhaust (default)**

| Equipment Name | Number Of Equipment | Hours Per Day |
|---|---|---|
| Cranes Composite | 1 | 4 |
| Forklifts Composite | 2 | 6 |
| Tractors/Loaders/Backhoes Composite | 1 | 8 |

- **Vehicle Exhaust**
  **Average Hauling Truck Round Trip Commute (mile):** 20 (default)

- **Vehicle Exhaust Vehicle Mixture (%)**

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

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

- **Worker Trips Vehicle Mixture (%)**

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

- **Vendor Trips**
  **Average Vendor Round Trip Commute (mile):** 40 (default)

- **Vendor Trips Vehicle Mixture (%)**

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

### 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 | 0.0797 | 0.0013 | 0.5505 | 0.3821 | 0.0203 | 0.0203 | 0.0071 | 128.81 |
| **Forklifts Composite** | | | | | | | | |
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.0274 | 0.0006 | 0.1265 | 0.2146 | 0.0043 | 0.0043 | 0.0024 | 54.457 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.0383 | 0.0007 | 0.2301 | 0.3598 | 0.0095 | 0.0095 | 0.0034 | 66.884 |

- **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 | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 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

**- Vehicle Exhaust Emissions per Phase**

$VMT_{VE} = BA * BH * (0.32 / 1000) * HT$

$VMT_{VE}$: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building ($ft^2$)
BH: Height of Building (ft)
(0.32 / 1000): Conversion Factor $ft^3$ to trips (0.32 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**

$VMT_{VT} = BA * BH * (0.05 / 1000) * HT$

$VMT_{VT}$: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building ($ft^2$)
BH: Height of Building (ft)
(0.05 / 1000): Conversion Factor $ft^3$ to trips (0.05 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

### 3.5 Architectural Coatings Phase

#### 3.5.1 Architectural Coatings Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 8
**Start Quarter:** 1
**Start Year:** 2022

**- Phase Duration**
**Number of Month:** 0
**Number of Days:** 7

#### 3.5.2 Architectural Coatings Phase Assumptions

**- General Architectural Coatings Information**
**Building Category:** Non-Residential
**Total Square Footage ($ft^2$):** 9163
**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 | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

#### 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:** 8
**Start Quarter:** 1
**Start Year:** 2022

**- Phase Duration**

**Number of Month:** 0
**Number of Days:** 21

### 3.6.2 Paving Phase Assumptions

**- General Paving Information**

**Paving Area ($ft^2$):** 181786

**- 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 |
|---|---|---|
| Cement and Mortar Mixers Composite | 4 | 6 |
| Pavers Composite | 1 | 7 |
| Paving Equipment Composite | 2 | 6 |
| Rollers Composite | 1 | 7 |

**- 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 | 0.0648 | 0.0013 | 0.3170 | 0.5103 | 0.0136 | 0.0136 | 0.0058 | 119.72 |
| **Graders Composite** | | | | | | | | |
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.0806 | 0.0014 | 0.4657 | 0.5731 | 0.0217 | 0.0217 | 0.0072 | 132.92 |
| **Other Construction Equipment Composite** | | | | | | | | |
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.0507 | 0.0012 | 0.2785 | 0.3488 | 0.0105 | 0.0105 | 0.0045 | 122.61 |
| **Rubber Tired Dozers Composite** | | | | | | | | |
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.1919 | 0.0024 | 1.3611 | 0.7352 | 0.0536 | 0.0536 | 0.0173 | 239.51 |
| **Scrapers Composite** | | | | | | | | |
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.1723 | 0.0026 | 1.1176 | 0.7579 | 0.0447 | 0.0447 | 0.0155 | 262.87 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.0383 | 0.0007 | 0.2301 | 0.3598 | 0.0095 | 0.0095 | 0.0034 | 66.884 |

**- 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 | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 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)

## 4. Construction / Demolition

### 4.1 General Information & Timeline Assumptions

**- Activity Location**

**County:** Okaloosa
**Regulatory Area(s):** NOT IN A REGULATORY AREA

**- Activity Title:** East Gate - Part 1

**- Activity Description:**

Part 1 of 2

**- Activity Start Date**

**Start Month:** 2
**Start Month:** 2023

**- Activity End Date**

**Indefinite:** False
**End Month:** 2
**End Month:** 2023

**- Activity Emissions:**

| Pollutant | Total Emissions (TONs) |
|---|---|
| VOC | 0.005351 |
| $SO_x$ | 0.000093 |
| $NO_x$ | 0.034021 |
| CO | 0.045985 |
| PM 10 | 0.018954 |

| Pollutant | Total Emissions (TONs) |
|---|---|
| PM 2.5 | 0.001379 |
| Pb | 0.000000 |
| $NH_3$ | 0.000050 |
| $CO_2e$ | 9.3 |
| | |

### 4.1 Demolition Phase

### 4.1.1 Demolition Phase Timeline Assumptions

**- Phase Start Date**

**Start Month:** 2
**Start Quarter:** 1
**Start Year:** 2023

**- Phase Duration**

**Number of Month:** 0
**Number of Days:** 14

### 4.1.2 Demolition Phase Assumptions

**- General Demolition Information**

**Area of Building to be demolished ($ft^2$):** 3345
**Height of Building to be demolished (ft):** 25

**- 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 |
| Rubber Tired Dozers Composite | 1 | 1 |
| Tractors/Loaders/Backhoes Composite | 2 | 6 |

**- Vehicle Exhaust**

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

**- Vehicle Exhaust Vehicle Mixture (%)**

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

**- Worker Trips**

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

**- Worker Trips Vehicle Mixture (%)**

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

### 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 | 0.0382 | 0.0006 | 0.2766 | 0.3728 | 0.0127 | 0.0127 | 0.0034 | 58.549 |

**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 | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 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

## 5. Construction / Demolition

### 5.1 General Information & Timeline Assumptions

**- Activity Location**

**County:** Okaloosa
**Regulatory Area(s):** NOT IN A REGULATORY AREA

**- Activity Title:** East Gate - Part 2

**- Activity Description:**

Part 2 of 2

**- Activity Start Date**

**Start Month:** 2
**Start Month:** 2023

**- Activity End Date**

**Indefinite:** False
**End Month:** 8
**End Month:** 2023

**- Activity Emissions:**

| Pollutant | Total Emissions (TONs) |
|---|---|
| VOC | 0.215045 |
| $SO_x$ | 0.002421 |
| $NO_x$ | 0.768408 |
| CO | 0.934759 |
| PM 10 | 3.303689 |

| Pollutant | Total Emissions (TONs) |
|---|---|
| PM 2.5 | 0.030142 |
| Pb | 0.000000 |
| $NH_3$ | 0.001233 |
| $CO_2e$ | 240.9 |
| | |

### 5.1 Demolition Phase

#### 5.1.1 Demolition Phase Timeline Assumptions

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

- **Phase Duration**
  - **Number of Month:** 1
  - **Number of Days:** 7

### 5.1.2 Demolition Phase Assumptions

- **General Demolition Information**
  - **Area of Building to be demolished ($ft^2$):** 93991
  - **Height of Building to be demolished (ft):** 1

- **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 |
| 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 | 0.0382 | 0.0006 | 0.2766 | 0.3728 | 0.0127 | 0.0127 | 0.0034 | 58.549 |
| **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 | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 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

### 5.2.1 Site Grading Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 3
**Start Quarter:** 1
**Start Year:** 2023

**- Phase Duration**
**Number of Month:** 1
**Number of Days:** 0

### 5.2.2 Site Grading Phase Assumptions

**- General Site Grading Information**
**Area of Site to be Graded ($ft^2$):** 305248
**Amount of Material to be Hauled On-Site ($yd^3$):** 0
**Amount of Material to be Hauled Off-Site ($yd^3$):** 0

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

**- Construction Exhaust (default)**

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

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

**- Vehicle Exhaust Vehicle Mixture (%)**

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

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

**- Worker Trips Vehicle Mixture (%)**

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

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

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

| Graders Composite | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.0757 | 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 |
| **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 | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 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:** 4
**Start Quarter:** 1
**Start Year:** 2023

**- Phase Duration**
**Number of Month:** 0
**Number of Days:** 14

### 5.3.2 Trenching / Excavating Phase Assumptions

**- General Trenching/Excavating Information**
**Area of Site to be Trenched/Excavated ($ft^2$):** 47223
**Amount of Material to be Hauled On-Site ($yd^3$):** 0
**Amount of Material to be Hauled Off-Site ($yd^3$):** 20988

**- 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 Equipment 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)**

| 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 |
| **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 | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 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:** 2023

**- Phase Duration**

**Number of Month:** 4
**Number of Days:** 20

### 5.4.2 Building Construction Phase Assumptions

**- General Building Construction Information**

**Building Category:** Commercial or Retail
**Area of Building ($ft^2$):** 7135
**Height of Building (ft):** 25
**Number of Units:** N/A

**- Building Construction Default Settings**

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

**- Construction Exhaust (default)**

| Equipment Name | Number Of Equipment | Hours Per Day |
|---|---|---|
| Cranes Composite | 1 | 4 |
| Forklifts Composite | 2 | 6 |
| Tractors/Loaders/Backhoes Composite | 1 | 8 |

**- Vehicle Exhaust**

**Average Hauling Truck Round Trip Commute (mile):** 20 (default)

**- Vehicle Exhaust Vehicle Mixture (%)**

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

**- Worker Trips**

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

**- Worker Trips Vehicle Mixture (%)**

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

**- Vendor Trips**

**Average Vendor Round Trip Commute (mile):** 40 (default)

**- Vendor Trips Vehicle Mixture (%)**

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

### 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 | 0.0754 | 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 |

| 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 | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 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**

$VMT_{VE} = BA * BH * (0.32 / 1000) * HT$

$VMT_{VE}$: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building ($ft^2$)
BH: Height of Building (ft)
(0.32 / 1000): Conversion Factor $ft^3$ to trips (0.32 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**
$VMT_{VT} = BA * BH * (0.05 / 1000) * HT$

$VMT_{VT}$: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building ($ft^2$)
BH: Height of Building (ft)
(0.05 / 1000): Conversion Factor $ft^3$ to trips (0.05 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

### 5.5.1 Architectural Coatings Phase Timeline Assumptions

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

**- Phase Duration**
**Number of Month:** 0
**Number of Days:** 7

### 5.5.2 Architectural Coatings Phase Assumptions

**- General Architectural Coatings Information**
**Building Category:** Non-Residential
**Total Square Footage ($ft^2$):** 7135
**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 | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 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:** 8
**Start Quarter:** 1
**Start Year:** 2023

**- Phase Duration**
**Number of Month:** 0
**Number of Days:** 14

### 5.6.2 Paving Phase Assumptions

**- General Paving Information**
**Paving Area ($ft^2$):** 110589

**- 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 |
|---|---|---|
| Cement and Mortar Mixers Composite | 4 | 6 |
| Pavers Composite | 1 | 7 |
| Paving Equipment Composite | 2 | 6 |
| Rollers Composite | 1 | 7 |

**- 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)**

| 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 |
| **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 | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 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)

## 6. Construction / Demolition

### 6.1 General Information & Timeline Assumptions

**- Activity Location**
**County:** Okaloosa
**Regulatory Area(s):** NOT IN A REGULATORY AREA

**- Activity Title:** Commercial Vehicle Inspection Gate - Part 1

**- Activity Description:**
Part 1 of 2.

**- Activity Start Date**
**Start Month:** 2
**Start Month:** 2024

**- Activity End Date**
**Indefinite:** False
**End Month:** 2
**End Month:** 2024

**- Activity Emissions:**

| Pollutant | Total Emissions (TONs) |
|---|---|
| VOC | 0.005143 |
| $SO_x$ | 0.000094 |
| $NO_x$ | 0.032341 |
| CO | 0.045905 |
| PM 10 | 0.020267 |

| Pollutant | Total Emissions (TONs) |
|---|---|
| PM 2.5 | 0.001227 |
| Pb | 0.000000 |
| $NH_3$ | 0.000052 |
| $CO_2e$ | 9.4 |
| | |

### 6.1 Demolition Phase

### 6.1.1 Demolition Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 2
**Start Quarter:** 1
**Start Year:** 2024

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

**Number of Days:** 14

### 6.1.2 Demolition Phase Assumptions

**- General Demolition Information**

**Area of Building to be demolished (ft$^2$):** 3624
**Height of Building to be demolished (ft):** 25

**- 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 |
| Rubber Tired Dozers Composite | 1 | 1 |
| Tractors/Loaders/Backhoes Composite | 2 | 6 |

**- Vehicle Exhaust**

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

**- Vehicle Exhaust Vehicle Mixture (%)**

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

**- Worker Trips**

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

**- Worker Trips Vehicle Mixture (%)**

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

### 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 | 0.0357 | 0.0006 | 0.2608 | 0.3715 | 0.0109 | 0.0109 | 0.0032 | 58.544 |
| **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 | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 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

## 7. Construction / Demolition

### 7.1 General Information & Timeline Assumptions

**- Activity Location**
**County:** Okaloosa
**Regulatory Area(s):** NOT IN A REGULATORY AREA

**- Activity Title:** Commercial Vehicle Inspection Gate - Part 2

**- Activity Description:**
Part 2 of 2.

**- Activity Start Date**
**Start Month:** 2
**Start Month:** 2024

**- Activity End Date**
**Indefinite:** False
**End Month:** 8
**End Month:** 2024

**- Activity Emissions:**

| Pollutant | Total Emissions (TONs) |
|---|---|
| VOC | 0.181843 |
| $SO_x$ | 0.002186 |
| $NO_x$ | 0.645525 |
| CO | 0.887108 |
| PM 10 | 2.988934 |

| Pollutant | Total Emissions (TONs) |
|---|---|
| PM 2.5 | 0.024386 |
| Pb | 0.000000 |
| $NH_3$ | 0.000831 |
| $CO_2e$ | 215.2 |
| | |

### 7.1 Demolition Phase

#### 7.1.1 Demolition Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 2
**Start Quarter:** 1
**Start Year:** 2024

**- Phase Duration**
**Number of Month:** 1
**Number of Days:** 7

#### 7.1.2 Demolition Phase Assumptions

**- General Demolition Information**
**Area of Building to be demolished ($ft^2$):** 56191
**Height of Building to be demolished (ft):** 1

- **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 |
| Rubber Tired Dozers Composite | 1 | 1 |
| Tractors/Loaders/Backhoes Composite | 2 | 6 |

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

- **Vehicle Exhaust Vehicle Mixture (%)**

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

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

- **Worker Trips Vehicle Mixture (%)**

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

### 7.1.3 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 |
| **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 | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 7.1.4 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

### 7.2 Site Grading Phase

#### 7.2.1 Site Grading Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 3
**Start Quarter:** 1
**Start Year:** 2024

**- Phase Duration**
**Number of Month:** 1
**Number of Days:** 0

#### 7.2.2 Site Grading Phase Assumptions

**- General Site Grading Information**
**Area of Site to be Graded ($ft^2$):** 287644
**Amount of Material to be Hauled On-Site ($yd^3$):** 0
**Amount of Material to be Hauled Off-Site ($yd^3$):** 0

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

**- Construction Exhaust (default)**

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

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

**- Vehicle Exhaust Vehicle Mixture (%)**

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

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

**- Worker Trips Vehicle Mixture (%)**

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

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

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

| Graders Composite | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.0714 | 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 |

| 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 | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 7.2.4 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

## 7.3 Trenching/Excavating Phase

### 7.3.1 Trenching / Excavating Phase Timeline Assumptions

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

**- Phase Duration**
**Number of Month:** 0
**Number of Days:** 14

### 7.3.2 Trenching / Excavating Phase Assumptions

**- General Trenching/Excavating Information**
**Area of Site to be Trenched/Excavated ($ft^2$):** 19837
**Amount of Material to be Hauled On-Site ($yd^3$):** 0
**Amount of Material to be Hauled Off-Site ($yd^3$):** 8816

**- 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 Equipment 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 |

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

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

| Graders Composite | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.0714 | 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 |
| **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 | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 7.3.4 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

## 7.4 Building Construction Phase

### 7.4.1 Building Construction Phase Timeline Assumptions

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

**- Phase Duration**
**Number of Month:** 4
**Number of Days:** 20

### 7.4.2 Building Construction Phase Assumptions

**- General Building Construction Information**

**Building Category:** Commercial or Retail
**Area of Building ($ft^2$):** 5400
**Height of Building (ft):** 25
**Number of Units:** N/A

**- Building Construction Default Settings**

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

**- Construction Exhaust (default)**

| Equipment Name | Number Of Equipment | Hours Per Day |
|---|---|---|
| Cranes Composite | 1 | 4 |
| Forklifts Composite | 2 | 6 |
| Tractors/Loaders/Backhoes Composite | 1 | 8 |

**- Vehicle Exhaust**

**Average Hauling Truck Round Trip Commute (mile):** 20 (default)

**- Vehicle Exhaust Vehicle Mixture (%)**

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

**- Worker Trips**

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

**- Worker Trips Vehicle Mixture (%)**

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

**- Vendor Trips**

**Average Vendor Round Trip Commute (mile):** 40 (default)

**- Vendor Trips Vehicle Mixture (%)**

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

### 7.4.3 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 |
| **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 | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 7.4.4 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**

$VMT_{VE} = BA * BH * (0.32 / 1000) * HT$

$VMT_{VE}$: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building ($ft^2$)
BH: Height of Building (ft)
(0.32 / 1000): Conversion Factor $ft^3$ to trips (0.32 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 * (0.05 / 1000) * HT

$VMT_{VT}$: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building ($ft^2$)
BH: Height of Building (ft)
(0.05 / 1000): Conversion Factor $ft^3$ to trips (0.05 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

## 7.5 Architectural Coatings Phase

### 7.5.1 Architectural Coatings Phase Timeline Assumptions

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

**- Phase Duration**
**Number of Month:** 0
**Number of Days:** 7

### 7.5.2 Architectural Coatings Phase Assumptions

**- General Architectural Coatings Information**
**Building Category:** Non-Residential
**Total Square Footage ($ft^2$):** 5400
**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 |

### 7.5.3 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 | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 7.5.4 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

## 7.6 Paving Phase

### 7.6.1 Paving Phase Timeline Assumptions

**- Phase Start Date**

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

**- Phase Duration**

**Number of Month:** 0
**Number of Days:** 14

### 7.6.2 Paving Phase Assumptions

**- General Paving Information**

**Paving Area ($ft^2$):** 118337

- **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 |
|---|---|---|
| Cement and Mortar Mixers Composite | 4 | 6 |
| Pavers Composite | 1 | 7 |
| Paving Equipment Composite | 2 | 6 |
| Rollers Composite | 1 | 7 |

- **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 |

### 7.6.3 Paving Phase Emission Factor(s)

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

| Graders Composite | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.0714 | 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 |
| **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 | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 7.6.4 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)

# 8. Construction / Demolition

## 8.1 General Information & Timeline Assumptions

**- Activity Location**
**County:** Okaloosa
**Regulatory Area(s):** NOT IN A REGULATORY AREA

**- Activity Title:** Soundside Gate - Part 1

**- Activity Description:**
Part 1 of 2.

**- Activity Start Date**
**Start Month:** 2
**Start Month:** 2025

**- Activity End Date**
**Indefinite:** False
**End Month:** 2
**End Month:** 2025

**- Activity Emissions:**

| Pollutant | Total Emissions (TONs) |
|---|---|
| VOC | 0.004816 |
| $SO_x$ | 0.000090 |
| $NO_x$ | 0.029362 |
| CO | 0.045244 |
| PM 10 | 0.013898 |

| Pollutant | Total Emissions (TONs) |
|---|---|
| PM 2.5 | 0.001036 |
| Pb | 0.000000 |
| $NH_3$ | 0.000043 |
| $CO_2e$ | 9.0 |
| | |

## 8.1 Demolition Phase

### 8.1.1 Demolition Phase Timeline Assumptions

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

**- Phase Duration**
**Number of Month:** 0
**Number of Days:** 14

### 8.1.2 Demolition Phase Assumptions

**- General Demolition Information**
**Area of Building to be demolished ($ft^2$):** 2448
**Height of Building to be demolished (ft):** 25

**- 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 |
| Rubber Tired Dozers Composite | 1 | 1 |
| Tractors/Loaders/Backhoes Composite | 2 | 6 |

**- Vehicle Exhaust**

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

**- Vehicle Exhaust Vehicle Mixture (%)**

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

**- Worker Trips**

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

**- Worker Trips Vehicle Mixture (%)**

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

### 8.1.3 Demolition Phase Emission Factor(s)

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

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

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

| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | Pb | $NH_3$ | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|---|
| LDGV | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 8.1.4 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

## 9. Construction / Demolition

### 9.1 General Information & Timeline Assumptions

**- Activity Location**

**County:** Okaloosa
**Regulatory Area(s):** NOT IN A REGULATORY AREA

**- Activity Title:** Soundside Gate - Part 2

**- Activity Description:**
Part 2 of 2.

**- Activity Start Date**
**Start Month:** 2
**Start Month:** 2025

**- Activity End Date**
**Indefinite:** False
**End Month:** 8
**End Month:** 2025

**- Activity Emissions:**

| Pollutant | Total Emissions (TONs) |
|---|---|
| VOC | 0.136663 |
| $SO_x$ | 0.001954 |
| $NO_x$ | 0.523266 |
| CO | 0.787655 |
| PM 10 | 0.750924 |

| Pollutant | Total Emissions (TONs) |
|---|---|
| PM 2.5 | 0.018721 |
| Pb | 0.000000 |
| $NH_3$ | 0.000911 |
| $CO_2e$ | 192.9 |
| | |

### 9.1 Demolition Phase

### 9.1.1 Demolition Phase Timeline Assumptions

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

**- Phase Duration**
**Number of Month:** 1
**Number of Days:** 7

### 9.1.2 Demolition Phase Assumptions

**- General Demolition Information**
**Area of Building to be demolished ($ft^2$):** 44757
**Height of Building to be demolished (ft):** 1

**- 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 |
| Rubber Tired Dozers Composite | 1 | 1 |
| Tractors/Loaders/Backhoes Composite | 2 | 6 |

**- Vehicle Exhaust**

**Average Hauling Truck Capacity ($yd^3$):** 20 (default)

**Average Hauling Truck Round Trip Commute (mile):** 20 (default)

**- Vehicle Exhaust Vehicle Mixture (%)**

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

**- Worker Trips**

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

**- Worker Trips Vehicle Mixture (%)**

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

### 9.1.3 Demolition Phase Emission Factor(s)

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

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

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

| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | Pb | $NH_3$ | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|---|
| LDGV | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 9.1.4 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

## 9.2 Site Grading Phase

### 9.2.1 Site Grading Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 3
**Start Quarter:** 1
**Start Year:** 2025

**- Phase Duration**
**Number of Month:** 0
**Number of Days:** 14

### 9.2.2 Site Grading Phase Assumptions

**- General Site Grading Information**

**Area of Site to be Graded ($ft^2$):** 127779
**Amount of Material to be Hauled On-Site ($yd^3$):** 0
**Amount of Material to be Hauled Off-Site ($yd^3$):** 0

**- Site Grading Default Settings**

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

**- Construction Exhaust (default)**

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

**- Vehicle Exhaust**

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

**- Vehicle Exhaust Vehicle Mixture (%)**

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

**- Worker Trips**

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

**- Worker Trips Vehicle Mixture (%)**

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

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

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

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

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

| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | Pb | $NH_3$ | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|---|
| LDGV | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 9.2.4 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

## 9.3 Trenching/Excavating Phase

### 9.3.1 Trenching / Excavating Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 3
**Start Quarter:** 1
**Start Year:** 2025

**- Phase Duration**
**Number of Month:** 0
**Number of Days:** 14

### 9.3.2 Trenching / Excavating Phase Assumptions

**- General Trenching/Excavating Information**
**Area of Site to be Trenched/Excavated ($ft^2$):** 29594
**Amount of Material to be Hauled On-Site ($yd^3$):** 0
**Amount of Material to be Hauled Off-Site ($yd^3$):** 13152

**- 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 Equipment 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 |

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

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

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

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

| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | Pb | $NH_3$ | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|---|
| LDGV | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 9.3.4 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

## 9.4 Building Construction Phase

### 9.4.1 Building Construction Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 3
**Start Quarter:** 1
**Start Year:** 2025

**- Phase Duration**
**Number of Month:** 4
**Number of Days:** 20

### 9.4.2 Building Construction Phase Assumptions

**- General Building Construction Information**
**Building Category:** Commercial or Retail
**Area of Building ($ft^2$):** 3312
**Height of Building (ft):** 25
**Number of Units:** N/A

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

**- Construction Exhaust (default)**

| Equipment Name | Number Of Equipment | Hours Per Day |
|---|---|---|
| Cranes Composite | 1 | 4 |
| Forklifts Composite | 2 | 6 |
| Tractors/Loaders/Backhoes Composite | 1 | 8 |

**- Vehicle Exhaust**

**Average Hauling Truck Round Trip Commute (mile):** 20 (default)

**- Vehicle Exhaust Vehicle Mixture (%)**

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

**- Worker Trips**

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

**- Worker Trips Vehicle Mixture (%)**

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

**- Vendor Trips**

**Average Vendor Round Trip Commute (mile):** 40 (default)

**- Vendor Trips Vehicle Mixture (%)**

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

### 9.4.3 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 |
| **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 | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 9.4.4 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 * (0.32 / 1000) * HT

$VMT_{VE}$: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building ($ft^2$)
BH: Height of Building (ft)
(0.32 / 1000): Conversion Factor $ft^3$ to trips (0.32 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 * (0.05 / 1000) * HT

$VMT_{VT}$: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building ($ft^2$)
BH: Height of Building (ft)
(0.05 / 1000): Conversion Factor $ft^3$ to trips (0.05 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

## 9.5 Architectural Coatings Phase

### 9.5.1 Architectural Coatings Phase Timeline Assumptions

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

**- Phase Duration**
**Number of Month:** 0
**Number of Days:** 7

### 9.5.2 Architectural Coatings Phase Assumptions

**- General Architectural Coatings Information**
**Building Category:** Non-Residential
**Total Square Footage ($ft^2$):** 3312
**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 |

### 9.5.3 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 | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 9.5.4 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

## 9.6 Paving Phase

### 9.6.1 Paving Phase Timeline Assumptions

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

**- Phase Duration**
**Number of Month:** 0
**Number of Days:** 14

### 9.6.2 Paving Phase Assumptions

**- General Paving Information**
**Paving Area ($ft^2$):** 54724

**- 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 |
|---|---|---|
| Cement and Mortar Mixers Composite | 4 | 6 |
| Pavers Composite | 1 | 7 |
| Paving Equipment Composite | 1 | 8 |
| Rollers Composite | 1 | 7 |
| Tractors/Loaders/Backhoes Composite | 1 | 7 |

**- 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 |

## 9.6.3 Paving Phase Emission Factor(s)

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

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

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

| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | Pb | $NH_3$ | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|---|
| LDGV | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

## 9.6.4 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)

# 10. Construction / Demolition

## 10.1 General Information & Timeline Assumptions

**- Activity Location**
**County:** Okaloosa
**Regulatory Area(s):** NOT IN A REGULATORY AREA

**- Activity Title:** Kerwood Gate - Part 1

**- Activity Description:**
Part 1 of 2.

**- Activity Start Date**
**Start Month:** 2
**Start Month:** 2026

**- Activity End Date**
**Indefinite:** False
**End Month:** 2
**End Month:** 2026

**- Activity Emissions:**

| Pollutant | Total Emissions (TONs) |
|---|---|
| VOC | 0.004991 |
| $SO_x$ | 0.000095 |
| $NO_x$ | 0.031080 |
| CO | 0.045924 |
| PM 10 | 0.022434 |

| Pollutant | Total Emissions (TONs) |
|---|---|
| PM 2.5 | 0.001103 |
| Pb | 0.000000 |
| $NH_3$ | 0.000055 |
| $CO_2e$ | 9.6 |
| | |

### 10.1 Demolition Phase

#### 10.1.1 Demolition Phase Timeline Assumptions

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

**- Phase Duration**
**Number of Month:** 0
**Number of Days:** 14

#### 10.1.2 Demolition Phase Assumptions

**- General Demolition Information**
**Area of Building to be demolished ($ft^2$):** 4060
**Height of Building to be demolished (ft):** 25

**- 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 |
| Rubber Tired Dozers Composite | 1 | 1 |
| Tractors/Loaders/Backhoes Composite | 2 | 6 |

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

**- Vehicle Exhaust Vehicle Mixture (%)**

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

**- Worker Trips**

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

**- Worker Trips Vehicle Mixture (%)**

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

### 10.1.3 Demolition Phase Emission Factor(s)

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

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

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

| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | Pb | $NH_3$ | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|---|
| LDGV | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 10.1.4 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

## 11. Construction / Demolition

### 11.1 General Information & Timeline Assumptions

**- Activity Location**
**County:** Okaloosa
**Regulatory Area(s):** NOT IN A REGULATORY AREA

**- Activity Title:** Kerwood Gate - Part 2

**- Activity Description:**
Part 2 of 2.

**- Activity Start Date**
**Start Month:** 2

**Start Month:** 2026

**- Activity End Date**

**Indefinite:** False
**End Month:** 8
**End Month:** 2026

**- Activity Emissions:**

| Pollutant | Total Emissions (TONs) |
|---|---|
| VOC | 0.155286 |
| $SO_x$ | 0.001559 |
| $NO_x$ | 0.426574 |
| CO | 0.681895 |
| PM 10 | 0.599985 |

| Pollutant | Total Emissions (TONs) |
|---|---|
| PM 2.5 | 0.015317 |
| Pb | 0.000000 |
| $NH_3$ | 0.000505 |
| $CO_2e$ | 152.4 |
| | |

## 11.1 Demolition Phase

### 11.1.1 Demolition Phase Timeline Assumptions

**- Phase Start Date**

**Start Month:** 2
**Start Quarter:** 1
**Start Year:** 2026

**- Phase Duration**

**Number of Month:** 1
**Number of Days:** 7

### 11.1.2 Demolition Phase Assumptions

**- General Demolition Information**

**Area of Building to be demolished ($ft^2$):** 60553
**Height of Building to be demolished (ft):** 1

**- 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 |
| Rubber Tired Dozers Composite | 1 | 1 |
| Tractors/Loaders/Backhoes Composite | 2 | 6 |

**- Vehicle Exhaust**

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

**- Vehicle Exhaust Vehicle Mixture (%)**

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

**- Worker Trips**

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

**- Worker Trips Vehicle Mixture (%)**

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

### 11.1.3 Demolition Phase Emission Factor(s)

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

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

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

| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | Pb | $NH_3$ | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|---|
| LDGV | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 11.1.4 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

## 11.2 Site Grading Phase

### 11.2.1 Site Grading Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 3
**Start Quarter:** 1
**Start Year:** 2026

**- Phase Duration**
**Number of Month:** 0
**Number of Days:** 14

### 11.2.2 Site Grading Phase Assumptions

**- General Site Grading Information**
**Area of Site to be Graded ($ft^2$):** 124558
**Amount of Material to be Hauled On-Site ($yd^3$):** 0
**Amount of Material to be Hauled Off-Site ($yd^3$):** 0

**- Site Grading Default Settings**
**Default Settings Used:** Yes

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

**- Construction Exhaust (default)**

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

**- Vehicle Exhaust**

**Average Hauling Truck Capacity ($yd^3$):** 20 (default)

**Average Hauling Truck Round Trip Commute (mile):** 20 (default)

**- Vehicle Exhaust Vehicle Mixture (%)**

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

**- Worker Trips**

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

**- Worker Trips Vehicle Mixture (%)**

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

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

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

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

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

| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | Pb | $NH_3$ | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|---|
| LDGV | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 11.2.4 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

## 11.3 Building Construction Phase

### 11.3.1 Building Construction Phase Timeline Assumptions

**- Phase Start Date**

**Start Month:** 3
**Start Quarter:** 1
**Start Year:** 2026

**- Phase Duration**

**Number of Month:** 4
**Number of Days:** 20

### 11.3.2 Building Construction Phase Assumptions

**- General Building Construction Information**

**Building Category:** Commercial or Retail
**Area of Building ($ft^2$):** 6049
**Height of Building (ft):** 25
**Number of Units:** N/A

**- Building Construction Default Settings**

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

**- Construction Exhaust (default)**

| Equipment Name | Number Of Equipment | Hours Per Day |
|---|---|---|
| Cranes Composite | 1 | 4 |
| Forklifts Composite | 2 | 6 |
| Tractors/Loaders/Backhoes Composite | 1 | 8 |

**- Vehicle Exhaust**

**Average Hauling Truck Round Trip Commute (mile):** 20 (default)

**- Vehicle Exhaust Vehicle Mixture (%)**

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

**- Worker Trips**

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

**- Worker Trips Vehicle Mixture (%)**

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

**- Vendor Trips**

**Average Vendor Round Trip Commute (mile):** 40 (default)

**- Vendor Trips Vehicle Mixture (%)**

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

### 11.3.3 Building Construction Phase Emission Factor(s)

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

| **Cranes Composite** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0680 | 0.0013 | 0.4222 | 0.3737 | 0.0143 | 0.0143 | 0.0061 | 128.77 |

| **Forklifts Composite** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0236 | 0.0006 | 0.0859 | 0.2147 | 0.0025 | 0.0025 | 0.0021 | 54.449 |

| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **VOC** | **$SO_x$** | **$NO_x$** | **CO** | **PM 10** | **PM 2.5** | **$CH_4$** | **$CO_2e$** |
| Emission Factors | 0.0335 | 0.0007 | 0.1857 | 0.3586 | 0.0058 | 0.0058 | 0.0030 | 66.872 |

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

| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | Pb | $NH_3$ | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|---|
| LDGV | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 11.3.4 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**

$VMT_{VE} = BA * BH * (0.32 / 1000) * HT$

$VMT_{VE}$: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building ($ft^2$)
BH: Height of Building (ft)
(0.32 / 1000): Conversion Factor $ft^3$ to trips (0.32 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**
$VMT_{VT} = BA * BH * (0.05 / 1000) * HT$

$VMT_{VT}$: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building ($ft^2$)
BH: Height of Building (ft)
(0.05 / 1000): Conversion Factor $ft^3$ to trips (0.05 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

## 11.4 Architectural Coatings Phase

### 11.4.1 Architectural Coatings Phase Timeline Assumptions

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

**- Phase Duration**
**Number of Month:** 0
**Number of Days:** 7

### 11.4.2 Architectural Coatings Phase Assumptions

**- General Architectural Coatings Information**
**Building Category:** Non-Residential
**Total Square Footage ($ft^2$):** 6049
**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 |

### 11.4.3 Architectural Coatings Phase Emission Factor(s)

**- Worker Trips Emission Factors (grams/mile)**

| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | Pb | $NH_3$ | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|---|
| LDGV | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 11.4.4 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

## 11.5 Paving Phase

### 11.5.1 Paving Phase Timeline Assumptions

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

- **Phase Duration**
  - **Number of Month:** 0
  - **Number of Days:** 14

### 11.5.2 Paving Phase Assumptions

- **General Paving Information**
  - **Paving Area ($ft^2$):** 116104

- **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 |
|---|---|---|
| Cement and Mortar Mixers Composite | 4 | 6 |
| Pavers Composite | 1 | 7 |
| Paving Equipment Composite | 2 | 6 |
| Rollers Composite | 1 | 7 |

- **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 |

### 11.5.3 Paving Phase Emission Factor(s)

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

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

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

| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | Pb | $NH_3$ | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|---|
| LDGV | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 11.5.4 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)

# Appendix F Air Conformity Applicability Model Report Alternatives

**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:** HURLBURT FIELD
**State:** Florida
**County(s):** Okaloosa
**Regulatory Area(s):** NOT IN A REGULATORY AREA

**b. Action Title:** HURLBURT FIELD ACCESS GATE RECONSTRUCTION

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

**d. Projected Action Start Date:** 2 / 2022

**e. Action Description:**

The need for reconstruction of the access gates at Hurlburt Field is to provide and maintain ECF/ACP that are adequate to secure Hurlburt Field from unauthorized access and intercept contraband while maximizing vehicular traffic flow to and from the installation by ensuring the proper level of access control and safety for all DoD personnel, visitors, and commercial traffic to the installation. The new ECF/ACP are required to be constructed in a manner that:
• Meets applicable DoD antiterrorism/force protection (AT/FP) criteria, consistent with UFC 4-010-01, DoD Minimum Antiterrorism Standards for Buildings and the Air Force Installation Force Protection Guide
• Meets the current UFC 4-022-01, Entry Control Facilities Access Control Points
• Aligns with implementation guidance from the US Army Military Surface Deployment and Distribution Command Transportation Engineering Agency (SDDCTEA), Pamphlet 55-15, Traffic and Safety Engineering for Better Entry Control Facilities
• Permits security forces to perform the required functions of visitor processing, vehicle registration, ID checks, privately owned vehicle inspections, and commercial/large vehicle inspections

**f. Point of Contact:**
**Name:** Taylor Boyko
**Title:** Project Scientist
**Organization:** MSE Group, LLC
**Email:** tboyko@msegroup.com
**Phone Number:** 910.777.5265

**2. Air Impact Analysis:** Based on the attainment status at the action location, the requirements of the General Conformity Rule are:

_____ applicable
__X__ not applicable

Total net direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the start of the action through achieving "steady state" (i.e., net gain/loss upon action fully implemented) emissions. The ACAM analysis used the latest and most accurate emission estimation techniques available; all algorithms, emission factors, and methodologies used are described in detail in the USAF Air Emissions Guide for Air Force Stationary Sources, the USAF Air Emissions Guide for Air Force Mobile Sources, and the USAF Air Emissions Guide for Air Force Transitory Sources.

“Insignificance Indicators” were used in the analysis to provide an indication of the significance of potential impacts to air quality based on current ambient air quality relative to the National Ambient Air Quality Standards (NAAQSs). These insignificance indicators are the 250 ton/yr Prevention of Significant Deterioration (PSD) major source threshold for actions occurring in areas that are “Clearly Attainment” (i.e., not within 5% of any NAAQS) and the GCR de minimis values (25 ton/yr for lead and 100 ton/yr for all other criteria pollutants) for actions occurring in areas that are “Near Nonattainment” (i.e., within 5% of any NAAQS). These indicators do not define a significant impact; however, they do provide a threshold to identify actions that are insignificant. Any action with net emissions below the insignificance indicators for all criteria pollutant is considered so insignificant that the action will not cause or contribute to an exceedance on one or more NAAQSs. For further detail on insignificance indicators see chapter 4 of the Air Force Air Quality Environmental Impact Analysis Process (EIAP) Guide, Volume II - Advanced Assessments.

The action’s net emissions for every year through achieving steady state were compared against the Insignificance Indicator and are summarized below.

**Analysis Summary:**

**2022**

| Pollutant | Action Emissions (ton/yr) | INSIGNIFICANCE INDICATOR | |
|---|---|---|---|
| | | Indicator (ton/yr) | Exceedance (Yes or No) |
| NOT IN A REGULATORY AREA | | | |
| **VOC** | 0.365 | 250 | No |
| **NOx** | 1.564 | 250 | No |
| **CO** | 1.612 | 250 | No |
| **SOx** | 0.004 | 250 | No |
| **PM 10** | 10.852 | 250 | No |
| **PM 2.5** | 0.064 | 250 | No |
| **Pb** | 0.000 | 25 | No |
| **NH3** | 0.002 | 250 | No |
| **CO2e** | 425.6 | | |

**2023**

| Pollutant | Action Emissions (ton/yr) | INSIGNIFICANCE INDICATOR | |
|---|---|---|---|
| | | Indicator (ton/yr) | Exceedance (Yes or No) |
| NOT IN A REGULATORY AREA | | | |
| **VOC** | 0.220 | 250 | No |
| **NOx** | 0.802 | 250 | No |
| **CO** | 0.981 | 250 | No |
| **SOx** | 0.003 | 250 | No |
| **PM 10** | 3.323 | 250 | No |
| **PM 2.5** | 0.032 | 250 | No |
| **Pb** | 0.000 | 25 | No |
| **NH3** | 0.001 | 250 | No |
| **CO2e** | 250.2 | | |

**2024**

| Pollutant | Action Emissions (ton/yr) | INSIGNIFICANCE INDICATOR | |
|---|---|---|---|
| | | Indicator (ton/yr) | Exceedance (Yes or No) |
| NOT IN A REGULATORY AREA | | | |
| **VOC** | 0.187 | 250 | No |
| **NOx** | 0.678 | 250 | No |
| **CO** | 0.933 | 250 | No |

| | | | |
|---|---|---|---|
| **SOx** | 0.002 | 250 | No |
| **PM 10** | 3.009 | 250 | No |
| **PM 2.5** | 0.026 | 250 | No |
| **Pb** | 0.000 | 25 | No |
| **NH3** | 0.001 | 250 | No |
| **CO2e** | 224.6 | | |

**2025**

| Pollutant | Action Emissions (ton/yr) | INSIGNIFICANCE INDICATOR | |
|---|---|---|---|
| | | Indicator (ton/yr) | Exceedance (Yes or No) |
| NOT IN A REGULATORY AREA | | | |
| **VOC** | 0.141 | 250 | No |
| **NOx** | 0.553 | 250 | No |
| **CO** | 0.833 | 250 | No |
| **SOx** | 0.002 | 250 | No |
| **PM 10** | 0.765 | 250 | No |
| **PM 2.5** | 0.020 | 250 | No |
| **Pb** | 0.000 | 25 | No |
| **NH3** | 0.001 | 250 | No |
| **CO2e** | 201.8 | | |

**2026**

| Pollutant | Action Emissions (ton/yr) | INSIGNIFICANCE INDICATOR | |
|---|---|---|---|
| | | Indicator (ton/yr) | Exceedance (Yes or No) |
| NOT IN A REGULATORY AREA | | | |
| **VOC** | 0.000 | 250 | No |
| **NOx** | 0.000 | 250 | No |
| **CO** | 0.000 | 250 | No |
| **SOx** | 0.000 | 250 | No |
| **PM 10** | 0.000 | 250 | No |
| **PM 2.5** | 0.000 | 250 | No |
| **Pb** | 0.000 | 25 | No |
| **NH3** | 0.000 | 250 | No |
| **CO2e** | 0.0 | | |

**2027 - (Steady State)**

| Pollutant | Action Emissions (ton/yr) | INSIGNIFICANCE INDICATOR | |
|---|---|---|---|
| | | Indicator (ton/yr) | Exceedance (Yes or No) |
| NOT IN A REGULATORY AREA | | | |
| **VOC** | 0.000 | 250 | No |
| **NOx** | 0.000 | 250 | No |
| **CO** | 0.000 | 250 | No |
| **SOx** | 0.000 | 250 | No |
| **PM 10** | 0.000 | 250 | No |
| **PM 2.5** | 0.000 | 250 | No |
| **Pb** | 0.000 | 25 | No |
| **NH3** | 0.000 | 250 | No |
| **CO2e** | 0.0 | | |

None of estimated annual net emissions associated with this action are above the insignificance indicators, indicating no significant impact to air quality. Therefore, the action will not cause or contribute to an exceedance on one or more NAAQSs. No further air assessment is needed.

__________________________________________________      ____________________

Taylor Boyko, Project Scientist      DATE

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# Appendix G Air Conformity Applicability Model Details Alternative

## 1. General Information

**- Action Location**

**Base:** HURLBURT FIELD
**State:** Florida
**County(s):** Okaloosa
**Regulatory Area(s):** NOT IN A REGULATORY AREA

**- Action Title:** HURLBURT FIELD ACCESS GATE RECONSTRUCTION

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

**- Projected Action Start Date:** 2 / 2022

**- Action Purpose and Need:**

The purpose for reconstruction of the access gates at Hurlburt Field is to address deficiencies in antiterrorism and force protection (AT/FP) requirements for four of the five Entry Control Facilities and Access Control Points (ECF/ACP). The existing roadway geometry at each gate permits undesirable approach speeds to the entry control facilities and does not allow adequate response by security forces personnel to stop a vehicle speeding past the ECF/ACP. The current access gate layouts also do not adequately provide for dedicated vehicle inspection, vehicle parking, vehicle rejection points, and gatehouse/ID check stations for security forces personnel. These deficiencies would be resolved through the construction of new facilities and infrastructure, and the demolition of obsolete facilities and infrastructure. Left unaddressed, these deficiencies degrade the ability of the installation to meet required Air Force and Department of Defense (DoD) AT/FP standards at its ECF/ACP to support current and future mission requirements.

**- Action Description:**

The need for reconstruction of the access gates at Hurlburt Field is to provide and maintain ECF/ACP that are adequate to secure Hurlburt Field from unauthorized access and intercept contraband while maximizing vehicular traffic flow to and from the installation by ensuring the proper level of access control and safety for all DoD personnel, visitors, and commercial traffic to the installation. The new ECF/ACP are required to be constructed in a manner that:

- Meets applicable DoD antiterrorism/force protection (AT/FP) criteria, consistent with UFC 4-010-01, DoD Minimum Antiterrorism Standards for Buildings and the Air Force Installation Force Protection Guide
- Meets the current UFC 4-022-01, Entry Control Facilities Access Control Points
- Aligns with implementation guidance from the US Army Military Surface Deployment and Distribution Command Transportation Engineering Agency (SDDCTEA), Pamphlet 55-15, Traffic and Safety Engineering for Better Entry Control Facilities
- Permits security forces to perform the required functions of visitor processing, vehicle registration, ID checks, privately owned vehicle inspections, and commercial/large vehicle inspections

**- Point of Contact**

**Name:** Taylor Boyko
**Title:** Project Scientist
**Organization:** MSE Group, LLC
**Email:** tboyko@msegroup.com
**Phone Number:** 910.777.5265

**- Activity List:**

| Activity Type | Activity Title |
|---|---|

| | | |
|---|---|---|
| 2. | Construction / Demolition | Main Gate Reconstruction - Part 1 |
| 3. | Construction / Demolition | Main Gate Reconstruction - Part 2 |
| 4. | Construction / Demolition | East Gate - Part 1 |
| 5. | Construction / Demolition | East Gate - Part 2 |
| 6. | Construction / Demolition | Commercial Vehicle Inspection Gate - Part 1 |
| 7. | Construction / Demolition | Commercial Vehicle Inspection Gate - Part 2 |
| 8. | Construction / Demolition | Soundside Gate - Part 1 |
| 9. | Construction / Demolition | Soundside Gate - Part 2 |

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

## 2. Construction / Demolition

### 2.1 General Information & Timeline Assumptions

**- Activity Location**
**County:** Okaloosa
**Regulatory Area(s):** NOT IN A REGULATORY AREA

**- Activity Title:** Main Gate Reconstruction - Part 1

**- Activity Description:**
Reconstruct main gate. Part 1 of 2. Includes building demo.

**- Activity Start Date**
**Start Month:** 2
**Start Month:** 2022

**- Activity End Date**
**Indefinite:** False
**End Month:** 2
**End Month:** 2022

**- Activity Emissions:**

| Pollutant | Total Emissions (TONs) |
|---|---|
| VOC | 0.006149 |
| $SO_x$ | 0.000110 |
| $NO_x$ | 0.041551 |
| CO | 0.048275 |
| PM 10 | 0.045046 |

| Pollutant | Total Emissions (TONs) |
|---|---|
| PM 2.5 | 0.001777 |
| Pb | 0.000000 |
| $NH_3$ | 0.000085 |
| $CO_2e$ | 11.3 |
| | |

### 2.1 Demolition Phase

#### 2.1.1 Demolition Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 2
**Start Quarter:** 1
**Start Year:** 2022

**- Phase Duration**
**Number of Month:** 0
**Number of Days:** 14

### 2.1.2 Demolition Phase Assumptions

**- General Demolition Information**

**Area of Building to be demolished ($ft^2$):** 8236

**Height of Building to be demolished (ft):** 25

**- 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 |
| Rubber Tired Dozers Composite | 1 | 1 |
| Tractors/Loaders/Backhoes Composite | 2 | 6 |

**- Vehicle Exhaust**

**Average Hauling Truck Capacity ($yd^3$):** 20 (default)

**Average Hauling Truck Round Trip Commute (mile):** 20 (default)

**- Vehicle Exhaust Vehicle Mixture (%)**

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

**- Worker Trips**

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

**- Worker Trips Vehicle Mixture (%)**

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

### 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 | 0.0410 | 0.0006 | 0.2961 | 0.3743 | 0.0148 | 0.0148 | 0.0037 | 58.556 |
| **Rubber Tired Dozers Composite** | | | | | | | | |
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.1919 | 0.0024 | 1.3611 | 0.7352 | 0.0536 | 0.0536 | 0.0173 | 239.51 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.0383 | 0.0007 | 0.2301 | 0.3598 | 0.0095 | 0.0095 | 0.0034 | 66.884 |

**- 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 | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 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

## 3. Construction / Demolition

### 3.1 General Information & Timeline Assumptions

**- Activity Location**
**County:** Okaloosa
**Regulatory Area(s):** NOT IN A REGULATORY AREA

**- Activity Title:** Main Gate Reconstruction - Part 2

**- Activity Description:**
Reconstruct main gate. Part 2 of 2. Road demo and all reconstruction.

**- Activity Start Date**
**Start Month:** 2
**Start Month:** 2022

**- Activity End Date**
**Indefinite:** False
**End Month:** 9
**End Month:** 2022

**- Activity Emissions:**

| Pollutant | Total Emissions (TONs) |
|---|---|
| VOC | 0.358532 |
| $SO_x$ | 0.004161 |
| $NO_x$ | 1.522312 |
| CO | 1.563690 |
| PM 10 | 10.807370 |

| Pollutant | Total Emissions (TONs) |
|---|---|
| PM 2.5 | 0.062594 |
| Pb | 0.000000 |
| $NH_3$ | 0.001435 |
| $CO_2e$ | 414.3 |
| | |

### 3.1 Demolition Phase

#### 3.1.1 Demolition Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 2
**Start Quarter:** 1
**Start Year:** 2022

**- Phase Duration**
**Number of Month:** 1
**Number of Days:** 0

#### 3.1.2 Demolition Phase Assumptions

**- General Demolition Information**
**Area of Building to be demolished ($ft^2$):** 143566
**Height of Building to be demolished (ft):** 1

**- 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 |
| Rubber Tired Dozers Composite | 1 | 1 |
| 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 |

### 3.1.3 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 | 0.0410 | 0.0006 | 0.2961 | 0.3743 | 0.0148 | 0.0148 | 0.0037 | 58.556 |
| **Rubber Tired Dozers Composite** | | | | | | | | |
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.1919 | 0.0024 | 1.3611 | 0.7352 | 0.0536 | 0.0536 | 0.0173 | 239.51 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.0383 | 0.0007 | 0.2301 | 0.3598 | 0.0095 | 0.0095 | 0.0034 | 66.884 |

- **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 | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 3.1.4 Demolition Phase Formula(s)

- **Fugitive Dust Emissions per Phase**

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

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor ($lb/ft^3$)
BA: Area of Building to be demolished ($ft^2$)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

**- Construction Exhaust Emissions per Phase**

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

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

**- Vehicle Exhaust Emissions per Phase**

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

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

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

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

**- Worker Trips Emissions per Phase**

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

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

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

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

## 3.2 Site Grading Phase

### 3.2.1 Site Grading Phase Timeline Assumptions

**- Phase Start Date**

**Start Month:** 3
**Start Quarter:** 1
**Start Year:** 2022

- **Phase Duration**
  - **Number of Month:** 2
  - **Number of Days:** 0

### 3.2.2 Site Grading Phase Assumptions

- **General Site Grading Information**
  - **Area of Site to be Graded ($ft^2$):** 530767
  - **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 | 0.0648 | 0.0013 | 0.3170 | 0.5103 | 0.0136 | 0.0136 | 0.0058 | 119.72 |
| **Graders Composite** | | | | | | | | |
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.0806 | 0.0014 | 0.4657 | 0.5731 | 0.0217 | 0.0217 | 0.0072 | 132.92 |
| **Other Construction Equipment Composite** | | | | | | | | |
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.0507 | 0.0012 | 0.2785 | 0.3488 | 0.0105 | 0.0105 | 0.0045 | 122.61 |
| **Rubber Tired Dozers Composite** | | | | | | | | |
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.1919 | 0.0024 | 1.3611 | 0.7352 | 0.0536 | 0.0536 | 0.0173 | 239.51 |

| Scrapers Composite | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.1723 | 0.0026 | 1.1176 | 0.7579 | 0.0447 | 0.0447 | 0.0155 | 262.87 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.0383 | 0.0007 | 0.2301 | 0.3598 | 0.0095 | 0.0095 | 0.0034 | 66.884 |

**- 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 | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 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:** 5
**Start Quarter:** 1
**Start Year:** 2022

**- Phase Duration**
**Number of Month:** 0
**Number of Days:** 10

### 3.3.2 Trenching / Excavating Phase Assumptions

**- General Trenching/Excavating Information**
**Area of Site to be Trenched/Excavated ($ft^2$):** 46989
**Amount of Material to be Hauled On-Site ($yd^3$):** 0
**Amount of Material to be Hauled Off-Site ($yd^3$):** 20884

**- 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 | 0.0648 | 0.0013 | 0.3170 | 0.5103 | 0.0136 | 0.0136 | 0.0058 | 119.72 |
| **Graders Composite** | | | | | | | | |
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.0806 | 0.0014 | 0.4657 | 0.5731 | 0.0217 | 0.0217 | 0.0072 | 132.92 |
| **Other Construction Equipment Composite** | | | | | | | | |
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.0507 | 0.0012 | 0.2785 | 0.3488 | 0.0105 | 0.0105 | 0.0045 | 122.61 |
| **Rubber Tired Dozers Composite** | | | | | | | | |
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.1919 | 0.0024 | 1.3611 | 0.7352 | 0.0536 | 0.0536 | 0.0173 | 239.51 |
| **Scrapers Composite** | | | | | | | | |
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.1723 | 0.0026 | 1.1176 | 0.7579 | 0.0447 | 0.0447 | 0.0155 | 262.87 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.0383 | 0.0007 | 0.2301 | 0.3598 | 0.0095 | 0.0095 | 0.0034 | 66.884 |

**- 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 | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 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:** 5
**Start Quarter:** 1
**Start Year:** 2022

**- Phase Duration**

**Number of Month:** 4
**Number of Days:** 0

### 3.4.2 Building Construction Phase Assumptions

**- General Building Construction Information**

**Building Category:** Commercial or Retail
**Area of Building ($ft^2$):** 9163
**Height of Building (ft):** 25
**Number of Units:** N/A

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

- **Construction Exhaust (default)**

| Equipment Name | Number Of Equipment | Hours Per Day |
|---|---|---|
| Cranes Composite | 1 | 4 |
| Forklifts Composite | 2 | 6 |
| Tractors/Loaders/Backhoes Composite | 1 | 8 |

- **Vehicle Exhaust**
  **Average Hauling Truck Round Trip Commute (mile):** 20 (default)

- **Vehicle Exhaust Vehicle Mixture (%)**

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

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

- **Worker Trips Vehicle Mixture (%)**

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

- **Vendor Trips**
  **Average Vendor Round Trip Commute (mile):** 40 (default)

- **Vendor Trips Vehicle Mixture (%)**

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

### 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 | 0.0797 | 0.0013 | 0.5505 | 0.3821 | 0.0203 | 0.0203 | 0.0071 | 128.81 |
| **Forklifts Composite** | | | | | | | | |
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.0274 | 0.0006 | 0.1265 | 0.2146 | 0.0043 | 0.0043 | 0.0024 | 54.457 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.0383 | 0.0007 | 0.2301 | 0.3598 | 0.0095 | 0.0095 | 0.0034 | 66.884 |

- **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 | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 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

**- Vehicle Exhaust Emissions per Phase**

$VMT_{VE}$ = BA * BH * (0.32 / 1000) * HT

$VMT_{VE}$: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building ($ft^2$)
BH: Height of Building (ft)
(0.32 / 1000): Conversion Factor $ft^3$ to trips (0.32 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 * (0.05 / 1000) * HT

$VMT_{VT}$: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building ($ft^2$)
BH: Height of Building (ft)
(0.05 / 1000): Conversion Factor $ft^3$ to trips (0.05 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

## 3.5 Architectural Coatings Phase

### 3.5.1 Architectural Coatings Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 8
**Start Quarter:** 1
**Start Year:** 2022

**- Phase Duration**
**Number of Month:** 0
**Number of Days:** 7

### 3.5.2 Architectural Coatings Phase Assumptions

**- General Architectural Coatings Information**
**Building Category:** Non-Residential
**Total Square Footage ($ft^2$):** 9163
**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 | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 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:** 8
**Start Quarter:** 1
**Start Year:** 2022

**- Phase Duration**
**Number of Month:** 0
**Number of Days:** 21

### 3.6.2 Paving Phase Assumptions

**- General Paving Information**
**Paving Area ($ft^2$):** 181786

**- 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 |
|---|---|---|
| Cement and Mortar Mixers Composite | 4 | 6 |
| Pavers Composite | 1 | 7 |
| Paving Equipment Composite | 2 | 6 |
| Rollers Composite | 1 | 7 |

**- 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 | 0.0648 | 0.0013 | 0.3170 | 0.5103 | 0.0136 | 0.0136 | 0.0058 | 119.72 |
| **Graders Composite** | | | | | | | | |
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.0806 | 0.0014 | 0.4657 | 0.5731 | 0.0217 | 0.0217 | 0.0072 | 132.92 |
| **Other Construction Equipment Composite** | | | | | | | | |
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.0507 | 0.0012 | 0.2785 | 0.3488 | 0.0105 | 0.0105 | 0.0045 | 122.61 |
| **Rubber Tired Dozers Composite** | | | | | | | | |
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.1919 | 0.0024 | 1.3611 | 0.7352 | 0.0536 | 0.0536 | 0.0173 | 239.51 |
| **Scrapers Composite** | | | | | | | | |
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.1723 | 0.0026 | 1.1176 | 0.7579 | 0.0447 | 0.0447 | 0.0155 | 262.87 |
| **Tractors/Loaders/Backhoes Composite** | | | | | | | | |
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.0383 | 0.0007 | 0.2301 | 0.3598 | 0.0095 | 0.0095 | 0.0034 | 66.884 |

**- 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 | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 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)

## 4. Construction / Demolition

### 4.1 General Information & Timeline Assumptions

**- Activity Location**
**County:** Okaloosa
**Regulatory Area(s):** NOT IN A REGULATORY AREA

**- Activity Title:** East Gate - Part 1

**- Activity Description:**
Part 1 of 2

**- Activity Start Date**
**Start Month:** 2
**Start Month:** 2023

**- Activity End Date**
**Indefinite:** False
**End Month:** 2
**End Month:** 2023

- **Activity Emissions:**

| Pollutant | Total Emissions (TONs) |
|---|---|
| VOC | 0.005351 |
| $SO_x$ | 0.000093 |
| $NO_x$ | 0.034021 |
| CO | 0.045985 |
| PM 10 | 0.018954 |

| Pollutant | Total Emissions (TONs) |
|---|---|
| PM 2.5 | 0.001379 |
| Pb | 0.000000 |
| $NH_3$ | 0.000050 |
| $CO_2e$ | 9.3 |
| | |

### 4.1 Demolition Phase

#### 4.1.1 Demolition Phase Timeline Assumptions

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

- **Phase Duration**
  - **Number of Month:** 0
  - **Number of Days:** 14

#### 4.1.2 Demolition Phase Assumptions

- **General Demolition Information**
  - **Area of Building to be demolished ($ft^2$):** 3345
  - **Height of Building to be demolished (ft):** 25

- **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 |
| Rubber Tired Dozers Composite | 1 | 1 |
| Tractors/Loaders/Backhoes Composite | 2 | 6 |

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

- **Vehicle Exhaust Vehicle Mixture (%)**

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

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

- **Worker Trips Vehicle Mixture (%)**

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

### 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 | 0.0382 | 0.0006 | 0.2766 | 0.3728 | 0.0127 | 0.0127 | 0.0034 | 58.549 |
| **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 | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 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

## 5. Construction / Demolition

### 5.1 General Information & Timeline Assumptions

**- Activity Location**

**County:** Okaloosa
**Regulatory Area(s):** NOT IN A REGULATORY AREA

**- Activity Title:** East Gate - Part 2

**- Activity Description:**

Part 2 of 2

**- Activity Start Date**

**Start Month:** 2
**Start Month:** 2023

**- Activity End Date**

**Indefinite:** False
**End Month:** 8
**End Month:** 2023

**- Activity Emissions:**

| Pollutant | Total Emissions (TONs) |
|---|---|
| VOC | 0.215045 |
| $SO_x$ | 0.002421 |
| $NO_x$ | 0.768408 |
| CO | 0.934759 |
| PM 10 | 3.303689 |

| Pollutant | Total Emissions (TONs) |
|---|---|
| PM 2.5 | 0.030142 |
| Pb | 0.000000 |
| $NH_3$ | 0.001233 |
| $CO_2e$ | 240.9 |
| | |

## 5.1 Demolition Phase

### 5.1.1 Demolition Phase Timeline Assumptions

**- Phase Start Date**

**Start Month:** 2
**Start Quarter:** 1
**Start Year:** 2023

**- Phase Duration**

**Number of Month:** 1
**Number of Days:** 7

### 5.1.2 Demolition Phase Assumptions

**- General Demolition Information**

**Area of Building to be demolished ($ft^2$):** 93991
**Height of Building to be demolished (ft):** 1

**- 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 |
| 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 | 0.0382 | 0.0006 | 0.2766 | 0.3728 | 0.0127 | 0.0127 | 0.0034 | 58.549 |
| **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 | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 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

### 5.2.1 Site Grading Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 3
**Start Quarter:** 1
**Start Year:** 2023

**- Phase Duration**
**Number of Month:** 1
**Number of Days:** 0

### 5.2.2 Site Grading Phase Assumptions

**- General Site Grading Information**
**Area of Site to be Graded ($ft^2$):** 305248
**Amount of Material to be Hauled On-Site ($yd^3$):** 0
**Amount of Material to be Hauled Off-Site ($yd^3$):** 0

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

**- Construction Exhaust (default)**

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

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

**- Vehicle Exhaust Vehicle Mixture (%)**

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

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

**- Worker Trips Vehicle Mixture (%)**

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

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

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

| Graders Composite | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.0757 | 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 |
| **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 | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 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:** 4
**Start Quarter:** 1
**Start Year:** 2023

**- Phase Duration**

**Number of Month:** 0
**Number of Days:** 14

### 5.3.2 Trenching / Excavating Phase Assumptions

**- General Trenching/Excavating Information**

**Area of Site to be Trenched/Excavated ($ft^2$):** 47223
**Amount of Material to be Hauled On-Site ($yd^3$):** 0
**Amount of Material to be Hauled Off-Site ($yd^3$):** 20988

**- 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 Equipment 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)**

| 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 |
| **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 | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 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:** 2023

**- Phase Duration**
**Number of Month:** 4
**Number of Days:** 20

### 5.4.2 Building Construction Phase Assumptions
**- General Building Construction Information**
**Building Category:** Commercial or Retail
**Area of Building ($ft^2$):** 7135
**Height of Building (ft):** 25
**Number of Units:** N/A

**- Building Construction Default Settings**

**Default Settings Used:** Yes

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

**- Construction Exhaust (default)**

| Equipment Name | Number Of Equipment | Hours Per Day |
|---|---|---|
| Cranes Composite | 1 | 4 |
| Forklifts Composite | 2 | 6 |
| Tractors/Loaders/Backhoes Composite | 1 | 8 |

**- Vehicle Exhaust**

**Average Hauling Truck Round Trip Commute (mile):** 20 (default)

**- Vehicle Exhaust Vehicle Mixture (%)**

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

**- Worker Trips**

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

**- Worker Trips Vehicle Mixture (%)**

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

**- Vendor Trips**

**Average Vendor Round Trip Commute (mile):** 40 (default)

**- Vendor Trips Vehicle Mixture (%)**

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

### 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 | 0.0754 | 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 |
| **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 | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 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 * (0.32 / 1000) * HT

$VMT_{VE}$: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building ($ft^2$)
BH: Height of Building (ft)
(0.32 / 1000): Conversion Factor $ft^3$ to trips (0.32 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 * (0.05 / 1000) * HT

$VMT_{VT}$: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building ($ft^2$)
BH: Height of Building (ft)
(0.05 / 1000): Conversion Factor $ft^3$ to trips (0.05 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

### 5.5.1 Architectural Coatings Phase Timeline Assumptions

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

**- Phase Duration**
**Number of Month:** 0
**Number of Days:** 7

### 5.5.2 Architectural Coatings Phase Assumptions

**- General Architectural Coatings Information**
**Building Category:** Non-Residential
**Total Square Footage ($ft^2$):** 7135
**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 | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 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:** 8
**Start Quarter:** 1
**Start Year:** 2023

**- Phase Duration**

**Number of Month:** 0
**Number of Days:** 14

### 5.6.2 Paving Phase Assumptions

**- General Paving Information**

**Paving Area ($ft^2$):** 110589

**- 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 |
|---|---|---|
| Cement and Mortar Mixers Composite | 4 | 6 |
| Pavers Composite | 1 | 7 |
| Paving Equipment Composite | 2 | 6 |
| Rollers Composite | 1 | 7 |

**- 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)**

| 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 |
| **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 | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 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)

## 6. Construction / Demolition

### 6.1 General Information & Timeline Assumptions

**- Activity Location**
**County:** Okaloosa
**Regulatory Area(s):** NOT IN A REGULATORY AREA

**- Activity Title:** Commercial Vehicle Inspection Gate - Part 1

**- Activity Description:**
Part 1 of 2.

**- Activity Start Date**
**Start Month:** 2
**Start Month:** 2024

**- Activity End Date**
**Indefinite:** False
**End Month:** 2
**End Month:** 2024

**- Activity Emissions:**

| Pollutant | Total Emissions (TONs) |
|---|---|
| VOC | 0.005143 |
| $SO_x$ | 0.000094 |
| $NO_x$ | 0.032341 |
| CO | 0.045905 |
| PM 10 | 0.020267 |

| Pollutant | Total Emissions (TONs) |
|---|---|
| PM 2.5 | 0.001227 |
| Pb | 0.000000 |
| $NH_3$ | 0.000052 |
| $CO_2e$ | 9.4 |
| | |

## 6.1 Demolition Phase

### 6.1.1 Demolition Phase Timeline Assumptions

**- Phase Start Date**

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

**- Phase Duration**

**Number of Month:** 0
**Number of Days:** 14

### 6.1.2 Demolition Phase Assumptions

**- General Demolition Information**

**Area of Building to be demolished ($ft^2$):** 3624
**Height of Building to be demolished (ft):** 25

**- 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 |
| Rubber Tired Dozers Composite | 1 | 1 |
| Tractors/Loaders/Backhoes Composite | 2 | 6 |

**- Vehicle Exhaust**

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

**- Vehicle Exhaust Vehicle Mixture (%)**

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

**- Worker Trips**

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

**- Worker Trips Vehicle Mixture (%)**

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

### 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 | 0.0357 | 0.0006 | 0.2608 | 0.3715 | 0.0109 | 0.0109 | 0.0032 | 58.544 |
| **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 | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 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

## 7. Construction / Demolition

### 7.1 General Information & Timeline Assumptions

**- Activity Location**

**County:** Okaloosa
**Regulatory Area(s):** NOT IN A REGULATORY AREA

**- Activity Title:** Commercial Vehicle Inspection Gate - Part 2

**- Activity Description:**
Part 2 of 2.

**- Activity Start Date**

**Start Month:** 2
**Start Month:** 2024

**- Activity End Date**

**Indefinite:** False
**End Month:** 8
**End Month:** 2024

**- Activity Emissions:**

| Pollutant | Total Emissions (TONs) |
|---|---|
| VOC | 0.181843 |
| $SO_x$ | 0.002186 |
| $NO_x$ | 0.645525 |
| CO | 0.887108 |
| PM 10 | 2.988934 |

| Pollutant | Total Emissions (TONs) |
|---|---|
| PM 2.5 | 0.024386 |
| Pb | 0.000000 |
| $NH_3$ | 0.000831 |
| $CO_2e$ | 215.2 |
| | |

### 7.1 Demolition Phase

### 7.1.1 Demolition Phase Timeline Assumptions

**- Phase Start Date**

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

- **Phase Duration**
  - **Number of Month:** 1
  - **Number of Days:** 7

### 7.1.2 Demolition Phase Assumptions

- **General Demolition Information**
  - **Area of Building to be demolished ($ft^2$):** 56191
  - **Height of Building to be demolished (ft):** 1
- **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 |
| Rubber Tired Dozers Composite | 1 | 1 |
| Tractors/Loaders/Backhoes Composite | 2 | 6 |

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

- **Vehicle Exhaust Vehicle Mixture (%)**

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

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

- **Worker Trips Vehicle Mixture (%)**

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

### 7.1.3 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 |
| **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 | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 7.1.4 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

## 7.2 Site Grading Phase

### 7.2.1 Site Grading Phase Timeline Assumptions

- **Phase Start Date**
  - **Start Month:** 3
  - **Start Quarter:** 1
  - **Start Year:** 2024

- **Phase Duration**
  - **Number of Month:** 1
  - **Number of Days:** 0

### 7.2.2 Site Grading Phase Assumptions

- **General Site Grading Information**
  - **Area of Site to be Graded ($ft^2$):** 287644
  - **Amount of Material to be Hauled On-Site ($yd^3$):** 0
  - **Amount of Material to be Hauled Off-Site ($yd^3$):** 0

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

- **Construction Exhaust (default)**

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

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

- **Vehicle Exhaust Vehicle Mixture (%)**

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

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

- **Worker Trips Vehicle Mixture (%)**

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

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

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

| Graders Composite | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.0714 | 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 |

| 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 | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 7.2.4 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

## 7.3 Trenching/Excavating Phase

### 7.3.1 Trenching / Excavating Phase Timeline Assumptions

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

**- Phase Duration**
**Number of Month:** 0
**Number of Days:** 14

### 7.3.2 Trenching / Excavating Phase Assumptions

**- General Trenching/Excavating Information**
**Area of Site to be Trenched/Excavated ($ft^2$):** 19837
**Amount of Material to be Hauled On-Site ($yd^3$):** 0
**Amount of Material to be Hauled Off-Site ($yd^3$):** 8816

**- 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 Equipment 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 |

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

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

| Graders Composite | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.0714 | 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 |

| 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 | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 7.3.4 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

## 7.4 Building Construction Phase

### 7.4.1 Building Construction Phase Timeline Assumptions

**- Phase Start Date**

**Start Month:** 4
**Start Quarter:** 1
**Start Year:** 2024

**- Phase Duration**

**Number of Month:** 4
**Number of Days:** 20

### 7.4.2 Building Construction Phase Assumptions

**- General Building Construction Information**

**Building Category:** Commercial or Retail
**Area of Building (ft$^2$):** 5400
**Height of Building (ft):** 25
**Number of Units:** N/A

**- Building Construction Default Settings**

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

**- Construction Exhaust (default)**

| Equipment Name | Number Of Equipment | Hours Per Day |
|---|---|---|
| Cranes Composite | 1 | 4 |
| Forklifts Composite | 2 | 6 |
| Tractors/Loaders/Backhoes Composite | 1 | 8 |

**- Vehicle Exhaust**

**Average Hauling Truck Round Trip Commute (mile):** 20 (default)

**- Vehicle Exhaust Vehicle Mixture (%)**

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

**- Worker Trips**

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

**- Worker Trips Vehicle Mixture (%)**

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

**- Vendor Trips**

**Average Vendor Round Trip Commute (mile):** 40 (default)

**- Vendor Trips Vehicle Mixture (%)**

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

### 7.4.3 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 |
| **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 | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 7.4.4 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**

$VMT_{VE} = BA * BH * (0.32 / 1000) * HT$

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

BA: Area of Building ($ft^2$)
BH: Height of Building (ft)
(0.32 / 1000): Conversion Factor $ft^3$ to trips (0.32 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 * (0.05 / 1000) * HT
$VMT_{VT}$: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building ($ft^2$)
BH: Height of Building (ft)
(0.05 / 1000): Conversion Factor $ft^3$ to trips (0.05 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

## 7.5 Architectural Coatings Phase

### 7.5.1 Architectural Coatings Phase Timeline Assumptions

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

**- Phase Duration**
**Number of Month:** 0
**Number of Days:** 7

### 7.5.2 Architectural Coatings Phase Assumptions

**- General Architectural Coatings Information**

**Building Category:** Non-Residential
**Total Square Footage ($ft^2$):** 5400
**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 |

### 7.5.3 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 | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 7.5.4 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

## 7.6 Paving Phase

### 7.6.1 Paving Phase Timeline Assumptions

**- Phase Start Date**

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

**- Phase Duration**

**Number of Month:** 0
**Number of Days:** 14

### 7.6.2 Paving Phase Assumptions

**- General Paving Information**

**Paving Area ($ft^2$):** 118337

**- 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 |
|---|---|---|
| Cement and Mortar Mixers Composite | 4 | 6 |
| Pavers Composite | 1 | 7 |
| Paving Equipment Composite | 2 | 6 |
| Rollers Composite | 1 | 7 |

**- 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 |

### 7.6.3 Paving Phase Emission Factor(s)

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

| Graders Composite | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | $CH_4$ | $CO_2e$ |
| Emission Factors | 0.0714 | 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 |
| **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 | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 7.6.4 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)

## 8. Construction / Demolition

### 8.1 General Information & Timeline Assumptions

**- Activity Location**

**County:** Okaloosa
**Regulatory Area(s):** NOT IN A REGULATORY AREA

**- Activity Title:** Soundside Gate - Part 1

**- Activity Description:**

Part 1 of 2.

**- Activity Start Date**

**Start Month:** 2
**Start Month:** 2025

**- Activity End Date**

**Indefinite:** False
**End Month:** 2
**End Month:** 2025

**- Activity Emissions:**

| Pollutant | Total Emissions (TONs) |
|---|---|
| VOC | 0.004816 |
| $SO_x$ | 0.000090 |
| $NO_x$ | 0.029362 |
| CO | 0.045244 |
| PM 10 | 0.013898 |

| Pollutant | Total Emissions (TONs) |
|---|---|
| PM 2.5 | 0.001036 |
| Pb | 0.000000 |
| $NH_3$ | 0.000043 |
| $CO_2e$ | 9.0 |
| | |

### 8.1 Demolition Phase

### 8.1.1 Demolition Phase Timeline Assumptions

**- Phase Start Date**

**Start Month:** 2
**Start Quarter:** 1
**Start Year:** 2025

**- Phase Duration**

**Number of Month:** 0
**Number of Days:** 14

### 8.1.2 Demolition Phase Assumptions

**- General Demolition Information**

**Area of Building to be demolished ($ft^2$):** 2448
**Height of Building to be demolished (ft):** 25

**- 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 |
| Rubber Tired Dozers Composite | 1 | 1 |
| Tractors/Loaders/Backhoes Composite | 2 | 6 |

**- Vehicle Exhaust**

**Average Hauling Truck Capacity ($yd^3$):** 20 (default)

**Average Hauling Truck Round Trip Commute (mile):** 20 (default)

**- Vehicle Exhaust Vehicle Mixture (%)**

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

**- Worker Trips**

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

**- Worker Trips Vehicle Mixture (%)**

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

### 8.1.3 Demolition Phase Emission Factor(s)

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

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

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

| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | Pb | $NH_3$ | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|---|
| LDGV | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 8.1.4 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

## 9. Construction / Demolition

### 9.1 General Information & Timeline Assumptions

**- Activity Location**
**County:** Okaloosa
**Regulatory Area(s):** NOT IN A REGULATORY AREA

**- Activity Title:** Soundside Gate - Part 2
**- Activity Description:**
Part 2 of 2.

- **Activity Start Date**
  - **Start Month:** 2
  - **Start Month:** 2025

- **Activity End Date**
  - **Indefinite:** False
  - **End Month:** 8
  - **End Month:** 2025

- **Activity Emissions:**

| Pollutant | Total Emissions (TONs) |
|---|---|
| VOC | 0.136663 |
| $SO_x$ | 0.001954 |
| $NO_x$ | 0.523266 |
| CO | 0.787655 |
| PM 10 | 0.750924 |

| Pollutant | Total Emissions (TONs) |
|---|---|
| PM 2.5 | 0.018721 |
| Pb | 0.000000 |
| $NH_3$ | 0.000911 |
| $CO_2e$ | 192.9 |
| | |

## 9.1 Demolition Phase

### 9.1.1 Demolition Phase Timeline Assumptions

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

- **Phase Duration**
  - **Number of Month:** 1
  - **Number of Days:** 7

### 9.1.2 Demolition Phase Assumptions

- **General Demolition Information**
  - **Area of Building to be demolished ($ft^2$):** 44757
  - **Height of Building to be demolished (ft):** 1

- **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 |
| Rubber Tired Dozers Composite | 1 | 1 |
| Tractors/Loaders/Backhoes Composite | 2 | 6 |

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

- **Vehicle Exhaust Vehicle Mixture (%)**

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

- **Worker Trips**
  - **Average Worker Round Trip Commute (mile):** 20 (default)
- **Worker Trips Vehicle Mixture (%)**

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

### 9.1.3 Demolition Phase Emission Factor(s)

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

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

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

| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | Pb | $NH_3$ | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|---|
| LDGV | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 9.1.4 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

## 9.2 Site Grading Phase

### 9.2.1 Site Grading Phase Timeline Assumptions

**- Phase Start Date**
**Start Month:** 3
**Start Quarter:** 1
**Start Year:** 2025

**- Phase Duration**
**Number of Month:** 0
**Number of Days:** 14

### 9.2.2 Site Grading Phase Assumptions

**- General Site Grading Information**
**Area of Site to be Graded ($ft^2$):** 127779
**Amount of Material to be Hauled On-Site ($yd^3$):** 0
**Amount of Material to be Hauled Off-Site ($yd^3$):** 0

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

**- Construction Exhaust (default)**

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

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

**- Vehicle Exhaust Vehicle Mixture (%)**

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

**- Worker Trips**

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

**- Worker Trips Vehicle Mixture (%)**

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

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

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

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

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

| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | Pb | $NH_3$ | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|---|
| LDGV | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 9.2.4 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

## 9.3 Trenching/Excavating Phase

### 9.3.1 Trenching / Excavating Phase Timeline Assumptions

**- Phase Start Date**

**Start Month:** 3
**Start Quarter:** 1
**Start Year:** 2025

**- Phase Duration**

**Number of Month:** 0
**Number of Days:** 14

### 9.3.2 Trenching / Excavating Phase Assumptions

**- General Trenching/Excavating Information**

**Area of Site to be Trenched/Excavated ($ft^2$):** 29594
**Amount of Material to be Hauled On-Site ($yd^3$):** 0
**Amount of Material to be Hauled Off-Site ($yd^3$):** 13152

**- 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 Equipment 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 |

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

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

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

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

| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | Pb | $NH_3$ | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|---|
| LDGV | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 9.3.4 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

## 9.4 Building Construction Phase

### 9.4.1 Building Construction Phase Timeline Assumptions

**- Phase Start Date**

**Start Month:** 3
**Start Quarter:** 1
**Start Year:** 2025

**- Phase Duration**

**Number of Month:** 4
**Number of Days:** 20

### 9.4.2 Building Construction Phase Assumptions

**- General Building Construction Information**

**Building Category:** Commercial or Retail
**Area of Building ($ft^2$):** 3312
**Height of Building (ft):** 25
**Number of Units:** N/A

**- Building Construction Default Settings**

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

**- Construction Exhaust (default)**

| Equipment Name | Number Of Equipment | Hours Per Day |
|---|---|---|
| Cranes Composite | 1 | 4 |
| Forklifts Composite | 2 | 6 |
| Tractors/Loaders/Backhoes Composite | 1 | 8 |

**- Vehicle Exhaust**

**Average Hauling Truck Round Trip Commute (mile):** 20 (default)

**- Vehicle Exhaust Vehicle Mixture (%)**

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

**- Worker Trips**

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

**- Worker Trips Vehicle Mixture (%)**

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

**- Vendor Trips**

**Average Vendor Round Trip Commute (mile):** 40 (default)

**- Vendor Trips Vehicle Mixture (%)**

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

### 9.4.3 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 |
| **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 | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 9.4.4 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**

$VMT_{VE} = BA * BH * (0.32 / 1000) * HT$

$VMT_{VE}$: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building ($ft^2$)
BH: Height of Building (ft)
(0.32 / 1000): Conversion Factor $ft^3$ to trips (0.32 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**

$VMT_{VT} = BA * BH * (0.05 / 1000) * HT$

$VMT_{VT}$: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building ($ft^2$)
BH: Height of Building (ft)
(0.05 / 1000): Conversion Factor $ft^3$ to trips (0.05 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

## 9.5 Architectural Coatings Phase

### 9.5.1 Architectural Coatings Phase Timeline Assumptions

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

**- Phase Duration**
**Number of Month:** 0
**Number of Days:** 7

### 9.5.2 Architectural Coatings Phase Assumptions

**- General Architectural Coatings Information**
**Building Category:** Non-Residential
**Total Square Footage ($ft^2$):** 3312
**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 |

### 9.5.3 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 | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 9.5.4 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

## 9.6 Paving Phase
### 9.6.1 Paving Phase Timeline Assumptions
**- Phase Start Date**
**Start Month:** 8
**Start Quarter:** 1
**Start Year:** 2025

**- Phase Duration**
**Number of Month:** 0
**Number of Days:** 14

### 9.6.2 Paving Phase Assumptions
**- General Paving Information**
**Paving Area ($ft^2$):** 54724

**- 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 |
|---|---|---|
| Cement and Mortar Mixers Composite | 4 | 6 |
| Pavers Composite | 1 | 7 |
| Paving Equipment Composite | 1 | 8 |
| Rollers Composite | 1 | 7 |
| Tractors/Loaders/Backhoes Composite | 1 | 7 |

**- 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 |

### 9.6.3 Paving Phase Emission Factor(s)

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

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

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

| | VOC | $SO_x$ | $NO_x$ | CO | PM 10 | PM 2.5 | Pb | $NH_3$ | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|---|
| LDGV | 000.282 | 000.002 | 000.207 | 003.392 | 000.006 | 000.005 | | 000.023 | 00341.791 |
| LDGT | 000.376 | 000.003 | 000.373 | 004.889 | 000.007 | 000.006 | | 000.024 | 00439.705 |
| HDGV | 000.832 | 000.005 | 000.964 | 016.217 | 000.016 | 000.014 | | 000.046 | 00814.851 |
| LDDV | 000.084 | 000.003 | 000.127 | 002.822 | 000.004 | 000.004 | | 000.008 | 00334.379 |
| LDDT | 000.227 | 000.004 | 000.365 | 004.850 | 000.007 | 000.006 | | 000.008 | 00473.628 |
| HDDV | 000.423 | 000.014 | 004.175 | 001.653 | 000.176 | 000.162 | | 000.028 | 01559.331 |
| MC | 003.040 | 000.003 | 000.626 | 013.017 | 000.026 | 000.023 | | 000.052 | 00392.775 |

### 9.6.4 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)

ANY TIME ANY PLACE