DRAFT
Environmental Assessment

Cantonment Areas Environmental Assessment
Eglin Air Force Base, Florida

Prepared for:

United States Army Corps of Engineers
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ABBREVIATIONS AND ACRONYMS

$\mu g/m^3$	Micrograms per cubic meter
20 SPCS	20th Space Control Squadron
6 RTB	6th Ranger Training Battalion
7 SFG(A)	7th Special Forces Group (Airborne)
919 SOW	919th Special Operations Wing
96 CEG/CEIE	96th Civil Engineer Group/Environmental Management
96 CEG/CEIEA	96th Civil Engineer Group/Environmental Assets
96 CEG/CEIEC	96th Civil Engineer Group/Environmental Compliance
96 CES/CESD	96th Civil Engineering Squadron/Explosive Ordnance Disposal Squadron
96 TW	96th Test Wing
96 TW/RANSS	96th Test Wing Range Support Squadron
96 TW/SE	96th Test Wing Safety Office
ACM	Asbestos-containing material
ADP	Area Development Plan
AFB	Air Force Base
AFCEC	Air Force Civil Engineer Center
AFI	Air Force Instruction
AFMAN	Air Force Manual
AFMC	Air Force Materiel Command
AFOSH	Air Force Occupational and Environmental Safety, Fire Protection, and Health
AFPD	Air Force Policy Directive
AFRL	Air Force Research Laboratory
AFSOC	Air Force Special Operations Command
AFTC	Air Force Test Center
AICUZ	Air Installations Compatible Use Zones
AOC	Area of concern
APE	Area of potential effect
APZ	Accident Potential Zone
AQMD	Air Quality Management District
ASUS	American States Utility Service
BG	Block group
BGEPA	Bald and Golden Eagle Protection Act
BMP	Best management practice
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
CGP	Construction generic permit
CH_4	methane
CHELCO	Choctawhatchee Electric Cooperative
CO	Carbon monoxide
CO_{2e}	Carbon dioxide equivalent
CT	Census tract
CWA	Clean Water Act
CZ	Clear Zone
CZMA	Coastal Zone Management Act

dB	decibels
dBA	A-weighted decibel
DNL	Day-Night Level
DoD	Department of Defense
DP	Disposal pit
DRMO	Defense Reutilization Marketing Office
EA	Environmental Assessment
EGTTR	Eglin Gulf Test and Training Range
EO	Executive Order
EPCRA	Emergency Planning and Community Right-to-Know Act
ERP	Environmental Restoration Program
ESA	Endangered Species Act
ESQD	Explosives Safety Quantity Distance
FAC	Florida Administrative Code
FCMP	Florida Coastal Management Program
FDEP	Florida Department of Environmental Protection
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Maps
FONPA	Finding of No Practicable Alternative
FONSI	Finding of No Significant Impact
FT	Fire training area
FWC	Florida Fish and Wildlife Conservation Commission
GHG	Greenhouse gas
GIS	Geographic information system
GPD	Gallons per day
HAP	Hazardous air pollutants
HMMP	Hazardous Materials Management Program
HVAC	Heating, ventilation and air conditioning
HWMP	Hazardous Waste Management Plan
Hz	hertz
ICRMP	Integrated Cultural Resources Management Plan
IDP	Installation Development Plan
INRMP	Integrated Natural Resources Management Plan
IRP	Installation Restoration Program
kV	kilovolts
LBP	Lead-based paint
lbs	pounds
LF	landfill
LOLA	Live ordnance loading area
LUC	Land use control
MAJCOM	Major Command
MBTA	Migratory Bird Treaty Act
MILCON	Military Construction
MMPA	Marine Mammal Protection Act
MMRP	Military Munitions Response Program
MOA	Memorandum of Agreement
MRTFB	Major Range and Test Facility Base
MSA	Munitions storage area

MVA	Million volt ampere
N_2O	Nitrous oxide
NAAQS	National Ambient Air Quality Standards
NEI	National Emissions Inventory
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NO_2	Nitrogen dioxide
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NRO	Natural Resources Office
O_3	Ozone
OCAT	Okaloosa County Air Terminal
ONA	Outstanding Natural Area
Pb	Lead
PCB	Polychlorinated biphenyls
PM_{10}	Particulate matter – less than or equal to 10 microns
$PM_{2.5}$	Particulate matter – less than or equal to 2.5 microns
POL	petroleum, oils, and lubricants
ppb	Parts per billion
ppm	Parts per million
PREIAP	Planning Requirements for the Environmental Impact Analysis Process
QD	Quantity-distance
RCRA	Resource Conservation and Recovery Act
RCW	Red-cockaded woodpecker
ROI	Region of influence
RW	Radioactive waste
SDZ	Surface danger zone
SEIS	Supplemental environmental impact statement
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SO_2	Sulfur dioxide
SOP	Standard Operating Procedure
SPCC	Spill Prevention, Control, and Countermeasures Plan
SS	Spill site
ST	Storage tank
STRATCOM	U.S. Strategic Command
SWPPP	Stormwater Pollution Prevention Plan
T&E	Threatened and endangered
THPO	Tribal Historic Preservation Officer
TSCA	Toxic Substances Control Act
UFC	Unified Facilities Criteria
USACE	United States Army Corps of Engineers
USAF	United States Air Force
USC	United States Code
USDA	United States Department of Agriculture
USEPA	U.S. Environmental Protection Agency

USFWS	U.S. Fish and Wildlife Service
UXO	Unexploded ordnance
VOC	Volatile organic compound
WWTP	Wastewater treatment plant

1.0 PURPOSE OF AND NEED FOR ACTION

1.1 Introduction

Eglin Air Force Base (AFB) is one of the largest U.S. Air Force (USAF) bases in the United States, encompassing over 724 square miles of reservation land and over 120,000 square miles of over water airspace known as the Eglin Gulf Test and Training Range (EGTTR), which extends south to the Florida Keys.[1] Eglin AFB is located within portions of four counties in the Florida Panhandle, including Okaloosa, Santa Rosa, Walton, and Gulf Counties. Eglin AFB is a national asset of the Air Force Materiel Command (AFMC) headquartered at Wright-Patterson AFB, Ohio, and the Air Force Test Center (AFTC), headquartered at Edwards AFB, California. Eglin AFB is one of several Department of Defense (DoD) installations comprising the congressionally established Major Range and Test Facility Base (MRTFB).[2] While Eglin AFB supports many missions and operations, the base's primary function is to support research and development of conventional weapons and electronic systems as well as individual and joint training of operational units.[3]

The 96th Test Wing (96 TW) currently serves as the host wing for Eglin AFB and is the test and evaluation center for air-delivered weapons, navigation and guidance systems, Command and Control systems, and Air Force Special Operations Command (AFSOC) systems.[4] The 96 TW performs development, test and evaluation across the complete system life cycle for a wide variety of customers, which include Air Force Systems Program Offices, Air Force Research Laboratory (AFRL), logistics and product centers, Major Commands (MAJCOM), other DoD services and U.S. government agencies, foreign military sales, and private industry.[5] Additionally, the 96 TW Commander serves as the installation commander, supporting Eglin with traditional military services, civil engineering, personnel, logistics, communications, computer, medical, security, and all other host services and base operating support functions.[6]

As Eglin AFB continues to support future missions and developments, it faces several challenges: accommodating growing numbers of staff in aging infrastructure, providing adequate facilities for mission support, adapting to changing missions, promoting sustainable development, and operating within increasingly congested environments. In 2017, an Installation Development Plan (IDP) was prepared in accordance with Unified Facilities Criteria (UFC) 2-100-01, *Installation Master Planning*; Air Force Instruction (AFI) 32-7062 *Comprehensive Planning*; and Air Force Policy Directive (AFPD) 32-10, *Installations and Facilities*. The IDP serves as a guidance document for future development decisions and assists Eglin AFB in meeting USAF goals for mission capability, sustainability, readiness, and modernization.[7]

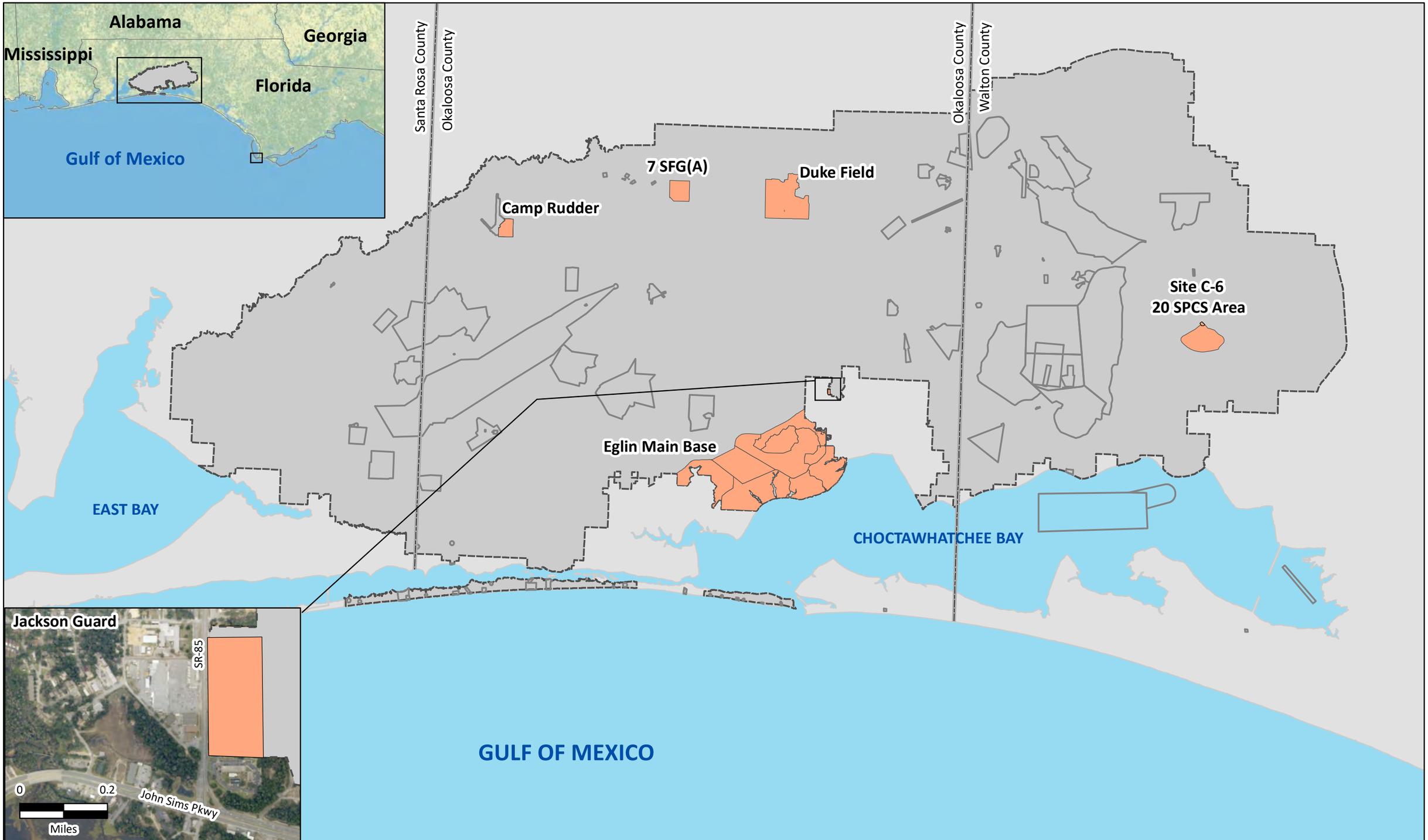
1.2 Proposed Action

For the purposes of the analysis within this Environmental Assessment (EA), the region of influence (ROI) has been defined as the following six areas on Eglin AFB (refer to **Figure 1-1**):

- Eglin Main Base
- Camp Rudder/6th Ranger Training Battalion (6 RTB)

[1] Eglin AFB. "96th Test Wing Fact Sheet." https://www.eglin.af.mil/About-Us/Fact-Sheets/Display/Article/390959/96th-test-wing/ . 2017. (August 24, 2018).
[2] Eglin AFB. *Downtown District Area Development Plan.* September 2017. p. 1-1.
[3] Eglin AFB. *Installation Development Plan.* August 2017. p. 3-2
[4] Eglin AFB. "96th Test Wing Fact Sheet." https://www.eglin.af.mil/About-Us/Fact-Sheets/Display/Article/390959/96th-test-wing/ . 2017. (August 24, 2018).
[5] *Ibid.*
[6] *Ibid.*
[7] Eglin AFB. *Installation Development Plan.* August 2017. p. 3-1.

Figure 1-1 Eglin AFB Cantonment Areas



N
W E
S
0 10
Miles

Legend

- Military Test Range
- Eglin AFB Property
- Areas Evaluated as Part of the EA

Figure 1-1
Eglin AFB Cantonment Areas
Eglin AFB Cantonment Areas
Draft DOPAA
Eglin Air Force Base, Florida

- Duke Field
- 7th Special Forces Group (Airborne) (7 SFG[A]) Cantonment)
- Site C-6 20th Space Control Squadron (20 SPCS) Area
- Jackson Guard Compound

Analysis of potential impacts resulting from implementation of proposed development projects within the cantonment areas was previously documented in the 2014 *Final Eglin Air Force Base Cantonment Areas Environmental Assessment*.[8] The 2014 EA analyzed development anticipated to occur within the next five years; this EA serves as an update to the 2014 EA and development that has occurred since the 2014 EA has been incorporated into baseline conditions. This EA is intended to evaluate development that is anticipated to occur within the next five years in the five cantonment areas.

An EA[9] was completed for the Jackson Guard Area Development Plan (ADP),[10] which documented the planning process for development projects anticipated to occur at the Jackson Guard compound within the next five years. The Finding of No Significant Impact (FONSI) for the ADP EA was signed on April 11, 2016.[11] While Jackson Guard is not a defined cantonment area at Eglin AFB, development within the boundaries of Jackson Guard is included for analysis in this EA as part of the Eglin Main Base. ADPs have also been prepared for the five cantonment areas and are incorporated into this EA by reference.

This EA will evaluate environmental impacts that may occur as a result of implementation of the proposed development within the cantonment areas identified above. In order to adequately and accurately address potential impacts and coordinate long-range planning efforts, this EA will serve as a "fence-to-fence" *National Environmental Policy Act* (NEPA) document, covering proposed development anticipated to occur within the foreseeable future. This EA is not intended to serve as a comprehensive NEPA analysis for every planned development action. Each proposed project will undergo the Environmental Impact Analysis Process to identify any potential environmental consequences of the proposed action. Each individual project would require the submittal of an AF FORM 813, *Request for Environmental Impact Analysis*, prior to implementation in order to analyze individual impacts of specific projects. This will ensure environmentally sensitive areas will be fully analyzed for potential impacts.

Simultaneous evaluation of proposed development contained in this EA will assist Eglin AFB in resource planning, minimization of impacts, mission support, and conservation of resources.

1.3 Purpose of Development

The Eglin IDP comprehensive planning process describes the installation's past, present, and future physical state.[12] Ideal development principles for maximizing the installation's long-term capabilities are identified in the Strategic Vision Alignment.[13] The outlined Planning Constraints, together with the Installation Capacity Opportunities, identify areas suitable for future development. Those, combined with Sustainability Development Indicators, direct the scale of development and indicate how and where that development should occur to best meet the ongoing mission needs and the long-term Eglin AFB IDP vision.[14]

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[8] Eglin AFB. *Final Eglin Air Force Base Cantonment Areas Environmental Assessment and Finding of No Significant Impact/Finding of No Practicable Alternative.* March 2014, October 2014.
[9] Eglin AFB. *Eglin Air Force Base Jackson Guard Area Development Plan Environmental Assessment Final.* March 2016.
[10] Eglin AFB. *Jackson Guard Compound Area Development Plan.* July 2013.
[11] Eglin AFB. *Final Finding of No Significant Impact for Jackson Guard Area Development Plan Environmental Assessment, Eglin Air Force Base, Florida.* 2016.
[12] *Ibid.*
[13] Eglin AFB. *Installation Development Plan.* August 2017. p. 3-2.
[14] *Ibid,* p. 3-1.

In addition to the 2017 Eglin IDP, ADPs were prepared for specific areas and districts on the Eglin AFB installation between 2012 and 2013. Each ADP focuses on the conceptual planning and design of a given area within the installation and takes into account physical conditions, constraints, opportunities for development, and aesthetic qualities when providing a framework for future development. Development projects identified in the various ADPs and other planning documents serve as the basis for the analysis in this EA. Development projects include military construction (MILCON), construction and demolition activities, and renovation and repair to existing facilities, as well as other proposed activities such as transportation and landscape improvements.

The Air Force desires to authorize the projected development within the cantonment areas and Jackson Guard where environmental consequences would be minimal for the next five to ten years. By identifying areas where environmental impacts would not occur, using geospatial and environmental analysis, the Air Force will be better positioned to conduct development projects as identified above quickly and efficiently to meet the growing needs of the Air Force and Eglin AFB.

Planning activities must integrate the NEPA process to ensure that federal decisions and actions reflect environmental values, identify alternatives that could be carried forward for full analysis, and inform decision-makers of potential effects from development projects.[15] Therefore, the Proposed Action will:

- Provide a fence-to-fence evaluation of environmental constraints within the five cantonment areas and Jackson Guard to facilitate quick and efficient processing of development actions. The goal is to provide a look at the environmental impacts associated with development of new facilities, demolition, and renovation of existing facilities in Eglin's cantonment areas and Jackson Guard. These actions are all necessary for maintaining proficiency and achieving the near- and long-term goals of the Air Force at Eglin AFB.
- Streamline the NEPA process for development of Eglin's cantonment areas by identifying areas that are free from environmental constraints, allowing for tiering and/or incorporation of this EA by reference. This EA is not intended to serve as a comprehensive NEPA analysis for every development action anticipated. Rather, it should be a starting point, helping to identify potential environmental consequences of the development actions efficiently. In many cases, individual projects may require additional analysis under NEPA, though the goal is to minimize repetition and facilitate rapid and efficient implementation of projects in the cantonment areas of Eglin AFB.
- Include the continuation of necessary routine maintenance activities already occurring within some wetlands and floodplains. This includes maintenance of landscaping in the airfield safety buffers, which is required to maintain safety for aircraft; maintenance of existing fence lines and utility right-of-ways, which already go through some wetland or floodplain areas; and other similar projects. No new developments or activities would be conducted in wetlands or floodplains as a result of the Proposed Action.

1.4 Need for Development

Installation development is needed to address deficiencies of function and capability in the facilities and infrastructure at Eglin AFB that result from obsolescence, deterioration, and evolving mission needs. These deficiencies are remedied through an ongoing process of construction, renovation, and demolition of redundant or obsolete facilities and infrastructure. Left unchecked, these deficiencies degrade the ability of the installation to meet USAF and DoD current and future mission requirements relative to state and federal requirements.

[15] AFI 32-7062, *Comprehensive Planning.*

The need for installation development at Eglin AFB is to be able to provide and maintain facilities and infrastructure adequate for 96 TW and its tenant units in a manner that:

- Supports the USAF mission requirements and quality of life of Airmen hosted by the installation.
- Meets applicable DoD installation master planning criteria, consistent with UFC 2-100-01, *Installation Master Planning*; AFI 32-7062 *Comprehensive Planning*; and AFPD 32-10, *Installations and Facilities*.
- Meets all applicable DoD, Federal, State, and local laws and regulations including but not limited to the following: *Endangered Species Act* (ESA), *National Historic Preservation Act* (NHPA), *Clean Water Act* (CWA), *Clean Air Act* (CAA), *Resource Conservation and Recovery Act* (RCRA), and *Migratory Bird Treaty Act* (MBTA). More detailed information regarding resource-specific laws and regulations are provided in the specific resource sections located in Chapter 3.

Additionally, development projects at Eglin AFB are currently tracked and applied separately to the 2014 *Final Eglin Air Force Base Cantonment Areas Environmental Assessment* and the 2016 *Eglin Air Force Base Jackson Guard Area Development Plan Environmental Assessment Final*. This causes inefficiencies in planning efforts and resource use when tracking and planning for development. Simultaneous evaluation of proposed development contained in this EA would assist Eglin AFB in resource planning, minimization of impacts, mission support, and conservation of resources, thereby reducing planning inefficiencies and ensuring the efficient use of resources.

1.5 Scope of Environmental Review

A development activity or land use activity may cause direct, indirect, or cumulative impacts on physical, natural, human, and/or cultural resources. As defined by the Council on Environmental Quality (CEQ), direct impacts are caused by the action or activity and occur at the same time and place as the action.[16] An example of a direct impact would be filling wetlands to construct a new building. Indirect impacts are also potentially caused by the action but occur later in time or are farther removed in distance; however, they are still reasonably foreseeable.[17] An example of an indirect impact would be if population growth occurs over time in an area due to improved infrastructure after a new highway is constructed. Finally, cumulative impacts are impacts on the environment which result from the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions.[18] Cumulative impacts would include impacts such as the collective loss of habitat for threatened and endangered species over time as a result of multiple development projects in an area.

1.6 Federal Permits, Licenses, Documents, and Other Regulatory Requirements

It is anticipated that the USAF will complete a Section 7 informal consultation with the U.S. Fish and Wildlife Service (USFWS) as part of this EA. Correspondence with USFWS is included in **Appendix A**, *Agency Coordination* (pending).

A consistency determination with respect to Florida's Coastal Zone Management Plan under the federal *Coastal Zone Management Act* (CZMA) is required due to the location of Eglin AFB within the state of Florida. All counties are within the jurisdiction of the Florida Department of Environmental Protection (FDEP); correspondence with FDEP is included in **Appendix B**, *Coastal Zone Management Act Consistency Determination* (pending).

[16] 40 Code of Federal Regulations (CFR) 1508.8
[17] 40 CFR 1508.8
[18] 40 CFR 1508.7

EO 11988, *Floodplain Management*, requires federal agencies to avoid, to the extent possible, the long and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative.[19] EO 11990, *Protection of Wetlands,* is intended to "minimize the destruction, loss or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands."[20] Coordination with the 96th Civil Engineer Group/Environmental Compliance (96 CEG/CEIEC) Water Resources Section will occur in the event that any stormwater design, permitting, potential discharges into surface waters from construction activities, and/or final backflow preventer design are required.

The FDEP, as authorized by the U.S. Environmental Protection Agency (USEPA), is responsible for regulating stormwater discharge under the National Pollutant Discharge Elimination System (NPDES).[21] FAC Rule 62-621 requires a Construction Generic Permit for construction activities that would disturb one or more acres of land collectively.[22] Projects impacting five or more acres are classified as large construction projects, while those disturbing less than five acres are considered small projects.[23] Regardless of size, projects permitted under a Generic Permit for Stormwater Discharge require a comprehensive Stormwater, Erosion, and Sedimentation Control Plan and a Stormwater Pollution Prevention Plan in the final plan design according to regulations contained within the CWA/NPDES. An application for a Stormwater Discharge Permit with stormwater retention and design is required prior to any ground-disturbing activities per FAC Rule 62-346.

Wastewater discharges are governed at the federal level by Title 40 CFR Part 22 (40 CFR 22) and 49 CFR 403. 40 CFR 22 permits general pretreatment programs, while 49 CFR 403 establishes categorical effluent limitations, including limitation for pretreatment of direct discharges. Title 23, Section 403 of the *Florida Air and Water Pollution Control Act* governs industrial and domestic wastewater discharges at the state level. Further guidance is provided under FAC 62-620 and FAC 62-621.

FAC Chapter 40A-2, *Consumptive Uses of Water*, provides for statewide regulations of drinking water. Federal primary and secondary drinking water standards, as delineated under the *Safe Drinking Water Act* and 42 USC 201, are also applicable. A new Potable Water System Permit or a revision to the existing Consumptive Use Permit may be required if consumptive use under the proposed action would exceed currently permitted levels or a new potable water system is required.

Section 438 of the *Energy Independence and Security Act of 2007* (EISA) requires federal agencies to reduce stormwater runoff from federal development and redevelopment projects to protect water resources.[24] Federal agencies can comply using a variety of stormwater management practices often referred to as "green infrastructure" or "low impact development" practices, including reducing impervious surfaces and using vegetative practices, porous pavements, cisterns and green roofs.[25]

Cultural and historic resources are protected under the NHPA, as amended, the *Archaeological Resources Protection Act of 1979*, and AFI 32-7065, *Cultural Resources Management,* which outlines cultural resource management guidelines at Eglin AFB. Eglin AFB will consult with the State Historic Preservation Officer (SHPO) to receive concurrence on potential cultural resources impacts in compliance with Section 106 of the NHPA. SHPO concurrence is included in **Appendix A**, *Agency Coordination (*pending).

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[19] EO 11988, *Floodplain Management*.
[20] EO 11990, *Protection of Wetlands*.
[21] Florida Statutes Section 403.0885
[22] FDEP. "Construction Activity Frequently Asked Questions." https://floridadep.gov/water/stormwater/content/construction-activity-cgp-faq April 11, 2018. (August 29, 2018).
[23] *Ibid.*
[24] USEPA. "Polluted Runoff: Nonpoint Source (NPS) Pollution." https://www.epa.gov/nps/stormwater-management-federal-facilities-under-section-438-energy-independence-and-security-act. August 22, 2018. (November 7, 2019).
[25] *Ibid.*

1.7 Public and Agency Review of IDEA

Through the public involvement process for the IDEA, the USAF will notify relevant Federal, state, and local agencies and the public of the Proposed Actions and request input on environmental concerns they might have regarding the Proposed Actions. The public involvement process provides Travis AFB with the opportunity to consider and address state and local views in its decision regarding implementing this Federal proposal. Hard copies of the Draft IDEA and FONSI will be sent to various agencies identified in **Appendix A** (pending), as well as any interested parties that have requested a copy.

Because the Proposed Action areas would not be located within wetlands or floodplains, they are not subject to the requirements and objectives of EO 11990, *Protection of Wetlands*, and EO 11988, *Floodplain Management*.

A Notice of Availability (NOA) of the Draft EA and FONSI will be published in the newspapers of record (listed below), announcing the availability of the EA for review on [insert date]. The NOA will invite the public to review and comment on the Draft EA. The public and agency review period ended on [insert date]. The NOA, public and agency comments are provided in **Appendix A** (pending).

The NOA will be published in the following newspaper:

Northwest Florida Daily News
2 Eglin Parkway NE
Fort Walton Beach, FL
32548

The Draft EA and FONSI will also be made available online.

Consultation with Native American tribal governments will be conducted in accordance with Department of Defense Instruction (DoDI) 4710.02, *Interactions with Federally-Recognized Tribes*, and AFI 90-2002, *Air Force Interaction with Federally-recognized Tribes*, Federally recognized tribes that are historically affiliated with the Eglin AFB geographic region will be invited to consult on all proposed undertakings that have the potential to affect properties of cultural, historical, or religious significance to the tribes. The tribal consultation process is distinct from NEPA consultation and the interagency coordination process, and it requires separate notification to all relevant tribes. The timelines for tribal consultation are also distinct from those of other consultations.

Native American tribal governments will be consulted regarding these actions and the consultation documents are provided in **Appendix A** (pending).

1.8 Document Organization

This EA contains six chapters. Chapter 1 describes the purpose and need for the action, details the location of the proposed action, and summarizes the scope of the environmental review. Chapter 2 explains the Proposed Action Alternatives and the No Action Alternative. Chapter 3 evaluates environmental and land use constraints, discusses the existing conditions of the resources in the vicinity of the cantonment areas, and presents the analysis of the environmental consequences of the Proposed Action and the No Action Alternative. Chapter 4 provides an analysis of cumulative impacts and explains irreversible and irretrievable commitments of resources. Chapter 5 identifies permitting requirements, mitigations, and management practices for minimizing potential impacts. Chapter 6 lists references cited in this EA.

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2.0 ALTERNATIVES

2.1 Introduction

Three alternatives are evaluated for potential environmental impacts as part of this EA. The alternatives presented for analysis are as follows:

No Action Alternative: The No Action Alternative provides the baseline for analysis of potential impacts. Under this Alternative, the anticipated development based on Eglin's IDP and ADPs would continue based on the authorized level of activity noted in the Preferred Alternative as laid out in the 2014 *Final Eglin Air Force Base Cantonment Areas Environmental Assessment*. [26] Development authorized at Jackson Guard in the 2016 *Eglin Air Force Base Jackson Guard Area Development Plan Environmental Assessment Final*[27] would continue as authorized. Under the No Action Alternative, AF FORM 813 documents for individual projects would be applied against authorized development totals in the 2014 *Final Eglin Air Force Base Cantonment Areas Environmental Assessment*[28] and the 2016 *Eglin Air Force Base Jackson Guard Area Development Plan Environmental Assessment Final*[29] separately.

Alternative 1: Alternative 1 would authorize the difference between the development authorized under the 2014 EA and the current level of activity, as established by TRIRIGA reports of activities occurring at Eglin AFB since 2014. Activities authorized under the 2016 Jackson Guard EA would be included as part of the total for Eglin Main Base. Under Alternative 1, AF FORM 813 documents for individual projects at the five cantonment areas and Jackson Guard would be applied against totals authorized under Alternative 1 of this EA. The inclusion of the 2016 Jackson Guard EA would ensure efficient use of all resources while implementing authorized and proposed activities.

Alternative 2: Under Alternative 2, proposed development from Alternative 1 would be implemented, with an increase in project footprints of 25 percent. Under Alternative 2, AF FORM 813 documents for individual projects at the five cantonment areas and Jackson Guard would be applied against totals authorized under Alternative 2 of this EA.

2.2 Alternatives Considered

Descriptions of the alternatives are provided below.

2.2.1 No-Action Alternative

The No-Action Alternative would authorize the approved level of development for the five cantonment areas, described as the Preferred Alternative in the 2014 *Final Eglin Air Force Base Cantonment Areas Environmental Assessment.*[30] Under the No-Action Alternative, the following levels of approved development would be authorized (refer to **Table 2-1**).

[26] Eglin AFB. *Final Eglin Air Force Base Cantonment Areas Environmental Assessment and Finding of No Significant Impact/Finding of No Practicable Alternative.* March 2014, October 2014.
[27] Eglin AFB. *Eglin Air Force Base Jackson Guard Area Development Plan Environmental Assessment Final.* March 2016.
[28] Eglin AFB. *Final Eglin Air Force Base Cantonment Areas Environmental Assessment and Finding of No Significant Impact/Finding of No Practicable Alternative.* March 2014, October 2014.
[29] Eglin AFB. *Eglin Air Force Base Jackson Guard Area Development Plan Environmental Assessment Final.* March 2016.
[30] Eglin AFB. *Final Eglin Air Force Base Cantonment Areas Environmental Assessment and Finding of No Significant Impact/Finding of No Practicable Alternative.* March 2014, October 2014.

Table 2-1 Approved Development from 2014 EA

	Total Area Disturbed (acres)	Facilities Construction (square feet)	Parking/Impervious (acres)	Roads/Infrastructure (acres)	Demolition (square feet)
Eglin Main	365	1,031,906	128	36	145,149
Duke Field	203	511,710	78	23	25,585
7 SFG(A)	41	228,851	4	4	11,443
Camp Rudder	61	130,680	17	18	6,534
C-6 20 SPCS	4	10,084	1	0	504

2.2.2 Alternative 1: Implement Area Development Plans at All Eglin AFB Cantonment Areas

Alternative 1 would authorize the difference between the development authorized under the 2014 EA and the current level of activity, as established by TRIRIGA reports of activities occurring at Eglin AFB since 2014. Activities authorized under the 2016 Jackson Guard EA are included as part of the total for Eglin Main Base. The development would include actions at Eglin Main Base (including Jackson Guard), Camp Rudder/6 RTB, Duke Field, 7 SFG(A) Cantonment, and Site C-6 20 SPCS Area.

The current level of activity is defined as the level of activity that has taken place since the approval of the 2014 EA. This data is captured in TRIRIGA, a database used by Eglin AFB to track construction and demolition activities. The current level of activity at the five cantonment areas is shown in **Table 2-2**.

Table 2-2 Current Level of Activity

	Total Area Disturbed (acres)	Facilities Construction (square feet)	Parking/Impervious (acres)	Roads/Infrastructure (acres)	Demolition (square feet)
Eglin Main	12.37	292,034	4.61	0.38	29,830
Duke Field	2.06	89,145	0	0	648
7 SFG(A)	3.32	143,468	0	0.02	260
Camp Rudder	0.09	3,732	0	0	0
C-6 20 SPCS	0	0	0	0	0

In order to most efficiently perform a quantitative analysis that would also allow for flexibility in implementation and provide a thorough environmental impacts analysis, Eglin AFB utilized the Preferred Alternative from the 2014 EA as a baseline; development approved under this EA would be authorized as the No-Action Alternative. Alternative 1 used the TRIRIGA reporting system, which totals development that has occurred since the approval of the 2014 EA to the present, to find the current level of activity (development activities that have occurred since the authorization of the 2014 EA) (refer to **Table 2-2**). The current level of activity was subtracted from the development approved under the 2014 EA (e.g. values in **Table 2-2** have been subtracted from **Table 2-1**); then, development approved under the 2016 Jackson Guard EA was added to the Eglin Main totals. Based on the current level of activity as depicted in **Table 2-2**, Alternative 1 would be anticipated to provide sufficient capacity for development occurring over the next five years; however, an increase in anticipated development could render these quantities insufficient. **Table 2-3** provides a summary of the proposed development at each cantonment area under Alternative 1.

Table 2-3 Alternative 1 Proposed Facilities for Each Cantonment Area

	Total Area Disturbed (acres)	Facilities Construction (square feet)	Parking/Impervious (acres)	Roads/Infrastructure (acres)	Demolition (square feet)
Eglin Main	355.6	795,266	125.4	36.6	170,016
Duke Field	200.9	422,565	78	23	24,937
7 SFG(A)	37.7	85,383	4	4	11,183
Camp Rudder	61	126,948	17	18	6,534
C-6 20 SPCS	4	10,084	1	0	504

2.2.2.1 Eglin Main Base

Alternative 1 would authorize the implementation of development at Eglin Main Base and Jackson Guard. The Eglin Main Base consists of a variety of uses and mission partners including headquarters and support functions, administrative office spaces, test and evaluation, training, laboratories, dormitories, community support and service functions, and recreation. Eglin Main Base consists of nine distinct areas: Downtown, Bayou Park, Bayside, Flightline, Boomtown, Tom's Creek, Fightertown, Westside, and Pinchot. According to the ADPs written for each of the nine areas, the overall goal of future development proposed for Eglin Main Base is to provide logical solutions for development issues and concerns while maximizing efficiency and striking a balance between operational needs and the natural environment.[31] Eglin Main Base is approximately 11,265 acres in size.[32] Of this acreage, approximately 6,528 acres are developed and 4,737 acres are undeveloped.[33] Future development included as part of the proposed action may include demolition, facilities construction, transportation infrastructure improvements, parking, facility maintenance, and other activities.[34] Total proposed development under Alternative 1 is anticipated to consist of approximately 795,266 ft^2 of construction or other improvements, while approximately 170,016 ft^2 would be slated for demolition. Parking and other impervious surfaces would total 123.4 acres, while roads and other infrastructure would consist of 35.6 acres.

The Jackson Guard compound is 14 acres in size and is located north of Eglin Main Base near the intersection of Florida Highway 85 and Florida Highway 20.[35] Jackson Guard's mission is the management of Eglin's natural resources in support of the military mission within the land and water ranges of the Eglin Military Complex.[36] Jackson Guard is responsible for integrating and prioritizing wildlife, fire, and forest management activities to protect and effectively manage the Complex's aquatic and terrestrial environments, and ensuring "no net loss" in the operational capability of these strategic priorities.[37] Proposed development at Jackson Guard may include refurbishments and upgrades to existing facilities, construction of new facilities, and demolition of infrastructure. Approximately 4.72 acres of Jackson Guard are developed, while the remaining 9.28 acres are undeveloped. Total proposed development under Alternative 1 is anticipated to consist of approximately 55,394 ft^2 of construction or other improvements, while approximately 54,697 ft^2 would be slated for demolition. Parking and other impervious surfaces would total 1.61 acres, while roads and other infrastructure would consist of 0.98-acre. Because Jackson

[31] Eglin AFB. *Downtown District Area Development Plan.* September 2017. p. 2-1.
[32] Source: Eglin AFB GIS data
[33] *Ibid.*
[34] Eglin AFB. *Installation Development Plan.* 2017.
[35] Eglin AFB. *Jackson Guard Area Development Plan.* July 2013. p. 7.
[36] *Ibid.* p. 35.
[37] *Ibid.*

Guard is not a defined cantonment area, its proposed development has been combined with that of Eglin Main Base in **Tables 2-3** and **2-4**.

2.2.2.2 Duke Field

Duke Field is a self-contained military airport located approximately 12 miles north of Eglin Main Base within the greater Eglin AFB Reservation. Duke Field is home to the 919th Special Operations Wing (919 SOW) and consists of facilities, roads, parking, paved runways, taxiways, helipads, and aprons.[38] The overall goal of development on Duke Field is to maximize efficiency and create a balance between operational needs and the natural environment while supporting readiness posture and missions.[39] Duke Field is approximately 1,946 acres in size.[40] Of this acreage, approximately 1,464 acres are developed and 482 acres are undeveloped.[41] Proposed development at Duke Field under Alternative 1 may include airfield improvements, facilities construction, transportation infrastructure improvements, and demolition projects.[42] Total proposed development under Alternative 1 is anticipated to consist of approximately 422,565 ft^2 of construction or other improvements, while approximately 24,937 ft^2 would be slated for demolition. Parking and other impervious surfaces would total 78 acres, while roads and other infrastructure would consist of 23 acres.

2.2.2.3 7 SFG(A) Cantonment

The 7 SFG(A) Cantonment is located approximately 12 miles north of Eglin Main Base. The 7 SFG(A) cantonment is designated for use by the 7 SFG(A), which is part of the U.S. Army Special Forces Command. Overall goals of the development proposed under Alternative 1 include enhancing mission readiness, maintaining security and low visibility of cantonment operations, implementing sustainable design, and enhancing the quality of life for military personnel and their families as well as civilian personnel.[43] The 7 SFG(A) Cantonment is approximately 500 acres in size.[44] Of this acreage, approximately 306 acres are developed and 194 acres are undeveloped. Development proposed under Alternative 1 may include facilities construction for housing and recreational uses, security improvements, and transportation infrastructure improvements.[45] Total proposed development under Alternative 1 is anticipated to consist of approximately 85,383 ft^2 of construction or other improvements, while approximately 11,183 ft^2 would be slated for demolition. Parking and other impervious surfaces would total 4 acres, while roads and other infrastructure would also consist of 4 acres.

2.2.2.4 Camp Rudder

Camp James E. Rudder, located approximately 14 miles northwest of the Eglin Main Base, is home to the U.S. Army's 6 RTB. The 6 RTB conducts approximately 11 classes per year and exposes students to tactical operations in a coastal swamp environment, including the third and final phase of U.S. Army Ranger Training.[46] The overall goal of proposed development at Camp Rudder is to ensure that facilities will provide quality training for U.S. Army Ranger Training School students.[47] Camp Rudder is approximately 287 acres in size.[48] Of this acreage, approximately 87 acres are developed and 200 acres are

[38] Eglin AFB. *Duke Field Area Development Plan*. October 2012. p. 6.
[39] *Ibid*, p. 26.
[40] *Ibid*, p. 23.
[41] Source: Eglin AFB GIS data
[42] Eglin AFB. *Duke Field Area Development Plan*. October 2012.
[43] Eglin AFB. *7 SFG(A) Area Development Plan*. September 2013. p. 24.
[44] *Ibid*.
[45] *Ibid*.
[46] Eglin AFB. *Camp Rudder Area Development Plan*. October 2012. p. 21.
[47] *Ibid*, p. 24.
[48] *Ibid*, p. 32.

undeveloped.[49] The proposed development on Camp Rudder reflects an anticipated increase in use of the site; projects may include multi-purpose and recreational facilities as well as housing.[50] Total proposed development under Alternative 1 is anticipated to consist of approximately 126,948 ft^2 of construction or other improvements, while approximately 6,534 ft^2 would be slated for demolition. Parking and other impervious surfaces would total 17 acres, while roads and other infrastructure would consist of 18 acres.

2.2.2.5 Site C-6 20 SPCS Area

The 20 SPCS operates a phased array radar system at Site C-6 on Eglin AFB. The phased array radar system is dedicated to tracking more than 16,000 near-earth and deep-space objects and provides space situational awareness for the U.S. Strategic Command's (STRATCOM) space control mission area.[51] Site C-6 is located approximately 17 miles east of Eglin Main Base. The cantonment area for Site C-6 is approximately 14 acres in size.[52] Of this acreage, all 14 acres are developed and zero acres are undeveloped.[53] Total proposed development under Alternative 1 is anticipated to consist of approximately 10,084 ft^2 of construction or other improvements, while approximately 504 ft^2 would be slated for demolition. Parking and other impervious surfaces would total 1 acre, while no development of roads and other infrastructure is anticipated.

2.2.3 Alternative 2: Alternative 1 Plus a Twenty-Five Percent Footprint Increase for All Projects

Implementation of Alternative 2 would authorize the same types of proposed development at the five cantonment areas, but would also include a 25 percent footprint increase for proposed development and demolition. A summary of the proposed development at each cantonment area is included in **Table 2-4**. The 25 percent footprint increase proposed under Alternative 2 would sufficiently capture future planned demolition and allow for additional unforeseen demolition and development. Based on the current level of activity as described in **Table 2-2**, a 25 percent increase represents a conservative increase that would allow for unforeseen development while also acknowledging the reasonable and practicable rate of development at which to conduct such activities.

Table 2-4 Alternative 2 Proposed Facilities for Each Cantonment Area Plus 25 Percent Footprint Increase

	Total Area Disturbed (acres)	Facilities Construction (square feet)	Parking/Impervious (acres)	Roads/Infrastructure (acres)	Demolition (square feet)
Eglin Main	444.5	994,083	156.75	45.75	212,520
Duke Field	251.1	528,206	97.5	28.8	31,171
7 SFG(A)	47.1	106,729	5	5	13,979
Camp Rudder	76.3	158,685	21.3	22.5	8,168
C-6 20 SPCS	5	12,605	1.3	0	630

[49] Source: Eglin AFB GIS data
[50] Eglin AFB. *Camp Rudder Area Development Plan*. October 2012.
[51] Eglin AFB. *Site C-6 Space Utilization Study*. October 2012. p. 11.
[52] *Ibid*, p. 14.
[53] Source: Eglin AFB GIS data

2.3 Resource Areas Eliminated from Detailed Analysis

In accordance with 40 Code of Federal Regulations (CFR) 1501.7(3) and 40 CFR 1506.3, resource areas that would not be impacted by a proposed action or that have been analyzed by prior environmental review have not been carried forward for further review in this EA. Guidance issued in the USAF program *Planning Requirements for the Environmental Impact Analysis Process* (PREIAP) promotes streamlining of the environmental review process through a thorough NEPA scoping process; CEQ and USAF regulations recommend that project proponents identify and eliminate resource areas from further study that have no potential for impact through implementation of the proposed action.[54,55] Therefore, the scoping process for this EA identified two resource areas that need not be carried forward for detailed analysis. The following resource areas were found to be irrelevant to the project alternatives, including the No Action Alternative, and was found to have no potential for direct, indirect, or cumulative impacts.

Airspace

Airspace analysis 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. Airspace is regulated in order to protect aircraft operations, promote safe conditions, control traffic and capacity, and ensure national security. No modifications to the existing airspace, introduction of new aircraft, modification of existing aircraft, or increase/change in air operations would occur as a result of the proposed development analyzed in this EA. Therefore, airspace is not further analyzed in this EA.

Land Use

Land use refers to the classification of land based on natural conditions and the types of human activity occurring on that land. Land-use planning combines both natural environments and associated human activity. Proper land-use planning considers functional interrelationships between natural conditions and human activities; the type of human activities occurring; and land use of adjacent and proximal areas, conservation or preservation area, and natural or scenic area. A wide variety of land-use categories result from human activity, and generally include commercial, industrial, military, residential, agricultural, institutional, transportation, utilities, and recreation. Development analyzed in this EA would occur entirely within the boundaries of the cantonment areas, which are designated for military use. No changes to existing land use, as outlined in the IDP, would occur as a result of the proposed development analyzed in this EA. Therefore, land use is not further analyzed in this EA.

2.4 Resource Areas Identified for Detailed Analysis

2.4.1 Air Quality

Air quality is influenced by a number of factors, including the type and amount of pollutants emitted into the atmosphere, the size and topography of the air basin, and local and regional meteorological influences. In order to analyze air quality, the significance of air pollutant concentrations in a geographical area is compared to federal and state ambient air quality standards, as outlined in the National Ambient Air Quality Standards (NAAQS). Changes in traffic volumes and usage of construction equipment, including machinery and worker vehicles utilized to implement the development projects, could influence ambient concentrations of the six criteria pollutants monitored under the NAAQS. The air quality analysis in this EA will determine if Eglin AFB is located within a designated attainment area and will discuss anticipated emissions levels in relation to those currently permitted by Eglin AFB and local authorities.

[54] 40 CFR 1501.7[a][3]
[55] 32 CFR 989.18

2.4.2 Biological Resources

Biological resources include native or naturalized plants and animals, and the habitats they occupy. Impacts to biological resources can occur through the degradation or alteration of habitat, an increase in noise, or a direct physical impact to a species. Habitat degradation or alteration occurs when physical damage or changes are made to terrestrial or aquatic resources as a result of development. Actions such as filling, clearing, grading, or construction associated with the proposed action could contribute to habitat alteration. Habitat degradation or alteration can be especially substantial for sensitive species or species of concern, including those protected under the ESA, MBTA, *Marine Mammal Protection Act* (MMPA), and the *Bald and Golden Eagle Protection Act* (BGEPA). Species that are listed on the ESA are threatened or endangered (T&E) and receive federal protection. Sensitive species that are not federally protected by the ESA, MBTA, MMPA, and BGEPA may be protected by state-specific legislation that provides protection for statewide species of importance. Under Florida Administrative Code (FAC) 68A-27, animal species may also be listed and qualify for regulatory protection by the Florida Fish and Wildlife Conservation Commission (FWC). Plant species may be recommended for state listing and regulatory protection under FAC Chapter 5B-40 by the Florida Department of Agriculture and Consumer Services.

The analysis of biological resources within this EA will include identifying T&E species and other species of concern and their habitats located within or near the cantonment areas, analyzing the potential for impacts resulting from the proposed action, and developing management actions for the avoidance and minimization of potential impacts.

2.4.3 Cultural Resources

Cultural and historic resources include architectural and archaeological sites that are considered culturally or historically significant due to their association with events that are significant in history, association with historical people, embody distinctive characteristics of a time period, or are likely to yield important information about history (National Register of Historic Places [NRHP]). Impacts to cultural and historic resources can include destruction or disturbance of sites or artifacts as a result of demolition or modification of historic structures and sites. This EA will determine what, if any, cultural resources are located within the vicinity of the cantonment areas and the likelihood of disturbance resulting from future development. The analysis of cultural resources within this EA will include developing management actions for the avoidance and minimization of potential impacts.

Eglin AFB will also coordinate with the Tribal Historic Preservation Officer (THPO) for the five federally recognized Native American tribes with historical ties to the area.

2.4.4 Hazardous Materials

Hazardous materials are defined by 49 CFR 171.8 as "hazardous substances, hazardous wastes, marine pollutants, elevated temperature materials, materials designated as hazardous in the Hazardous Materials Table,[56] and materials that meet the defining criteria for hazard classes and divisions" in 49 CFR 173. Hazardous wastes are defined by the RCRA at 42 U.S. Code (USC) 6903(5), as amended by the Hazardous and Solid Waste Amendments, as "a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may (A) cause, or significantly contribute to an increase in, mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed."

Hazardous materials can be solid, liquid, or gaseous substances and may damage the environment when released through development activities. Petroleum, oils, and lubricants (POLs), fuel storage tanks, asbestos-containing materials (ACMs), polychlorinated biphenyls (PCBs), mercury, and lead-based paint

[56] 49 CFR 172.101

(LBP) present the potential for environmental impacts within the Eglin cantonment areas, particularly during the demolition or renovation of existing facilities. The hazardous materials analysis in this EA will include Military Munitions Response Program (MMRP) and Installation Restoration Program (IRP) sites and potential actions that could impact IRP sites and other hazardous materials.

2.4.5 Noise

Noise is defined as unwanted or disturbing sound that interferes with verbal communication and hearing. In the context of Eglin AFB, noise is primarily derived from mission activity and its associated elements. Both humans and wildlife can be impacted by noise, including hearing loss or damage and inconvenience or increased stress. Responses to increased noise levels vary according to the source of the noise, characteristics of the source, the distance between the source and the receptor, the sensitivity of the receptor, and the time of day. The noise analysis for this EA will examine how construction activities associated with the development projects included in the proposed action will impact noise levels. An additional concern is the potential for aircraft noise to impact facilities to be developed. The biological resources section will discuss noise impacts to wildlife.

2.4.6 Safety/Restricted Access

The condition of safety occurs when the potential for death, serious bodily injury, illness, or property damage is reduced to the greatest extent practicable. Types of safety include ground safety, explosives and munition safety, construction safety, and flight safety. In accordance with the *Occupational Safety and Health Act* (29 USC Section 651), which applies to contractors and civilians, and AFI 91-202, *U.S. Air Force Mishap Prevention Program,* and AFI 91-203, *Air Force Consolidated Occupational Safety Instruction,* which applies to active duty military, Eglin AFB implements safety measures in order to reduce hazards and potential harm to military personnel and the public resulting from mission activities and construction. One possible safety measure is restricted access, which limits who can access a site and which sites are accessible to limited numbers of personnel. Restricted access may be necessary for a variety of reasons, including environmental control, site security, electromagnetic radiation hazards, the presence of hazardous materials, etc. While all cantonment areas at Eglin AFB are under restricted public access, the public is able to access some portions of the base, such as Jackson Guard, for recreational opportunities. This EA will evaluate the potential for additional restricted access that may be required to improve safety considerations during active construction or demolition activities.

2.4.7 Socioeconomics and Environmental Justice

Socioeconomic impacts from a project can occur in the form of shifting demographics, changing economics (including increased or decreased employment opportunities and local investments), risks to children, and exposure of low-income and minority populations to disproportionate negative impacts. Impacts resulting from changes to quality of life, noise levels, economic standing, and employment opportunities will be considered when analyzing potential socioeconomic impacts. In accordance with Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations* and EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, this EA will evaluate communities both within and in the immediate vicinity of Eglin AFB that contain children, low-income or minority populations and determine if disproportionate negative impacts will occur as a result of the proposed action.

2.4.8 Soils

Soils consist of unconsolidated materials formed from the underlying bedrock or other parent material. Seventeen types of soil, the majority of which are sandy in nature, are represented on Eglin AFB.[57] Soil

[57] Eglin AFB. *Integrated Natural Resources Management Plan.* August 2017. p. 35.

concerns, such as potential sedimentation and erosion resulting from proposed development, will be analyzed as part of this EA. The EA will analyze the potential for impacts and recommend best management practices (BMP) to prevent soil damage during construction activities.

2.4.9 Utilities

When considering the construction of additional housing, administrative, and recreational facilities, Eglin AFB must examine impacts to existing utilities. Utilities include electrical supply, liquid fuel supply, natural gas supply, potable water supply, solid waste management, sanitary sewer and wastewater systems, stormwater drainage, and communications systems. This EA will identify the locations of existing utilities within the cantonment areas on Eglin AFB and determine if sufficient quantities are in place to support the proposed development. The EA will not evaluate additional utilities and infrastructure improvements; rather, it will address capacity issues and determine what, if any, impacts could result from construction activities.

2.4.10 Water Resources

Water resources at Eglin AFB include groundwater, surface water, stormwater, floodplains, and wetlands. Eglin AFB is home to the highest abundance and density of steepheads, a unique type of seepage stream characterized by steep slopes terminating in an amphitheater-like ravine where the spring flow originates, under a single ownership.[58] Additionally, several bodies of water on or adjacent to Eglin AFB have been defined as Outstanding Florida Waters pursuant to FAC 62-302.700 due to their exceptional recreational or ecological significance, including: Fred Gannon Rocky Bayou State Recreational Area, Rocky Bayou State Aquatic Preserve, Basin Bayou State Recreation Area, Gulf Islands National Seashore, St. Joseph Bay Aquatic Preserve, Yellow River Marsh Aquatic Preserve, and the Shoal River. While these bodies of water are located in proximity to Eglin AFB, none are located in the immediate vicinity of the cantonment areas. This EA will examine the potential for impacts to water resources within and around the cantonment areas, including surface waters, wetlands, floodplains, stormwater, and groundwater. Impacts to water resources can include sedimentation, contamination, fill, drainage, and other issues.

2.4.11 Cumulative Impacts Analysis

Cumulative impacts are defined as impacts on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such actions.[59] The CEQ regulations detailed in 40 CFR 1508.7 require that cumulative impacts be considered during the NEPA process. While cumulative impacts can be individually minor, they can create significant impacts when considered collectively over an extended period. For the proposed action to have cumulatively significant impacts on an environmental condition, two conditions must be met:[60]

- The combined impacts of all identified past, present, and reasonably foreseeable projects, activities, and processes on a resource, including the impacts of the proposed action, must be significant; and,
- The proposed action must make a substantial contribution to that significant cumulative impact.

This EA will evaluate cumulative impacts beyond the immediate study area of the cantonment areas and will consider past, present, and reasonably foreseeable future actions that could result in potential impacts when considered collectively.

[58] Eglin AFB. *Integrated Natural Resources Management Plan.* August 2017. p. 187.
[59] 40 CFR 1508.7
[60] 40 CFR 1508.7

2.5 Comparison of Alternatives

Impacts that may occur under each alternative are summarized in **Table 2-5**.

Table 2-5 Summary of Impacts

Resource Area	No Action Alternative	Alternative 1	Alternative 2
Air Quality	Based on the analysis performed as part of the 2014 *Final Eglin Air Force Base Cantonment Areas Environmental Assessment* and FONSI/Finding of No Practicable Alternative (FONPA), there would be no significant impacts to air quality.	Implementation of Alternative 1 or Alternative 2 would result in a minor, temporary increase in emissions as a result of construction and demolition. No significant impacts to air quality would occur as a result of implementation of Alternative 1 or Alternative 2. Each individual project would require the submittal of an AF FORM 813, *Request for Environmental Impact Analysis*, prior to implementation in order to analyze individual impacts of specific projects.	
Biological Resources	Based on the analysis performed as part of the 2014 *Final Eglin Air Force Base Cantonment Areas Environmental Assessment* and FONSI/FONPA, there would be no significant impacts to biological resources.	No significant impacts to biological resources would occur as a result of implementation of Alternative 1 or Alternative 2. While the majority of projects would be anticipated to occur in areas that are already developed, construction in undeveloped areas could result in a loss of habitat. Construction noise, daily operations, and land clearing could cause native terrestrial wildlife to leave the immediate area and utilize remaining foliage for habitat. Gopher tortoise surveys would be conducted prior to construction, as necessary, and any tortoises found to be located at any site would be relocated. Sedimentation and runoff associated with construction and land-clearing activities occurring under Alternative 1 or Alternative 2 could potentially impact the Okaloosa darter. However, Eglin AFB requires a vegetative buffer of 200 feet around Okaloosa darter streams in order to minimize potential impacts. Development would comply with the Terms and Conditions identified in the 2013 Final PBO for the RCW, the 2009 PBO for Air Force activities that may potentially affect the Eastern indigo snake, and best practices and guidelines as outlined in the 2017 *Integrated Natural Resources Management Plan* (INRMP). In the event that a gopher tortoise or eastern indigo snake is spotted, construction activities would cease and the animals would be allowed to leave the area before activities are resumed. No significant impact to threatened and endangered species is anticipated. Each individual project would require the submittal of an AF FORM 813, *Request for Environmental Impact Analysis*, prior to implementation in order to analyze individual impacts of specific projects.	

Cultural Resources	Based on the analysis performed as part of the 2014 *Final Eglin Air Force Base Cantonment Areas Environmental Assessment* and FONSI/FONPA, there would be no significant impacts to cultural resources.	Cultural resources, archaeological sites, and historic structures are located throughout the cantonment areas. Construction and design plans would account for the location of protected resources. Coordination with 96 CEG/CEIEA Cultural Resources Office would occur prior to the implementation of any project. Applicable policies and procedures in the Eglin AFB *Integrated Cultural Resources Management Plan* would be applied. No significant impact to cultural resources is anticipated. Each individual project would require the submittal of an AF FORM 813, *Request for Environmental Impact Analysis*, prior to implementation in order to analyze individual impacts of specific projects.
Hazardous Materials and Waste	Based on the analysis performed as part of the 2014 *Final Eglin Air Force Base Cantonment Areas Environmental Assessment* and FONSI/FONPA, there would be no significant impacts to hazardous materials and waste.	No significant adverse impacts related to hazardous materials are anticipated from the implementation of Alternative 1 or Alternative 2. Construction and/or demolition operations at some existing buildings could produce lead-based paint, asbestos waste, PCBs, or mercury due to the age of the building. Both hazardous and non-hazardous wastes would be generated as a result of implementation of Alternative 1 and 2. Management of hazardous waste would be performed in accordance with existing procedures and the *Hazardous Waste Management Plan*. No significant adverse impacts to hazardous waste management is anticipated. IRP sites are located at several of the cantonment areas. Construction or demolition occurring in the vicinity of any IRP site would be coordinated with the Eglin AFB IRP Office, USEPA, FDEP, and other stakeholders as required. No adverse impacts to IRP sites are anticipated as a result of implementation of Alternative 1 or Alternative 2. Each individual project would require the submittal of an AF FORM 813, *Request for Environmental Impact Analysis*, prior to implementation in order to analyze individual impacts of specific projects.
Noise	Based on the analysis performed as part of the 2014 *Final Eglin Air Force Base Cantonment Areas Environmental Assessment* and FONSI/FONPA, there would be no significant impacts to noise levels.	Implementation of Alternative 1 or Alternative 2 would result in the generation of minor, temporary, localized noise during construction activities. In order to minimize noise impacts and disturbance to local residences and workplaces, noise-sensitive construction activities would not occur between the hours of 10 p.m. and 7 a.m. Aircraft noise is the predominant form of noise occurring at Eglin AFB. Existing noise contours would be considered in the siting of facilities prior to project development. If required, sound attenuation measures would be implemented in planning and construction. Each individual project would require the submittal of an AF FORM 813, *Request for Environmental Impact Analysis*, prior to implementation in order to analyze individual impacts of specific projects.

Safety	Based on the analysis performed as part of the 2014 *Final Eglin Air Force Base Cantonment Areas Environmental Assessment* and FONSI/FONPA, there would be no significant impacts to safety.	Any new facilities proposed for construction under Alternative 1 or Alternative 2 would be sited with consideration to Explosives Safety Quantity Distance arcs, Surface Danger Zones, Clear Zones, and Accident Potential Zones. Facilities sited in areas of possible or probable unexploded ordnance would require coordination with 96th Test Wing Safety Office (96 TW/SE), 96th Test Wing Range Support Squadron (96 TW/RANSS) and the 96th Civil Engineering Squadron/Explosive Ordnance Disposal Squadron (96 CES/CESD); UXO surveys would be required. New munitions storage facilities would require the submittal of an Explosive Site Plan package. Construction activities. No unique safety regulations would be required to construct new facilities; standard industrial safety standards and best management practices would be utilized. Therefore, no adverse impacts to safety are anticipated. Each individual project would require the submittal of an AF FORM 813, *Request for Environmental Impact Analysis*, prior to implementation in order to analyze individual impacts of specific projects.
Socioeconomics and Environmental Justice	Based on the analysis performed as part of the 2014 *Final Eglin Air Force Base Cantonment Areas Environmental Assessment* and FONSI/FONPA, there would be no significant impacts to socioeconomics and environmental justice populations.	No significant impacts to socioeconomics would occur under the implementation of Alternative 1 or Alternative 2. Construction activities would be anticipated to generate temporary construction workers in the local region as well as revenue to the local economy through the purchase of materials and supplies. However, no new military jobs would be generated a and no new personnel would be relocated to Eglin AFB as a result of the proposed development. Therefore, it is anticipated that expenditures, employment, and population at Eglin AFB would remain near current levels. No disproportionate impacts to environmental justice populations or children would be anticipated as a result of implementation of Alternative 1 or Alternative 2. Each individual project would require the submittal of an AF FORM 813, *Request for Environmental Impact Analysis*, prior to implementation in order to analyze individual impacts of specific projects.
Soil	Based on the analysis performed as part of the 2014 *Final Eglin Air Force Base Cantonment Areas Environmental Assessment* and FONSI/FONPA, there would be no significant impacts to soils.	Soil quality could be impacted by land-clearing, site preparation, and construction activities occurring under the implementation of Alternative 1 or Alternative 2. Development approved under both Alternative 1 and Alternative 2 would be conducted in a series of projects, each adhering to basewide BMPs for erosion control as outlined in the *Erosion Control Component Plan.*[61] A Construction Generic Permit would be required under FAC Rule 62-621 for construction activities that would disturb one or more acres of land collectively. Under the terms of the

[61] Eglin AFB. *Erosion Control Component Plan.* April 17, 2018. p. 5-1.

		permit, a comprehensive Stormwater, Erosion, and Sedimentation Control Plan and a Storm Water Pollution Prevention Plan in the final plan design would be required. Each individual project would require the submittal of an AF FORM 813, *Request for Environmental Impact Analysis*, prior to implementation in order to analyze individual impacts of specific projects.
Utilities	Based on the analysis performed as part of the 2014 *Final Eglin Air Force Base Cantonment Areas Environmental Assessment* and FONSI/FONPA, there would be no significant impacts to utilities.	No significant impacts to utilities would be anticipate to occur under implementation of Alternative 1 or Alternative 2. Increases in utilities usage may occur but would remain within permitted limits. Sufficient electric, water, and natural gas supply is available in northwest Florida to accommodate additional development. Wastewater treatment plants currently utilized by the five cantonment areas have sufficient capacity to accommodate additional wastewater flow. Additional utilities infrastructure may be constructed as part of the proposed development. Each individual project would require the submittal of an AF FORM 813, *Request for Environmental Impact Analysis*, prior to implementation in order to analyze individual impacts of specific projects.
Water Resources	Based on the analysis performed as part of the 2014 *Final Eglin Air Force Base Cantonment Areas Environmental Assessment* and FONSI/FONPA, there would be no significant impacts to water resources.	Adherence to Section 404 permitting requirements, implementation of site-specific Stormwater Pollution Prevention Plans, and use of BMPs would minimize impacts to water resources under the implementation of Alternative 1 or Alternative 2. No significant impacts to water resources would be anticipated. Each individual project would require the submittal of an AF FORM 813, *Request for Environmental Impact Analysis*, prior to implementation in order to analyze individual impacts of specific projects.

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3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 Constraints Analysis

The purpose of this EA is to identify potential areas for development on each of the six identified areas (the five cantonments and Jackson Guard). A constraints analysis was performed to identify areas that are minimally intrusive to the human and natural environment and are unconstrained by existing environmental and human limitations. Existing geographic information systems (GIS) data from Eglin AFB, state, and federal agencies was used to identify both constrained and unconstrained areas within the five cantonment areas and Jackson Guard. The GIS analysis identified both environmental constraints and land use constraints.

Environmental constraints are associated with natural resources and the physical environment and can include protected resources, such as wetlands or threatened and endangered species, topographical challenges, such as steepheads, and more. Environmental constraints may be regulated by federal, state, or local regulations, including, but not limited to, the ESA, CWA, NHPA, or CZMA. Avoidance and minimization measures help to limit disturbances to the environment. Permits, BMPs, or coordination efforts may be required when natural resources would be impacted by proposed actions.

Land use constraints on Eglin AFB are typically associated with Air Force instruction or installation policy, including clear zones, safety buffers, or intentional grouping of certain land uses in one specific area. Military development is often constrained by operational requirements, and in some cases, land use would not be impacted by demolition and consolidation of existing facilities.

This chapter of the EA will discuss both environmental and land use constraints within the six identified areas. GIS analysis will be used to identify land that is free from constraints to the extent practicable.

3.1.1 Environmental Constraints

The following environmental constraints were identified within the five cantonment areas:

- Wetlands
- 100-year floodplains
- RCW active/inactive cavity trees
- RCW foraging habitat
- Potential Okaloosa darter stream and protective buffer
- Potential reticulated flatwoods salamander pond and buffer
- High quality ecological area
- Active IRP/Area of Concern (AOC) sites
- Historic district area
- Cultural restricted area

Figures 3-1 through **3-5** show environmental constraints occurring at each of the cantonment areas. No proposed activity that would occur in an environmentally constrained area would be authorized under this EA without the need for additional evaluation under NEPA and compliance with all other applicable regulations.

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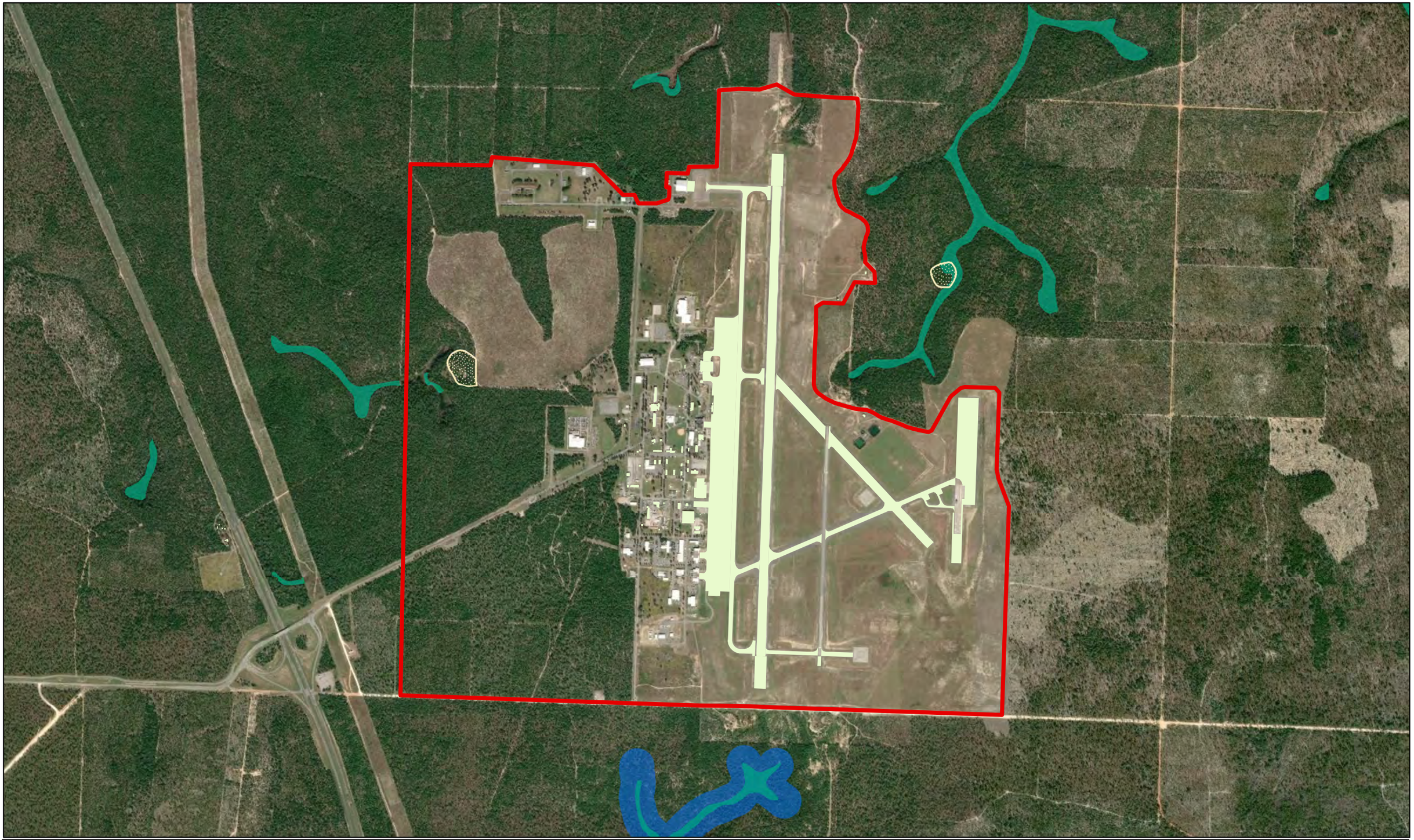
- Eglin Main Districts
- 100 Year Flood Zone
- Cultural Restricted Area
- Historic District Area
- Protective buffer for potential Okaloosa darter stream
- Wetlands
- Active IRP Sites and LUCs

Figure 3-1
Eglin Main Base Environmental Constraints
Eglin AFB Cantonment Areas
Draft EA
Eglin Air Force Base, Florida



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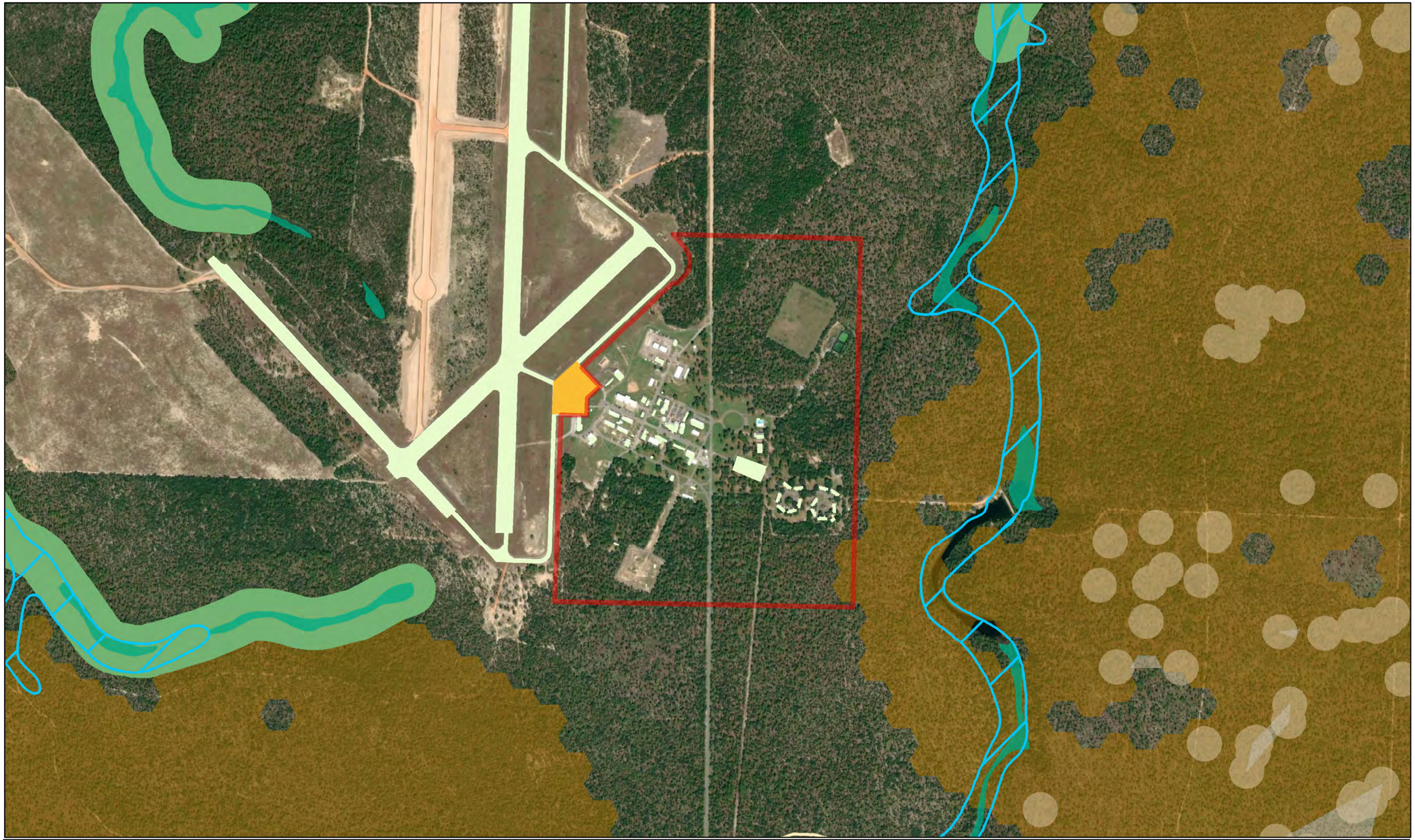
- Duke Field Boundary
- Cultural Restricted Area
- Wetlands
- Protective buffer for potential Okaloosa darter stream
- Historic Structure

Figure 3-2
Duke Field Environmental Constraints
Eglin AFB Cantonment Areas
Draft EA
Eglin Air Force Base, Florida



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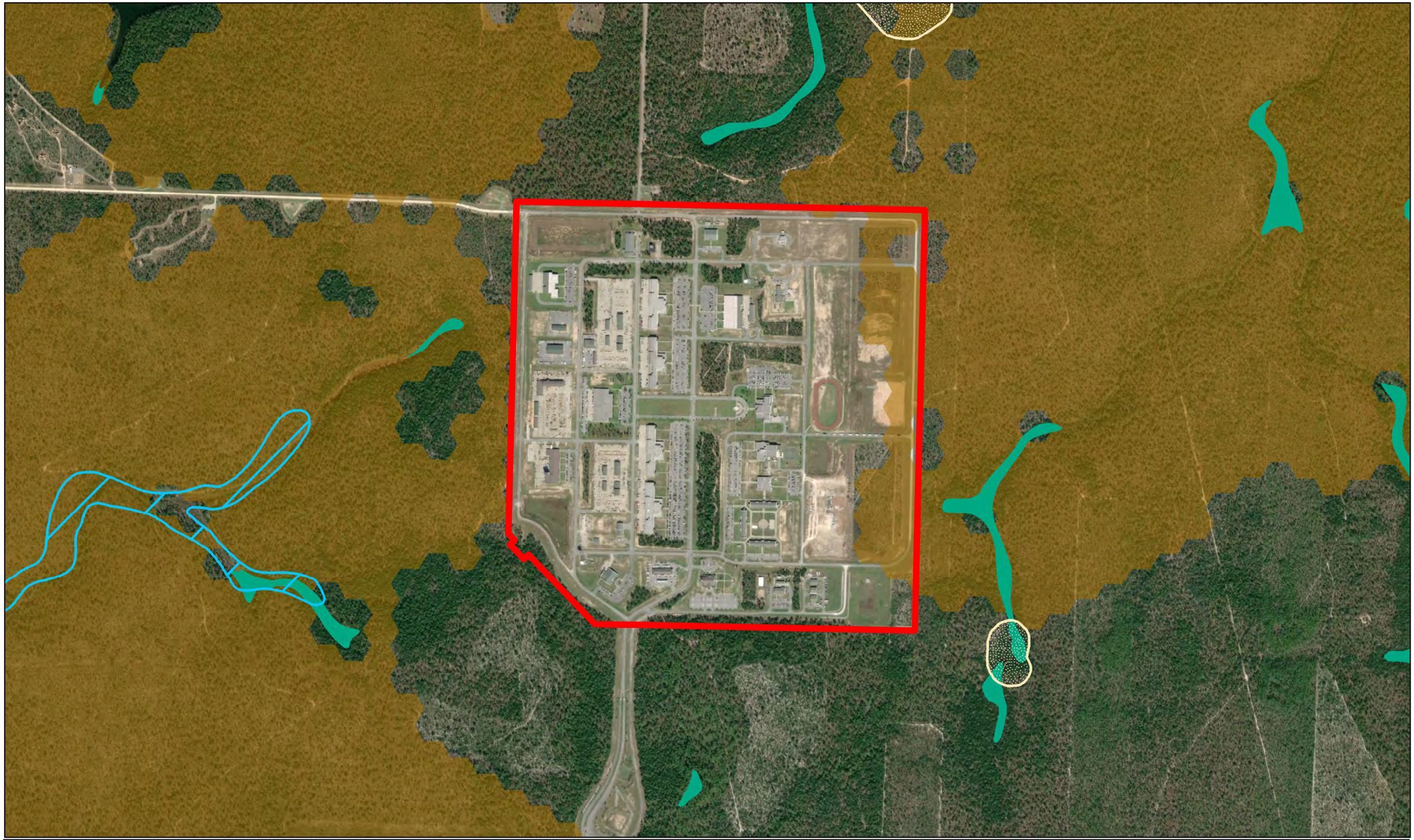
- Camp Rudder Boundary
- 100 Year Flood Zone
- Active ERP Sites or LUCs
- Historic Structure
- Wetlands
- Florida bog frog protection buffer
- Red-cockaded woodpecker (RCW) forage area
- Protective buffer for RCW cavity trees

Figure 3-3
Camp Rudder Environmental Constraints
Eglin AFB Cantonment Areas
Draft EA
Eglin Air Force Base, Florida



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- 7SFG (A) Boundary
- Cultural Restricted Area
- Red-cockaded woodpecker (RCW) forage area
- 100 Year Flood Zone
- Wetlands

Figure 3-4
7 SFG(A) Cantonment Environmental Constraints
Eglin AFB Cantonment Areas
Draft DOPAA
Eglin Air Force Base, Florida

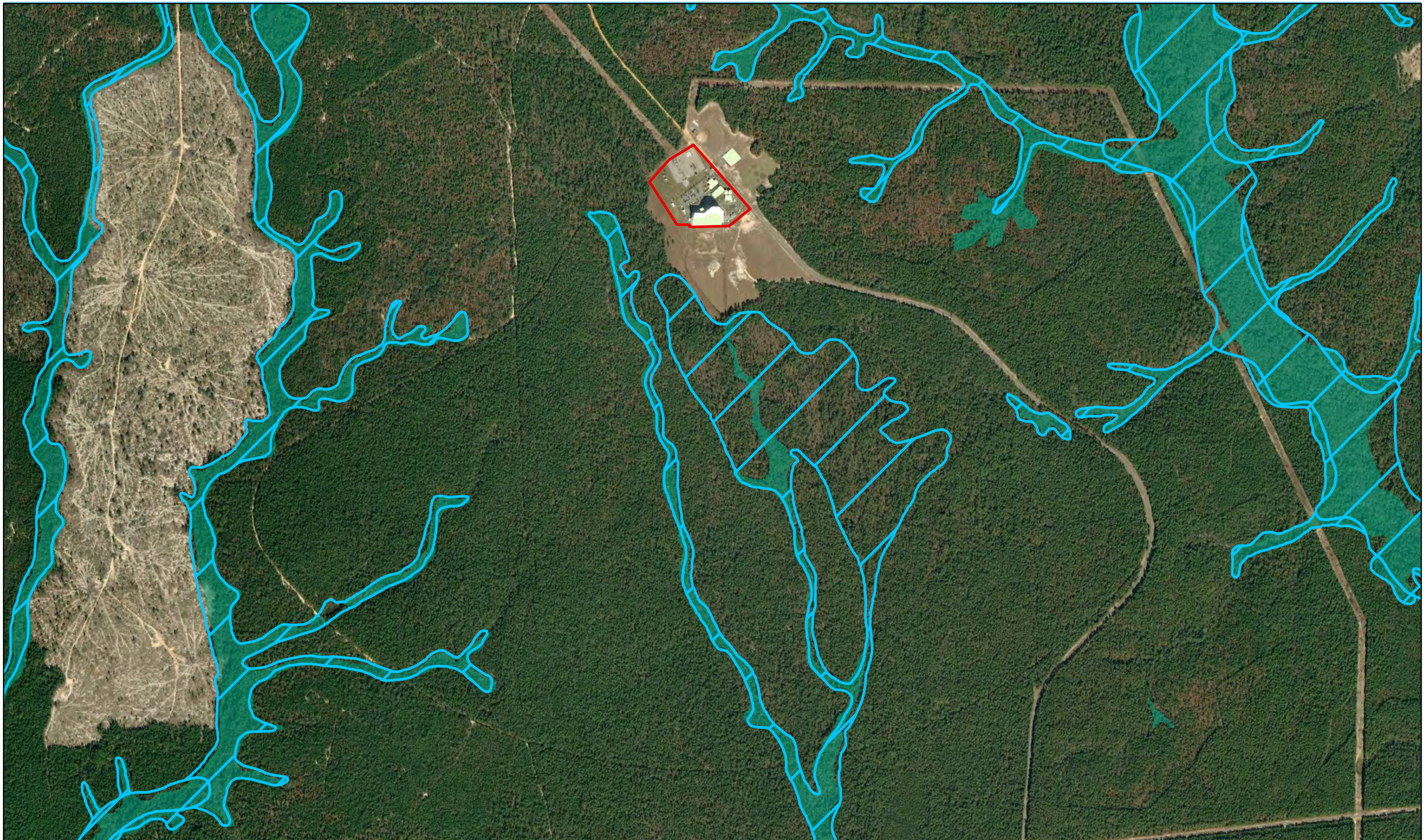


Figure 3-5
Site C-6 20 SPCS Environmental Constraints
Eglin AFB Cantonment Areas
Draft EA
Eglin Air Force Base, Florida

3.1.2 Land Use Constraints

The following land use constraints were identified within the five cantonment areas:

- Probable or possible unexploded ordnance (UXO)
- Airfield Clear Zones (CZ) and Accident Potential Zones (APZ)
- Explosives Safety Quantity Distance (ESQD) arcs
- Military Surface Danger Zones (SDZs)
- Live-fire ranges
- Aircraft noise contours/Air Installations Compatible Use Zones (AICUZ)

Figures 3-6 through **3-10** show land use constraints occurring at each of the cantonment areas. Some development activities may occur in areas where land use constraints occur providing that actions comply with applicable Air Force and installation-specific requirements and that proper coordination occurs.

3.2 Air Quality

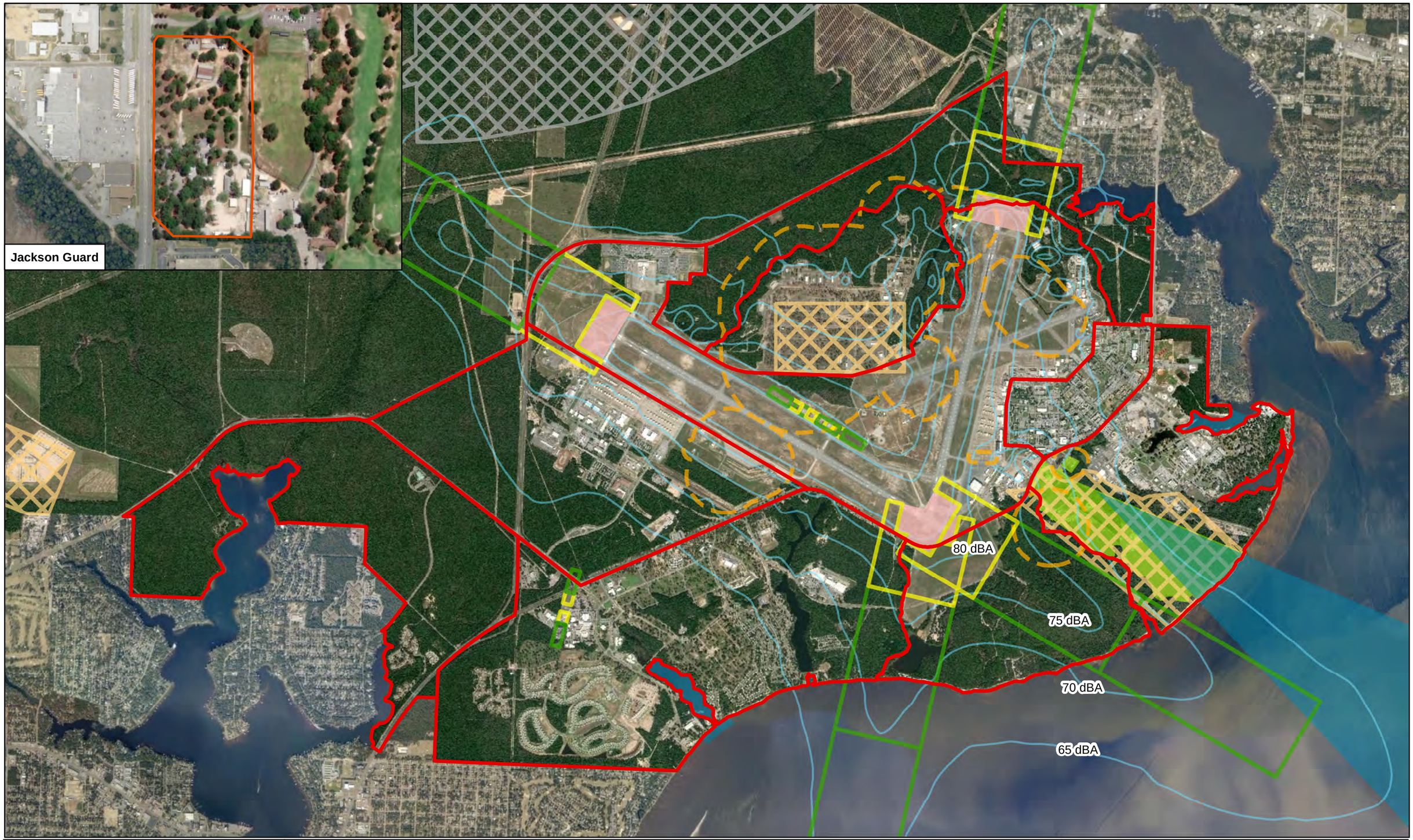
3.2.1 Definition

Air Quality can be affected by many types of pollutants that are emitted from various sources, including both stationary and mobile sources. These sources release both criteria and hazardous air pollutants, which cause health effects, ecological harm, and material damage.

The CAA was enacted in 1970 to reduce emissions of harmful pollutants to the air and protect air quality. The CAA required the USEPA and states to establish standards aimed at reducing pollutant emissions. The USEPA set NAAQS for six principal pollutants, which are called criteria air pollutants, and are codified in 40 CFR 50. These standards represent the maximum allowable atmospheric concentration that may occur and still protect public health and welfare. The NAAQS provide both short- and long-term standards for the following criteria air pollutants: carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter equal to or less than 10 microns (PM_{10}) and 2.5 microns ($PM_{2.5}$), ozone (O_3), and lead (Pb).[62]

Under the CAA, it is the responsibility of the individual states to achieve and maintain the NAAQS. To accomplish this, states use the USEPA-required State Implementation Plan (SIP) designed to reduce the level of pollutants in the air and bring the state into compliance with the NAAQS. All areas of the U.S. are designated as having air quality better than (attainment) or worse than (nonattainment) the NAAQS. Areas that meet the air quality standard for the criteria pollutants are designated as being in attainment. Areas where there are insufficient air quality data for the USEPA to form a basis for attainment status are unclassifiable and are treated as attainment areas until proven otherwise. Maintenance areas are those that were previously classified as nonattainment but where air pollution concentrations have been reduced to levels below the standard. Maintenance areas are subject to special maintenance plans to ensure compliance with the NAAQS. Areas that do not meet the air quality standard for one of the criteria pollutants may be subject to the formal rule-making process and designated as being in nonattainment for that standard.

[62] USEPA. "National Ambient Air Quality Standards (NAAQS)." https://www.epa.gov/criteria-air-pollutants/naaqs-table. December 20, 2016. (August 30, 2019).



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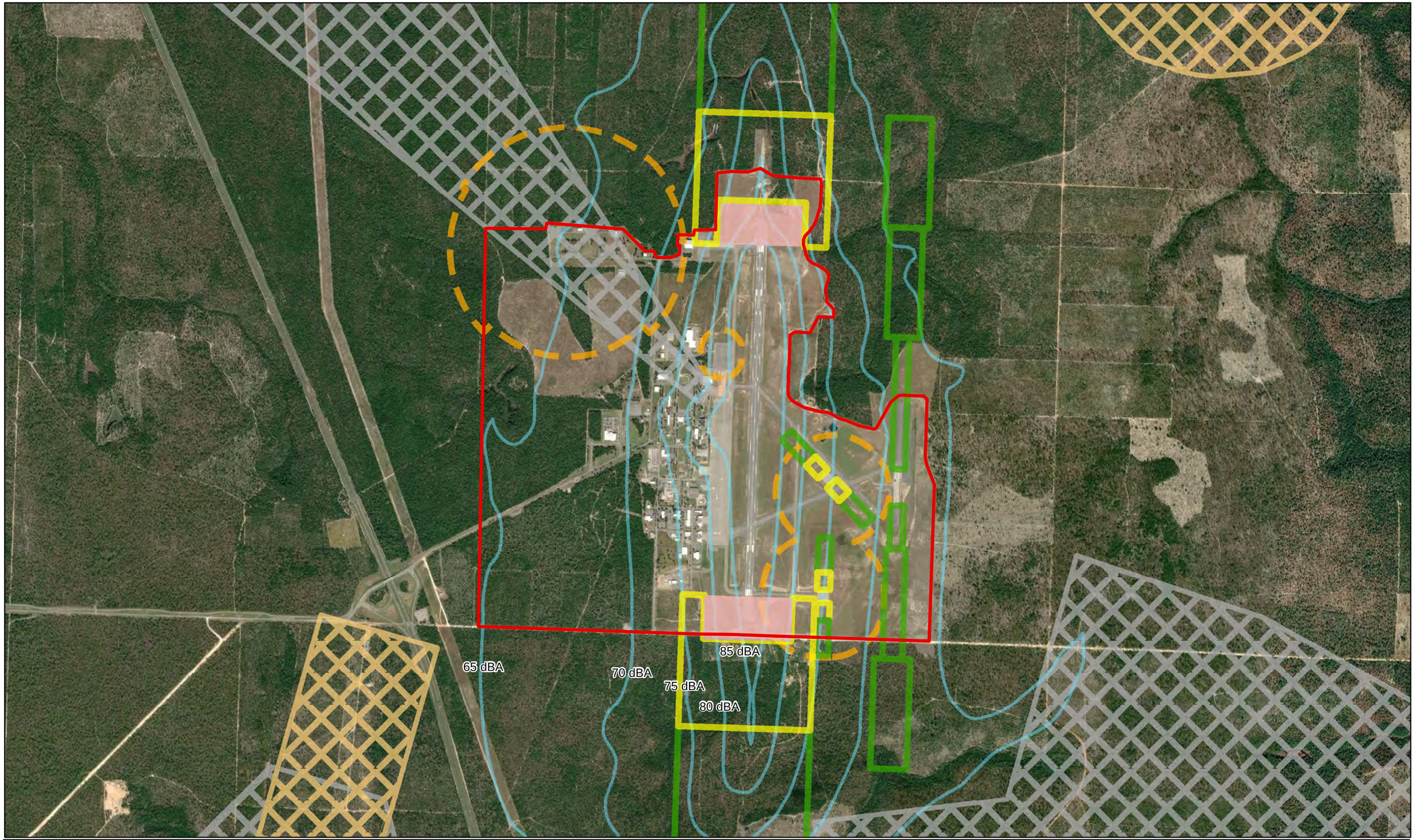
- Eglin Main Districts
- ESQD Arc
- APZ
- CZ
- Graded CZ
- Existing Noise Contours
- Surface Danger Zone
- Active Military Ranges
- Possible UXO Contamination
- Probable UXO Contamination

Figure 3-6
Eglin Main Base Land Use Constraints
Eglin AFB Cantonment Areas
Draft EA
Eglin Air Force Base, Florida



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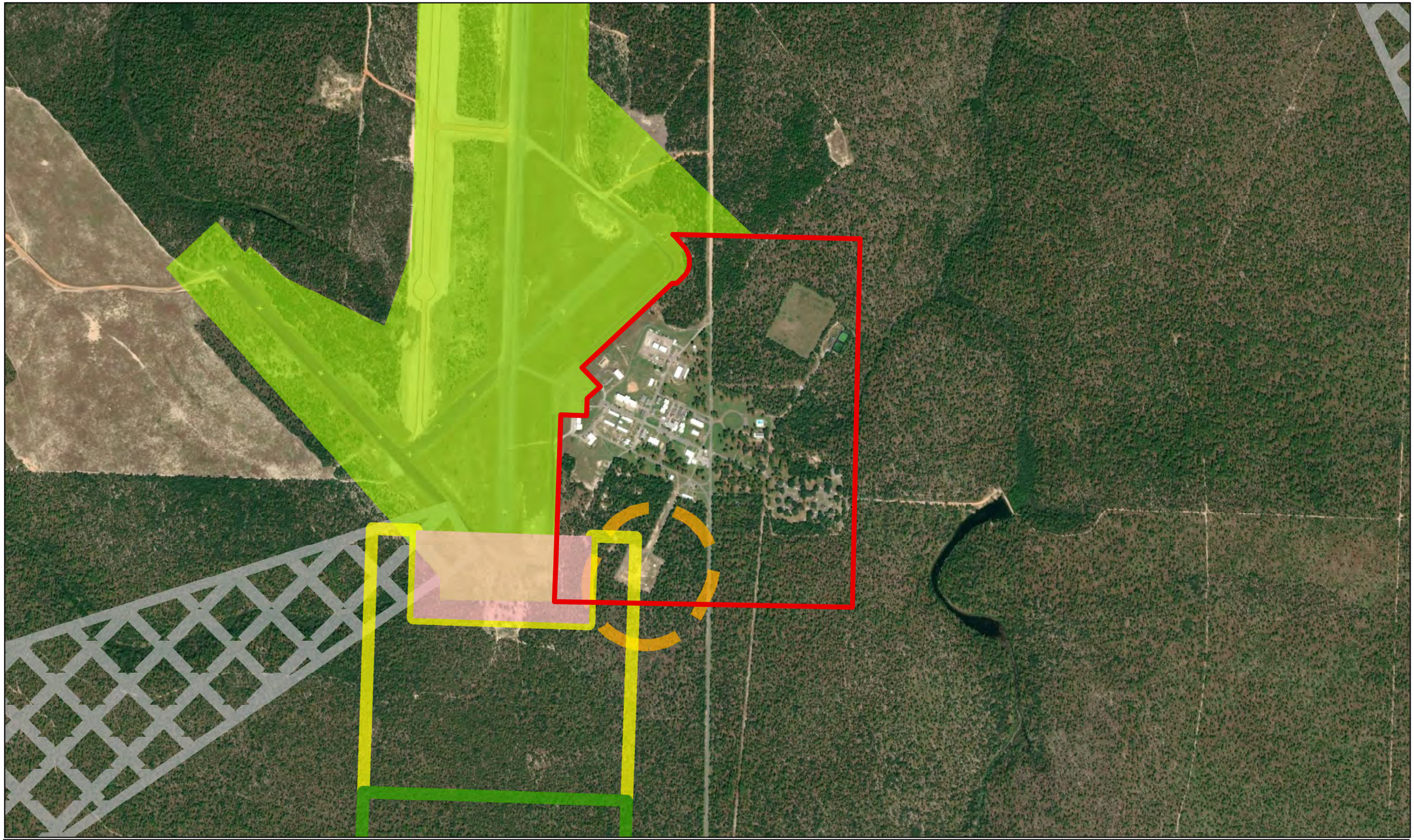
- Duke Field Boundary
- Existing Noise Contours
- APZ
- CZ
- Graded CZ
- ESQD Arc
- Active Military Ranges
- Surface Danger Zone
- Possible UXO Contamination
- Probable UXO Contamination

Figure 3-7
Duke Field Land Use Constraints
Eglin AFB Cantonment Areas
Draft EA
Eglin Air Force Base, Florida



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- Camp Rudder Boundary
- ESQD Arc
- APZ
- CZ
- Graded CZ
- Active Military Ranges
- Possible UXO Contamination

Figure 3-8
Camp Rudder Land Use Constraints
Eglin AFB Cantonment Areas
Draft EA
Eglin Air Force Base, Florida

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7SFG (A) Boundary

Possible UXO Contamination

Active Military Ranges

Figure 3-9
7 SFG(A) Cantonment Land Use Constraints
Eglin AFB Cantonment Areas
Draft DOPAA
Eglin Air Force Base, Florida

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Site C-6 20 SPCS Boundary

Probable UXO Contamination

Figure 3-10
Site C-6 20 SPCS Land Use Constraints
Eglin AFB Cantonment Areas
Draft EA
Eglin Air Force Base, Florida

The current NAAQS are listed **Table 3-1** below. Units of measure for the standards are parts per million (ppm) by volume, parts per billion (ppb) by volume, and micrograms per cubic meter of air (µg/m^3).

Table 3-1 National Ambient Air Quality Standards[63]

Pollutant		Primary/ Secondary	Averaging Time	Level	Form
CO		Primary	8-hour	9 ppm	Not to be exceeded more than once per year
			1-hour	35 ppm	
Pb		Primary and Secondary	Rolling 3-month average	0.15 µg/m^3 (1)	Not to be exceeded
NO_2		Primary	1-hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		Primary and Secondary	1 year	53 ppb (2)	Annual Mean
O_3		Primary and Secondary	8-hour	0.70 ppm (3)	Annual fourth-highest daily maximum 8-hour concentration averaged over 3 years
PM	$PM_{2.5}$	Primary	1 year	12.0 µg/m^3	Annual mean, averaged over 3 years
		Secondary	1 year	15.0 µg/m^3	Annual mean, averaged over 3 years
		Primary and Secondary	24 hours	35 µg/m^3	98th percentile, averaged over 3 years
	PM_{10}	Primary and Secondary	24 hours	150 µg/m^3	Not to be exceeded more than once per year on average over 3 years
SO_2		Primary	1-hour	75 ppb (4)	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		Secondary	3-hour	0.5 ppm	Not to be exceeded more than once per year

(1) In areas designated nonattainment for the Pb standards prior to the promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 µg/m^3 as a calendar quarter average) also remain in effect.
(2) The level of the annual NO_2 standard is 0.053 ppm. It is shown here in terms of ppb for the purposes of clearer comparison to the 1-hour standard level.
(3) Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) O_3 standards additionally remain in effect in some areas. Revocation of the previous (2008) O_3 standards and transitioning to the current (2015) standards will be addressed in the implementation rule for the current standards.
(4) The previous SO_2 standards (0.14 ppm 24-hour and 0.03 ppm annual) will additionally remain in effect in certain areas: (1) any area for which it is not yet 1 year since the effective date of designation under the current (2010) standards, and (2) any area for which an implementation plan providing for attainment of the current (2010) standard has not been submitted and approved and which is designated nonattainment under the previous SO_2 standards or is not meeting the requirements of a State Implementation Plan (SIP) call under the previous SO_2 standards (40 CFR 50.4(3)). A SIP call is an EPA action requiring a state to resubmit all or part of its State Implementation Plan to demonstrate attainment of the required NAAQS.

Hazardous air pollutants (HAPs) are chemicals that are known or suspected of causing cancer or other serious health effects. Unlike the criteria pollutants, national ambient standards currently do not exist for HAPs. Some volatile organic compounds (VOCs) are classified as HAPs. VOCs are also ozone precursors

[63] USEPA. "National Ambient Air Quality Standards (NAAQS)." https://www.epa.gov/criteria-air-pollutants/naaqs-table. December 20, 2016. (August 30, 2019).

and include any organic compound involved in atmospheric photochemical reactions, except those designated by an USEPA administrator as having negligible photochemical reactivity. HAPs are not covered by the NAAQS but may present a threat of adverse human health or environmental effects under certain conditions.

Eglin AFB is a major source of criteria pollutants under the federal Title V Operating Permit Program, and currently operates under Title V Operation Permit 0910031-020-AV.[64] This permit regulates specific major stationary sources of air emissions at Eglin AFB and requires that the emissions from these sources do not exceed major source values regulated under the Title V program. Mobile sources of air emissions at Eglin AFB are not regulated under the Title V permit but they represent a substantial percentage of Eglin's total air emissions. Emissions from mobile sources at Eglin AFB are periodically inventoried as part of Eglin's air quality management program. Eglin AFB emits HAPs during fuel storage, painting, and other activities. HAP emissions at Eglin AFB are estimated on an annual basis; however, Eglin is not a major source of HAPs.[65]

Greenhouse gases (GHGs) are gases that trap heat in the Earth's atmosphere. They are emitted by both natural processes and human activities, and their accumulation in the atmosphere regulates temperature. GHGs include CO_2, methane (CH_4) nitrous oxide (N_2O), hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. To compare GHGs to each other, each GHG quantity is translated into a common unit called the "carbon dioxide equivalent" (CO_{2e}). There are no established thresholds or standards for GHGs. However, GHG emissions estimates are required for assessing a proposed action's potential impact to air quality.

3.2.2 Affected Environment

The ROI for air quality includes Okaloosa County, Walton County, and Santa Rosa County, Florida. All three counties are currently classified as being in attainment for all criteria pollutants under the NAAQS.[66]

Emissions that would be generated by the Proposed Action were compared with the total of Okaloosa County, Walton County, and Santa Rosa County emissions obtained from USEPA's most recent National Emissions Inventory (NEI).[67] These data include emissions amounts from point sources, area sources, and mobile sources. Point sources are stationary sources that can be identified by name and location. Area sources are point sources from which emissions are too low to track individually, such as a home or small office building, or a diffuse stationary source, such as wildfires or agricultural tilling. Mobile sources are any kind of vehicle or equipment with gasoline or diesel engine, an airplane, or a ship. Two types of mobile sources are included: on-road and nonroad. On-road sources consist of vehicles such as cars, light trucks, heavy trucks, buses, engines, and motorcycles. Nonroad sources are aircraft, locomotives, diesel and gasoline boats and ships, personal watercraft, lawn and garden equipment, agricultural and construction

[64] FDEP. "Notice of Final Permit, Title V Air Operation Permit Revision, Permit No. 0910031-020-AV, Eglin Air Force Base." https://depedms.dep.state.fl.us/Oculus/servlet/hitlist?action=hitlist&searchResultParam=fromSearchResultPage# November 2, 2016. (August 30, 2019).
[65] *Ibid.*
[66] USEPA. "Florida Nonattainment/Maintenance Area Status for Each County by Year for All Criteria Pollutants." https://www3.epa.gov/airquality/greenbook/anayo_fl.html. January 31, 2019. (August 30, 2019).
[67] USEPA. *National Emissions Inventory (NEI) Data*. https://www.epa.gov/air-emissions-inventories/2014-national-emissions-inventory-nei-data and https://archive.org/details/2014neiv1FacilityProcess. 2014. (August 30, 2019).

equipment, and recreational vehicles.[68] **Table 3-2** presents the USEPA's 2014 NEI data for Okaloosa, Walton, and Santa Rosa Counties.

Table 3-2 Baseline Air Pollutant Emissions Inventory[69]

County	Air Pollutant Emissions (tons/year)							
	CO	Pb	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC	CO_2e
Okaloosa	71,774.50	0.38	6,612.23	12,176	4,772.89	537.02	47,775.42	2,028,472.23
Walton	46,734	0.045	3,722	14,700	3,767	285	8,445	1,212,284
Santa Rosa	64,574.09	--	6,067.09	15,447.38	4,908.92	1,787.60	47,750.50	1,724,251.39
Total ROI	183,082.59	0.425	16,401.32	42,323.38	13,448.81	2,609.62	103,970.92	4,965,007.61

CO = carbon monoxide; Pb = lead; NOx = nitrogen oxides; PM10 - particulate matter less than 10 microns in diameter; PM2.5 - particulate matter less than 2.5 microns in diameter; SO2 = sulfur dioxide; VOCs = volatile organic compounds (not a criteria pollutant); CO_2e = carbon dioxide equivalent (not a criteria pollutant).

3.2.3 Environmental Consequences

3.2.3.1 No-Action Alternative

As outlined in Chapter 2 (Alternatives), the No-Action Alternative is the approved level of development for the five cantonment areas, described as the Preferred Alternative in the 2014 *Final Eglin Air Force Base Cantonment Areas Environmental Assessment.*[70] Possible actions associated with the approved level of development under the No-Action Alternative include grading, facility construction and demolition, and paving of roads, sidewalks, parking areas, and other impervious surfaces. Construction worker travel, use of stationary equipment (such as generators and saws), use of mobile equipment, and architectural coatings would also be associated with potential development. Fossil fuel combustion during the use of machinery and fugitive dust emissions from ground disturbance would contribute to construction emissions. The results of air quality monitoring conducted for the 2014 *Final Eglin Air Force Base Cantonment Areas Environmental Assessment* concluded that individual pollutant emissions from the No-Action Alternative would not exceed 7.49 percent of the total ROI emissions for each corresponding pollutant. [71] PM_{10} and NO_x would comprise approximately 7.49 and 0.19 percent of the ROI's total PM_{10} and NO_x emissions, respectively.[72] According to the analysis conducted in the 2014 *Final Eglin Air Force Base Cantonment Areas Environmental Assessment*, there would be no major impacts to air quality associated with implementation of the No-Action Alternative.[73]

Implementation of the No-Action Alternative would result in the combustion of fossil fuels, thereby increasing greenhouse gas emissions. Currently, no federal agency has adopted a quantitative threshold to evaluate the significance of an individual Proposed Action's contribution to GHG emissions in the context of NEPA. The results of the greenhouse gas emissions modeling conducted for the 2014 *Final Eglin Air Force Base Cantonment Areas Environmental Assessment* concluded that project combustion emissions would not result in significant impacts to local or regional air quality as a result of implementation of the No-Action Alternative.[74]

[68] USEPA. *2014 National Emissions Inventory, version 2, Technical Support Document.* https://www.epa.gov/sites/production/files/2018-07/documents/nei2014v2_tsd_05jul2018.pdf. July 2018. (August 30, 2019).
[69] USEPA. *National Emissions Inventory (NEI) Data.* https://www.epa.gov/air-emissions-inventories/2014-national-emissions-inventory-nei-data. 2014. (August 30, 2019).
[70] Eglin AFB. *Final Eglin Air Force Base Cantonment Areas Environmental Assessment.* March 2014.
[71] *Ibid,* p. 3-17.
[72] *Ibid.*
[73] Eglin AFB. *Final Eglin Air Force Base Cantonment Areas Environmental Assessment.* March 2014. p. 3-16 – 3-17.
[74] *Ibid*, p. 3-18.

3.2.3.2 Alternative 1

The air emissions estimates for potential demolition and construction projects on Eglin's five cantonment areas were performed using the Air Force Air Conformity Applicability Model (ACAM) application. As such, ACAM's default designations were utilized regarding types and quantities of construction equipment, number of project workers, etc.

Input factors included the potential sizes of the buildings to be demolished and constructed at each location, sizes of areas to be graded, trenched and paved as well as an estimate of the amount of earthen material to be removed from the project areas as well as an equal amount of compaction material to be transported on to the project areas. The basis for the time frame of each phase of each project was also input and based on reviews of prior project analysis at other locations. Emissions factors, assumptions, and complete calculations are included in **Appendix C**, *Air Quality Analysis*.

Results of the ACAM analysis for each Alternative were compared against the General Conformity de minimis threshold values in order to determine if the Alternative's emissions would exceed the maximum net change considered acceptable for an action to emit in an attainment area. General Conformity de minimis threshold values are presented in **Table 3-3**.[75]

Table 3-3 General Conformity De Minimis Threshold Values

Pollutant of Interest	De Minimis Level (tons/year)
CO	100
NO_x	100
PM_{10}	100
$PM_{2.5}$	100
SO_x	100
VOCs	100

As described in **Table 2-3**, Alternative 1 would authorize an additional 1,440,246 ft^2 of facilities construction, 225.4 acres of parking/impervious surfaces, 81.6 acres of roads/infrastructure, and 213,174 ft^2 of demolition across the six identified areas. No specific projects have been identified under Alternative 1, and projects would vary in size, scope, and implementation date across the cantonment areas. Each individual project would require the submittal of an AF FORM 813, *Request for Environmental Impact Analysis*, prior to implementation in order to analyze individual impacts of specific projects.

Possible actions associated with the approved level of development under Alternative 1 include grading, facility construction and demolition, and paving of roads, sidewalks, parking areas, and other impervious surfaces. Construction worker travel, use of stationary equipment (such as generators and saws), use of mobile equipment, and architectural coatings would also be associated with potential development. Fossil fuel combustion during the use of machinery and fugitive dust emissions from ground disturbance would contribute to construction emissions. Individual pollutant emissions resulting from implementation of Alternative 1 are shown in **Table 3-4.**

[75] Air Force Civil Engineer Center, Compliance Technical Support Branch. *Air Force Air Quality Environmental Impact Analysis Process (EIAP) Guide – Fundamentals, Volume 1 of 2*. August 2017. p. 63.

Table 3-4 Alternative 1 Emissions

Source	Total Projected Emissions (tons/yr)						
	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_x	VOCs	CO_{2e}
Eglin Main	7.31	9.48	44.93	0.41	0.03	1.51	2,798.90
Duke Field	4.94	5.63	16.46	0.26	0.01	0.98	1,388.40
7 SFG(A)	2.58	2.72	4.88	0.13	0.01	0.43	625.80
Camp Rudder	3.51	3.85	18.44	0.18	0.01	0.64	884.30
Site C-6 20 SPCS	1.15	1.43	0.21	0.07	0.00	0.23	305.30
Total	**19.49**	**23.11**	**84.92**	**1.04**	**0.06**	**3.80**	**6,002.70**
ROI Emissions	183,083	16,401	42,323	13,449	2,610	103,971	4,965,007
Percent of ROI Emissions	0.011%	0.141%	0.201%	0.008%	0.002%	0.004%	0.121%

As demonstrated in **Table 3-4**, individual pollutant emissions from the implementation of Alternative 1 would not exceed the General Conformity de minimis threshold values outlined in **Table 3-3** for any of the criteria pollutants. Therefore, no significant impacts to air quality would be associated with the implementation of Alternative 1.

Implementation of the No-Action Alternative would result in the combustion of fossil fuels, thereby increasing greenhouse gas emissions. Currently, no federal agency has adopted a quantitative threshold to evaluate the significance of an individual Proposed Action's contribution to GHG emissions in the context of NEPA. Nevertheless, GHG emissions were estimated for anticipated development occurring under Alternative 1, and **Table 3-4** summarizes the Proposed Action emissions of the GHG in terms of CO_{2e}. GHG emissions were quantified in order to provide information for comparison by members of the public as well as decision makers. However, there is currently no regulatory or USAF threshold for significance determination.

3.2.3.3 Alternative 2

The emissions estimates for Alternative 2 are based on the same assumptions and input factors identified in Alternative 1.

As described in **Table 2-4**, Alternative 2 would authorize an additional 25 percent increase in development over Alternative 1 for a total of 1,800,308 ft^2 of facilities construction, 281.85 acres of parking/impervious surfaces, 102.05 acres of roads/infrastructure, and 266,468 ft^2 of demolition. The additional development outlined above would increase the notional footprint for development that was approved under the No-Action Alternative. No specific projects have been identified under Alternative 2, and projects would vary in size, scope, and implementation date across the cantonment areas. Each individual project would require the submittal of an AF FORM 813, *Request for Environmental Impact Analysis*, prior to implementation in order to analyze individual impacts of specific projects.

Possible actions associated with the approved level of development under Alternative 2 include grading, facility construction and demolition, and paving of roads, sidewalks, parking areas, and other impervious surfaces. Construction worker travel, use of stationary equipment (such as generators and saws), use of mobile equipment, and architectural coatings would also be associated with potential development. Fossil fuel combustion during the use of machinery and fugitive dust emissions from ground disturbance would contribute to construction emissions. Individual pollutant emissions resulting from implementation of Alternative 2 are shown in **Table 3-5.**

Table 3-5 Alternative 2 Emissions

Source	Total Projected Emissions (tons/yr)						
	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_x	VOCs	CO_{2e}
Eglin Main	8.63	11.39	0.03	1.82	91.93	0.49	3,350.20
Duke Field	6.74	8.27	0.02	1.34	67.11	0.36	2,281.40
7 SFG(A)	2.74	2.93	0.01	0.47	6.14	0.14	679.70
Camp Rudder	3.74	4.24	0.01	0.70	19.28	0.19	995.90
Site C-6 20 SPCS	2.98	4.88	0.01	0.60	0.40	0.21	995.90
Total	**24.83**	**31.71**	**0.08**	**4.93**	**184.86**	**1.38**	**8,303.10**
ROI Emissions	183,083	16,401	2,610	103,971	42,323	13,449	4,965,007
Percent of ROI Emissions	0.014%	0.193%	0.003%	0.005%	0.437%	0.010%	0.167%

As demonstrated in **Table 3-5**, individual pollutant emissions from the implementation of Alternative 2 would not exceed the General Conformity de minimis threshold values outlined in **Table 3-3** for CO, NO_x, PM_{10}, $PM_{2.5}$, or VOCs. A significance indicator for SO_x may be exceeded under implementation of Alternative 2; however, the increase in emissions would be temporary and a result of construction. This exceedance would not cause long-term adverse air quality impacts due to its temporary nature. Therefore, no significant impacts to air quality would be associated with the implementation of Alternative 2.

Implementation of the No-Action Alternative would result in the combustion of fossil fuels, thereby increasing greenhouse gas emissions. Currently, no federal agency has adopted a quantitative threshold to evaluate the significance of an individual Proposed Action's contribution to GHG emissions in the context of NEPA. Nevertheless, GHG emissions were estimated for anticipated development occurring under Alternative 2, and **Table 3-5** summarizes the Proposed Action emissions of the GHG in terms of CO_2 equivalent (CO_{2e}). GHG emissions were quantified in order to provide information for comparison by members of the public as well as decision makers. However, there is currently no regulatory or USAF threshold for significance determination.

3.3 Biological Resources

3.3.1 Definition

Biological resources include native or naturalized plants and animals and the habitats (e.g., grasslands, forests, wetlands) in which they exist. Protected and sensitive biological resources include threatened, endangered and candidate species and migratory birds. Threatened, endangered and proposed species are designated by the USFWS (terrestrial and freshwater organisms) and National Marine Fisheries Service (NMFS) (marine organisms) under the ESA or by the FWC under the *Florida Endangered and Threatened Species Act*. Migratory birds are protected species under the MBTA. Sensitive habitats include those areas designated or proposed by USFWS or NMFS as critical habitat protected by the ESA and as sensitive ecological areas designated by state or other federal rulings. Sensitive habitats also include wetlands, plant communities that are unusual or limited in distribution and important seasonal use areas for wildlife (e.g., migration routes, breeding areas, crucial summer and winter habitats).

The ESA (16 United States Code § 1531 et seq.) establishes a federal program to protect and recover imperiled species and the ecosystems upon which they depend. The ESA requires federal agencies, in consultation with USFWS and NMFS, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species. Under the ESA, "jeopardy" occurs when an action is reasonably expected, directly or indirectly, to diminish numbers, reproduction, or distribution of

a species so that the likelihood of survival and recovery in the wild is appreciably reduced. An "endangered species" is defined by the ESA as any species in danger of extinction throughout all or a significant portion of its range. A "threatened species" is defined by the ESA as any species likely to become an endangered species in the foreseeable future. The ESA also prohibits any action that causes a "take" of any listed animal. "Take" is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct." Listed plants are not protected from take, although it is illegal to collect or maliciously harm them on federal land. Under Section 7 of the ESA, federal agencies must consult with USFWS when their actions may affect a federally listed species. This process usually begins as informal consultation. Informal consultation is the process by which a federal agency requests USFWS concurrence of the agency's determination that its action is not likely to affect a federally listed species. Formal consultation is required when a federal agency determines that its action is likely to adversely affect a federally listed species. Formal consultation includes a federal agency request for formal consultation, sharing of information between the federal agency and USFWS, and USFWS preparation of a biological opinion on whether the action would jeopardize the continued existence of a federally listed species.

Critical habitat is designated if USFWS or NMFS determines that the habitat is essential to the conservation of a threatened or endangered species. Federal agencies must ensure that their activities do not adversely modify designated critical habitat to the point that it will no longer aid in the species' recovery.

In Florida, the FWC oversees the protection and management of state-protected fauna under the *Florida Endangered and Threatened Species Act* (Florida Statute 372.072). Within the FAC, protection is provided to endangered species (68A-27.003 FAC), threatened species (68A-27.004 FAC), and species of special concern (68A-27.005 FAC). The Florida Department of Agriculture and Consumer Services maintains the state list of plants designated as endangered, threatened, and commercially exploited (5B-40 FAC) as defined under Florida Statute 581.185(2).

The MBTA of 1918 (16 United States Code § 703–712), as amended, and EO 13186, R*esponsibilities of Federal Agencies to Protect Migratory Birds*, require federal agencies to minimize or avoid impacts on migratory birds. Unless otherwise permitted by regulations, the MBTA makes it unlawful to (or attempt to) pursue, hunt, take, capture, or kill any migratory bird, nest, or egg. Federal agencies with activities that that could have measurable negative impacts on migratory birds are directed by EO 13186 to develop and implement a Memorandum of Understanding with USFWS to promote the conservation of migratory bird populations.

Bald and golden eagles are protected under the BGEPA, which prohibits the "take" of bald or golden eagles in the United States. BGEPA defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb." For purposes of these guidelines, "disturb" means "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause: (1) injury to an eagle; (2) a decrease in its productivity by substantially interfering with normal breeding, feeding, or sheltering behavior; or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior." In addition to immediate impacts, this definition also covers impacts that result from human-induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagle's return, such alterations agitate or bother an eagle to a degree that interferes with or interrupts normal breeding, feeding, or sheltering habits, and causes injury, death, or nest abandonment.

3.3.2 Affected Environment

The large size of Eglin AFB lends itself to broad diversity of vegetation and wildlife across the base. The five cantonment areas are spread out throughout the Base and because the proposed development would occur at each of the five cantonment areas, each will be discussed in kind. Eglin AFB as a whole is home

to four broad ecological associations as defined by flora, fauna, and geophysical attributes, including the Sandhill Matrix, Flatwoods Matrix, Barrier Island Matrix, and Wetlands/Riparian Matrix.[76] These four ecological associations describe the majority of land cover types found on Eglin AFB, with the exception of artificially maintained open grassland/shrubland areas and developed/urban areas. With the exception of some undeveloped portions of Eglin Main, the five cantonment areas predominantly feature developed/urban landscapes.

Habitat degradation or alteration occurs when physical damage or changes are made to terrestrial or aquatic resources as a result of development. Actions such as filling, clearing, grading, or construction associated with proposed development could contribute to habitat alteration. Habitat degradation or alteration is especially significant for sensitive species or species of concern. Species that are listed or on the ESA receive federal protection, as do species listed under the other acts. Ten federally protected species and their habitats are known to occur within the boundaries of the Eglin Main Range (refer to **Table 3-6**).[77]

Table 3-6 Federally Listed T&E Species on Eglin Mainland Reservation

Species		Federal Status
Scientific Name	**Common Name**	
Ambystoma bishopi	Reticulated Flatwoods Salamander	Endangered
Picoides borealis	Red-cockaded woodpecker	Endangered
Villosa choctawensis	Choctaw bean	Endangered
Etheostoma okaloosae	Okaloosa darter	Threatened
Acipenser oxyrinchus desotoi	Gulf sturgeon	Threatened
Fusconaia escambia	Narrow pigtoe	Threatened
Drymarchon couperi	Eastern indigo snake	Threatened
Hamiota australis	Southern sandshell	Threatened
Haliaeetus leucocephalus	Fuzzy pigtoe	Threatened
Gopherus polyphemus	Gopher tortoise	Candidate
Haliaeetus leucocephalus	Bald eagle	BGEPA

BGEPA = Protected by BGEPA

Sensitive species that are not federally protected by the ESA, BGEPA, MMPA, and MBTA may be protected by state-specific legislation that provides protection for statewide species of importance. Under FAC 68A-27, animal species may also be listed and qualify for regulatory protection by the FWC. Plant species may be designated for state listing and regulatory protection under FAC Chapter 5B-40 by the Florida Department of Agriculture and Consumer Services.

Federally protected sensitive species known to occur on or near the five cantonment areas include the red-cockaded woodpecker (RCW), and eastern indigo snake. Choctaw bean, Gulf sturgeon, narrow pigtoe, southern sandshell, fuzzy pigtoe, and reticulated flatwoods salamander are not known to occur within or in the immediate vicinity of the cantonment areas; therefore, these species receive no further analysis in the document. State protected sensitive species known to occur on or near the five cantonment areas include the Florida pine snake (*Pituophis melanoleucus*) and the gopher tortoise (*Gopherus polyphemus*). Undeveloped portions of the cantonment areas often feature trees, shrubs, and other vegetation that provides habitat for migratory birds, protected under the MBTA.

[76] Eglin AFB. *Integrated Natural Resources Management Plan.* August 2017. p. 45-48.
[77] Eglin AFB. *Integrated Natural Resources Management Plan.* August 2017. p. 50.

Red-cockaded woodpecker

The RCW is a small (8- to 9-inch) woodpecker with black and white coloring and a longish bill.[78] The bird features a black grown, nape, and moustachial stripe border; the cheeks and side of the neck are white.[79] Male specimens have a small red mark, or "cockade," on each side of the head.[80] One of only two federally protected species of woodpecker, RCW live in small family groups and are known to be social and vocal within their species as compared to other woodpeckers.[81] The RCW feeds predominantly on insects in the egg, larvae and adult stages, including beetles, ants, roaches, spiders and other insects found in or on pine trees.[82] A small portion of the diet is also comprised of fruits and seeds.[83]

The RCW is found in the southeastern United States and prefer living in mature pine forests, particularly those containing longleaf pines between 80 to 120 years old and loblolly pines averaging 70 to 100 years old.[84] While pine savannahs and open woodlands were once pervasive across the southeastern United States, approximately one percent of the original RCW habitat remains.[85] Unlike the majority of woodpecker species, which excavate dead trees, RCW create cavities exclusively in living trees. The birds take approximately three years to excavate the cavities used for nesting and roosting, and they remain loyal to their cavity trees.[86] Groups are generally comprised of a breeding pair and "helper" single males; each RCW occupies its own cavity within the tree.[87]

Eastern indigo snake

The eastern indigo snake is an extremely large snake that can reach a length of 8.5 feet, making it the longest native snake in the United States.[88] It is listed as threatened on both the federal and state threatened and endangered species list due to its slow-moving, docile nature, which makes it an easy target for over-collection for the domestic and international pet trade.[89] The snake is best known for the "lustrous, glossy, iridescent, blue-black coloration of the head and body" but may also have red, reddish-orange, or cream coloration on the chin, throat, or cheeks.[90] The snake feeds predominantly on other snakes, turtles, mammals, frogs, birds, and lizards.[91] Eastern indigo snakes prefer to burrow during the winter months, utilizing the burrows of gopher tortoises and other species.[92] During the warmer summer months, eastern indigo snakes may be found near "more densely vegetated moist habitats, suggesting a

[78] USFWS, Environmental Conservation Online System (ECOS), "Species Profile for Red-cockaded woodpecker (*Picoides borealis*)," https://ecos.fws.gov/ecp0/profile/speciesProfile?spcode=B04F, (November 29, 2018).
[79] *Ibid.*
[80] *Ibid.*
[81] USFWS, Endangered Species Act Library, "*Red-cockaded Woodpecker* (*Picoides borealis*)," https://www.fws.gov/endangered/esa-library/pdf/woodpecker.pdf, (November 29, 2018).
[82] USFWS, "Red-cockaded Woodpecker Recovery," https://www.fws.gov/rcwrecovery/rcw.html, September 20, 2019 (October 17, 2019).
[83] *Ibid.*
[84] USFWS, Endangered Species Act Library, "*Red-cockaded Woodpecker* (*Picoides borealis*)," https://www.fws.gov/endangered/esa-library/pdf/woodpecker.pdf, (November 29, 2018).
[85] *Ibid.*
[86] *Ibid.*
[87] *Ibid.*
[88] National Park Service, Everglades National Park, "Eastern Indigo Snake: Species Profile," https://www.nps.gov/ever/learn/nature/easternindigosnake.htm, October 17, 2017, (January 15, 2019).
[89] *Ibid.*
[90] USFWS, "Eastern Indigo Snake Fact Sheet," https://www.fws.gov/panamacity/resources/EasternIndigoSnakeFactSheet.pdf, (January 15, 2019).
[91] *Ibid.*
[92] Eglin AFB. *Integrated Natural Resources Management Plan.* August 2017. p. 132.

potential seasonal selection of habitat related to thermoregulation."[93] Therefore, their typical habitat is similar to that of gopher tortoises**.** Eastern indigo snakes have documented sightings at 17 sites across the Eglin Reservation; [94] 29 sightings occurred between 1956 and 1999, but no sightings have been reported since 1999.[95]

Florida pine snake

The Florida pine snake is one of the largest snakes found in Eastern North America; the snakes can reach up to 84 inches in length.[96] The Florida pine snake is listed as a species of special concern in the state of Florida and has a dark brown body with dark splotches, a white underside, ridged scales, a small head, and pointed snout.[97] Nesting occurs throughout summer, June through August, with eggs hatching in early fall (September and October).[98] The female pine snake builds nests by creating side burrows in the main burrows of other burrowing species, such as the gopher tortoise or pocket gopher.[99] Their diets consist primarily of ground-dwelling birds and other small mammals, such as mice, pocket gophers, and immature rabbits.[100]

Habitat for the pine snake primarily consists of well-drained, sandy soils in an open to moderately covered canopy area.[101] Pine snakes live in close proximity to gopher tortoises.[102] The species is somewhat dependent on prescribed fire to maintain the health of its habitat, as it requires a moderately open canopy that is regularly cleared by fire to prevent the encroachment of hardwoods. The Florida pine snake is found in nearly every county in the state, including the four counties comprising Eglin AFB.

Gopher tortoise

The gopher tortoise is a "moderate-sized, terrestrial turtle, averaging 9-11 inches in length."[103] These animals, which are a candidate for listing as a federally threatened species in the state of Florida,[104] typically live 40 to 60 years in the wild and have "shovel-like forelimbs adapted for digging" and long tan, brown, or grey shells.[105] Gopher tortoises are "primarily herbivorous creatures…[that] eat grasses, mushrooms, saw palmetto berries, and prickly pear cactus pads, fruits and flowers, as well as blackberries,

[93] USFWS. *Indigo Snake Programmatic Biological Opinion Eglin Air Force Base, Florida.* February 18, 2009. p. 13.
[94] Eglin AFB. *Integrated Natural Resources Management Plan.* August 2017. p. 132.
[95] Eglin AFB. *Threatened and Endangered Species Component Plan Update.* May 4, 2017.
[96] Florida Fish and Wildlife Conservation Commission, "Florida Pine Snake," http://myfwc.com/wildlifehabitats/imperiled/profiles/reptiles/florida-pine-snake/, (December 19, 2018)
[97] Florida Natural Areas Inventory. *Field Guide to the Rare Animals of Florida.* https://www.fnai.org/FieldGuide/pdf/Pituophis_melanoleucus_mugitus.PDF (December 18, 2018)
[98] *Ibid.*
[99] Florida Fish and Wildlife Conservation Commission, *A Species Action Plan for the Florida Pine Snake (Pituophis melanoleucus mugitus)*, November 1, 2013. p. 3.
[100] *Ibid.*
[101] Ernst, C. H., and E. M. Ernst. 2003. *Snakes of the United States and Canada*. Smithsonian Books, Washington, D.C., USA. p. 668.
[102] Florida Fish and Wildlife Conservation Commission, *A Species Action Plan for the Florida Pine Snake (Pituophis melanoleucus mugitus)*, November 1, 2013. p. iii.
[103] Florida Fish and Wildlife Conservation Commission, "Gopher Tortoise," http://myfwc.com/wildlifehabitats/profiles/reptiles-and-amphibians/reptiles/gopher-tortoise/, (January 30, 2019)
[104] USFWS, Environmental Conservation Online System (ECOS), "Species Profile for Gopher Tortoise (*Gopherus polyphemus*)," https://ecos.fws.gov/ecp0/profile/speciesProfile?spcode=C044, (December 10, 2018).
[105] Florida Fish and Wildlife Conservation Commission, "Gopher Tortoise," http://myfwc.com/wildlifehabitats/profiles/reptiles-and-amphibians/reptiles/gopher-tortoise/, (January 30, 2019)

blueberries, gopher apples and other low-growing fruits."[106] The gopher tortoise is the only North American tortoise species found east of the Mississippi River.[107] Populations of the gopher tortoise have been regulated in Florida since 1972 and fully protected since 1988;[108] the species is listed as threatened in the state of Florida, and both the tortoise and its burrow are protected under FAC Chapter 68A-27.[109] Gopher tortoises must be relocated prior to land clearing or development that occurs in the vicinity of their known habitat.[110]

The preferred habitat of the gopher tortoise is a well-drained, sandy area with plenty of low-growing vegetation and a sparse tree canopy.[111] This habitat is pervasive across undeveloped areas in the Florida panhandle; gopher tortoise burrows are located throughout the Eglin Main Range,[112] including in the vicinity of the project area. Gopher tortoise burrows also serve as habitat for over 350 other species,[113] including the federally protected Eastern indigo snake.

Migratory birds

Migratory birds are protected under the MBTA (16 USC § 703–712), as amended, EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds,* and Solicitor's Opinion M-37050, *The Migratory Bird Treaty Act Does Not Prohibit Incidental Take.* This legislation requires federal agencies to minimize or avoid impacts on migratory birds. Unless otherwise permitted by regulations, the MBTA makes it unlawful to (or attempt to) pursue, hunt, take, capture, or kill any migratory bird, nest, or egg; Solicitor's Opinion M-37050 clarifies that incidental take is not prohibited and that the intent of the MBTA is to prevent "affirmative actions that have as their purpose the taking or killing of migratory birds, their nests, or their eggs."[114] In order to protect migratory bird species, Eglin Natural Resources Office (NRO) coordinates with project proponents during the NEPA process in order to minimize and avoid impacts. In the event an impact is deemed unavoidable, Eglin NRO coordinates directly with USFWS in advance of implementation of the proposed action.

3.3.2.1 Eglin Main Base

As depicted in **Figure 3-11**, Eglin Main is highly developed with large urbanized areas. The dominant ecological association at Eglin Main is the Sandhill Matrix, which is predominantly hardwood forest. The southeastern portion of the base, particularly southeast of the airfield, features a mixture of

[106] USFWS, North Florida Ecological Services Office, "Gopher Tortoise," https://www.fws.gov/northflorida/GopherTortoise/Gopher_Tortoise_Fact_Sheet.html, February 20, 2018 (October 17, 2019).
[107] Florida Fish and Wildlife Conservation Commission, "Gopher Tortoise," http://myfwc.com/wildlifehabitats/profiles/reptiles-and-amphibians/reptiles/gopher-tortoise/, (January 30, 2019)
[108] Florida Fish and Wildlife Conservation Commission, "Gopher Tortoise Management Plan," http://myfwc.com/wildlifehabitats/managed/gopher-tortoise/management-plan/, (December 11, 2018).
[109] Florida Fish and Wildlife Conservation Commission, "Gopher Tortoise," http://myfwc.com/wildlifehabitats/managed/gopher-tortoise/, (December 11, 2018).
[110] Florida Fish and Wildlife Conservation Commission, "Gopher Tortoise Rules and Regulations," http://myfwc.com/wildlifehabitats/managed/gopher-tortoise/rules-and-regulations/, (December 11, 2018).
[111] Florida Fish and Wildlife Conservation Commission, "Gopher Tortoise," http://myfwc.com/wildlifehabitats/managed/gopher-tortoise/, (December 11, 2018).
[112] Eglin AFB. *Integrated Natural Resources Management Plan.* August 2017. p. 133.
[113] Florida Fish and Wildlife Conservation Commission, "Gopher Tortoise," http://myfwc.com/wildlifehabitats/managed/gopher-tortoise/, (December 11, 2018).
[114] DOI. *Solicitor's Opinion M-37050: The Migratory Bird Treaty Act Does Not Prohibit Incidental Take.* https://www.doi.gov/sites/doi.gov/files/uploads/m-37050.pdf. December 22, 2017. (April 2, 2019).

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Feet

Legend

- Eglin Main Districts
- Grassland/Shrubland
- Sandhill
- Wetlands/Riparian
- Flatwood
- Open Water
- Urban

Figure 3-11
Eglin Main Base Ecological Associations
Eglin AFB Cantonment Areas
Draft EA
Eglin Air Force Base, Florida

wetland/riparian areas, flatwoods, and grassland/shrubland. Some of these natural areas, including those near Choctawhatchee Bay and bordering Toms Creek, are considered high quality.[115]

Eglin Main borders the Choctawhatchee Bay, which is critical habitat for the Gulf sturgeon (refer to **Figure 3-12**). Okaloosa darter protective buffers are in place around Toms Creek and its tributaries, which are located in the northeastern corner of the base in the vicinity of the airfield. Two bald eagle nests are located on Eglin Main, including one bordering Choctawhatchee Bay and one in the southwestern corner of the base. Inactive cavity trees for RCW are primarily concentrated in three areas of Eglin Main, including the western portion of the base, central, and just north of the airfield. No active cavity trees are located on Eglin Main and none are anticipated to occur due to inadequate foraging habitat in the vicinity.

All of Jackson Guard is developed (refer to **Figure 3-11**). No habitat considered suitable for special status species is located in the vicinity of Jackson Guard (refer to **Figure 3-12**).

3.3.2.2 Duke Field

The majority of the eastern half of Duke Field is developed, with urbanized areas surrounding the airfield (refer to **Figure 3-13**). Areas of grassland/shrubland are also present in the northern and southern portions of the cantonment. The western portion of the cantonment is dominated by sandhills, including hardwood forest and pine production areas.

Several inactive RCW cavity trees are located in the southwest corner of Duke Field (refer to **Figure 3-14**); no active cavity trees are located in the cantonment area. Foraging habitat for RCW is located just outside the boundaries of the southeastern corner of the cantonment; suitable foraging habitat is also located west of the cantonment. Juniper Creek, which includes habitat suitable for Okaloosa darter, is located just south of Duke Field. A high-quality natural community abuts Duke Field on the southeastern corner of the cantonment.[116]

3.3.2.3 Camp Rudder

Camp Rudder is mostly urbanized and features development southeast of the airfield (refer to **Figure 3-13**). Sandhills, including hardwood forest and pine production, are located both north and south of the developed area. Small areas of grassland/shrubland associated with cleared vegetation are also present. No active or inactive RCW cavity trees are located on Camp Rudder. A small area of foraging habitat for RCW is located in the far southeastern corner of the cantonment (refer to **Figure 3-14**). A high-quality natural community also borders Camp Rudder to the east and southeast.[117]

3.3.2.4 7 SFG(A) Cantonment

Virtually all of the 7 SFG(A) Cantonment is developed; however, the area is surrounded by sandhills (refer to **Figure 3-13**). No active or inactive RCW cavity trees are located on the 7 SFG(A) Cantonment; however, some suitable foraging habitat exists on the eastern side of the cantonment area (refer to **Figure 3-14**). A small high-quality natural community is located to the south of 7 SFG(A) Cantonment.[118]

3.3.2.5 Site C-6 20 SPCS Area

Site C-6 20 SPCS Area is entirely developed with small areas of cleared vegetation (refer to **Figure 3-13**). No habitat considered suitable for special status species is located in the vicinity of Site C-6 20 SPCS (refer to **Figure 3-14**). The Alice Creek Outstanding Natural Area (ONA) abuts the cantonment.

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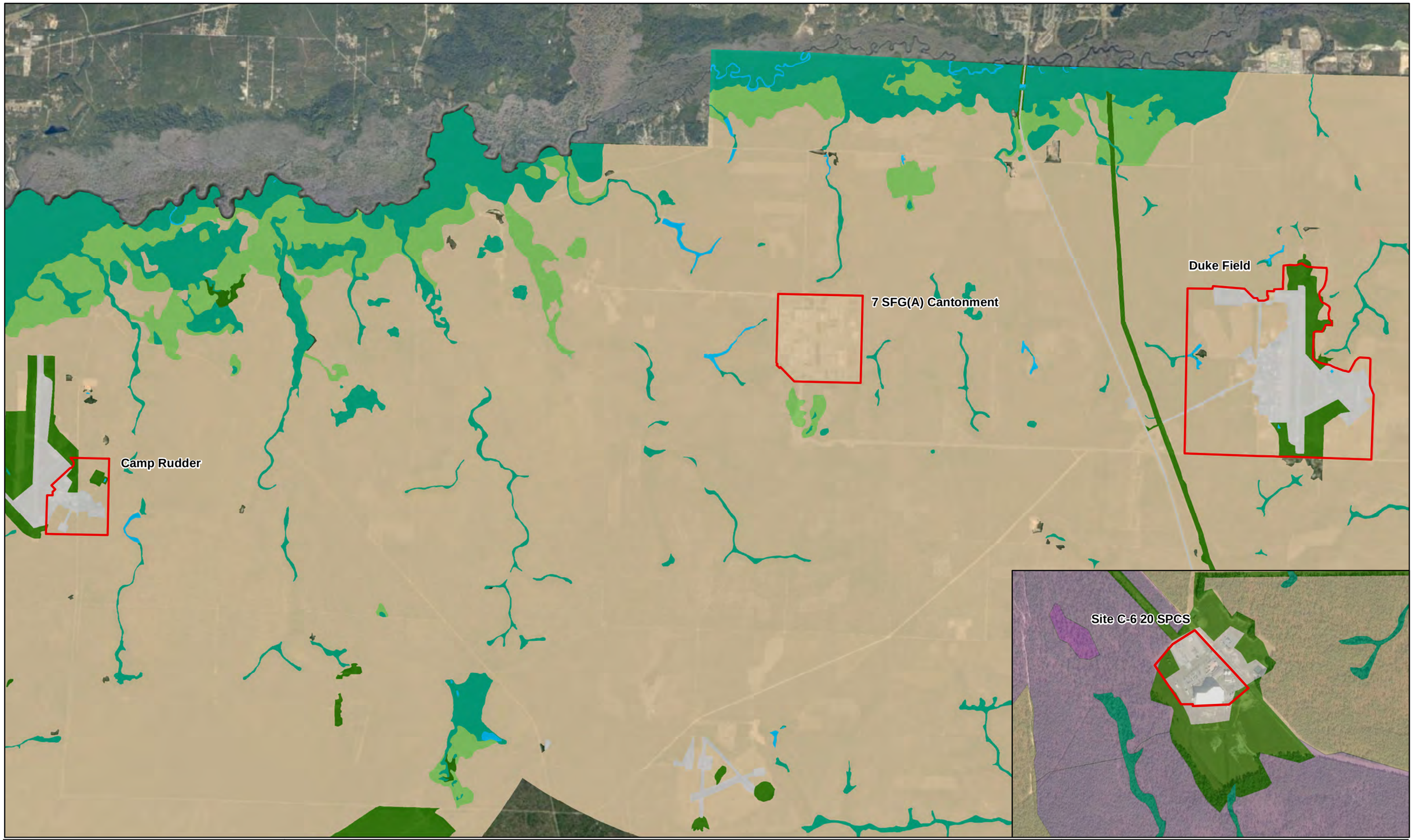
[115] Eglin AFB. *Integrated Natural Resources Management Plan.* 2017. p. 42.
[116] *Ibid.*
[117] *Ibid.*
[118] Eglin AFB. *Integrated Natural Resources Management Plan.* 2017. p. 42.

Legend

- Bald eagle active nest
- Red-cockaded woodpecker (RCW) inactive cavity tree
- Eglin Main Districts
- Protective buffer for potential Okaloosa darter stream
- Gulf sturgeon critical habitat

Figure 3-12
Eglin Main Base Biological Resources
Eglin AFB Cantonment Areas
Draft EA
Eglin Air Force Base, Florida

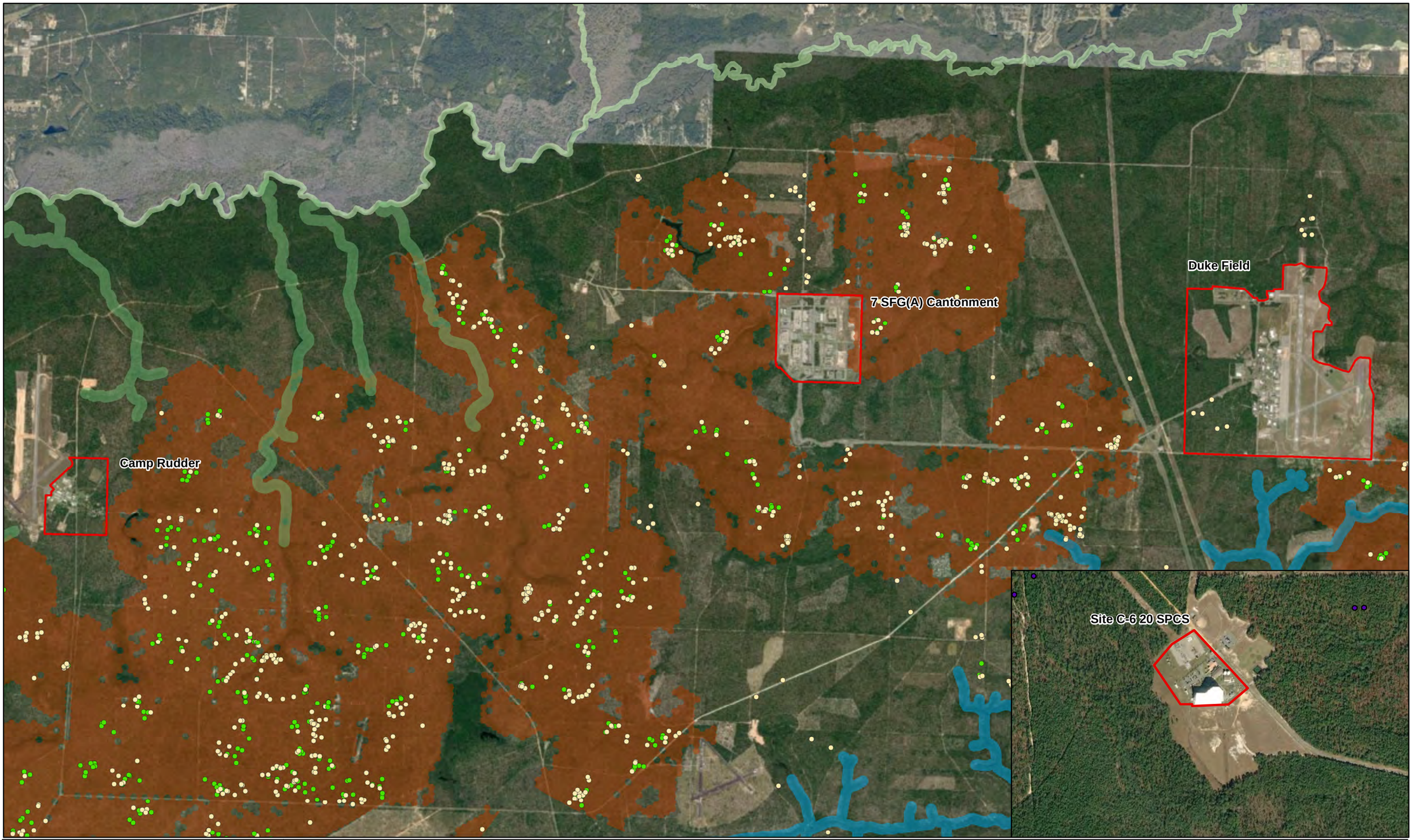


N
W E
S

Legend

- Cantonments
- Grassland/Shrubland
- Sandhill
- Wetlands/Riparian
- Flatwood
- Open Water
- Urban

Figure 3-13
Camp Rudder, 7 SFG(A), Duke Field, Site C-6 20 SPCS
Ecological Associations
Eglin AFB Cantonment Areas
Draft EA
Eglin Air Force Base, Florida



N
W E
S

Legend

- RCW active cavity tree
- RCW inactive cavity tree
- At-risk mussels protective buffer
- Florida bog frog protection buffer
- Protective buffer for potential Okaloosa darter stream
- Red-cockaded woodpecker (RCW) forage area
- Cantonment boundaries

Figure 3-14
Camp Rudder, 7 SFG(A), Duke Field, Site C-6 20 SPCS
Biological Resources
Eglin AFB Cantonment Areas
Draft EA
Eglin Air Force Base, Florida

3.3.3 Environmental Consequences

3.3.3.1 No-Action Alternative

As outlined in Chapter 2 (Alternatives), the No-Action Alternative is the approved level of development for the five cantonment areas, described as the Preferred Alternative in the 2014 *Final Eglin Air Force Base Cantonment Areas Environmental Assessment.*[119] The following describes the current practices and methodology, and subsequent effects pertaining to the No-Action Alternative.

Development authorized under the No-Action Alternative would not be anticipated to result in significant impacts to biological resources. Some loss of habitat would occur in areas of new construction; however, it is anticipated that the majority of development occurring under the No-Action Alternative would be sited in the vicinity of existing infrastructure. Because the majority of development would occur in areas with existing human presence and populations, no significant losses to habitat would be anticipated to occur.

Any construction actions taking place within the boundaries of a high-quality natural area or ONA would be reviewed by Eglin NRO, which would provide recommendations on how best to mitigate potential impacts to biological resources within these areas.

Okaloosa darter streams are present on Eglin Main in the Toms Creek area and near Duke Field in the Juniper Creek area. Sedimentation and runoff associated with construction and land-clearing activities occurring at these two cantonments could potentially impact the Okaloosa darter. However, Eglin AFB requires a vegetative buffer of at least 200 feet around Okaloosa darter streams in order to minimize potential impacts.[120] Development authorized under the No-Action Alternative would adhere to these guidelines. A Stormwater Pollution Prevention Plan (SWPPP) and erosion BMPs would be implemented to minimize any unnecessary soil erosion that could occur during construction or land clearing activities associated with the authorized development.

Development authorized under the No-Action Alternative would be designed and sited to minimize the loss of trees and special species habitat, including RCW active or inactive cavity trees, gopher tortoise burrows, and other suitable habitat. Development occurring under the No-Action Alternative would comply with the Terms and Conditions identified in the 2013 Final PBO[121] for the RCW, the 2009 PBO for Air Force activities that may potentially affect the Eastern indigo snake,[122] and best practices and guidelines as outlined in the 2017 *Integrated Natural Resources Management Plan* (INRMP).[123] In the event that a gopher tortoise or eastern indigo snake is spotted, construction activities would cease and the animals would be allowed to leave the area before activities are resumed. In the event that a gopher tortoise burrow would be impacted by authorized development occurring under the No-Action Alternative, relocations would be conducted in accordance with the procedures outlined in the *Threatened and Endangered Species Component Plan.*[124] Coordination with Eglin NRO would be required prior to project initiation to ensure compliance with the MBTA.

3.3.3.2 Alternative 1

As described in **Table 2-3**, Alternative 1 would authorize an additional 1,440,246 ft^2 of facilities construction, 225.4 acres of parking/impervious surfaces, 81.6 acres of roads/infrastructure, and

[119] Eglin AFB. *Final Eglin Air Force Base Cantonment Areas Environmental Assessment.* March 2014.
[120] Eglin AFB. *Integrated Natural Resources Management Plan.* August 2017. p. 67.
[121] USFWS. *Red-Cockaded Woodpecker Final Programmatic Biological Opinion.* August 14, 2013.
[122] USFWS. *Indigo Snake Programmatic Biological Opinion Eglin Air Force Base, Florida.* February 18, 2009.
[123] Eglin AFB. *Integrated Natural Resources Management Plan.* August 2017.
[124] Eglin AFB. *Eglin AFB Final Threatened and Endangered Species Component Plan Update.* June 2017. p. 14-40.

213,174 ft^2 of demolition across the six identified areas. Under the implementation of Alternative 1, the environmental consequences related to biological resources would be the same as discussed in Section 3.3.3.1 for the No-Action Alternative with a slight increase accounting for the additional development. No specific projects have been identified under Alternative 1, and projects would vary in size, scope, and implementation date across the cantonment areas. Each individual project would require the submittal of an AF FORM 813, *Request for Environmental Impact Analysis*, prior to implementation in order to analyze individual impacts of specific projects.

3.3.3.3 Alternative 2

As described in **Table 2-4**, Alternative 2 would authorize an additional 25 percent increase in development over Alternative 1 for a total of 1,800,308 ft^2 of facilities construction, 281.85 acres of parking/impervious surfaces, 102.05 acres of roads/infrastructure, and 266,468 ft^2 of demolition. Under the implementation of Alternative 2, the environmental consequences related to biological resources would be the same as discussed in Section 3.3.3.2 for Alternative 1. The additional development outlined above would increase the notional footprint for development that was approved under the No-Action Alternative. No specific projects have been identified under Alternative 2, and projects would vary in size, scope, and implementation date across the cantonment areas. Each individual project would require the submittal of an AF FORM 813, *Request for Environmental Impact Analysis*, prior to implementation in order to analyze individual impacts of specific projects.

3.4 Cultural Resources

3.4.1 Definition

Cultural resources are historic districts, sites, buildings, structures, or objects considered important to a culture, subculture, or community for scientific, traditional, religious, or other purposes. Depending on the condition and historic use, such resources might provide insight into the cultural practices of previous civilizations, or they might retain cultural or religious significance to modern groups. Typically, cultural resources are subdivided into archaeological resources (prehistoric or historic sites, where human activity has left physical evidence of that activity, but no structures remain standing); architectural resources (buildings or other structures or groups of structures, or designed landscapes that are of historic or aesthetic significance); or resources of traditional, religious, or cultural significance to Native American tribes.

Cultural resources that are listed on or eligible for listing on the NRHP are known as historic properties. Section 106 of the NHPA requires federal agencies to assess the impact of their undertakings on historic properties in an undertaking's Area of Potential Effect (APE). The APE is the "geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist" (36 CFR 800.16[d]). The APE for cultural resources is the entirety of the five cantonment areas.

3.4.2 Affected Environment

3.4.2.1 Eglin Main Base

Of the 67 archaeological sites located on Eglin Main Base, 23 are considered eligible, potentially eligible, or under review on listing on the NRHP. Fifteen cultural restricted access areas are found within the boundaries of Eglin Main. There are seven historic districts either listed in the NRHP or eligible for listing within the boundaries of Eglin Main, as well as 31 structures currently listed in the NRHP and 60 structures eligible for listing. An additional 12 structures are potentially eligible, while 34 structures are currently under review and 28 structures have not been assessed. To date, 95 cultural resources surveys have been conducted on Eglin Main Base. One cemetery, Davis Cemetery, is potentially eligible for listing on the

NRHP and is located within the boundaries of Eglin Main. No traditional cultural properties (TCPs) have been identified within Eglin Main.

One archaeological site is located on Jackson Guard; it is ineligible for listing on the NRHP. Fifteen historic structures are located within the boundaries of Jackson Guard; none of these properties are eligible or potentially eligible for listing on the NRHP. To date, two cultural resources surveys have been conducted on Jackson Guard. The Eglin Golf Course Driving Range and the Eglin Golf Course are located adjacent to Jackson Guard and are Historic Designated Landscapes listed on the NRHP.

3.4.2.2 Duke Field

Five archaeological sites are located within the boundaries of Duke Field; one of these sites is considered eligible for listing on the NRHP. There is one cultural restricted access area. Of the 64 historic buildings located within the boundaries of Duke Field, none are considered eligible or potentially eligible for listing on the NRHP and none are undergoing evaluation. Fourteen cultural resource surveys have been conducted on Duke Field. No historic districts, cemeteries, or TCPs have been identified on Duke Field.

3.4.2.3 7 SFG(A) Cantonment

No archaeological sites or historic buildings are located within the boundaries of the 7 SFG(A) Cantonment. Six cultural resource surveys have been conducted on 7 SFG(A) Cantonment. No historic districts, cemeteries, or TCPs have been identified on 7 SFG(A) Cantonment.

3.4.2.4 Camp Rudder

No archaeological sites are located within the boundaries of Camp Rudder. Five of the 62 historic buildings located on Camp Rudder are considered potentially eligible for listing on the NRHP. Five cultural resource surveys have been conducted at Camp Rudder. No historic districts, cemeteries, or TCPs have been identified on Camp Rudder.

3.4.2.5 Site C-6 20 SPCS

No archaeological sites are located within the boundaries of Site C-6 20 SPCS. Of the nine historic buildings located within the boundaries of Site C-6 20 SPCS, one is considered eligible for listing on the NRHP. One cultural resource survey has been conducted at Site C-6 20 SPCS. No historic districts, cemeteries, or TCPs have been identified on Site C-6 20 SPCS.

3.4.3 Environmental Consequences

3.4.3.1 No-Action Alternative

As outlined in Chapter 2 (Alternatives), the No-Action Alternative is the approved level of development for the five cantonment areas, described as the Preferred Alternative in the 2014 *Final Eglin Air Force Base Cantonment Areas Environmental Assessment.*[125] The following describes the current practices and methodology, and subsequent effects pertaining to the No-Action Alternative.

Under the No-Action Alternative, the previously authorized level of development would be implemented. Development occurring under the No-Action Alternative could include construction and demolition of facilities, such as offices and administrative buildings, commercial and support facilities, and other uses, in both developed and undeveloped areas. All ground-disturbing activities would be conducted in accordance with Eglin AFB policies and procedures pertaining to protection of cultural resources. Areas containing resources considered eligible, potentially eligible, or under review for listing on the NRHP would be consciously avoided in site selection for proposed development. In the event that proposed

[125] Eglin AFB. *Final Eglin Air Force Base Cantonment Areas Environmental Assessment.* March 2014.

development within a culturally restricted area is deemed necessary, additional consultation with the SHPO under Section 106 of the NHPA would occur. According to the analysis conducted in the 2014 *Final Eglin Air Force Base Cantonment Areas Environmental Assessment*, no impacts to cultural resources would be anticipated under implementation of the No-Action Alternative.[126]

In the event that unknown cultural resources are discovered during the construction or operational phases of the Proposed Actions, all activity in the immediate vicinity would cease until the Base Historic Preservation Officer and the Cultural Resources Branch of 96th Civil Engineer Group/Environmental Assets (96 CEG/CEIEA) have been notified and a determination of significance has been rendered. The following actions would be taken to prevent potential impacts to cultural resources in accordance with the Standard Operating Procedures (SOPs) outlined in the *Integrated Cultural Resources Management Plan* (ICRMP):[127]

- All ground-disturbing activities would be coordinated with the 96 CEG/CEIEA.[128]
- Any archaeological artifacts discovered would be left in place and their locations immediately reported to the 96 CEG/CEIEA. Construction or demolition activities would cease and efforts to protect the resource from further impact would be taken.[129]
- Vehicle movements would be restricted near water bodies, on steep slopes, or in areas where the soil is soft and/or devoid of vegetation, or in areas where artifacts are located on the surface of the ground.[130]
- In the event of the discovery of potential Native American artifacts and/or remains, construction and operational activities would cease and the THPO would be notified immediately.[131]

Government-to-government consultation with federally recognized tribal groups is not anticipated under this alternative per SOP No. 4 of the Eglin AFB ICRMP.[132] No effect on prehistoric archaeological sites eligible or potentially eligible for listing on the NRHP would occur.[133]

3.4.3.2 Alternative 1

As described in **Table 2-3**, Alternative 1 would authorize an additional 1,440,246 ft^2 of facilities construction, 225.4 acres of parking/impervious surfaces, 81.6 acres of roads/infrastructure, and 213,174 ft^2 of demolition across the five cantonment areas. The additional development outlined above would increase the notional footprint for development that was approved under the No-Action Alternative. No specific projects have been identified under Alternative 1, and projects would vary in size, scope, and implementation date across the cantonment areas. Each individual project would require the submittal of an AF FORM 813, *Request for Environmental Impact Analysis*, prior to implementation in order to analyze individual impacts of specific projects. Impacts to cultural resources would be anticipated to be identical to those of the No-Action Alternative.

3.4.3.3 Alternative 2

As described in **Table 2-4**, Alternative 2 would authorize an additional 25 percent increase in development over Alternative 1 for a total of 1,800,308 ft^2 of facilities construction, 281.85 acres of parking/impervious surfaces, 102.05 acres of roads/infrastructure, and 266,468 ft^2 of demolition The additional development

[126] Eglin AFB. *Final Eglin Air Force Base Cantonment Areas Environmental Assessment.* March 2014. p. 3-69.
[127] Eglin AFB. *Integrated Cultural Resources Management Plan.* 2017. p. 32-52.
[128] *Ibid,* p. 32.
[129] *Ibid,* p. 35.
[130] *Ibid,* p. 51.
[131] *Ibid,* p. 35.
[132] *Ibid,* p. 35.
[133] Eglin AFB. *Final Eglin Air Force Base Cantonment Areas Environmental Assessment.* March 2014. p. 3-69.

outlined above would increase the notional footprint for development that was approved under the No-Action Alternative. No specific projects have been identified under Alternative 2, and projects would vary in size, scope, and implementation date across the cantonment areas. Each individual project would require the submittal of an AF FORM 813, *Request for Environmental Impact Analysis*, prior to implementation in order to analyze individual impacts of specific projects. Impacts to cultural resources would be anticipated to be identical to those of the No-Action Alternative.

3.5 Hazardous Materials and Waste

3.5.1 Definition

Hazardous materials are defined by Title 49, Code of Federal Regulations, Section 171.8 (49 CFR § 171.8) as "hazardous substances, hazardous wastes, marine pollutants, elevated temperature materials, materials designated as hazardous in the Hazardous Materials Table (49 CFR § 172.101), and materials that meet the defining criteria for hazard classes and divisions" in 49 CFR § 173. Hazardous wastes are defined by the RCRA at Title 42 USC Section 6903(5), as amended by the Hazardous and Solid Waste Amendments, as "a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may (A) cause, or significantly contribute to an increase in, mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed."

AFI 32-7086, *Hazardous Materials Management*, establishes procedures and standards for managing hazardous materials throughout the USAF to ensure compliance with the *Emergency Planning and Community Right-to-Know Act* (EPCRA), and applies to all USAF personnel who authorize, procure, issue, use, or dispose of hazardous materials, and to those who manage, monitor, or track any of those activities. Under AFI 32-7086, the USAF has established roles, responsibilities, and requirements for a hazardous materials management program. The purpose of the hazardous materials management program is to control the procurement and use of hazardous materials to support USAF missions, ensure the safety and health of personnel and surrounding communities, and minimize USAF dependence on hazardous materials.

Hazardous substances that might pose a risk to human health are addressed separately from other hazardous substances and are referred to as special hazards. Special hazards include ACMs, PCBs, and LBP. The potential presence, location, quantity, and condition of special hazards assist the USAF in determining the significance of a Proposed Action. The USEPA regulates these special hazard substances under the authority of the TSCA (15 USC § 53). USEPA has established regulations regarding asbestos abatement and worker safety (40 CFR § 763), with additional emissions regulations (40 CFR § 61). Whether from LBP abatement or other activities, depending on the quantity or concentration, the disposal of the LBP waste is regulated by the RCRA at 40 CFR § 260. The disposal of PCBs is addressed in 40 CFR §§ 750 and 761.

The Defense Environmental Restoration Program (ERP) was established by Section 211 of the *Superfund Amendments and Reauthorization Act of 1986* (10 USC §§ 2701-2707). The ERP was developed to facilitate thorough investigation and cleanup of contaminated sites on military installations (i.e., active installations, installations subject to Base Realignment and Closure, and Formerly Used Defense Sites). The IRP and MMRP are components of the ERP and are managed by the Air Force Civil Engineer Center (AFCEC). The IRP requires each DoD installation to identify, investigate, and clean up hazardous waste disposal or release sites. The MMRP addresses non-operational rangelands that are suspected or known to contain unexploded ordnance, discarded military munitions, or munitions constituent contamination.

For the USAF, the management of hazardous materials, hazardous wastes, and special hazards is covered in Air Force Policy Directive 32-70, *Environmental Quality*, and the AFI 32-7000 series, which incorporates the requirements of all federal regulations and other AFIs and DoD Directives.

3.5.2 Affected Environment

Hazardous Materials and Petroleum Wastes

AFI 32-7086, *Hazardous Materials Management*, establishes procedures and standards that govern management of hazardous materials throughout the USAF. It applies to all USAF personnel who authorize, procure, issue, use, or dispose of hazardous materials, and to those who manage, monitor, or track any of those activities. Under AFI 32-7086,[134] the USAF has established roles, responsibilities, and requirements for a Hazardous Materials Management Program (HMMP). The purpose of the HMMP is to control the procurement and use of hazardous materials to support USAF missions, ensure the safety and health of personnel and surrounding communities, and minimize USAF dependence on hazardous materials. Operations at Eglin AFB require the use and storage of many hazardous materials. Hazardous materials are managed by the 96th Civil Engineer Group/Environmental Management Branch (96 CEG/CEIE).

Hazardous Wastes

Eglin AFB implements a comprehensive Hazardous Waste Management Plan (HWMP)[135] which addresses mandatory hazardous waste management requirements of the FDEP, USAF, and USEPA. The HWMP establishes procedures and policies and assigns responsibilities associated with the generation, handling, use, management, transportation, and disposal of hazardous materials and wastes at Eglin AFB in accordance with AFI 32-7042, *Solid and Hazardous Waste Compliance*. Procedures and responsibilities for responding to a hazardous waste spill or other incident are addressed in the Eglin AFB Spill Prevention, Control, and Countermeasures Plan (SPCC).[136]

Eglin AFB is a Large Quantity Generator of hazardous waste under USEPA ID FL8570024366,[137] which means approximately 1,000 kilograms per month or more of hazardous wastes are generated on the installation.[138] Hazardous wastes are stored and accumulated in Building 524 at a designated Hazardous Waste Accumulation Site.[139] Within 90 days the wastes are transported off installation and disposed of in accordance with applicable Federal, state, local regulations and Eglin AFB management procedures.

Solid Waste

Solid wastes may include garbage, refuse, discarded materials and debris, sludge, or any other waste material resulting from industrial, commercial, mining, and agricultural operations and community activities. The *Solid Waste Disposal Act* (42 USC 3251 et seq.) established guidelines for solid waste collection, transport, separation, recovery, and disposal systems. RCRA (42 USC 6901 et seq.) amended this act by shifting the emphasis from disposal to recycling and reuse of recoverable materials. The state of Florida also has solid waste management regulations pertaining to solid waste facilities; resource recovery and management programs; certification of resource recovery equipment; as well as used oil

[134] Eglin *AFB. AFI 32-7086*. January 2016.
[135] Eglin AFB. *U.S. Air Force Hazardous Waste Management Plan*. January 2019.
[136] Eglin AFB. *Final Spill Prevention, Control, and Countermeasure Plan Update*. July 2011.
[137] Eglin *AFB. U.S. Air Force Hazardous Waste Management Plan*. January 2019.
[138] USEPA, "Large Quantity Generators," https://www.epa.gov/hwgenerators/categories-hazardous-waste-generators#large, October 16, 2018, (March 3, 2019).
[139] *Eglin AFB. U.S. Air Force Hazardous Waste Management Plan. January 2019.*

and domestic sludge classification, utilization, and disposal criteria. Eglin Environmental Management directs the solid waste management program and has implemented a supplement to AFI 32-7042, referred to as the *Eglin AFB Solid Waste Management Plan*.[140]

Asbestos-Containing Materials

ACM includes materials that contain more than 1 percent asbestos; it is categorized as either friable or non-friable. Friable ACM is any material containing more than 1 percent asbestos, and that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure. Nonfriable ACM is any ACM that does not meet the criteria for friable ACM.

AFI 32-1052, *Facilities Asbestos Management,* which implements AFPD 32-10, Installations and Facilities, ensures compliance with 40 CFR Part 61 Subpart M, *National Emissions Standard for Asbestos*, and 29 CFR 1926.1101, *Toxic and Hazardous Substances: Asbestos*. AFI 32-1052 assigns responsibilities and establishes requirements to incorporate facility asbestos management principles and practices into all USAF programs. Additionally, it requires installations to develop an asbestos management plan for the purpose of maintaining permanent records of the status and conditions of ACM installation facilities.

Eglin AFB manages ACM in accordance with its *Asbestos Management Plan*[141] and the *Asbestos Operations Plan,*[142] which specify procedures for removal, encapsulations, enclosure, and repair activities. Contact or disturbance of ACM may occur during any construction and demolition activities. ACMs that could be encountered during these activities include, but are not limited to, flooring, siding, tiles, roofing, and pipe insulation.

Lead-Based Paint

Lead is a naturally occurring metal found in the Earth's surface and was used in paint for coloration and durability purposes; however, it was banned in 1978 by the Federal government. Buildings constructed prior to 1978 are assumed to contain LBP. The primary hazard from exposure to LBP is from chipping, cracking, peeling, flaking paint chips that can generate lead dust during demolition or renovation activities. The TSCA and the *Occupational Safety and Health Act* also regulate proper disposal of lead-containing wastes, including their disposal at a state-approved facility.

The Eglin AFB *Lead-Based Paint Management Plan* provides guidance on the identification and management of LBP.[143] LBP waste generated during maintenance, repair, or renovation work at Eglin AFB may be regulated as hazardous waste under the RCRA and/or state of Florida hazardous waste regulations.

Mercury and PCBs

In addition to asbestos and lead, demolition and renovation activities have the potential to disturb mercury and PCBs. These materials are also regulated under the TSCA. Buildings may contain liquid mercury in thermostats and switches, and fluorescent lighting fixtures typically contain elemental mercury in the fluorescent light bulbs; compact fluorescent lamps also contain mercury. In addition, fluorescent lighting fixture ballasts have the potential to contain PCBs.

The Eglin AFB HWMP requires that the 96 CEG/CEIE be notified of the anticipated generation of PCB-contaminated equipment.[144] In addition to regulation under the TSCA, PCBs in Florida are regulated as

[140] Eglin AFB Plan 32-7042. *Eglin AFB Solid Waste Management Plan.* April 15, 2009.
[141] Eglin AFB Plan 32-3. *Asbestos Management Plan.* April 20, 2010.
[142] USAF Air Armament Center. *Asbestos Operations Plan.* March 2006.
[143] Eglin AFB Plan 32-4. *Lead-Based Paint Management Plan.* April 20, 2010.
[144] Eglin AFB. *U.S. Air Force Hazardous Waste Management Plan.* January 2019. p. 36.

non-RCRA hazardous waste. The HWMP also provides procedures for proper management and disposal of mercury-containing items, such as fluorescent lamps, mercury switches, and thermostats as universal waste.

Environmental Restoration Sites

The DoD began conducting environmental restoration activities in accordance with *Comprehensive Environmental Response, Compensation and Liability Act* (CERCLA) in 1975 under the Installation Restoration Program, now known as the Environmental Restoration Program.[145] In 2001, DoD established the MMRP to address sites known or suspected to contain UXO, discarded military munitions or their constituents. In accordance with AF policy, all IRP sites at Eglin AFB are addressed in a manner consistent with the CERCLA or RCRA processes, which require federal installations to investigate and remediate or mitigate health risks associated with releases of contaminants into the environment. Eglin AFB holds a RCRA Part B Corrective Action Permit, which is updated every five years and was most recently updated on August 27, 2018.[146]

Eglin AFB is required to implement and maintain land use restrictions and controls at most IRP sites to prevent certain types of land uses and thereby protect the Base populace from unacceptable exposure to contaminants. Land use controls (LUCs), defined as "any restriction or control arising from the need to protect human health and/or the environment, that limits the use of and/or exposure to, environmentally contaminated media," are specified for IRP sites in accordance with the LUC Memorandum of Agreement (MOA) between USEPA, FDEP, and Eglin AFB.[147]

Eglin AFB currently has a total of 421 IRP sites, of which 87 are active.[148] Primary site types at Eglin AFB include spill sites (SS), landfills (LF), disposal pits (DP), storage tanks (ST), low level radioactive waste (RW), and fire training areas (FT).[149] Of the 87 active IRP sites, 54 are located within the five cantonment areas: 49 on Eglin Main Base and 5 on Duke Field; no active IRP sites are located on Camp Rudder, 7 SFG(A) Cantonment, Site C-6 20 SPCS, or Jackson Guard (refer to **Figures 3-15** and **3-16**). One IRP site (POI-717) directly abuts Camp Rudder and one IRP site (POI-718) is located in close proximity to Site C-6 20 SPCS.

Table 3-7 shows the active IRP sites within or in immediate proximity to the five cantonment areas. Detailed descriptions of each IRP site are included in **Appendix D**, *Active IRP Sites*.

Table 3-7 Active IRP Sites

Site ID	Site Name	Cantonment Area
POI-717	Nozzle Spray Test Area Field 6 Ranger Camp	Camp Rudder
POI-718	Nozzle Spray Test Area Test Range C-6	Site C-6 20 SPCS
POI 719	Former WWTP and Spray Field at Duke Field	Duke Field
POI-733	Building 3087	Duke Field
POI-735	Building 3057	Duke Field
ST-055A	Duke Field Tank Farm (Buildings 3206 and 3208)	Duke Field
ST-069	Building 3073, Waste Oil Tank	Duke Field
AOC-054	Gulf Power Substation	Eglin Main Base
AOC-214	Eglin Housing Pod #4A west (former New Plew) & Pod #1, #4A east and community center (former Western Old Plew)	Eglin Main Base
AOC-215	Eglin Housing Pod #5 (former Eastern Old Plew)	Eglin Main Base

[145] Department of Defense. "Department of Defense Environment, Safety and Occupational Health Network and Information Exchange." https://www.denix.osd.mil/derp/about/. (February 2019).
[146] Eglin AFB. *FY2018 Sites Status Report, Environmental Restoration Program, Eglin Air Force Base, Florida.* October 2018. p. 2.
[147] *Ibid*, p. 9.
[148] *Ibid*, p. 14.
[149] *Ibid*, p. 16.

Site ID	Site Name	Cantonment Area
AOC-216	Eglin Housing (former Wherry) Parcel B	Eglin Main Base
AOC-217	Eglin Housing- Pod #7 (existing Capehart) Parcel B	Eglin Main Base
DP-84	Jack's Lake Limb Disposal Area	Eglin Main Base
DP-261	Building 914 Dump Site	Eglin Main Base
FT-28	Eglin Main Base Old Fire Training Area	Eglin Main Base
LF-03	Eglin Main Landfill, Defense Reutilization Marketing Office (DRMO), CE Storage Yard	Eglin Main Base
LF-05	Eglin Main Landfill	Eglin Main Base
LF-08	Receiver Area Landfill	Eglin Main Base
LF-51	Upper Memorial Lake	Eglin Main Base
OT-35	Seventh Street BX Station	Eglin Main Base
POI-702	FT-92	Eglin Main Base
POI-703	Middle FTA	Eglin Main Base
POI-704	Eglin WWTP	Eglin Main Base
POI-705	Building 71	Eglin Main Base
POI-706	Building 72	Eglin Main Base
POI-707	Building 138	Eglin Main Base
POI-708	Building 440	Eglin Main Base
POI-709	Building 1386	Eglin Main Base
POI-710	Building 1412	Eglin Main Base
POI-715	Nozzle Spray Test Area Main Base Eglin	Eglin Main Base
POI-722	NW-SE Flightline Drainage Ditch	Eglin Main Base
POI-723	Jack Lake	Eglin Main Base
POI-724	Eglin Main Base Old Fire Training Area/FT-28	Eglin Main Base
POI-725	N-S Flightline Drainage Ditch	Eglin Main Base
POI-727	LF-08 Receiver Landfill	Eglin Main Base
POI-728	Building 500	Eglin Main Base
POI-729	2011 Beech C24R Fire	Eglin Main Base
POI-731	AFFF Holding Pond	Eglin Main Base
POI-732	Building 916A	Eglin Main Base
SS-26	Hardstand 7	Eglin Main Base
SS-36	POL Tank Farm	Eglin Main Base
SS-86	Exterior Electric Shop/Entomology Shop	Eglin Main Base
SS-275	ACC Tank Farm	Eglin Main Base
SS-279	JP-8 Spill Site	Eglin Main Base
SS-280	33d Spill Site	Eglin Main Base
SS-281	Deep TCE Plume 33rd Fighter Wing	Eglin Main Base
SS-283	JP-8 LNAPL Site	Eglin Main Base
SS-286	McKinley Lab Fire Site	Eglin Main Base
SS-287	Tank 92 Spill Site	Eglin Main Base
ST-59	Ben's Lake Marina	Eglin Main Base
ST-99	Okaloosa County Air Terminal (OCAT)	Eglin Main Base
XU-658	Burial Pit Site C-3	Eglin Main Base

3.5.3 Environmental Consequences

3.5.3.1 No-Action Alternative

As outlined in Chapter 2 (Alternatives), the No-Action Alternative is the approved level of development for the five cantonment areas, described as the Preferred Alternative in the 2014 *Final Eglin Air Force Base*

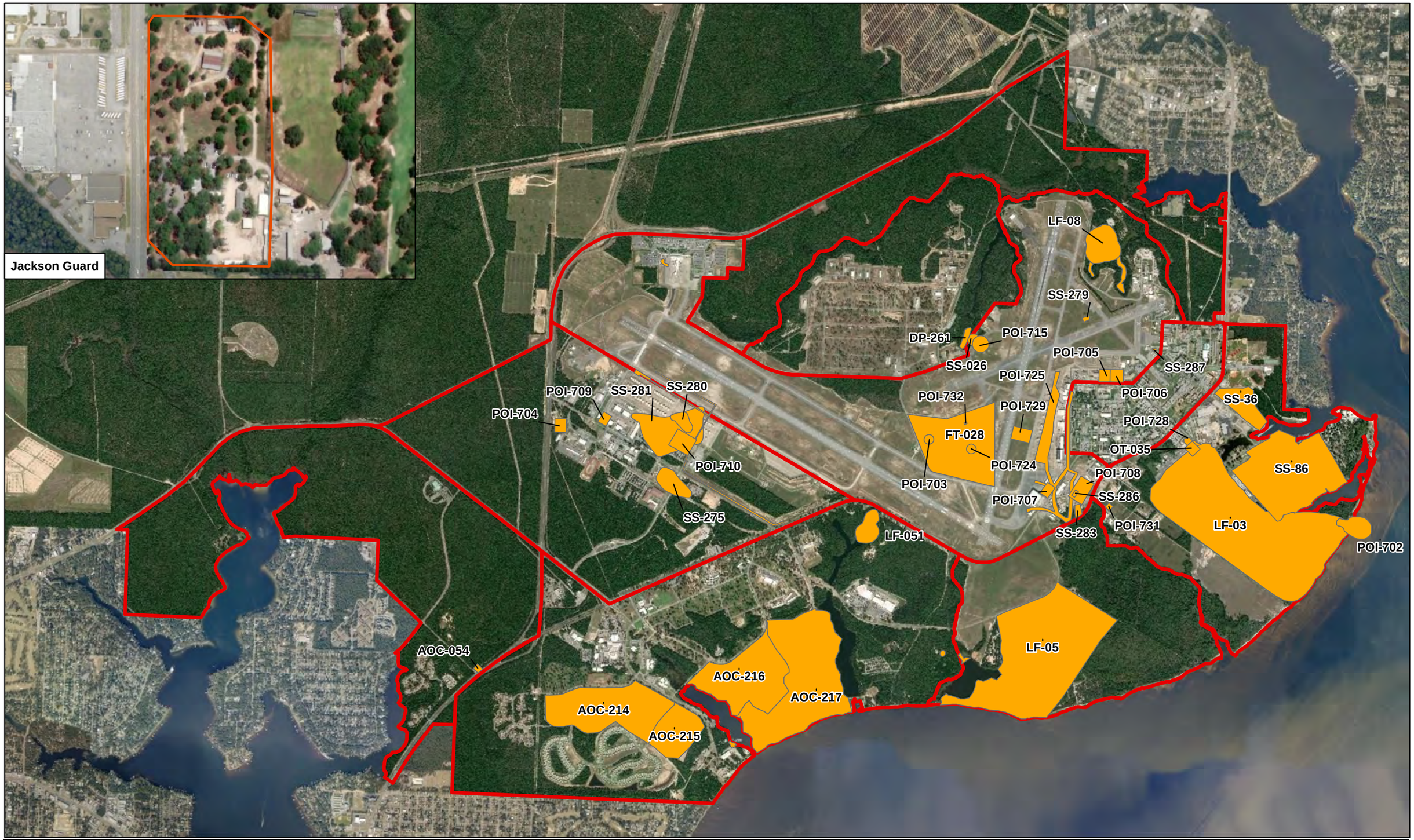
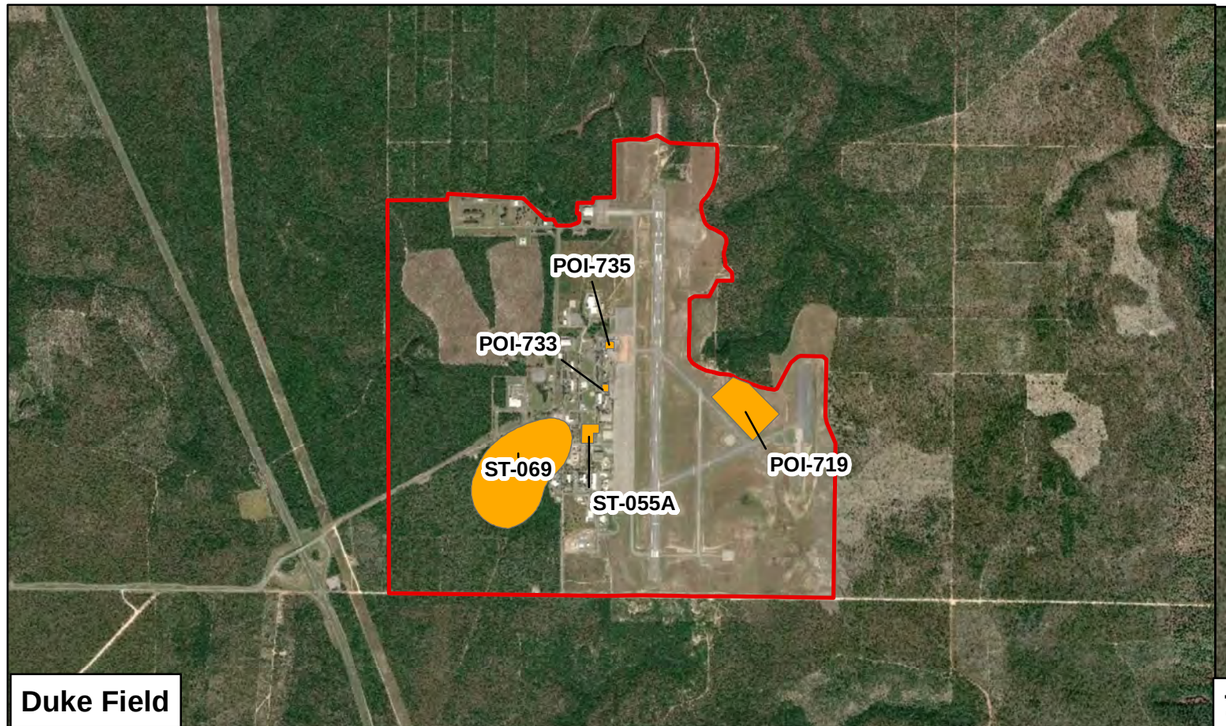


Figure 3-15
Eglin Main Base Active IRP Sites
Eglin AFB Cantonment Areas
Draft EA
Eglin Air Force Base, Florida



N
W E
S

Legend

Active IRP Sites

Cantonment Boundary

Figure 3-16
Camp Rudder, 7 SFG(A), Duke Field, Site C-6 20 SPCS
Active IRP Sites
Eglin AFB Cantonment Areas
Draft EA
Eglin Air Force Base, Florida

Cantonment Areas Environmental Assessment.[150] The following describes the current practices and methodology, and subsequent effects pertaining to the No-Action Alternative.

Hazardous Materials and Petroleum Wastes

Demolition and construction activities associated with development approved in the 2014 *Final Eglin Air Force Base Cantonment Areas Environmental Assessment* may result in short- and long-term, negligible, adverse impacts to hazardous materials and petroleum products as a result of the use of these products in construction and demolition equipment. Land-clearing activities associated with previously authorized development may also result in short- and long-term, negligible, adverse impacts to hazardous materials and petroleum products as a result of the use of these products in land-clearing equipment. Any hazardous materials or petroleum products proposed for use during the construction or maintenance would be authorized and approved through the Eglin AFB HWMP.[151] Implementation of processes established for proper hazardous materials and petroleum products management during demolition and construction would reduce any potential adverse impact that would result from a spill or release. All hazardous materials and petroleum products would be managed of in accordance with applicable USAF regulations and federal, state, and local requirements as well as the Eglin AFB HWMP.

Hazardous Wastes

Small quantities of hazardous wastes may be generated from demolition, construction, and land-clearing projects associated with development approved in the 2014 *Final Eglin Air Force Base Cantonment Areas Environmental Assessment*. Equipment used during these activities could result in spilled petroleum, oils, or fuel; however, such spills would be immediately contained and remediated in accordance with the Eglin AFB HWMP so that no substantial contamination could occur. Disposal of all hazardous and petroleum wastes would be in accordance with federal, state, and local laws and regulations, and the Eglin AFB HWMP. This increase in generation of hazardous waste would not be expected to affect the management plans or capacities for handling this waste. Demolition and construction activities associated with approved development may result in short- and long-term, negligible, adverse impacts on hazardous and petroleum wastes. Land-clearing activities associated with approved development may also result in short- and long-term, negligible, adverse impacts on hazardous petroleum wastes.

Solid Waste

Solid waste generated from demolition, construction, and land-clearing projects associated with development approved in the 2014 *Final Eglin Air Force Base Cantonment Areas Environmental Assessment* consist of building materials such as concrete, asphalt, sheet rock, scrap metals, and lumber. Contractors would be required to recycle construction and demolition debris to the maximum extent practicable in accordance with applicable USAF policies and AFI 32-7042,[152] thereby diverting it from landfills. Eglin AFB generates approximately 9,860 tons of construction debris and successfully diverts approximately 6,892 tons, or approximately 70 percent of the generated amount, away from landfills or incinerators through recycling or recovery efforts.[153] The 70 percent diversion rate exceeds base, USAF, and U.S. government goals for solid waste diversion.[154] The contractor would dispose of non-recyclable C&D debris as part of their construction agreement. Clean construction and demolition debris (e.g.,

[150] Eglin AFB. *Final Eglin Air Force Base Cantonment Areas Environmental Assessment.* March 2014.
[151] Eglin AFB. *U.S. Air Force Hazardous Waste Management Plan.* January 2019.
[152] Eglin AFB Plan 32-7042. *Eglin AFB Solid Waste Management Plan.* April 15, 2009.
[153] Eglin AFB. *Installation Development Plan.* August 2017. p. 8-9.
[154] *Ibid.*

concrete, asphalt) would be ground, recycled, and used for fill and roadwork rather than disposed of in a landfill, whenever possible.

The USEPA guidance on estimating solid waste resulting from construction indicates that approximately 4.39 pounds (lbs) of debris is generated for each square foot of construction activity and approximately 158 lbs/ft^2 is generated from the demolition of existing facilities; this formula can be applied to the construction of both buildings and impervious surfaces. As indicated in **Table 3-8**, approximately 9,378 tons of solid waste would be generated each year from development approved in the 2014 *Final Eglin Air Force Base Cantonment Areas Environmental Assessment*.[155]

Table 3-8 No-Action Alternative Annual Solid Waste

Cantonment Area	Solid Waste Generated per Year (Tons)		
	Construction	**Demolition**	**Total**
Eglin Main	3,589	2,293	5,883
Duke Field	2,156	404	2,560
7 SFG(A)	253	181	434
Camp Rudder	727	103	830
C-6 20 SPCS Area	24	8	32
Total	**6,749**	**2,990**	**9,738**

Solid waste generated from implementation of previously approved development would be diverted to the greatest extent feasible and would not appreciably increase the average amount of construction debris generated by Eglin AFB during the year of implementation.

Asbestos-Containing Materials

USAF regulations prohibit the use of ACM for new construction; therefore, there would be no adverse impacts from ACM during new construction activities associated with development approved in the 2014 *Final Eglin Air Force Base Cantonment Areas Environmental Assessment*. Any buildings considered for demolition under the approved action that are of an age in which ACM could be present would be surveyed for ACM prior to commencing demolition. The removal of friable ACM would be performed by a licensed asbestos abatement contractor and all notification and abatement would be done according to federal, state, and USAF regulations. Short-term, minor, direct and indirect, adverse effects would be expected from demolition activities. Long-term, negligible, beneficial effects would be expected as a result of the removal of asbestos from the base.

Lead-Based Paint

USAF regulations prohibit the use of LBP for new construction; therefore, there would be no adverse impacts from LBP during construction activities associated with development approved in the 2014 *Final Eglin Air Force Base Cantonment Areas Environmental Assessment*. Any buildings considered for demolition under the approved action that are of an age in which LBP could be present would be surveyed for LBP prior to commencing demolition. All LBP abatement would be performed according to federal, state, and USAF regulations. Short-term, minor, direct and indirect, adverse effects would be expected from demolition activities. Long-term, negligible, beneficial effects would be expected as a result of the removal of LBP from the base.

Mercury and PCBs

PCBs are not used during construction activities according to USAF regulations; therefore, there would be no adverse impacts from PCBs during construction activities associated with development approved in

[155] Eglin AFB. *Final Eglin Air Force Base Cantonment Areas Environmental Assessment.* March 2014. p. 3-35.

the 2014 *Final Eglin Air Force Base Cantonment Areas Environmental Assessment*. Mercury and PCBs are found in electrical equipment such as transformers and capacitors, hydraulic systems, and fluorescent light ballasts. There is the potential to encounter mercury and/or PCBs in buildings proposed for demolition activities. Surveys of these buildings for mercury and PCBs would occur prior to any demolition or renovation activities and the removal and disposal of mercury and PCBs would be conducted according to all federal, state, and USAF regulations, therefore, short-term, minor, direct, adverse effects would be expected.

Installation Restoration Sites

Construction and demolition activities associated with development approved in the 2014 *Final Eglin Air Force Base Cantonment Areas Environmental Assessment* could result in workers encountering contaminated groundwater or soils if these actions take place in the vicinity of an active IRP site. Excavation and any associated dewatering activities during demolition would be coordinated with the Eglin AFB IRP Office, Building 216, to ensure proper worker safety and environmental controls are implemented and groundwater generated from dewatering activities is properly managed and disposed. If contaminated groundwater or soil from nearby IRP sites is encountered during construction and demolition activities, the handling, storage, transportation, and disposal of hazardous substances would be conducted in accordance with applicable Federal, state, and local regulations, USAF regulations, and Eglin AFB management procedures. Coordination with the Eglin AFB IRP Office and Environmental Restoration Branch would be undertaken prior to any construction and demolition activities to verify the status of IRP site cleanups occurring near Proposed Actions sites and to verify that proceeding with the Proposed Actions is appropriate. Prior to commencement of construction and demolition activities at or within the vicinity of active IRP sites, a health and safety plan should be prepared in accordance with OSHA regulations. Prior to commencement of construction and demolition activities at or within the vicinity of active IRP sites, a health and safety plan should be prepared in accordance with OSHA regulations.

3.5.3.2 Alternative 1

As described in **Table 2-3**, Alternative 1 would authorize an additional 1,440,246 ft^2 of facilities construction, 225.4 acres of parking/impervious surfaces, 81.6 acres of roads/infrastructure, and 213,174 ft^2 of demolition across the five cantonment areas. Under the implementation of Alternative 1, the environmental consequences related to hazardous materials and petroleum wastes, hazardous wastes, ACM, LBP, mercury and PCBs, and IRP sites would be the same as discussed in Section 3.5.3.1 for the No-Action Alternative. The additional development outlined above would increase the notional footprint for development that was approved under the No-Action Alternative. No specific projects have been identified under Alternative 1, and projects would vary in size, scope, and implementation date across the cantonment areas. Each individual project would require the submittal of an AF FORM 813, *Request for Environmental Impact Analysis*, prior to implementation in order to analyze individual impacts of specific projects. Existing policies and procedures currently in place at Eglin AFB for hazardous materials and hazardous wastes would be sufficient to prevent any significant risk or impact associated with these materials.

Solid Waste

Due to the increase in approved development, solid waste generation would increase under the implementation of Alternative 1. As indicated in **Table 3-9**, approximately 49,355 tons of solid waste would be generated each year from development approved under Alternative 1.

Table 3-9 Alternative 1 Annual Solid Waste

Cantonment Area	Solid Waste Generated per Year (Tons)		
	Construction	Demolition	Total
Eglin Main	17,235	13,431	30,666
Duke Field	10,585	1,970	12,555
7 SFG(A)	952	833	1,835
Camp Rudder	3,625	516	4,141
C-6 20 SPCS Area	118	40	158
Total	**32,515**	**16,790**	**49,355**

Solid waste generated from implementation of previously approved development would be diverted to the greatest extent feasible and would not appreciably increase the average amount of construction debris generated by Eglin AFB during the year of implementation.

3.5.3.3 Alternative 2

As described in **Table 2-4**, Alternative 2 would authorize an additional 25 percent increase in development over Alternative 1 for a total of 1,800,308 ft^2 of facilities construction, 281.85 acres of parking/impervious surfaces, 102.05 acres of roads/infrastructure, and 266,468 ft^2 of demolition. Under the implementation of Alternative 2, the environmental consequences related to hazardous materials and petroleum wastes, hazardous wastes, ACM, LBP, mercury and PCBs, and IRP sites would be the same as discussed in Section 3.5.3.1 for the No-Action Alternative. The additional development outlined above would increase the notional footprint for development that was approved under the No-Action Alternative. No specific projects have been identified under Alternative 2, and projects would vary in size, scope, and implementation date across the cantonment areas. Each individual project would require the submittal of an AF FORM 813, *Request for Environmental Impact Analysis*, prior to implementation in order to analyze individual impacts of specific projects. Existing policies and procedures currently in place at Eglin AFB for hazardous materials and hazardous wastes would be sufficient to prevent any significant risk or impact associated with these materials.

Solid Waste

Due to the increase in approved development, solid waste generation would increase under the implementation of Alternative 2. As indicated in **Table 3-10** below, approximately 61,686 tons of solid waste would be generated each year from development approved under Alternative 2.

Table 3-10 Alternative 2 Annual Solid Waste

Cantonment Area	Solid Waste Generated per Year (Tons)		
	Construction	Demolition	Total
Eglin Main	21,544	16,789	38,333
Duke Field	13,235	2,463	15,698
7 SFG(A)	1,190	1,104	2,294
Camp Rudder	4,536	645	5,181
C-6 20 SPCS Area	130	50	180
Total	**40,635**	**21,051**	**61,686**

Solid waste generated from implementation of previously approved development would be diverted to the greatest extent feasible and would not appreciably increase the average amount of construction debris generated by Eglin AFB during the year of implementation.

3.6 Noise

3.6.1 Definition

Noise and sound share the same physical aspects, but noise is considered a disturbance while sound is defined as an auditory effect. The meaning of noise for this analysis is undesirable sound that interferes with verbal communication and hearing or is otherwise annoying (unwanted sound). Human response to increased noise levels varies according to the source type, characteristics of the noise source, distance between source and receptor, receptor sensitivity, and time of day.

Sound varies by both intensity and frequency. Sound pressure level, described in decibels (dB), is used to quantify sound intensity. The decibel is a logarithmic unit that expresses the ratio of a sound pressure level to a standard reference level. Sound frequency is quantified using the units of hertz (Hz). Sound level measurements used to characterize sound levels that can be sensed by the human ear are designated "A-weighted" (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.

The dBA noise metric describes steady noise levels, although very few noises are constant. Therefore, the A-weighted Day-Night Level (DNL) has been developed. The DNL is defined as the average sound energy in a 24-hour period with a 10-dB penalty added to nighttime levels (10 p.m. to 7 a.m.). The DNL is a useful descriptor for noise because it averages ongoing, yet intermittent noise and it measures total sound energy over a 24-hour period. Noise levels used to characterize community noise effects from such activities as aircraft or building construction are measured in the DNL.

Most people are exposed to sound levels of DNL 50 to 55 dBA or higher daily. Studies specifically conducted to determine noise effects on various human activities show that about 90 percent of the population is not significantly bothered by outdoor sound levels below a DNL of 65 dBA.[156] As shown in **Table 3-11,** a normal suburban area is about 55 dBA, which increases to 60 dBA for an urban residential area and 80 dBA in the downtown section of a city. Common household items range from 50 dBA for a refrigerator running in the background of the home to 90 dBA for an active garbage disposal.

Table 3-11 Noise Levels of Common Locations and Items

Outdoor	Sound Level (dBA)	Indoor
Motorcycle	100	Subway Train
Tractor	90	Garbage Disposal
Noisy Restaurant	85	Blender
Downtown (large city)	80	Ringing Telephone
Freeway Traffic	75	TV Audio
Very Noisy Urban Residential Area	70	Hair Dryer
Noisy Urban Residential Area	65	Vacuum
Normal Conversation	60	Sewing Machine
Suburban Residential Area	55	Coffee Pot
Rainfall	50	Refrigerator
Quiet Residential Area	40	Library

Source: FHWA, 1980 and Harris, 1998

The *Noise Control Act of 1972* (Public Law 92-574) directs federal agencies to comply with applicable federal, state, and local noise control regulations. In 1974, the USEPA provided information suggesting

[156] Federal Interagency Committee on Noise (FICON). 1992. Federal Agency Review of Selected Airport Noise Analysis Issues. August 1992.

continuous and long-term noise levels greater than 65 dBA DNL are normally unacceptable for noise-sensitive receptors such as residences, schools, churches, and hospitals.

3.6.2 Affected Environment

The primary sources of noise on Eglin AFB are airfield operations, construction activities, vehicular traffic, munitions use (bombs and small arms) from nearby ranges, and residential activity. Typical ambient sound levels on the Base have not been measured, but would be expected to be comparable to sound levels in other moderately populated areas in the southern U.S. During the day, both on- and off-base individuals may be subjected to multiple sources of noise, including military unit training activities, construction activities, normal operation of heating, ventilation, and air-conditioning (HVAC) systems, lawn maintenance, and general maintenance of streets and sidewalks. Eglin Main Base and Duke Field have active airfields located within their boundaries, while Camp Rudder lies adjacent to Auxiliary Field 6. Therefore, airfield operations represent the highest contributors to noise at these cantonment areas.

Since 2014, the 2018 *Air Installations Compatible Use Zones Study, Eglin Air Force Base and Duke Field, Okaloosa County, Florida*[157] has been completed for Eglin Main and Duke Field and the Supplemental EIS for the F-35 Beddown[158] at Eglin AFB has been completed. The 2018 AICUZ provides updated noise contours over those reflected in the previous AICUZ (dated 2006) and the supplemental EIS (SEIS). The updated noise contours show that noise impacts from the F-35 beddown have not been as far reaching as originally modeled and generally follow a similar pattern to the 2006 contours.[159] Additionally, F-35B aircraft are no longer scheduled to beddown at Eglin AFB, and noise levels near Duke Field are less intense than what was anticipated during preparation of the SEIS.[160]

Siting and construction of facilities on Eglin Main and Duke Field would be considered in compliance with AFI 91-301, *Air Force Occupational and Environmental Safety, Fire Protection and Health (AFOSH) Program,* and AFOSH Standard 48-20, *Occupational Noise and Hearing Conservation Program.* The 2018 AICUZ[161] provides guidelines for incorporating noise levels, CZs, APZs, and flight clearance requirements associated with military airfield operations into local community planning programs in order to maintain the airfield's operational requirements while minimizing the impact to residents in the surrounding community.[162]

3.6.3 Environmental Consequences

Recognizing the inevitability of aircraft noise, Eglin AFB strives to be a good neighbor to the surrounding communities and minimize impacts from noise when possible. Facility siting criteria considers the appropriate location of receptors in relation to the airfield, noise contours, CZs, and APZs. The following measures are implemented to reduce noise levels near the installation:[163]

- Late-night operations are minimized to the extent possible while still accomplishing training and testing requirements, thereby reducing late-night noise disturbances. Approximately two percent of total flying operations are conducted between 10 p.m. and 7 a.m.

[157] Eglin AFB. *Air Installations Compatible Use Zones Study, Eglin Air Force Base and Duke Field, Okaloosa County, Florida.* June 2018.
[158] Eglin AFB. *Supplemental Environmental Impact Statement for the F-35 Beddown at Eglin Air Force Base, Florida.* May 2013.
[159] Eglin AFB. *Air Installations Compatible Use Zones Study, Eglin Air Force Base and Duke Field, Okaloosa County, Florida.* June 2018. p. 40.
[160] *Ibid,* p. 41.
[161] *Ibid.*
[162] *Ibid,* p. 1.
[163] *Ibid,* p. 34.

- High-power static engine runs (runs exceeding 80 percent power) for fighter aircraft other than the F-35 are conducted in a "hush house" or at a designated location near the center of the base. High-power static engine runs for the F-35 are conducted at Hill AFB.
- Afterburners are typically de-selected prior to crossing the installation fenceline, reducing noise levels.
- F-35 aircraft operations on Runway 1/19 are limited in accordance with the 2014 *Record of Decision, Final Supplemental Environmental Impact Statement, F-35 Beddown at Eglin Air Force Base, Florida.*[164]
- Flights over populated areas are avoided to the extent practicable. When unavoidable, flight crews are required to adhere to established minimum altitudes.
- Commanders are required to periodically review existing traffic patterns, instrument approaches, weather constrictions, and operating practices in relation to populated areas.

The primary source of noise impacts associated with the proposed development is construction noise. Construction noise occurs on a short-term basis and increases in noise levels would occur intermittently during construction and demolition activities. Noise would vary depending on the type of equipment being used, the area in which the action would occur, and the distance of the receptor from the noise source. Heavy equipment would be used periodically during construction; therefore, noise levels would fluctuate. Most equipment used would be expected to produce noise levels between 70 and 95 dBA at 50 feet (refer to **Table 3-12**).

Table 3-12 Noise Attenuation

Construction Equipment dBA at 50 feet	Predicted Attenuated Noise Levels (dBA)					
	100 feet	500 feet	1,000 feet	2,000 feet	2,500 feet	3,000 feet
100 max	93.9	80.0	73.9	67.9	66.0	64.4
75 sustained	68.9	55.0	48.9	42.9	41.0	39.4

Source – USEPA, 1971 and FHWA, 2006

Noise levels at the upper end of this range would be associated with equipment such as pile drivers and limited to short durations of intermittent bursts. Sound levels on the lower end of the range would be more constant during construction and demolition activities. These noise levels would decrease with distance from the construction and demolition sites. No long-term impacts would occur to the overall noise environment. Construction and demolition activities usually require several pieces of equipment to be used simultaneously. Considering a conservative 5 dBA for additive noise associated with multiple pieces of construction equipment operating simultaneously,[165] a maximum value of 100 dBA and a sustained value of 75 dBA are used for attenuation calculations. Noise levels associated with typical construction equipment would noticeably attenuate to below 65 dBA between approximately 500 and 3,000 feet from the source depending on the equipment used.

3.6.3.1 No-Action Alternative

As outlined in Chapter 2 (Alternatives), the No-Action Alternative is the approved level of development for the five cantonment areas, described as the Preferred Alternative in the 2014 *Final Eglin Air Force Base*

[164] Eglin AFB. *Supplemental Environmental Impact Statement for the F-35 Beddown at Eglin Air Force Base, Florida.* May 2013.
[165] U.S. Department of Transportation. *Highway Traffic Noise: Analysis and Abatement Guidance.* December 2011.

Cantonment Areas Environmental Assessment.[166] The following describes the current practices and methodology, and subsequent effects pertaining to the No-Action Alternative.

Under the No-Action Alternative, the previously authorized level of development would be implemented. Development occurring under the No-Action Alternative could include construction and demolition of facilities, such as offices and administrative buildings, commercial and support facilities, and other uses, in both developed and undeveloped areas. Construction noise resulting from construction and demolition activities would temporarily increase noise levels in the area surrounding the construction site. However, noise impacts resulting from implementation of the authorized development would be limited to the duration of construction and demolition activities and would occur only during normal working hours between 7 a.m. and 5 p.m. Potential noise impacts from the active work phases of each project would be minimized by the employment of construction BMPs as specified in 23 CFR Part 772, *Procedures for Abatement of Highway Traffic Noise and Construction Noise*. Construction noise would be temporary and localized to the areas immediately surrounding the active project sites. Therefore, implementation of the No-Action Alternative would have short-term, minor, direct, adverse effects on noise levels.

All applicable noise laws and guidelines would be followed to reduce effects from noise produced by construction activities. Workers would be required to use proper personal hearing protection in accordance with AFOSH Standard 48-20, *Operational Noise and Hearing Conservation Program*, to limit exposure. Appropriate noise attenuation equipment would also be used where applicable.

3.6.3.2 Alternative 1

As described in **Table 2-3**, Alternative 1 would authorize an additional 1,440,246 ft^2 of facilities construction, 225.4 acres of parking/impervious surfaces, 81.6 acres of roads/infrastructure, and 213,174 ft^2 of demolition across the five cantonment areas. Under the implementation of Alternative 1, the environmental consequences related to noise would be the same as discussed in Section 3.6.3.1 for the No-Action Alternative. The additional development outlined above would increase the notional footprint for development that was approved under the No-Action Alternative. No specific projects have been identified under Alternative 1, and projects would vary in size, scope, and implementation date across the cantonment areas. Each individual project would require the submittal of an AF FORM 813, *Request for Environmental Impact Analysis*, prior to implementation in order to analyze individual impacts of specific projects.

3.6.3.3 Alternative 2

As described in **Table 2-4**, Alternative 2 would authorize an additional 25 percent increase in development over Alternative 1 for a total of 1,800,308 ft^2 of facilities construction, 281.85 acres of parking/impervious surfaces, 102.05 acres of roads/infrastructure, and 266,468 ft^2 of demolition. Under the implementation of Alternative 1, the environmental consequences related to noise would be the same as discussed in Section 3.6.3.1 for the No-Action Alternative. The additional development outlined above would increase the notional footprint for development that was approved under the No-Action Alternative. No specific projects have been identified under Alternative 2, and projects would vary in size, scope, and implementation date across the cantonment areas. Each individual project would require the submittal of an AF FORM 813, *Request for Environmental Impact Analysis*, prior to implementation in order to analyze individual impacts of specific projects.

[166] Eglin AFB. *Final Eglin Air Force Base Cantonment Areas Environmental Assessment.* March 2014.

3.7 Safety

3.7.1 Definition

Safety occurs when the potential for death, serious bodily injury, illness, or property damage is reduced to the greatest extent practicable. Several Air Force regulations address safety, including AFI 91-301, *AFOSH Program* and Air Force Manual 91-201, *Explosives Safety Standards*. Air Force activities are required to comply with AFOSH guidelines and with *Occupational Safety and Health Act* (29 USC Section 651) regulations. The health and safety of military personnel and the public must be considered when evaluating potential impacts from a federal action. Under 32 CFR 989.27, an environmental document should "assess direct and indirect impacts of proposed actions on the safety and health of Air Force employees and others at a work site" but is not required to specify compliance procedures.[167] Any impacts that require a change in work practices to achieve an adequate level of health and safety should be discussed.[168]

The safety analyses address the potential for encountering UXO during construction and renovation activities, explosive safety, ground safety, and flight safety. The potential for encountering UXO is evaluated due to the expenditure and storage of ordnance in various areas on Eglin AFB, including within the cantonment areas. Explosives safety addresses the management and use of ordnance or munitions associated with Base operations and training activities, while ground safety considers issues associated with human activities and operations and maintenance activities that support unit operations. Flight safety considers aircraft flight risks such as aircraft accidents or mishaps and considers potential risks resulting from construction in or near existing CZs and APZs.

3.7.2 Affected Environment

3.7.2.1 Eglin Main and Jackson Guard

Air Force Manual (AFMAN) 91-201, *Explosive Safety Standards,* establishes the size of clearance zones around facilities used to store, handle, and maintain munitions based on the quantity-distance (QD) criteria. ESQD arcs are "safety zones around activities that handle, test, or store explosive materials."[169] ESQD arcs are established by the Eglin AFB Safety Office "based on the types and amounts of explosive materials to be handled, tested, or stored on the Installation."[170] A total of 19 ESQD arcs are located on Eglin Main Base, totaling 1,841 acres.[171] The majority of these ESQDs are located in the munitions storage areas (MSA) north of the airfield and the F-35 ramp and live ordnance loading area (LOLA) located southwest of Runway 12/30.[172] Two armament research test areas southeast of the climatic laboratory also have associated ESQDs, which are sited adjacent to Eglin AFB's main east-west transportation corridor, Eglin Boulevard (refer to **Figure 3-6**).[173]

UXO contamination is considered probable in the southeast areas of the base near Choctawhatchee Bay. No areas are designated for probable UXO contamination within the Jackson Guard Compound.[174]

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[167] 32 CFR 989.27
[168] *Ibid.*
[169] Eglin AFB. *Installation Development Plan.* 2017. p. 6-70.
[170] *Ibid.*
[171] *Ibid.*
[172] *Ibid.*
[173] *Ibid.*
[174] Eglin AFB. *Jackson Guard Compound Area Development Plan.* 2013. p. 48.

Anti-terrorism/force protection (AT/FP) is a security program designed to protect USAF active-duty personnel, civilian employees, family members, and facilities and equipment in all locations and situations. The program is accomplished through the planned and integrated application of anti-terrorism measures, physical security, operations security, and personal protective services. These guidelines address a range of considerations that include access to the Base, access to facilities on the Base, facility siting, exterior design, interior infrastructure design, and landscaping. UFC 4-010-01, *DoD Minimum Antiterrorism Standards for Buildings*,[175] establishes minimum standoff distances that must be maintained between several categories of structures and areas. The intent of AT/FP and design guidance is to improve security, minimize fatalities, and limit damage to facilities and personnel in the event of a terrorist attack at Eglin AFB. Many military installations, such as Eglin AFB, were developed before such considerations became a critical concern. Thus, under current conditions, many units are not able to comply with all present AT/FP standards. New construction and modification of facilities would incorporate AT/FP standards to the maximum extent practicable.

The primary public concern regarding flight safety is the potential for aircraft accidents. Such mishaps may occur because of mid-air collisions, collisions with structures or terrain, weather-related accidents, mechanical failure, pilot error, or bird-aircraft collisions.[176] The USAF has established AICUZ around Eglin AFB to recommend compatible uses in areas subject to noise and accident hazards. The designation of AICUZ ensures compatible development around the airfield and provides for the health, safety, and welfare of personnel from noise and airfield hazards.

CZs are established at the ends of each runway and represent the area of highest accident potential; CZs extend 3,000 feet from the end of the runway. APZs I and II lie beyond the CZs and represent areas of lesser accident potential but of a magnitude great enough to warrant land use restrictions and recommendations.[177] APZ I begins at the end of the CZ and extends an additional 5,000 feet in length; APZ I is 3,000 feet wide. APZ II begins at the end of APZ I and is 7,000 feet long and 3,000 feet wide. Primary surface CZs, APZ CZs, APZ I and 50:1 approach/departure A/D slopes exist on Eglin Main for Runway 01/19 and Runway 12/30. No APZ II areas lie within the Eglin Main Base cantonment boundary (refer to **Figure 3-6**).[178]

Day-to-day operation and maintenance activities conducted at Eglin AFB are performed in accordance with applicable USAF safety regulations, published USAF Technical Orders, and standards prescribed by AFOSH requirements. These are intended to reduce occupational risks to government personnel and contractors, and to protect other individuals that reside on or visit or are near the Base.

Construction job site safety and accident prevention are an ongoing activity on every Eglin AFB job site. All contractors performing construction activities are responsible for following workers' compensation programs and complying with USAF safety requirements and OSHA regulations and are required to conduct construction activities in a manner that does not pose undue risk to workers or personnel. All personnel involved with USAF activities on Eglin AFB are responsible for following ground safety regulations. Construction contractors are responsible for reviewing potentially hazardous workplace operations, monitoring exposure to workplace chemicals (e.g., asbestos, lead, hazardous materials), physical hazards (e.g., noise propagation, slips, trips, falls), and biological agents (e.g., infectious waste, wildlife, poisonous plants). Construction contractors are required to recommend and evaluate controls (e.g., preventative, administrative, engineering) to ensure personnel are properly protected and to

[175] Department of Defense. *DoD Minimum Antiterrorism Standards for Buildings*. December 12, 2018.
[176] Eglin AFB. *Bird/Wildlife Aircraft Strike Hazard Plan, EAFB Plan 91-212*. January 2015.
[177] AFI 32-7063. *Air Installations Compatible Use Zones Program*. March 1994.
[178] Eglin AFB. *Installation Development Plan*. 2017. p. 8-12.

implement a medical surveillance program to perform occupational health physicals for those workers subject to any accidental chemical exposures.

3.7.2.2 Duke Field

Duke Field has four ESQDs associated with an MSA in the northwest corner of the cantonment, two hot cargo pads, and one LOLA (refer to **Figure 3-7**).[179] The largest ESQD is associated with the MSA, while the smallest is associated with the LOLA. Possible UXO contamination associated with the MSA exists in the northwestern corner of Duke Field.[180] Airfield constraints at Duke Field consist of primary surface CZs, APZ CZs, and 50:1 A/D slopes for Runway 18/36, as well as APZ I and APZ II CZs.[181]

3.7.2.3 Camp Rudder

An ESQD arc associated with munitions and training equipment storage requirements are located at the southern end of Camp Rudder (refer to **Figure 3-8**). UXO contamination at Camp Rudder is considered probable on the far western portion of the base and possible in the central-western portion of the base.[182] The southwestern corner of the Camp Rudder cantonment area overlaps the CZ for the associated north-south runway located outside of the cantonment boundaries.

3.7.2.4 7 SFG(A)

No ESQD arcs exist on the 7 SFG(A) cantonment (refer to **Figure 3-9**). The entire area is considered probable for UXO contamination. No CZs or APZs exist on the 7 SFG(A) cantonment.

3.7.2.5 Site C-6 20 SPCS Area

No ESQD arcs exist at the Site C-6 20 SPCS Area (refer to **Figure 3-10**). The entire Site C-6 20 SPCS Area and the surrounding Eglin Test Range are considered "probable" for UXO contamination; the probability of finding UXO within Site C-6 20 SPCS Area is moderate to high.[183] No CZ or APZ areas are located at Site C-6; however, the 20 SPCS restricts airspace within 2.5 nautical miles around its facilities.

3.7.3 Environmental Consequences

3.7.3.1 No-Action Alternative

As outlined in Chapter 2 (Alternatives), the No-Action Alternative is the approved level of development for the five cantonment areas, described as the Preferred Alternative in the 2014 *Final Eglin Air Force Base Cantonment Areas Environmental Assessment.*[184] The following describes the current practices and methodology, and subsequent effects pertaining to the No-Action Alternative.

The explosives and munitions safety program at Eglin AFB would continue to be conducted in accordance with AFMAN 91-201. Construction of new munitions storage facilities would require preparation and submittal of Explosive Site Plan packages in accordance with AFMAN 91-201. Existing coordination procedures would continue to be implemented to ensure safety of all personnel while working in areas associated with increased risk of explosives and munitions. When required, signage will be constructed to prohibit public entry in restricted areas. No impacts to explosives and munitions safety would be anticipated under implementation of the No-Action Alternative.

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[179] *Ibid*, p. 6-70.
[180] Eglin AFB. *Duke Field Area Development Plan.* 2012. p. 41.
[181] Eglin AFB. *Installation Development Plan.* 2017. p. 8-12.
[182] Eglin AFB. *6th Ranger Training Battalion (6RTBn) Camp Rudder Area Development Plan.* 2012. p. 54.
[183] Eglin AFB. *Site C-6 20th Space Command Squadron (20SPCS) Space Utilization Study.* 2012. p. 24.
[184] Eglin AFB. *Final Eglin Air Force Base Cantonment Areas Environmental Assessment.* March 2014.

UXO management and clearance on active ranges supporting current missions would continue to be managed by the 96 TW/SE, 96 TW/RANSS and the 96 CES/CESD. Activities taking place in areas considered probable for UXO contamination would be surveyed and remediated prior to 96 TW/SE approval for ground disturbance. Coordination with the 96 TW/RANSS and 96 CES/CESD would occur prior to construction of other ground-disturbing activities proposed in areas of possible or probable UXO contamination. As a result of this coordination, no adverse impacts from UXO would be anticipated as a result of implementation of the No-Action Alternative.

In accordance with DoD Instruction 4165.57, *AICUZ,* construction or alteration of facilities within a CZ or APZ would be performed in accordance with AICUZ. Therefore, no adverse impacts would be anticipated to flight safety as a result of implementation of the No-Action Alternative.

Operations and maintenance procedures would continue to be conducted in accordance with applicable regulations, technical orders, and AFOSH standards pertaining to ground safety. No impacts to ground safety would be anticipated as a result of implementation of the No-Action Alternative.

The AT/FP security program would continue in accordance with regulations and force protection standards at Eglin AFB. In the event that obsolete facilities not complying with current AT/FP security programs were demolished and replaced as part of the approved level of development occurring under the No-Action Alternative, a long-term, direct, beneficial impact to safety would result.

Construction activities on Eglin AFB are conducted in accordance with applicable USAF safety regulations, published USAF Technical Orders, and standards prescribed by AFOSH Program. Construction contractors are also required to follow applicable OSHA requirements. Construction activities on the Base are required to have appropriate Site Safety Plans detailing safety policies and procedures. During C&D, most ground safety issues would be associated with the potential for slips, trips, falls, unfamiliar working environments, and task-specific hazards such as working with hand tools, power tools, and heavy equipment. Construction is an inherently dangerous activity due to the use of large, powerful, and noisy pieces of equipment; however, all construction activities would be conducted in compliance with all applicable OSHA regulations to protect workers. USAF and OSHA excavation safety procedures and regulations would be followed at each phase of each project to help ensure the safety of all involved. Clear demarcation of the work area as well as fencing would be needed to keep construction activities and debris in the construction area and bystanders out of the potentially dangerous work areas. Construction employees would be given the proper training to identify hazards as well as all necessary PPE to do their jobs safely. The PPE would include hard hats, steel toed boots, hearing protection, work gloves, reflective vests, safety harnesses, signaling flags, communication devices and any other equipment deemed necessary. The use of PPE and signage at the construction site would protect workers and bystanders from sharp or heavy tools and construction materials, loose construction debris, large and noisy moving equipment, as well as biological hazards such that an increase in the number or severity of construction accidents would not be expected under the No-Action Alternative. Based on analysis from the 2014 *Final Eglin Air Force Base Cantonment Areas Environmental Assessment*, short-term, minor, direct, adverse effects to safety would be expected.[185]

3.7.3.2 Alternative 1

As described in **Table 2-3**, Alternative 1 would authorize an additional 1,440,246 ft^2 of facilities construction, 225.4 acres of parking/impervious surfaces, 81.6 acres of roads/infrastructure, and 213,174 ft^2 of demolition across the five cantonment areas. Under the implementation of Alternative 1, the environmental consequences related to safety would be the same as discussed in Section 3.7.3.1 for the

[185] Eglin AFB. *Final Eglin Air Force Base Cantonment Areas Environmental Assessment.* March 2014. p. 3-43.

No-Action Alternative. No specific projects have been identified under Alternative 1, and projects would vary in size, scope, and implementation date across the cantonment areas. Each individual project would require the submittal of an AF FORM 813, *Request for Environmental Impact Analysis*, prior to implementation in order to analyze individual impacts of specific projects.

3.7.3.3 Alternative 2

As described in **Table 2-4**, Alternative 2 would authorize an additional 25 percent increase in development over Alternative 1 for a total of 1,800,308 ft^2 of facilities construction, 281.85 acres of parking/impervious surfaces, 102.05 acres of roads/infrastructure, and 266,468 ft^2 of demolition. Under the implementation of Alternative 2, the environmental consequences related to safety would be the same as discussed in Section 3.7.3.1 for the No-Action Alternative. No specific projects have been identified under Alternative 2, and projects would vary in size, scope, and implementation date across the cantonment areas. Each individual project would require the submittal of an AF FORM 813, *Request for Environmental Impact Analysis*, prior to implementation in order to analyze individual impacts of specific projects.

3.8 Socioeconomic Resources and Environmental Justice

3.8.1 Definition of Socioeconomic Resources

Socioeconomics comprises the basic attributes and resources associated with the human environment in the ROI, particularly population and economic activity. Socioeconomic impacts would be considered significant if the Proposed Action would result in a substantial shift in population trends or notably affect regional employment, earnings, or community resources. An evaluation of socioeconomic impacts describes "how elements of the human environment such as population, employment, housing, and public services might be affected by the proposed action and alternative(s)."[186] Socioeconomic impacts on a military base could involve impacts to military personnel, civilians, military retirees, and dependents at Eglin AFB, as well as impacts to local economic activity through the creation of new jobs and increased income. Impacts to community quality of life, such as those caused by increased traffic or noise, are also considered.

3.8.2 Affected Environment for Socioeconomic Resources

Eglin AFB spreads across Santa Rosa, Okaloosa, and Walton Counties; however, the five cantonment areas are located in Okaloosa County (Eglin Main, Duke Field, 7 SFG(A) Cantonment, and Camp Rudder) and Walton County (Site C-6 20 SPCS). Any socioeconomic impacts would be reasonably assumed to affect all three counties as a result of commuters to Eglin AFB coming from each area. It is anticipated that potential impacts would be limited to Santa Rosa, Okaloosa, and Walton Counties.

3.8.2.1 Population

The tri-county area surrounding Eglin AFB has continued to experience significant growth over the past several decades. **Table 3-13** depicts the populations and growth rates of each county adjacent to Eglin AFB.

Table 3-13 Populations of Adjacent Counties

County	2010 Population[a]	2018 Population[b]	Average Annual Growth Rate
Okaloosa County	180,822	207,269	1.83%
Santa Rosa County	151,372	179,349	2.28%
Walton County	55,043	71,375	3.71%

[a] Source: Census 2010 Data [b] Source: Census 2018 Population Estimate

[186] *Ibid.*

As reflected in **Table 3-13**, Walton County has the highest average annual growth rate at 3.71 percent, while Okaloosa County has the highest population. **Table 3-13** reflects the rapid rate of growth occurring in the area surrounding Eglin AFB. Of the five cantonment areas, only Eglin Main is surrounded by populated areas. Duke Field, the 7 SFG(A) Cantonment, Camp Rudder, and Site C-6 20 SPCS are isolated and not located near any communities that construction noise or other impacts could potentially affect.

3.8.2.2 Economic Activity

The presence of Eglin AFB has a significant impact on the local economy. Approximately one in four jobs in Okaloosa County and one in six jobs in Santa Rosa County are in the government sector; Eglin AFB is the largest single-site employer in Okaloosa County.[187] Aside from Government Services, the primary employment industries in Okaloosa County in 2018 were Services, employing 37,615 people, Retail Trade, employing 26,276 people, and Public Administration, and Finance, Insurance, and Real Estate, employing 7,182 people.[188]The unemployment rate in Okaloosa County ranged from 2.5 to 3.4 percent during the first half of 2019.[189] Employment in Santa Rosa County mirrors that of Okaloosa County with Services, Retail Trade, and Public Administration as the top employment industries.[190] The unemployment rate in Santa Rosa County is approximately 3.0 percent.[191] Walton County employees work predominantly in Leisure and Hospitality (26.4 percent), Trade, Transportation, and Utilities (20.5 percent) and Government Services (12.8 percent).[192] Unemployment in Walton County is approximately 3.1 percent.[193]

3.8.2.3 Military

The majority of the Eglin AFB populations is located within Okaloosa County.[194] In 2017, the population of Eglin AFB included 68,129 people, including 13,227 active duty service members, 6,069 civilians, 3,466 contractors, 12,492 retirees, and 32,875 dependents.[195] Approximately 20,000 people are part of the Eglin AFB workforce.[196] The regional population growth rate in the tri-county area is estimated at 11.4 percent, representing an increase in the population growth rate of 8.9 percent.[197] Growth at Eglin AFB is anticipated to be similar to that of the regional population and is described as "rapid, expansive, [and] with long lead times and short notices."[198] To prepare for future growth, Eglin AFB has invested approximately $220 million in a 50-year housing privatization lease with an estimated completion date of 2020 and has privatized its natural gas, water/wastewater, and electrical utilities.[199]

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[187] Eglin AFB. *Installation Development Plan.* 2017. p. 5-5.
[188] Okaloosa County Economic Development Council, "Education and Workforce," https://florida-edc.org/okaloosa-county/education-and-workforce, 2019, (August 13, 2019).
[189] *Ibid.*
[190] Santa Rosa Economic Development, "Santa Rosa County Demographic and Workforce Information," http://www.santarosaedo.com/page/demographics, 2019, (August 13, 2019).
[191] Santa Rosa Economic Development, "Santa Rosa County Demographic and Workforce Information," http://www.santarosaedo.com/page/demographics, 2019, (August 13, 2019).
[192] Florida Legislature, Office of Economic and Demographic Research, *Walton County*, http://edr.state.fl.us/Content/area-profiles/county/walton.pdf, June 2019, (August 13, 2019).
[193] *Ibid.*
[194] Eglin AFB. *Installation Development Plan.* 2017. p. 5-7.
[195] *Ibid*, p. 5-7.
[196] *Ibid*, p. 3-4.
[197] *Ibid*, p. 8-17.
[198] *Ibid*, p. 3-4.
[199] *Ibid*, p. 3-4.

3.8.3 Definition of Environmental Justice and Special Risks to Children

The USEPA defines environmental justice as "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies."[200] The three fundamental principles of environmental justice are:

- To avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations;
- To ensure the full and fair participation by all potentially affected communities in the decision-making process; and,
- To prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations.[201]

EO 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*, "directs federal agencies to identify and address the disproportionately high and adverse human health or environmental effects of their actions on minority and low-income populations, to the greatest extent practicable and permitted by law."[202] The purpose of EO 12898 is to "promote nondiscrimination in federal programs that affect human health and the environment, as well as provide minority and low-income communities access to public information and public participation."[203] EO 13229, *Protection of Children from Environmental Health Risks and Safety Risks*, and EO 13296 require that all federal agencies address potential environmental risks to health and safety that are attributable to products or substances that children may come in contact with or ingest as a result of a federal action.[204]

For the purposes of this analysis, the following definitions are applied to the relevant populations:

- *Minority population:* Blacks, American Indians, Eskimos, Aleuts, Asians, Pacific Islanders, and persons of Hispanic or Latino origin of any race.
- *Low-income population:* Persons living below the poverty level, based on the equivalent annual income for a family of four.
- *Youth population:* Children under the age of 18.

3.8.4 Affected Environment for Environmental Justice and Special Risks to Children

In order to evaluate disproportionate impacts to environmental justice populations, the percentage of protected populations found in the Census Block Groups (BGs) surrounding each cantonment area were compared to the county in which they lie and the state of Florida in order to provide context. Because the five cantonment areas lie within Okaloosa County and Walton County, the affected environment for environmental justice and special risks to children will include these two areas. Census block groups with a higher percentage of the population classified as minority or low-income populations than the

[200] USEPA, "Environmental Justice," https://www.epa.gov/environmentaljustice (Accessed August 15, 2019).
[201] Federal Highway Administration, "Environmental Justice Overview," http://www.fhwa.dot.gov/environment/environmental_justice/overview/, Updated December 12, 2012 (Accessed April 25, 2016)
[202] USEPA, "Summary of Executive Order 12898 – Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," https://www.epa.gov/laws-regulations/summary-executive-order-12898-federal-actions-address-environmental-justice, September 17, 2018 (August 9, 2019).
[203] *Ibid.*
[204] EO 13229 (2001). EO 13296 (2003).

surrounding county and state were then designated as potential environmental justice communities. If the percentage of the population classified as minority or low-income is lower than that of the county and state, no disproportionate impacts would be anticipated. To evaluate potential risks to children, the median age of the census block group was compared to that of the county and state to establish which block groups had a greater potential to impact children.

Duke Field, Camp Rudder, and 7 SFG(A) Cantonment are entirely encompassed by Census Tract (CT) 208 BG 1 in Okaloosa County; the northern portion of Eglin Main is also located within this BG (refer to **Figure 3-17**). The remainder of Eglin Main is located within the boundaries of CT 212 BG 2, and CT 214 BGs 1, 2, and 3; Jackson Guard is located in CT 211.01 BG 1. **Table 3-14** shows the median age, percent minority, and percent low-income for each of the BGs, Okaloosa County, and the state of Florida.

Table 3-14 Environmental Justice Characteristics for BGs in Okaloosa County[205]

	CT 208 BG 1	CT 211.01 BG 1	CT 212 BG 2	CT 214 BG 1	CT 214 BG 2	CT 214 BG 3	Okaloosa County	Florida
Median Age	20.0	39.6	22.0	24.6	22.4	-[a]	37.7	42.0
Percent Minority	27.6	15.8	13.4	28.9	34.2	0	13.8	24.3
Percent Low Income	8.8	7.5	0	14.9	2.7	0	16.0	13.5

[a] Data not available

As indicated in **Table 3-14**, each of the BGs for which data is available have a median age that is substantially lower than that of Okaloosa County and the state of Florida. This is likely the result of two factors: first, the population on Eglin AFB is made up of many young service members and their families; second, Okaloosa County and Florida are both known for their large numbers of retired residents. CT 208 BG 1, CT 214 BG 1, and CT 214 BG 2 all report higher percentages of the population that are considered minorities than Okaloosa County and the state of Florida. None of the BGs have higher percentages of the population considered low income than Okaloosa County or the state of Florida. Therefore, environmental justice populations may be located in the vicinities of Eglin Main, Duke Field, Camp Rudder, and 7 SFG(A) Cantonment.

Site C-6 20 SPCS is entirely encompassed by CT 9503.02 BG 1 in Walton County. **Table 3-15** shows the median age, percent minority, and percent low-income for the BG, Walton County, and the state of Florida.

Table 3-15 Environmental Justice Characteristics for BGs in Walton County

	CT 9503.02 BG 1	Walton County	Florida
Median Age	41.3	44.5	42.0
Percent Minority	15.2	13.8	24.3
Percent Low Income	14.0	16.0	13.5

As demonstrated by **Table 3-15**, CT 9503.02 BG 1 has a median age that is slightly lower than that of Walton County and the state of Florida. The percentage of the population considered minority is 1.4 percentage points higher than that of Walton County but 9.1 percentage points higher than the state of Florida. The percentage of the population considered low income is two percentage points lower than

[205] U.S. Census Bureau. *2017 American Community Survey 5-year Estimates*. 2019.

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Cantonment Boundaries

Census Block Groups

County

Figure 3-17
Census Block Groups
Eglin AFB Cantonment Areas
Draft EA
Eglin Air Force Base, Florida

Walton County and 0.5 percentage point higher than the state of Florida. Therefore, no environmental justice populations are located in the vicinity of Site C-6 20 SPCS.

3.8.5 Environmental Consequences

3.8.5.1 No-Action Alternative

As outlined in Chapter 2 (Alternatives), the No-Action Alternative is the approved level of development for the five cantonment areas, described as the Preferred Alternative in the 2014 *Final Eglin Air Force Base Cantonment Areas Environmental Assessment.*[206] The following describes the current practices and methodology, and subsequent effects pertaining to the No-Action Alternative.

Development approved in the 2014 *Final Eglin Air Force Base Cantonment Areas Environmental Assessment*[207] would be anticipated to generate temporary construction workers in the local region as well as revenue to the local economy through the purchase of materials and supplies. However, no new military jobs would be generated as a result of proposed development approved under the 2014 EA and no new personnel would be relocated to Eglin AFB as a result of the proposed development. Therefore, it is anticipated that expenditures, employment, and population at Eglin AFB would remain near current levels. Construction activities associated with implementation of the No-Action Alternative would be anticipated to result in temporary, beneficial, insignificant impacts. Similarly, demolition of buildings would result in indirect, temporary impacts through the on-Base relocation of personnel, equipment, and operations to new facilities.

Eglin AFB has an estimated annual impact of $2.5 billion on the local and regional economy.[208] Although the previously authorized level of development would support general operation of Eglin AFB in furtherance of its mission and thus indirectly support local and regional jobs and revenue, it would not be expected to significantly impact socioeconomic conditions in the ROI. Therefore, impacts to socioeconomics as a result of development authorized under the No-Action Alternative would be minor, beneficial, and temporary.

No disproportionate impacts to minority or low-income populations would be anticipated to occur as a result of authorized development at Duke Field, Camp Rudder, 7 SFG(A) Cantonment, and Site C-6 20 SPCS because no environmental justice populations are located near these cantonments. Despite the presence of environmental justice populations occurring in the vicinity of Eglin Main, no disproportionate impacts to environmental justice populations would be anticipated to occur as a result of authorized development at Eglin Main because all activities would occur within the confines of Eglin AFB and projects would be sited appropriately to avoid potential impacts from construction noise.

3.8.5.2 Alternative 1

As described in **Table 2-3**, Alternative 1 would authorize an additional 1,440,246 ft^2 of facilities construction, 225.4 acres of parking/impervious surfaces, 81.6 acres of roads/infrastructure, and 213,174 ft^2 of demolition across the five cantonment areas. Under the implementation of Alternative 1, the environmental consequences related to socioeconomic resources would be the same as discussed in Section 3.8.5.1 for the No-Action Alternative. The additional development outlined above would increase the notional footprint for development that was approved under the No-Action Alternative. No specific projects have been identified under Alternative 1, and projects would vary in size, scope, and implementation date across the cantonment areas. It is anticipated that authorizing the additional

[206] Eglin AFB. *Final Eglin Air Force Base Cantonment Areas Environmental Assessment.* March 2014.
[207] Eglin AFB. *Final Eglin Air Force Base Cantonment Areas Environmental Assessment.* March 2014.
[208] Eglin AFB. *Installation Development Plan.* 2017. p. 3-7.

development proposed under Alternative 1 would have additional proportionate minor, beneficial, and temporary impacts on socioeconomic resources at Eglin AFB.

No disproportionate impacts to minority or low-income populations would be anticipated to occur as a result of authorized development at Duke Field, Camp Rudder, 7 SFG(A) Cantonment, and Site C-6 20 SPCS because no environmental justice populations are located near these cantonments. Despite the presence of environmental justice populations occurring in the vicinity of Eglin Main, no disproportionate impacts to environmental justice populations would be anticipated to occur as a result of authorized development at Eglin Main because all activities would occur within the confines of Eglin AFB and projects would be sited appropriately to avoid potential impacts from construction noise. It is not anticipated that development would occur in the vicinity of schools, daycare centers, or residential areas located on base where children are likely to be found; therefore, impacts to children are not anticipated. No schools are located on Eglin AFB, while two childcare centers are located on base along Boatner Road. Each individual project would require the submittal of an AF FORM 813, *Request for Environmental Impact Analysis*, prior to implementation in order to analyze individual impacts of specific projects. In the event that a proposed project would be located in the vicinity of a site where children may be present, standard construction site safety procedures would be followed in order to minimize risks to children.

3.8.5.3 Alternative 2

As described in **Table 2-4**, Alternative 2 would authorize an additional 25 percent increase in development over Alternative 1 for a total of 1,800,308 ft^2 of facilities construction, 281.85 acres of parking/impervious surfaces, 102.05 acres of roads/infrastructure, and 266,468 ft^2 of demolition. Under the implementation of Alternative 2, the environmental consequences related to socioeconomic resources and environmental justice populations would be the same as discussed in Section 3.8.5.2 for Alternative 1. The additional development outlined above would increase the notional footprint for development that was approved under the No-Action Alternative. No specific projects have been identified under Alternative 2, and projects would vary in size, scope, and implementation date across the cantonment areas. Each individual project would require the submittal of an AF FORM 813, *Request for Environmental Impact Analysis*, prior to implementation in order to analyze individual impacts of specific projects.

3.9 Soils

3.9.1 Definition

The term "soils" refers to unconsolidated materials formed from the underlying bedrock or other parent material. Soils play a critical role in both the natural and human environment. Soil drainage, texture, strength, shrink/swell potential, and erodibility all determine the suitability of the ground to support man-made structures and facilities. Soil erosion occurs when soils are unable to absorb more water, causing the excess water to move down-slope as concentrated flow, resulting in overland flow erosion.[209] The erodibility (susceptibility of the soil to erosion) of the soil is influenced by factors such as soil texture, moisture content, pH, and iconic strength of the eroding water.[210] Clay soils and those with high organic matter content are less erodible, while uniform silts and sands, such as those found on the majority of Eglin AFB, tend to have high soil erodibility.[211]

In addition to climatic factors affecting soil erosion, such as intensity and duration of rainfall, topographic variables such as slope angle and length also influence erosion. Soil erosion is more likely to occur on steep

[209] Eglin AFB. *Erosion Control Component Plan.* April 17, 2018. p. 3-1.
[210] *Ibid.*
[211] *Ibid.*

slopes, and slopes with extended lengths also increase erosion. Eglin AFB has many stream systems bordered by steep slopes, making them susceptible to sedimentation.[212] In general, landscapes with mild slopes and highly permeable soil types have a reduced risk of erodibility compared to landscapes with steeper slopes.

Some parts of Eglin AFB are particularly susceptible to accelerated erosion as a result of the combination of heavy rainfall, erodible soils, and steep slopes found on the base. Slopes devoid of vegetation are particularly susceptible to erosion; frequently disturbed sites on steep slopes with erodible soils are the most prone to excessive erosion.[213]

Analysis Methodology

In order to determine the potential for soil erosion to occur during ground-disturbing activities and construction, the physical characteristics of the five cantonment areas were mapped in GIS. Soil types, land contours, nearby surface water features, and existing vegetative cover on each cantonment area was identified and mapped using GIS. To evaluate stormwater runoff potential, general topographic characteristics of each cantonment area were also evaluated.

3.9.2 Affected Environment

3.9.2.1 Eglin Main

The predominant soil type on the majority of Eglin Main Base and on all of Jackson Guard is Lakeland Sand (refer to **Figure 3-18**). Lakeland sand is a soil type classified by the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) as "excessively drained soil" found on broad ridgetops in the uplands.[214] Lakeland sand ranges from very strongly acid to medium acid throughout the profile.[215] Vegetation types commonly associated with this soil include longleaf pine and turkey oak, and the soil is generally unsuited to agriculture due to excessive leaching of nutrients from the soil.[216] The center of the base in the vicinity of the airfield is made up of disturbed soils classified by NRCS as Urban Land. In the southeastern corner of the base near Choctawhatchee Bay, Dorovan Muck soils dominant the area. Numerous streams originate on Eglin Main Base and empty into Choctawhatchee Bay. Dorovan Muck is a level, very poorly drained soil typically found in large hardwood swamps and on floodplains along drainageways.[217] It is frequently flooded with moderate permeability.[218]

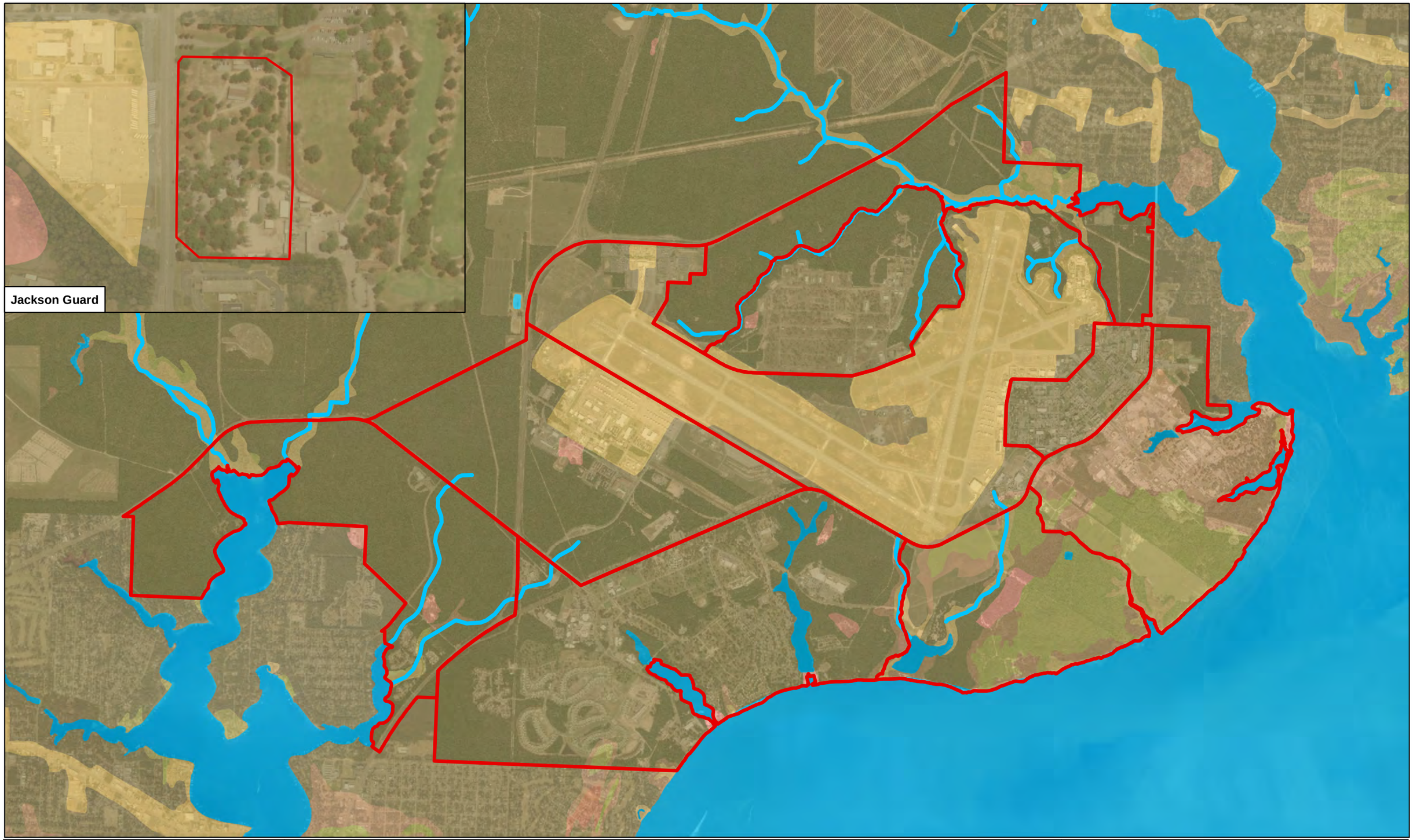
3.9.2.2 Duke Field

As shown in **Figure 3-19**, land within the boundaries of the Duke Field cantonment area is dominated by Lakeland Sand soil. The area in the vicinity of the airfield is comprised of disturbed soil classified by NRCS as Urban Land. Troup Sand is also present within the cantonment area. Two streams begin in Duke Field, including Pearl Creek on the western side of the cantonment area and Silver Creek on the northern side.

3.9.2.3 Camp Rudder

Lakeland Sand is the dominant soil type on Camp Rudder (refer to **Figure 3-19**). Disturbed soils associated with urban land are located in the developed portion of the cantonment area on the western side of the

[212] Eglin AFB. *Erosion Control Component Plan.* April 17, 2018. p. 3-1.
[213] *Ibid.*
[214] Eglin AFB. *Integrated Natural Resources Management Plan.* August 2017. p. 19.
[215] *Ibid*, p. 84.
[216] *Ibid,* p. 20.
[217] United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS). *Soil Survey of Okaloosa County, Florida.* 1995. p. 17.
[218] *Ibid.*



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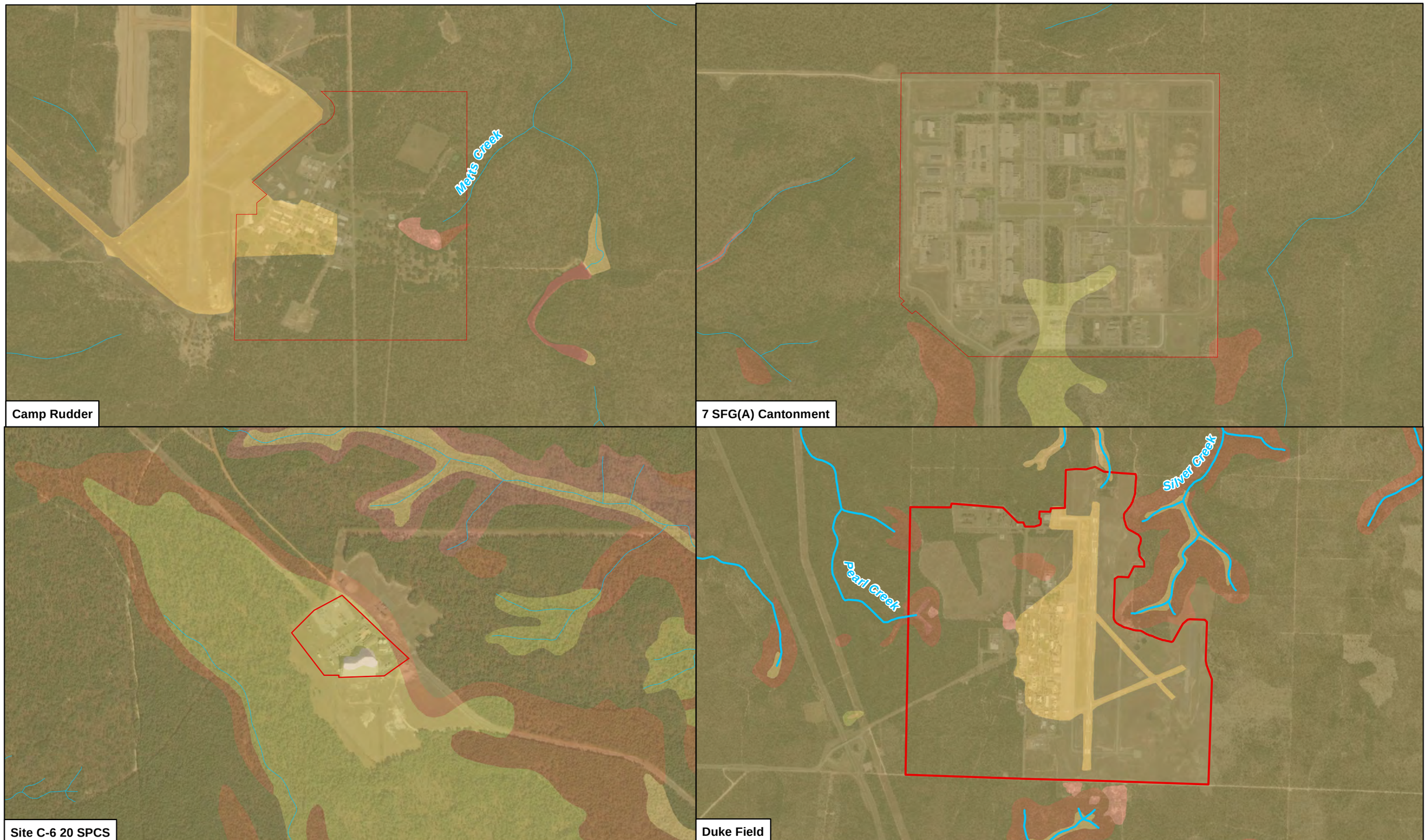
- Stream
- Eglin Main Districts
- Arents
- Chipley and Hurricane Soils
- Dorovan Muck
- Foxworth Sand
- Lakeland Sand
- Leon Sand
- Mandarin Sand
- Resota Sand
- Rutlege Fine Sand
- Udorthents
- Urban Land
- Water

Figure 3-18
Eglin Main Base Soils
Eglin AFB Cantonment Areas
Draft EA
Eglin Air Force Base, Florida



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- Stream
- Cantonment boundaries
- Chipley and Hurricane Soils
- Dorovan Muck
- Lakeland Sand
- Troup Sand
- Udorthents
- Urban land
- Water

Figure 3-19
Camp Rudder, 7 SFG(A), Duke Field, Site C-6 20 SPCS Soils
Eglin AFB Cantonment Areas
Draft EA
Eglin Air Force Base, Florida

cantonment near the airfield. Small areas of Udorthents and Troup Sand are located on the eastern side of the cantonment near the beginning of Metts Creek. Udorthents are soils consisting of "material in areas of open excavations from which sand and loamy materials have been removed" and are thoroughly mixed.[219] Troup sands are well drained soils with rapid to moderate permeability.[220]

3.9.2.4 7 SFG(A)

Soils within the boundaries of the 7 SFG(A) Cantonment are predominantly Lakeland Sand (refer to **Figure 3-19**). A small area of Chipley and Hurricane Soils is located at the south-central end of the cantonment, and a small pocket of Troup sand is located on the eastern boundary. Chipley and Hurricane Soils are characterized by nearly level or gentle slopes and are somewhat poorly drained.[221] Permeability in these soils is rapid.[222] No streams are located within 7 SFG(A) Cantonment.

3.9.2.5 Site C-6 20 SPCS

Nearly the entire cantonment area of Site C-6 20 SPCS is comprised of Chipley-Hurricane Soil (refer to **Figure 3-19**). One small area of disturbed soil associated with urban land is located in the south-central portion of the cantonment, and a small area of Troup Sand is located in the southeast corner. No streams are located within the Site C-6 20 SPCS cantonment area.

3.9.2.6 Topography across the Five Cantonment Areas

Eglin Main Base, Duke Field, Camp Rudder, and 7 SFG(A) Cantonment are all fairly level with average slopes of less than 1 percent across the majority of the base.[223] Site C-6 20 SPCS displays the greatest topographic variation with a slope of 12 percent from the high point near RR 208 and the low point near the southern boundary.[224]

3.9.3 Environmental Consequences

3.9.3.1 No-Action Alternative

As outlined in Chapter 2 (Alternatives), the No-Action Alternative is the approved level of development for the five cantonment areas, described as the Preferred Alternative in the 2014 *Final Eglin Air Force Base Cantonment Areas Environmental Assessment.*[225] The following describes the current practices and methodology, and subsequent effects pertaining to the No-Action Alternative.

Under the No-Action Alternative, no significant impacts to soils are anticipated to occur as a result of proposed development within the five cantonment areas. Land clearing and disturbing activities would temporarily disrupt the top layers of soil, while construction and demolition activities would result in grading and compaction of the soil for stability. New construction would result in the addition of impervious surfaces, such as new parking lots, buildings, or roadways. Utilities and other infrastructure improvements would be buried underground; however, no impacts to groundwater are anticipated.

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[219] United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS). *Soil Survey of Okaloosa County, Florida*. 1995. p. 24.
[220] *Ibid*, p. 26.
[221] United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS). *Soil Survey of Okaloosa County, Florida*. 1995. p. 16.
[222] *Ibid*, p. 16.
[223] Eglin AFB. *Final Eglin AFB Cantonment Areas Final Environmental Assessment*. March 2014. p. 3-64.
[224] *Ibid*.
[225] *Ibid*.

In areas where the topography is mostly level, including Eglin Main Base, Duke Field, Camp Rudder, and 7 SFG(A) Cantonment, no changes to stormwater drainage would be anticipated. The steeper slope of approximately 12 percent at Site C-6 20 SPCS would be more prone to increased stormwater velocity as a result of the proposed development.

Development approved under the No-Action Alternative would be conducted in a series of projects, each adhering to basewide BMPs for erosion control as outlined in the *Erosion Control Component Plan.*[226] A Construction Generic Permit would be required under FAC Rule 62-621 for construction activities that would disturb one or more acres of land collectively. Under the terms of the permit, a comprehensive Stormwater, Erosion, and Sedimentation Control Plan and a Storm Water Pollution Prevention Plan in the final plan design would be required. An application for a Stormwater Discharge Permit with stormwater retention and design would be required prior to any ground-disturbing activities per FAC Rule 62-346.

3.9.3.2 Alternative 1

As described in **Table 2-3**, Alternative 1 would authorize an additional 1,440,246 ft^2 of facilities construction, 225.4 acres of parking/impervious surfaces, 81.6 acres of roads/infrastructure, and 213,174 ft^2 of demolition across the five cantonment areas. Under the implementation of Alternative 1, the environmental consequences related to soils would be the same as discussed in Section 3.9.3.1 for the No-Action Alternative. The additional development outlined above would increase the notional footprint for development that was approved under the No-Action Alternative. No specific projects have been identified under Alternative 1, and projects would vary in size, scope, and implementation date across the cantonment areas. Each individual project would require the submittal of an AF FORM 813, *Request for Environmental Impact Analysis*, prior to implementation in order to analyze individual impacts of specific projects.

Development approved under the No-Action Alternative would be conducted in a series of projects, each adhering to basewide BMPs for erosion control as outlined in the *Erosion Control Component Plan.*[227] A Construction Generic Permit would be required under FAC Rule 62-621 for construction activities that would disturb one or more acres of land collectively. Under the terms of the permit, a comprehensive Stormwater, Erosion, and Sedimentation Control Plan and a Storm Water Pollution Prevention Plan in the final plan design would be required. An application for a Stormwater Discharge Permit with stormwater retention and design would be required prior to any ground-disturbing activities per FAC Rule 62-346.

3.9.3.3 Alternative 2

As described in **Table 2-4**, Alternative 2 would authorize an additional 25 percent increase in development over Alternative 1 for a total of 1,800,308 ft^2 of facilities construction, 281.85 acres of parking/impervious surfaces, 102.05 acres of roads/infrastructure, and 266,468 ft^2 of demolition. Under the implementation of Alternative 2, the environmental consequences related to soils would be the same as discussed in Section 3.9.3.2 for Alternative 1. The additional development outlined above would increase the notional footprint for development that was approved under the No-Action Alternative. No specific projects have been identified under Alternative 2, and projects would vary in size, scope, and implementation date across the cantonment areas. Each individual project would require the submittal of an AF FORM 813, *Request for Environmental Impact Analysis*, prior to implementation in order to analyze individual impacts of specific projects.

[226] Eglin AFB. *Erosion Control Component Plan.* April 17, 2018. p. 5-1.
[227] Eglin AFB. *Erosion Control Component Plan.* April 17, 2018. p. 5-1.

Development approved under the No-Action Alternative would be conducted in a series of projects, each adhering to basewide BMPs for erosion control as outlined in the *Erosion Control Component Plan.*[228] A Construction Generic Permit would be required under FAC Rule 62-621 for construction activities that would disturb one or more acres of land collectively. Under the terms of the permit, a comprehensive Stormwater, Erosion, and Sedimentation Control Plan and a SWPPP in the final plan design would be required. An application for a Stormwater Discharge Permit with stormwater retention and design would be required prior to any ground-disturbing activities per FAC Rule 62-346.

3.10 Utilities

3.10.1 Definition

Utilities include electrical supply, liquid fuel supply, natural gas supply, water supply, sanitary sewer and wastewater systems, storm water drainage, and communications systems. Solid waste management primarily relates to the availability of systems and landfills to support a population's residential, commercial, and industrial needs. The infrastructure information contained in this section provides a brief overview of each infrastructure component and comments on its existing general condition at Eglin AFB.

3.10.2 Affected Environment

3.10.2.1 Eglin Main Base

Eglin Main Base (refer to **Figure 3-20**) receives electrical power from the Choctawhatchee Electric Cooperative, Inc. (CHELCO), which owns, operates, and maintains the electrical infrastructure at Eglin AFB.[229] Natural gas service is provided by the Okaloosa Gas District via a high-pressure main that meets both current and future mission demands.[230] Extensive communications systems for telephone, secure and non-classified internet, and television connectivity are available throughout Eglin Main Base.[231]

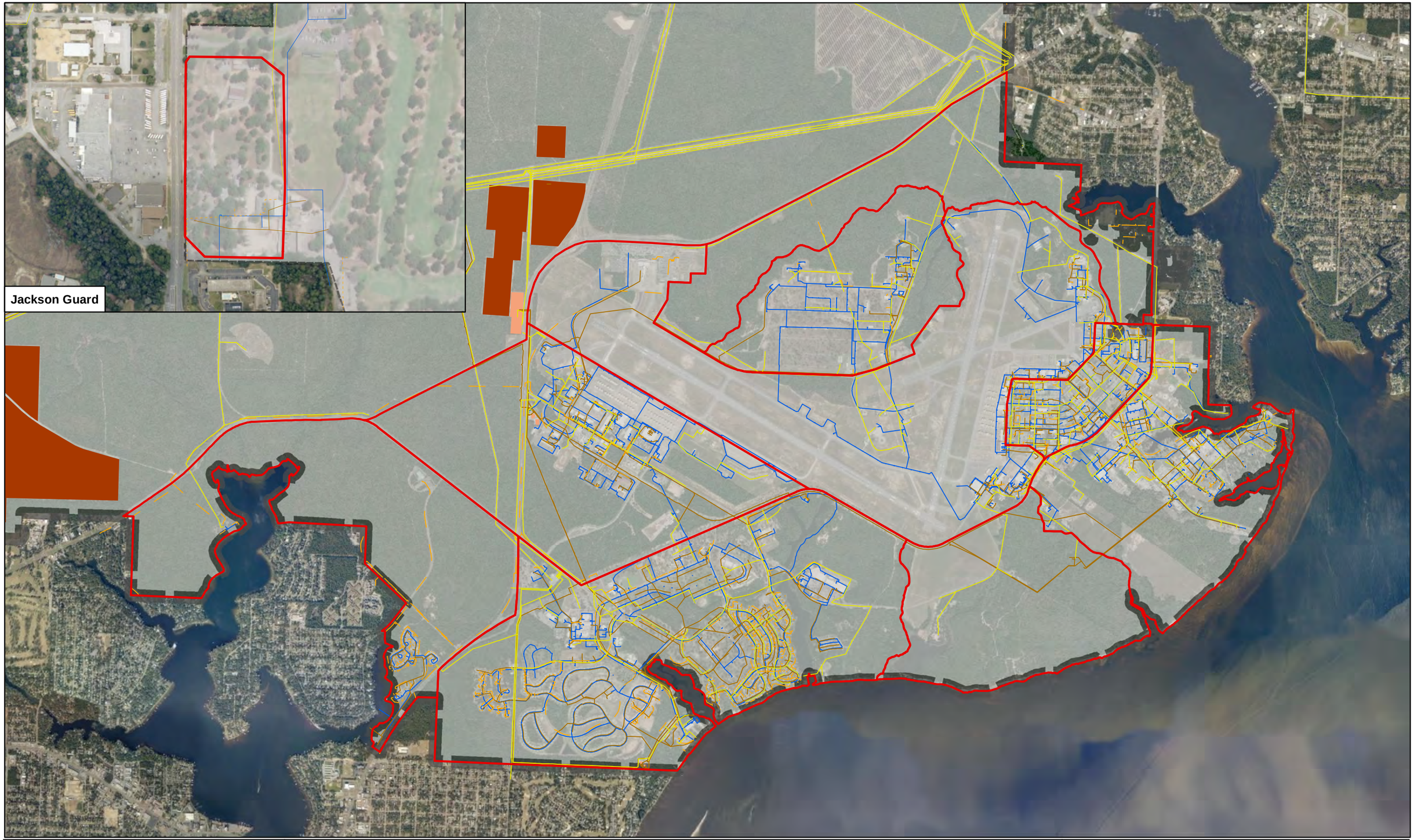
Water services are contracted through American States Utility Service (ASUS) as a result of the privatization of utilities on Eglin and is provided to facilities through a distribution loop.[232] Overall water capacity is considered adequate.[233] Wastewater services are also provided by ASUS, which transports wastewater from Eglin Main to the Arbennie Pritchett Water Reclamation Facility in Fort Walton Beach.[234]

Electrical service is provided to Jackson Guard (refer to **Figure 3-20**) by CHELCO and Gulf Power, while natural gas is provided by the Okaloosa Gas District.[235] Jackson Guard has extensive communications systems, including telephone, secured and nonclassified internet, and television connectivity.[236] Water and wastewater services are provided by ASUS; wastewater from Jackson Guard is transported to the Arbennie Pritchett Water Reclamation Facility in Fort Walton Beach.

3.10.2.2 Duke Field

Duke Field (refer to **Figure 3-21**) receives electrical power from the Valparaiso substation at Eglin Main Base, which is supplied by Gulf Power and distributed throughout the cantonment via a series of

[228] Eglin AFB. *Erosion Control Component Plan.* April 17, 2018. p. 5-1.
[229] Eglin AFB. *Downtown District Area Development Plan.* September 2017. p. 3-11.
[230] *Ibid.*
[231] *Ibid.*
[232] *Ibid.* p. 3-12.
[233] *Ibid.*
[234] *Ibid.*
[235] Eglin AFB. *Eglin Air Force Base Jackson Guard Area Development Plan Final Environmental Assessment.* March 2016. p. 3-16.
[236] *Ibid*, p. 3-16.



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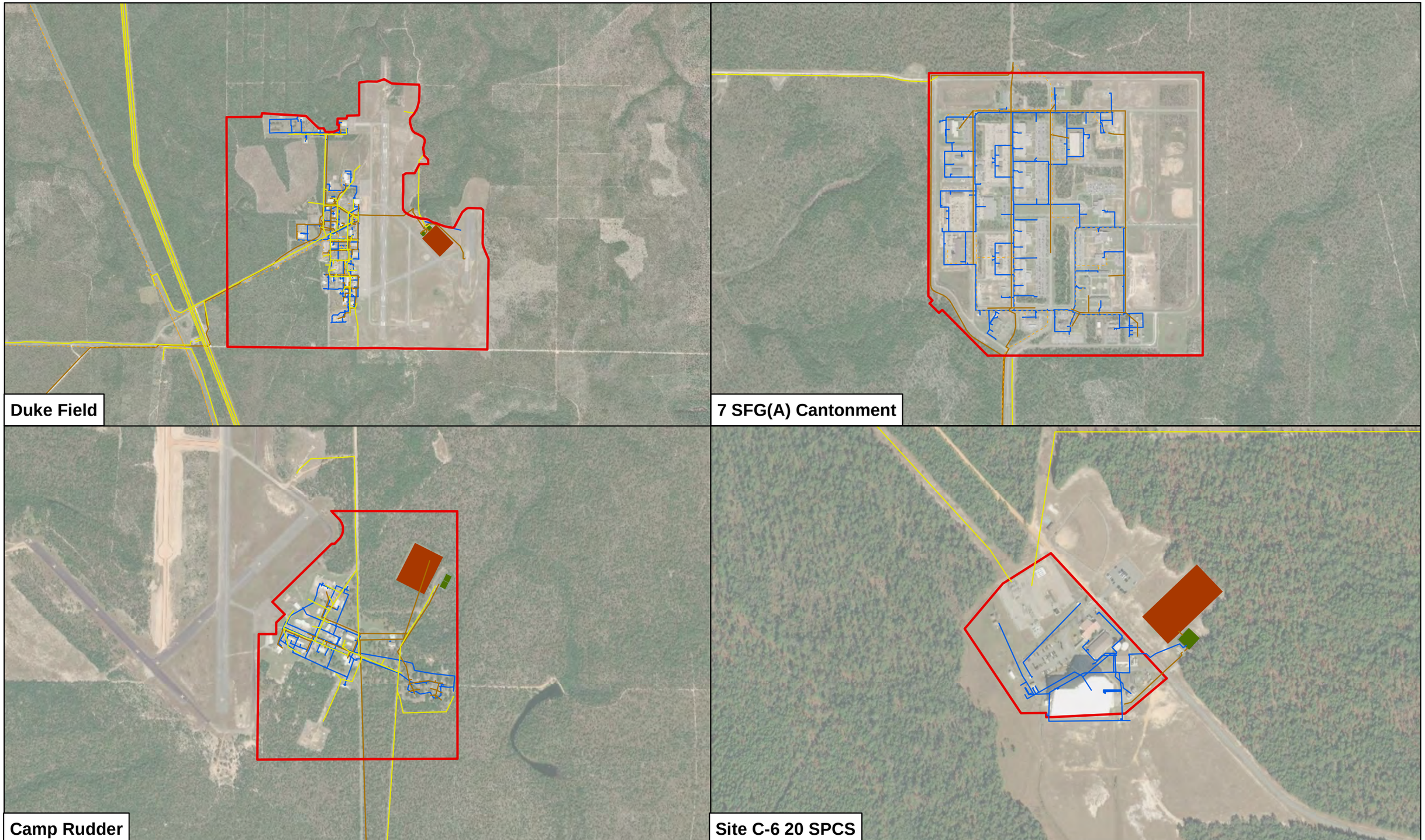
- Electrical Cable Line
- Natural Gas Line
- Wastewater Line
- Water Line
- Wastewater Spray Field
- Wastewater Treatment Plant
- Eglin Main Districts
- Eglin AFB Property

Figure 3-20
Eglin Main Base Utility Systems
Eglin AFB Cantonment Areas
Draft EA
Eglin Air Force Base, Florida



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- Electrical Line
- Natural Gas Line
- Wastewater Line
- Water Line
- Wastewater Lagoon
- Wastewater Spray Field
- Cantonment Boundary
- Eglin AFB Property

Figure 3-21
Camp Rudder, 7 SFG(A), Duke Field, Site C-6 20 SPCS Utility Systems
Eglin AFB Cantonment Areas
Draft EA
Eglin Air Force Base, Florida

aboveground wooden poles and pole mounted transformers.[237] Adequate electrical capacity exists to support future development, and redundant capability of the electrical distribution system exists.[238] The electrical distribution system is being considered as part of the utility privatization effort.[239]

Natural gas is supplied to Duke Field by Okaloosa County, which runs a four-inch high pressure pipeline along the main access road.[240] Service is provided throughout the cantonment area.[241] Sufficient natural gas capacity exists to support long term future development.[242]

Duke Field has an extensive communications network consisting of metallic cable for voice and information transfer and fiber optic cable for telephone and internet access.[243] Both secure and non-classified communications systems are available at Duke Field.[244]

The water supply for domestic uses and fire protection at Duke Field is provided by deep water wells, an elevated storage tank, and exterior water distribution.[245] Water services is provided to facilities at Duke Field via eight-inch mains connected to the elevated storage tanks; five storage tanks are located on Duke Field, including one constructed within the past decade south of the Medical Clinic.[246] Existing water wells are in good condition and provide adequate capacity, and the potential for future connection to a 30-inch water main owned by Okaloosa County would allow for additional supply if needed.[247] While water supply is adequate, the water distribution system is considered to be in poor condition.[248] In order to adequately support existing operations and future mission growth, it is recommended that aging water mains be replaced and the distribution system be updated to remove dead ends and circulate in a loop.[249]

Wastewater at Duke Field flows from gravity flow mains connecting lift stations to the Duke Field Wastewater Treatment Plant (WWTP).[250] While the existing capacity of Duke Field's WWTP is approximately 125,000 gallons per day (GPD), current usage ranges from 15,000 GPD on an average day to 24,000 GPD on reserve duty training weekends.[251] Domestic wastewater generated at Duke Field flows to the Okaloosa County Arbennie Pritchett Plant in Fort Walton Beach. Existing wastewater system capacity is sufficient to support future development.[252]

3.10.2.3 7 SFG(A) Cantonment

The 7 SFG(A) Cantonment (refer to **Figure 3-21**) receives electrical power from a substation located adjacent to the existing Gulf Power transmission lines that parallel the east side of FL Highway 85.[253] The substation is entirely dedicated to serving the 7 SFG(A) Cantonment and consists of a high voltage bus,

[237] Eglin AFB. *Duke Field, Auxiliary Field #3 Area Development Plan.* October 2012. p. 47.
[238] *Ibid.*
[239] *Ibid.*
[240] *Ibid.*
[241] *Ibid.*
[242] *Ibid.*
[243] Eglin AFB. *Duke Field, Auxiliary Field #3 Area Development Plan.* October 2012. p. 47.
[244] *Ibid.*
[245] *Ibid*, p. 46.
[246] *Ibid.*
[247] *Ibid.*
[248] *Ibid.*
[249] *Ibid.*
[250] *Ibid*, p. 47.
[251] *Ibid.*
[252] *Ibid.*
[253] Eglin AFB. *7th Special Forces Group (Airborne) Area Development Plan.* September 2013. p. 38.

one 28-million volt ampere (MVA) transformer, and 12.47 kilovolts (kV) main and transfer busses.[254] Additional capacity also exists should the need arise in the future.[255] Electricity is distributed throughout the cantonment through an underground system; mission-critical facilities are supplied by emergency generators in the event of power loss.[256]

Natural gas service at the 7 SFG(A) Cantonment is provided by Okaloosa County, which operates a four-inch high pressure pipeline along the main access road to the southern boundary of the site.[257] Service is provided throughout the cantonment, and sufficient capacity exists to support long-term future development.[258]

Communications services available at 7 SFG(A) Cantonment include telephone service, internet connectivity, cable television, and closed-circuit television.[259] Both secure and non-classified communications systems are available at 7 SFG(A) Cantonment.[260]

Water supply for domestic and fire protection uses on 7 SFG(A) Cantonment is provided by two water wells, two elevated storage tanks, and exterior water distribution, while lawn irrigation is provided through shallow, non-potable water wells.[261] The two water wells on site have a capacity of approximately 288,000 gallons combined, while the two elevated storage tanks on site offer a capacity of 400,000 gallons.[262] Water service is provided to facilities at 7 SFG(A) Cantonment through a distribution loop of eight-inch mains connecting to each elevated storage tank.[263]

Wastewater is collected at 7 SFG(A) Cantonment through a system of gravity flow mains connecting to a lift station sited outside of the northern boundary fence; the force main follows the western boundary of the cantonment and proceeds south through the Eglin Reservation to Okaloosa County's Arbennie Pritchett Reclamation Facility in Fort Walton Beach.[264] The wastewater system for 7 SFG(A) Cantonment has a capacity of 345,000 GPD, while only 26,000 GPD are currently in use. Therefore, the existing wastewater system has sufficient capacity to support future development.[265]

3.10.2.4 Camp Rudder

Camp Rudder (refer to **Figure 3-21**) receives electrical service from Gulf Power through the West Range substation, located approximately nine miles south of Camp Rudder.[266] Electrical distribution is achieved through a combination of both aboveground and underground structures; underground distribution occurs in the family housing area.[267] No redundant source of power is available on Camp Rudder.[268] No

[254] Eglin AFB. *7th Special Forces Group (Airborne) Area Development Plan.* September 2013. p. 38.
[255] *Ibid.*
[256] *Ibid.*
[257] *Ibid.*
[258] *Ibid.*
[259] Eglin AFB. *7th Special Forces Group (Airborne) Area Development Plan.* September 2013. p. 43.
[260] *Ibid.*
[261] *Ibid*, p. 40.
[262] *Ibid.*
[263] *Ibid.*
[264] *Ibid.*
[265] *Ibid.*
[266] Eglin AFB. *6th Ranger Training Battalion (6RTBn) Camp Rudder Area Development Plan.* October 2012. p. 43.
[267] *Ibid.*
[268] *Ibid.*

natural gas service is available at Camp Rudder.[269] Propane gas tanks are provided by Eglin AFB for heating and hot water needs.[270]

Communications networks on Camp Rudder are provided via connections to the Eglin AFB communications network fiber optic connection.[271]

Camp Rudder is equipped with two elevated water tanks supplied by two onsite wells.[272] Water distribution within Camp Rudder is a looped system that reaches facilities and housing.[273] Wastewater is transported by gravity lines that connect to a package treatment plan north of the camp; the treatment plant is currently operating at 35 percent capacity.[274] Eventually, it is anticipated that the WWTP will be abandoned as part of the utilities privatization effort at Eglin and that the area will become available for development.[275]

3.10.2.5 Site C-6 20 SPCS

Site C-6 20 SPCS (refer to **Figure 3-21**) receives electrical service from two PowerSouth lines, including one from Alabama and one from Freeport/Defuniak Springs, Florida.[276] The cantonment uses its own substation to supply power to its facilities and the AN/FPS-85 Radar, which is the chief user of electricity on Eglin Reservation.[277] There is no natural gas service available at Site C-6 20 SPCS.[278]

Communications at Site C-6 20 SPCS are provided through underground connections to the Eglin AFB communications network.[279]

One well, located at Building 8638, and two water tanks supply water to the facilities at Site C-6 20 SPCS via water mains.[280] Wastewater from Site C-6 20 SPCS is collected and treated at the C-6 Wastewater Treatment Plant, which is located just outside of the cantonment area.[281]

3.10.3 Environmental Consequences

3.10.3.1 No-Action Alternative

As outlined in Chapter 2 (Alternatives), the No-Action Alternative is the approved level of development for the five cantonment areas, described as the Preferred Alternative in the 2014 *Final Eglin Air Force Base Cantonment Areas Environmental Assessment.*[282] The following describes the current practices and methodology, and subsequent effects pertaining to the No-Action Alternative.

Under the No-Action Alternative, the previously authorized level of development would be implemented. Development occurring under the No-Action Alternative could include construction and demolition of facilities, such as offices and administrative buildings, commercial and support facilities, and other uses, in both developed and undeveloped areas.

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[269] Eglin AFB. *6th Ranger Training Battalion (6RTBn) Camp Rudder Area Development Plan*. October 2012. p. 43.
[270] *Ibid.*
[271] *Ibid.*
[272] *Ibid*, p. 44.
[273] *Ibid.*
[274] *Ibid.*
[275] Eglin AFB. *6th Ranger Training Battalion (6RTBn) Camp Rudder Area Development Plan*. October 2012. p. 44.
[276] Eglin AFB. *Site C-6 20th Space Command Squadron (20SPCS) Space Utilization Study*. October 2012. p. 18.
[277] *Ibid.*
[278] *Ibid.*
[279] *Ibid.*
[280] *Ibid*, p. 19.
[281] *Ibid.*
[282] Eglin AFB. *Final Eglin Air Force Base Cantonment Areas Environmental Assessment.* March 2014.

All five cantonment areas were determined to have sufficient electrical capacity to support future mission and development requirements. Natural gas supplies at Eglin Main, Duke Field, and 7 SFG(A) Cantonments were deemed adequate to support future mission and development requirements; no natural gas is available at Camp Rudder or Site C-6 20 SPCS. While natural gas supplies are not anticipated for development at Camp Rudder or Site C-6 20 SPCS, coordination with Okaloosa and Walton Counties would occur in the event that natural gas infrastructure would be implemented. Communications networks at all five cantonment areas are adequate to support future mission and development requirements.

Alteration of potable water systems that could occur under the approved development would be conducted in accordance with state and federal regulations, including the *Florida Safe Drinking Water Act* and the federal *Safe Drinking Water Act* (42 USC 201, 300 *et seq.*) and the National Primary Drinking Water Regulations.

Actions authorized under the No-Action Alternative that could affect wastewater systems would be conducted in accordance with the CWA and NPDES permitting system. Permitting and implementation pertaining to the *Florida Air and Water Pollution Control Act* would be coordinated with FDEP as needed. Therefore, no adverse impacts related to utilities are associated with implementation of the No-Action Alternative.

3.10.3.2 Alternative 1

As described in **Table 2-3**, Alternative 1 would authorize an additional 1,440,246 ft^2 of facilities construction, 225.4 acres of parking/impervious surfaces, 81.6 acres of roads/infrastructure, and 213,174 ft^2 of demolition across the five cantonment areas. Under the implementation of Alternative 1, the environmental consequences related to utilities would be the same as discussed in Section 3.10.3.1 for the No-Action Alternative. The additional development outlined above would increase the notional footprint for development that was approved under the No-Action Alternative. No specific projects have been identified under Alternative 1, and projects would vary in size, scope, and implementation date across the cantonment areas. Each individual project would require the submittal of an AF FORM 813, *Request for Environmental Impact Analysis*, prior to implementation in order to analyze individual impacts of specific projects.

3.10.3.3 Alternative 2

As described in **Table 2-4**, Alternative 2 would authorize an additional 25 percent increase in development over Alternative 1 for a total of 1,800,308 ft^2 of facilities construction, 281.85 acres of parking/impervious surfaces, 102.05 acres of roads/infrastructure, and 266,468 ft^2 of demolition. Under the implementation of Alternative 1, the environmental consequences related to utilities would be the same as discussed in Section 3.10.3.1 for the No-Action Alternative. The additional development outlined above would increase the notional footprint for development that was approved under the No-Action Alternative. No specific projects have been identified under Alternative 2, and projects would vary in size, scope, and implementation date across the cantonment areas. Each individual project would require the submittal of an AF FORM 813, *Request for Environmental Impact Analysis*, prior to implementation in order to analyze individual impacts of specific projects.

3.11 Water Resources

3.11.1 Definition

3.11.1.1 Groundwater

Groundwater includes the subsurface hydrologic resources of the physical environment and is an important source of fresh water commonly used for potable water consumption by the general

population, agricultural irrigation, and industrial applications. In addition, groundwater plays an important role in the overall hydrologic cycle. Groundwater properties are often described in terms of depth to aquifer or water table, water quality, and surrounding geologic composition.

3.11.1.2 Surface Water

Surface water resources include lakes, rivers, and streams which are important for a variety of reasons, including irrigation, power generation, recreation, flood control, and human health. Surface water features present on Eglin AFB are discussed in **Section 3.11.2.2.**

3.11.1.3 Stormwater

Stormwater is a form of surface water that occurs when water flows across the landscape during or immediately after precipitation events. Any stormwater that does not soak into the ground becomes surface runoff. Stormwater is of important concern because of flood control and water pollution. When stormwater falls on impermeable surfaces (e.g., parking lots, roads, buildings, compacted soils, etc.) it cannot soak into the ground, and thus creates runoff. Runoff can cause many problems, including the erosion of watercourses and flooding. In addition, daily human activities result in the deposition of pollutants on roads, lawns, roofs, farm fields, etc. Therefore, when stormwater results in runoff, pollutants have the potential to be introduced into surface waters.

3.11.1.4 Floodplains

EO 11988, *Floodplain Management*, requires that efforts be made by federal agencies to avoid, to the extent possible, the long and short-term adverse impacts associated with the occupancy and modification of floodplains. When there is a practicable alternative, federal agencies are required to avoid direct or indirect support of floodplain development.[283] Projects with the potential to affect floodplains would require actions to comply with EO 11988. However, specific details of floodplain impacts are unknown until specific projects are defined. Each specific project with the potential to impact floodplains would be required to undergo evaluation on a case-by-case basis through the AF Form 813 process.

3.11.1.5 Wetlands

The U.S. Army Corps of Engineers (USACE) defines wetlands as "those areas that are inundated or saturated with ground or surface water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions."[284] Wetlands are an important natural system with diverse biological and hydrological functions. These functions include water quality improvement, groundwater recharge and discharge, pollutant uptake, nutrient recycling, unique plant and wildlife habitat provision, storm water attenuation and storage, sediment detention, and erosion protection.

Wetlands are protected as a subset of the "waters of the U.S." under Section 404 of the CWA and incorporate deep-water aquatic habitats and special aquatic habitats (including wetlands). Wetlands, streams, reservoirs, sloughs, ponds, marshes, and vernal pools typically meet the criteria for federal jurisdiction under Section 404 of the CWA. A policy of no-net loss of wetlands on military installations applies to Eglin AFB pursuant to EO 11990, *Protection of Wetlands* and DoDI 4715.3 (ENC 4, Paragraph B8, respectively). AFI 32-7064 addresses wetland management on USAF installations. Pursuant to NEPA of 1969, as amended (42 USC 4321 et seq.), any long- and short-term adverse impacts should be avoided to the maximum extent practicable. Pursuant to the Section 2(a) of EO 11990, Eglin AFB should avoid

[283] FEMA, "Executive Order 11988: Floodplain Management," http://www.fema.gov/environmental-planning-and-historic-preservation-program/executive-order-11988-floodplain-management, (December 29, 2018).
[284] 33 CFR Part 338

undertaking or providing assistance for new construction in wetlands unless there are no practicable alternatives and the Proposed Action includes all practicable measures to minimize harm to wetlands that may result from such use.

The CWA was established to ensure the "restoration and maintenance of the chemical, physical, and biological integrity of the Nation's waters" (Section 402). Under the act, it is illegal to discharge pollutants from a "point source" into any surface water without a NPDES permit. Furthermore, any applicant for a federal license or permit to conduct activities that may result in the discharge of a pollutant into Waters of the United States must also obtain certification from the state in which the discharge would originate or, if appropriate, from the interstate water pollution control agency with jurisdiction over the affected waters at the point where the discharge would originate.

Therefore, all Proposed Actions that have a federal component and may affect state water quality (including Proposed Actions that require federal agency approval, such as issuance of a Section 404 permit) must also comply with the CWA. The USEPA sets standards for the quality of wastewater discharges. For Proposed Actions at Eglin AFB, the state of Florida implements and enforces the provisions of the CWA through the FDEP, while the USEPA retains oversight responsibilities.

The NPDES storm water program requires construction site operators engaged in clearing, grading, and excavating activities that disturb one acre or more to obtain coverage under an NPDES Construction Generic Permit (CGP) for storm water discharges.

Section 404 of the CWA authorizes the Secretary of the Army, acting through the Chief of Engineers, to issue permits for the discharge of dredge or fill into wetlands and other Waters of the United States. Any discharge of dredge or fill into Waters of the United States requires a permit from the USACE. Furthermore, EO 11990, *Protection of Wetlands,* requires federal agencies to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands. Federal agencies must avoid, to the extent possible, destruction or modification of wetlands wherever there is a practicable alternative. The "no net loss" requirement in the CWA and EO 11990, *Protection of Wetlands* requires federal actions to protect natural values of all wetlands. Mitigation of potential impacts by federal actions include approaches to avoid impacts first, minimize impacts if avoidance is not possible, and mitigate at last resort by creation, restoration, or enhancement of wetland function. Eglin AFB attempts to either avoid or minimize impacts to wetlands. When impacts to wetlands are unavoidable, the wetland habitat is mitigated through on-site restoration or purchase of off-Base wetland mitigation credits.

3.11.2 Affected Environment

3.11.2.1 Groundwater

The surficial aquifer, known as the sand and gravel aquifer, and the Floridan aquifer underlie the main reservation of Eglin AFB, including the five cantonment areas.[285] The sand and gravel aquifer lies closest to the surface and consists primarily of "clean, fine-to-coarse sand and gravel" and features water quality that is generally good.[286] Due to the superior quality of water from the Floridan aquifer, water from the sand and gravel aquifer is not used as a primary source for the domestic or public water stores on Eglin AFB; however, the base does use wells to draw from the surficial aquifer for both the potable and non-potable water supplies.[287] Groundwater in the surficial aquifer is also prone to contamination from pollutants because it lies just beneath the surface. Most streams and rivers on base, including Prairie Creek

[285] Eglin AFB. *Integrated Natural Resources Management Plan.* August 2017. p. 38.
[286] *Ibid.*
[287] *Ibid.*

and its tributaries, are fed by groundwater flowing to the surface from the surficial aquifer. Therefore, pollution in the groundwater can easily spread to surface water.

The Floridan aquifer lies below the sand and gravel aquifer and is composed of "a thick sequence of inter-bedded limestone and dolomite."[288] The Floridan aquifer is confined by a low-permeability Pensacola Clay confining bed, protecting it from pollutants and preventing the migration of saline water from Choctawhatchee Bay and the Gulf of Mexico from entering the aquifer, thereby contributing to the high water quality. This aquifer is the primary source of water used at Eglin AFB, as "water drawn from the upper limestone of the Floridan aquifer is of suitable quality for most uses."[289]

3.11.2.2 Surface Water and Wetlands

Eglin Main Base

The main water bodies surrounding Eglin Main base include Choctawhatchee Bay to the south, Boggy Bayou to the east, and Hand Cove to the west (refer to **Figure 3-22**). Five named lakes/ponds, including Ben's Lake, Lower Memorial Lake, Upper Memorial Lake, Jack's Lake, and Weekly Pond, are located within the boundaries of Eglin Main. Ben's Lake, Lower Memorial Lake, Upper Memorial Lake, and Jack's Lake are all located in the southwestern portion of Eglin Main, while Weekly Pond is located on the eastern side of the cantonment. Lightwood Knot Creek and Garnier Creek flow south into the bayous associated with Hand Cove, passing through the unpopulated northwestern portion of the cantonment. Tom's Creek and its tributaries run through much of the northern and northeastern portion of the cantonment, eventually draining into Boggy Bayou. Jack's Creek Branch drains into Jack's Lake and eventually into Choctawhatchee Bay. Several unnamed streams also wind through the western portion of the cantonment. The most populated areas of the base, including the downtown district and housing areas located in the southeast and southwest corners of the base, are largely unencumbered by water features and wetlands. Wetland areas are located in the vicinity of Ben's Lake, east of Jack's Lake Branch, and south of Weekly Pond.

No streams, wetlands, or water bodies are located on or directly adjacent to Jackson Guard (refer to **Figure 3-22**). Jackson Guard is located within the Boggy Bayou watershed. Trout Lake and Plew Lake, part of the Eglin Golf Course, are located approximately 1,500 feet east of Jackson Guard, while Turkey Creek is located approximately 1,750 feet west of the Jackson Guard Boundary.

Duke Field

A tributary of Silver Creek enters Duke Field's boundaries at the far northern portion of the airfield, and a small portion of a tributary of Pearl Creek encroaches the boundary of the western side of the cantonment (refer to **Figure 3-23**). A small wetland area associated with Pearl Creek is located just inside the boundaries of Duke Field in an undeveloped area on the western side of the cantonment. Other tributaries of Silver Creek are located between 700 and 1,000 feet outside of the eastern edge of the cantonment area, while Juniper Creek is approximately 1,300 feet from the southern boundary of Duke Field. Three watershed drainage areas, including Pearl Creek, Silver Creek, and Anderson Branch, transect the cantonment area.

7 SFG(A) Cantonment

No streams, wetlands, or water bodies are located on or directly adjacent to the 7 SFG(A) Cantonment (refer to **Figure 3-23**). Five watershed drainage areas converge in the center of 7 SFG(A) Cantonment. The closest water bodies are Turkey Gobbler Creek and its associated wetlands, located approximately 600

[288] Eglin AFB. *Integrated Natural Resources Management Plan.* August 2017. p. 38.
[289] *Ibid.*

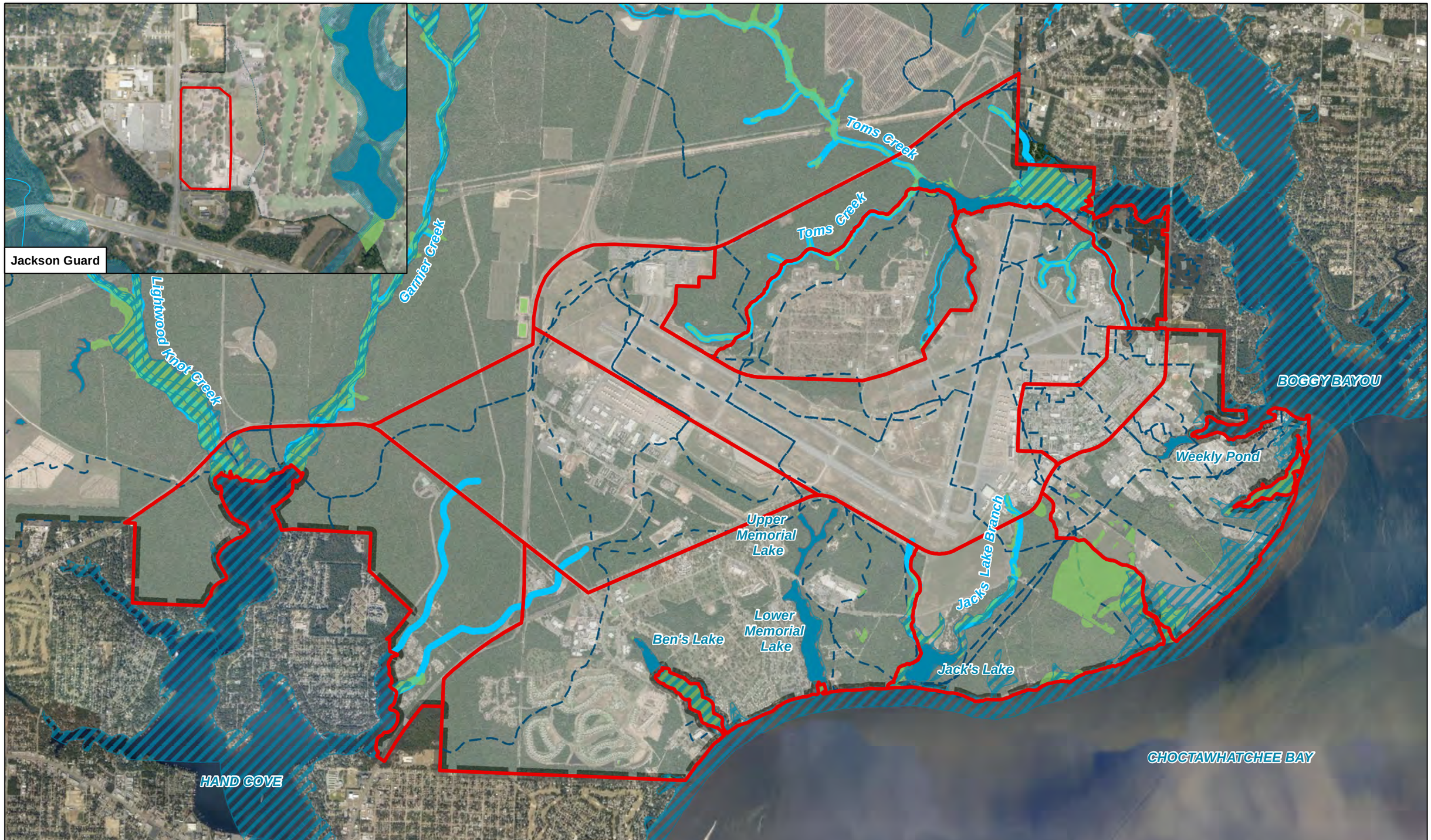


Figure 3-22
Eglin Main Base Water Resources
Eglin AFB Cantonment Areas
Draft EA
Eglin Air Force Base, Florida

feet west of the cantonment, and Turkey Hen Creek and its associated wetlands, located approximately 400 feet (to the wetlands) and 800 feet (to the stream) east of the cantonment boundary.

Camp Rudder

One stream, a tributary of Metts Creek, is located within the boundary of Camp Rudder on the eastern side of the cantonment areas (refer to **Figure 3-23**). No wetlands or other streams or water bodies are found within the cantonment area. Carroll Creek and its associated wetlands are located approximately one-half mile from the western boundary of the cantonment, across the airfield, while Camp Creek is located approximately one-third mile from the southwestern corner of the cantonment. Two watershed drainage areas, Metts Creek and Yellow River, divide Camp Rudder.

Site C-6 20 SPCS

No streams, wetlands, or water bodies are located on or directly adjacent to Site C-6 20 SPCS (refer to **Figure 3-23**). The cantonment is divided by the Little Basin Creek and Little Alaqua Creek watersheds. Little Basin Creek and its associated wetlands are located approximately 750 feet west of the cantonment area, while Little Alaqua Creek and its associated wetlands are located approximately just over 1,000 feet to the east of the cantonment boundary.

3.11.2.3 Stormwater

The stormwater discharge/collection systems at each of the cantonment areas are considered adequate in terms of both condition and capacity; the IDP notes that Eglin AFB as a whole has minimal stormwater discharge and surge issues, even during peak rainfall times during the month of July.[290]

Eglin Main

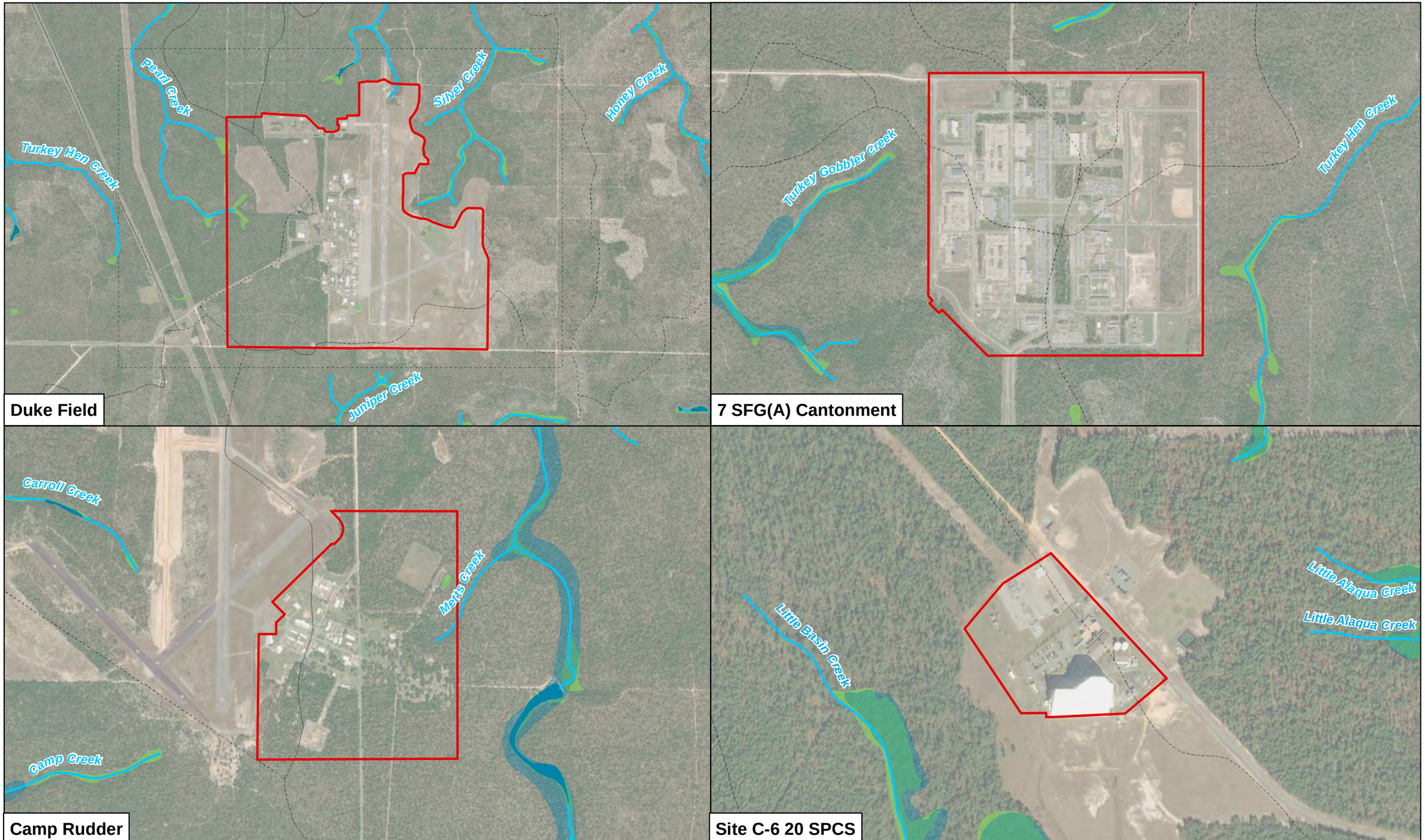
Stormwater collection facilities at Eglin Main Base consist of manmade systems, including underground storm drainage piping and associated catch basins, drain inlets, manholes, and similar drainage features. These systems carry collected stormwater to ditches, ponds, swales, and streams before eventually removing it from the installation.[291] New construction is required to provide stormwater treatment, while older portions of the base use ditches to divert runoff into the natural stream system in accordance with NPDES requirements.[292] Future development requires a stormwater analysis to verify that the post-development levels do not exceed pre-development runoff volumes and flow rates.[293]

Coordination with the 96 CEG/CEIEC Water Resources Section will occur in the event that any stormwater design, permitting, potential discharges into surface waters from construction activities, and/or final backflow preventer design are required. The storm sewer system is permitted as an FDEP Phase II MS4 and is administered under the authority of the 96 CEG/CEIEC and the Eglin AFB SWPPP, which helps base authorities to identify BMPs that can reduce or prevent pollutants associated with stormwater discharge. New construction activities are not covered under the SWPPP.

Duke Field

Stormwater management is accounted for in Duke Field's ADP. The document notes that "low-impact development stormwater management will be integrated into the site design to handle the retention, detention, and infiltration of stormwater on each parcel."[294] The stormwater management system at Duke

[290] Eglin AFB. *Installation Development Plan.* August 2017. p. 7-37.
[291] *Ibid.*
[292] *Ibid.*
[293] *Ibid.*
[294] Eglin AFB. *Duke Field, Auxiliary Field #3 Area Development Plan.* October 2012. p. 12.



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Legend

- Stream
- Cantonment Boundary
- Eglin AFB Property
- 100 Year Floodplain
- Pond/Lake
- Wetland
- Watershed Drainage Area

Figure 3-23
Camp Rudder, 7 SFG(A), Duke Field, Site C-6 20 SPCS
Water Resources
Eglin AFB Cantonment Areas
Draft EA
Eglin Air Force Base, Florida

Field includes multiple storm holding ponds, paved and unpaved ditches designed to transport stormwater, and a storm drain line;[295] drainage flows towards an unnamed tributary of Juniper Creek south of the airfield and to Silver Creel in the northeast (refer to **Figure 3-23**). Stormwater discharge at Duke Field is regulated under the NPDES Florida MSGP and is reported separately from Eglin Main. New construction at Duke Field would not be covered under the existing SWPPP.

7 SFG(A) Cantonment

Notable stormwater management features at the 7 SFG (A) Cantonment area include four stormwater retention ponds: two larger ponds located in the northwest and southwest corners of the cantonment, and two smaller ponds located on the eastern side of the cantonment (one inside the perimeter boundaries and one just outside the boundaries in a proposed future expansion area).[296] Wastewater lines run throughout the cantonment area, but no dedicated stormwater sewer system is apparent. Topographic data indicates that stormwater flows outward from the center of the cantonment area towards the four retention ponds before continuing offsite.[297]

Camp Rudder

No designated stormwater sewer system exists on Camp Rudder. Stormwater is collected by a combination of aboveground drainage ditches and culverts, and infiltration of surface stormwater is promoted by sandy soils.[298] Due to the level topography of the cantonment area, stormwater disperses relatively evenly across Camp Rudder.

Site C-6 20 SPCS

No designated stormwater sewer system exists at Site C-6 20 SPCS. Stormwater is collected by a combination of aboveground drainage ditches and culverts, and infiltration of surface stormwater is promoted by sandy soils.[299] Stormwater that is not absorbed by the sandy soils generally flows north to south towards the wetlands of Little Basin Creek.

3.11.2.4 Floodplains

The 100-year floodplain boundary details the flood elevation that has a one percent chance of being equaled or exceeded each year, thereby flooding the area. The boundaries of 100-year floodplains are depicted on the Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Maps (FIRM), which were used to evaluate floodplains for this EA. Eglin Main Base has 100-year floodplains located along its southern border with Choctawhatchee Bay, as well as some small areas of 100-year floodplains located along streams running through the cantonment area; no floodplains are present on Jackson Guard (refer to **Figure 3-22**). No 100-year floodplains are present on Duke Field, 7 SFG(A) Cantonment, Camp Rudder, or Site C-6 20 SPCS (refer to **Figure 3-23**).

3.11.2.5 Coastal Zone

The CZMA, enacted in 1972, aims to "preserve, protect, develop, and where possible, to restore or enhance the resources of the nation's coastal zone."[300] The CZMA defines the coastal zone as "the coastal waters…and the adjacent shorelands…strongly influenced by each other and in proximity to the shorelines

[295] Eglin AFB. *Duke Field, Auxiliary Field #3 Area Development Plan.* October 2012. p. 49.
[296] Eglin AFB. *7th Special Forces Group (Airborne) Area Development Plan.* September 2013. p. 41.
[297] *Ibid*, p. 51.
[298] Eglin AFB. *6th Ranger Training Battalion (6RTBn) Camp Rudder Area Development Plan.* October 2012. p. 44.
[299]. Eglin AFB. *Site C-6 20th Command Squadron (20SPCS) Space Utilization Study*. October 2012. p. 19.
[300] 16 U.S.C. 1452 Section 303 (1)

of the several coastal states, and includes islands, transitional and intertidal areas, salt marshes, wetlands, and beaches."[301]

Each state is charged with developing and implementing enforceable policies that allow states to control the development and land use within the CZMA, and federal actions that could potentially impact the coastal zone are required to apply with these approved programs. In accordance with the CZMA, the boundaries of the coastal zone are determined by state. Because no point in Florida is more than 70 miles from the coast, the entire state of Florida is defined as the coastal zone.[302] To this end, the state of Florida established the Florida Coastal Management Program (FCMP) under the CZMA. The goal of the FCMP is "to coordinate local, state, and federal agency activities using existing laws to ensure that Florida's coast is as valuable to future generations as it is today."[303] Although the FCMP consists of nine state agencies and five water management districts,[304] the FDEP is responsible for directing the implementation of the FCMP. The diversity of state agencies represented under the FCMP ensures that resources of all kinds are protected and that laws are uniformly integrated throughout the agencies.

Federal actions at Eglin AFB are required to be consistent, to the maximum extent possible, with the statutes of the FCMP. Prior to undertaking a federal action, Eglin AFB submits CZMA consistency determinations to the state of Florida for review and concurrence.

3.11.3 Environmental Consequences

3.11.3.1 No- Action Alternative

As outlined in Chapter 2 (Alternatives), the No-Action Alternative is the approved level of development for the five cantonment areas, described as the Preferred Alternative in the 2014 *Final Eglin Air Force Base Cantonment Areas Environmental Assessment.*[305] The following describes the current practices and methodology, and subsequent effects pertaining to the No-Action Alternative.

3.11.3.1.1 Groundwater

No impacts to groundwater would be anticipated under implementation of the No-Action Alternative. Only surface-level land-clearing activities would be anticipated to occur as a result of the proposed development. Coordination with the IRP would occur in order to check for any relevant LUCs and to locate and comply with restrictions near monitored sites or water wells within the five cantonment areas.

3.11.3.1.2 Surface Water and Wetlands

Overall, individual construction activities would have the potential for short-term, minor to moderate, direct and indirect, adverse effects on surface water quality in any location where construction would occur within 50 feet of a surface water body. However, the use of BMPs specified in the installation-specific SWPPP and development of site-specific construction SWPPPs (as required) would minimize potential adverse effects. There is a potential for erosion and associated sedimentation to flow into surface water features during construction.

All construction activities resulting in ground disturbance would be conducted in accordance with the applicable stormwater discharge permit to control erosion and prevent sediment, debris, or other pollutants from entering the stormwater system. Construction activities that disturb one acre or more

[301] 16 U.S.C. 1452 Section 304 (1)
[302] Eglin AFB. *Integrated Natural Resources Management Plan.* August 2017. p. 167.
[303] FDEP. "Florida Coastal Management Program." https://floridadep.gov/fco/fcmp. 2019. (January 28, 2019).
[304] FDEP. "State Agency Partners." https://floridadep.gov/fco/fcmp/content/state-agency-partners. January 23, 2019. (January 28, 2019).
[305] Eglin AFB. *Final Eglin Air Force Base Cantonment Areas Environmental Assessment.* March 2014.

would need coverage under the NPDES Construction Generic Permit. No construction activities would begin until a Proposed Action-specific construction SWPPP is completed. All required BMPs contained within the SWPPP would be implemented during construction.

New construction could result in a potential increase in surface runoff due to an increase in impermeable surfaces. Development proposed under Alternative 1 would be anticipated to result in an increase in surface runoff of 2.212 inches, while development proposed under Alternative 2 would be anticipated to result in an increase in surface runoff of 4.864 inches (refer to **Appendix E**, *Stormwater Analysis*). Any construction of impervious surface (e.g., pavements, buildings), storm water management systems (retention ponds, swales, storm water pipes/culverts), or work in wetlands would require an Environmental Resource Permit through the Northwest Florida Water Management District (NWFWMD).

Erosion control BMPs, as outlined in the *Erosion Control Component Plan,* would be implemented during construction and demolition activities associated with proposed development. No new actions would take place in wetlands or floodplains aside from regular maintenance activities such as airfield landscaping (mowing, trimming, tree removal, etc.) to maintain flight safety buffers, maintaining existing fence lines and utility right-of-ways, etc. These impacts would be temporary in nature and no permanent changes to drainage would occur within these areas. Therefore, no adverse impacts to wetlands or surface water would be anticipated. In the event that a future proposed project would be slated for construction in wetlands or surface water, a wetland delineation and Jurisdictional Waters of the United States determination would be conducted and additional NEPA analysis would be performed.

3.11.3.1.3 Stormwater

FDEP, as authorized by the USEPA, is responsible for regulating stormwater discharge under the NPDES. FAC Rule 62-621 requires a Construction Generic Permit for construction activities that would disturb one or more acres of land collectively. Projects impacting five or more acres are classified as large construction projects, while those disturbing less than five acres are considered small projects. Regardless of size, projects permitted under a Generic Permit for Stormwater Discharge require a comprehensive Stormwater, Erosion, and Sedimentation Control Plan and a SWPPP in the final plan design according to regulations contained within the CWA/NPDES. An application for a Stormwater Discharge Permit with stormwater retention and design is required prior to any ground-disturbing activities per FAC Rule 62-346.

Coordination with the 96 CEG/CEIEC Water Resources Section would occur in the event that any stormwater design, permitting, potential discharges into surface waters from construction activities, and/or final backflow preventer design are required.

A SWPPP and erosion BMPs would be implemented to minimize any unnecessary soil erosion that could occur during land-clearing activities, construction, and demolition associated with the proposed development. Land disturbance would predominantly consist of clearing and leveling the ground, thereby minimizing deep disturbances of the soil.

In accordance with Section 438 of EISA, facilities over 5,000 ft^2 that are proposed for construction or redevelopment will be constructed or redeveloped in a manner that maintains or restores the pre-development site hydrology to the maximum extent technically feasible.

Development proposed under Alternative 1 would be anticipated to result in an increase in surface runoff of 2.212 inches, while development proposed under Alternative 2 would be anticipated to result in an increase in surface runoff of 4.864 inches (refer to **Appendix E**, *Stormwater Analysis*). Increases in impervious surfaces occurring under Alternative 1 and Alternative 2 would alter natural drainage flows, and remove vegetation. These impacts are expected to be long-term, minor, and adverse; however, adverse effects would be minimized by implementing protection measures and following the Eglin AFB

SWPPP. Impacts would be further reduced by adhering to state storm water rules governed by Part IV of Chapter 373 Florida Statues, administered by the NWFWMD, which require the treatment of storm water to avoid adverse effects on water quality and to reduce storm water to control adverse flooding conditions.

3.11.3.1.4 Floodplains

No new actions would take place in floodplains aside from regular maintenance activities such as airfield landscaping (mowing, trimming, tree removal, etc.) to maintain flight safety buffers, maintaining existing fence lines and utility right-of-ways, etc. These impacts would be temporary in nature and no permanent changes to drainage would occur within these areas. Therefore, no impacts to floodplains are anticipated to occur.

3.11.3.1.5 Coastal Zone

The Proposed Action would take place within the coastal zone and the jurisdictional area of the FDEP. Eglin AFB has prepared a CZMA determination to address potential impacts to the coastal zone (refer to **Appendix B** [pending]). Concurrence would be required prior to construction.

3.11.3.2 Alternative 1

As described in **Table 2-3**, Alternative 1 would authorize an additional 1,440,246 ft^2 of facilities construction, 225.4 acres of parking/impervious surfaces, 81.6 acres of roads/infrastructure, and 213,174 ft^2 of demolition across the five cantonment areas. Under the implementation of Alternative 1, the environmental consequences related water resources would be the same as discussed in Section 3.11.3.1 for the No-Action Alternative. The additional development outlined above would increase the notional footprint for development that was approved under the No-Action Alternative. No specific projects have been identified under Alternative 1, and projects would vary in size, scope, and implementation date across the cantonment areas. Each individual project would require the submittal of an AF FORM 813, *Request for Environmental Impact Analysis*, prior to implementation in order to analyze individual impacts of specific projects.

3.11.3.3 Alternative 2

As described in **Table 2-4**, Alternative 2 would authorize an additional 25 percent increase in development over Alternative 1 for a total of 1,800,308 ft^2 of facilities construction, 281.85 acres of parking/impervious surfaces, 102.05 acres of roads/infrastructure, and 266,468 ft^2 of demolition. Under the implementation of Alternative 2, the environmental consequences related to water resources would be the same as discussed in Section 3.11.3.1 for the No-Action Alternative. The additional development outlined above would increase the notional footprint for development that was approved under the No-Action Alternative. No specific projects have been identified under Alternative 2, and projects would vary in size, scope, and implementation date across the cantonment areas. Each individual project would require the submittal of an AF FORM 813, *Request for Environmental Impact Analysis*, prior to implementation in order to analyze individual impacts of specific projects.

4.0 CUMULATIVE IMPACTS

The CEQ regulations stipulate that the cumulative effects analysis in an EA should consider the potential environmental consequences resulting from "the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions."[306]

Actions that have a potential to interact with the proposed actions at Eglin AFB are included in this cumulative effect analysis. This approach enables decision makers to have the most current information available so that they can evaluate the range of environmental consequences that would result from implementation of the proposed actions at Eglin AFB.

In this chapter, the USAF has identified past and present actions in the region of Eglin AFB. In addition, this analysis also evaluated reasonably foreseeable future actions that are in the planning phase in this region.

The assessment of cumulative effects begins with defining the scope of other project actions and the potential interrelationship with the proposed action.[307] The scope of the analysis must consider other projects that coincide with the location and timetable of implementation of the proposed projects at Eglin AFB. Cumulative effects can arise from single or multiple actions and through additive or interactive processes acting individually or in combination with each other. Actions that are not part of the proposal, but that could be considered as actions connected in time or space,[308,309] could include projects that affect areas on or near Eglin AFB. This analysis addresses three questions to identify cumulative effects:

1. Does a relationship exist such that elements of the proposed action or alternatives might interact with elements of past, present, or reasonably foreseeable actions?
2. If one or more of the elements of the alternatives and another action could be expected to interact, would the alternative affect or be affected by impacts of the other action?
3. If such a relationship exists, does an assessment reveal any potentially significant impacts not identified when the alternative is considered alone?

For the proposed actions under consideration to have cumulatively significant impacts on an environmental resource, two conditions must be met. First, the combined impacts of all identified past, present, and reasonably foreseeable projects, activities, and processes on a resource, including the impacts of the proposed action, must be significant. Second, the proposed action must make a substantial contribution to that significant cumulative impact. Proposed actions of limited scope do not typically require as comprehensive an assessment of cumulative impacts as proposed actions that have significant environmental impacts over a large area.[310]

In the following sections, the cumulative significance is based on the context, intensity, and timing of the projects discussed in Chapter 3, related to the past, present, and reasonably foreseeable actions. A discussion of the resource areas that have potentially significant cumulative effects based on the above evaluation criteria is provided.

[306] 40 CFR 1508.7
[307] Council on Environmental Quality. *Considering Cumulative Effects Under the National Environmental Policy Act*. January 1997.
[308] 40 CFR 1508.25
[309] Council on Environmental Quality. *Considering Cumulative Effects Under the National Environmental Policy Act*. January 1997.
[310] Council on Environmental Quality. *Guidance on the Consideration of Past Actions in Cumulative Effects Analysis*. June 2005.

4.1 Past, Present, and Reasonably Foreseeable Actions in the ROI

A FONSI was signed in October 2014 for the *Final Eglin Air Force Base Cantonment Areas Environmental Assessment* authorizing the development described in this EA as the No-Action Alternative. Numerous construction and demolition projects have been implemented under the authorization of the 2014 EA. Electrical infrastructure at Eglin AFB was privatized beginning in August 2017 with a 50-year privatization contract awarded to CHELCO.[311] Water and wastewater utility privatization is contracted through ASUS beginning in June 2017.[312] Military housing at Eglin Main Base and Duke Field was privatized under a 50-year contract to Corvias Military Living, who began managing housing on base in 2016.[313]

Construction and demolition projects are anticipated to continue at Eglin AFB and the surrounding area throughout the next five years in order to support the mission and growth of the Base. Impacts from future projects that are similar in nature would be anticipated to result in similar impacts to air quality, noise, utilities, water resources, and hazardous materials and waste.

For the purposes of this analysis, past activities are defined as actions that occurred on the Base earlier than the five-year timeframe before the proposed development (i.e., occurred earlier than FY FY 2014) that have shaped the current environmental conditions of the cantonment areas. For many resource areas, such as biological resources, infrastructure, and hazardous materials and waste, the effects of past actions are now part of the existing environment and are incorporated in the descriptions of the affected environment in Chapter 3.

Table 4-1 summarizes past, present, and reasonably foreseeable actions on Eglin AFB and in the surrounding area that could interact with implementation of proposed development at Eglin AFB. **Table 4-1** briefly describes each identified action, presents the proponent or jurisdiction of the action and the timeframe (e.g., present/ongoing, future), and describes, when information is available, the footprint of the action.

Table 4-1 Past, Present, and Reasonably Foreseeable Actions at Eglin AFB and Associated Region

Action	Proponent/Location	Timeframe	Description
F-35 Beddown EIS/ROD	Eglin AFB	Past	This project included the beddown of an additional 59 F-35 aircraft, bringing approximately 4,000 military personnel and approximately 6,000 dependents to Eglin AFB and the surrounding area.
Cantonment Areas EA/FONSI/FONPA 2014	Eglin AFB	Past/Present	The No-Action Alternative would authorize the approved level of development for the five cantonment areas, described as the Preferred Alternative in the 2014 *Final Eglin Air Force Base Cantonment Areas Environmental Assessment.* The levels of development are detailed in Table 2-1.

[311] Eglin AFB. *Installation Development Plan.* 2017. p. 3-4.
[312] *Ibid.*
[313] Eglin AFB. "Air Force Housing." https://www.housing.af.mil/Home/Units/Eglin/ (September 9, 2019).

Privatization of Electrical Infrastructure	Eglin AFB	Past	CHECLO was awarded a 50-year privatization contract to provide electrical services and maintenance of electrical infrastructure on Eglin AFB beginning in 2017.
Privatization of Water and Wastewater Infrastructure	Eglin AFB	Past	ASUS was awarded a privatization contract to provide water and wastewater services and maintenance of water and wastewater infrastructure on Eglin AFB beginning in 2017.
Privatization of Military Housing	Eglin AFB	Past	Corvias Military Living was awarded a privatization contract to provide housing facilities and services on Eglin AFB beginning in 2016.
Improvements to State Road 85 from State Road 123 to Hospital Drive	Off base, located adjacent to Eglin Main Base and in proximity to Duke Airfield	Future	Proposed improvements to State Road 85 include addition of sidewalks, extension of turn lanes, signalization improvements, addition of a turn lane, median modifications, and drainage improvements. Proposed improvements to I-10 included as part of the project include addition of another turn lane, widening the westbound ramp, extending turn lanes, and signalization improvements.[314]
Destin-Fort Walton Beach Airport Master Plan Update	Destin-Fort Walton Beach Airport	Future	Projects associated with the master plan update include ramp extension, associated stormwater changes, expansion of the west apron, expansion of the baggage handling facility, and construction of an additional concourse. Right-of-entry through the Eglin Main cantonment area will be requested.
Weapons Technology Innovation Center	Eglin AFB	Future	The proposed project includes construction of a 192,000 ft^2 Weapons Technology Innovation Center on Eglin AFB.
96 Cyberspace Test Group	Eglin AFB	Future	The proposed project includes construction of an 80,000 ft^2 facility for the 96 Cyberspace Test Group on Eglin AFB.

[314] Florida Department of Transportation, "Northwest Florida Roads – Future Projects – SR 85 (S Ferndon Blvd) from North of SR 123 to Hospital Drive," https://nwflroads.com/projects/441548-1, October 14, 2019 (October 23, 2019).

4.2 Cumulative Impacts

4.2.1 Air Quality

The proposed development would occur entirely within the boundary of Eglin AFB; no state or private actions are planned or are likely to occur within this USAF installation that would not include a federal nexus. The proposed development includes demolition, construction, and renovation/repair activities which would occur over a limited period (estimated one to five years) and would not have a cumulative effect on air quality in the Northwest Florida area. The proposed development would result in short-term, intermittent increases in air pollutant levels during those phases of work. The estimated emissions from the proposed development are not significant based on the location, intensity, and timing of the proposed development. No significant long-term cumulative impacts on air quality are expected from the implementation of Alternative 1 or Alternative 2. Potential incremental impacts of Alternative 1 and Alternative 2 on air quality, when added to other present and reasonably foreseeable future actions, would result in less than significant cumulative impacts on air quality.

Most GHG emissions resulting from the implementation of Alternative 1 or Alternative 2 are from mobile sources; the total annual GHG emissions from the proposed development are very minor compared to EPA's proposed GHG significant emission rate. Implementation of Alternative 1 or Alternative 2, when added to other present and reasonably foreseeable future actions, would result in less than significant cumulative impact to air quality and climate change due to GHG emissions.

4.2.2 Biological Resources

Proposed development occurring under the implementation of Alternative 1 or Alternative 2 would result in localized loss of habitat, habitat degradation, and temporary noise impacts. Direct physical impacts to native wildlife and plant species could occur under the implementation of Alternative 1 or Alternative 2. Because the majority of these projects would occur at previously developed sites, implementation of these Alternatives would be anticipated to result in minimal impacts on biological resources when considered on a regional scale. Eglin AFB would implement existing management actions and BMPs, as outlined in Section 3.3.3. In the event that proposed development potentially impacting a protected species is deemed necessary, additional consultation with the USFWS under Section 7 of the ESA would occur. When considered in conjunction with past, present, and reasonably foreseeable future actions at Eglin AFB, implementation of the Proposed Actions would result in less than significant cumulative impacts on biological resources.

4.2.3 Cultural Resources

The potential for construction activities to impact cultural resources is low as all ground-disturbance would be conducted in accordance with Eglin AFB policies and procedures pertaining to protection of cultural resources. Areas containing resources considered eligible, potentially eligible, or under review for listing on the NRHP would be consciously avoided in site selection for proposed development so as not to compromise the integrity or spatial context of historical sites. In the event that proposed development within a culturally restricted area is deemed necessary, additional consultation with the SHPO under Section 106 of the NHPA would occur. Therefore, when considered in conjunction with other past, present, and reasonably foreseeable future actions, no significant cumulative impacts to cultural resources would be anticipated under implementation of Alternative 1 or Alternative 2.

4.2.4 Hazardous Materials and Waste

Construction activities associated with proposed development occurring under Alternative 1 or Alternative 2 could involve the use of some hazardous materials and result in the generation of hazardous wastes. All hazardous materials/wastes would be handled in accordance with applicable federal, state,

and local laws and regulations as well as the management procedures identified in the Eglin AFB HMMP and HWMP. Land clearing debris generated from clearing and grubbing activities would be diverted to the extent possible; remaining debris would be disposed of at an off-base landfill. Construction solid waste would be disposed of at an off-base landfill and some of the debris would be reused and recycled, as appropriate. Significant cumulative impacts to hazardous materials and solid waste would not be anticipated when considered with other reasonably foreseeable past, present, and future projects.

4.2.5 Noise

Construction and demolition activities associated with proposed development under Alternative 1 and Alternative 2 would result in temporary, localized increases in the immediate vicinity. Construction noise could be compounded by other construction projects occurring concurrently. All development would be implemented in areas already subject to a high level of noise from aircraft operations, which is the primary source of noise on Eglin AFB. In order to minimize disturbance to local residences, workplaces, and sensitive receptors, noise attenuation measures would be incorporated into design and construction. No construction activities would take place after 10 p.m. or prior to 7 a.m.

When considered in conjunction with the past F-35 beddown project and future beddown projects and support activities, the proposed construction activities would be anticipated to have minor and temporary impacts to the noise environment. There would be no long term or significant impacts to the overall noise environment as a result of the proposed development when considered in conjunction with other past, present, and reasonably foreseeable future projects.

4.2.6 Safety

No cumulative impacts to safety were identified when considered in conjunction with other past, present, and reasonably foreseeable future actions.

4.2.7 Socioeconomic Resources and Environmental Justice

Development approved under Alternative 1 or Alternative 2 would be anticipated to generate additional temporary construction workers in the local region as well as revenue to the local economy through the purchase of materials and supplies when considered in conjunction with other past, present, and reasonably foreseeable future projects. It is anticipated that expenditures, employment, and population at Eglin AFB would remain near current levels. Construction activities associated with implementation of Alternative 1 or Alternative 2 would be anticipated to result in temporary, beneficial, insignificant impacts that, when combined with other projects, would provide new employment and earnings opportunities. Therefore, a slight beneficial cumulative impact to socioeconomic resources would occur as a result of implementation of Alternative 1 or Alternative 2.

No disproportionate cumulative impacts to environmental justice populations or children would be anticipated as a result of implementation of Alternative 1 or Alternative 2.

4.2.8 Soils

Cumulative impacts to soils would be minimized through the use of basewide BMPs for erosion control as outlined in the *Erosion Control Component Plan.*[315] A Construction Generic Permit would be required under FAC Rule 62-621 for construction activities that would disturb one or more acres of land collectively. Under the terms of the permit, a comprehensive Stormwater, Erosion, and Sedimentation Control Plan and a Storm Water Pollution Prevention Plan in the final plan design would be required. An application

[315] Eglin AFB. *Erosion Control Component Plan.* April 17, 2018. p. 5-1.

for a Stormwater Discharge Permit with stormwater retention and design would be required prior to any ground-disturbing activities per FAC Rule 62-346. No past, present, or reasonably foreseeable future projects identified by Eglin AFB have been found to contribute significantly to impacts to soils.

4.2.9 Utilities

Cumulative impacts to utilities could occur under implementation of Alternative 1 or Alternative 2. While capacity is available to accommodate additional development, ongoing growth on Eglin AFB could eventually strain these systems. However, older buildings demolished as part of the proposed development would be replaced with new construction that would be more energy-efficient and use more efficient water and waste water systems, providing a beneficial impact.

4.2.10 Water Resources

Proposed development occurring under Alternative 1 or 2 could result in impacts to water resources during construction and demolition activities. Earth-moving activities associated with multiple construction projects occurring simultaneously could affect water resources by increasing erosion and sedimentation, thereby decreasing the quality of stormwater runoff during storm events. Impacts from multiple actions would be reduced to insignificant levels by adhering to the suggested BMPs, Basewide permits, and programs that are currently in place and would be implemented under each project. A site-specific construction SWPPP would be prepared for each project.

4.3 Irreversible and Irretrievable Commitment of Resources

The irreversible environmental changes that would result from implementation of Alternative 1 or Alternative 2 at Eglin AFB involve the consumption of material resources and energy resources, and the permanent removal of occupied and unoccupied habitat. The use of these resources is considered permanent. Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the impacts that use of these resources will have on future generations. Irreversible impacts primarily result from use or destruction of a specific resource that cannot be replaced within a reasonable timeframe (e.g., energy and minerals).

Irretrievable resource commitments also involve the loss in value of an affected resource that cannot be restored because of the action. For the proposed development at Eglin AFB, most resource commitments would be neither irreversible nor irretrievable. Most impacts would be short-term and temporary (e.g., air emissions from construction), or longer lasting but negligible. Those limited resources that could involve a possible irreversible or irretrievable commitment would be used in a beneficial manner.

Implementation of either alternative would require the consumption of limited amounts of material typically associated with interior renovations (wiring, insulation, windows, and drywall) and exterior construction (concrete, steel, sand, mortar, brick, and asphalt). An undetermined amount of energy to conduct demolition, construction, renovation/repair, and operation of these facilities would be expended and irreversibly lost, but energy would be used in an efficient and sustainable manner throughout the useful life cycle of the facilities. Additionally, demolition of older, deteriorating buildings would free up energy resources used to maintain and operate these facilities.

Development authorized under Alternative 1 or Alternative 2 would continue to involve the consumption of nonrenewable resources, such as gasoline used in vehicles and equipment. None of these activities are expected to significantly decrease the availability of minerals or petroleum resources. Personal vehicle uses by construction contractors and those continuing to support the existing missions would consume fuel, oil, and lubricants. The amount of these materials used would increase slightly; however, this additional use is not expected to significantly affect the availability of the resources in the region surrounding Eglin AFB.

Development authorized under Alternative 1 or Alternative 2 could replace native and landscaped vegetation used as habitat by wildlife. However, most of the cantonment areas are highly improved or semi-improved and are regularly disturbed; therefore, these areas are low quality habitat for wildlife. When individual projects result in an increase in impervious surfaces, permanent loss of potential habitat for wildlife species from construction could occur. However, development authorized under Alternative 1 and Alternative 2 would take several actions to limit the loss of habitat associated with the proposed construction such as avoiding actively inhabited gopher tortoise burrows, reseeding areas of temporary ground disturbance with native vegetation to reestablish habitat areas, eradicating invasive species vegetation, and the use of minimization and avoidance measures and BMPs.

5.0 MANAGEMENT PRACTICES

5.1 Regulations, Plans, and Permits

Programmatic biological opinions are in place for the RCW and eastern indigo snake. These PBOs establish appropriate avoidance and minimization measures, coordination and reporting requirements, and terms and conditions, that would be implemented in order to minimize impacts to threatened and endangered species. A Programmatic Conference Assessment has been submitted to USFWS for the gopher tortoise; however, Eglin AFB has not yet received a Conference Opinion from USFWS. Formal or informal consultation with USFWS under Section 7 of the ESA may be required for individual projects.

A Construction Generic Permit would be required under FAC Rule 62-621 for any construction activities that would disturb one or more acres of land collectively. Under the terms of the permit, a comprehensive Stormwater, Erosion, and Sedimentation Control Plan and a SWPPP in the final plan design would be required. An application for a Stormwater Discharge Permit with stormwater retention and design is required prior to any ground-disturbing activities per FAC Rule 62-346.

The Proposed Action takes place within a jurisdictional concern of the FDEP and therefore requires a consistency determination in accordance with Florida's FCMP under the CZMA. Correspondence with the FDEP related to coastal zone consistency is included in **Appendix B**, *Coastal Zone Management Act Consistency Determination* (pending).

Consultation under Section 106 of the NHPA with the SHPO and federally recognized tribes may be required for individual projects.

5.2 Management Actions

This EA was prepared under the assumption that the following management actions would be followed in order to avoid and minimize impacts to environmental resources to the maximum extent practicable. Eglin AFB is responsible for ensuring that the following management actions are implemented.

5.2.1 Air Quality

- Employ standard management measures such as watering of graded areas, covering soil stockpiles, and contour grading (if necessary) to minimize temporary generation of fugitive dust and particulate matter during construction activities.
- Diesel-powered highway and nonroad vehicles and engines used in construction will limit idling time except as necessary for safety, security, or to prevent damage to property.

5.2.2 Biological Resources

- Coordinate with Eglin AFB NRO prior to initiation of individual projects to confirm compliance with the MBTA and verify that no migratory bird survey is required.
- In order to limit the potential for introduction of invasive species, equipment and off-site vehicles would be required to be cleaned prior to use on-site. Fill dirt, straw, and any plantings must also be checked for evidence of invasive non-native plants.
- Only native plants would be used for landscaping.
- All activities (training, construction, or otherwise) would cease in the event of an eastern indigo snake sighting until the snake is safely out of harm's way.
- Eglin Natural Resources Section must be notified of any sightings of the eastern indigo snake, gopher tortoise, or black bear.

- A gopher tortoise survey may be required for individual projects prior to the beginning of construction activities. Any tortoises found during the pre-construction survey would be relocated qualified biologists in compliance with FWC guidelines. A temporary silt fence or similar barrier would be erected during construction to prevent relocated gopher tortoises from returning to the area. Burrows found on the project site during the pre-construction survey would be investigated for the presence of eastern indigo snakes. Burrows would be collapsed after investigation and relocated, if applicable, to deter further occupation by additional gopher tortoises or wildlife.
- Waste would be disposed of in bear-proof dumpsters and bear-resistant garbage cans to discourage human-bear interactions.
- A 100-foot vegetated buffer would be maintained along Okaloosa darter and Florida bog frog streams. Erosion control measures, such as silt fencing, would be utilized near these streams.
- Monitoring of RCW near cantonment areas by Eglin NRO would continue.
- Prescribed burns in RCW foraging habitat would continue to the extent possible.

5.2.3 Cultural Resources

The following actions would be taken to prevent potential impacts to cultural resources in accordance with the SOPs outlined in the ICRMP:[316]

- All ground-disturbing activities would be coordinated with the 96 CEG/CEIEA in order to determine precise locations to be avoided in order to protect cultural resources.[317]
- Any archaeological artifacts discovered would be left in place and their locations immediately reported to the 96 CEG/CEIEA. Construction or demolition activities would cease and efforts to protect the resource from further impact would be taken.[318]
- Vehicle movements would be restricted near water bodies, on steep slopes, or in areas where the soil is soft and/or devoid of vegetation, or in areas where artifacts are located on the surface of the ground.[319]
- In the event of the discovery of potential Native American artifacts and/or remains, construction and operational activities would cease and the THPO would be notified immediately.[320]
- No ground-disturbing activities would occur in the vicinity of Davis Cemetery on Eglin Main Base.

5.2.4 Hazardous Materials and Waste

- Manage hazardous materials/waste in coordination with the 96 CEG/CEIEC and in accordance with all applicable environmental compliance regulations and Eglin AFB environmental management plans.
- Construction will adhere to AFI 32-7086 and existing tracking and reporting requirements as presented in the *Hazardous Waste Management Plan*.
- Nonhazardous solid waste generated from construction activities will be recycled to the extent possible.
- Equip all construction sites with adequate waste disposal receptacles for solid, liquid, and hazardous wastes to prevent construction and demolition debris from leaving the work site.

[316] Eglin AFB. *Integrated Cultural Resources Management Plan.* 2017. p. 32-52.
[317] *Ibid,* p. 32.
[318] *Ibid,* p. 35.
[319] *Ibid,* p. 51.
[320] *Ibid,* p. 35.

5.2.5 Safety

- Coordination with 96 TW/SE, 96 TW/RANSS, and 96 CES/CESD would be conducted for any ground disturbing activity occurring within the Eglin AFB Range Complex. Surface or subsurface activities occurring within an area delineated as probable UXO contamination would require surveying and remediation prior to 96 TW/SE approval.
- Physical barriers and "no trespassing" signs would be placed around the demolition and construction sites to deter children and unauthorized personnel. All construction vehicles and equipment would be locked or otherwise secured when not in use.
- All construction equipment would be maintained to the manufacturer's specification to minimize effects associated with safety and minimize impacts from construction noise.

5.2.6 Soils

- A site-specific SWPPP would be implemented to minimize any unnecessary soil erosion that could occur during construction.
- Clearing and grubbing would be timed with construction to minimize the exposure of cleared surfaces. Such activities would not be conducted during periods of wet weather. Construction activities would be staged to allow for the stabilization of disturbed soils.
- Soil erosion-control measures, such as soil erosion-control mats, silt fences, straw bales, diversion ditches, riprap channels, water bars, water spreaders, vegetative buffer strips, and hardened stream crossings, would be used as appropriate.
- Disturbance boundaries would be clearly delineated by measures such as staking, fence, or flagging, prior to the start of construction. Any off-road traffic would be prohibited in the disturbance area. All equipment would be confined to these designated work zones (including access roads and laydown) within the Proposed Action area.
- Project planning should include the need for sampling and subsequent remediation within the project area to account for the discovery of contaminated soil.
- Development would be required to adhere to basewide BMPs for erosion control as outlined in the *Erosion Control Component Plan.*[321]

5.2.7 Utilities

- Coordination with all utility providers would be required prior to any ground-disturbing activities in order to minimize potential conflicts between providers.

5.2.8 Water Resources

- Use established roads to cross streams.
- Follow recommended BMPs for soil erosion and sedimentation prevention. BMPs utilized by the base to control erosion and excess sedimentation could include one or more of the following:
    - Installation of temporary silt fencing or hay bales
    - Earth moving to establish berms, detention basins, or other stormwater controls
    - Planting of grasses and woody vegetation
    - Fertilizing and mowing
    - Establishing or reestablishing native wetland plants.
- Install and maintain entrenched silt fencing and hay bales along the perimeter of the construction site prior to any ground-disturbing activities and maintain them in effective working order through

[321] Eglin AFB. *Erosion Control Component Plan.* April 17, 2018. p. 5-1.

the construction process to prevent fill material, pollutants, and runoff from entering wetlands or other surface waters.

- Incorporate a monitoring plan to observe the effectiveness of silt fencing, hay bales, and other erosion and sedimentation control devices and address deficiencies accordingly.
- Vehicles and equipment must remain at least 50 meters from the edge of slopes leading down to streams.
- A 100-ft vegetated buffer must be maintained between construction sites and surface waters,
- Where applicable, reduce erosion using rough grade slopes or terrace slopes.

6.0 REFERENCES

16 USC 1452 Section 303(1), *Coastal Zone Management Act of 1972*

16 USC 1452 Section 304 (1), *Coastal Zone Management Act of 1972*

29 USC Section 651, *Occupational Safety and Health*

32 CFR 989.18, Environmental Impact Analysis Process, Scoping

32 CFR 989.27, Environmental Impact Analysis Process, Occupational Safety and Health

33 CFR Part 338, Other Corps Activities Involving the Discharge of Dredged Material or Fill into Waters of the U.S.

40 CFR 1501.7[a][3], Council on Environmental Quality, NEPA and Agency Planning, Scoping

40 CFR 1506.3, Council on Environmental Quality, Other Requirements of NEPA, Adoption

40 CFR 1508.7, Council on Environmental Quality, Agency Compliance

40 CFR 1508.8, Council on Environmental Quality, Terminology and Index

40 CFR 1508.25, Council on Environmental Quality, Terminology and Index, Scope

42 USC 201, The Public Health and Welfare, Public Health Service, Administration and Miscellaneous Provisions, Definitions

42 USC 3251, The Public Health and Welfare, Solid Waste Disposal

42 USC 6901, The Public Health and Welfare, Solid Waste Disposal, General Provisions, Congressional Findings

42 USC 6903(5), The Public Health and Welfare, Solid Waste Disposal, General Provisions, Definitions

49 CFR 171.8, Transportation, Pipeline and Hazardous Materials Safety Administration

49 CFR 172.101, Transportation, Pipeline and Hazardous Materials Safety Administration

49 CFR 173, Transportation, Pipeline and Hazardous Materials Safety Administration

AFI 32-7062, *Comprehensive Planning.*

AFI 32-7063, *Air Installations Compatible Use Zones Program.*

AFI 91-202, *The US Air Force Mishap Prevention Program.*

AFI 91-203, *Air Force Occupational Safety, Fire, and Health Hazards.*

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Appendix A

Agency Coordination (pending)

Appendix B

Coastal Zone Management Act Consistency Determination (pending)

FEDERAL AGENCY COASTAL ZONE MANAGEMENT ACT
CONSISTENCY DETERMINATION

Introduction:

This document provides the State of Florida with the U.S. Air Force's determination of consistency of the Proposed Action with the Florida Coastal Management Program under the Coastal Zone Management Act (CZMA) Section 307 and 15 C.F.R. Part 930 sub-part C. The information in this Consistency Determination is provided pursuant to 15 C.F.R. Section 930.39 and Section 307 of the Coastal Zone Management Act, 16 U.S.C. § 1456, as amended, and its implementing regulations 15 C.F.R. Part 930.

The Proposed Action is the implementation of an authorized level of construction and demolition activities across five cantonment areas and the Jackson Guard compound for the foreseeable future on Eglin Air Force Base (AFB), Florida, according to the Preferred Alternative as described in the Environmental Assessment (EA) *2019 Cantonment Areas Environmental Assessment, Eglin Air Force Base, FL.* Programmatic in nature, this Preferred Alternative is derived from three sources: 1) the authorized level of activities from the 2014 *Final Eglin AFB Cantonment Areas Environmental Assessment* (Table 1), 2) the current level of activities that have been measured since the 2014 Cantonment Areas EA was implemented (Table 2), and 3) the level of development authorized in the 2016 *Eglin AFB Jackson Guard Area Development Plan Environmental Assessment Final.*

Proposed Federal Agency Action:

As Eglin AFB continues to support future missions and developments, it faces several challenges: accommodating growing numbers of staff in aging infrastructure, providing adequate facilities for mission support, adapting to changing missions, promoting sustainable development, and operating within increasingly congested environments. The vast majority of the construction and demolition activities required to address these challenges will occur at these locations: Eglin Main Base, Camp Rudder/6th Ranger Training Battalion (6 RTB), Duke Field, 7th Special Forces Group (Airborne) (7 SFG[A]) Cantonment), Site C-6 20th Space Control Squadron (20 SPCS) Area, and the Jackson Guard Compound (Figure 1).

The Proposed Action (Preferred Alternative [Alternative 2] from 2019 Cantonment Areas EA) multiplies the differences in activity levels between the 2014 authorized amount and what was actually constructed/demolished by 25 percent to represent what Eglin AFB regards as a "mission surge" level (Table 3). As the Proposed Action is programmatic in nature, it is intended to provide categorical exclusion under the National Environmental Policy Act for specific construction or demolition projects at scales that shouldn't exceed the limits of any of the cantonment areas described herein.

Table 1. Authorized level of activities from 2014 Cantonment Areas EA, Eglin Air Force Base, Florida

	Total Area Disturbed (acres)	Facilities Construction (square feet)	Parking/Impervious (acres)	Roads/Infrastructure (acres)	Demolition (square feet)
Eglin Main	365	1,031,906	128	36	145,149
Duke Field	203	511,710	78	23	25,585
7 SFG(A)	41	228,851	4	4	11,443
Camp Rudder	61	130,680	17	18	6,534
C-6 20 SPCS	4	10,084	1	0	504

Table 2. Activities measured from time of implementation of 2014 Cantonment Areas EA to 2019

	Total Area Disturbed (acres)	Facilities Construction (square feet)	Parking/Impervious (acres)	Roads/Infrastructure (acres)	Demolition (square feet)
Eglin Main	12.37	292,034	4.61	0.38	29,830
Duke Field	2.06	89,145	0	0	648
7 SFG(A)	3.32	143,468	0	0.02	260
Camp Rudder	0.09	3,732	0	0	0
C-6 20 SPCS	0	0	0	0	0

Table 3. Proposed level of activities evaluated for Florida Coastal Management Program consistency[1]

	Total Area Disturbed (acres)	Facilities Construction (square feet)	Parking/Impervious (acres)	Roads/Infrastructure (acres)	Demolition (square feet)
Eglin Main	444.5	994,083	156.75	45.75	212,520
Duke Field	251.1	528,206	97.5	28.8	31,171
7 SFG(A)	47.1	106,729	5	5	13,979
Camp Rudder	76.3	158,685	21.3	22.5	8,168
C-6 20 SPCS	5	12,605	1.3	0	630

[1]Jackson Guard activities are included within Eglin Main amounts

Eglin Main Base

The Proposed Action includes the implementation of development at Eglin Main Base and Jackson Guard. The Eglin Main Base consists of a variety of uses and mission partners including headquarters and support functions, administrative office spaces, test and evaluation, training, laboratories, dormitories, community support and service functions, and recreation. Eglin Main Base consists of nine distinct areas: Downtown, Bayou Park, Bayside, Flightline, Boomtown, Tom's Creek, Fightertown, Westside, and Pinchot. According to the Area Development Plans written for each of the nine areas, the overall goal of future development proposed for Eglin Main Base is to provide logical solutions for development issues and concerns while maximizing efficiency and striking a balance between operational needs and the natural environment. Eglin Main Base is approximately 11,265 acres in size. Of this acreage, approximately 6,528 acres are developed and 4,737 acres are undeveloped. Future development may include demolition, facilities construction, transportation infrastructure improvements, parking, facility maintenance, and other activities. Total proposed development is anticipated to consist of approximately 994,083 ft^2 of construction or other improvements, while approximately 212,550 ft^2 would be slated for demolition. Parking and other impervious surfaces would total 156.75 acres, while roads and other infrastructure would consist of 45.75 acres.

The Jackson Guard compound is 14 acres in size and is located north of Eglin Main Base near the intersection of Florida Highway 85 and Florida Highway 20. Jackson Guard's mission is the management of Eglin's natural resources in support of the military mission within the land and water ranges of the Eglin Military Complex. Jackson Guard is responsible for integrating and prioritizing wildlife, fire, and forest management activities to protect and effectively manage the Complex's aquatic and terrestrial environments, and ensuring "no net loss" in the operational capability of these strategic priorities. Proposed development at Jackson Guard may include refurbishments and upgrades to existing facilities, construction of new facilities, and demolition of infrastructure. Approximately 4.72 acres of Jackson Guard are developed, while the remaining 9.28 acres are undeveloped. Total proposed development is anticipated to consist of approximately 69,243 ft^2 of construction or other improvements, while approximately 68,371 ft^2 would be slated for demolition. Parking and other impervious surfaces would total 2.01 acres, while roads and other infrastructure would consist of 1.23 acres. Because Jackson Guard is not a defined cantonment area, its proposed development has been combined with that of Eglin Main Base in Table 3-- the aforementioned quantities are a part of, and not in addition to the Eglin Main Base quantities in Table 3.

Duke Field

Duke Field is a self-contained military airport located approximately 12 miles north of Eglin Main Base within the greater Eglin AFB Reservation. Duke Field is home to the 919th Special Operations Wing (919 SOW) and consists of facilities, roads, parking, paved runways, taxiways, helipads, and aprons. The overall goal of development on Duke Field is to maximize efficiency and create a balance between operational needs and the natural environment while supporting readiness

posture and missions. Duke Field is approximately 1,946 acres in size. Of this acreage, approximately 1,464 acres are developed and 482 acres are undeveloped. Proposed development at Duke Field under may include airfield improvements, facilities construction, transportation infrastructure improvements, and demolition projects. Total proposed development is anticipated to consist of approximately 528,206 ft^2 of construction or other improvements, while approximately 31,171 ft^2 would be slated for demolition. Parking and other impervious surfaces would total 97.5 acres, while roads and other infrastructure would consist of 28.8 acres.

7 SFG(A) Cantonment

The 7 SFG(A) Cantonment is located approximately 12 miles north of Eglin Main Base. The 7 SFG(A) cantonment is designated for use by the 7 SFG(A), which is part of the U.S. Army Special Forces Command. Overall goals of the development proposed include enhancing mission readiness, maintaining security and low visibility of cantonment operations, implementing sustainable design, and enhancing the quality of life for military personnel and their families as well as civilian personnel. The 7 SFG(A) Cantonment is approximately 500 acres in size. Of this acreage, approximately 306 acres are developed and 194 acres are undeveloped. Development proposed may include facilities construction for housing and recreational uses, security improvements, and transportation infrastructure improvements. Total proposed development is anticipated to consist of approximately 106,729 ft^2 of construction or other improvements, while approximately 13,979 ft^2 would be slated for demolition. Parking and other impervious surfaces would total 5 acres, while roads and other infrastructure would also consist of 5 acres.

Camp Rudder

Camp James E. Rudder, located approximately 14 miles northwest of the Eglin Main Base, is home to the U.S. Army's 6 RTB. 6 RTB conducts approximately 11 classes per year and exposes students to tactical operations in a coastal swamp environment, including the third and final phase of U.S. Army Ranger training. The overall goal of proposed development at Camp Rudder is to ensure that facilities will provide quality training for U.S. Army Ranger Training School students. Camp Rudder is approximately 287 acres in size. Of this acreage, approximately 87 acres are developed and 200 acres are undeveloped. The proposed development on Camp Rudder reflects an anticipated increase in use of the site; projects may include multi-purpose and recreational facilities as well as housing. Total proposed development is anticipated to consist of approximately 158,685 ft^2 of construction or other improvements, while approximately 8,168 ft^2 would be slated for demolition. Parking and other impervious surfaces would total 21.3 acres, while roads and other infrastructure would consist of 22.5 acres.

Site C-6 20 SPCS Area

The 20 SPCS operates a phased array radar system at Site C-6 on Eglin AFB. The phased array radar system is dedicated to tracking more than 16,000 near-earth and deep-space objects and provides space situational awareness for the U.S. Strategic Command's (STRATCOM) space control mission area. Site C-6 is located approximately 17 miles east of Eglin Main Base. The cantonment area for Site C-6 is approximately 14 acres in size. Of this acreage, all 14 acres are developed and zero acres are undeveloped. Total proposed development is anticipated to consist of approximately 12,605 ft^2 of construction or other improvements, while approximately 630 ft^2 would be slated for demolition. Parking and other impervious surfaces would total 1.3 acres, while no development of roads and other infrastructure is anticipated.

Federal Review:

Eglin AFB Natural Resources Office addressed statutes in Table 4 as part of the Florida Coastal Management Program consistency review. After review of Florida's statutes and regulations, the U.S. Air Force (USAF) has made a determination that this activity would be consistent with the Florida Coastal Management Program.

Table 4. Florida Coastal Management Program Consistency Review

Statute	Scope	Consistency
Chapter 161 *Beach and Shore Preservation*	This statute provides policy for the regulation of construction, reconstruction, and other physical activities related to the beaches and shores of the state. Additionally, this statute requires the restoration and maintenance of critically eroding beaches.	The Proposed Action will not affect beach and shore management, specifically as it pertains to: • The Coastal Construction Permit Program. • The Coastal Construction Control Line (CCCL) Permit Program. • The Coastal Zone Protection Program.
Chapter 163, Part II *Growth Policy; County and Municipal Planning; Land Development Regulation*	Provides for the implementation of comprehensive planning programs to guide and control future development of the state.	The Proposed Action will not affect local government comprehensive plans.
Chapter 186 *State and Regional Planning*	Provides direction for the delivery of governmental services, a means for defining and achieving the specific goals of the state, and a method for evaluating the accomplishment of	An increase in electricity, potable water, and natural gas usage would be likely to occur, but usage would still be within permitted limits and could be accommodated without adverse

Statute	Scope	Consistency
	those goals in regards to the state comprehensive plan.	impact on the electrical or natural gas supply in northwest Florida. Existing wastewater treatment plants would not have difficulty accommodating the additional flow from cantonment areas. New utilities infrastructure would be likely to be required for some projects sites. However, construction on the existing cantonment areas would provide adequate existing infrastructure from which to branch off as described in Section 3.10 of the EA. The Proposed Action would not affect state plans for water use, land development or transportation.
Chapter 252 *Emergency Management*	Directs the state to reduce the vulnerability of its people and property to natural and manmade disasters; prepare for, respond to and reduce the impacts of disasters; and decrease the time and resources needed to recover from disasters.	The Proposed Action will not affect the state's vulnerability to natural disasters. The Proposed Action will not affect emergency response and evacuation procedures.
Chapter 253 *State Lands*	Addresses the acquisition, administration, management, control, supervision, conservation, protection, and disposition of all state lands.	The Proposed Action will not affect state lands.
Chapter 258 *State Parks and Preserves*	Addresses the state's administration of state parks, aquatic preserves, and state recreation areas.	The Proposed Action will not affect state parks, state recreational areas, or aquatic preserves.
Chapter 259 *Land Acquisition for Conservation or Recreation*	Addresses public ownership of natural areas for purposes of maintaining the state's unique natural resources; protecting air, land, and water quality; promoting water resource development to meet the needs of natural systems and citizens of this state; promoting restoration activities on public lands; and providing lands for natural resource based recreation.	The Proposed Action will not affect tourism or outdoor recreation.
Chapter 260 *Florida Greenways and Trails Act*	Statewide system of greenways and trails established in order to conserve, develop, and use the natural resources	The Proposed Action will not affect the Greenways and Trails Program.

Statute	Scope	Consistency
	of Florida for healthful and recreational purposes.	
Chapter 267 *Historical Resources*	Addresses the management and preservation of the state's archaeological and historical resources.	Impacts on cultural resources are not expected from this Proposed Action; relevant discussion is provided in Section 3.4 of the EA. No cultural resources are known to exist within the proposed project area and discovery of new resources during ground disturbing activities is not anticipated based on the results of Eglin AFB's predictive model and the Phase I cultural resources survey conducted for this project. However, in the event that resources are inadvertently discovered, the Cultural Resources Office (96 CEG/CEIEA) would be notified immediately and further ground disturbing activities would cease in that area. Any identified resources would be managed in compliance with Federal Law and Air Force regulations. Therefore, the Proposed Action will not affect archaeological and historical resources of the state.
Chapter 288 *Commercial Development and Capital Improvements*	Promotes and develops general business, trade, and tourism components of the state economy.	The Proposed Action will not affect future business opportunities on state lands, or the promotion of tourism in the region.
Chapter 334 *Transportation Administration*	Addresses the state's policy concerning transportation administration.	The Proposed Action will not affect transportation.
Chapter 339 *Transportation Finance and Planning*	Addresses the finance and planning needs of the state's transportation system.	The Proposed Action will not affect the finance and planning needs of the state's transportation system.
Chapter 373 *Water Resources*	Addresses sustainable water management; the conservation of surface and ground waters for full beneficial use; the preservation of natural resources, fish, and wildlife; protecting public land; and promoting the health and general welfare of Floridians.	Although the Proposed Action will increase the potential for impacts to water resources due to an increased rate and volume of stormwater runoff, resulting from an overall increase in impervious surface area, significant impacts to the State's water resources are not expected; relevant discussion is provided in Sections 3.3, 3.9, and 3.11

Statute	Scope	Consistency
		in the EA. In order to limit the effects the Proposed Action will have on water resources, Best Management Practices (BMPs) will be applied to control erosion and stormwater runoff. Eglin's Water Resources Office (96 CEG/CEIEC) will coordinate all applicable permits for individual projects proposed for categorical exclusion under the EA in accordance with the Florida Administrative Code (FAC). The Proponent of the Proposed Action will be responsible for implementing all permit requirements. Individual projects proposed for categorical exclusion under the EA may require an Environmental Resource Permit pursuant to Chapter 62-330 FAC when they either *include more than 4,000 sq ft of impervious or semi-impervious surfaces subject to vehicular traffic, include 9,000 sq ft of total impervious surfaces, or the project area is more than 1 acre and is not part of a larger common plan of development*. Individual projects proposed for categorical exclusion under the EA will require a NPDES stormwater construction permit from FDEP pursuant to Chapter 62-621 FAC if they disturb more than 1 ac. of soil. Therefore, the Proposed Action will be consistent with Florida's statutes and regulations regarding water resources.
Chapter 375 *Outdoor Recreation and Conservation Lands*	Addresses the development of a comprehensive multipurpose outdoor recreation plan, with the purpose to document recreational supply and demand, describe current recreational opportunities, estimate the need for additional recreational opportunities, and propose the means to meet the identified needs.	The Proposed Action will not affect opportunities for recreation on state lands.

Statute	Scope	Consistency
Chapter 376 *Pollutant Discharge Prevention and Removal*	Regulates transfer, storage, and transportation of pollutants, and cleanup of pollutant discharges.	There will be no significant impacts from pollutant discharges under the Proposed Action; relevant discussion is provided in Sections 3.2 and 3.5 of the EA. Construction/demolition of some buildings could result in the production of minor amounts of lead-based paint or asbestos wastes. Hazardous and nonhazardous waste would be generated as a result of construction/demolition activities. Management of hazardous waste would be performed according to prescribed procedures already in place. Thus, no change to permits, hazardous waste generated status, or management procedures would be required and no adverse environmental impacts are anticipated. Eglin AFB would respond to hazardous material spills or other incidents according to established procedures. Development on or near any Environmental Restoration Program sites on Eglin AFB would be coordinated with the Eglin Environmental Office, the U.S. Environmental Protection Agency, the Florida Department of Environmental Protection, and other relevant stakeholders, as required. Proponents of individual projects proposed for categorical exclusion under the EA will take reasonable precautions to minimize fugitive particulate (dust) emissions during any ground disturbing/construction/renovation activities in accordance with Chapter 62-296 FAC Rule 62-296. Therefore, the Proposed Action will be consistent with Florida's statutes and regulations regarding the transfer, storage, transportation of pollutants, and cleanup of pollutant discharges.
Chapter 377 *Energy Resources*	Addresses regulation, planning, and development of the energy resources of the state; provides policy to	The Proposed Action will not affect energy resource production, including

Statute	Scope	Consistency
	conserve and control the oil and gas resources in the state.	oil and gas, and/or the transportation of oil and gas.
Chapter 379 *Fish and Wildlife Conservation*	Establishes the framework for the management and protection of the state of Florida's wide diversity of fish and wildlife resources.	The Proposed Action is not anticipated to have a significant impact on wildlife resources of the state; relevant discussion is provided in Section 3.3 of the EA. Proponents for individual projects requesting categorical exclusion under the EA will comply with existing terms and conditions under the Endangered Species Act, as well as conservation measures described within Section 5 of the EA. The Proposed Action is covered under the *Red-Cockaded Woodpecker Programmatic Biological Opinion* and the *Eastern Indigo Snake Programmatic Biological Opinion* for Eglin AFB. All conservation measures resulting from these consultations will be followed. Eglin Natural Resources will conduct protected species surveys prior to ground disturbance or tree removal activities. Individual projects for which categorical exclusions are sought under the EA will also be evaluated for effects on other ESA-listed species as well as species protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act, and subject to consultation with US Fish and Wildlife Service where necessary. Therefore, the Proposed Action will be consistent with Florida's statutes and regulations regarding the protection of fish and wildlife resources of the state.
Chapter 380 *Land and Water Management*	Establishes land and water management policies to guide and coordinate local decisions relating to growth and development.	Impacts to the State's Land and Water Management from the Proposed Action are not expected; relevant discussion is provided in Section 3.8 and 3.10 of the EA. The Proposed Action will not affect development of state lands with regional (i.e. more than one county) impacts, as it is programmatic in nature; individual projects proposed for categorical

Statute	Scope	Consistency
		exclusion under the EA will all be confined to a cantonment and will not span more than one county. The Proposed Action will not include changes to coastal infrastructure such as capacity increases of existing coastal infrastructure, or use of state funds for infrastructure planning, designing or construction.
Chapter 381 *Public Health, General Provisions*	Establishes public policy concerning the state's public health system.	The Proposed Action will not affect the state's policy concerning the public health system.
Chapter 388 *Mosquito Control*	Addresses mosquito control efforts in the state.	The Proposed Action will not affect mosquito control efforts.
Chapter 403 *Environmental Control*	Establishes public policy concerning environmental control in the state.	The Proposed Action will not affect water quality, pollution control, solid waste management, or other environmental control efforts.
Chapter 553 *Building Construction Standards*	Addresses building construction standards and provides for a unified Florida Building Code.	The Proposed Action will not affect building construction standards.
Chapter 582 *Soil and Water Conservation*	Provides for the control and prevention of soil erosion.	Impacts to the State's Soil and Water Conservation from the Proposed Action are not expected; relevant discussion is provided in Section 3.9 of the EA. All applicable BMPs, such as erosion and sediment controls and stormwater management measures (See response regarding consistency with *Ch. 373, Water Resources*), will be implemented during ground disturbing activities to minimize potential impacts to surrounding soils. Therefore, the Proposed Action will be consistent with statutes and regulations regarding soil and water conservation efforts.
Chapter 597 *Aquaculture*	Establishes public policy concerning the cultivation of aquatic organisms of the state. Addresses state aquaculture plan, which provides for the coordination and prioritization of state aquaculture efforts, the conservation and enhancement of aquatic resources	The Proposed Action will not affect state aquaculture efforts.

Statute	Scope	Consistency
	and provides mechanisms for increasing aquaculture production.	

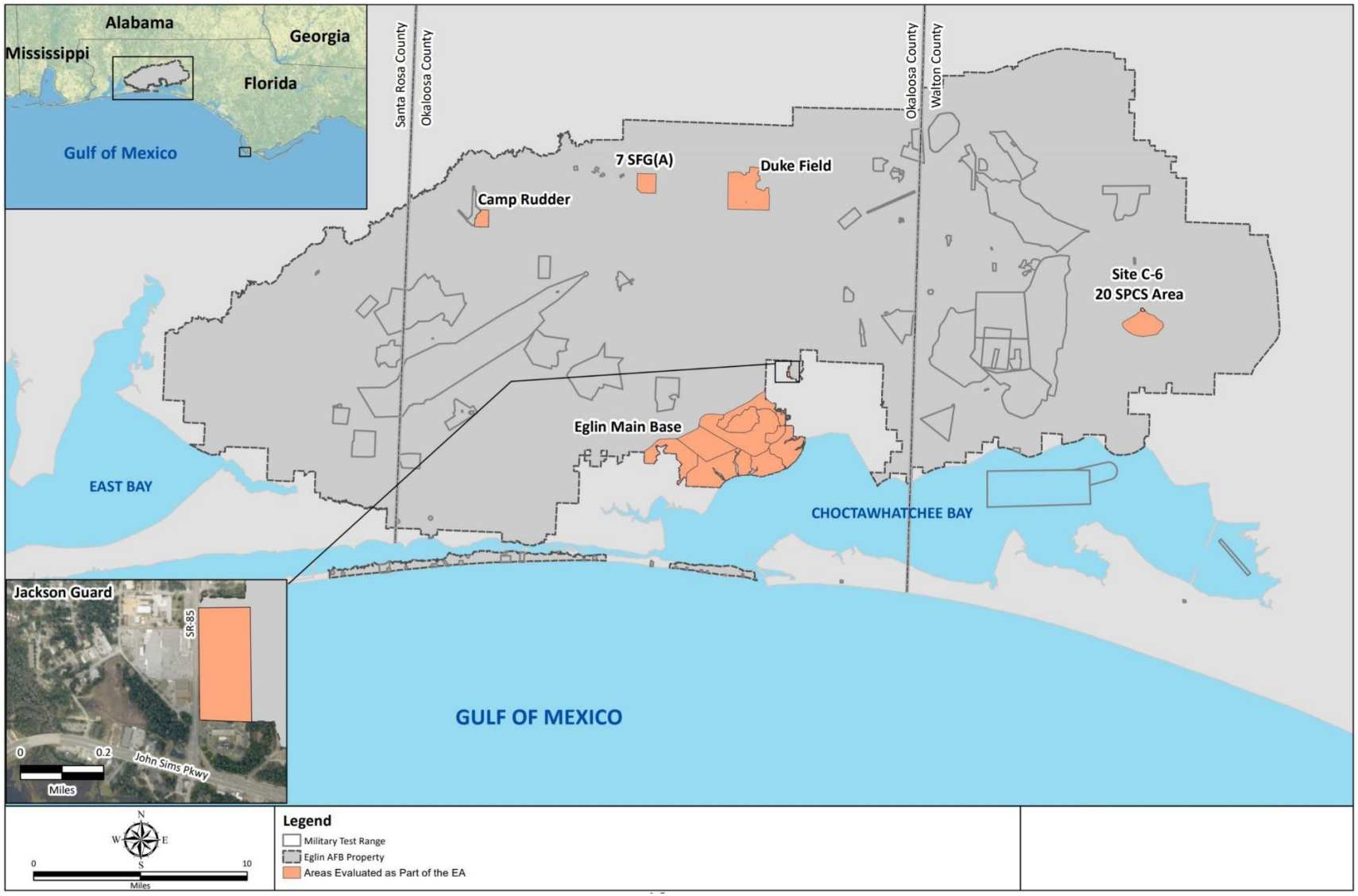

Figure 1. Five Cantonment Areas (to include Jackson Guard compound) that comprise the proposed action area at Eglin Air Force Base, Florida

Appendix C

Air Quality Analysis

Total Projected Emissions (Tons/Year)

Alternative 1	CO	NOx	PM_{10}	$PM_{2.5}$	SO_X	VOC	CO2e
Eglin Main Base	7.31	9.48	44.93	0.41	0.03	1.51	2798.90
Duke Field	4.94	5.63	16.46	0.26	0.01	0.98	1388.40
7SFG (A)	2.58	2.72	4.88	0.13	0.01	0.43	625.80
Camp Rudder	3.51	3.85	18.44	0.18	0.01	0.64	884.30
C-6 20 SPCS	1.15	1.43	0.21	0.07	0.00	0.23	305.30
Total	19.49	23.11	84.92	1.04	0.06	3.80	6002.70
ROI Emissions	183,083	16,401	42,323	13,449	2,610	103,971	4,965,007
Percent ROI Emissions	0.011%	0.141%	0.201%	0.008%	0.002%	0.004%	0.121%

Baseline AEI for ROI

	CO	NOx	PM_{10}	$PM_{2.5}$	SO_X	VOC	CO2e
Okaloosa	71,774.50	6,612.23	12,176.00	4,772.89	537.02	47,775.42	2,028,472.00
Walton	46,734.00	3,722.00	14,700.00	3,767.00	285.00	8,445.00	1,212,284.00
Santa Rosa	64,574.00	6,067.09	15,447.37	4,908.92	1,787.60	47,750.50	1,724,251.00
ROI Total	183,083	16,401	42,323	13,449	2,610	103,971	4,965,007

Total Projected Emissions (Tons/Year)

Alternative 2	CO	NOx	PM_{10}	$PM_{2.5}$	SO_X	VOC	CO2e
Eglin Main Base	8.63	11.39	91.93	0.49	0.03	1.82	3350.20
Duke Field	6.74	8.27	67.11	0.36	0.02	1.34	2281.40
7SFG (A)	2.74	2.93	6.14	0.14	0.01	0.47	679.70
Camp Rudder	3.74	4.24	19.28	0.19	0.01	0.70	995.90
C-6 20 SPCS	2.98	4.88	0.40	0.21	0.01	0.60	995.90
Total	24.83	31.71	184.86	1.38	0.08	4.93	8303.10
ROI Emissions	183,083	16,401	42,323	13,449	2,610	103,971	4,965,007
Percent ROI Emissions	0.014%	0.193%	0.437%	0.010%	0.003%	0.005%	0.167%

Baseline AEI for ROI

	CO	NOx	PM_{10}	$PM_{2.5}$	SO_X	VOC	CO2e
Okaloosa	71,774.50	6,612.23	12,176.00	4,772.89	537.02	47,775.42	2,028,472.00
Walton	46,734.00	3,722.00	14,700.00	3,767.00	285.00	8,445.00	1,212,284.00
Santa Rosa	64,574.00	6,067.09	15,447.37	4,908.92	1,787.60	47,750.50	1,724,251.00
ROI Total	183,083	16,401	42,323	13,449	2,610	103,971	4,965,007

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

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 Instruction 32-7040, Air Quality Compliance And Resource Management; 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: EGLIN AFB
State: Florida
County(s): Okaloosa; Santa Rosa; Walton
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: Eglin AQ Analysis of potential construction Projects at Alt. 1 Eglin Main Field.

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2020

e. Action Description:

Demolition/construction activities are possible over the next few years at five locations on EAFB. The location, Alt. 1 Eglin Main Field is presented as part of the AQ analysis.

f. Point of Contact:
Name: Kyle Flowers
Title: Contractor
Organization: Trinity ADC
Email: kyle.m.flowers.ctr@mail.mil
Phone Number: 334 303-0119

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 combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action fully implemented) emissions.

"Air Quality Indicators" were used to provide an indication of the significance of potential impacts to air quality. These air quality indicators are EPA General Conformity Rule (GCR) thresholds (de minimis levels) that are applied out of context to their intended use. Therefore, these indicators do not trigger a regulatory requirement; however, they provide a warning that the action is potentially significant. It is important to note that these indicators only provide a clue to the potential impacts to air quality.

Given the GCR de minimis threshold values are the maximum net change an action can acceptably emit in non-attainment and maintenance areas, these threshold values would also conservatively indicate an actions emissions within an attainment would also be acceptable. An air quality indicator value of 100 tons/yr is used based on the GCR de minimis threshold for the least severe non-attainment classification for all criteria pollutants (see 40 CFR 93.153). Therefore, the worst-case year emissions were compared against the GCR Indicator and are summarized below.

Analysis Summary:

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

2020

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.657	100	No
NOx	4.992	100	No
CO	3.626	100	No
SOx	0.014	100	No
PM 10	44.726	100	No
PM 2.5	0.207	100	No
Pb	0.000	25	No
NH3	0.017	100	No
CO2e	1491.5		

2021

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.856	100	No
NOx	4.494	100	No
CO	3.691	100	No
SOx	0.013	100	No
PM 10	0.204	100	No
PM 2.5	0.197	100	No
Pb	0.000	25	No
NH3	0.014	100	No
CO2e	1307.4		

2022 - (Steady State)

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.000	100	No
NOx	0.000	100	No
CO	0.000	100	No
SOx	0.000	100	No
PM 10	0.000	100	No
PM 2.5	0.000	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	0.0		

None of estimated emissions associated with this action are above the GCR indicators, indicating no significant impact to air quality; therefore, no further air assessment is needed.

Kyle Flowers, Contractor

DATE

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location
Base: EGLIN AFB
State: Florida
County(s): Okaloosa; Santa Rosa; Walton
Regulatory Area(s): NOT IN A REGULATORY AREA

- Action Title: Eglin AQ Analysis of potential construction Projects at five (5) locations - Two (2) Alternatives

- Project Number/s (if applicable):

- Projected Action Start Date: 1 / 2020

- Action Purpose and Need:
To determine potential air pollution emissions from proposed demolition/construction activites

- Action Description:
Demolition/construction activites are possible over the next few years at five locations on EAFB. The locations are Eglin Main Base, Duke Field, 7SFG(A), Camp Rudder and C-6 20 SPCS. Two project alternatives, noted as Alternative 1 and Alternative 2 are presented as part of the AQ analysis.

- Point of Contact
Name: Kyle Flowers
Title: Contractor
Organization: Trinity ADC
Email: kyle.m.flowers.ctr@mail.mil
Phone Number: 334 303-0119

- Activity List:

Activity Type		Activity Title
2.	Construction / Demolition	Alternative 1 Eglin Main Field

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; Santa Rosa; Walton
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Alternative 1 Eglin Main Field

- Activity Description:
Demolish a 170,016 square ft. building(s), construct 795,266 sq, ft. building(s), 125.4 acres parking, and 36.6 road acres with a total disturbance of 200.9 acres.

- Activity Start Date
Start Month: 1

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Start Month: 2020

- Activity End Date
Indefinite: False
End Month: 12
End Month: 2021

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	1.513092
SO_x	0.026732
NO_x	9.485599
CO	7.316191
PM 10	44.929299

Pollutant	Total Emissions (TONs)
PM 2.5	0.404572
Pb	0.000000
NH_3	0.031416
CO_2e	2798.9

2.1 Demolition Phase

2.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2020

- Phase Duration
Number of Month: 0
Number of Days: 15

2.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 170016
Height of Building to be demolished (ft): 48

- 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

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	0.0483	0.0006	0.3409	0.3782	0.0195	0.0195	0.0043	58.572
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2117	0.0024	1.5772	0.8005	0.0630	0.0630	0.0191	239.56
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897

- 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

2.2 Site Grading Phase

2.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 2
Start Quarter: 1
Start Year: 2020

- Phase Duration
Number of Month: 0
Number of Days: 15

2.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 8636066
Amount of Material to be Hauled On-Site (yd^3): 79963
Amount of Material to be Hauled Off-Site (yd^3): 79963

- 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	2	8
Other Construction Equipment Composite	2	8
Rollers Composite	1	8
Rubber Tired Dozers Composite	3	8
Scrapers Composite	6	8
Tractors/Loaders/Backhoes Composite	2	8

- Vehicle Exhaust

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

2.2.3 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	0.0732	0.0013	0.4042	0.5124	0.0183	0.0183	0.0066	119.74
Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0919	0.0014	0.5823	0.5765	0.0280	0.0280	0.0082	132.95
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0562	0.0012	0.3519	0.3508	0.0138	0.0138	0.0050	122.62
Rollers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0584	0.0007	0.3793	0.3836	0.0232	0.0232	0.0052	67.171
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.2117	0.0024	1.5772	0.8005	0.0630	0.0630	0.0191	239.56
Scrapers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1913	0.0026	1.3434	0.7938	0.0540	0.0540	0.0172	262.91
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897

- 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

2.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD}$ = (20 * ACRE * WD) / 2000

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

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

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

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

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

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

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

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

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

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

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

2.3 Trenching/Excavating Phase

2.3.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 3
Start Quarter: 1
Start Year: 2020

- Phase Duration
Number of Month: 0
Number of Days: 12

2.3.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 79526
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 5891

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

- Construction Exhaust (default)

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

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

2.3.3 Trenching / Excavating Phase Emission Factor(s)

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

Excavators Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0732	0.0013	0.4042	0.5124	0.0183	0.0183	0.0066	119.74
Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0919	0.0014	0.5823	0.5765	0.0280	0.0280	0.0082	132.95
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0562	0.0012	0.3519	0.3508	0.0138	0.0138	0.0050	122.62
Rollers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0584	0.0007	0.3793	0.3836	0.0232	0.0232	0.0052	67.171
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.2117	0.0024	1.5772	0.8005	0.0630	0.0630	0.0191	239.56
Scrapers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1913	0.0026	1.3434	0.7938	0.0540	0.0540	0.0172	262.91
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897

- 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

2.3.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

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

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

- Construction Exhaust Emissions per Phase

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

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment

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

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

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

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

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

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

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

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

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

2.4 Building Construction Phase

2.4.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2020

- Phase Duration
Number of Month: 20
Number of Days: 0

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2.4.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial
Area of Building (ft^2): 795266
Height of Building (ft): 48
Number of Units: N/A

- Building Construction Default Settings

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	7
Forklifts Composite	3	8
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	3	7
Welders 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

2.4.3 Building Construction Phase Emission Factor(s)

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

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0898	0.0013	0.6610	0.3917	0.0256	0.0256	0.0081	128.83
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0320	0.0006	0.1690	0.2160	0.0070	0.0070	0.0028	54.467
Generator Sets Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0395	0.0006	0.3232	0.2731	0.0149	0.0149	0.0035	61.081

Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897
Welders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0310	0.0003	0.1734	0.1816	0.0102	0.0102	0.0027	25.672

- 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

2.4.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase

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

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

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

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

- Vender Trips Emissions per Phase
VMT_{VT} = BA * BH * (0.38 / 1000) * HT

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

2.5 Paving Phase

2.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 10
Start Quarter: 1
Start Year: 2021

- Phase Duration
Number of Month: 2
Number of Days: 12

2.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 7840800

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Pavers Composite	1	8
Paving Equipment Composite	2	8

Rollers Composite	2	6

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

2.5.3 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	0.0732	0.0013	0.4042	0.5124	0.0183	0.0183	0.0066	119.74
Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0919	0.0014	0.5823	0.5765	0.0280	0.0280	0.0082	132.95
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0562	0.0012	0.3519	0.3508	0.0138	0.0138	0.0050	122.62
Rollers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0584	0.0007	0.3793	0.3836	0.0232	0.0232	0.0052	67.171
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.2117	0.0024	1.5772	0.8005	0.0630	0.0630	0.0191	239.56
Scrapers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1913	0.0026	1.3434	0.7938	0.0540	0.0540	0.0172	262.91
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897

- 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

2.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

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

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

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

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

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

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

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

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

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

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

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

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 Instruction 32-7040, Air Quality Compliance And Resource Management; 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: EGLIN AFB
State: Florida
County(s): Okaloosa; Santa Rosa; Walton
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: Eglin AQ Analysis of potential construction Projects at Alt. 2 Eglin Main Field.

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2020

e. Action Description:

Demolition/construction activities are possible over the next few years at five locations on EAFB. The location, Alt. 2 at Eglin Main Field is presented as part of the AQ analysis.

f. Point of Contact:

Name:	Kyle Flowers
Title:	Contractor
Organization:	Trinity ADC
Email:	kyle.m.flowers.ctr@mail.mil
Phone Number:	334 303-0119

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 combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action fully implemented) emissions.

"Air Quality Indicators" were used to provide an indication of the significance of potential impacts to air quality. These air quality indicators are EPA General Conformity Rule (GCR) thresholds (de minimis levels) that are applied out of context to their intended use. Therefore, these indicators do not trigger a regulatory requirement; however, they provide a warning that the action is potentially significant. It is important to note that these indicators only provide a clue to the potential impacts to air quality.

Given the GCR de minimis threshold values are the maximum net change an action can acceptably emit in non-attainment and maintenance areas, these threshold values would also conservatively indicate an actions emissions within an attainment would also be acceptable. An air quality indicator value of 100 tons/yr is used based on the GCR de minimis threshold for the least severe non-attainment classification for all criteria pollutants (see 40 CFR 93.153). Therefore, the worst-case year emissions were compared against the GCR Indicator and are summarized below.

Analysis Summary:

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

2020

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.762	100	No
NOx	5.785	100	No
CO	4.131	100	No
SOx	0.016	100	No
PM 10	91.684	100	No
PM 2.5	0.240	100	No
Pb	0.000	25	No
NH3	0.019	100	No
CO2e	1698.3		

2021

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	1.012	100	No
NOx	5.251	100	No
CO	4.206	100	No
SOx	0.015	100	No
PM 10	0.238	100	No
PM 2.5	0.230	100	No
Pb	0.000	25	No
NH3	0.017	100	No
CO2e	1543.5		

2022

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.049	100	No
NOx	0.361	100	No
CO	0.293	100	No
SOx	0.001	100	No
PM 10	0.016	100	No
PM 2.5	0.015	100	No
Pb	0.000	25	No
NH3	0.001	100	No
CO2e	108.4		

2023 - (Steady State)

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.000	100	No
NOx	0.000	100	No
CO	0.000	100	No
SOx	0.000	100	No
PM 10	0.000	100	No
PM 2.5	0.000	100	No

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

Pb	0.000	25	No
NH3	0.000	100	No
CO2e	0.0		

None of estimated emissions associated with this action are above the GCR indicators, indicating no significant impact to air quality; therefore, no further air assessment is needed.

_____ _____

Kyle Flowers, Contractor DATE

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location
Base: EGLIN AFB
State: Florida
County(s): Okaloosa; Santa Rosa; Walton
Regulatory Area(s): NOT IN A REGULATORY AREA

- Action Title: Eglin AQ Analysis of potential construction Projects at five (5) locations - Two (2) Alternatives

- Project Number/s (if applicable):

- Projected Action Start Date: 1 / 2020

- Action Purpose and Need:
To determine potential air pollution emissions from proposed demolition/construction activites

- Action Description:
Demolition/construction activites are possible over the next few years at five locations on EAFB. The locations are Eglin Main Base, Duke Field, 7SFG(A), Camp Rudder and C-6 20 SPCS. Two project alternatives, noted as Alternative 1 and Alternative 2 are presented as part of the AQ analysis.

- Point of Contact
Name: Kyle Flowers
Title: Contractor
Organization: Trinity ADC
Email: kyle.m.flowers.ctr@mail.mil
Phone Number: 334 303-0119

- Activity List:

Activity Type		Activity Title
2.	Construction / Demolition	Alternative 2 Eglin Main Field

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; Santa Rosa; Walton
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Alternative 2 Eglin Main Field

- Activity Description:
Demolish a 212,520 square ft. building(s), construct 994,083,266 sq, ft. building(s), 156.75 acres parking, and 45.75 road acres with a total disturbance of 445 acres.

- Activity Start Date
Start Month: 1

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Start Month: 2020

- Activity End Date
Indefinite: False
End Month: 1
End Month: 2022

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	1.823069
SO_x	0.031951
NO_x	11.397389
CO	8.630197
PM 10	91.937684

Pollutant	Total Emissions (TONs)
PM 2.5	0.485376
Pb	0.000000
NH_3	0.037733
CO_2e	3350.2

2.1 Demolition Phase

2.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2020

- Phase Duration
Number of Month: 0
Number of Days: 25

2.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 212520
Height of Building to be demolished (ft): 48

- 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

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	0.0483	0.0006	0.3409	0.3782	0.0195	0.0195	0.0043	58.572
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2117	0.0024	1.5772	0.8005	0.0630	0.0630	0.0191	239.56
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897

- 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

2.2 Site Grading Phase

2.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 2
Start Quarter: 1
Start Year: 2020

- Phase Duration
Number of Month: 0
Number of Days: 25

2.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 10819283
Amount of Material to be Hauled On-Site (yd^3): 79963
Amount of Material to be Hauled Off-Site (yd^3): 79963

- Site Grading Default Settings
Default Settings Used: Yes

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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	2	8
Other Construction Equipment Composite	2	8
Rollers Composite	1	8
Rubber Tired Dozers Composite	3	8
Scrapers Composite	6	8
Tractors/Loaders/Backhoes Composite	2	8

- Vehicle Exhaust

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

2.2.3 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	0.0732	0.0013	0.4042	0.5124	0.0183	0.0183	0.0066	119.74
Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0919	0.0014	0.5823	0.5765	0.0280	0.0280	0.0082	132.95
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0562	0.0012	0.3519	0.3508	0.0138	0.0138	0.0050	122.62
Rollers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0584	0.0007	0.3793	0.3836	0.0232	0.0232	0.0052	67.171
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.2117	0.0024	1.5772	0.8005	0.0630	0.0630	0.0191	239.56
Scrapers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1913	0.0026	1.3434	0.7938	0.0540	0.0540	0.0172	262.91
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897

- 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

2.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD}$ = (20 * ACRE * WD) / 2000

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

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

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

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

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

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

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

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

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

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

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

2.3 Trenching/Excavating Phase

2.3.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 3
Start Quarter: 1
Start Year: 2020

- Phase Duration
Number of Month: 0
Number of Days: 18

2.3.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 99408
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 7364

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

- Construction Exhaust (default)

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

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

2.3.3 Trenching / Excavating Phase Emission Factor(s)

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

Excavators Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0732	0.0013	0.4042	0.5124	0.0183	0.0183	0.0066	119.74
Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0919	0.0014	0.5823	0.5765	0.0280	0.0280	0.0082	132.95
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0562	0.0012	0.3519	0.3508	0.0138	0.0138	0.0050	122.62
Rollers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0584	0.0007	0.3793	0.3836	0.0232	0.0232	0.0052	67.171
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.2117	0.0024	1.5772	0.8005	0.0630	0.0630	0.0191	239.56
Scrapers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1913	0.0026	1.3434	0.7938	0.0540	0.0540	0.0172	262.91
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897

- 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

2.3.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

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

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

- Construction Exhaust Emissions per Phase

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

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment

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

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

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

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

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

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

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

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

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

2.4 Building Construction Phase

2.4.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2020

- Phase Duration
Number of Month: 22
Number of Days: 0

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2.4.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial
Area of Building (ft^2): 994083
Height of Building (ft): 48
Number of Units: N/A

- Building Construction Default Settings

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	7
Forklifts Composite	3	8
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	3	7
Welders 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

2.4.3 Building Construction Phase Emission Factor(s)

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

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0898	0.0013	0.6610	0.3917	0.0256	0.0256	0.0081	128.83
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0320	0.0006	0.1690	0.2160	0.0070	0.0070	0.0028	54.467
Generator Sets Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0395	0.0006	0.3232	0.2731	0.0149	0.0149	0.0035	61.081

Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897
Welders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0310	0.0003	0.1734	0.1816	0.0102	0.0102	0.0027	25.672

- 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

2.4.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase

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

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

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

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

- Vender Trips Emissions per Phase
VMT_{VT} = BA * BH * (0.38 / 1000) * HT

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

2.5 Paving Phase

2.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 10
Start Quarter: 1
Start Year: 2021

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

2.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 9825200

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Pavers Composite	1	8
Paving Equipment Composite	2	8

Rollers Composite	2	6

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

2.5.3 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	0.0732	0.0013	0.4042	0.5124	0.0183	0.0183	0.0066	119.74
Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0919	0.0014	0.5823	0.5765	0.0280	0.0280	0.0082	132.95
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0562	0.0012	0.3519	0.3508	0.0138	0.0138	0.0050	122.62
Rollers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0584	0.0007	0.3793	0.3836	0.0232	0.0232	0.0052	67.171
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.2117	0.0024	1.5772	0.8005	0.0630	0.0630	0.0191	239.56
Scrapers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1913	0.0026	1.3434	0.7938	0.0540	0.0540	0.0172	262.91
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897

- 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

2.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

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

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

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

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

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

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

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

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

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

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

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

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 Instruction 32-7040, Air Quality Compliance And Resource Management; 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: EGLIN AFB
State: Florida
County(s): Okaloosa; Santa Rosa; Walton
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: Eglin AQ Analysis of potential construction Projects at Alt. 1 Duke Field.

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2020

e. Action Description:

Demolition/construction activities are possible over the next few years at five locations on EAFB. The location. Alt. 1 Duke Field is presented as part of the AQ analysis.

f. Point of Contact:

Name: Kyle Flowers
Title: Contractor
Organization: Trinity ADC
Email: kyle.m.flowers.ctr@mail.mil
Phone Number: 334 303-0119

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 combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action fully implemented) emissions.

"Air Quality Indicators" were used to provide an indication of the significance of potential impacts to air quality. These air quality indicators are EPA General Conformity Rule (GCR) thresholds (de minimis levels) that are applied out of context to their intended use. Therefore, these indicators do not trigger a regulatory requirement; however, they provide a warning that the action is potentially significant. It is important to note that these indicators only provide a clue to the potential impacts to air quality.

Given the GCR de minimis threshold values are the maximum net change an action can acceptably emit in non-attainment and maintenance areas, these threshold values would also conservatively indicate an actions emissions within an attainment would also be acceptable. An air quality indicator value of 100 tons/yr is used based on the GCR de minimis threshold for the least severe non-attainment classification for all criteria pollutants (see 40 CFR 93.153). Therefore, the worst-case year emissions were compared against the GCR Indicator and are summarized below.

Analysis Summary:

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

2020

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.464	100	No
NOx	3.150	100	No
CO	2.714	100	No
SOx	0.008	100	No
PM 10	16.336	100	No
PM 2.5	0.138	100	No
Pb	0.000	25	No
NH3	0.006	100	No
CO2e	790.0		

2021

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.520	100	No
NOx	2.478	100	No
CO	2.223	100	No
SOx	0.006	100	No
PM 10	0.124	100	No
PM 2.5	0.122	100	No
Pb	0.000	25	No
NH3	0.005	100	No
CO2e	598.4		

2022 - (Steady State)

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.000	100	No
NOx	0.000	100	No
CO	0.000	100	No
SOx	0.000	100	No
PM 10	0.000	100	No
PM 2.5	0.000	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	0.0		

None of estimated emissions associated with this action are above the GCR indicators, indicating no significant impact to air quality; therefore, no further air assessment is needed.

Kyle Flowers, Contractor

DATE

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location
Base: EGLIN AFB
State: Florida
County(s): Okaloosa; Santa Rosa; Walton
Regulatory Area(s): NOT IN A REGULATORY AREA

- Action Title: Eglin AQ Analysis of potential construction Projects at five (5) locations - Two (2) Alternatives

- Project Number/s (if applicable):

- Projected Action Start Date: 1 / 2020

- Action Purpose and Need:
To determine potential air pollution emissions from proposed demolition/construction activites

- Action Description:
Demolition/construction activites are possible over the next few years at five locations on EAFB. The locations are Eglin Main Base, Duke Field, 7SFG(A), Camp Rudder and C-6 20SPCS. Two project alternatives, noted as Alternative 1 and Alternative 2 are presented as part of the AQ analysis.

- Point of Contact
Name: Kyle Flowers
Title: Contractor
Organization: Trinity ADC
Email: kyle.m.flowers.ctr@mail.mil
Phone Number: 334 303-0119

- Activity List:

Activity Type		Activity Title
2.	Construction / Demolition	Alternative 1 Duke Field

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; Santa Rosa; Walton
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Alternative 1 Duke Field

- Activity Description:
Demolish a 24,973 square ft. building(s), construct 422,565 sq, ft. building(s), 78 acres parking, and 23 road acres with a total disturbance of 200.9 acres.

- Activity Start Date
Start Month: 1

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

Start Month: 2020

- Activity End Date
Indefinite: False
End Month: 7
End Month: 2021

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.983534
SO_x	0.013692
NO_x	5.628107
CO	4.937059
PM 10	16.459638

Pollutant	Total Emissions (TONs)
PM 2.5	0.259987
Pb	0.000000
NH_3	0.010802
CO_2e	1388.4

2.1 Demolition Phase

2.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2020

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

2.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 24937
Height of Building to be demolished (ft): 24

- 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	0.0483	0.0006	0.3409	0.3782	0.0195	0.0195	0.0043	58.572
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2117	0.0024	1.5772	0.8005	0.0630	0.0630	0.0191	239.56
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897

- 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

2.2 Site Grading Phase

2.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 2
Start Quarter: 1
Start Year: 2020

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

2.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 1535843
Amount of Material to be Hauled On-Site (yd^3): 14220
Amount of Material to be Hauled Off-Site (yd^3): 14220

- Site Grading Default Settings
Default Settings Used: Yes

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

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	3	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

2.2.3 Site Grading Phase Emission Factor(s)

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

Excavators Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0732	0.0013	0.4042	0.5124	0.0183	0.0183	0.0066	119.74
Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0919	0.0014	0.5823	0.5765	0.0280	0.0280	0.0082	132.95
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0562	0.0012	0.3519	0.3508	0.0138	0.0138	0.0050	122.62
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.2117	0.0024	1.5772	0.8005	0.0630	0.0630	0.0191	239.56
Scrapers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1913	0.0026	1.3434	0.7938	0.0540	0.0540	0.0172	262.91
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897

- 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

2.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD}$ = (20 * ACRE * WD) / 2000

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

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

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

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

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

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

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

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

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

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

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

2.3 Trenching/Excavating Phase

2.3.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 3
Start Quarter: 1
Start Year: 2020

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

2.3.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 79526
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 5890

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

- Construction Exhaust (default)

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

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

2.3.3 Trenching / Excavating Phase Emission Factor(s)

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

Excavators Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0732	0.0013	0.4042	0.5124	0.0183	0.0183	0.0066	119.74
Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0919	0.0014	0.5823	0.5765	0.0280	0.0280	0.0082	132.95
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0562	0.0012	0.3519	0.3508	0.0138	0.0138	0.0050	122.62
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.2117	0.0024	1.5772	0.8005	0.0630	0.0630	0.0191	239.56
Scrapers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1913	0.0026	1.3434	0.7938	0.0540	0.0540	0.0172	262.91
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897

- 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

2.3.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

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

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

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

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

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

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

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

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

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

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

2.4 Building Construction Phase

2.4.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2020

- Phase Duration
Number of Month: 16
Number of Days: 0

2.4.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 422565
Height of Building (ft): 28
Number of Units: N/A

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	7
Forklifts Composite	2	7
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

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

- Vendor Trips Vehicle Mixture (%)

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

2.4.3 Building Construction Phase Emission Factor(s)

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

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0898	0.0013	0.6610	0.3917	0.0256	0.0256	0.0081	128.83
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0320	0.0006	0.1690	0.2160	0.0070	0.0070	0.0028	54.467
Generator Sets Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0395	0.0006	0.3232	0.2731	0.0149	0.0149	0.0035	61.081
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897
Welders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0310	0.0003	0.1734	0.1816	0.0102	0.0102	0.0027	25.672

- 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

2.4.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase

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

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

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

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

VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
VMT_{VT} = BA * BH * (0.38 / 1000) * HT

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

2.5 Paving Phase

2.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2021

- Phase Duration
Number of Month: 4
Number of Days: 0

2.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 4888400

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Pavers Composite	1	8
Paving Equipment Composite	2	8
Rollers Composite	2	6

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

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC

POVs	0	0	0	0	0	100.00	0

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

2.5.3 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	0.0732	0.0013	0.4042	0.5124	0.0183	0.0183	0.0066	119.74
Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0919	0.0014	0.5823	0.5765	0.0280	0.0280	0.0082	132.95
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0562	0.0012	0.3519	0.3508	0.0138	0.0138	0.0050	122.62
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.2117	0.0024	1.5772	0.8005	0.0630	0.0630	0.0191	239.56
Scrapers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1913	0.0026	1.3434	0.7938	0.0540	0.0540	0.0172	262.91
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897

- 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

2.5.4 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

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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)

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

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 Instruction 32-7040, Air Quality Compliance And Resource Management; 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: EGLIN AFB
State: Florida
County(s): Okaloosa; Santa Rosa; Walton
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: Eglin AQ Analysis of potential construction Projects at Alt. 2 Duke Field.

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2020

e. Action Description:

Demolition/construction activities are possible over the next few years at five locations on EAFB. The location, Alt. 2 Duke Field is presented as part of the AQ analysis.

f. Point of Contact:

Name: Kyle Flowers
Title: Contractor
Organization: Trinity ADC
Email: kyle.m.flowers.ctr@mail.mil
Phone Number: 334 303-0119

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 combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action fully implemented) emissions.

"Air Quality Indicators" were used to provide an indication of the significance of potential impacts to air quality. These air quality indicators are EPA General Conformity Rule (GCR) thresholds (de minimis levels) that are applied out of context to their intended use. Therefore, these indicators do not trigger a regulatory requirement; however, they provide a warning that the action is potentially significant. It is important to note that these indicators only provide a clue to the potential impacts to air quality.

Given the GCR de minimis threshold values are the maximum net change an action can acceptably emit in non-attainment and maintenance areas, these threshold values would also conservatively indicate an actions emissions within an attainment would also be acceptable. An air quality indicator value of 100 tons/yr is used based on the GCR de minimis threshold for the least severe non-attainment classification for all criteria pollutants (see 40 CFR 93.153). Therefore, the worst-case year emissions were compared against the GCR Indicator and are summarized below.

Analysis Summary:

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

2020

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.729	100	No
NOx	5.233	100	No
CO	4.118	100	No
SOx	0.014	100	No
PM 10	66.974	100	No
PM 2.5	0.220	100	No
Pb	0.000	25	No
NH3	0.013	100	No
CO2e	1426.7		

2021

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.614	100	No
NOx	3.034	100	No
CO	2.619	100	No
SOx	0.008	100	No
PM 10	0.139	100	No
PM 2.5	0.135	100	No
Pb	0.000	25	No
NH3	0.008	100	No
CO2e	854.7		

2022 - (Steady State)

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.000	100	No
NOx	0.000	100	No
CO	0.000	100	No
SOx	0.000	100	No
PM 10	0.000	100	No
PM 2.5	0.000	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	0.0		

None of estimated emissions associated with this action are above the GCR indicators, indicating no significant impact to air quality; therefore, no further air assessment is needed.

Kyle Flowers, Contractor

DATE

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location
Base: EGLIN AFB
State: Florida
County(s): Okaloosa; Santa Rosa; Walton
Regulatory Area(s): NOT IN A REGULATORY AREA

- Action Title: Eglin AQ Analysis of potential construction Projects at five (5) locations - Two (2) Alternatives

- Project Number/s (if applicable):

- Projected Action Start Date: 1 / 2020

- Action Purpose and Need:
To determine potential air pollution emissions from proposed demolition/construction activites

- Action Description:
Demolition/construction activites are possible over the next few years at five locations on EAFB. The locations are Eglin Main Field, Duke Field, 7SFG(A), Camp Rudder and C-6 20SPCS. Two project alternatives, noted as Alternative 1 and Alternative 2 are presented as part of the AQ analysis.

- Point of Contact
Name: Kyle Flowers
Title: Contractor
Organization: Trinity ADC
Email: kyle.m.flowers.ctr@mail.mil
Phone Number: 334 303-0119

- Activity List:

Activity Type		Activity Title
2.	Construction / Demolition	Alternative 2 Duke Field

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; Santa Rosa; Walton
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Alternative 2 Duke Field

- Activity Description:
Demolish a 31,171 square ft. building(s), construct 528,206 sq, ft. building(s), 97.5 acres parking, and 28.8 road acres with a total disturbance of 251 acres.

- Activity Start Date
Start Month: 1

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Start Month: 2020

- Activity End Date
Indefinite: False
End Month: 8
End Month: 2021

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	1.343693
SO_x	0.022109
NO_x	8.267082
CO	6.737445
PM 10	67.112871

Pollutant	Total Emissions (TONs)
PM 2.5	0.355316
Pb	0.000000
NH_3	0.021128
CO_2e	2281.4

2.1 Demolition Phase

2.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2020

- Phase Duration
Number of Month: 0
Number of Days: 10

2.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 31171
Height of Building to be demolished (ft): 24

- 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	0.0483	0.0006	0.3409	0.3782	0.0195	0.0195	0.0043	58.572
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2117	0.0024	1.5772	0.8005	0.0630	0.0630	0.0191	239.56
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897

- 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

2.2 Site Grading Phase

2.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 2
Start Quarter: 1
Start Year: 2020

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

2.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 6641126
Amount of Material to be Hauled On-Site (yd^3): 61492
Amount of Material to be Hauled Off-Site (yd^3): 61492

- 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	2	8
Other Construction Equipment Composite	2	8
Rollers Composite	1	8
Rubber Tired Dozers Composite	3	8
Scrapers Composite	6	8
Tractors/Loaders/Backhoes Composite	2	8

- Vehicle Exhaust

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

2.2.3 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	0.0732	0.0013	0.4042	0.5124	0.0183	0.0183	0.0066	119.74
Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0919	0.0014	0.5823	0.5765	0.0280	0.0280	0.0082	132.95
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0562	0.0012	0.3519	0.3508	0.0138	0.0138	0.0050	122.62
Rollers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0584	0.0007	0.3793	0.3836	0.0232	0.0232	0.0052	67.171
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.2117	0.0024	1.5772	0.8005	0.0630	0.0630	0.0191	239.56
Scrapers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1913	0.0026	1.3434	0.7938	0.0540	0.0540	0.0172	262.91
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897

- 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

2.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD}$ = (20 * ACRE * WD) / 2000

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

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

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

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

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

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

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

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

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

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

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

2.3 Trenching/Excavating Phase

2.3.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 3
Start Quarter: 1
Start Year: 2020

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

2.3.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 52820
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 3913

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

- Construction Exhaust (default)

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

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

2.3.3 Trenching / Excavating Phase Emission Factor(s)

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

Excavators Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0732	0.0013	0.4042	0.5124	0.0183	0.0183	0.0066	119.74
Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0919	0.0014	0.5823	0.5765	0.0280	0.0280	0.0082	132.95
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0562	0.0012	0.3519	0.3508	0.0138	0.0138	0.0050	122.62
Rollers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0584	0.0007	0.3793	0.3836	0.0232	0.0232	0.0052	67.171
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.2117	0.0024	1.5772	0.8005	0.0630	0.0630	0.0191	239.56
Scrapers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1913	0.0026	1.3434	0.7938	0.0540	0.0540	0.0172	262.91
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897

- 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

2.3.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

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

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

- Construction Exhaust Emissions per Phase

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

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment

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

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

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

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

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

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

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

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

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

2.4 Building Construction Phase

2.4.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 3
Start Quarter: 1
Start Year: 2020

- Phase Duration
Number of Month: 18
Number of Days: 0

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2.4.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial
Area of Building (ft^2): 528206
Height of Building (ft): 48
Number of Units: N/A

- Building Construction Default Settings

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	7
Forklifts Composite	3	8
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	3	7
Welders 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

2.4.3 Building Construction Phase Emission Factor(s)

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

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0898	0.0013	0.6610	0.3917	0.0256	0.0256	0.0081	128.83
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0320	0.0006	0.1690	0.2160	0.0070	0.0070	0.0028	54.467
Generator Sets Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0395	0.0006	0.3232	0.2731	0.0149	0.0149	0.0035	61.081

Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897
Welders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0310	0.0003	0.1734	0.1816	0.0102	0.0102	0.0027	25.672

- 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

2.4.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase

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

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

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

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

- Vender Trips Emissions per Phase
VMT_{VT} = BA * BH * (0.38 / 1000) * HT

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

2.5 Paving Phase

2.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2021

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

2.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 6112920

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Pavers Composite	1	8
Paving Equipment Composite	2	8

Rollers Composite	2	6

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

2.5.3 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	0.0732	0.0013	0.4042	0.5124	0.0183	0.0183	0.0066	119.74
Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0919	0.0014	0.5823	0.5765	0.0280	0.0280	0.0082	132.95
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0562	0.0012	0.3519	0.3508	0.0138	0.0138	0.0050	122.62
Rollers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0584	0.0007	0.3793	0.3836	0.0232	0.0232	0.0052	67.171
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.2117	0.0024	1.5772	0.8005	0.0630	0.0630	0.0191	239.56
Scrapers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1913	0.0026	1.3434	0.7938	0.0540	0.0540	0.0172	262.91
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897

- 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

2.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

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

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

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

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

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

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

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

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

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

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

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

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 Instruction 32-7040, Air Quality Compliance And Resource Management; 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: EGLIN AFB
State: Florida
County(s): Okaloosa; Santa Rosa; Walton
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: Eglin AQ Analysis of potential construction Projects at Alt. 1 Camp Rudder.

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2020

e. Action Description:

Demolition/construction activities are possible over the next few years at five locations on EAFB. The location, Alt. 1 Camp Rudder is presented as part of the AQ analysis.

f. Point of Contact:

Name: Kyle Flowers
Title: Contractor
Organization: Trinity ADC
Email: kyle.m.flowers.ctr@mail.mil
Phone Number: 334 303-0119

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 combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action fully implemented) emissions.

"Air Quality Indicators" were used to provide an indication of the significance of potential impacts to air quality. These air quality indicators are EPA General Conformity Rule (GCR) thresholds (de minimis levels) that are applied out of context to their intended use. Therefore, these indicators do not trigger a regulatory requirement; however, they provide a warning that the action is potentially significant. It is important to note that these indicators only provide a clue to the potential impacts to air quality.

Given the GCR de minimis threshold values are the maximum net change an action can acceptably emit in non-attainment and maintenance areas, these threshold values would also conservatively indicate an actions emissions within an attainment would also be acceptable. An air quality indicator value of 100 tons/yr is used based on the GCR de minimis threshold for the least severe non-attainment classification for all criteria pollutants (see 40 CFR 93.153). Therefore, the worst-case year emissions were compared against the GCR Indicator and are summarized below.

Analysis Summary:

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

2020

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.437	100	No
NOx	2.884	100	No
CO	2.583	100	No
SOx	0.007	100	No
PM 10	18.387	100	No
PM 2.5	0.129	100	No
Pb	0.000	25	No
NH3	0.004	100	No
CO2e	670.3		

2021

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.202	100	No
NOx	0.962	100	No
CO	0.930	100	No
SOx	0.002	100	No
PM 10	0.050	100	No
PM 2.5	0.049	100	No
Pb	0.000	25	No
NH3	0.001	100	No
CO2e	214.0		

2022 - (Steady State)

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.000	100	No
NOx	0.000	100	No
CO	0.000	100	No
SOx	0.000	100	No
PM 10	0.000	100	No
PM 2.5	0.000	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	0.0		

None of estimated emissions associated with this action are above the GCR indicators, indicating no significant impact to air quality; therefore, no further air assessment is needed.

Kyle Flowers, Contractor

DATE

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location
Base: EGLIN AFB
State: Florida
County(s): Okaloosa; Santa Rosa; Walton
Regulatory Area(s): NOT IN A REGULATORY AREA

- Action Title: Eglin AQ Analysis of potential construction Projects at five (5) locations - Two (2) Alternatives

- Project Number/s (if applicable):

- Projected Action Start Date: 1 / 2020

- Action Purpose and Need:
To determine potential air pollution emissions from proposed demolition/construction activites

- Action Description:
Demolition/construction activites are possible over the next few years at five locations on EAFB. The locations are Eglin Main Base, Duke Field, 7SFG(A), Camp Rudder and C-6 20 SPCS. Two project alternatives, noted as Alternative 1 and Alternative 2 are presented as part of the AQ analysis.

- Point of Contact
Name: Kyle Flowers
Title: Contractor
Organization: Trinity ADC
Email: kyle.m.flowers.ctr@mail.mil
Phone Number: 334 303-0119

- Activity List:

Activity Type		Activity Title
2.	Construction / Demolition	Alternative 1 Camp Rudder

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; Santa Rosa; Walton
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Alternative 1 Camp Rudder

- Activity Description:
Demolish a 6534 square ft. building(s), construct 126,948 sq, ft. building(s), 17 acres parking, and 18 road acres with a total disturbance of 61 acres.

- Activity Start Date
Start Month: 1

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Start Month: 2020

- Activity End Date
Indefinite: False
End Month: 3
End Month: 2021

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.639003
SO_x	0.008860
NO_x	3.846603
CO	3.513134
PM 10	18.437172

Pollutant	Total Emissions (TONs)
PM 2.5	0.177950
Pb	0.000000
NH_3	0.005086
CO_2e	884.3

2.1 Demolition Phase

2.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2020

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

2.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 6534
Height of Building to be demolished (ft): 12

- 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	0.0483	0.0006	0.3409	0.3782	0.0195	0.0195	0.0043	58.572
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2117	0.0024	1.5772	0.8005	0.0630	0.0630	0.0191	239.56
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897

- 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

2.2 Site Grading Phase

2.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 2
Start Quarter: 1
Start Year: 2020

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

2.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 1820948
Amount of Material to be Hauled On-Site (yd^3): 16860
Amount of Material to be Hauled Off-Site (yd^3): 16860

- 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
Rollers Composite	1	8
Rubber Tired Dozers Composite	2	8
Scrapers Composite	3	8
Tractors/Loaders/Backhoes Composite	2	8

- Vehicle Exhaust

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

2.2.3 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	0.0732	0.0013	0.4042	0.5124	0.0183	0.0183	0.0066	119.74
Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0919	0.0014	0.5823	0.5765	0.0280	0.0280	0.0082	132.95
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0562	0.0012	0.3519	0.3508	0.0138	0.0138	0.0050	122.62
Rollers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0584	0.0007	0.3793	0.3836	0.0232	0.0232	0.0052	67.171
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.2117	0.0024	1.5772	0.8005	0.0630	0.0630	0.0191	239.56
Scrapers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1913	0.0026	1.3434	0.7938	0.0540	0.0540	0.0172	262.91
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897

- 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

2.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD}$ = (20 * ACRE * WD) / 2000

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

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

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

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

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

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

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

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

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

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

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

2.3 Trenching/Excavating Phase

2.3.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 3
Start Quarter: 1
Start Year: 2020

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

2.3.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 12695
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 941

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

- Construction Exhaust (default)

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

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

2.3.3 Trenching / Excavating Phase Emission Factor(s)

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

Excavators Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0732	0.0013	0.4042	0.5124	0.0183	0.0183	0.0066	119.74
Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0919	0.0014	0.5823	0.5765	0.0280	0.0280	0.0082	132.95
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0562	0.0012	0.3519	0.3508	0.0138	0.0138	0.0050	122.62
Rollers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0584	0.0007	0.3793	0.3836	0.0232	0.0232	0.0052	67.171
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.2117	0.0024	1.5772	0.8005	0.0630	0.0630	0.0191	239.56
Scrapers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1913	0.0026	1.3434	0.7938	0.0540	0.0540	0.0172	262.91
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897

- 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

2.3.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

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

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

- Construction Exhaust Emissions per Phase

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

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment

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

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

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

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

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

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

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

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

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

2.4 Building Construction Phase

2.4.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2020

- Phase Duration
Number of Month: 12
Number of Days: 0

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2.4.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial
Area of Building (ft^2): 126948
Height of Building (ft): 28
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	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

- Vendor Trips

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

- Vendor Trips Vehicle Mixture (%)

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

2.4.3 Building Construction Phase Emission Factor(s)

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

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0898	0.0013	0.6610	0.3917	0.0256	0.0256	0.0081	128.83
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0320	0.0006	0.1690	0.2160	0.0070	0.0070	0.0028	54.467
Generator Sets Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0395	0.0006	0.3232	0.2731	0.0149	0.0149	0.0035	61.081

Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897
Welders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0310	0.0003	0.1734	0.1816	0.0102	0.0102	0.0027	25.672

- 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

2.4.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase

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

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

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

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

- Vender Trips Emissions per Phase
VMT_{VT} = BA * BH * (0.38 / 1000) * HT

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

2.5 Paving Phase

2.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 2
Start Quarter: 1
Start Year: 2021

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

2.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 1694000

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Pavers Composite	1	8
Paving Equipment Composite	2	8

Rollers Composite	2	6

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

2.5.3 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	0.0732	0.0013	0.4042	0.5124	0.0183	0.0183	0.0066	119.74
Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0919	0.0014	0.5823	0.5765	0.0280	0.0280	0.0082	132.95
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0562	0.0012	0.3519	0.3508	0.0138	0.0138	0.0050	122.62
Rollers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0584	0.0007	0.3793	0.3836	0.0232	0.0232	0.0052	67.171
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.2117	0.0024	1.5772	0.8005	0.0630	0.0630	0.0191	239.56
Scrapers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1913	0.0026	1.3434	0.7938	0.0540	0.0540	0.0172	262.91
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897

- 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

2.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

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

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

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

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

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

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

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

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

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

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

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

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 Instruction 32-7040, Air Quality Compliance And Resource Management; 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: EGLIN AFB
State: Florida
County(s): Okaloosa; Santa Rosa; Walton
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: Eglin AQ Analysis of potential construction Projects at Alt. 2 Camp Rudder.

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2020

e. Action Description:

Demolition/construction activities are possible over the next few years at five locations on EAFB. The location, Alt. 2 Camp Rudder is presented as part of the AQ analysis.

f. Point of Contact:
Name: Kyle Flowers
Title: Contractor
Organization: Trinity ADC
Email: kyle.m.flowers.ctr@mail.mil
Phone Number: 334 303-0119

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 combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action fully implemented) emissions.

"Air Quality Indicators" were used to provide an indication of the significance of potential impacts to air quality. These air quality indicators are EPA General Conformity Rule (GCR) thresholds (de minimis levels) that are applied out of context to their intended use. Therefore, these indicators do not trigger a regulatory requirement; however, they provide a warning that the action is potentially significant. It is important to note that these indicators only provide a clue to the potential impacts to air quality.

Given the GCR de minimis threshold values are the maximum net change an action can acceptably emit in non-attainment and maintenance areas, these threshold values would also conservatively indicate an actions emissions within an attainment would also be acceptable. An air quality indicator value of 100 tons/yr is used based on the GCR de minimis threshold for the least severe non-attainment classification for all criteria pollutants (see 40 CFR 93.153). Therefore, the worst-case year emissions were compared against the GCR Indicator and are summarized below.

Analysis Summary:

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

2020

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.482	100	No
NOx	3.225	100	No
CO	2.790	100	No
SOx	0.008	100	No
PM 10	19.224	100	No
PM 2.5	0.143	100	No
Pb	0.000	25	No
NH3	0.005	100	No
CO2e	763.3		

2021

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.220	100	No
NOx	1.012	100	No
CO	0.950	100	No
SOx	0.002	100	No
PM 10	0.052	100	No
PM 2.5	0.051	100	No
Pb	0.000	25	No
NH3	0.002	100	No
CO2e	232.6		

2022 - (Steady State)

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.000	100	No
NOx	0.000	100	No
CO	0.000	100	No
SOx	0.000	100	No
PM 10	0.000	100	No
PM 2.5	0.000	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	0.0		

None of estimated emissions associated with this action are above the GCR indicators, indicating no significant impact to air quality; therefore, no further air assessment is needed.

Kyle Flowers, Contractor

DATE

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location
Base: EGLIN AFB
State: Florida
County(s): Okaloosa; Santa Rosa; Walton
Regulatory Area(s): NOT IN A REGULATORY AREA

- Action Title: Eglin AQ Analysis of potential construction Projects at five (5) locations - Two (2) Alternatives

- Project Number/s (if applicable):

- Projected Action Start Date: 1 / 2020

- Action Purpose and Need:
To determine potential air pollution emissions from proposed demolition/construction activites

- Action Description:
Demolition/construction activites are possible over the next few years at five locations on EAFB. The locations are Eglin Main Base, Duke Field, 7SFG(A), Camp Rudder and C-6 20 SPCS. Two project alternatives, noted as Alternative 1 and Alternative 2 are presented as part of the AQ analysis.

- Point of Contact
Name: Kyle Flowers
Title: Contractor
Organization: Trinity ADC
Email: kyle.m.flowers.ctr@mail.mil
Phone Number: 334 303-0119

- Activity List:

Activity Type		Activity Title
2.	Construction / Demolition	Alternative 2 Camp Rudder

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; Santa Rosa; Walton
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Alternative 2 Camp Rudder

- Activity Description:
Demolish a 8,168 square ft. building(s), construct 158,685 sq, ft. building(s), 21.3 acres parking, and 22.5 road acres with a total disturbance of 76 acres.

- Activity Start Date
Start Month: 1

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

Start Month: 2020

- Activity End Date
Indefinite: False
End Month: 12
End Month: 2021

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.701620
SO_x	0.009900
NO_x	4.236678
CO	3.739824
PM 10	19.276431

Pollutant	Total Emissions (TONs)
PM 2.5	0.194008
Pb	0.000000
NH_3	0.006417
CO_2e	995.9

2.1 Demolition Phase

2.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2020

- Phase Duration
Number of Month: 0
Number of Days: 10

2.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 8168
Height of Building to be demolished (ft): 12

- 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	0.0483	0.0006	0.3409	0.3782	0.0195	0.0195	0.0043	58.572
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2117	0.0024	1.5772	0.8005	0.0630	0.0630	0.0191	239.56
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897

- 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

2.2 Site Grading Phase

2.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2020

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

2.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 1910685
Amount of Material to be Hauled On-Site (yd^3): 17692
Amount of Material to be Hauled Off-Site (yd^3): 17692

- 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	2	8
Other Construction Equipment Composite	2	8
Rollers Composite	1	8
Rubber Tired Dozers Composite	2	8
Scrapers Composite	4	8
Tractors/Loaders/Backhoes Composite	2	8

- Vehicle Exhaust

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

2.2.3 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	0.0732	0.0013	0.4042	0.5124	0.0183	0.0183	0.0066	119.74
Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0919	0.0014	0.5823	0.5765	0.0280	0.0280	0.0082	132.95
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0562	0.0012	0.3519	0.3508	0.0138	0.0138	0.0050	122.62
Rollers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0584	0.0007	0.3793	0.3836	0.0232	0.0232	0.0052	67.171
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.2117	0.0024	1.5772	0.8005	0.0630	0.0630	0.0191	239.56
Scrapers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1913	0.0026	1.3434	0.7938	0.0540	0.0540	0.0172	262.91
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897

- 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

2.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD}$ = (20 * ACRE * WD) / 2000

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

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

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

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

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

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

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

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

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

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

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

2.3 Trenching/Excavating Phase

2.3.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 3
Start Quarter: 1
Start Year: 2020

- Phase Duration
Number of Month: 0
Number of Days: 10

2.3.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 15869
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 1175

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

- Construction Exhaust (default)

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

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

2.3.3 Trenching / Excavating Phase Emission Factor(s)

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

Excavators Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0732	0.0013	0.4042	0.5124	0.0183	0.0183	0.0066	119.74
Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0919	0.0014	0.5823	0.5765	0.0280	0.0280	0.0082	132.95
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0562	0.0012	0.3519	0.3508	0.0138	0.0138	0.0050	122.62
Rollers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0584	0.0007	0.3793	0.3836	0.0232	0.0232	0.0052	67.171
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.2117	0.0024	1.5772	0.8005	0.0630	0.0630	0.0191	239.56
Scrapers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1913	0.0026	1.3434	0.7938	0.0540	0.0540	0.0172	262.91
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897

- 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

2.3.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

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

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

- Construction Exhaust Emissions per Phase

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

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment

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

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

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

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

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

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

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

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

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

2.4 Building Construction Phase

2.4.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 3
Start Quarter: 1
Start Year: 2020

- Phase Duration
Number of Month: 13
Number of Days: 0

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2.4.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial
Area of Building (ft^2): 158685
Height of Building (ft): 36
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	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

- Vendor Trips

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

- Vendor Trips Vehicle Mixture (%)

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

2.4.3 Building Construction Phase Emission Factor(s)

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

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0898	0.0013	0.6610	0.3917	0.0256	0.0256	0.0081	128.83
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0320	0.0006	0.1690	0.2160	0.0070	0.0070	0.0028	54.467
Generator Sets Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0395	0.0006	0.3232	0.2731	0.0149	0.0149	0.0035	61.081

Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897
Welders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0310	0.0003	0.1734	0.1816	0.0102	0.0102	0.0027	25.672

- 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

2.4.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase

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

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

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

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

- Vender Trips Emissions per Phase
VMT_{VT} = BA * BH * (0.38 / 1000) * HT

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

2.5 Paving Phase

2.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 11
Start Quarter: 1
Start Year: 2021

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

2.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 2119920

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Pavers Composite	1	8
Paving Equipment Composite	2	8

Rollers Composite	2	6

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

2.5.3 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	0.0732	0.0013	0.4042	0.5124	0.0183	0.0183	0.0066	119.74
Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0919	0.0014	0.5823	0.5765	0.0280	0.0280	0.0082	132.95
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0562	0.0012	0.3519	0.3508	0.0138	0.0138	0.0050	122.62
Rollers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0584	0.0007	0.3793	0.3836	0.0232	0.0232	0.0052	67.171
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.2117	0.0024	1.5772	0.8005	0.0630	0.0630	0.0191	239.56
Scrapers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1913	0.0026	1.3434	0.7938	0.0540	0.0540	0.0172	262.91
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897

- 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

2.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

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

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

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

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

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

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

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

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

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

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

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

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 Instruction 32-7040, Air Quality Compliance And Resource Management; 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: EGLIN AFB
State: Florida
County(s): Okaloosa; Santa Rosa; Walton
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: Eglin AQ Analysis of potential construction Project Alternative 1 at 7SFG (A)

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2020

e. Action Description:

Demolition/construction activities are possible over the next few years at five locations on EAFB. The location Alternative 1 at 7SFG (A) is presented as part of the AQ analysis.

f. Point of Contact:
Name: Kyle Flowers
Title: Contractor
Organization: Trinity ADC
Email: kyle.m.flowers.ctr@mail.mil
Phone Number: 334 303-0119

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 combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action fully implemented) emissions.

"Air Quality Indicators" were used to provide an indication of the significance of potential impacts to air quality. These air quality indicators are EPA General Conformity Rule (GCR) thresholds (de minimis levels) that are applied out of context to their intended use. Therefore, these indicators do not trigger a regulatory requirement; however, they provide a warning that the action is potentially significant. It is important to note that these indicators only provide a clue to the potential impacts to air quality.

Given the GCR de minimis threshold values are the maximum net change an action can acceptably emit in non-attainment and maintenance areas, these threshold values would also conservatively indicate an actions emissions within an attainment would also be acceptable. An air quality indicator value of 100 tons/yr is used based on the GCR de minimis threshold for the least severe non-attainment classification for all criteria pollutants (see 40 CFR 93.153). Therefore, the worst-case year emissions were compared against the GCR Indicator and are summarized below.

Analysis Summary:

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

2020

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.395	100	No
NOx	2.557	100	No
CO	2.417	100	No
SOx	0.006	100	No
PM 10	4.874	100	No
PM 2.5	0.115	100	No
Pb	0.000	25	No
NH3	0.003	100	No
CO2e	594.0		

2021

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.039	100	No
NOx	0.165	100	No
CO	0.164	100	No
SOx	0.000	100	No
PM 10	0.010	100	No
PM 2.5	0.010	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	31.8		

2022 - (Steady State)

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.000	100	No
NOx	0.000	100	No
CO	0.000	100	No
SOx	0.000	100	No
PM 10	0.000	100	No
PM 2.5	0.000	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	0.0		

None of estimated emissions associated with this action are above the GCR indicators, indicating no significant impact to air quality; therefore, no further air assessment is needed.

Kyle Flowers, Contractor

DATE

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location
Base: EGLIN AFB
State: Florida
County(s): Okaloosa; Santa Rosa; Walton
Regulatory Area(s): NOT IN A REGULATORY AREA

- Action Title: Eglin AQ Analysis of potential construction Projects at five (5) locations - Two (2) Alternatives

- Project Number/s (if applicable):

- Projected Action Start Date: 1 / 2020

- Action Purpose and Need:
To determine potential air pollution emissions from proposed demolition/construction activites

- Action Description:
Demolition/construction activites are possible over the next few years at five lcoations on EAFB. The locations are Eglin Main Base, Duke Field, 7SFG(A), Camp Rudder and C-6 20SPCS. Two project alternatives, noted as Alternative 1 and Alternative 2 are presented as part of the AQ analysis.

- Point of Contact
Name: Kyle Flowers
Title: Contractor
Organization: Trinity ADC
Email: kyle.m.flowers.ctr@mail.mil
Phone Number: 334 303-0119

- Activity List:

Activity Type		Activity Title
2.	Construction / Demolition	Alternative 1 7SFG (A)

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; Santa Rosa; Walton
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Alternative 1 7SFG (A)

- Activity Description:
Demolish a 11,183 square ft. building(s), construct 85,383 sq, ft. building(s), 4 acres parking, and 4 road acres with a total disturbance of 37.7 acres.

- Activity Start Date
Start Month: 1

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

Start Month: 2020

- Activity End Date
Indefinite: False
End Month: 11
End Month: 2021

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.433447
SO_x	0.006309
NO_x	2.721658
CO	2.580443
PM 10	4.883814

Pollutant	Total Emissions (TONs)
PM 2.5	0.125356
Pb	0.000000
NH_3	0.003322
CO_2e	625.8

2.1 Demolition Phase

2.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2020

- Phase Duration
Number of Month: 0
Number of Days: 15

2.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 11183
Height of Building to be demolished (ft): 12

- 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	0.0483	0.0006	0.3409	0.3782	0.0195	0.0195	0.0043	58.572
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2117	0.0024	1.5772	0.8005	0.0630	0.0630	0.0191	239.56
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897

- 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

2.2 Site Grading Phase

2.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 2
Start Quarter: 1
Start Year: 2020

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

2.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 472583
Amount of Material to be Hauled On-Site (yd^3): 4375
Amount of Material to be Hauled Off-Site (yd^3): 4375

- Site Grading Default Settings
Default Settings Used: Yes

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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

2.2.3 Site Grading Phase Emission Factor(s)

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

Excavators Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0732	0.0013	0.4042	0.5124	0.0183	0.0183	0.0066	119.74
Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0919	0.0014	0.5823	0.5765	0.0280	0.0280	0.0082	132.95
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0562	0.0012	0.3519	0.3508	0.0138	0.0138	0.0050	122.62
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.2117	0.0024	1.5772	0.8005	0.0630	0.0630	0.0191	239.56
Scrapers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1913	0.0026	1.3434	0.7938	0.0540	0.0540	0.0172	262.91
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897

- 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

2.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD}$ = (20 * ACRE * WD) / 2000

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

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

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

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

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

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

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

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

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

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

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

2.3 Trenching/Excavating Phase

2.3.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 2
Start Quarter: 1
Start Year: 2020

- Phase Duration
Number of Month: 0
Number of Days: 10

2.3.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 8538
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 632

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

- Construction Exhaust (default)

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

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

2.3.3 Trenching / Excavating Phase Emission Factor(s)

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

Excavators Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0732	0.0013	0.4042	0.5124	0.0183	0.0183	0.0066	119.74
Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0919	0.0014	0.5823	0.5765	0.0280	0.0280	0.0082	132.95
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0562	0.0012	0.3519	0.3508	0.0138	0.0138	0.0050	122.62
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.2117	0.0024	1.5772	0.8005	0.0630	0.0630	0.0191	239.56
Scrapers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1913	0.0026	1.3434	0.7938	0.0540	0.0540	0.0172	262.91
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897

- 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

2.3.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

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

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

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

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

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

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

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

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

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

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

2.4 Building Construction Phase

2.4.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 3
Start Quarter: 1
Start Year: 2020

- Phase Duration
Number of Month: 10
Number of Days: 0

2.4.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 85382
Height of Building (ft): 36
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	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

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

- Vendor Trips Vehicle Mixture (%)

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

2.4.3 Building Construction Phase Emission Factor(s)

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

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0898	0.0013	0.6610	0.3917	0.0256	0.0256	0.0081	128.83
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0320	0.0006	0.1690	0.2160	0.0070	0.0070	0.0028	54.467
Generator Sets Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0395	0.0006	0.3232	0.2731	0.0149	0.0149	0.0035	61.081
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897
Welders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0310	0.0003	0.1734	0.1816	0.0102	0.0102	0.0027	25.672

- 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

2.4.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase

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

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

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

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

VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
VMT_{VT} = BA * BH * (0.38 / 1000) * HT

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

2.5 Paving Phase

2.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 10
Start Quarter: 1
Start Year: 2021

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

2.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 387200

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Pavers Composite	1	8
Paving Equipment Composite	2	6
Rollers Composite	2	6

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

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC

POVs	0	0	0	0	0	100.00	0

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

2.5.3 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	0.0732	0.0013	0.4042	0.5124	0.0183	0.0183	0.0066	119.74
Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0919	0.0014	0.5823	0.5765	0.0280	0.0280	0.0082	132.95
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0562	0.0012	0.3519	0.3508	0.0138	0.0138	0.0050	122.62
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.2117	0.0024	1.5772	0.8005	0.0630	0.0630	0.0191	239.56
Scrapers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1913	0.0026	1.3434	0.7938	0.0540	0.0540	0.0172	262.91
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897

- 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

2.5.4 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

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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)

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

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 Instruction 32-7040, Air Quality Compliance And Resource Management; 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: EGLIN AFB
State: Florida
County(s): Okaloosa; Santa Rosa; Walton
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: Eglin AQ Analysis of potential construction Projects at Alt. 2 7SFG (A).

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2020

e. Action Description:

Demolition/construction activities are possible over the next few years at five locations on EAFB. The location, Alt. 2 7SFG (A) is presented as part of the AQ analysis.

f. Point of Contact:

Name: Kyle Flowers
Title: Contractor
Organization: Trinity ADC
Email: kyle.m.flowers.ctr@mail.mil
Phone Number: 334 303-0119

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 combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action fully implemented) emissions.

"Air Quality Indicators" were used to provide an indication of the significance of potential impacts to air quality. These air quality indicators are EPA General Conformity Rule (GCR) thresholds (de minimis levels) that are applied out of context to their intended use. Therefore, these indicators do not trigger a regulatory requirement; however, they provide a warning that the action is potentially significant. It is important to note that these indicators only provide a clue to the potential impacts to air quality.

Given the GCR de minimis threshold values are the maximum net change an action can acceptably emit in non-attainment and maintenance areas, these threshold values would also conservatively indicate an actions emissions within an attainment would also be acceptable. An air quality indicator value of 100 tons/yr is used based on the GCR de minimis threshold for the least severe non-attainment classification for all criteria pollutants (see 40 CFR 93.153). Therefore, the worst-case year emissions were compared against the GCR Indicator and are summarized below.

Analysis Summary:

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

2020

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.466	100	No
NOx	2.933	100	No
CO	2.743	100	No
SOx	0.007	100	No
PM 10	6.137	100	No
PM 2.5	0.136	100	No
Pb	0.000	25	No
NH3	0.004	100	No
CO2e	679.7		

2021 - (Steady State)

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.000	100	No
NOx	0.000	100	No
CO	0.000	100	No
SOx	0.000	100	No
PM 10	0.000	100	No
PM 2.5	0.000	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	0.0		

None of estimated emissions associated with this action are above the GCR indicators, indicating no significant impact to air quality; therefore, no further air assessment is needed.

Kyle Flowers, Contractor

DATE

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location
Base: EGLIN AFB
State: Florida
County(s): Okaloosa; Santa Rosa; Walton
Regulatory Area(s): NOT IN A REGULATORY AREA

- Action Title: Eglin AQ Analysis of potential construction Projects at five (5) locations - Two (2) Alternatives

- Project Number/s (if applicable):

- Projected Action Start Date: 1 / 2020

- Action Purpose and Need:
To determine potential air pollution emissions from proposed demolition/construction activites

- Action Description:
Demolition/construction activites are possible over the next few years at five lcoations on EAFB. The locations are Eglin Main Base, Duke Field, 7SFG(A), Camp Rudder and C-6 20SPCS.Two project alternatives, noted as Alternative 1 and Alternative 2 are presented as part of the AQ analysis.

- Point of Contact
Name: Kyle Flowers
Title: Contractor
Organization: Trinity ADC
Email: kyle.m.flowers.ctr@mail.mil
Phone Number: 334 303-0119

- Activity List:

Activity Type		Activity Title
2.	Construction / Demolition	Alternative 2 7SFG (A)

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; Santa Rosa; Walton
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Alternative 2 7SFG (A)

- Activity Description:
Demolish a 13,979 square ft. building(s), construct 106,729 sq, ft. building(s), 5.0 acres parking, and 5.0 road acres with a total disturbance of 47 acres.

- Activity Start Date
Start Month: 1

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Start Month: 2020

- Activity End Date
Indefinite: False
End Month: 12
End Month: 2020

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.465878
SO_x	0.006822
NO_x	2.933174
CO	2.742749
PM 10	6.136795

Pollutant	Total Emissions (TONs)
PM 2.5	0.135978
Pb	0.000000
NH_3	0.003920
CO_2e	679.7

2.1 Demolition Phase

2.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2020

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

2.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 13979
Height of Building to be demolished (ft): 24

- 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	0.0483	0.0006	0.3409	0.3782	0.0195	0.0195	0.0043	58.572
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2117	0.0024	1.5772	0.8005	0.0630	0.0630	0.0191	239.56
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897

- 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

2.2 Site Grading Phase

2.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 2
Start Quarter: 1
Start Year: 2020

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

2.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 590729
Amount of Material to be Hauled On-Site (yd^3): 5470
Amount of Material to be Hauled Off-Site (yd^3): 5470

- Site Grading Default Settings
Default Settings Used: Yes

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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

2.2.3 Site Grading Phase Emission Factor(s)

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

Excavators Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0732	0.0013	0.4042	0.5124	0.0183	0.0183	0.0066	119.74
Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0919	0.0014	0.5823	0.5765	0.0280	0.0280	0.0082	132.95
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0562	0.0012	0.3519	0.3508	0.0138	0.0138	0.0050	122.62
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.2117	0.0024	1.5772	0.8005	0.0630	0.0630	0.0191	239.56
Scrapers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1913	0.0026	1.3434	0.7938	0.0540	0.0540	0.0172	262.91
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897

- 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

2.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD}$ = (20 * ACRE * WD) / 2000

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

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

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

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

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

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

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

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

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

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

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

2.3 Trenching/Excavating Phase

2.3.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 2
Start Quarter: 1
Start Year: 2020

- Phase Duration
Number of Month: 0
Number of Days: 15

2.3.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 10673
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 791

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

- Construction Exhaust (default)

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

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

2.3.3 Trenching / Excavating Phase Emission Factor(s)

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

Excavators Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0732	0.0013	0.4042	0.5124	0.0183	0.0183	0.0066	119.74
Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0919	0.0014	0.5823	0.5765	0.0280	0.0280	0.0082	132.95
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0562	0.0012	0.3519	0.3508	0.0138	0.0138	0.0050	122.62
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.2117	0.0024	1.5772	0.8005	0.0630	0.0630	0.0191	239.56
Scrapers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1913	0.0026	1.3434	0.7938	0.0540	0.0540	0.0172	262.91
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897

- 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

2.3.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

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

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

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

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

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

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

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

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

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

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

2.4 Building Construction Phase

2.4.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 3
Start Quarter: 1
Start Year: 2020

- Phase Duration
Number of Month: 10
Number of Days: 0

2.4.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 106729
Height of Building (ft): 36
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	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

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

- Vendor Trips Vehicle Mixture (%)

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

2.4.3 Building Construction Phase Emission Factor(s)

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

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0898	0.0013	0.6610	0.3917	0.0256	0.0256	0.0081	128.83
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0320	0.0006	0.1690	0.2160	0.0070	0.0070	0.0028	54.467
Generator Sets Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0395	0.0006	0.3232	0.2731	0.0149	0.0149	0.0035	61.081
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897
Welders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0310	0.0003	0.1734	0.1816	0.0102	0.0102	0.0027	25.672

- 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

2.4.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase

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

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

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

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

VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
VMT_{VT} = BA * BH * (0.38 / 1000) * HT

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

2.5 Paving Phase

2.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 10
Start Quarter: 1
Start Year: 2020

- Phase Duration
Number of Month: 1
Number of Days: 10

2.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 484000

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Pavers Composite	1	8
Paving Equipment Composite	2	6
Rollers Composite	2	6

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

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC

POVs	0	0	0	0	0	100.00	0

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

2.5.3 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	0.0732	0.0013	0.4042	0.5124	0.0183	0.0183	0.0066	119.74
Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0919	0.0014	0.5823	0.5765	0.0280	0.0280	0.0082	132.95
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0562	0.0012	0.3519	0.3508	0.0138	0.0138	0.0050	122.62
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.2117	0.0024	1.5772	0.8005	0.0630	0.0630	0.0191	239.56
Scrapers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1913	0.0026	1.3434	0.7938	0.0540	0.0540	0.0172	262.91
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897

- 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

2.5.4 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

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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)

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

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 Instruction 32-7040, Air Quality Compliance And Resource Management; 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: EGLIN AFB
State: Florida
County(s): Okaloosa; Santa Rosa; Walton
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: Eglin AQ Analysis of potential construction Projects at Alt. 1 C-6 SPCS.

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2020

e. Action Description:

Demolition/construction activities are possible over the next few years at five locations on EAFB. The location, Alt. 1 at C-6 SPCS is presented as part of the QA analysis.

f. Point of Contact:

Name: Kyle Flowers
Title: Contractor
Organization: Trinity ADC
Email: kyle.m.flowers.ctr@mail.mil
Phone Number: 334 303-0119

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 combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action fully implemented) emissions.

"Air Quality Indicators" were used to provide an indication of the significance of potential impacts to air quality. These air quality indicators are EPA General Conformity Rule (GCR) thresholds (de minimis levels) that are applied out of context to their intended use. Therefore, these indicators do not trigger a regulatory requirement; however, they provide a warning that the action is potentially significant. It is important to note that these indicators only provide a clue to the potential impacts to air quality.

Given the GCR de minimis threshold values are the maximum net change an action can acceptably emit in non-attainment and maintenance areas, these threshold values would also conservatively indicate an actions emissions within an attainment would also be acceptable. An air quality indicator value of 100 tons/yr is used based on the GCR de minimis threshold for the least severe non-attainment classification for all criteria pollutants (see 40 CFR 93.153). Therefore, the worst-case year emissions were compared against the GCR Indicator and are summarized below.

Analysis Summary:

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

2020

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.234	100	No
NOx	1.430	100	No
CO	1.473	100	No
SOx	0.003	100	No
PM 10	0.207	100	No
PM 2.5	0.070	100	No
Pb	0.000	25	No
NH3	0.001	100	No
CO2e	305.3		

2021 - (Steady State)

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.000	100	No
NOx	0.000	100	No
CO	0.000	100	No
SOx	0.000	100	No
PM 10	0.000	100	No
PM 2.5	0.000	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	0.0		

None of estimated emissions associated with this action are above the GCR indicators, indicating no significant impact to air quality; therefore, no further air assessment is needed.

Kyle Flowers, Contractor

DATE

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location
Base: EGLIN AFB
State: Florida
County(s): Okaloosa; Santa Rosa; Walton
Regulatory Area(s): NOT IN A REGULATORY AREA

- Action Title: Eglin AQ Analysis of potential construction Projects at five (5) locations - Two (2) Alternatives

- Project Number/s (if applicable):

- Projected Action Start Date: 1 / 2020

- Action Purpose and Need:
To determine potential air pollution emissions from proposed demolition/construction activites

- Action Description:
Demolition/construction activites are possible over the next few years at five locations on EAFB. The locations are Eglin Main Base, Duke Field, 7SFG(A), Camp Rudder and C-6 20 SPCS. Two project alternatives, noted as Alternative 1 and Alternative 2 presented as part of the QA analysis.

- Point of Contact
Name: Kyle Flowers
Title: Contractor
Organization: Trinity ADC
Email: kyle.m.flowers.ctr@mail.mil
Phone Number: 334 303-0119

- Activity List:

Activity Type		Activity Title
2.	Construction / Demolition	Alternative 1 C-6 20 SPCS

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; Santa Rosa; Walton
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Aalternative 1 C-6 20 SPCS

- Activity Description:
Demolish a 504 square ft. building(s), construct 10,084 sq, ft. building(s), 1 acres parking, and 0 road acres with a total disturbance of 4.0 acres.

- Activity Start Date
Start Month: 1

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Start Month: 2020

- Activity End Date
Indefinite: False
End Month: 6
End Month: 2020

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.233856
SO_x	0.003126
NO_x	1.429609
CO	1.472932
PM 10	0.206594

Pollutant	Total Emissions (TONs)
PM 2.5	0.070131
Pb	0.000000
NH_3	0.000961
CO_2e	305.3

2.1 Demolition Phase

2.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2020

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

2.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 504
Height of Building to be demolished (ft): 12

- 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	0.0483	0.0006	0.3409	0.3782	0.0195	0.0195	0.0043	58.572
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2117	0.0024	1.5772	0.8005	0.0630	0.0630	0.0191	239.56
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897

- 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

2.2 Site Grading Phase

2.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 2
Start Quarter: 1
Start Year: 2020

- Phase Duration
Number of Month: 0
Number of Days: 5

2.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 54084
Amount of Material to be Hauled On-Site (yd^3): 501
Amount of Material to be Hauled Off-Site (yd^3): 501

- Site Grading Default Settings
Default Settings Used: Yes

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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	6
Other Construction Equipment Composite	1	8
Rollers Composite	1	8
Rubber Tired Dozers Composite	1	6
Scrapers Composite	6	8
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

2.2.3 Site Grading Phase Emission Factor(s)

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

Excavators Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0732	0.0013	0.4042	0.5124	0.0183	0.0183	0.0066	119.74
Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0919	0.0014	0.5823	0.5765	0.0280	0.0280	0.0082	132.95
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0562	0.0012	0.3519	0.3508	0.0138	0.0138	0.0050	122.62
Rollers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0584	0.0007	0.3793	0.3836	0.0232	0.0232	0.0052	67.171
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.2117	0.0024	1.5772	0.8005	0.0630	0.0630	0.0191	239.56
Scrapers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1913	0.0026	1.3434	0.7938	0.0540	0.0540	0.0172	262.91
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897

- 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

2.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD}$ = (20 * ACRE * WD) / 2000

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

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

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

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

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

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

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

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

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

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

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

2.3 Trenching/Excavating Phase

2.3.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 3
Start Quarter: 1
Start Year: 2020

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

2.3.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 1100
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 81.5

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

- Construction Exhaust (default)

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

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

2.3.3 Trenching / Excavating Phase Emission Factor(s)

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

Excavators Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0732	0.0013	0.4042	0.5124	0.0183	0.0183	0.0066	119.74
Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0919	0.0014	0.5823	0.5765	0.0280	0.0280	0.0082	132.95
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0562	0.0012	0.3519	0.3508	0.0138	0.0138	0.0050	122.62
Rollers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0584	0.0007	0.3793	0.3836	0.0232	0.0232	0.0052	67.171
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.2117	0.0024	1.5772	0.8005	0.0630	0.0630	0.0191	239.56
Scrapers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1913	0.0026	1.3434	0.7938	0.0540	0.0540	0.0172	262.91
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897

- 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

2.3.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

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

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

- Construction Exhaust Emissions per Phase

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

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment

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

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

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

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

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

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

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

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

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

2.4 Building Construction Phase

2.4.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 2
Start Quarter: 1
Start Year: 2020

- Phase Duration
Number of Month: 4
Number of Days: 10

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2.4.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial
Area of Building (ft^2): 10084
Height of Building (ft): 12
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
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders 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

2.4.3 Building Construction Phase Emission Factor(s)

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

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0898	0.0013	0.6610	0.3917	0.0256	0.0256	0.0081	128.83
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0320	0.0006	0.1690	0.2160	0.0070	0.0070	0.0028	54.467
Generator Sets Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0395	0.0006	0.3232	0.2731	0.0149	0.0149	0.0035	61.081

Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897
Welders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0310	0.0003	0.1734	0.1816	0.0102	0.0102	0.0027	25.672

- 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

2.4.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase

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

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

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

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

- Vender Trips Emissions per Phase
VMT_{VT} = BA * BH * (0.38 / 1000) * HT

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

2.5 Paving Phase

2.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2020

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

2.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 48400

- 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

2.5.3 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	0.0732	0.0013	0.4042	0.5124	0.0183	0.0183	0.0066	119.74
Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0919	0.0014	0.5823	0.5765	0.0280	0.0280	0.0082	132.95
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0562	0.0012	0.3519	0.3508	0.0138	0.0138	0.0050	122.62
Rollers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0584	0.0007	0.3793	0.3836	0.0232	0.0232	0.0052	67.171
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.2117	0.0024	1.5772	0.8005	0.0630	0.0630	0.0191	239.56
Scrapers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1913	0.0026	1.3434	0.7938	0.0540	0.0540	0.0172	262.91
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897

- 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

2.5.4 Paving Phase Formula(s)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- 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)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

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

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 Instruction 32-7040, Air Quality Compliance And Resource Management; 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: EGLIN AFB
State: Florida
County(s): Okaloosa; Santa Rosa; Walton
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: Eglin AQ Analysis of potential construction Projects at Alt. 2 C-6 SPCS.

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2020

e. Action Description:

Demolition/construction activities are possible over the next few years at five locations on EAFB. The location, Alt. 2 C-6 SPCS is presented as part of the AQ analysis.

f. Point of Contact:

Name: Kyle Flowers
Title: Contractor
Organization: Trinity ADC
Email: kyle.m.flowers.ctr@mail.mil
Phone Number: 334 303-0119

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 combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action fully implemented) emissions.

"Air Quality Indicators" were used to provide an indication of the significance of potential impacts to air quality. These air quality indicators are EPA General Conformity Rule (GCR) thresholds (de minimis levels) that are applied out of context to their intended use. Therefore, these indicators do not trigger a regulatory requirement; however, they provide a warning that the action is potentially significant. It is important to note that these indicators only provide a clue to the potential impacts to air quality.

Given the GCR de minimis threshold values are the maximum net change an action can acceptably emit in non-attainment and maintenance areas, these threshold values would also conservatively indicate an actions emissions within an attainment would also be acceptable. An air quality indicator value of 100 tons/yr is used based on the GCR de minimis threshold for the least severe non-attainment classification for all criteria pollutants (see 40 CFR 93.153). Therefore, the worst-case year emissions were compared against the GCR Indicator and are summarized below.

Analysis Summary:

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

2020

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.600	100	No
NOx	4.877	100	No
CO	2.984	100	No
SOx	0.014	100	No
PM 10	0.398	100	No
PM 2.5	0.209	100	No
Pb	0.000	25	No
NH3	0.023	100	No
CO2e	1541.3		

2021 - (Steady State)

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.000	100	No
NOx	0.000	100	No
CO	0.000	100	No
SOx	0.000	100	No
PM 10	0.000	100	No
PM 2.5	0.000	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	0.0		

None of estimated emissions associated with this action are above the GCR indicators, indicating no significant impact to air quality; therefore, no further air assessment is needed.

Kyle Flowers, Contractor

DATE

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location
Base: EGLIN AFB
State: Florida
County(s): Okaloosa; Santa Rosa; Walton
Regulatory Area(s): NOT IN A REGULATORY AREA

- Action Title: Eglin AQ Analysis of potential construction Projects at five (5) locations - Two (2) Alternatives

- Project Number/s (if applicable):

- Projected Action Start Date: 1 / 2020

- Action Purpose and Need:
To determine potential air pollution emissions from proposed demolition/construction activites

- Action Description:
Demolition/construction activites are possible over the next few years at five locations on EAFB. The locations are Eglin Main Base, Duke Field, 7SFG(A), Camp Rudder and C-6 20 SPCS. Two project alternatives, noted as Alternative 1 and Alternative 2 are presented as part of the AQ analysis.

- Point of Contact
Name: Kyle Flowers
Title: Contractor
Organization: Trinity ADC
Email: kyle.m.flowers.ctr@mail.mil
Phone Number: 334 303-0119

- Activity List:

Activity Type		Activity Title
2.	Construction / Demolition	Alternative 2 C-6 20 SPCS

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; Santa Rosa; Walton
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Aalternative 2 C-6 20 SPCS

- Activity Description:
Demolish a 630 square ft. building(s), construct 12,605 sq, ft. building(s), 1.3 acres parking, and 0 road acres with a total disturbance of 5.0 acres.

- Activity Start Date
Start Month: 1

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

Start Month: 2020

- Activity End Date
Indefinite: False
End Month: 8
End Month: 2020

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.599968
SO_x	0.014259
NO_x	4.876526
CO	2.983664
PM 10	0.398144

Pollutant	Total Emissions (TONs)
PM 2.5	0.209380
Pb	0.000000
NH_3	0.022783
CO_2e	1541.3

2.1 Demolition Phase

2.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2020

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

2.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 630
Height of Building to be demolished (ft): 12

- 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	0.0483	0.0006	0.3409	0.3782	0.0195	0.0195	0.0043	58.572
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2117	0.0024	1.5772	0.8005	0.0630	0.0630	0.0191	239.56
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897

- 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

2.2 Site Grading Phase

2.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2020

- Phase Duration
Number of Month: 0
Number of Days: 5

2.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 75525
Amount of Material to be Hauled On-Site (yd^3): 699699
Amount of Material to be Hauled Off-Site (yd^3): 501

- 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	6
Other Construction Equipment Composite	1	8
Rollers Composite	1	8
Rubber Tired Dozers Composite	1	6
Scrapers Composite	6	8
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

2.2.3 Site Grading Phase Emission Factor(s)

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

Excavators Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0732	0.0013	0.4042	0.5124	0.0183	0.0183	0.0066	119.74
Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0919	0.0014	0.5823	0.5765	0.0280	0.0280	0.0082	132.95
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0562	0.0012	0.3519	0.3508	0.0138	0.0138	0.0050	122.62
Rollers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0584	0.0007	0.3793	0.3836	0.0232	0.0232	0.0052	67.171
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.2117	0.0024	1.5772	0.8005	0.0630	0.0630	0.0191	239.56
Scrapers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1913	0.0026	1.3434	0.7938	0.0540	0.0540	0.0172	262.91
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897

- 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

2.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD}$ = (20 * ACRE * WD) / 2000

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

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

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

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

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

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

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

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

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

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

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

2.3 Trenching/Excavating Phase

2.3.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 2
Start Quarter: 1
Start Year: 2020

- Phase Duration
Number of Month: 0
Number of Days: 5

2.3.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 1260
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 94

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

- Construction Exhaust (default)

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

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

2.3.3 Trenching / Excavating Phase Emission Factor(s)

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

Excavators Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0732	0.0013	0.4042	0.5124	0.0183	0.0183	0.0066	119.74
Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0919	0.0014	0.5823	0.5765	0.0280	0.0280	0.0082	132.95
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0562	0.0012	0.3519	0.3508	0.0138	0.0138	0.0050	122.62
Rollers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0584	0.0007	0.3793	0.3836	0.0232	0.0232	0.0052	67.171
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.2117	0.0024	1.5772	0.8005	0.0630	0.0630	0.0191	239.56
Scrapers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1913	0.0026	1.3434	0.7938	0.0540	0.0540	0.0172	262.91
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897

- 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

2.3.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

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

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

- Construction Exhaust Emissions per Phase

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

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment

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

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

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

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

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

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

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

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

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

2.4 Building Construction Phase

2.4.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 2
Start Quarter: 1
Start Year: 2020

- Phase Duration
Number of Month: 5
Number of Days: 10

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2.4.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial
Area of Building (ft^2): 12605
Height of Building (ft): 12
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
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders 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

2.4.3 Building Construction Phase Emission Factor(s)

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

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0898	0.0013	0.6610	0.3917	0.0256	0.0256	0.0081	128.83
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0320	0.0006	0.1690	0.2160	0.0070	0.0070	0.0028	54.467
Generator Sets Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0395	0.0006	0.3232	0.2731	0.0149	0.0149	0.0035	61.081

Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897
Welders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0310	0.0003	0.1734	0.1816	0.0102	0.0102	0.0027	25.672

- 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

2.4.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

- Worker Trips Emissions per Phase

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

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

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

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

- Vender Trips Emissions per Phase
VMT_{VT} = BA * BH * (0.38 / 1000) * HT

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

2.5 Paving Phase

2.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2020

- Phase Duration
Number of Month: 5
Number of Days: 0

2.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 62920

- 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

2.5.3 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	0.0732	0.0013	0.4042	0.5124	0.0183	0.0183	0.0066	119.74
Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0919	0.0014	0.5823	0.5765	0.0280	0.0280	0.0082	132.95
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0562	0.0012	0.3519	0.3508	0.0138	0.0138	0.0050	122.62
Rollers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0584	0.0007	0.3793	0.3836	0.0232	0.0232	0.0052	67.171
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.2117	0.0024	1.5772	0.8005	0.0630	0.0630	0.0191	239.56
Scrapers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1913	0.0026	1.3434	0.7938	0.0540	0.0540	0.0172	262.91
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897

- 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

2.5.4 Paving Phase Formula(s)

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- 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)

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43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

Appendix D

Active ERP Sites

Site ID	Site Name	Description	Status
AOC-054	Gulf Power Substation	This former substation is located at the intersection of State Road 85 and Sunset Road and is approximately 3150 square feet in size. The site is in an Active Lease Agreement with Gulf Power. The 1991 site visit found that all electrical equipment had been removed and a concrete pad had a large black stain; no other staining was observed.	The site is under a FDEP Consent Order with Gulf Power for environmental assessment because PCB transformers, arsenic-based herbicides, and creosote may have been used on site. Gulf Power has completed the site assessment, and FDEP concurs with Gulf Power's recommendation of NFA for soil and groundwater at this site. Once FDEP receives documentation of proper well abandonment, a Site Rehabilitation Completion Order will be issued.
AOC-214	Eglin Housing Pod #4A west (former New Plew) & Pod #1, #4A east and community center (former Western Old Plew)	Eglin Housing Pod #4A west (former New Plew) & Pod #1, #4A east and community center (former Western Old Plew)	AOC added to the 2017 RCRA Permit modification currently in FDEP review.
AOC-215	Eglin Housing Pod #5 (former Eastern Old Plew)	Eglin Housing Pod #5 (former Eastern Old Plew)	AOC added to the 2017 RCRA Permit modification currently in FDEP review.
AOC-216	Eglin Housing (former Wherry) Parcel B	Eglin Housing (former Wherry) Parcel B	AOC added to the 2017 RCRA Permit modification currently in FDEP review.
AOC-217	Eglin Housing- Pod #7 (existing Capehart) Parcel B	Eglin Housing- Pod #7 (existing Capehart) Parcel B	AOC added to the 2017 RCRA Permit modification currently in FDEP review.
DP-261	Building 914 Dump Site	The site was used for the indiscriminate disposal of hardfill (plastics, metal debris, drums, concrete, etc.) between the late 1960s and early 1970s. In August 1997, Eglin removed the debris from the site.	The site has LUCs for sediment that restrict development without proper engineering controls. These LUCs have been approved by FDEP as the selected remedy. LUCs will remain in force perpetually until sediment concentrations in upper Hardstand Pond meet unrestricted (residential) land use standards. Any change from current land use must be approved and coordinated through Eglin's Environmental Restoration Office.
DP-84	Jack's Lake Limb Disposal Area	The site originated as an undesignated disposal area; consequently, the date of initial usage is unknown. Access to the area was uncontrolled until approximately 1991 when a guard was posted to control access and monitor material deposited on the site. Large quantities of unknown materials were discarded in the area during the uncontrolled period. Scrap wood, plastic waste,	LUCs preventing exposure to soils by restricting the site from residential development without proper engineering controls have been approved by EPA, FDEP, and the public as the selected remedy.

Site ID	Site Name	Description	Status
		tires, concrete fragments, and construction debris have been identified on the clearing surface, primarily in the southwest part of the site.	
FT-28	Eglin Main Base Old Fire Training Area	The site was used as a fire training area from the 1950s until the mid-1980s. Flammable liquids were transferred from an on-site AST or a tank truck into the burn pit through a buried transfer line, and firefighters practiced extinguishing flames on mock aircraft. RFIs in 1994 and 1995 indicated the presence of contaminants of potential concern, including VOCs and petroleum hydrocarbons, in soil and groundwater. Studies in 1998 concluded that NA was reducing BTEX concentrations and that chlorinated VOCs in the deep aquifer were being dechlorinated by microbial action. MNA and long-term monitoring were recommended for groundwater remedy. Also in 1998, a foot of clean soil was spread across the site after all debris was removed, and the site was covered with sod. A bioventing system initiated in 1994 was converted to an SVE system in 2001–2002. An HHRA indicated that risks under current land use are within the USEPA target risk range and only slightly exceed FDEP acceptable risk levels for base workers, maintenance workers, and construction workers under the most conservative RME scenario. Both FDEP and USEPA risk standards are exceeded at the site for future hypothetical residents under both the average and RME scenarios.	Site FT-28 is included in the performance-based remediation (PBR) contract under the minimum performance objective (MPO) of OES. The site has LUCs that restrict residential development without proper engineering controls and use of the shallow aquifer as a source of potable drinking water. The LUCs were approved by EPA, FDEP, and the public as the selected remedy. It has been determined that the SVE system has reached asymptotic levels and does not support a reasonable timeline for site closure. At a minimum, restrictions on the use of groundwater in the area will remain in place until groundwater meets acceptable standards.
LF-03	Eglin Main Landfill, Defense Reutilization Marketing Office (DRMO), CE Storage Yard	IRP Site No. LF-03 includes the main landfill, DRMO Storage Yard, CE storage yard, waste oil receiver yard, and three petroleum pipeline valve pits. Eglin operated the main landfill portion of IRP Site No. LF-03 from the early 1940s to the 1960s. As part of	Site LF-03 is included in the performance-based remediation (PBR) contract under the minimum performance objective of optimized exit strategy (OES) at the end of the POP in 2020. Recommendations in the Five-Year EM Report No. 9 (May 2017; reported June 2016 results) to

Site ID	Site Name	Description	Status
		landfill management, trenches, approximately 10 to 12 feet deep, were excavated until groundwater was encountered (generally at depths of up to approximately 10 feet below land surface [bls]). Fill material placed in the trenches reportedly consisted of construction rubble, tires, wire, suspected polychlorinated biphenyl (PCB) transformers, pesticide containers, waste oils, waste solvents, hydraulic fuels, septic tank sludge, medical wastes, general and sanitary refuse, and drums containing corrosive liquids. Pesticides were reportedly sprayed over the waste material to control the insect and pest population. Several feet of sandy soil were placed over the fill material upon closure of the landfill in the 1960s.	discontinue sampling well SS023-MW-02D for iron, well LF003-MW-01D for iron and manganese, and well LF003-MW-14D for iron, manganese, and volatile organic compounds (VOCs) were approved by FDEP. Based on these changes, monitoring wells SS023-MW-02D and LF003-MW-14D have been removed from the monitoring network.
LF-05	Eglin Main Landfill	Site LF05 is a closed 30- to 35- acre trench-and-fill landfill. Site LF-05 is located adjacent to Flightline Drainage Creek. The landfill was reportedly used between 1972 and 1978 to dispose of hardfill, septic tank and OWS sludge. The landfill was reportedly covered with 5 feet of soil upon closure.	Site LF-05 is included in the performance-based remediation (PBR) contract under the minimum performance objective of OES at the end of the POP in 2020.
LF-08	Receiver Area Landfill	Site LF-08 encompasses approximately 10 acres. The landfill is covered with several feet of soil. There are three 10,000-square-foot concrete pads located on the site for use as storage areas for petroleum-contaminated soil. The landfill was active for approximately 10 years and was closed in the late 1970s with a cover of several feet of soil. During the landfill's operation, wastes were reportedly disposed of into portions of the steephead adjoining the site. The fill material is believed to be between 3 and 35 feet thick.	The site has LUCs that restrict residential development without proper engineering controls and use of the shallow aquifer as a source of potable drinking water. These LUCs have been approved by EPA, FDEP, and the public as the selected remedy. The LUCs also require catch-and-release fishing practices in the pond.
LF-51	Upper Memorial Lake	Landfilling activities reportedly occurred at the site during an undetermined time period in the 1960s. In 1983, Eglin AFB notified EPA and FDEP that an estimated 150 drums potentially	Site LF-51 is included in the performance-based remediation (PBR) contract under the minimum performance objective of OES. The site has LUCs that restrict residential development without

Site ID	Site Name	Description	Status
		containing herbicides may have been disposed of on site. A surface geophysical study performed in 1992 revealed possible buried metallic objects, and a confirmatory excavation uncovered approximately 25 empty drums. Residue from these drums showed traces of herbicides.	proper engineering controls and use of the shallow aquifer as a source of potable drinking water. The LUCs were approved by EPA, FDEP, and the public as the selected remedy.
OT-35	Seventh Street BX Station	Approximately 3,600 gallons of petroleum leaked from USTs in 1984. In 1994, soil and groundwater near a UST containing waste oil exhibited petroleum contamination. A pump and treat system (to remove free product), bioventing system, and excavation of contaminated soil, conducted between 1992 and 1997, proved inadequate to remediate the high soil and groundwater contaminant concentrations. Two AAS systems and an SVE system were installed in 2004. These systems have reduced contaminant amounts to cleanup levels, and the groundwater plume has shrunk to the source area.	Site OT-35 is included in the performance-based remediation (PBR) contract under the minimum performance objective of site closeout (SC). Based on current site conditions, as described above, additional SI was completed in 2014. Remedial action implementation will address the impacted groundwater followed by PARM. It is expected that after these corrective actions are applied, clean up levels will be met and SRCO will to be requested to close the site with NFA. Following RAP implementation and performance monitoring, PARM will be completed to verify that GCTLs are maintained, allowing for an SRCO to be requested to close the site with NFA.
Sites POI-702 - 735		In July 2015, a PA was conducted at locations on Eglin AFB that may have been contaminated by discharges or releases of Aqueous Film Firefighting Foam (AFFF) containing PFOS and PFOA. Over thirty fire training areas (FTA) and non-FTA locations were identified as potential sites.	A follow-on SI will be conducted in April 2018 to sample these areas for PFOS/PFOA. Although PFOS/PFOA are currently not regulated contaminants in Florida, the USAF has taken a proactive approach to address this issue. Eglin AFB has been given a low-priority ranking for sampling requirements because they utilize drinking water wells that are installed within the deep Floridan Aquifer and shallow groundwater is not used for potable sources. Results from the SIs will either recommend additional investigation or no further action at the prospective new sites. If additional investigation is required at any of these locations, Eglin AFB will continue to work closely with the FDEP to accomplish a path forward.
POI-702	FT-92	Eglin Skeet Range and Fire-Training Area	Refer to Status for “Sites POI 702-735” above

Site ID	Site Name	Description	Status
POI-703	Middle FTA	Middle Fire Training Area	Refer to Status for “Sites POI 702-735” above
POI-704	Eglin WWTP	Current Fire Training Area	Refer to Status for “Sites POI 702-735” above
POI-705	Building 71	Building 71	Refer to Status for “Sites POI 702-735” above
POI-706	Building 72	Building 72	Refer to Status for “Sites POI 702-735” above
POI-707	Building 138	Building 138	Refer to Status for “Sites POI 702-735” above
POI-708	Building 440	Building 440	Refer to Status for “Sites POI 702-735” above
POI-709	Building 1386	Building 1386	Refer to Status for “Sites POI 702-735” above
POI-710	Building 1412	Building 1412	Refer to Status for “Sites POI 702-735” above
POI-715	Nozzle Spray Test Area Main Base Eglin	Nozzle Spray Test Area Main Base Eglin	Refer to Status for “Sites POI 702-735” above
POI-717	Nozzle Spray Test Area Field 6 Ranger Camp	Nozzle Spray Test Area Field 6 Ranger Camp	Refer to Status for “Sites POI 702-735” above
POI-718	Nozzle Spray Test Area Test Range C-6	Nozzle Spray Test Area Test Range C-6	Refer to Status for “Sites POI 702-735” above
POI-719	Former WWTP and Spray Field at Duke Field	Former WWTP and Spray Field at Duke Field	Refer to Status for “Sites POI 702-735” above
POI-722	NW-SE Flightline Drainage Ditch	NW-SE Flightline Drainage Ditch	Refer to Status for “Sites POI 702-735” above
POI-723	Jack Lake	Jack Lake	Refer to Status for “Sites POI 702-735” above
POI-724	Eglin Main Base Old Fire Training Area/FT-28	Eglin Main Base Old Fire Training Area/FT-28	Refer to Status for “Sites POI 702-735” above
POI-725	N-S Flightline Drainage Ditch	N-S Flightline Drainage Ditch	Refer to Status for “Sites POI 702-735” above
POI-727	LF-08 Receiver Landfill	LF-08 Receiver Landfill	Refer to Status for “Sites POI 702-735” above
POI-728	Building 500	Building 500	Refer to Status for “Sites POI 702-735” above
POI-729	2011 Beech C24R Fire	2011 Beech C24R Fire	Refer to Status for “Sites POI 702-735” above
POI-731	AFFF Holding Pond	AFFF Holding Pond	Refer to Status for “Sites POI 702-735” above
POI-732	Building 916A	Building 916A	Refer to Status for “Sites POI 702-735” above
POI-733	Building 3087	Building 3087	Refer to Status for “Sites POI 702-735” above
POI-735	Building 3057	Building 3057	Refer to Status for “Sites POI 702-735” above
SS-26	Hardstand 7	The Hardstand 7 site was used for storage of herbicide drums and transfer of herbicides to aircraft for dissemination on the Herbicide Test Grid at C-52A. Several investigations have been conducted since 1970 to characterize the soil, water quality, and biota in the vicinity of Hardstand 7. In 1985, the entire area around Hardstand Pond and Beaver Pond was fenced and signs were posted banning trespassing and fishing, as recommended in a 1984 report.	The site has LUCs that restrict residential development without proper engineering controls and use of the shallow aquifer as a source of potable drinking water. The LUCs have been approved by EPA, FDEP, and the public as the selected remedy. LUCs will remain in force perpetually. Any change from current land use must be approved and coordinated through Eglin’s Environmental Restoration Office.
SS-275	ACC Tank Farm	This site is associated with Sites ST-70 and SS-72. In 1995, elevated OVA readings were observed, believed to be related to an old AST release. A	Site SS-275 is included in the performance-based remediation (PBR) contract under the minimum performance objective of site closeout (SC) by the

Site ID	Site Name	Description	Status
		subsequent search located records of a JP-4 spill. Apparently, the area southwest of Tank 1302 was used to dispose of water in the tank bottom and JP-4 prior to installation of the concrete containment berms around the two ASTs. According to Eglin AFB records, base personnel responded to reports of a JP-4 surface spill in this area in 1985 and recovered approximately 300 gallons of JP-4. Also, subsequent to a 1995 CAR, it was discovered that JP-8 was running out of a drain of a containment unit and that a drain sump was allowing fuel to be released directly to the ground. Base personnel excavated a portion of the containment unit down to 15 to 16 feet, but excessively contaminated soil was still present. The excavation was restored to grade using clean backfill material. A SAR was prepared in 1998 and resulted in discovery of BTEX in soil and groundwater samples. A subsequent RAP identified AAS, SVE, and NA for remediation. Free product was discovered in existing and new monitoring wells, and an investigation concluded that approximately 700,000 pounds of mobile, residual, and dissolved petroleum hydrocarbon contamination exists over an area of approximately 20 acres.	end of the PBR's period of performance (POP) in 2020. Operation and optimization of the remedial system to reduce source area concentrations will continue to a point where active remediation is no longer required. Once the site has reached GCTLs, PARM sampling will be initiated.
SS-279	JP-8 Spill Site	A JP-8 fuel spill occurred at the site in 2005 during a fuel transfer. Improperly positioned valves caused a 1,000-gallon product recovery tank to overflow, resulting in release of an estimated 1,200 to 1,500 gallons of fuel. The surface soil was saturated with fuels around the UST. Due to the presence of underground utilities and the possibility of undermining a mission-critical fuel facility, minimal soil removal was completed. Soil and groundwater samples taken in 2005 indicated	Active remedial actions will cease when the remediation objectives are met or the treatment application is deemed to have reached a treatment plateau. A treatment plateau is considered to be achieved when remedial action is no longer effectively reducing the contaminant mass. If the system reaches a treatment plateau and groundwater concentrations exceed NFA criteria, current contaminant levels will be evaluated to make a recommendation for a future

Site ID	Site Name	Description	Status
		the soil was impacted with BTEX, PAHs, and petroleum hydrocarbons. Two monitoring wells contained free product and were not sampled during the Preliminary Assessment. Groundwater samples were collected from two of the four on-site monitoring wells, and no constituents were detected above GCTLs. Passive bailers removed 4.1 gallons of free product in 2005. A RAP, prepared in 2008, recommended the installation of AAS and SVE systems.	course of action. This site is expected to reach NFA unrestricted levels in the next three to five years.
SS-280	33d Spill Site	Site SS-280 is located along the pipeline that connects the 33rd Fighter Wing fuel farm to the flightline hot pits. An estimated 1,000 to 30,000 gallons of JP-8 fuel leaked from the pipeline in 2008 or prior. In August 2008, 3,662 tons of contaminated soil was excavated. In 2005, an additional fuel spill occurred, releasing an estimated 1,200 to 1,500 gallons. Surface soil was saturated with fuel around the UST. Minimal soil removal was completed. Soil and groundwater samples collected as part of a 2005 Preliminary Assessment indicated that soils were impacted with BTEX, PAHs, and petroleum hydrocarbons. Two of four monitoring wells contained free product, and passive bailers were installed for removal. A RAP recommended installation of AAS and SVE systems, which were installed in 2008.	The remedial system at Site SS-280 is operational and currently consists of 12 AAS wells, nine SVE wells, and blower systems. FDEP approved the cessation of the SVE system operation on March 6, 2015. Groundwater quality is monitored quarterly. While free product is no longer detected at the site and most of the groundwater plume is stable or decreasing in both areal extent and magnitude, one area of the plume is expanding to the southeast. The installation of two new monitoring wells for delineation in that area was accomplished in fall 2014. An additional eight monitoring wells were installed in January/February 2017 to assist in plume delineation. The original AAS system is still operational and a RAP Addendum is being prepared to address the southeast area of the plume. Operation and optimization of the remedial system to reduce source area concentrations to a point where active remediation is no longer required. The system will be optimized in the source area. With the one area of the plume expanding, a site closure timeline cannot accurately be predicted. The goal for the site is to reach NFA unrestricted levels within approximately five years.

Site ID	Site Name	Description	Status
SS-281	Deep TCE Plume 33rd Fighter Wing	Site SS-281 is concurrent with SS-280 but represents the deep aspect of the spill.	Site SS-281 is included in the performance-based remediation (PBR) contract under the minimum performance objective of remedy in place (RIP) in 2019, within the PBR's period of performance (POP). An OES Plan was developed to establish performance metrics for contaminant reduction. The second semi-annual NAM sampling event was conducted in August 2017. Based on the data from this event, it was recommended to remove monitoring wells 281-MW-04 and 281-MW-07 from the monitoring network. This recommendation was approved by FDEP (letter dated February 15, 2018). Sampling for the third semi-annual NAM event was conducted in February 2018, and the NAM report is in FDEP review.
SS-283	JP-8 LNAPL Site	SS-283 is located near ST-65. It is south of the McKinley Climatic Laboratory and north of Eglin Boulevard. It is related to ST-65, the former tank field which consisted of two USTs. The AAS and SVE systems were shut down in 2003. A sampling conducted in 2010 showed JP-4, JP-8, other petroleum byproducts, and PAHs.	Site SS-283 is included in the performance-based remediation (PBR) contract under the minimum performance objective of site closeout (SC) by the end of the PBR's period of performance (POP) in 2020. To address FDEP's comments on the MoD, three revisions to the MoD have been submitted to FDEP. The latest revision is currently under review by FDEP.
SS-286	McKinley Lab Fire Site	On July 7, 2017, at approximately 10:00 a.m., a fire occurred in the air conditioning system at Eglin's McKinley Climatic Lab that resulted in the release and/or consumption by fire of approximately 8,100 gallons of the refrigerant methylene chloride. The fire and release were reported to the FDEP and, after emergency operations were completed, samples were collected from two existing groundwater monitoring wells located adjacent to the facility. Analytical results from the samples indicate that methylene chloride has reached the shallow	Funding and contracting actions for the work are currently being pursued through AFCEC.

Site ID	Site Name	Description	Status
		aquifer groundwater table and will need to be assessed and remediated by Eglin's IRP personnel.	
SS-287	Tank 92 Spill Site	On January 5, 2018, freezing temperatures caused a pump transfer switch box to freeze and remain on, which resulted in overfilling of a 1,000-gallon underground storage tank. Jet fuel travelled up the vent pipe, discharged onto the roof, and then flowed to the ground surface through the gutters. Approximately 2,600 gallons of fuel were discharged. Eglin's Emergency response cleanup was not able to excavate all contaminated soils. Site responsibilities were transferred to Eglin's IRP personnel for site investigation and remediation.	An EM Work Plan, including a Field Sampling Plan for SS-287, was submitted to FDEP in May 2018. The plan was approved by FDEP in a letter dated June 8, 2018. Environmental monitoring activities will include a site assessment, determination of groundwater flow and contaminant migration, and monitoring and removal of free product, if found.
SS-36	POL Tank Farm	Approximately 4,000 gallons of JP-4 petroleum product were discovered to have been discharged from an underground pipe in 1983. Initial remedial action consisted of trenching and free product removal of 1,900 gallons. Petroleum constituents (BTEX, PAHs, and TRPH) were found in soils and groundwater. Dissolved phase and free product have been detected in groundwater. Between 1986 and 1987, an estimated 5,000 pounds of JP-4 hydrocarbon mass was removed and 150 gallons of free product was recovered. Three air sparge systems are currently operating at the site. A bioventing system is currently inactive.	Site SS-36 is included in the performance-based remediation (PBR) contract under the minimum performance objective of site closeout (SC). A RAP modification proposing bioremediation injections to address remaining petroleum contamination has been verbally approved by FDEP, and injection activities are planned for September 2018. The areas of Tank 27 (formerly Tank 710) and 29 Area, Fuel Transfer Area (BV System), Tank 28 Area, Tank 38 Area, and Building 762 Area meet NFA requirements. For the area downgradient of Tank 45, remedial action implementation will address the impacted groundwater followed by PARM. It is expected that after these corrective actions are applied, clean up levels will be met and SRCO will to be requested to close the site with NFA.
SS-86	Exterior Electric Shop/Entomology Shop	In the early 1980s, prior to constructing Building 692, Building 687 served as the primary storage location for pesticides used on base, including DDD, DDT, and chlordane. Following completion of Building 692, Building 687 was refurbished and used for office space. Until mid-1995, Building 692 contained both the Exterior Electric Shop and the Entomology Shop. The Entomology Shop stored	Site SS-86 is included in the performance-based remediation (PBR) contract under the minimum performance objective of OES. The site has LUCs that restrict residential development without proper engineering controls, and use of the shallow aquifer as a source of potable drinking water. Soil LUCs have been applied to two discrete locations (Areas A and B) as shown on the

Site ID	Site Name	Description	Status
		pesticides in the northwest part of the building. In 1995, the Entomology Shop was relocated to Buildings 574 and 576, while the Exterior Electric Shop remained in Building 692. No chemicals are currently stored in Buildings 687 or 692 (Rust, 1996).	attached figure. These LUCs have been approved by EPA, FDEP, and the public as the selected remedy. Groundwater monitoring is performed to support remedy effectiveness reviews. In FDEP's review of the Annual EM Report No. 14, FDEP agreed with the recommendations to continue groundwater monitoring for VOCs, natural attenuation parameters, and dieldrin (one monitoring well, SS086-MW-32SR); and to discontinue zone of discharge monitoring (FDEP letter dated March 9, 2018).
ST-055A	Duke Field Tank Farm (Buildings 3206 and 3208)	Site ST-55A included two former ASTs, which were designated as Tanks 31 and 32. Surrounding the former ASTs were circular concrete dikes with asphalt spillways for storm water drainage on the northeastern sides. Former Buildings 3206 and 3208 were located at the southern end of the site, and were pump sheds for the offloading headers that transferred fuel to the ASTs via aboveground piping. Fuel was then transferred to two fill stations located along Blake Street for loading into tanker trucks. The infrastructure of the petroleum storage facility was decommissioned and removed in fall of 2006 and the site is currently a flat grassy open area. The known existing underground fuel piping was abandoned in place.	The demolition of the tank farm was completed in 2006. The SVE remedial system was shut-down in 2009. The AAS system failed due to equipment issues in February 2012. An ISCO pilot study, including two injections and associated performance monitoring, was conducted from January 2015 through April 2018. Performance monitoring indicates that the site COCs are below cleanup criteria. A Site Rehabilitation Completion Order Request was submitted as recommended by the FDEP. Work at the site is funded by DLA funds.
ST-069	Building 3073, Waste Oil Tank	Site ST-69 includes Building 3073, a maintenance building located at the southwest corner of the motor pool facility of the 728th Air Control Squadron, Transportation Branch. The site also included a former waste oil tank, located approximately 40 feet southwest of the southwest corner of Building 3073. The former waste oil tank located at Site ST-69 consisted of two 55-gallon steel drums. These	Site ST-69 is included in the performance-based remediation (PBR) contract. This site was initially under the minimum performance objective of site closeout (SC). However, the minimum performance objective was contractually modified to an OES in May 2018 based upon further evaluation of site information and results of the existing remedy. As per the FDEP approved Final Technical Memorandum Requesting Phase 4 Treatment System Optimization (September,

Site ID	Site Name	Description	Status
		drums were welded together, with a 6-inch-diameter hole in the bottom that drained south to a stone leach field. The tank was connected by underground piping to Building 3072, which is located approximately 30 feet east of Building 3073. The tank system has been inactive since approximately 1989.	2017), the ST-69 performance objective is now based on the reduction of PCE mass during the annual performance monitoring events conducted in January 2018, 2019, and 2020 to assess performance of the ST-69 treatment system.
ST-59	Ben's Lake Marina	The former tank field was located on approximately the same area as the new UST system, and consisted of two 3,000-gallon USTs that supplied gasoline to two dispensers located near the docks. The USTs were excavated in December 1991. The tank pit was over-excavated approximately 25 feet north/south and 20 feet east/west to a depth of 12 feet when OVA readings revealed excessively contaminated soil (greater than 500 ppm).	NFA has been approved by FDEP for response actions that have previously occurred on this site, however, for a recent response action with similar contaminants, it has been determined that the best way forward is to reopen the site. A site validation checklist to reopen the site has been submitted to AFCEC/CZ for approval in October 2018.
ST-99	Okaloosa County Air Terminal (OCAT)	Site ST-99, the Okaloosa County Air Terminal (OCAT) site, consists of former underground storage tanks (USTs) and a former spill site located south-southeast of the USTs. Contamination was first noted at the site in July 1991 when Eglin AFB and FDEP were notified of a fuel spill at the OCAT. The original investigation focused on three areas surrounding the USTs and a fourth area located south-southeast of the USTs (former spill area).	As of 2009, the site was awaiting state managed cleanup under the FDEP Bureau of Petroleum Storage Systems (BPSS) in Tallahassee, but it was very low on the priority ranking. It was assigned a ranking of 7 at that time. As of that date, funding was available to begin cleanup work for sites with a priority score of 40 or greater. The FDEP-assigned facility identification number is DOD_3_2639. The FDEP Facility ID is 468623556.
XU-658	Burial Pit Site C-3	MRS XU658 is a relatively new site that was identified in 2014 by Eglin Explosive Ordnance Disposal (EOD) when they were responding to a report of munitions located outside the perimeter fence of Auxiliary Field 2 (Test Area C-3) in the south-central part of the Eglin reservation just west of SR 285.	A CSE Phase I/II and Supplemental Investigation were prepared for the site. Field activities were completed in September 2016, including a visual survey, surface clearance, vegetation removal (as necessary), digital geophysical mapping (DGM), and subsurface investigation. The report for this site has been submitted to the FDEP for review with recommendations to close the site with No Further Action required. Regulatory comments have been received on the document, and they are

Site ID	Site Name	Description	Status
			currently being reviewed and addressed by Eglin IRP and contractor personnel.
Source: Eglin AFB. *FY2018 Sites Status Report, Environmental Restoration Program, Eglin Air Force Base, Florida.* October 2018.			

Appendix E

Stormwater Analysis

APPENDIX F
STORMWATER RUNOFF ANALYSIS
September 2019

The Natural Resources Conservation Service (NRCS) WinTR-55 is a single-event rainfall-runoff small watershed hydrologic model based on the United States Department of Agriculture, Soil Conservation Service TR-55. The model can subdivide up to 10 watersheds and calculates combined CN values based on the multiple land uses and soil types and provides calculations of other necessary parameters. Once specific project locations and details are proposed in future actions, the model can be re-run to calculate storage volumes required to determine stormwater structures for management of stormwater at each project site.

The SCS method is recommended for areas with greater than ten percent urbanization. All cantonment areas met this criterion. The SCS equations may under predict runoff volume from most small storms (because the CN values used in the SCS method assume that runoff will only occur once the soil has become saturated); but in this analysis, 25-year storm values were used.

Evaluation

The WinTR-55 model and User Manual NRCS were downloaded from the NRCS website.[1] The maximum area for the model is 25 square miles, which is sufficient for each of the five cantonment areas. The Rainfall duration of the model is 24 hours and the primary inputs need to run WinTR-55 are the drainage area, CN, and Time of Concentration (Tc). Several assumptions had to be made for input decisions because the actual project site locations and sizes are unknown at this point.

Rainfall

Typical stormwater system design considerations evaluate the peak discharge for 25-year storms for multiple durations ranging from 1 hour to 24 hours. This accounts for variations in soil types and accompanying percolation rates. Soils with good percolation rates may experience peak runoff rates during shorter, more intense storms and soils with poor percolation rates may experience peak flows during longer storms with greater total rainfall amounts.

The WinTR-55 model provides Type MSE6 rain data for Okaloosa County in a 24-hour duration format. It was decided that a 25-year storm was the appropriate frequency storm to evaluate runoff amounts. A 25-year storm event has a one in 25 or 4% chance of occurring in any given year. In Okaloosa County, Florida, a 25-year storm is predicted to yield 11.77 inches of rain during a consecutive 24-hour period.

Land Areas

The potential land areas for each cantonment location were identified on a United States Geological Survey (USGS) Topographical map. Only one drainage area was used and an average slope was entered for the landscape within property boundaries.

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[1] USDA-NRCS. "WinTR-55 Watershed Hydrology." https://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/water/?cid=stelprdb1042901. (Accessed September 5, 2019).

Land Use
A CN parameter quantifies the runoff potential for each cantonment area based on land use and soil type.

The following urban land use estimates were made from the total acreage of each cantonment for *pre-construction condition* (existing condition) as percent pervious and impervious pavement. This total was calculated based on the Preferred Alternative calculations from the 2014 *Final Eglin Air Force Base Cantonment Areas Environmental Assessment*, which assumed that 100 percent of the total disturbed acreage would be impervious.[2]

- Eglin Main 78% impervious (8813 acres), 22% pervious (2451 acres)
- Duke Field 30% impervious (592 acres), 70% pervious (1353 acres)
- 7SFG (A) 83% impervious (416 acres), 17% pervious (84 acres)
- Camp Rudder 31% impervious (89.6 acres), 69% impervious (196 acres)
- C-6 SPCS 100% impervious (14 acres), 0% pervious (0 acres)

The urban land use estimates for *post-construction condition* of each cantonment in Alternative 1 was calculated by adding the pre-construction acres of impervious surface to the total amount of activity (facilities construction, roads, and parking/impervious surfaces) from Table 2-3 of the EA. The total disturbed acreage was subtracted from the pre-construction pervious acreage for the post-construction pervious acreage. Post-construction conditions for Alternative 2 were calculated using the same methodology as applied to Table 2-4 of the EA.

The Hydrologic Soil Groups (HSG) A, B, C, and D identify the soil type. Type A soils are considered highly pervious with low runoff potential, while Type D soils are highly impervious with a high runoff potential. As noted in Section 3.9.2 of the EA, the predominant soil type at each of the cantonment areas except Site C-6 20 SPCS is Lakeland Sand, which belongs to Type A. Site C-6 20 SPCS predominantly consists of Hurricane Sand, which also belongs to Type A. Therefore, Type A soils were used for each cantonment area.

Time of Concentration (T_c)
The Tc is the length of time it takes for water to flow from the most remote point of the area to the outlet once the soil has become saturated. After a maximum of 100', sheet flow usually becomes shallow concentrated and that is the most common designation used, in lieu of specific channel patterns and lengths.

The WinTR-55 model also requires the input of flow length, slope, and a flow path designation of paved or unpaved to calculate Tc. One flow length (L) was calculated from GIS maps, across the longest predominate stormwater flow of each cantonment area.

Input values for drainage lengths were as follows: Eglin Main (L=14784'), 7SFG (A) (L=4799'), Duke Field (L=10327'), Camp Rudder (L=5359'), C-6 SPCS (L=900').

[2] Eglin AFB. *Final Eglin Air Force Base Cantonment Areas Environmental Assessment.* March 2014.

Slopes were calculated from GIS maps and in Table F-1 expressed as Average Slope (%). Elevations were taken from Eglin Test and Training Complex Land Range Map, NGA reference no. V747MEGLINLAND1.

Table F-1 Topography of the Five Cantonment Areas, Expressed as Average Slope

Cantonment	Low Elevation (ft) MSL	High Elevation (ft) MSL	Height (ft)	Length (ft)	Average Slope (%)
Eglin Main	0	75	75	6,372	<1
Duke Field	200	200	0	3,960	<1
7 SFG(A)	175	175	0	1,980	<1
Camp Rudder	70	135	65	8,557	<1
Site C-6 20 SPCS	75	160	85	660	12

7 SFG(A) = 7th Special Forces Group (Airborne); **ft** = feet; **MSL** = mean sea level; **SPCS** = Space Control Squadron

Based upon the designation (input) of paved or unpaved, Manning's number was determined and flow velocity is calculated. 'Paved' designation was used for Eglin Main, 7SFG (A), and C-6 SPCS because of the higher estimated amounts of impervious surfaces than pervious. And, 'Unpaved' was used for Duke Field and Camp Rudder with higher estimated areas of pervious surfaces.

Results

Once the rainfall, land area and use, and T_c data are entered, WinTR-55 is run to yield the peak discharge flow of stormwater runoff in cubic feet per second (cfs). Additionally, a report can be run, providing the total amount of runoff for the area in inches. Tables E-2 and Table E-3 summarize run results to allow comparison between existing conditions at each cantonment and Alternative 1 and Alternative 2 actions. Alternative 2 reflects a 25% notional footprint increase over Alternative 1.

Alternative 1:

The urban land use estimates for *post-construction condition* of each cantonment in Alternative 1 was calculated by adding the pre-construction acres of impervious surface to the total amount of activity (facilities construction, roads, and parking/impervious surfaces) from Table 2-3 of the EA. Site C-6 20 SPCS totals remained at 100 percent impervious because the total amount of impervious surfaces cannot exceed 100 percent.

- Eglin Main 80% impervious (8993 acres), 20% pervious (2271 acres)
- Duke Field 36% impervious (703 acres), 64% pervious (1242 acres)
- 7SFG (A) 85% impervious (426 acres), 15% pervious (74 acres)
- Camp Rudder 47% impervious (134 acres), 53% impervious (152 acres)
- C-6 SPCS 100% impervious (14 acres), 0% pervious (0 acres)

Eglin Main:

The model yielded peak flows of 28,450 cfs and 28,729 cfs for the existing and the notional construction actions. Additionally, the TR-20 report yielded total runoff amounts of 9.08 inches and 9.216 inches for the existing (pre-construction) and notional (post-construction) activity.

Duke Field:

The model yielded peak flows of 3,497 cfs and 3,880 cfs for existing and notional conditions, respectively. Additionally, the TR-20 report yielded total runoff amounts of 5.907 inches and 6.361 inches for the existing and notional conditions.

7 SFG(A):
The model yielded peak flows of 2501 cfs and 2527 cfs for the existing and notional conditions, respectively. Additionally, the TR-20 report yielded total runoff amounts of 9.484 inches and 9.617 inches for the existing and notional conditions.

Camp Rudder:
The model yielded peak flows of 771 cfs and 963 cfs for existing and notional conditions, respectively. Additionally, the TR-20 report yielded total runoff amounts of 5.907 inches and 7.396 inches for the existing and notional conditions.

C-6 SPCS:
The model yielded peak flows of 147 cfs for existing conditions. Additionally, the TR-20 report yielded total runoff amounts of 11.52 inches for the existing conditions. Because the existing conditions as modeled under the 2014 EA would consist of 100 percent impervious surfaces on Site C-6 20 SPCS, no additional modeling was performed.

Table F-2 Modeled Alternative 1 Cantonment Areas Pre- and Post-Construction Stormwater Runoff Conditions

Area Modeled	Runoff (inches)		Peak Flows (ft^3/s)		Runoff Increases Due to Construction (inches)
	Pre	Post	Pre	Post	
Eglin Main	9.080	9.216	28,450	28,729	0.136
Duke Field	5.907	6.361	3,497	3,880	0.454
7 SFG(A)	9.484	9.617	2,501	2,527	0.133
Camp Rudder	5.907	7.396	771	963	1.489
Site C-6 20 SPCS	11.52	11.52	147	147	0

ft^3/s = cubic feet per second

Alternative 2:
The total disturbed acreage was subtracted from the pre-construction pervious acreage for the post-construction pervious acreage. Post-construction conditions for Alternative 2 were calculated using the same methodology as applied to Table 2-4 of the EA.

- Eglin Main 80% impervious (9038 acres), 20% pervious (2226 acres)
- Duke Field 38% impervious (730 acres), 62% pervious (1215 acres)
- 7SFG (A) 86% impervious (428 acres), 14% pervious (72 acres)
- Camp Rudder 50% impervious (144 acres), 50% impervious (142 acres)
- C-6 SPCS 100% impervious (14 acres), 0% pervious (0 acres)

Eglin Main:
The model yielded peak flows of 28,450 cfs and 28,729 cfs for the existing and the notional construction actions. Additionally, the TR-20 report yielded total runoff amounts of 9.08 inches and 9.216 inches for the existing (pre-construction) and notional (post-construction) activity.

Duke Field:
The model yielded peak flows of 3,497 cfs and 3,880 cfs for existing and notional conditions, respectively. Additionally, the TR-20 report yielded total runoff amounts of 5.907 inches and 6.512 inches for the existing and notional conditions.

7SFG (A):
The model yielded peak flows of 2501 cfs and 2527 cfs for the existing and notional conditions, respectively. Additionally, the TR-20 report yielded total runoff amounts of 9.484 inches and 9.617 inches for the existing and notional conditions.

Camp Rudder:
The model yielded peak flows of 771 cfs and 999 cfs for existing and notional conditions, respectively. Additionally, the TR-20 report yielded total runoff amounts of 5.907 inches and 7.685 inches for the existing and notional conditions.

C-6 SPCS:
The model yielded peak flows of 147 cfs for existing conditions. Additionally, the TR-20 report yielded total runoff amounts of 11.52 inches for the existing conditions. Because the existing conditions as modeled under the 2014 EA would consist of 100 percent impervious surfaces on Site C-6 20 SPCS, no additional modeling was performed.

Table F-3 Modeled Alternative 2 Cantonment Areas Pre- and Post-Construction Stormwater Runoff Conditions

Area Modeled	Runoff (inches)		Peak Flows (ft^3/s)		Runoff Increases Due to Construction (inches)
	Pre	Post	Pre	Post	
Eglin Main	9.080	9.216	28,450	28,729	0.136
Duke Field	5.907	6.512	3,497	3,880	0.605
7 SFG(A)	9.484	9.617	2,501	2,527	0.133
Camp Rudder	5.907	7.685	771	999	1.778
Site C-6 20 SPCS	11.52	11.52	147	147	0

ft^3/s = cubic feet per second

Summary
For both Alternative 1 and Alternative 2, the model showed increased post-construction peak flow (cfs) and increased stormwater runoff (inches) over existing conditions at all cantonment areas except for Site C-6 20 SPCS, which cannot add anymore impervious surfaces over the existing conditions as proposed under the 2014 EA preferred alternative. Due to the nature of the analysis and the undefined nature of specific projects, it was not possible to define smaller sub-basin areas with specific, measurable drainage paths, particularly at Eglin Main due to its large size. No increases to stormwater runoff during a modeled 25-year/24-hour storm event were observed between Alternatives 1 and 2 for Eglin Main, 7 SFG(A), and Site C-6 20 SPCS. Camp Rudder and Duke Field did show small increases to stormwater runoff as a result of the increase in construction activity reflected in Alternative 2.

WinTR-20 Printed Page File Beginning of Input Data List
TR20.inp

WinTR-20: Version 1.10 0 0 0.05
Eglin Cantonment Areas EA
Eglin Main No-Action Alternative

SUB-AREA:
Eglin MainOutlet 17.6 79. 2.04

STREAM REACH:

STORM ANALYSIS:
25-Yr 11.77 Type MSE6 2

STRUCTURE RATING:

RAINFALL DISTRIBUTION:
Type MSE6 0.1

0.0	0.000713	0.00145	0.00221	0.00300
0.00380	0.00464	0.00549	0.00637	0.00727
0.00820	0.00915	0.01013	0.01112	0.01215
0.01319	0.01426	0.01535	0.01647	0.01761
0.01878	0.01996	0.02118	0.02241	0.02367
0.02495	0.02626	0.02759	0.02894	0.03032
0.03172	0.03315	0.03460	0.03607	0.03757
0.03909	0.04063	0.04220	0.04379	0.04540
0.04704	0.04871	0.05039	0.05210	0.05384
0.05559	0.05737	0.05918	0.06101	0.06286
0.06474	0.06664	0.06856	0.07051	0.07248
0.07447	0.07649	0.07853	0.08060	0.08269
0.08480	0.08694	0.08910	0.09129	0.09349
0.09573	0.09798	0.10026	0.10256	0.10489
0.10724	0.10962	0.11201	0.11444	0.11688
0.11935	0.12184	0.12436	0.12690	0.12947
0.13205	0.13467	0.13730	0.13996	0.14264
0.14535	0.14808	0.15083	0.15361	0.15641
0.15924	0.16327	0.16735	0.17148	0.17566
0.17990	0.18418	0.18851	0.19289	0.19732
0.20180	0.20632	0.21090	0.21553	0.22021
0.22494	0.23145	0.23857	0.24630	0.25465
0.26360	0.27316	0.28333	0.29411	0.30550
0.31750	0.33312	0.35347	0.38046	0.41660
0.47904	0.58340	0.61954	0.64653	0.66688
0.68250	0.69450	0.70589	0.71667	0.72684
0.73640	0.74535	0.75370	0.76143	0.76855
0.77506	0.77979	0.78447	0.78910	0.79368
0.79820	0.80268	0.80711	0.81149	0.81582
0.82010	0.82434	0.82852	0.83265	0.83673
0.84076	0.84359	0.84639	0.84917	0.85192
0.85465	0.85736	0.86004	0.86270	0.86533
0.86795	0.87053	0.87310	0.87564	0.87816
0.88065	0.88312	0.88556	0.88799	0.89038
0.89276	0.89511	0.89744	0.89974	0.90202
0.90427	0.90651	0.90871	0.91090	0.91306
0.91520	0.91731	0.91940	0.92147	0.92351
0.92553	0.92752	0.92949	0.93144	0.93336
0.93526	0.93714	0.93899	0.94082	0.94263
0.94441	0.94616	0.94790	0.94961	0.95129
0.95296	0.95460	0.95621	0.95780	0.95937
0.96091	0.96243	0.96393	0.96540	0.96685
0.96828	0.96968	0.97106	0.97241	0.97374
0.97505	0.97633	0.97759	0.97882	0.98004
0.98122	0.98239	0.98353	0.98465	0.98574
0.98681	0.98785	0.98888	0.98987	0.99085
0.99180	0.99273	0.99363	0.99451	0.99536
0.99620	0.99700	0.99779	0.99855	0.999287

GLOBAL OUTPUT:
2 0.05 YYYYN YYYYNN

WinTR-20: Version 1.10 0 0 0.05
Cantonment Areas EA (continued)
Eglin Main No-Action Alternative

SUB-AREA:
Eglin MainOutlet 17.6 79. 2.04

STREAM REACH:

WinTR-20 Printed Page File End of Input Data List

Eglin Cantonment Areas EA
Eglin Main No-Action Alternative

Name of printed page file:
TR20.out

STORM 25-Yr

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Peak Flow Time (hr)	Peak Flow Rate (cfs)	Peak Flow Rate (csm)
Eglin Main	17.600		9.080		13.29	28450.30	1616.49

Line Start Time (hr)	Flow Values @ time increment of 0.129 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
4.143	0.29	0.99	2.46	5.17	9.67	16.55	26.27
5.045	39.16	55.40	75.05	98.09	124.37	153.71	185.88
5.947	220.58	257.50	296.39	337.07	379.36	423.12	468.22
6.849	514.55	562.00	610.47	659.88	710.16	761.24	813.05
7.751	865.54	918.64	972.32	1026.53	1081.22	1136.37	1191.93
8.653	1247.86	1304.13	1360.70	1418.16	1478.78	1544.98	1618.70
9.555	1702.59	1799.74	1911.70	2036.85	2172.47	2315.55	2463.50
10.457	2614.34	2767.78	2928.55	3102.15	3295.00	3517.01	3782.34
11.359	4102.24	4482.30	4933.06	5480.58	6173.39	7124.62	8545.11
12.260	10487.20	12876.66	15714.66	18900.46	22103.50	24826.12	26819.89
13.162	28010.90	28450.30	28268.05	27455.60	26248.63	24698.58	22841.61
14.064	20840.07	18977.35	17330.73	15841.95	14514.37	13334.37	12263.39
14.966	11291.35	10438.05	9689.40	9021.92	8429.63	7896.90	7409.14
15.868	6951.77	6534.13	6147.76	5793.49	5470.65	5178.67	4913.83
16.770	4677.42	4466.66	4284.64	4124.40	3983.03	3860.23	3748.84
17.672	3646.28	3550.72	3461.20	3377.19	3298.27	3224.68	3158.25
18.574	3101.34	3048.56	2998.84	2951.15	2904.98	2860.11	2816.40
19.476	2773.65	2731.73	2690.50	2649.85	2609.59	2569.57	2529.73
20.377	2490.06	2450.48	2411.01	2371.62	2332.30	2293.09	2253.97
21.279	2214.97	2176.08	2137.23	2098.38	2059.47	2020.52	1981.55
22.181	1942.57	1903.57	1864.55	1825.52	1786.47	1747.42	1708.33
23.083	1669.24	1630.14	1591.01	1551.86	1512.71	1473.53	1434.31
23.985	1393.74	1349.30	1299.41	1242.47	1176.28	1098.98	1011.80
24.887	918.16	821.88	726.61	634.50	548.26	469.38	398.34
25.789	336.06	283.63	240.29	203.88	173.04	146.88	124.52
26.691	105.35	89.10	75.39	63.72	53.78	45.35	38.20
27.593	32.12	26.99	22.65	18.97	15.84	13.18	10.91
28.495	9.00	7.37	6.01	4.86	3.88	3.07	2.39
29.396	1.79	1.29	0.87	0.54	0.29	0.12	

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Peak Flow Time (hr)	Peak Flow Rate (cfs)	Peak Flow Rate (csm)
OUTLET	17.600		9.080		13.29	28450.30	1616.49

WinTR-20: Version 1.10 0 0 0.05
Cantonment Areas EA (continued)
Eglin Main No-Action Alternative
STORM 25-Yr
SUB-AREA:
Eglin MainOutlet 17.6 79. 2.04

STREAM REACH:

Eglin Cantonment Areas EA
Eglin Main No-Action Alternative

Line Start Time (hr)	Flow Values @ time increment of 0.129 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
4.143	0.29	0.99	2.46	5.17	9.67	16.55	26.27
5.045	39.16	55.40	75.05	98.09	124.37	153.71	185.88
5.947	220.58	257.50	296.39	337.07	379.36	423.12	468.22
6.849	514.55	562.00	610.47	659.88	710.16	761.24	813.05
7.751	865.54	918.64	972.32	1026.53	1081.22	1136.37	1191.93
8.653	1247.86	1304.13	1360.70	1418.16	1478.78	1544.98	1618.70
9.555	1702.59	1799.74	1911.70	2036.85	2172.47	2315.55	2463.50
10.457	2614.34	2767.78	2928.55	3102.15	3295.00	3517.01	3782.34
11.359	4102.24	4482.30	4933.06	5480.58	6173.39	7124.62	8545.11
12.260	10487.20	12876.66	15714.66	18900.46	22103.50	24826.12	26819.89
13.162	28010.90	28450.30	28268.05	27455.60	26248.63	24698.58	22841.61
14.064	20840.07	18977.35	17330.73	15841.95	14514.37	13334.37	12263.39
14.966	11291.35	10438.05	9689.40	9021.92	8429.63	7896.90	7409.14
15.868	6951.77	6534.13	6147.76	5793.49	5470.65	5178.67	4913.83
16.770	4677.42	4466.66	4284.64	4124.40	3983.03	3860.23	3748.84
17.672	3646.28	3550.72	3461.20	3377.19	3298.27	3224.68	3158.25
18.574	3101.34	3048.56	2998.84	2951.15	2904.98	2860.11	2816.40
19.476	2773.65	2731.73	2690.50	2649.85	2609.59	2569.57	2529.73
20.377	2490.06	2450.48	2411.01	2371.62	2332.30	2293.09	2253.97
21.279	2214.97	2176.08	2137.23	2098.38	2059.47	2020.52	1981.55
22.181	1942.57	1903.57	1864.55	1825.52	1786.47	1747.42	1708.33
23.083	1669.24	1630.14	1591.01	1551.86	1512.71	1473.53	1434.31
23.985	1393.74	1349.30	1299.41	1242.47	1176.28	1098.98	1011.80
24.887	918.16	821.88	726.61	634.50	548.26	469.38	398.34
25.789	336.06	283.63	240.29	203.88	173.04	146.88	124.52
26.691	105.35	89.10	75.39	63.72	53.78	45.35	38.20
27.593	32.12	26.99	22.65	18.97	15.84	13.18	10.91
28.495	9.00	7.37	6.01	4.86	3.88	3.07	2.39
29.396	1.79	1.29	0.87	0.54	0.29	0.12	

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WinTR-20: Version 1.10                  0         0         0.05
 Cantonment Areas EA                                                    (continued)
Eglin Main No-Action Alternative
                                          STORM 25-Yr
SUB-AREA:
          Eglin MainOutlet              17.6      79.       2.04

STREAM REACH:
```


Eglin Cantonment Areas EA
Eglin Main No-Action Alternative

Area or Reach Identifier	Drainage Area (sq mi)	Alternate	Peak Flow by Storm 25-Yr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)
Eglin Main	17.600		28450.30				
OUTLET	17.600		28450.30				

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WinTR-20: Version 1.10                  0         0         0.05
 Cantonment Areas EA                                                    (continued)
Eglin Main No-Action Alternative
                                          STORM 25-Yr
SUB-AREA:
          Eglin MainOutlet              17.6      79.       2.04

STREAM REACH:
```

WinTR-20 Printed Page File Beginning of Input Data List
TR20.inp

WinTR-20: Version 1.10 0 0 0.05
Eglin Cantonment Areas EA
Eglin Main Alternative 1

SUB-AREA:
Eglin MainOutlet 17.6 80. 2.04

STREAM REACH:

STORM ANALYSIS:
25-Yr 11.77 Type MSE6 2

STRUCTURE RATING:

RAINFALL DISTRIBUTION:
Type MSE6 0.1

0.0	0.000713	0.00145	0.00221	0.00300
0.00380	0.00464	0.00549	0.00637	0.00727
0.00820	0.00915	0.01013	0.01112	0.01215
0.01319	0.01426	0.01535	0.01647	0.01761
0.01878	0.01996	0.02118	0.02241	0.02367
0.02495	0.02626	0.02759	0.02894	0.03032
0.03172	0.03315	0.03460	0.03607	0.03757
0.03909	0.04063	0.04220	0.04379	0.04540
0.04704	0.04871	0.05039	0.05210	0.05384
0.05559	0.05737	0.05918	0.06101	0.06286
0.06474	0.06664	0.06856	0.07051	0.07248
0.07447	0.07649	0.07853	0.08060	0.08269
0.08480	0.08694	0.08910	0.09129	0.09349
0.09573	0.09798	0.10026	0.10256	0.10489
0.10724	0.10962	0.11201	0.11444	0.11688
0.11935	0.12184	0.12436	0.12690	0.12947
0.13205	0.13467	0.13730	0.13996	0.14264
0.14535	0.14808	0.15083	0.15361	0.15641
0.15924	0.16327	0.16735	0.17148	0.17566
0.17990	0.18418	0.18851	0.19289	0.19732
0.20180	0.20632	0.21090	0.21553	0.22021
0.22494	0.23145	0.23857	0.24630	0.25465
0.26360	0.27316	0.28333	0.29411	0.30550
0.31750	0.33312	0.35347	0.38046	0.41660
0.47904	0.58340	0.61954	0.64653	0.66688
0.68250	0.69450	0.70589	0.71667	0.72684
0.73640	0.74535	0.75370	0.76143	0.76855
0.77506	0.77979	0.78447	0.78910	0.79368
0.79820	0.80268	0.80711	0.81149	0.81582
0.82010	0.82434	0.82852	0.83265	0.83673
0.84076	0.84359	0.84639	0.84917	0.85192
0.85465	0.85736	0.86004	0.86270	0.86533
0.86795	0.87053	0.87310	0.87564	0.87816
0.88065	0.88312	0.88556	0.88799	0.89038
0.89276	0.89511	0.89744	0.89974	0.90202
0.90427	0.90651	0.90871	0.91090	0.91306
0.91520	0.91731	0.91940	0.92147	0.92351
0.92553	0.92752	0.92949	0.93144	0.93336
0.93526	0.93714	0.93899	0.94082	0.94263
0.94441	0.94616	0.94790	0.94961	0.95129
0.95296	0.95460	0.95621	0.95780	0.95937
0.96091	0.96243	0.96393	0.96540	0.96685
0.96828	0.96968	0.97106	0.97241	0.97374
0.97505	0.97633	0.97759	0.97882	0.98004
0.98122	0.98239	0.98353	0.98465	0.98574
0.98681	0.98785	0.98888	0.98987	0.99085
0.99180	0.99273	0.99363	0.99451	0.99536
0.99620	0.99700	0.99779	0.99855	0.999287

GLOBAL OUTPUT:
2 0.05 YYYYN YYYYNN

WinTR-20 Printed Page File Beginning of Input Data List
TR20.inp

WinTR-20: Version 1.10 0 0 0.05
Cantonment Areas EA (continued)
Eglin Main Alternative 1

SUB-AREA:
Eglin MainOutlet 17.6 80. 2.04

STREAM REACH:

WinTR-20 Printed Page File End of Input Data List

Eglin Cantonment Areas EA
Eglin Main Alternative 1

Name of printed page file:
TR20.out

STORM 25-Yr

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Peak Flow Time (hr)	Peak Flow Rate (cfs)	Peak Flow Rate (csm)
Eglin Main	17.600		9.216		13.25	28729.60	1632.36

Line Start Time (hr)	Flow Values @ time increment of 0.129 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
3.975	0.29	0.99	2.49	5.22	9.77	16.73	26.56
4.877	39.60	56.03	75.92	99.24	125.84	155.54	188.12
5.779	223.25	260.64	300.01	341.18	383.98	428.26	473.90
6.681	520.78	568.77	617.80	667.76	718.59	770.20	822.55
7.583	875.56	929.19	983.38	1038.09	1093.27	1148.89	1204.91
8.485	1261.28	1317.99	1374.98	1432.22	1489.70	1549.52	1614.61
9.387	1686.69	1768.28	1862.74	1972.89	2097.43	2233.56	2378.24
10.289	2528.15	2681.90	2837.23	2998.10	3170.26	3359.59	3574.68
11.191	3829.15	4136.40	4503.56	4938.63	5460.56	6111.17	6983.38
12.092	8294.61	10133.51	12428.64	15190.63	18354.02	21638.57	24527.07
12.994	26721.92	28119.34	28729.60	28704.18	28010.97	26886.48	25401.93
13.896	23583.76	21564.45	19640.92	17931.67	16383.68	14998.81	13770.03
14.798	12658.33	11643.76	10749.84	9967.55	9270.02	8651.61	8098.36
15.700	7596.54	7125.34	6694.56	6296.29	5929.86	5595.62	5292.72
16.602	5017.48	4771.50	4551.12	4359.81	4192.02	4043.91	3915.77
17.504	3800.30	3694.42	3596.10	3504.10	3417.76	3336.66	3260.82
18.406	3191.58	3132.45	3078.25	3027.37	2978.85	2931.94	2886.42
19.308	2842.11	2798.82	2756.41	2714.74	2673.70	2633.13	2592.82
20.209	2552.71	2512.78	2472.96	2433.23	2393.60	2354.04	2314.60
21.111	2275.25	2236.02	2196.91	2157.86	2118.82	2079.74	2040.64
22.013	2001.50	1962.33	1923.16	1883.96	1844.74	1805.50	1766.27
22.915	1727.01	1687.73	1648.46	1609.16	1569.84	1530.53	1491.21
23.817	1451.86	1411.75	1368.59	1320.29	1265.45	1202.07	1128.03
24.719	1043.24	950.79	854.56	758.23	664.65	575.94	494.46
25.621	420.70	355.39	299.65	253.55	215.13	182.56	154.96
26.523	131.45	111.28	94.10	79.62	67.33	56.85	47.95
27.425	40.40	33.99	28.56	23.99	20.10	16.80	14.00
28.327	11.61	9.58	7.87	6.42	5.21	4.17	3.31
29.228	2.59	1.97	1.44	1.00	0.64	0.36	0.17

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Peak Flow Time (hr)	Peak Flow Rate (cfs)	Peak Flow Rate (csm)
OUTLET	17.600		9.216		13.25	28729.60	1632.36

WinTR-20 Printed Page File Beginning of Input Data List
TR20.inp

WinTR-20: Version 1.10 0 0 0.05
Cantonment Areas EA (continued)
Eglin Main Alternative 1

STORM 25-Yr

SUB-AREA:
Eglin MainOutlet 17.6 80. 2.04

STREAM REACH:

Eglin Cantonment Areas EA
Eglin Main Alternative 1

Line Start Time (hr)	Flow Values @ time increment of 0.129 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
3.975	0.29	0.99	2.49	5.22	9.77	16.73	26.56
4.877	39.60	56.03	75.92	99.24	125.84	155.54	188.12
5.779	223.25	260.64	300.01	341.18	383.98	428.26	473.90
6.681	520.78	568.77	617.80	667.76	718.59	770.20	822.55
7.583	875.56	929.19	983.38	1038.09	1093.27	1148.89	1204.91
8.485	1261.28	1317.99	1374.98	1432.22	1489.70	1549.52	1614.61
9.387	1686.69	1768.28	1862.74	1972.89	2097.43	2233.56	2378.24
10.289	2528.15	2681.90	2837.23	2998.10	3170.26	3359.59	3574.68
11.191	3829.15	4136.40	4503.56	4938.63	5460.56	6111.17	6983.38
12.092	8294.61	10133.51	12428.64	15190.63	18354.02	21638.57	24527.07
12.994	26721.92	28119.34	28729.60	28704.18	28010.97	26886.48	25401.93
13.896	23583.76	21564.45	19640.92	17931.67	16383.68	14998.81	13770.03
14.798	12658.33	11643.76	10749.84	9967.55	9270.02	8651.61	8098.36
15.700	7596.54	7125.34	6694.56	6296.29	5929.86	5595.62	5292.72
16.602	5017.48	4771.50	4551.12	4359.81	4192.02	4043.91	3915.77
17.504	3800.30	3694.42	3596.10	3504.10	3417.76	3336.66	3260.82
18.406	3191.58	3132.45	3078.25	3027.37	2978.85	2931.94	2886.42
19.308	2842.11	2798.82	2756.41	2714.74	2673.70	2633.13	2592.82
20.209	2552.71	2512.78	2472.96	2433.23	2393.60	2354.04	2314.60
21.111	2275.25	2236.02	2196.91	2157.86	2118.82	2079.74	2040.64
22.013	2001.50	1962.33	1923.16	1883.96	1844.74	1805.50	1766.27
22.915	1727.01	1687.73	1648.46	1609.16	1569.84	1530.53	1491.21
23.817	1451.86	1411.75	1368.59	1320.29	1265.45	1202.07	1128.03
24.719	1043.24	950.79	854.56	758.23	664.65	575.94	494.46
25.621	420.70	355.39	299.65	253.55	215.13	182.56	154.96
26.523	131.45	111.28	94.10	79.62	67.33	56.85	47.95
27.425	40.40	33.99	28.56	23.99	20.10	16.80	14.00
28.327	11.61	9.58	7.87	6.42	5.21	4.17	3.31
29.228	2.59	1.97	1.44	1.00	0.64	0.36	0.17

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WinTR-20: Version 1.10                  0         0         0.05
 Cantonment Areas EA                                                    (continued)
Eglin Main Alternative 1
                                           STORM 25-Yr
SUB-AREA:
          Eglin MainOutlet              17.6      80.       2.04

STREAM REACH:
```


Eglin Cantonment Areas EA
Eglin Main Alternative 1

Area or Reach Identifier	Drainage Area (sq mi)	Alternate	Peak Flow by Storm 25-Yr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)
Eglin Main	17.600		28729.60				
OUTLET	17.600		28729.60				

```
WinTR-20: Version 1.10                  0         0         0.05
 Cantonment Areas EA                                                    (continued)
Eglin Main Alternative 1
                                          STORM 25-Yr
SUB-AREA:
          Eglin MainOutlet              17.6      80.       2.04

STREAM REACH:
```

WinTR-20 Printed Page File Beginning of Input Data List
TR20.inp

WinTR-20: Version 1.10 0 0 0.05
Eglin Cantonment Areas EA
Eglin Main Alternative 2

SUB-AREA:
Eglin MainOutlet 17.6 80. 2.04

STREAM REACH:

STORM ANALYSIS:
25-Yr 11.77 Type MSE6 2

STRUCTURE RATING:

RAINFALL DISTRIBUTION:
Type MSE6 0.1

0.0	0.000713	0.00145	0.00221	0.00300
0.00380	0.00464	0.00549	0.00637	0.00727
0.00820	0.00915	0.01013	0.01112	0.01215
0.01319	0.01426	0.01535	0.01647	0.01761
0.01878	0.01996	0.02118	0.02241	0.02367
0.02495	0.02626	0.02759	0.02894	0.03032
0.03172	0.03315	0.03460	0.03607	0.03757
0.03909	0.04063	0.04220	0.04379	0.04540
0.04704	0.04871	0.05039	0.05210	0.05384
0.05559	0.05737	0.05918	0.06101	0.06286
0.06474	0.06664	0.06856	0.07051	0.07248
0.07447	0.07649	0.07853	0.08060	0.08269
0.08480	0.08694	0.08910	0.09129	0.09349
0.09573	0.09798	0.10026	0.10256	0.10489
0.10724	0.10962	0.11201	0.11444	0.11688
0.11935	0.12184	0.12436	0.12690	0.12947
0.13205	0.13467	0.13730	0.13996	0.14264
0.14535	0.14808	0.15083	0.15361	0.15641
0.15924	0.16327	0.16735	0.17148	0.17566
0.17990	0.18418	0.18851	0.19289	0.19732
0.20180	0.20632	0.21090	0.21553	0.22021
0.22494	0.23145	0.23857	0.24630	0.25465
0.26360	0.27316	0.28333	0.29411	0.30550
0.31750	0.33312	0.35347	0.38046	0.41660
0.47904	0.58340	0.61954	0.64653	0.66688
0.68250	0.69450	0.70589	0.71667	0.72684
0.73640	0.74535	0.75370	0.76143	0.76855
0.77506	0.77979	0.78447	0.78910	0.79368
0.79820	0.80268	0.80711	0.81149	0.81582
0.82010	0.82434	0.82852	0.83265	0.83673
0.84076	0.84359	0.84639	0.84917	0.85192
0.85465	0.85736	0.86004	0.86270	0.86533
0.86795	0.87053	0.87310	0.87564	0.87816
0.88065	0.88312	0.88556	0.88799	0.89038
0.89276	0.89511	0.89744	0.89974	0.90202
0.90427	0.90651	0.90871	0.91090	0.91306
0.91520	0.91731	0.91940	0.92147	0.92351
0.92553	0.92752	0.92949	0.93144	0.93336
0.93526	0.93714	0.93899	0.94082	0.94263
0.94441	0.94616	0.94790	0.94961	0.95129
0.95296	0.95460	0.95621	0.95780	0.95937
0.96091	0.96243	0.96393	0.96540	0.96685
0.96828	0.96968	0.97106	0.97241	0.97374
0.97505	0.97633	0.97759	0.97882	0.98004
0.98122	0.98239	0.98353	0.98465	0.98574
0.98681	0.98785	0.98888	0.98987	0.99085
0.99180	0.99273	0.99363	0.99451	0.99536
0.99620	0.99700	0.99779	0.99855	0.999287

GLOBAL OUTPUT:
2 0.05 YYYYN YYYYNN

WinTR-20 Printed Page File Beginning of Input Data List
TR20.inp

WinTR-20: Version 1.10 0 0 0.05
Cantonment Areas EA (continued)
Eglin Main Alternative 2

SUB-AREA:
Eglin MainOutlet 17.6 80. 2.04

STREAM REACH:

WinTR-20 Printed Page File End of Input Data List

Eglin Cantonment Areas EA
Eglin Main Alternative 2

Name of printed page file:
TR20.out

STORM 25-Yr

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Peak Flow Time (hr)	Peak Flow Rate (cfs)	Peak Flow Rate (csm)
Eglin Main	17.600		9.216		13.25	28729.60	1632.36

Line Start Time (hr)	Flow Values @ time increment of 0.129 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
3.975	0.29	0.99	2.49	5.22	9.77	16.73	26.56
4.877	39.60	56.03	75.92	99.24	125.84	155.54	188.12
5.779	223.25	260.64	300.01	341.18	383.98	428.26	473.90
6.681	520.78	568.77	617.80	667.76	718.59	770.20	822.55
7.583	875.56	929.19	983.38	1038.09	1093.27	1148.89	1204.91
8.485	1261.28	1317.99	1374.98	1432.22	1489.70	1549.52	1614.61
9.387	1686.69	1768.28	1862.74	1972.89	2097.43	2233.56	2378.24
10.289	2528.15	2681.90	2837.23	2998.10	3170.26	3359.59	3574.68
11.191	3829.15	4136.40	4503.56	4938.63	5460.56	6111.17	6983.38
12.092	8294.61	10133.51	12428.64	15190.63	18354.02	21638.57	24527.07
12.994	26721.92	28119.34	28729.60	28704.18	28010.97	26886.48	25401.93
13.896	23583.76	21564.45	19640.92	17931.67	16383.68	14998.81	13770.03
14.798	12658.33	11643.76	10749.84	9967.55	9270.02	8651.61	8098.36
15.700	7596.54	7125.34	6694.56	6296.29	5929.86	5595.62	5292.72
16.602	5017.48	4771.50	4551.12	4359.81	4192.02	4043.91	3915.77
17.504	3800.30	3694.42	3596.10	3504.10	3417.76	3336.66	3260.82
18.406	3191.58	3132.45	3078.25	3027.37	2978.85	2931.94	2886.42
19.308	2842.11	2798.82	2756.41	2714.74	2673.70	2633.13	2592.82
20.209	2552.71	2512.78	2472.96	2433.23	2393.60	2354.04	2314.60
21.111	2275.25	2236.02	2196.91	2157.86	2118.82	2079.74	2040.64
22.013	2001.50	1962.33	1923.16	1883.96	1844.74	1805.50	1766.27
22.915	1727.01	1687.73	1648.46	1609.16	1569.84	1530.53	1491.21
23.817	1451.86	1411.75	1368.59	1320.29	1265.45	1202.07	1128.03
24.719	1043.24	950.79	854.56	758.23	664.65	575.94	494.46
25.621	420.70	355.39	299.65	253.55	215.13	182.56	154.96
26.523	131.45	111.28	94.10	79.62	67.33	56.85	47.95
27.425	40.40	33.99	28.56	23.99	20.10	16.80	14.00
28.327	11.61	9.58	7.87	6.42	5.21	4.17	3.31
29.228	2.59	1.97	1.44	1.00	0.64	0.36	0.17

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Peak Flow Time (hr)	Peak Flow Rate (cfs)	Peak Flow Rate (csm)
OUTLET	17.600		9.216		13.25	28729.60	1632.36

WinTR-20: Version 1.10 0 0 0.05
Cantonment Areas EA (continued)
Eglin Main Alternative 2

STORM 25-Yr

SUB-AREA:
Eglin MainOutlet 17.6 80. 2.04

STREAM REACH:

Eglin Cantonment Areas EA
Eglin Main Alternative 2

Line Start Time (hr)	Flow Values @ time increment of 0.129 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
3.975	0.29	0.99	2.49	5.22	9.77	16.73	26.56
4.877	39.60	56.03	75.92	99.24	125.84	155.54	188.12
5.779	223.25	260.64	300.01	341.18	383.98	428.26	473.90
6.681	520.78	568.77	617.80	667.76	718.59	770.20	822.55
7.583	875.56	929.19	983.38	1038.09	1093.27	1148.89	1204.91
8.485	1261.28	1317.99	1374.98	1432.22	1489.70	1549.52	1614.61
9.387	1686.69	1768.28	1862.74	1972.89	2097.43	2233.56	2378.24
10.289	2528.15	2681.90	2837.23	2998.10	3170.26	3359.59	3574.68
11.191	3829.15	4136.40	4503.56	4938.63	5460.56	6111.17	6983.38
12.092	8294.61	10133.51	12428.64	15190.63	18354.02	21638.57	24527.07
12.994	26721.92	28119.34	28729.60	28704.18	28010.97	26886.48	25401.93
13.896	23583.76	21564.45	19640.92	17931.67	16383.68	14998.81	13770.03
14.798	12658.33	11643.76	10749.84	9967.55	9270.02	8651.61	8098.36
15.700	7596.54	7125.34	6694.56	6296.29	5929.86	5595.62	5292.72
16.602	5017.48	4771.50	4551.12	4359.81	4192.02	4043.91	3915.77
17.504	3800.30	3694.42	3596.10	3504.10	3417.76	3336.66	3260.82
18.406	3191.58	3132.45	3078.25	3027.37	2978.85	2931.94	2886.42
19.308	2842.11	2798.82	2756.41	2714.74	2673.70	2633.13	2592.82
20.209	2552.71	2512.78	2472.96	2433.23	2393.60	2354.04	2314.60
21.111	2275.25	2236.02	2196.91	2157.86	2118.82	2079.74	2040.64
22.013	2001.50	1962.33	1923.16	1883.96	1844.74	1805.50	1766.27
22.915	1727.01	1687.73	1648.46	1609.16	1569.84	1530.53	1491.21
23.817	1451.86	1411.75	1368.59	1320.29	1265.45	1202.07	1128.03
24.719	1043.24	950.79	854.56	758.23	664.65	575.94	494.46
25.621	420.70	355.39	299.65	253.55	215.13	182.56	154.96
26.523	131.45	111.28	94.10	79.62	67.33	56.85	47.95
27.425	40.40	33.99	28.56	23.99	20.10	16.80	14.00
28.327	11.61	9.58	7.87	6.42	5.21	4.17	3.31
29.228	2.59	1.97	1.44	1.00	0.64	0.36	0.17

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WinTR-20: Version 1.10                  0         0         0.05
 Cantonment Areas EA                                                    (continued)
Eglin Main Alternative 2
                                          STORM 25-Yr
SUB-AREA:
          Eglin MainOutlet              17.6      80.       2.04

STREAM REACH:
```


Eglin Cantonment Areas EA
Eglin Main Alternative 2

Area or Reach Identifier	Drainage Area (sq mi)	Alternate	Peak Flow by Storm 25-Yr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)
Eglin Main	17.600		28729.60				
OUTLET	17.600		28729.60				

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WinTR-20: Version 1.10                  0         0         0.05
 Cantonment Areas EA                                                    (continued)
Eglin Main Alternative 2
                                          STORM 25-Yr
SUB-AREA:
          Eglin MainOutlet              17.6      80.       2.04

STREAM REACH:
```

WinTR-20 Printed Page File Beginning of Input Data List
TR20.inp

WinTR-20: Version 1.10 0 0 0.05
Eglin Cantonment Areas EA
Duke Field No Action Alternative

SUB-AREA:
Duke FieldOutlet 3.03906 57. 1.798

STREAM REACH:

STORM ANALYSIS:
25-Yr 11.77 Type MSE6 2

STRUCTURE RATING:

RAINFALL DISTRIBUTION:
Type MSE6 0.1

0.0	0.000713	0.00145	0.00221	0.00300
0.00380	0.00464	0.00549	0.00637	0.00727
0.00820	0.00915	0.01013	0.01112	0.01215
0.01319	0.01426	0.01535	0.01647	0.01761
0.01878	0.01996	0.02118	0.02241	0.02367
0.02495	0.02626	0.02759	0.02894	0.03032
0.03172	0.03315	0.03460	0.03607	0.03757
0.03909	0.04063	0.04220	0.04379	0.04540
0.04704	0.04871	0.05039	0.05210	0.05384
0.05559	0.05737	0.05918	0.06101	0.06286
0.06474	0.06664	0.06856	0.07051	0.07248
0.07447	0.07649	0.07853	0.08060	0.08269
0.08480	0.08694	0.08910	0.09129	0.09349
0.09573	0.09798	0.10026	0.10256	0.10489
0.10724	0.10962	0.11201	0.11444	0.11688
0.11935	0.12184	0.12436	0.12690	0.12947
0.13205	0.13467	0.13730	0.13996	0.14264
0.14535	0.14808	0.15083	0.15361	0.15641
0.15924	0.16327	0.16735	0.17148	0.17566
0.17990	0.18418	0.18851	0.19289	0.19732
0.20180	0.20632	0.21090	0.21553	0.22021
0.22494	0.23145	0.23857	0.24630	0.25465
0.26360	0.27316	0.28333	0.29411	0.30550
0.31750	0.33312	0.35347	0.38046	0.41660
0.47904	0.58340	0.61954	0.64653	0.66688
0.68250	0.69450	0.70589	0.71667	0.72684
0.73640	0.74535	0.75370	0.76143	0.76855
0.77506	0.77979	0.78447	0.78910	0.79368
0.79820	0.80268	0.80711	0.81149	0.81582
0.82010	0.82434	0.82852	0.83265	0.83673
0.84076	0.84359	0.84639	0.84917	0.85192
0.85465	0.85736	0.86004	0.86270	0.86533
0.86795	0.87053	0.87310	0.87564	0.87816
0.88065	0.88312	0.88556	0.88799	0.89038
0.89276	0.89511	0.89744	0.89974	0.90202
0.90427	0.90651	0.90871	0.91090	0.91306
0.91520	0.91731	0.91940	0.92147	0.92351
0.92553	0.92752	0.92949	0.93144	0.93336
0.93526	0.93714	0.93899	0.94082	0.94263
0.94441	0.94616	0.94790	0.94961	0.95129
0.95296	0.95460	0.95621	0.95780	0.95937
0.96091	0.96243	0.96393	0.96540	0.96685
0.96828	0.96968	0.97106	0.97241	0.97374
0.97505	0.97633	0.97759	0.97882	0.98004
0.98122	0.98239	0.98353	0.98465	0.98574
0.98681	0.98785	0.98888	0.98987	0.99085
0.99180	0.99273	0.99363	0.99451	0.99536
0.99620	0.99700	0.99779	0.99855	0.999287

GLOBAL OUTPUT:
2 0.05 YYYYN YYYYNN

WinTR-20 Printed Page File Beginning of Input Data List
TR20.inp

WinTR-20: Version 1.10 0 0 0.05
Cantonment Areas EA (continued)
Duke Field No Action Alternative

SUB-AREA:
Duke FieldOutlet 3.03906 57. 1.798

STREAM REACH:

WinTR-20 Printed Page File End of Input Data List

Eglin Cantonment Areas EA
Duke Field No Action Alternative

Name of printed page file:
TR20.out

STORM 25-Yr

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Peak Flow Time (hr)	Peak Flow Rate (cfs)	Peak Flow Rate (csm)
Duke Field	3.039		5.907		13.19	3497.12	1150.72

Line Start Time (hr)	Flow Values @ time increment of 0.114 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
8.191	0.13	0.33	0.68	1.27	2.18	3.45	5.14
8.986	7.25	9.86	13.05	16.87	21.40	26.75	33.03
9.781	40.23	48.33	57.25	66.92	77.28	88.23	99.71
10.576	111.82	124.83	139.10	155.16	173.81	196.00	222.54
11.370	254.06	291.03	334.36	386.40	451.44	538.52	669.80
12.165	865.95	1127.13	1450.86	1835.63	2259.42	2669.46	3014.39
12.960	3269.26	3426.94	3497.12	3484.10	3401.90	3269.98	3092.17
13.755	2877.34	2654.37	2448.51	2261.04	2088.61	1932.21	1789.21
14.550	1656.52	1535.66	1428.35	1333.41	1249.52	1175.70	1110.68
15.345	1052.65	1000.12	951.49	905.04	860.60	818.34	778.30
16.140	740.95	706.24	674.71	646.19	620.40	597.80	578.38
16.935	561.29	545.85	531.78	518.83	506.82	495.70	485.59
17.730	476.78	469.04	461.93	455.30	449.04	443.05	437.31
18.525	431.75	426.37	421.12	415.99	410.95	405.98	401.07
19.319	396.20	391.35	386.53	381.73	376.94	372.15	367.36
20.114	362.58	357.80	353.03	348.26	343.49	338.72	333.93
20.909	329.13	324.33	319.52	314.70	309.87	305.04	300.20
21.704	295.34	290.48	285.60	280.71	275.82	270.91	266.00
22.499	261.07	256.14	251.21	246.27	241.32	236.36	231.40
23.294	226.42	221.44	216.46	211.47	206.47	201.46	196.24
24.089	190.46	183.86	176.20	167.17	156.47	144.28	131.09
24.884	117.47	103.94	90.82	78.51	67.23	57.06	48.14
25.679	40.63	34.42	29.21	24.79	21.05	17.85	15.10
26.474	12.77	10.81	9.14	7.72	6.51	5.48	4.61
27.269	3.88	3.26	2.73	2.28	1.90	1.57	1.30
28.063	1.06	0.87	0.70	0.56	0.45	0.35	0.26
28.858	0.19	0.13	0.08				

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Peak Flow Time (hr)	Peak Flow Rate (cfs)	Peak Flow Rate (csm)
OUTLET	3.039		5.907		13.19	3497.12	1150.72

Line Start Time (hr)	Flow Values @ time increment of 0.114 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)

WinTR-20: Version 1.10 0 0 0.05
Cantonment Areas EA (continued)
Duke Field No Action Alternative
STORM 25-Yr
SUB-AREA:
Duke FieldOutlet 3.03906 57. 1.798

STREAM REACH:

8.191	0.13	0.33	0.68	1.27	2.18	3.45	5.14
8.986	7.25	9.86	13.05	16.87	21.40	26.75	33.03

Eglin Cantonment Areas EA
Duke Field No Action Alternative

Line Start Time (hr)	Flow Values @ time increment of 0.114 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
9.781	40.23	48.33	57.25	66.92	77.28	88.23	99.71
10.576	111.82	124.83	139.10	155.16	173.81	196.00	222.54
11.370	254.06	291.03	334.36	386.40	451.44	538.52	669.80
12.165	865.95	1127.13	1450.86	1835.63	2259.42	2669.46	3014.39
12.960	3269.26	3426.94	3497.12	3484.10	3401.90	3269.98	3092.17
13.755	2877.34	2654.37	2448.51	2261.04	2088.61	1932.21	1789.21
14.550	1656.52	1535.66	1428.35	1333.41	1249.52	1175.70	1110.68
15.345	1052.65	1000.12	951.49	905.04	860.60	818.34	778.30
16.140	740.95	706.24	674.71	646.19	620.40	597.80	578.38
16.935	561.29	545.85	531.78	518.83	506.82	495.70	485.59
17.730	476.78	469.04	461.93	455.30	449.04	443.05	437.31
18.525	431.75	426.37	421.12	415.99	410.95	405.98	401.07
19.319	396.20	391.35	386.53	381.73	376.94	372.15	367.36
20.114	362.58	357.80	353.03	348.26	343.49	338.72	333.93
20.909	329.13	324.33	319.52	314.70	309.87	305.04	300.20
21.704	295.34	290.48	285.60	280.71	275.82	270.91	266.00
22.499	261.07	256.14	251.21	246.27	241.32	236.36	231.40
23.294	226.42	221.44	216.46	211.47	206.47	201.46	196.24
24.089	190.46	183.86	176.20	167.17	156.47	144.28	131.09
24.884	117.47	103.94	90.82	78.51	67.23	57.06	48.14
25.679	40.63	34.42	29.21	24.79	21.05	17.85	15.10
26.474	12.77	10.81	9.14	7.72	6.51	5.48	4.61
27.269	3.88	3.26	2.73	2.28	1.90	1.57	1.30
28.063	1.06	0.87	0.70	0.56	0.45	0.35	0.26
28.858	0.19	0.13	0.08				

WinTR-20: Version 1.10 0 0 0.05
Cantonment Areas EA (continued)
Duke Field No Action Alternative
STORM 25-Yr
SUB-AREA:
Duke FieldOutlet 3.03906 57. 1.798

STREAM REACH:

Eglin Cantonment Areas EA
Duke Field No Action Alternative

Area or Reach Identifier	Drainage Area (sq mi)	Alternate	Peak Flow by Storm 25-Yr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)
Duke Field	3.039		3497.12				
OUTLET	3.039		3497.12				

```
WinTR-20: Version 1.10                  0         0         0.05
 Cantonment Areas EA                                                    (continued)
Duke Field No Action Alternative
                                          STORM 25-Yr
SUB-AREA:
          Duke FieldOutlet              3.03906   57.       1.798

STREAM REACH:
```

WinTR-20 Printed Page File Beginning of Input Data List
TR20.inp

WinTR-20: Version 1.10 0 0 0.05
Eglin Cantonment Areas EA
Duke Field Alternative 1

SUB-AREA:
Duke FieldOutlet 3.03906 60. 1.798

STREAM REACH:

STORM ANALYSIS:
25-Yr 11.77 Type MSE6 2

STRUCTURE RATING:

RAINFALL DISTRIBUTION:
Type MSE6 0.1

0.0	0.000713	0.00145	0.00221	0.00300
0.00380	0.00464	0.00549	0.00637	0.00727
0.00820	0.00915	0.01013	0.01112	0.01215
0.01319	0.01426	0.01535	0.01647	0.01761
0.01878	0.01996	0.02118	0.02241	0.02367
0.02495	0.02626	0.02759	0.02894	0.03032
0.03172	0.03315	0.03460	0.03607	0.03757
0.03909	0.04063	0.04220	0.04379	0.04540
0.04704	0.04871	0.05039	0.05210	0.05384
0.05559	0.05737	0.05918	0.06101	0.06286
0.06474	0.06664	0.06856	0.07051	0.07248
0.07447	0.07649	0.07853	0.08060	0.08269
0.08480	0.08694	0.08910	0.09129	0.09349
0.09573	0.09798	0.10026	0.10256	0.10489
0.10724	0.10962	0.11201	0.11444	0.11688
0.11935	0.12184	0.12436	0.12690	0.12947
0.13205	0.13467	0.13730	0.13996	0.14264
0.14535	0.14808	0.15083	0.15361	0.15641
0.15924	0.16327	0.16735	0.17148	0.17566
0.17990	0.18418	0.18851	0.19289	0.19732
0.20180	0.20632	0.21090	0.21553	0.22021
0.22494	0.23145	0.23857	0.24630	0.25465
0.26360	0.27316	0.28333	0.29411	0.30550
0.31750	0.33312	0.35347	0.38046	0.41660
0.47904	0.58340	0.61954	0.64653	0.66688
0.68250	0.69450	0.70589	0.71667	0.72684
0.73640	0.74535	0.75370	0.76143	0.76855
0.77506	0.77979	0.78447	0.78910	0.79368
0.79820	0.80268	0.80711	0.81149	0.81582
0.82010	0.82434	0.82852	0.83265	0.83673
0.84076	0.84359	0.84639	0.84917	0.85192
0.85465	0.85736	0.86004	0.86270	0.86533
0.86795	0.87053	0.87310	0.87564	0.87816
0.88065	0.88312	0.88556	0.88799	0.89038
0.89276	0.89511	0.89744	0.89974	0.90202
0.90427	0.90651	0.90871	0.91090	0.91306
0.91520	0.91731	0.91940	0.92147	0.92351
0.92553	0.92752	0.92949	0.93144	0.93336
0.93526	0.93714	0.93899	0.94082	0.94263
0.94441	0.94616	0.94790	0.94961	0.95129
0.95296	0.95460	0.95621	0.95780	0.95937
0.96091	0.96243	0.96393	0.96540	0.96685
0.96828	0.96968	0.97106	0.97241	0.97374
0.97505	0.97633	0.97759	0.97882	0.98004
0.98122	0.98239	0.98353	0.98465	0.98574
0.98681	0.98785	0.98888	0.98987	0.99085
0.99180	0.99273	0.99363	0.99451	0.99536
0.99620	0.99700	0.99779	0.99855	0.999287

GLOBAL OUTPUT:
2 0.05 YYYYN YYYYNN

WinTR-20: Version 1.10 0 0 0.05
Cantonment Areas EA (continued)
Duke Field Alternative 1

SUB-AREA:
Duke FieldOutlet 3.03906 60. 1.798

STREAM REACH:

WinTR-20 Printed Page File End of Input Data List

Eglin Cantonment Areas EA
Duke Field Alternative 1

Name of printed page file:
TR20.out

STORM 25-Yr

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Peak Flow Time (hr)	Peak Flow Rate (cfs)	Peak Flow Rate (csm)
Duke Field	3.039		6.361		13.27	3779.97	1243.80

Line Start Time (hr)	Flow Values @ time increment of 0.114 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
7.593	0.13	0.33	0.69	1.29	2.20	3.49	5.20
8.388	7.34	9.93	12.95	16.39	20.22	24.42	28.99
9.183	34.01	39.58	45.80	52.81	60.79	69.80	79.79
9.978	90.68	102.33	114.66	127.55	140.89	154.75	169.39
10.773	185.24	202.85	223.09	247.05	275.74	309.88	349.97
11.568	396.83	452.42	520.60	608.63	735.59	929.09	1194.10
12.362	1523.73	1919.54	2366.51	2816.03	3204.00	3498.02	3687.07
13.157	3777.37	3779.97	3699.26	3564.00	3379.62	3151.15	2903.95
13.952	2672.98	2465.04	2273.18	2098.94	1940.90	1794.70	1660.44
14.747	1540.94	1435.62	1342.24	1260.06	1187.67	1123.70	1065.77
15.542	1012.86	962.69	914.80	869.28	826.19	785.77	748.32
16.337	714.00	683.08	655.02	630.17	608.85	590.14	573.35
17.132	558.09	544.07	531.10	519.07	508.06	498.32	489.95
17.927	482.30	475.19	468.51	462.13	456.02	450.12	444.41
18.722	438.86	433.43	428.11	422.88	417.72	412.59	407.50
19.517	402.44	397.40	392.38	387.36	382.36	377.35	372.35
20.312	367.36	362.37	357.39	352.41	347.42	342.42	337.40
21.106	332.38	327.36	322.34	317.31	312.27	307.22	302.15
21.901	297.08	292.00	286.91	281.81	276.71	271.59	266.47
22.696	261.35	256.21	251.08	245.93	240.78	235.63	230.46
23.491	225.29	220.12	214.93	209.75	204.42	198.63	192.03
24.286	184.42	175.48	164.88	152.64	139.22	125.20	111.14
25.081	97.44	84.44	72.49	61.67	52.08	43.92	37.17
25.876	31.54	26.77	22.72	19.28	16.32	13.80	11.68
26.671	9.88	8.34	7.04	5.93	4.99	4.20	3.53
27.466	2.96	2.47	2.06	1.71	1.41	1.16	0.95
28.261	0.77	0.62	0.49	0.38	0.29	0.21	0.15
29.055	0.09	0.05					

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Peak Flow Time (hr)	Peak Flow Rate (cfs)	Peak Flow Rate (csm)
OUTLET	3.039		6.361		13.27	3779.97	1243.80

WinTR-20: Version 1.10 0 0 0.05
Cantonment Areas EA (continued)
Duke Field Alternative 1

STORM 25-Yr

SUB-AREA:
Duke FieldOutlet 3.03906 60. 1.798

STREAM REACH:

Eglin Cantonment Areas EA
Duke Field Alternative 1

Line Start Time (hr)	Flow Values @ time increment of 0.114 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
7.593	0.13	0.33	0.69	1.29	2.20	3.49	5.20
8.388	7.34	9.93	12.95	16.39	20.22	24.42	28.99
9.183	34.01	39.58	45.80	52.81	60.79	69.80	79.79
9.978	90.68	102.33	114.66	127.55	140.89	154.75	169.39
10.773	185.24	202.85	223.09	247.05	275.74	309.88	349.97
11.568	396.83	452.42	520.60	608.63	735.59	929.09	1194.10
12.362	1523.73	1919.54	2366.51	2816.03	3204.00	3498.02	3687.07
13.157	3777.37	3779.97	3699.26	3564.00	3379.62	3151.15	2903.95
13.952	2672.98	2465.04	2273.18	2098.94	1940.90	1794.70	1660.44
14.747	1540.94	1435.62	1342.24	1260.06	1187.67	1123.70	1065.77
15.542	1012.86	962.69	914.80	869.28	826.19	785.77	748.32
16.337	714.00	683.08	655.02	630.17	608.85	590.14	573.35
17.132	558.09	544.07	531.10	519.07	508.06	498.32	489.95
17.927	482.30	475.19	468.51	462.13	456.02	450.12	444.41
18.722	438.86	433.43	428.11	422.88	417.72	412.59	407.50
19.517	402.44	397.40	392.38	387.36	382.36	377.35	372.35
20.312	367.36	362.37	357.39	352.41	347.42	342.42	337.40
21.106	332.38	327.36	322.34	317.31	312.27	307.22	302.15
21.901	297.08	292.00	286.91	281.81	276.71	271.59	266.47
22.696	261.35	256.21	251.08	245.93	240.78	235.63	230.46
23.491	225.29	220.12	214.93	209.75	204.42	198.63	192.03
24.286	184.42	175.48	164.88	152.64	139.22	125.20	111.14
25.081	97.44	84.44	72.49	61.67	52.08	43.92	37.17
25.876	31.54	26.77	22.72	19.28	16.32	13.80	11.68
26.671	9.88	8.34	7.04	5.93	4.99	4.20	3.53
27.466	2.96	2.47	2.06	1.71	1.41	1.16	0.95
28.261	0.77	0.62	0.49	0.38	0.29	0.21	0.15
29.055	0.09	0.05					

WinTR-20: Version 1.10 0 0 0.05
Cantonment Areas EA (continued)
Duke Field Alternative 1

STORM 25-Yr

SUB-AREA:
Duke FieldOutlet 3.03906 60. 1.798

STREAM REACH:

Eglin Cantonment Areas EA
Duke Field Alternative 1

Area or Reach Identifier	Drainage Area (sq mi)	Alternate	Peak Flow by Storm 25-Yr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)
Duke Field	3.039		3779.97				
OUTLET	3.039		3779.97				

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WinTR-20: Version 1.10                  0         0         0.05
 Cantonment Areas EA                                                    (continued)
Duke Field Alternative 1
                                          STORM 25-Yr
SUB-AREA:
          Duke FieldOutlet              3.03906   60.       1.798

STREAM REACH:
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WinTR-20: Version 1.10                  0         0         0.05
Eglin Cantonment Areas EA
Duke Field Alternative 2

SUB-AREA:
          Duke FieldOutlet              3.03906   61.       1.798

STREAM REACH:

STORM ANALYSIS:
          25-Yr                         11.77     Type MSE6 2

STRUCTURE RATING:

RAINFALL DISTRIBUTION:
          Type MSE6           0.1
                     0.0  0.000713  0.00145   0.00221   0.00300
                 0.00380   0.00464   0.00549   0.00637   0.00727
                 0.00820   0.00915   0.01013   0.01112   0.01215
                 0.01319   0.01426   0.01535   0.01647   0.01761
                 0.01878   0.01996   0.02118   0.02241   0.02367
                 0.02495   0.02626   0.02759   0.02894   0.03032
                 0.03172   0.03315   0.03460   0.03607   0.03757
                 0.03909   0.04063   0.04220   0.04379   0.04540
                 0.04704   0.04871   0.05039   0.05210   0.05384
                 0.05559   0.05737   0.05918   0.06101   0.06286
                 0.06474   0.06664   0.06856   0.07051   0.07248
                 0.07447   0.07649   0.07853   0.08060   0.08269
                 0.08480   0.08694   0.08910   0.09129   0.09349
                 0.09573   0.09798   0.10026   0.10256   0.10489
                 0.10724   0.10962   0.11201   0.11444   0.11688
                 0.11935   0.12184   0.12436   0.12690   0.12947
                 0.13205   0.13467   0.13730   0.13996   0.14264
                 0.14535   0.14808   0.15083   0.15361   0.15641
                 0.15924   0.16327   0.16735   0.17148   0.17566
                 0.17990   0.18418   0.18851   0.19289   0.19732
                 0.20180   0.20632   0.21090   0.21553   0.22021
                 0.22494   0.23145   0.23857   0.24630   0.25465
                 0.26360   0.27316   0.28333   0.29411   0.30550
                 0.31750   0.33312   0.35347   0.38046   0.41660
                 0.47904   0.58340   0.61954   0.64653   0.66688
                 0.68250   0.69450   0.70589   0.71667   0.72684
                 0.73640   0.74535   0.75370   0.76143   0.76855
                 0.77506   0.77979   0.78447   0.78910   0.79368
                 0.79820   0.80268   0.80711   0.81149   0.81582
                 0.82010   0.82434   0.82852   0.83265   0.83673
                 0.84076   0.84359   0.84639   0.84917   0.85192
                 0.85465   0.85736   0.86004   0.86270   0.86533
                 0.86795   0.87053   0.87310   0.87564   0.87816
                 0.88065   0.88312   0.88556   0.88799   0.89038
                 0.89276   0.89511   0.89744   0.89974   0.90202
                 0.90427   0.90651   0.90871   0.91090   0.91306
                 0.91520   0.91731   0.91940   0.92147   0.92351
                 0.92553   0.92752   0.92949   0.93144   0.93336
                 0.93526   0.93714   0.93899   0.94082   0.94263
                 0.94441   0.94616   0.94790   0.94961   0.95129
                 0.95296   0.95460   0.95621   0.95780   0.95937
                 0.96091   0.96243   0.96393   0.96540   0.96685
                 0.96828   0.96968   0.97106   0.97241   0.97374
                 0.97505   0.97633   0.97759   0.97882   0.98004
                 0.98122   0.98239   0.98353   0.98465   0.98574
                 0.98681   0.98785   0.98888   0.98987   0.99085
                 0.99180   0.99273   0.99363   0.99451   0.99536
                 0.99620   0.99700   0.99779   0.99855   0.999287

GLOBAL OUTPUT:
          2         0.05                YYYYN     YYYYNN
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WinTR-20 Printed Page File Beginning of Input Data List
TR20.inp

WinTR-20: Version 1.10 0 0 0.05
Cantonment Areas EA (continued)
Duke Field Alternative 2

SUB-AREA:
Duke FieldOutlet 3.03906 61. 1.798

STREAM REACH:

WinTR-20 Printed Page File End of Input Data List

Eglin Cantonment Areas EA
Duke Field Alternative 2

Name of printed page file:
TR20.out

STORM 25-Yr

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Peak Flow Time (hr)	Peak Flow Rate (cfs)	Peak Flow Rate (csm)
Duke Field	3.039		6.512		13.19	3880.41	1276.85

Line Start Time (hr)	Flow Values @ time increment of 0.114 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
7.399	0.13	0.33	0.69	1.29	2.21	3.50	5.22
8.194	7.37	9.97	13.01	16.46	20.31	24.53	29.06
8.989	33.87	39.03	44.66	50.85	57.75	65.53	74.38
9.784	84.32	95.25	107.05	119.59	132.78	146.47	160.57
10.579	175.22	190.78	207.68	226.63	248.64	274.88	306.30
11.374	343.57	387.14	437.96	498.75	574.35	675.04	825.72
12.169	1047.86	1340.28	1700.20	2124.76	2587.77	3029.84	3396.28
12.964	3661.35	3818.74	3880.41	3850.64	3746.87	3589.70	3383.45
13.759	3138.97	2888.90	2659.58	2451.25	2260.39	2087.74	1930.05
14.554	1784.03	1651.43	1533.92	1429.99	1338.26	1257.56	1186.54
15.349	1123.13	1065.84	1012.87	962.40	914.26	868.61	825.42
16.143	785.21	747.90	714.06	683.46	655.81	631.63	610.82
16.938	592.47	575.88	560.76	546.82	533.91	521.97	511.14
17.733	501.74	493.47	485.88	478.80	472.12	465.72	459.59
18.528	453.66	447.91	442.32	436.85	431.47	426.18	420.96
19.323	415.77	410.61	405.49	400.38	395.29	390.20	385.12
20.118	380.05	374.99	369.93	364.88	359.83	354.79	349.72
20.913	344.65	339.58	334.50	329.41	324.32	319.22	314.11
21.708	308.99	303.87	298.73	293.59	288.43	283.27	278.10
22.503	272.92	267.74	262.56	257.37	252.17	246.97	241.75
23.298	236.53	231.31	226.08	220.85	215.61	210.36	204.88
24.092	198.80	191.86	183.82	174.33	163.08	150.30	136.49
24.887	122.25	108.13	94.44	81.61	69.87	59.28	50.00
25.682	42.20	35.76	30.35	25.76	21.87	18.54	15.69
26.477	13.27	11.23	9.49	8.02	6.76	5.70	4.79
27.272	4.03	3.38	2.83	2.37	1.97	1.63	1.35
28.067	1.10	0.90	0.73	0.58	0.46	0.36	0.27
28.862	0.19	0.13	0.08				

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Peak Flow Time (hr)	Peak Flow Rate (cfs)	Peak Flow Rate (csm)
OUTLET	3.039		6.512		13.19	3880.41	1276.85

WinTR-20: Version 1.10 0 0 0.05
Cantonment Areas EA (continued)
Duke Field Alternative 2

STORM 25-Yr

SUB-AREA:
Duke FieldOutlet 3.03906 61. 1.798

STREAM REACH:

Eglin Cantonment Areas EA
Duke Field Alternative 2

Line Start Time (hr)	Flow Values @ time increment of 0.114 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
7.399	0.13	0.33	0.69	1.29	2.21	3.50	5.22
8.194	7.37	9.97	13.01	16.46	20.31	24.53	29.06
8.989	33.87	39.03	44.66	50.85	57.75	65.53	74.38
9.784	84.32	95.25	107.05	119.59	132.78	146.47	160.57
10.579	175.22	190.78	207.68	226.63	248.64	274.88	306.30
11.374	343.57	387.14	437.96	498.75	574.35	675.04	825.72
12.169	1047.86	1340.28	1700.20	2124.76	2587.77	3029.84	3396.28
12.964	3661.35	3818.74	3880.41	3850.64	3746.87	3589.70	3383.45
13.759	3138.97	2888.90	2659.58	2451.25	2260.39	2087.74	1930.05
14.554	1784.03	1651.43	1533.92	1429.99	1338.26	1257.56	1186.54
15.349	1123.13	1065.84	1012.87	962.40	914.26	868.61	825.42
16.143	785.21	747.90	714.06	683.46	655.81	631.63	610.82
16.938	592.47	575.88	560.76	546.82	533.91	521.97	511.14
17.733	501.74	493.47	485.88	478.80	472.12	465.72	459.59
18.528	453.66	447.91	442.32	436.85	431.47	426.18	420.96
19.323	415.77	410.61	405.49	400.38	395.29	390.20	385.12
20.118	380.05	374.99	369.93	364.88	359.83	354.79	349.72
20.913	344.65	339.58	334.50	329.41	324.32	319.22	314.11
21.708	308.99	303.87	298.73	293.59	288.43	283.27	278.10
22.503	272.92	267.74	262.56	257.37	252.17	246.97	241.75
23.298	236.53	231.31	226.08	220.85	215.61	210.36	204.88
24.092	198.80	191.86	183.82	174.33	163.08	150.30	136.49
24.887	122.25	108.13	94.44	81.61	69.87	59.28	50.00
25.682	42.20	35.76	30.35	25.76	21.87	18.54	15.69
26.477	13.27	11.23	9.49	8.02	6.76	5.70	4.79
27.272	4.03	3.38	2.83	2.37	1.97	1.63	1.35
28.067	1.10	0.90	0.73	0.58	0.46	0.36	0.27
28.862	0.19	0.13	0.08				

WinTR-20: Version 1.10 0 0 0.05
Cantonment Areas EA (continued)
Duke Field Alternative 2

STORM 25-Yr

SUB-AREA:
Duke FieldOutlet 3.03906 61. 1.798

STREAM REACH:

Eglin Cantonment Areas EA
Duke Field Alternative 2

Area or Reach Identifier	Drainage Area (sq mi)	Alternate	Peak Flow by Storm 25-Yr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)
Duke Field	3.039		3880.41				
OUTLET	3.039		3880.41				

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WinTR-20: Version 1.10                  0         0         0.05
 Cantonment Areas EA                                                    (continued)
Duke Field Alternative 2
                                          STORM 25-Yr
SUB-AREA:
          Duke FieldOutlet              3.03906   61.       1.798

STREAM REACH:
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WinTR-20 Printed Page File Beginning of Input Data List
TR20.inp

WinTR-20: Version 1.10 0 0 0.05
Eglin Cantonment Areas EA
7th SFG (A) No Action Alternative

SUB-AREA:
7SFG (A) Outlet .78125 82. .676

STREAM REACH:

STORM ANALYSIS:
25-Yr 11.77 Type MSE6 2

STRUCTURE RATING:

RAINFALL DISTRIBUTION:
Type MSE6 0.1

0.0	0.000713	0.00145	0.00221	0.00300
0.00380	0.00464	0.00549	0.00637	0.00727
0.00820	0.00915	0.01013	0.01112	0.01215
0.01319	0.01426	0.01535	0.01647	0.01761
0.01878	0.01996	0.02118	0.02241	0.02367
0.02495	0.02626	0.02759	0.02894	0.03032
0.03172	0.03315	0.03460	0.03607	0.03757
0.03909	0.04063	0.04220	0.04379	0.04540
0.04704	0.04871	0.05039	0.05210	0.05384
0.05559	0.05737	0.05918	0.06101	0.06286
0.06474	0.06664	0.06856	0.07051	0.07248
0.07447	0.07649	0.07853	0.08060	0.08269
0.08480	0.08694	0.08910	0.09129	0.09349
0.09573	0.09798	0.10026	0.10256	0.10489
0.10724	0.10962	0.11201	0.11444	0.11688
0.11935	0.12184	0.12436	0.12690	0.12947
0.13205	0.13467	0.13730	0.13996	0.14264
0.14535	0.14808	0.15083	0.15361	0.15641
0.15924	0.16327	0.16735	0.17148	0.17566
0.17990	0.18418	0.18851	0.19289	0.19732
0.20180	0.20632	0.21090	0.21553	0.22021
0.22494	0.23145	0.23857	0.24630	0.25465
0.26360	0.27316	0.28333	0.29411	0.30550
0.31750	0.33312	0.35347	0.38046	0.41660
0.47904	0.58340	0.61954	0.64653	0.66688
0.68250	0.69450	0.70589	0.71667	0.72684
0.73640	0.74535	0.75370	0.76143	0.76855
0.77506	0.77979	0.78447	0.78910	0.79368
0.79820	0.80268	0.80711	0.81149	0.81582
0.82010	0.82434	0.82852	0.83265	0.83673
0.84076	0.84359	0.84639	0.84917	0.85192
0.85465	0.85736	0.86004	0.86270	0.86533
0.86795	0.87053	0.87310	0.87564	0.87816
0.88065	0.88312	0.88556	0.88799	0.89038
0.89276	0.89511	0.89744	0.89974	0.90202
0.90427	0.90651	0.90871	0.91090	0.91306
0.91520	0.91731	0.91940	0.92147	0.92351
0.92553	0.92752	0.92949	0.93144	0.93336
0.93526	0.93714	0.93899	0.94082	0.94263
0.94441	0.94616	0.94790	0.94961	0.95129
0.95296	0.95460	0.95621	0.95780	0.95937
0.96091	0.96243	0.96393	0.96540	0.96685
0.96828	0.96968	0.97106	0.97241	0.97374
0.97505	0.97633	0.97759	0.97882	0.98004
0.98122	0.98239	0.98353	0.98465	0.98574
0.98681	0.98785	0.98888	0.98987	0.99085
0.99180	0.99273	0.99363	0.99451	0.99536
0.99620	0.99700	0.99779	0.99855	0.999287

GLOBAL OUTPUT:
2 0.05 YYYYN YYYYNN

WinTR-20: Version 1.10 0 0 0.05
Cantonment Areas EA (continued)
7th SFG (A) No Action Alternative

SUB-AREA:
7SFG (A) Outlet .78125 82. .676

STREAM REACH:

WinTR-20 Printed Page File End of Input Data List

Eglin Cantonment Areas EA
7th SFG (A) No Action Alternative

Name of printed page file:
TR20.out

STORM 25-Yr

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Peak Flow Time (hr)	Peak Flow Rate (cfs)	Peak Flow Rate (csm)
7SFG (A)	0.781		9.484		12.43	2501.35	3201.72

Line Start Time (hr)	Flow Values @ time increment of 0.043 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
3.595	0.08	0.14	0.25	0.39	0.58	0.81	1.10
3.894	1.43	1.81	2.22	2.68	3.16	3.68	4.22
4.193	4.78	5.36	5.95	6.57	7.19	7.83	8.47
4.492	9.13	9.80	10.47	11.15	11.84	12.54	13.24
4.791	13.95	14.67	15.39	16.11	16.85	17.58	18.33
5.090	19.07	19.82	20.58	21.33	22.09	22.86	23.63
5.389	24.40	25.17	25.95	26.73	27.51	28.30	29.09
5.688	29.88	30.67	31.47	32.27	33.08	33.88	34.70
5.986	35.51	36.33	37.15	37.97	38.79	39.61	40.44
6.285	41.27	42.10	42.93	43.77	44.60	45.44	46.28
6.584	47.12	47.96	48.81	49.65	50.50	51.34	52.19
6.883	53.03	53.88	54.73	55.59	56.44	57.30	58.16
7.182	59.03	59.89	60.75	61.62	62.48	63.34	64.21
7.481	65.07	65.94	66.80	67.66	68.53	69.39	70.26
7.780	71.12	71.99	72.86	73.74	74.61	75.48	76.36
8.078	77.23	78.11	78.98	79.85	80.72	81.59	82.46
8.377	83.33	84.20	85.07	85.94	86.81	87.68	88.55
8.676	89.42	90.29	91.16	92.03	92.90	93.77	94.64
8.975	95.51	96.42	97.49	98.82	100.51	102.67	105.43
9.274	108.81	112.70	116.95	121.39	125.90	130.38	134.71
9.573	138.85	142.76	146.36	149.63	152.64	155.46	158.11
9.872	160.63	163.04	165.35	167.57	169.71	171.80	173.82
10.170	175.81	177.75	179.66	181.54	183.40	185.24	187.06
10.469	188.88	190.73	192.82	195.34	198.48	202.51	207.74
10.768	214.37	222.35	231.57	241.85	253.02	264.95	277.40
11.067	290.34	303.57	316.98	330.42	343.93	357.56	371.28
11.366	385.17	399.16	413.31	427.56	442.21	457.72	474.54
11.665	493.64	515.98	543.13	576.25	616.76	666.18	726.52
11.964	801.91	895.49	1014.57	1166.76	1349.45	1554.79	1775.18
12.263	1998.73	2200.67	2356.95	2457.43	2501.35	2495.56	2445.41
12.561	2355.65	2238.99	2101.81	1949.55	1795.26	1652.56	1524.32
12.860	1407.29	1301.87	1207.40	1122.09	1045.65	978.32	919.04
13.159	866.27	819.37	777.46	739.60	705.18	673.95	645.24
13.458	618.58	593.80	570.29	547.68	525.75	504.27	483.09
13.757	461.86	440.99	420.86	401.62	383.54	366.69	351.34
14.056	337.52	325.24	314.54	305.59	298.18	291.78	286.22
14.355	281.35	277.05	273.23	269.85	266.83	264.10	261.62

WinTR-20: Version 1.10 0 0 0.05
Cantonment Areas EA (continued)
7th SFG (A) No Action Alternative
STORM 25-Yr
SUB-AREA:
7SFG (A) Outlet .78125 82. .676

STREAM REACH:

14.653	259.34	257.24	255.28	253.45	251.72	250.07	248.49
14.952	246.97	245.49	243.93	242.08	239.83	237.04	233.51
15.251	229.10	223.92	218.21	212.22	206.22	200.30	194.71

Eglin Cantonment Areas EA
7th SFG (A) No Action Alternative

Line Start Time (hr)	Flow Values @ time increment of 0.043 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
15.550	189.51	184.75	180.52	176.91	173.84	171.16	168.80
15.849	166.72	164.85	163.16	161.65	160.28	159.03	157.88
16.148	156.82	155.84	154.92	154.06	153.24	152.46	151.71
16.447	150.99	150.30	149.62	148.96	148.31	147.67	147.03
16.745	146.41	145.79	145.18	144.57	143.96	143.37	142.78
17.044	142.20	141.62	141.05	140.49	139.92	139.36	138.79
17.343	138.22	137.65	137.08	136.50	135.92	135.34	134.76
17.642	134.18	133.60	133.02	132.45	131.88	131.30	130.73
17.941	130.15	129.58	129.02	128.45	127.88	127.31	126.73
18.240	126.16	125.58	125.01	124.43	123.86	123.29	122.71
18.539	122.14	121.56	120.98	120.40	119.82	119.24	118.65
18.838	118.07	117.48	116.90	116.32	115.74	115.16	114.59
19.136	114.01	113.44	112.87	112.29	111.72	111.15	110.58
19.435	110.01	109.44	108.87	108.30	107.72	107.14	106.56
19.734	105.97	105.38	104.80	104.22	103.64	103.05	102.47
20.033	101.89	101.31	100.73	100.16	99.59	99.01	98.43
20.332	97.85	97.26	96.68	96.09	95.50	94.92	94.33
20.631	93.75	93.16	92.58	92.00	91.42	90.84	90.27
20.930	89.69	89.12	88.54	87.96	87.39	86.82	86.25
21.228	85.67	85.10	84.52	83.93	83.35	82.76	82.17
21.527	81.58	80.99	80.41	79.82	79.24	78.66	78.07
21.826	77.48	76.90	76.32	75.73	75.15	74.56	73.98
22.125	73.40	72.82	72.24	71.66	71.08	70.51	69.93
22.424	69.36	68.78	68.20	67.61	67.03	66.44	65.85
22.723	65.26	64.67	64.08	63.49	62.91	62.32	61.74
23.022	61.16	60.58	60.00	59.42	58.85	58.27	57.69
23.320	57.10	56.52	55.93	55.34	54.75	54.16	53.56
23.619	52.98	52.39	51.81	51.22	50.64	50.05	49.47
23.918	48.86	48.09	47.08	45.76	44.02	41.76	38.97
24.217	35.78	32.34	28.83	25.36	22.03	18.94	16.12
24.516	13.61	11.47	9.71	8.24	7.00	5.95	5.05
24.815	4.28	3.62	3.07	2.60	2.20	1.85	1.56
25.114	1.32	1.11	0.94	0.79	0.66	0.55	0.46
25.413	0.38	0.31	0.26	0.21	0.17	0.13	0.11
25.711	0.08	0.06					

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Time (hr)	Rate (cfs)	Rate (csm)
OUTLET	0.781		9.484		12.43	2501.35	3201.72

Line Start Time (hr)	Flow Values @ time increment of 0.043 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)

WinTR-20: Version 1.10 0 0 0.05
Cantonment Areas EA (continued)
7th SFG (A) No Action Alternative
STORM 25-Yr
SUB-AREA:
7SFG (A) Outlet .78125 82. .676

STREAM REACH:

3.595	0.08	0.14	0.25	0.39	0.58	0.81	1.10
3.894	1.43	1.81	2.22	2.68	3.16	3.68	4.22
4.193	4.78	5.36	5.95	6.57	7.19	7.83	8.47
4.492	9.13	9.80	10.47	11.15	11.84	12.54	13.24
4.791	13.95	14.67	15.39	16.11	16.85	17.58	18.33

Eglin Cantonment Areas EA
7th SFG (A) No Action Alternative

Line Start Time (hr)	Flow Values @ time increment of 0.043 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
5.090	19.07	19.82	20.58	21.33	22.09	22.86	23.63
5.389	24.40	25.17	25.95	26.73	27.51	28.30	29.09
5.688	29.88	30.67	31.47	32.27	33.08	33.88	34.70
5.986	35.51	36.33	37.15	37.97	38.79	39.61	40.44
6.285	41.27	42.10	42.93	43.77	44.60	45.44	46.28
6.584	47.12	47.96	48.81	49.65	50.50	51.34	52.19
6.883	53.03	53.88	54.73	55.59	56.44	57.30	58.16
7.182	59.03	59.89	60.75	61.62	62.48	63.34	64.21
7.481	65.07	65.94	66.80	67.66	68.53	69.39	70.26
7.780	71.12	71.99	72.86	73.74	74.61	75.48	76.36
8.078	77.23	78.11	78.98	79.85	80.72	81.59	82.46
8.377	83.33	84.20	85.07	85.94	86.81	87.68	88.55
8.676	89.42	90.29	91.16	92.03	92.90	93.77	94.64
8.975	95.51	96.42	97.49	98.82	100.51	102.67	105.43
9.274	108.81	112.70	116.95	121.39	125.90	130.38	134.71
9.573	138.85	142.76	146.36	149.63	152.64	155.46	158.11
9.872	160.63	163.04	165.35	167.57	169.71	171.80	173.82
10.170	175.81	177.75	179.66	181.54	183.40	185.24	187.06
10.469	188.88	190.73	192.82	195.34	198.48	202.51	207.74
10.768	214.37	222.35	231.57	241.85	253.02	264.95	277.40
11.067	290.34	303.57	316.98	330.42	343.93	357.56	371.28
11.366	385.17	399.16	413.31	427.56	442.21	457.72	474.54
11.665	493.64	515.98	543.13	576.25	616.76	666.18	726.52
11.964	801.91	895.49	1014.57	1166.76	1349.45	1554.79	1775.18
12.263	1998.73	2200.67	2356.95	2457.43	2501.35	2495.56	2445.41
12.561	2355.65	2238.99	2101.81	1949.55	1795.26	1652.56	1524.32
12.860	1407.29	1301.87	1207.40	1122.09	1045.65	978.32	919.04
13.159	866.27	819.37	777.46	739.60	705.18	673.95	645.24
13.458	618.58	593.80	570.29	547.68	525.75	504.27	483.09
13.757	461.86	440.99	420.86	401.62	383.54	366.69	351.34
14.056	337.52	325.24	314.54	305.59	298.18	291.78	286.22
14.355	281.35	277.05	273.23	269.85	266.83	264.10	261.62
14.653	259.34	257.24	255.28	253.45	251.72	250.07	248.49
14.952	246.97	245.49	243.93	242.08	239.83	237.04	233.51
15.251	229.10	223.92	218.21	212.22	206.22	200.30	194.71
15.550	189.51	184.75	180.52	176.91	173.84	171.16	168.80
15.849	166.72	164.85	163.16	161.65	160.28	159.03	157.88
16.148	156.82	155.84	154.92	154.06	153.24	152.46	151.71
16.447	150.99	150.30	149.62	148.96	148.31	147.67	147.03
16.745	146.41	145.79	145.18	144.57	143.96	143.37	142.78
17.044	142.20	141.62	141.05	140.49	139.92	139.36	138.79
17.343	138.22	137.65	137.08	136.50	135.92	135.34	134.76

WinTR-20: Version 1.10 0 0 0.05
Cantonment Areas EA (continued)
7th SFG (A) No Action Alternative
STORM 25-Yr
SUB-AREA:
7SFG (A) Outlet .78125 82. .676

STREAM REACH:

17.642	134.18	133.60	133.02	132.45	131.88	131.30	130.73
17.941	130.15	129.58	129.02	128.45	127.88	127.31	126.73
18.240	126.16	125.58	125.01	124.43	123.86	123.29	122.71
18.539	122.14	121.56	120.98	120.40	119.82	119.24	118.65
18.838	118.07	117.48	116.90	116.32	115.74	115.16	114.59
19.136	114.01	113.44	112.87	112.29	111.72	111.15	110.58
19.435	110.01	109.44	108.87	108.30	107.72	107.14	106.56
19.734	105.97	105.38	104.80	104.22	103.64	103.05	102.47
20.033	101.89	101.31	100.73	100.16	99.59	99.01	98.43

Eglin Cantonment Areas EA
7th SFG (A) No Action Alternative

Line Start Time (hr)	Flow Values @ time increment of 0.043 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
20.332	97.85	97.26	96.68	96.09	95.50	94.92	94.33
20.631	93.75	93.16	92.58	92.00	91.42	90.84	90.27
20.930	89.69	89.12	88.54	87.96	87.39	86.82	86.25
21.228	85.67	85.10	84.52	83.93	83.35	82.76	82.17
21.527	81.58	80.99	80.41	79.82	79.24	78.66	78.07
21.826	77.48	76.90	76.32	75.73	75.15	74.56	73.98
22.125	73.40	72.82	72.24	71.66	71.08	70.51	69.93
22.424	69.36	68.78	68.20	67.61	67.03	66.44	65.85
22.723	65.26	64.67	64.08	63.49	62.91	62.32	61.74
23.022	61.16	60.58	60.00	59.42	58.85	58.27	57.69
23.320	57.10	56.52	55.93	55.34	54.75	54.16	53.56
23.619	52.98	52.39	51.81	51.22	50.64	50.05	49.47
23.918	48.86	48.09	47.08	45.76	44.02	41.76	38.97
24.217	35.78	32.34	28.83	25.36	22.03	18.94	16.12
24.516	13.61	11.47	9.71	8.24	7.00	5.95	5.05
24.815	4.28	3.62	3.07	2.60	2.20	1.85	1.56
25.114	1.32	1.11	0.94	0.79	0.66	0.55	0.46
25.413	0.38	0.31	0.26	0.21	0.17	0.13	0.11
25.711	0.08	0.06					

WinTR-20: Version 1.10 0 0 0.05
Cantonment Areas EA (continued)
7th SFG (A) No Action Alternative
STORM 25-Yr
SUB-AREA:
7SFG (A) Outlet .78125 82. .676

STREAM REACH:

Eglin Cantonment Areas EA
7th SFG (A) No Action Alternative

Area or Reach Identifier	Drainage Area (sq mi)	Alternate	Peak Flow by Storm 25-Yr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)
7SFG (A)	0.781		2501.35				
OUTLET	0.781		2501.35				

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WinTR-20: Version 1.10                  0         0         0.05
 Cantonment Areas EA                                                    (continued)
7th SFG (A) No Action Alternative
                                          STORM 25-Yr
SUB-AREA:
          7SFG (A)  Outlet              .78125    82.       .676

STREAM REACH:
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WinTR-20 Printed Page File Beginning of Input Data List
TR20.inp

WinTR-20: Version 1.10 0 0 0.05
Eglin Cantonment Areas EA
7th SFG (A) Alternative 1

SUB-AREA:
7SFG (A) Outlet .78125 83. .676

STREAM REACH:

STORM ANALYSIS:
25-Yr 11.77 Type MSE6 2

STRUCTURE RATING:

RAINFALL DISTRIBUTION:
Type MSE6 0.1

0.0	0.000713	0.00145	0.00221	0.00300
0.00380	0.00464	0.00549	0.00637	0.00727
0.00820	0.00915	0.01013	0.01112	0.01215
0.01319	0.01426	0.01535	0.01647	0.01761
0.01878	0.01996	0.02118	0.02241	0.02367
0.02495	0.02626	0.02759	0.02894	0.03032
0.03172	0.03315	0.03460	0.03607	0.03757
0.03909	0.04063	0.04220	0.04379	0.04540
0.04704	0.04871	0.05039	0.05210	0.05384
0.05559	0.05737	0.05918	0.06101	0.06286
0.06474	0.06664	0.06856	0.07051	0.07248
0.07447	0.07649	0.07853	0.08060	0.08269
0.08480	0.08694	0.08910	0.09129	0.09349
0.09573	0.09798	0.10026	0.10256	0.10489
0.10724	0.10962	0.11201	0.11444	0.11688
0.11935	0.12184	0.12436	0.12690	0.12947
0.13205	0.13467	0.13730	0.13996	0.14264
0.14535	0.14808	0.15083	0.15361	0.15641
0.15924	0.16327	0.16735	0.17148	0.17566
0.17990	0.18418	0.18851	0.19289	0.19732
0.20180	0.20632	0.21090	0.21553	0.22021
0.22494	0.23145	0.23857	0.24630	0.25465
0.26360	0.27316	0.28333	0.29411	0.30550
0.31750	0.33312	0.35347	0.38046	0.41660
0.47904	0.58340	0.61954	0.64653	0.66688
0.68250	0.69450	0.70589	0.71667	0.72684
0.73640	0.74535	0.75370	0.76143	0.76855
0.77506	0.77979	0.78447	0.78910	0.79368
0.79820	0.80268	0.80711	0.81149	0.81582
0.82010	0.82434	0.82852	0.83265	0.83673
0.84076	0.84359	0.84639	0.84917	0.85192
0.85465	0.85736	0.86004	0.86270	0.86533
0.86795	0.87053	0.87310	0.87564	0.87816
0.88065	0.88312	0.88556	0.88799	0.89038
0.89276	0.89511	0.89744	0.89974	0.90202
0.90427	0.90651	0.90871	0.91090	0.91306
0.91520	0.91731	0.91940	0.92147	0.92351
0.92553	0.92752	0.92949	0.93144	0.93336
0.93526	0.93714	0.93899	0.94082	0.94263
0.94441	0.94616	0.94790	0.94961	0.95129
0.95296	0.95460	0.95621	0.95780	0.95937
0.96091	0.96243	0.96393	0.96540	0.96685
0.96828	0.96968	0.97106	0.97241	0.97374
0.97505	0.97633	0.97759	0.97882	0.98004
0.98122	0.98239	0.98353	0.98465	0.98574
0.98681	0.98785	0.98888	0.98987	0.99085
0.99180	0.99273	0.99363	0.99451	0.99536
0.99620	0.99700	0.99779	0.99855	0.999287

GLOBAL OUTPUT:
2 0.05 YYYYN YYYYNN

WinTR-20 Printed Page File Beginning of Input Data List
TR20.inp

WinTR-20: Version 1.10 0 0 0.05
Cantonment Areas EA (continued)
7th SFG (A) Alternative 1

SUB-AREA:
7SFG (A) Outlet .78125 83. .676

STREAM REACH:

WinTR-20 Printed Page File End of Input Data List

Eglin Cantonment Areas EA
7th SFG (A) Alternative 1

Name of printed page file:
TR20.out

STORM 25-Yr

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Peak Flow Time (hr)	Peak Flow Rate (cfs)	Peak Flow Rate (csm)
7SFG (A)	0.781		9.617		12.44	2527.36	3235.02

Line Start Time (hr)	Flow Values @ time increment of 0.043 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
3.427	0.08	0.15	0.25	0.40	0.59	0.83	1.12
3.726	1.45	1.84	2.26	2.72	3.22	3.74	4.29
4.025	4.86	5.44	6.05	6.67	7.30	7.95	8.61
4.324	9.28	9.95	10.64	11.33	12.03	12.74	13.46
4.623	14.18	14.90	15.63	16.37	17.11	17.86	18.61
4.922	19.37	20.13	20.90	21.66	22.44	23.22	24.00
5.221	24.78	25.57	26.36	27.15	27.94	28.74	29.54
5.519	30.34	31.15	31.96	32.76	33.58	34.39	35.21
5.818	36.03	36.86	37.69	38.52	39.35	40.19	41.02
6.117	41.86	42.70	43.54	44.39	45.23	46.08	46.93
6.416	47.78	48.63	49.49	50.34	51.19	52.05	52.90
6.715	53.76	54.62	55.48	56.33	57.19	58.05	58.92
7.014	59.78	60.65	61.52	62.39	63.26	64.13	65.01
7.313	65.88	66.75	67.62	68.49	69.37	70.24	71.11
7.611	71.98	72.85	73.72	74.59	75.46	76.34	77.21
7.910	78.09	78.97	79.85	80.73	81.61	82.48	83.36
8.209	84.23	85.11	85.98	86.85	87.73	88.59	89.46
8.508	90.33	91.20	92.08	92.95	93.82	94.69	95.56
8.807	96.43	97.30	98.17	99.04	99.90	100.82	101.92
9.106	103.29	105.03	107.27	110.14	113.65	117.69	122.07
9.405	126.65	131.29	135.88	140.32	144.55	148.54	152.19
9.703	155.50	158.55	161.40	164.08	166.61	169.04	171.36
10.002	173.58	175.73	177.82	179.85	181.83	183.76	185.67
10.301	187.54	189.39	191.22	193.04	194.84	196.70	198.80
10.600	201.36	204.57	208.72	214.10	220.92	229.12	238.58
10.899	249.11	260.53	272.72	285.42	298.61	312.07	325.70
11.198	339.35	353.06	366.89	380.80	394.86	409.02	423.33
11.497	437.73	452.56	468.27	485.35	504.79	527.60	555.39
11.795	589.29	630.75	681.31	743.10	820.30	916.22	1038.44
12.094	1194.29	1380.65	1589.07	1811.99	2036.62	2237.52	2390.89
12.393	2487.46	2527.36	2517.34	2463.31	2369.69	2249.95	2109.87
12.692	1955.35	1799.72	1656.60	1528.10	1410.70	1305.07	1210.38
12.991	1124.85	1048.26	980.88	921.57	868.72	821.77	779.77
13.290	741.84	707.31	676.02	647.22	620.47	595.60	571.98
13.589	549.24	527.18	505.57	484.26	462.90	441.95	421.77
13.888	402.47	384.36	367.50	352.16	338.35	326.10	315.45
14.186	306.55	299.17	292.78	287.23	282.37	278.07	274.26

WinTR-20: Version 1.10 0 0 0.05
Cantonment Areas EA (continued)
7th SFG (A) Alternative 1

STORM 25-Yr

SUB-AREA:
7SFG (A) Outlet .78125 83. .676

STREAM REACH:

14.485	270.88	267.86	265.12	262.64	260.36	258.26	256.29
14.784	254.45	252.72	251.06	249.47	247.94	246.46	244.88
15.083	243.00	240.71	237.87	234.28	229.79	224.53	218.77

Line Start Time (hr) — Flow Values @ time increment of 0.043 hr (cfs)

15.382	212.74	206.71	200.77	195.17	189.97	185.22	181.00
15.681	177.41	174.36	171.69	169.35	167.27	165.40	163.71
15.980	162.20	160.84	159.59	158.44	157.38	156.40	155.48
16.278	154.61	153.79	153.01	152.26	151.54	150.84	150.17
16.577	149.50	148.85	148.20	147.56	146.94	146.31	145.70
16.876	145.08	144.48	143.88	143.29	142.71	142.13	141.55
17.175	140.98	140.42	139.85	139.28	138.71	138.13	137.55
17.474	136.97	136.39	135.81	135.23	134.64	134.06	133.48
17.773	132.90	132.33	131.75	131.17	130.60	130.02	129.45
18.072	128.88	128.31	127.74	127.16	126.58	126.00	125.43
18.370	124.85	124.27	123.69	123.12	122.54	121.96	121.38
18.669	120.80	120.21	119.62	119.04	118.45	117.86	117.28
18.968	116.69	116.11	115.53	114.95	114.37	113.80	113.22
19.267	112.65	112.08	111.50	110.93	110.35	109.78	109.21
19.566	108.63	108.06	107.47	106.89	106.30	105.71	105.12
19.865	104.54	103.95	103.37	102.78	102.20	101.62	101.04
20.164	100.46	99.89	99.31	98.73	98.14	97.55	96.96
20.463	96.37	95.79	95.20	94.61	94.02	93.43	92.85
20.761	92.27	91.69	91.11	90.53	89.95	89.37	88.80
21.060	88.22	87.64	87.07	86.49	85.92	85.34	84.76
21.359	84.17	83.58	82.99	82.40	81.81	81.22	80.63
21.658	80.05	79.46	78.88	78.29	77.70	77.11	76.53
21.957	75.94	75.35	74.77	74.18	73.60	73.02	72.43
22.256	71.85	71.28	70.70	70.12	69.55	68.96	68.38
22.555	67.79	67.20	66.61	66.02	65.43	64.83	64.24
22.853	63.66	63.07	62.48	61.90	61.32	60.73	60.16
23.152	59.58	59.00	58.42	57.83	57.25	56.66	56.07
23.451	55.48	54.88	54.29	53.70	53.11	52.52	51.93
23.750	51.35	50.76	50.17	49.59	48.97	48.18	47.16
24.049	45.81	44.03	41.73	38.90	35.68	32.23	28.71
24.348	25.23	21.90	18.81	16.00	13.51	11.39	9.64
24.647	8.19	6.95	5.91	5.01	4.25	3.60	3.05
24.945	2.58	2.18	1.84	1.55	1.31	1.10	0.93
25.244	0.78	0.65	0.55	0.45	0.38	0.31	0.25
25.543	0.21	0.17	0.13	0.11	0.08	0.06	

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Peak Flow Time (hr)	Peak Flow Rate (cfs)	Peak Flow Rate (csm)
OUTLET	0.781		9.617		12.44	2527.36	3235.02

Line Start Time (hr) — Flow Values @ time increment of 0.043 hr (cfs)

WinTR-20: Version 1.10 0 0 0.05
Cantonment Areas EA (continued)
7th SFG (A) Alternative 1

STORM 25-Yr

SUB-AREA:
7SFG (A) Outlet .78125 83. .676

STREAM REACH:

3.427	0.08	0.15	0.25	0.40	0.59	0.83	1.12
3.726	1.45	1.84	2.26	2.72	3.22	3.74	4.29
4.025	4.86	5.44	6.05	6.67	7.30	7.95	8.61
4.324	9.28	9.95	10.64	11.33	12.03	12.74	13.46
4.623	14.18	14.90	15.63	16.37	17.11	17.86	18.61

Eglin Cantonment Areas EA
7th SFG (A) Alternative 1

Line Start Time (hr)	Flow Values @ time increment of 0.043 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
4.922	19.37	20.13	20.90	21.66	22.44	23.22	24.00
5.221	24.78	25.57	26.36	27.15	27.94	28.74	29.54
5.519	30.34	31.15	31.96	32.76	33.58	34.39	35.21
5.818	36.03	36.86	37.69	38.52	39.35	40.19	41.02
6.117	41.86	42.70	43.54	44.39	45.23	46.08	46.93
6.416	47.78	48.63	49.49	50.34	51.19	52.05	52.90
6.715	53.76	54.62	55.48	56.33	57.19	58.05	58.92
7.014	59.78	60.65	61.52	62.39	63.26	64.13	65.01
7.313	65.88	66.75	67.62	68.49	69.37	70.24	71.11
7.611	71.98	72.85	73.72	74.59	75.46	76.34	77.21
7.910	78.09	78.97	79.85	80.73	81.61	82.48	83.36
8.209	84.23	85.11	85.98	86.85	87.73	88.59	89.46
8.508	90.33	91.20	92.08	92.95	93.82	94.69	95.56
8.807	96.43	97.30	98.17	99.04	99.90	100.82	101.92
9.106	103.29	105.03	107.27	110.14	113.65	117.69	122.07
9.405	126.65	131.29	135.88	140.32	144.55	148.54	152.19
9.703	155.50	158.55	161.40	164.08	166.61	169.04	171.36
10.002	173.58	175.73	177.82	179.85	181.83	183.76	185.67
10.301	187.54	189.39	191.22	193.04	194.84	196.70	198.80
10.600	201.36	204.57	208.72	214.10	220.92	229.12	238.58
10.899	249.11	260.53	272.72	285.42	298.61	312.07	325.70
11.198	339.35	353.06	366.89	380.80	394.86	409.02	423.33
11.497	437.73	452.56	468.27	485.35	504.79	527.60	555.39
11.795	589.29	630.75	681.31	743.10	820.30	916.22	1038.44
12.094	1194.29	1380.65	1589.07	1811.99	2036.62	2237.52	2390.89
12.393	2487.46	2527.36	2517.34	2463.31	2369.69	2249.95	2109.87
12.692	1955.35	1799.72	1656.60	1528.10	1410.70	1305.07	1210.38
12.991	1124.85	1048.26	980.88	921.57	868.72	821.77	779.77
13.290	741.84	707.31	676.02	647.22	620.47	595.60	571.98
13.589	549.24	527.18	505.57	484.26	462.90	441.95	421.77
13.888	402.47	384.36	367.50	352.16	338.35	326.10	315.45
14.186	306.55	299.17	292.78	287.23	282.37	278.07	274.26
14.485	270.88	267.86	265.12	262.64	260.36	258.26	256.29
14.784	254.45	252.72	251.06	249.47	247.94	246.46	244.88
15.083	243.00	240.71	237.87	234.28	229.79	224.53	218.77
15.382	212.74	206.71	200.77	195.17	189.97	185.22	181.00
15.681	177.41	174.36	171.69	169.35	167.27	165.40	163.71
15.980	162.20	160.84	159.59	158.44	157.38	156.40	155.48
16.278	154.61	153.79	153.01	152.26	151.54	150.84	150.17
16.577	149.50	148.85	148.20	147.56	146.94	146.31	145.70
16.876	145.08	144.48	143.88	143.29	142.71	142.13	141.55
17.175	140.98	140.42	139.85	139.28	138.71	138.13	137.55

WinTR-20: Version 1.10 0 0 0.05
Cantonment Areas EA (continued)
7th SFG (A) Alternative 1

STORM 25-Yr

SUB-AREA:
7SFG (A) Outlet .78125 83. .676

STREAM REACH:

17.474	136.97	136.39	135.81	135.23	134.64	134.06	133.48
17.773	132.90	132.33	131.75	131.17	130.60	130.02	129.45
18.072	128.88	128.31	127.74	127.16	126.58	126.00	125.43
18.370	124.85	124.27	123.69	123.12	122.54	121.96	121.38
18.669	120.80	120.21	119.62	119.04	118.45	117.86	117.28
18.968	116.69	116.11	115.53	114.95	114.37	113.80	113.22
19.267	112.65	112.08	111.50	110.93	110.35	109.78	109.21
19.566	108.63	108.06	107.47	106.89	106.30	105.71	105.12
19.865	104.54	103.95	103.37	102.78	102.20	101.62	101.04

Eglin Cantonment Areas EA
7th SFG (A) Alternative 1

Line Start Time (hr)	Flow Values @ time increment of 0.043 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
20.164	100.46	99.89	99.31	98.73	98.14	97.55	96.96
20.463	96.37	95.79	95.20	94.61	94.02	93.43	92.85
20.761	92.27	91.69	91.11	90.53	89.95	89.37	88.80
21.060	88.22	87.64	87.07	86.49	85.92	85.34	84.76
21.359	84.17	83.58	82.99	82.40	81.81	81.22	80.63
21.658	80.05	79.46	78.88	78.29	77.70	77.11	76.53
21.957	75.94	75.35	74.77	74.18	73.60	73.02	72.43
22.256	71.85	71.28	70.70	70.12	69.55	68.96	68.38
22.555	67.79	67.20	66.61	66.02	65.43	64.83	64.24
22.853	63.66	63.07	62.48	61.90	61.32	60.73	60.16
23.152	59.58	59.00	58.42	57.83	57.25	56.66	56.07
23.451	55.48	54.88	54.29	53.70	53.11	52.52	51.93
23.750	51.35	50.76	50.17	49.59	48.97	48.18	47.16
24.049	45.81	44.03	41.73	38.90	35.68	32.23	28.71
24.348	25.23	21.90	18.81	16.00	13.51	11.39	9.64
24.647	8.19	6.95	5.91	5.01	4.25	3.60	3.05
24.945	2.58	2.18	1.84	1.55	1.31	1.10	0.93
25.244	0.78	0.65	0.55	0.45	0.38	0.31	0.25
25.543	0.21	0.17	0.13	0.11	0.08	0.06	

WinTR-20: Version 1.10 0 0 0.05
Cantonment Areas EA (continued)
7th SFG (A) Alternative 1

STORM 25-Yr

SUB-AREA:
7SFG (A) Outlet .78125 83. .676

STREAM REACH:

Eglin Cantonment Areas EA
7th SFG (A) Alternative 1

Area or Reach Identifier	Drainage Area (sq mi)	Alternate	Peak Flow by Storm 25-Yr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)
7SFG (A)	0.781		2527.36				
OUTLET	0.781		2527.36				

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WinTR-20: Version 1.10                  0         0         0.05
 Cantonment Areas EA                                                    (continued)
7th SFG (A) Alternative 1
                                          STORM 25-Yr
SUB-AREA:
          7SFG (A)  Outlet              .78125    83.       .676

STREAM REACH:
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WinTR-20 Printed Page File Beginning of Input Data List
TR20.inp

WinTR-20: Version 1.10 0 0 0.05
Eglin Cantonment Areas EA
7th SFG (A) Alternative 2

SUB-AREA:
7SFG (A) Outlet .78125 83. .676

STREAM REACH:

STORM ANALYSIS:
25-Yr 11.77 Type MSE6 2

STRUCTURE RATING:

RAINFALL DISTRIBUTION:
Type MSE6 0.1

0.0	0.000713	0.00145	0.00221	0.00300
0.00380	0.00464	0.00549	0.00637	0.00727
0.00820	0.00915	0.01013	0.01112	0.01215
0.01319	0.01426	0.01535	0.01647	0.01761
0.01878	0.01996	0.02118	0.02241	0.02367
0.02495	0.02626	0.02759	0.02894	0.03032
0.03172	0.03315	0.03460	0.03607	0.03757
0.03909	0.04063	0.04220	0.04379	0.04540
0.04704	0.04871	0.05039	0.05210	0.05384
0.05559	0.05737	0.05918	0.06101	0.06286
0.06474	0.06664	0.06856	0.07051	0.07248
0.07447	0.07649	0.07853	0.08060	0.08269
0.08480	0.08694	0.08910	0.09129	0.09349
0.09573	0.09798	0.10026	0.10256	0.10489
0.10724	0.10962	0.11201	0.11444	0.11688
0.11935	0.12184	0.12436	0.12690	0.12947
0.13205	0.13467	0.13730	0.13996	0.14264
0.14535	0.14808	0.15083	0.15361	0.15641
0.15924	0.16327	0.16735	0.17148	0.17566
0.17990	0.18418	0.18851	0.19289	0.19732
0.20180	0.20632	0.21090	0.21553	0.22021
0.22494	0.23145	0.23857	0.24630	0.25465
0.26360	0.27316	0.28333	0.29411	0.30550
0.31750	0.33312	0.35347	0.38046	0.41660
0.47904	0.58340	0.61954	0.64653	0.66688
0.68250	0.69450	0.70589	0.71667	0.72684
0.73640	0.74535	0.75370	0.76143	0.76855
0.77506	0.77979	0.78447	0.78910	0.79368
0.79820	0.80268	0.80711	0.81149	0.81582
0.82010	0.82434	0.82852	0.83265	0.83673
0.84076	0.84359	0.84639	0.84917	0.85192
0.85465	0.85736	0.86004	0.86270	0.86533
0.86795	0.87053	0.87310	0.87564	0.87816
0.88065	0.88312	0.88556	0.88799	0.89038
0.89276	0.89511	0.89744	0.89974	0.90202
0.90427	0.90651	0.90871	0.91090	0.91306
0.91520	0.91731	0.91940	0.92147	0.92351
0.92553	0.92752	0.92949	0.93144	0.93336
0.93526	0.93714	0.93899	0.94082	0.94263
0.94441	0.94616	0.94790	0.94961	0.95129
0.95296	0.95460	0.95621	0.95780	0.95937
0.96091	0.96243	0.96393	0.96540	0.96685
0.96828	0.96968	0.97106	0.97241	0.97374
0.97505	0.97633	0.97759	0.97882	0.98004
0.98122	0.98239	0.98353	0.98465	0.98574
0.98681	0.98785	0.98888	0.98987	0.99085
0.99180	0.99273	0.99363	0.99451	0.99536
0.99620	0.99700	0.99779	0.99855	0.999287

GLOBAL OUTPUT:
2 0.05 YYYYN YYYYNN

WinTR-20 Printed Page File Beginning of Input Data List
TR20.inp

WinTR-20: Version 1.10 0 0 0.05
Cantonment Areas EA (continued)
7th SFG (A) Alternative 2

SUB-AREA:
7SFG (A) Outlet .78125 83. .676

STREAM REACH:

WinTR-20 Printed Page File End of Input Data List

Eglin Cantonment Areas EA
7th SFG (A) Alternative 2

Name of printed page file:
TR20.out

STORM 25-Yr

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Peak Flow Time (hr)	Peak Flow Rate (cfs)	Peak Flow Rate (csm)
7SFG (A)	0.781		9.617		12.44	2527.36	3235.02

Line Start Time (hr)	Flow Values @ time increment of 0.043 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
3.427	0.08	0.15	0.25	0.40	0.59	0.83	1.12
3.726	1.45	1.84	2.26	2.72	3.22	3.74	4.29
4.025	4.86	5.44	6.05	6.67	7.30	7.95	8.61
4.324	9.28	9.95	10.64	11.33	12.03	12.74	13.46
4.623	14.18	14.90	15.63	16.37	17.11	17.86	18.61
4.922	19.37	20.13	20.90	21.66	22.44	23.22	24.00
5.221	24.78	25.57	26.36	27.15	27.94	28.74	29.54
5.519	30.34	31.15	31.96	32.76	33.58	34.39	35.21
5.818	36.03	36.86	37.69	38.52	39.35	40.19	41.02
6.117	41.86	42.70	43.54	44.39	45.23	46.08	46.93
6.416	47.78	48.63	49.49	50.34	51.19	52.05	52.90
6.715	53.76	54.62	55.48	56.33	57.19	58.05	58.92
7.014	59.78	60.65	61.52	62.39	63.26	64.13	65.01
7.313	65.88	66.75	67.62	68.49	69.37	70.24	71.11
7.611	71.98	72.85	73.72	74.59	75.46	76.34	77.21
7.910	78.09	78.97	79.85	80.73	81.61	82.48	83.36
8.209	84.23	85.11	85.98	86.85	87.73	88.59	89.46
8.508	90.33	91.20	92.08	92.95	93.82	94.69	95.56
8.807	96.43	97.30	98.17	99.04	99.90	100.82	101.92
9.106	103.29	105.03	107.27	110.14	113.65	117.69	122.07
9.405	126.65	131.29	135.88	140.32	144.55	148.54	152.19
9.703	155.50	158.55	161.40	164.08	166.61	169.04	171.36
10.002	173.58	175.73	177.82	179.85	181.83	183.76	185.67
10.301	187.54	189.39	191.22	193.04	194.84	196.70	198.80
10.600	201.36	204.57	208.72	214.10	220.92	229.12	238.58
10.899	249.11	260.53	272.72	285.42	298.61	312.07	325.70
11.198	339.35	353.06	366.89	380.80	394.86	409.02	423.33
11.497	437.73	452.56	468.27	485.35	504.79	527.60	555.39
11.795	589.29	630.75	681.31	743.10	820.30	916.22	1038.44
12.094	1194.29	1380.65	1589.07	1811.99	2036.62	2237.52	2390.89
12.393	2487.46	2527.36	2517.34	2463.31	2369.69	2249.95	2109.87
12.692	1955.35	1799.72	1656.60	1528.10	1410.70	1305.07	1210.38
12.991	1124.85	1048.26	980.88	921.57	868.72	821.77	779.77
13.290	741.84	707.31	676.02	647.22	620.47	595.60	571.98
13.589	549.24	527.18	505.57	484.26	462.90	441.95	421.77
13.888	402.47	384.36	367.50	352.16	338.35	326.10	315.45
14.186	306.55	299.17	292.78	287.23	282.37	278.07	274.26

WinTR-20: Version 1.10 0 0 0.05
Cantonment Areas EA (continued)
7th SFG (A) Alternative 2

STORM 25-Yr

SUB-AREA:
7SFG (A) Outlet .78125 83. .676

STREAM REACH:

14.485	270.88	267.86	265.12	262.64	260.36	258.26	256.29
14.784	254.45	252.72	251.06	249.47	247.94	246.46	244.88
15.083	243.00	240.71	237.87	234.28	229.79	224.53	218.77

Eglin Cantonment Areas EA
7th SFG (A) Alternative 2

Line Start Time (hr)	Flow Values @ time increment of 0.043 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
15.382	212.74	206.71	200.77	195.17	189.97	185.22	181.00
15.681	177.41	174.36	171.69	169.35	167.27	165.40	163.71
15.980	162.20	160.84	159.59	158.44	157.38	156.40	155.48
16.278	154.61	153.79	153.01	152.26	151.54	150.84	150.17
16.577	149.50	148.85	148.20	147.56	146.94	146.31	145.70
16.876	145.08	144.48	143.88	143.29	142.71	142.13	141.55
17.175	140.98	140.42	139.85	139.28	138.71	138.13	137.55
17.474	136.97	136.39	135.81	135.23	134.64	134.06	133.48
17.773	132.90	132.33	131.75	131.17	130.60	130.02	129.45
18.072	128.88	128.31	127.74	127.16	126.58	126.00	125.43
18.370	124.85	124.27	123.69	123.12	122.54	121.96	121.38
18.669	120.80	120.21	119.62	119.04	118.45	117.86	117.28
18.968	116.69	116.11	115.53	114.95	114.37	113.80	113.22
19.267	112.65	112.08	111.50	110.93	110.35	109.78	109.21
19.566	108.63	108.06	107.47	106.89	106.30	105.71	105.12
19.865	104.54	103.95	103.37	102.78	102.20	101.62	101.04
20.164	100.46	99.89	99.31	98.73	98.14	97.55	96.96
20.463	96.37	95.79	95.20	94.61	94.02	93.43	92.85
20.761	92.27	91.69	91.11	90.53	89.95	89.37	88.80
21.060	88.22	87.64	87.07	86.49	85.92	85.34	84.76
21.359	84.17	83.58	82.99	82.40	81.81	81.22	80.63
21.658	80.05	79.46	78.88	78.29	77.70	77.11	76.53
21.957	75.94	75.35	74.77	74.18	73.60	73.02	72.43
22.256	71.85	71.28	70.70	70.12	69.55	68.96	68.38
22.555	67.79	67.20	66.61	66.02	65.43	64.83	64.24
22.853	63.66	63.07	62.48	61.90	61.32	60.73	60.16
23.152	59.58	59.00	58.42	57.83	57.25	56.66	56.07
23.451	55.48	54.88	54.29	53.70	53.11	52.52	51.93
23.750	51.35	50.76	50.17	49.59	48.97	48.18	47.16
24.049	45.81	44.03	41.73	38.90	35.68	32.23	28.71
24.348	25.23	21.90	18.81	16.00	13.51	11.39	9.64
24.647	8.19	6.95	5.91	5.01	4.25	3.60	3.05
24.945	2.58	2.18	1.84	1.55	1.31	1.10	0.93
25.244	0.78	0.65	0.55	0.45	0.38	0.31	0.25
25.543	0.21	0.17	0.13	0.11	0.08	0.06	

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Time (hr)	Rate (cfs)	Rate (csm)
OUTLET	0.781		9.617		12.44	2527.36	3235.02

Line Start Time (hr)	Flow Values @ time increment of 0.043 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)

WinTR-20: Version 1.10 0 0 0.05
Cantonment Areas EA (continued)
7th SFG (A) Alternative 2

STORM 25-Yr

SUB-AREA:
7SFG (A) Outlet .78125 83. .676

STREAM REACH:

3.427	0.08	0.15	0.25	0.40	0.59	0.83	1.12
3.726	1.45	1.84	2.26	2.72	3.22	3.74	4.29
4.025	4.86	5.44	6.05	6.67	7.30	7.95	8.61
4.324	9.28	9.95	10.64	11.33	12.03	12.74	13.46
4.623	14.18	14.90	15.63	16.37	17.11	17.86	18.61

Eglin Cantonment Areas EA
7th SFG (A) Alternative 2

Line Start Time (hr)	Flow Values @ time increment of 0.043 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
4.922	19.37	20.13	20.90	21.66	22.44	23.22	24.00
5.221	24.78	25.57	26.36	27.15	27.94	28.74	29.54
5.519	30.34	31.15	31.96	32.76	33.58	34.39	35.21
5.818	36.03	36.86	37.69	38.52	39.35	40.19	41.02
6.117	41.86	42.70	43.54	44.39	45.23	46.08	46.93
6.416	47.78	48.63	49.49	50.34	51.19	52.05	52.90
6.715	53.76	54.62	55.48	56.33	57.19	58.05	58.92
7.014	59.78	60.65	61.52	62.39	63.26	64.13	65.01
7.313	65.88	66.75	67.62	68.49	69.37	70.24	71.11
7.611	71.98	72.85	73.72	74.59	75.46	76.34	77.21
7.910	78.09	78.97	79.85	80.73	81.61	82.48	83.36
8.209	84.23	85.11	85.98	86.85	87.73	88.59	89.46
8.508	90.33	91.20	92.08	92.95	93.82	94.69	95.56
8.807	96.43	97.30	98.17	99.04	99.90	100.82	101.92
9.106	103.29	105.03	107.27	110.14	113.65	117.69	122.07
9.405	126.65	131.29	135.88	140.32	144.55	148.54	152.19
9.703	155.50	158.55	161.40	164.08	166.61	169.04	171.36
10.002	173.58	175.73	177.82	179.85	181.83	183.76	185.67
10.301	187.54	189.39	191.22	193.04	194.84	196.70	198.80
10.600	201.36	204.57	208.72	214.10	220.92	229.12	238.58
10.899	249.11	260.53	272.72	285.42	298.61	312.07	325.70
11.198	339.35	353.06	366.89	380.80	394.86	409.02	423.33
11.497	437.73	452.56	468.27	485.35	504.79	527.60	555.39
11.795	589.29	630.75	681.31	743.10	820.30	916.22	1038.44
12.094	1194.29	1380.65	1589.07	1811.99	2036.62	2237.52	2390.89
12.393	2487.46	2527.36	2517.34	2463.31	2369.69	2249.95	2109.87
12.692	1955.35	1799.72	1656.60	1528.10	1410.70	1305.07	1210.38
12.991	1124.85	1048.26	980.88	921.57	868.72	821.77	779.77
13.290	741.84	707.31	676.02	647.22	620.47	595.60	571.98
13.589	549.24	527.18	505.57	484.26	462.90	441.95	421.77
13.888	402.47	384.36	367.50	352.16	338.35	326.10	315.45
14.186	306.55	299.17	292.78	287.23	282.37	278.07	274.26
14.485	270.88	267.86	265.12	262.64	260.36	258.26	256.29
14.784	254.45	252.72	251.06	249.47	247.94	246.46	244.88
15.083	243.00	240.71	237.87	234.28	229.79	224.53	218.77
15.382	212.74	206.71	200.77	195.17	189.97	185.22	181.00
15.681	177.41	174.36	171.69	169.35	167.27	165.40	163.71
15.980	162.20	160.84	159.59	158.44	157.38	156.40	155.48
16.278	154.61	153.79	153.01	152.26	151.54	150.84	150.17
16.577	149.50	148.85	148.20	147.56	146.94	146.31	145.70
16.876	145.08	144.48	143.88	143.29	142.71	142.13	141.55
17.175	140.98	140.42	139.85	139.28	138.71	138.13	137.55

WinTR-20: Version 1.10 0 0 0.05
Cantonment Areas EA (continued)
7th SFG (A) Alternative 2

STORM 25-Yr

SUB-AREA:
7SFG (A) Outlet .78125 83. .676

STREAM REACH:

17.474	136.97	136.39	135.81	135.23	134.64	134.06	133.48
17.773	132.90	132.33	131.75	131.17	130.60	130.02	129.45
18.072	128.88	128.31	127.74	127.16	126.58	126.00	125.43
18.370	124.85	124.27	123.69	123.12	122.54	121.96	121.38
18.669	120.80	120.21	119.62	119.04	118.45	117.86	117.28
18.968	116.69	116.11	115.53	114.95	114.37	113.80	113.22
19.267	112.65	112.08	111.50	110.93	110.35	109.78	109.21
19.566	108.63	108.06	107.47	106.89	106.30	105.71	105.12
19.865	104.54	103.95	103.37	102.78	102.20	101.62	101.04

Eglin Cantonment Areas EA
7th SFG (A) Alternative 2

Line Start Time (hr)	Flow Values @ time increment of 0.043 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
20.164	100.46	99.89	99.31	98.73	98.14	97.55	96.96
20.463	96.37	95.79	95.20	94.61	94.02	93.43	92.85
20.761	92.27	91.69	91.11	90.53	89.95	89.37	88.80
21.060	88.22	87.64	87.07	86.49	85.92	85.34	84.76
21.359	84.17	83.58	82.99	82.40	81.81	81.22	80.63
21.658	80.05	79.46	78.88	78.29	77.70	77.11	76.53
21.957	75.94	75.35	74.77	74.18	73.60	73.02	72.43
22.256	71.85	71.28	70.70	70.12	69.55	68.96	68.38
22.555	67.79	67.20	66.61	66.02	65.43	64.83	64.24
22.853	63.66	63.07	62.48	61.90	61.32	60.73	60.16
23.152	59.58	59.00	58.42	57.83	57.25	56.66	56.07
23.451	55.48	54.88	54.29	53.70	53.11	52.52	51.93
23.750	51.35	50.76	50.17	49.59	48.97	48.18	47.16
24.049	45.81	44.03	41.73	38.90	35.68	32.23	28.71
24.348	25.23	21.90	18.81	16.00	13.51	11.39	9.64
24.647	8.19	6.95	5.91	5.01	4.25	3.60	3.05
24.945	2.58	2.18	1.84	1.55	1.31	1.10	0.93
25.244	0.78	0.65	0.55	0.45	0.38	0.31	0.25
25.543	0.21	0.17	0.13	0.11	0.08	0.06	

WinTR-20: Version 1.10 0 0 0.05
Cantonment Areas EA (continued)
7th SFG (A) Alternative 2

STORM 25-Yr

SUB-AREA:
7SFG (A) Outlet .78125 83. .676

STREAM REACH:

Eglin Cantonment Areas EA
7th SFG (A) Alternative 2

Area or Reach Identifier	Drainage Area (sq mi)	Alternate	Peak Flow by Storm 25-Yr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)
7SFG (A)	0.781		2527.36				
OUTLET	0.781		2527.36				

```
WinTR-20: Version 1.10                  0         0         0.05
 Cantonment Areas EA                                                    (continued)
7th SFG (A) Alternative 2
                                          STORM 25-Yr
SUB-AREA:
          7SFG (A)  Outlet              .78125    83.       .676

STREAM REACH:
```

WinTR-20 Printed Page File Beginning of Input Data List
TR20.inp

WinTR-20: Version 1.10 0 0 0.05
Eglin Cantonment Areas EA
Camp Rudder No Action Alternative

SUB-AREA:
Camp RuddeOutlet .44938 57. .943

STREAM REACH:

STORM ANALYSIS:
25-Yr 11.77 Type MSE6 2

STRUCTURE RATING:

RAINFALL DISTRIBUTION:
Type MSE6 0.1

0.0	0.000713	0.00145	0.00221	0.00300
0.00380	0.00464	0.00549	0.00637	0.00727
0.00820	0.00915	0.01013	0.01112	0.01215
0.01319	0.01426	0.01535	0.01647	0.01761
0.01878	0.01996	0.02118	0.02241	0.02367
0.02495	0.02626	0.02759	0.02894	0.03032
0.03172	0.03315	0.03460	0.03607	0.03757
0.03909	0.04063	0.04220	0.04379	0.04540
0.04704	0.04871	0.05039	0.05210	0.05384
0.05559	0.05737	0.05918	0.06101	0.06286
0.06474	0.06664	0.06856	0.07051	0.07248
0.07447	0.07649	0.07853	0.08060	0.08269
0.08480	0.08694	0.08910	0.09129	0.09349
0.09573	0.09798	0.10026	0.10256	0.10489
0.10724	0.10962	0.11201	0.11444	0.11688
0.11935	0.12184	0.12436	0.12690	0.12947
0.13205	0.13467	0.13730	0.13996	0.14264
0.14535	0.14808	0.15083	0.15361	0.15641
0.15924	0.16327	0.16735	0.17148	0.17566
0.17990	0.18418	0.18851	0.19289	0.19732
0.20180	0.20632	0.21090	0.21553	0.22021
0.22494	0.23145	0.23857	0.24630	0.25465
0.26360	0.27316	0.28333	0.29411	0.30550
0.31750	0.33312	0.35347	0.38046	0.41660
0.47904	0.58340	0.61954	0.64653	0.66688
0.68250	0.69450	0.70589	0.71667	0.72684
0.73640	0.74535	0.75370	0.76143	0.76855
0.77506	0.77979	0.78447	0.78910	0.79368
0.79820	0.80268	0.80711	0.81149	0.81582
0.82010	0.82434	0.82852	0.83265	0.83673
0.84076	0.84359	0.84639	0.84917	0.85192
0.85465	0.85736	0.86004	0.86270	0.86533
0.86795	0.87053	0.87310	0.87564	0.87816
0.88065	0.88312	0.88556	0.88799	0.89038
0.89276	0.89511	0.89744	0.89974	0.90202
0.90427	0.90651	0.90871	0.91090	0.91306
0.91520	0.91731	0.91940	0.92147	0.92351
0.92553	0.92752	0.92949	0.93144	0.93336
0.93526	0.93714	0.93899	0.94082	0.94263
0.94441	0.94616	0.94790	0.94961	0.95129
0.95296	0.95460	0.95621	0.95780	0.95937
0.96091	0.96243	0.96393	0.96540	0.96685
0.96828	0.96968	0.97106	0.97241	0.97374
0.97505	0.97633	0.97759	0.97882	0.98004
0.98122	0.98239	0.98353	0.98465	0.98574
0.98681	0.98785	0.98888	0.98987	0.99085
0.99180	0.99273	0.99363	0.99451	0.99536
0.99620	0.99700	0.99779	0.99855	0.999287

GLOBAL OUTPUT:
2 0.05 YYYYN YYYYNN

WinTR-20: Version 1.10 0 0 0.05
Cantonment Areas EA (continued)
Camp Rudder No Action Alternative

SUB-AREA:
Camp RuddeOutlet .44938 57. .943

STREAM REACH:

WinTR-20 Printed Page File End of Input Data List

Eglin Cantonment Areas EA
Camp Rudder No Action Alternative

Name of printed page file:
TR20.out

STORM 25-Yr

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Peak Flow Time (hr)	Peak Flow Rate (cfs)	Peak Flow Rate (csm)
Camp Rudde	0.449		5.907		12.67	770.67	1714.96

Line Start Time (hr)	Flow Values @ time increment of 0.060 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
8.148	0.05	0.10	0.17	0.26	0.39	0.55	0.75
8.565	0.97	1.23	1.51	1.82	2.15	2.50	2.86
8.982	3.24	3.64	4.07	4.53	5.04	5.61	6.26
9.399	6.99	7.79	8.65	9.56	10.51	11.50	12.51
9.816	13.54	14.58	15.62	16.66	17.70	18.75	19.81
10.232	20.87	21.94	23.01	24.09	25.18	26.30	27.48
10.649	28.77	30.22	31.89	33.88	36.23	38.96	42.08
11.066	45.56	49.41	53.61	58.14	62.99	68.14	73.58
11.483	79.27	85.30	91.80	99.02	107.33	117.22	129.48
11.900	144.95	165.42	193.51	232.73	284.65	347.89	421.65
12.317	502.84	584.77	657.19	713.11	750.51	768.86	770.67
12.734	756.54	730.35	694.36	650.88	603.60	558.14	517.43
13.151	480.86	448.07	418.82	392.48	368.53	347.03	327.73
13.568	309.91	293.27	277.56	262.67	248.33	234.61	221.55
13.985	209.24	197.78	187.29	177.70	169.14	161.53	154.85
14.401	149.05	144.07	139.82	136.10	132.81	129.85	127.19
14.818	124.77	122.58	120.62	118.87	117.32	115.78	114.16
15.235	112.36	110.30	107.86	105.13	102.19	99.17	96.17
15.652	93.24	90.48	87.92	85.59	83.51	81.74	80.22
16.069	78.88	77.70	76.65	75.71	74.85	74.08	73.39
16.486	72.74	72.14	71.59	71.06	70.56	70.09	69.63
16.903	69.20	68.77	68.36	67.96	67.56	67.18	66.80
17.320	66.43	66.06	65.69	65.33	64.97	64.60	64.24
17.737	63.88	63.52	63.17	62.82	62.46	62.11	61.76
18.154	61.41	61.06	60.71	60.35	60.00	59.64	59.29
18.571	58.93	58.58	58.22	57.86	57.49	57.13	56.77
18.987	56.40	56.04	55.68	55.31	54.95	54.59	54.22
19.404	53.86	53.50	53.14	52.77	52.41	52.04	51.67
19.821	51.31	50.93	50.56	50.19	49.82	49.45	49.08
20.238	48.71	48.33	47.96	47.59	47.21	46.84	46.46
20.655	46.08	45.71	45.33	44.95	44.57	44.20	43.82
21.072	43.45	43.07	42.70	42.32	41.95	41.57	41.19
21.489	40.81	40.43	40.05	39.66	39.28	38.90	38.51
21.906	38.13	37.75	37.36	36.98	36.59	36.21	35.83
22.323	35.44	35.06	34.68	34.29	33.91	33.53	33.14
22.740	32.75	32.36	31.97	31.58	31.20	30.81	30.42
23.156	30.03	29.65	29.26	28.87	28.48	28.09	27.70

WinTR-20: Version 1.10 0 0 0.05
Cantonment Areas EA (continued)
Camp Rudder No Action Alternative
STORM 25-Yr
SUB-AREA:
Camp RuddeOutlet .44938 57. .943

STREAM REACH:

23.573	27.31	26.92	26.53	26.13	25.74	25.35	24.94
23.990	24.45	23.84	23.08	22.11	20.89	19.42	17.77
24.407	16.02	14.25	12.51	10.85	9.31	7.92	6.68

Eglin Cantonment Areas EA
Camp Rudder No Action Alternative

Line Start Time (hr)	Flow Values @ time increment of 0.060 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
24.824	5.64	4.77	4.05	3.44	2.92	2.48	2.10
25.241	1.78	1.51	1.27	1.08	0.91	0.77	0.65
25.658	0.54	0.46	0.38	0.32	0.27	0.22	0.18
26.075	0.15	0.12	0.10	0.08	0.07	0.05	

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Time (hr)	Rate (cfs)	Rate (csm)
OUTLET	0.449		5.907		12.67	770.67	1714.96

Line Start Time (hr)	Flow Values @ time increment of 0.060 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
8.148	0.05	0.10	0.17	0.26	0.39	0.55	0.75
8.565	0.97	1.23	1.51	1.82	2.15	2.50	2.86
8.982	3.24	3.64	4.07	4.53	5.04	5.61	6.26
9.399	6.99	7.79	8.65	9.56	10.51	11.50	12.51
9.816	13.54	14.58	15.62	16.66	17.70	18.75	19.81
10.232	20.87	21.94	23.01	24.09	25.18	26.30	27.48
10.649	28.77	30.22	31.89	33.88	36.23	38.96	42.08
11.066	45.56	49.41	53.61	58.14	62.99	68.14	73.58
11.483	79.27	85.30	91.80	99.02	107.33	117.22	129.48
11.900	144.95	165.42	193.51	232.73	284.65	347.89	421.65
12.317	502.84	584.77	657.19	713.11	750.51	768.86	770.67
12.734	756.54	730.35	694.36	650.88	603.60	558.14	517.43
13.151	480.86	448.07	418.82	392.48	368.53	347.03	327.73
13.568	309.91	293.27	277.56	262.67	248.33	234.61	221.55
13.985	209.24	197.78	187.29	177.70	169.14	161.53	154.85
14.401	149.05	144.07	139.82	136.10	132.81	129.85	127.19
14.818	124.77	122.58	120.62	118.87	117.32	115.78	114.16
15.235	112.36	110.30	107.86	105.13	102.19	99.17	96.17
15.652	93.24	90.48	87.92	85.59	83.51	81.74	80.22
16.069	78.88	77.70	76.65	75.71	74.85	74.08	73.39
16.486	72.74	72.14	71.59	71.06	70.56	70.09	69.63
16.903	69.20	68.77	68.36	67.96	67.56	67.18	66.80
17.320	66.43	66.06	65.69	65.33	64.97	64.60	64.24
17.737	63.88	63.52	63.17	62.82	62.46	62.11	61.76
18.154	61.41	61.06	60.71	60.35	60.00	59.64	59.29
18.571	58.93	58.58	58.22	57.86	57.49	57.13	56.77
18.987	56.40	56.04	55.68	55.31	54.95	54.59	54.22
19.404	53.86	53.50	53.14	52.77	52.41	52.04	51.67
19.821	51.31	50.93	50.56	50.19	49.82	49.45	49.08
20.238	48.71	48.33	47.96	47.59	47.21	46.84	46.46

WinTR-20: Version 1.10 0 0 0.05
Cantonment Areas EA (continued)
Camp Rudder No Action Alternative
STORM 25-Yr
SUB-AREA:
Camp RuddeOutlet .44938 57. .943

STREAM REACH:

20.655	46.08	45.71	45.33	44.95	44.57	44.20	43.82
21.072	43.45	43.07	42.70	42.32	41.95	41.57	41.19
21.489	40.81	40.43	40.05	39.66	39.28	38.90	38.51
21.906	38.13	37.75	37.36	36.98	36.59	36.21	35.83
22.323	35.44	35.06	34.68	34.29	33.91	33.53	33.14
22.740	32.75	32.36	31.97	31.58	31.20	30.81	30.42

Eglin Cantonment Areas EA
Camp Rudder No Action Alternative

Line Start Time (hr)	Flow Values @ time increment of 0.060 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
23.156	30.03	29.65	29.26	28.87	28.48	28.09	27.70
23.573	27.31	26.92	26.53	26.13	25.74	25.35	24.94
23.990	24.45	23.84	23.08	22.11	20.89	19.42	17.77
24.407	16.02	14.25	12.51	10.85	9.31	7.92	6.68
24.824	5.64	4.77	4.05	3.44	2.92	2.48	2.10
25.241	1.78	1.51	1.27	1.08	0.91	0.77	0.65
25.658	0.54	0.46	0.38	0.32	0.27	0.22	0.18
26.075	0.15	0.12	0.10	0.08	0.07	0.05	

WinTR-20: Version 1.10 0 0 0.05
Cantonment Areas EA (continued)
Camp Rudder No Action Alternative
STORM 25-Yr
SUB-AREA:
Camp RuddeOutlet .44938 57. .943

STREAM REACH:

Eglin Cantonment Areas EA
Camp Rudder No Action Alternative

Area or Reach Identifier	Drainage Area (sq mi)	Alternate	Peak Flow by Storm 25-Yr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)
Camp Rudde	0.449		770.67				
OUTLET	0.449		770.67				

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WinTR-20: Version 1.10                  0         0         0.05
 Cantonment Areas EA                                                    (continued)
Camp Rudder No Action Alternative
                                          STORM 25-Yr
SUB-AREA:
          Camp RuddeOutlet              .44938    57.       .943

STREAM REACH:
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WinTR-20 Printed Page File Beginning of Input Data List
TR20.inp

WinTR-20: Version 1.10 0 0 0.05
Eglin Cantonment Areas EA
Camp Rudder Alternative 1

SUB-AREA:
Camp RuddeOutlet .44688 67. .943

STREAM REACH:

STORM ANALYSIS:
25-Yr 11.77 Type MSE6 2

STRUCTURE RATING:

RAINFALL DISTRIBUTION:
Type MSE6 0.1

0.0	0.000713	0.00145	0.00221	0.00300
0.00380	0.00464	0.00549	0.00637	0.00727
0.00820	0.00915	0.01013	0.01112	0.01215
0.01319	0.01426	0.01535	0.01647	0.01761
0.01878	0.01996	0.02118	0.02241	0.02367
0.02495	0.02626	0.02759	0.02894	0.03032
0.03172	0.03315	0.03460	0.03607	0.03757
0.03909	0.04063	0.04220	0.04379	0.04540
0.04704	0.04871	0.05039	0.05210	0.05384
0.05559	0.05737	0.05918	0.06101	0.06286
0.06474	0.06664	0.06856	0.07051	0.07248
0.07447	0.07649	0.07853	0.08060	0.08269
0.08480	0.08694	0.08910	0.09129	0.09349
0.09573	0.09798	0.10026	0.10256	0.10489
0.10724	0.10962	0.11201	0.11444	0.11688
0.11935	0.12184	0.12436	0.12690	0.12947
0.13205	0.13467	0.13730	0.13996	0.14264
0.14535	0.14808	0.15083	0.15361	0.15641
0.15924	0.16327	0.16735	0.17148	0.17566
0.17990	0.18418	0.18851	0.19289	0.19732
0.20180	0.20632	0.21090	0.21553	0.22021
0.22494	0.23145	0.23857	0.24630	0.25465
0.26360	0.27316	0.28333	0.29411	0.30550
0.31750	0.33312	0.35347	0.38046	0.41660
0.47904	0.58340	0.61954	0.64653	0.66688
0.68250	0.69450	0.70589	0.71667	0.72684
0.73640	0.74535	0.75370	0.76143	0.76855
0.77506	0.77979	0.78447	0.78910	0.79368
0.79820	0.80268	0.80711	0.81149	0.81582
0.82010	0.82434	0.82852	0.83265	0.83673
0.84076	0.84359	0.84639	0.84917	0.85192
0.85465	0.85736	0.86004	0.86270	0.86533
0.86795	0.87053	0.87310	0.87564	0.87816
0.88065	0.88312	0.88556	0.88799	0.89038
0.89276	0.89511	0.89744	0.89974	0.90202
0.90427	0.90651	0.90871	0.91090	0.91306
0.91520	0.91731	0.91940	0.92147	0.92351
0.92553	0.92752	0.92949	0.93144	0.93336
0.93526	0.93714	0.93899	0.94082	0.94263
0.94441	0.94616	0.94790	0.94961	0.95129
0.95296	0.95460	0.95621	0.95780	0.95937
0.96091	0.96243	0.96393	0.96540	0.96685
0.96828	0.96968	0.97106	0.97241	0.97374
0.97505	0.97633	0.97759	0.97882	0.98004
0.98122	0.98239	0.98353	0.98465	0.98574
0.98681	0.98785	0.98888	0.98987	0.99085
0.99180	0.99273	0.99363	0.99451	0.99536
0.99620	0.99700	0.99779	0.99855	0.999287

GLOBAL OUTPUT:
2 0.05 YYYYN YYYYNN

WinTR-20: Version 1.10 0 0 0.05
Cantonment Areas EA (continued)
Camp Rudder Alternative 1

SUB-AREA:
Camp RuddeOutlet .44688 67. .943

STREAM REACH:

WinTR-20 Printed Page File End of Input Data List

Eglin Cantonment Areas EA
Camp Rudder Alternative 1

Name of printed page file:
TR20.out

STORM 25-Yr

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Peak Flow Time (hr)	Peak Flow Rate (cfs)	Peak Flow Rate (csm)
Camp Rudde	0.447		7.396		12.62	963.31	2155.64

Line Start Time (hr)	Flow Values @ time increment of 0.060 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
6.245	0.05	0.10	0.17	0.27	0.41	0.57	0.77
6.662	1.01	1.27	1.57	1.89	2.23	2.60	2.98
7.079	3.38	3.79	4.21	4.64	5.09	5.54	6.00
7.496	6.47	6.95	7.43	7.92	8.41	8.91	9.41
7.913	9.92	10.44	10.96	11.48	12.01	12.54	13.07
8.330	13.61	14.15	14.70	15.25	15.80	16.36	16.92
8.747	17.48	18.04	18.61	19.18	19.76	20.35	21.00
9.164	21.74	22.58	23.56	24.72	26.07	27.55	29.15
9.581	30.81	32.52	34.24	35.95	37.64	39.29	40.88
9.998	42.40	43.89	45.35	46.79	48.20	49.60	50.99
10.414	52.37	53.74	55.14	56.64	58.31	60.26	62.58
10.831	65.41	68.84	72.86	77.46	82.61	88.27	94.39
11.248	100.93	107.85	115.12	122.67	130.46	138.62	147.34
11.665	156.95	167.97	181.07	197.30	217.79	244.78	281.53
12.082	332.15	398.01	477.00	567.89	666.36	763.61	847.17
12.499	909.27	948.00	963.31	958.54	934.65	896.84	847.73
12.916	790.31	729.39	671.79	620.53	574.57	533.55	497.03
13.333	464.18	434.42	407.81	383.97	362.01	341.61	322.46
13.750	304.39	287.08	270.64	255.05	240.44	226.89	214.51
14.167	203.23	193.17	184.23	176.40	169.58	163.73	158.73
14.583	154.34	150.44	146.94	143.77	140.89	138.29	135.96
15.000	133.90	132.07	130.26	128.35	126.25	123.84	121.03
15.417	117.88	114.53	111.08	107.67	104.35	101.23	98.34
15.834	95.70	93.36	91.36	89.64	88.13	86.79	85.60
16.251	84.52	83.54	82.66	81.86	81.12	80.43	79.79
16.668	79.18	78.61	78.06	77.53	77.03	76.53	76.06
17.085	75.59	75.13	74.68	74.25	73.81	73.39	72.96
17.502	72.54	72.12	71.70	71.28	70.87	70.46	70.05
17.919	69.64	69.24	68.83	68.43	68.02	67.62	67.22
18.336	66.81	66.41	66.00	65.59	65.19	64.78	64.37
18.753	63.95	63.54	63.13	62.72	62.30	61.89	61.48
19.169	61.06	60.65	60.24	59.83	59.42	59.01	58.60
19.586	58.19	57.78	57.36	56.95	56.53	56.11	55.70
20.003	55.28	54.86	54.44	54.03	53.61	53.19	52.77
20.420	52.36	51.94	51.51	51.09	50.67	50.25	49.83
20.837	49.40	48.98	48.56	48.14	47.73	47.31	46.89
21.254	46.47	46.05	45.63	45.21	44.79	44.36	43.94

WinTR-20: Version 1.10 0 0 0.05
Cantonment Areas EA (continued)
Camp Rudder Alternative 1

STORM 25-Yr

SUB-AREA:
Camp RuddeOutlet .44688 67. .943

STREAM REACH:

21.671	43.51	43.09	42.66	42.24	41.81	41.38	40.96
22.088	40.53	40.11	39.68	39.26	38.83	38.41	37.99
22.505	37.56	37.14	36.71	36.29	35.86	35.43	35.00

Eglin Cantonment Areas EA
Camp Rudder Alternative 1

Line Start Time (hr)	Flow Values @ time increment of 0.060 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
22.922	34.57	34.14	33.71	33.29	32.86	32.43	32.01
23.338	31.58	31.15	30.72	30.29	29.86	29.43	29.00
23.755	28.57	28.14	27.71	27.25	26.71	26.03	25.19
24.172	24.11	22.76	21.14	19.33	17.41	15.48	13.57
24.589	11.76	10.09	8.58	7.24	6.11	5.17	4.39
25.006	3.73	3.17	2.69	2.27	1.93	1.63	1.38
25.423	1.17	0.98	0.83	0.70	0.59	0.50	0.42
25.840	0.35	0.29	0.24	0.20	0.16	0.13	0.11
26.257	0.09	0.07	0.05				

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Time (hr)	Rate (cfs)	Rate (csm)
OUTLET	0.447		7.396		12.62	963.31	2155.64

Line Start Time (hr)	Flow Values @ time increment of 0.060 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
6.245	0.05	0.10	0.17	0.27	0.41	0.57	0.77
6.662	1.01	1.27	1.57	1.89	2.23	2.60	2.98
7.079	3.38	3.79	4.21	4.64	5.09	5.54	6.00
7.496	6.47	6.95	7.43	7.92	8.41	8.91	9.41
7.913	9.92	10.44	10.96	11.48	12.01	12.54	13.07
8.330	13.61	14.15	14.70	15.25	15.80	16.36	16.92
8.747	17.48	18.04	18.61	19.18	19.76	20.35	21.00
9.164	21.74	22.58	23.56	24.72	26.07	27.55	29.15
9.581	30.81	32.52	34.24	35.95	37.64	39.29	40.88
9.998	42.40	43.89	45.35	46.79	48.20	49.60	50.99
10.414	52.37	53.74	55.14	56.64	58.31	60.26	62.58
10.831	65.41	68.84	72.86	77.46	82.61	88.27	94.39
11.248	100.93	107.85	115.12	122.67	130.46	138.62	147.34
11.665	156.95	167.97	181.07	197.30	217.79	244.78	281.53
12.082	332.15	398.01	477.00	567.89	666.36	763.61	847.17
12.499	909.27	948.00	963.31	958.54	934.65	896.84	847.73
12.916	790.31	729.39	671.79	620.53	574.57	533.55	497.03
13.333	464.18	434.42	407.81	383.97	362.01	341.61	322.46
13.750	304.39	287.08	270.64	255.05	240.44	226.89	214.51
14.167	203.23	193.17	184.23	176.40	169.58	163.73	158.73
14.583	154.34	150.44	146.94	143.77	140.89	138.29	135.96
15.000	133.90	132.07	130.26	128.35	126.25	123.84	121.03
15.417	117.88	114.53	111.08	107.67	104.35	101.23	98.34
15.834	95.70	93.36	91.36	89.64	88.13	86.79	85.60
16.251	84.52	83.54	82.66	81.86	81.12	80.43	79.79

WinTR-20: Version 1.10 0 0 0.05
Cantonment Areas EA (continued)
Camp Rudder Alternative 1

STORM 25-Yr

SUB-AREA:
Camp RuddeOutlet .44688 67. .943

STREAM REACH:

16.668	79.18	78.61	78.06	77.53	77.03	76.53	76.06
17.085	75.59	75.13	74.68	74.25	73.81	73.39	72.96
17.502	72.54	72.12	71.70	71.28	70.87	70.46	70.05
17.919	69.64	69.24	68.83	68.43	68.02	67.62	67.22
18.336	66.81	66.41	66.00	65.59	65.19	64.78	64.37
18.753	63.95	63.54	63.13	62.72	62.30	61.89	61.48

Eglin Cantonment Areas EA
Camp Rudder Alternative 1

Line Start Time (hr)	Flow Values @ time increment of 0.060 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
19.169	61.06	60.65	60.24	59.83	59.42	59.01	58.60
19.586	58.19	57.78	57.36	56.95	56.53	56.11	55.70
20.003	55.28	54.86	54.44	54.03	53.61	53.19	52.77
20.420	52.36	51.94	51.51	51.09	50.67	50.25	49.83
20.837	49.40	48.98	48.56	48.14	47.73	47.31	46.89
21.254	46.47	46.05	45.63	45.21	44.79	44.36	43.94
21.671	43.51	43.09	42.66	42.24	41.81	41.38	40.96
22.088	40.53	40.11	39.68	39.26	38.83	38.41	37.99
22.505	37.56	37.14	36.71	36.29	35.86	35.43	35.00
22.922	34.57	34.14	33.71	33.29	32.86	32.43	32.01
23.338	31.58	31.15	30.72	30.29	29.86	29.43	29.00
23.755	28.57	28.14	27.71	27.25	26.71	26.03	25.19
24.172	24.11	22.76	21.14	19.33	17.41	15.48	13.57
24.589	11.76	10.09	8.58	7.24	6.11	5.17	4.39
25.006	3.73	3.17	2.69	2.27	1.93	1.63	1.38
25.423	1.17	0.98	0.83	0.70	0.59	0.50	0.42
25.840	0.35	0.29	0.24	0.20	0.16	0.13	0.11
26.257	0.09	0.07	0.05				

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WinTR-20: Version 1.10                  0         0         0.05
 Cantonment Areas EA                                                    (continued)
Camp Rudder Alternative 1
                                           STORM 25-Yr
SUB-AREA:
          Camp RuddeOutlet              .44688    67.       .943

STREAM REACH:
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Eglin Cantonment Areas EA
Camp Rudder Alternative 1

Area or Reach Identifier	Drainage Area (sq mi)	Alternate	Peak Flow by Storm 25-Yr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)
Camp Rudde	0.447		963.31				
OUTLET	0.447		963.31				

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WinTR-20: Version 1.10                  0         0         0.05
 Cantonment Areas EA                                                    (continued)
Camp Rudder Alternative 1
                                          STORM 25-Yr
SUB-AREA:
          Camp RuddeOutlet              .44688    67.       .943

STREAM REACH:
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WinTR-20 Printed Page File Beginning of Input Data List
TR20.inp

WinTR-20: Version 1.10 0 0 0.05
Eglin Cantonment Areas EA
Camp Rudder Alternative 2

SUB-AREA:
Camp RuddeOutlet .44688 69. .943

STREAM REACH:

STORM ANALYSIS:
25-Yr 11.77 Type MSE6 2

STRUCTURE RATING:

RAINFALL DISTRIBUTION:
Type MSE6 0.1

0.0	0.000713	0.00145	0.00221	0.00300
0.00380	0.00464	0.00549	0.00637	0.00727
0.00820	0.00915	0.01013	0.01112	0.01215
0.01319	0.01426	0.01535	0.01647	0.01761
0.01878	0.01996	0.02118	0.02241	0.02367
0.02495	0.02626	0.02759	0.02894	0.03032
0.03172	0.03315	0.03460	0.03607	0.03757
0.03909	0.04063	0.04220	0.04379	0.04540
0.04704	0.04871	0.05039	0.05210	0.05384
0.05559	0.05737	0.05918	0.06101	0.06286
0.06474	0.06664	0.06856	0.07051	0.07248
0.07447	0.07649	0.07853	0.08060	0.08269
0.08480	0.08694	0.08910	0.09129	0.09349
0.09573	0.09798	0.10026	0.10256	0.10489
0.10724	0.10962	0.11201	0.11444	0.11688
0.11935	0.12184	0.12436	0.12690	0.12947
0.13205	0.13467	0.13730	0.13996	0.14264
0.14535	0.14808	0.15083	0.15361	0.15641
0.15924	0.16327	0.16735	0.17148	0.17566
0.17990	0.18418	0.18851	0.19289	0.19732
0.20180	0.20632	0.21090	0.21553	0.22021
0.22494	0.23145	0.23857	0.24630	0.25465
0.26360	0.27316	0.28333	0.29411	0.30550
0.31750	0.33312	0.35347	0.38046	0.41660
0.47904	0.58340	0.61954	0.64653	0.66688
0.68250	0.69450	0.70589	0.71667	0.72684
0.73640	0.74535	0.75370	0.76143	0.76855
0.77506	0.77979	0.78447	0.78910	0.79368
0.79820	0.80268	0.80711	0.81149	0.81582
0.82010	0.82434	0.82852	0.83265	0.83673
0.84076	0.84359	0.84639	0.84917	0.85192
0.85465	0.85736	0.86004	0.86270	0.86533
0.86795	0.87053	0.87310	0.87564	0.87816
0.88065	0.88312	0.88556	0.88799	0.89038
0.89276	0.89511	0.89744	0.89974	0.90202
0.90427	0.90651	0.90871	0.91090	0.91306
0.91520	0.91731	0.91940	0.92147	0.92351
0.92553	0.92752	0.92949	0.93144	0.93336
0.93526	0.93714	0.93899	0.94082	0.94263
0.94441	0.94616	0.94790	0.94961	0.95129
0.95296	0.95460	0.95621	0.95780	0.95937
0.96091	0.96243	0.96393	0.96540	0.96685
0.96828	0.96968	0.97106	0.97241	0.97374
0.97505	0.97633	0.97759	0.97882	0.98004
0.98122	0.98239	0.98353	0.98465	0.98574
0.98681	0.98785	0.98888	0.98987	0.99085
0.99180	0.99273	0.99363	0.99451	0.99536
0.99620	0.99700	0.99779	0.99855	0.999287

GLOBAL OUTPUT:
2 0.05 YYYYN YYYYNN

WinTR-20: Version 1.10 0 0 0.05
Cantonment Areas EA (continued)
Camp Rudder Alternative 2

SUB-AREA:
Camp RuddeOutlet .44688 69. .943

STREAM REACH:

WinTR-20 Printed Page File End of Input Data List

Eglin Cantonment Areas EA
Camp Rudder Alternative 2

Name of printed page file:
TR20.out

STORM 25-Yr

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Peak Flow Time (hr)	Peak Flow Rate (cfs)	Peak Flow Rate (csm)
Camp Rudde	0.447		7.685		12.62	999.26	2236.09

Line Start Time (hr)	Flow Values @ time increment of 0.060 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
5.890	0.05	0.10	0.17	0.28	0.41	0.58	0.78
6.307	1.02	1.29	1.59	1.91	2.26	2.63	3.02
6.724	3.42	3.84	4.26	4.70	5.15	5.61	6.08
7.141	6.55	7.04	7.53	8.02	8.52	9.03	9.54
7.558	10.06	10.58	11.11	11.64	12.17	12.71	13.25
7.975	13.80	14.35	14.90	15.46	16.02	16.59	17.16
8.392	17.73	18.30	18.88	19.46	20.04	20.62	21.21
8.809	21.80	22.39	22.99	23.59	24.21	24.90	25.68
9.226	26.59	27.66	28.93	30.41	32.04	33.79	35.61
9.643	37.48	39.35	41.20	43.02	44.79	46.49	48.11
10.060	49.68	51.22	52.72	54.20	55.66	57.10	58.53
10.476	59.94	61.39	62.95	64.71	66.75	69.21	72.23
10.893	75.89	80.19	85.11	90.60	96.64	103.15	110.10
11.310	117.44	125.13	133.09	141.29	149.87	159.03	169.13
11.727	180.71	194.49	211.59	233.23	261.72	300.50	353.82
12.144	422.78	505.07	599.38	701.07	800.70	885.39	947.56
12.561	985.45	999.26	992.45	966.00	925.54	873.63	813.37
12.978	749.91	690.32	637.36	589.85	547.49	509.78	475.85
13.395	445.14	417.71	393.11	370.46	349.43	329.69	311.08
13.812	293.27	276.37	260.37	245.38	231.50	218.83	207.29
14.229	197.00	187.86	179.87	172.91	166.93	161.82	157.33
14.645	153.34	149.75	146.50	143.56	140.89	138.51	136.40
15.062	134.52	132.65	130.69	128.53	126.04	123.16	119.94
15.479	116.51	112.99	109.52	106.13	102.96	100.02	97.34
15.896	94.97	92.93	91.19	89.65	88.29	87.07	85.98
16.313	84.98	84.09	83.27	82.51	81.81	81.16	80.54
16.730	79.95	79.39	78.85	78.33	77.83	77.34	76.86
17.147	76.39	75.94	75.49	75.04	74.61	74.17	73.74
17.564	73.31	72.88	72.46	72.03	71.61	71.19	70.78
17.981	70.36	69.95	69.54	69.12	68.71	68.30	67.88
18.398	67.47	67.05	66.64	66.22	65.81	65.39	64.97
18.815	64.55	64.12	63.70	63.28	62.86	62.44	62.02
19.231	61.59	61.18	60.76	60.34	59.92	59.50	59.08
19.648	58.66	58.24	57.82	57.39	56.97	56.54	56.12
20.065	55.69	55.27	54.84	54.42	53.99	53.57	53.14
20.482	52.71	52.28	51.85	51.42	50.99	50.56	50.14
20.899	49.71	49.28	48.85	48.43	48.00	47.58	47.15

WinTR-20: Version 1.10 0 0 0.05
Cantonment Areas EA (continued)
Camp Rudder Alternative 2

STORM 25-Yr

SUB-AREA:
Camp RuddeOutlet .44688 69. .943

STREAM REACH:

21.316	46.73	46.30	45.87	45.44	45.01	44.58	44.14
21.733	43.71	43.28	42.84	42.41	41.98	41.54	41.11
22.150	40.68	40.25	39.82	39.39	38.96	38.53	38.10

Eglin Cantonment Areas EA
Camp Rudder Alternative 2

Line Start Time (hr)	Flow Values @ time increment of 0.060 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
22.567	37.66	37.23	36.80	36.36	35.93	35.49	35.06
22.984	34.62	34.19	33.75	33.32	32.88	32.45	32.02
23.401	31.58	31.15	30.71	30.27	29.84	29.40	28.96
23.817	28.52	28.09	27.62	27.07	26.37	25.51	24.41
24.234	23.02	21.37	19.53	17.58	15.62	13.69	11.86
24.651	10.17	8.64	7.29	6.15	5.21	4.42	3.75
25.068	3.19	2.71	2.29	1.94	1.64	1.39	1.17
25.485	0.99	0.84	0.70	0.59	0.50	0.42	0.35
25.902	0.29	0.24	0.20	0.17	0.14	0.11	0.09
26.319	0.07	0.06					

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Time (hr)	Rate (cfs)	Rate (csm)
OUTLET	0.447		7.685		12.62	999.26	2236.09

Line Start Time (hr)	Flow Values @ time increment of 0.060 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
5.890	0.05	0.10	0.17	0.28	0.41	0.58	0.78
6.307	1.02	1.29	1.59	1.91	2.26	2.63	3.02
6.724	3.42	3.84	4.26	4.70	5.15	5.61	6.08
7.141	6.55	7.04	7.53	8.02	8.52	9.03	9.54
7.558	10.06	10.58	11.11	11.64	12.17	12.71	13.25
7.975	13.80	14.35	14.90	15.46	16.02	16.59	17.16
8.392	17.73	18.30	18.88	19.46	20.04	20.62	21.21
8.809	21.80	22.39	22.99	23.59	24.21	24.90	25.68
9.226	26.59	27.66	28.93	30.41	32.04	33.79	35.61
9.643	37.48	39.35	41.20	43.02	44.79	46.49	48.11
10.060	49.68	51.22	52.72	54.20	55.66	57.10	58.53
10.476	59.94	61.39	62.95	64.71	66.75	69.21	72.23
10.893	75.89	80.19	85.11	90.60	96.64	103.15	110.10
11.310	117.44	125.13	133.09	141.29	149.87	159.03	169.13
11.727	180.71	194.49	211.59	233.23	261.72	300.50	353.82
12.144	422.78	505.07	599.38	701.07	800.70	885.39	947.56
12.561	985.45	999.26	992.45	966.00	925.54	873.63	813.37
12.978	749.91	690.32	637.36	589.85	547.49	509.78	475.85
13.395	445.14	417.71	393.11	370.46	349.43	329.69	311.08
13.812	293.27	276.37	260.37	245.38	231.50	218.83	207.29
14.229	197.00	187.86	179.87	172.91	166.93	161.82	157.33
14.645	153.34	149.75	146.50	143.56	140.89	138.51	136.40
15.062	134.52	132.65	130.69	128.53	126.04	123.16	119.94
15.479	116.51	112.99	109.52	106.13	102.96	100.02	97.34

WinTR-20: Version 1.10 0 0 0.05
Cantonment Areas EA (continued)
Camp Rudder Alternative 2

STORM 25-Yr

SUB-AREA:
Camp RuddeOutlet .44688 69. .943

STREAM REACH:

15.896	94.97	92.93	91.19	89.65	88.29	87.07	85.98
16.313	84.98	84.09	83.27	82.51	81.81	81.16	80.54
16.730	79.95	79.39	78.85	78.33	77.83	77.34	76.86
17.147	76.39	75.94	75.49	75.04	74.61	74.17	73.74
17.564	73.31	72.88	72.46	72.03	71.61	71.19	70.78
17.981	70.36	69.95	69.54	69.12	68.71	68.30	67.88

Eglin Cantonment Areas EA
Camp Rudder Alternative 2

Line Start Time (hr)	Flow Values @ time increment of 0.060 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
18.398	67.47	67.05	66.64	66.22	65.81	65.39	64.97
18.815	64.55	64.12	63.70	63.28	62.86	62.44	62.02
19.231	61.59	61.18	60.76	60.34	59.92	59.50	59.08
19.648	58.66	58.24	57.82	57.39	56.97	56.54	56.12
20.065	55.69	55.27	54.84	54.42	53.99	53.57	53.14
20.482	52.71	52.28	51.85	51.42	50.99	50.56	50.14
20.899	49.71	49.28	48.85	48.43	48.00	47.58	47.15
21.316	46.73	46.30	45.87	45.44	45.01	44.58	44.14
21.733	43.71	43.28	42.84	42.41	41.98	41.54	41.11
22.150	40.68	40.25	39.82	39.39	38.96	38.53	38.10
22.567	37.66	37.23	36.80	36.36	35.93	35.49	35.06
22.984	34.62	34.19	33.75	33.32	32.88	32.45	32.02
23.401	31.58	31.15	30.71	30.27	29.84	29.40	28.96
23.817	28.52	28.09	27.62	27.07	26.37	25.51	24.41
24.234	23.02	21.37	19.53	17.58	15.62	13.69	11.86
24.651	10.17	8.64	7.29	6.15	5.21	4.42	3.75
25.068	3.19	2.71	2.29	1.94	1.64	1.39	1.17
25.485	0.99	0.84	0.70	0.59	0.50	0.42	0.35
25.902	0.29	0.24	0.20	0.17	0.14	0.11	0.09
26.319	0.07	0.06					

```
WinTR-20: Version 1.10                  0         0         0.05
 Cantonment Areas EA                                                    (continued)
Camp Rudder Alternative 2
                                          STORM 25-Yr
SUB-AREA:
          Camp RuddeOutlet              .44688    69.       .943

STREAM REACH:
```


Eglin Cantonment Areas EA
Camp Rudder Alternative 2

Area or Reach Identifier	Drainage Area (sq mi)	Alternate	Peak Flow by Storm 25-Yr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)
Camp Rudde	0.447		999.26				
OUTLET	0.447		999.26				

```
WinTR-20: Version 1.10                  0         0         0.05
 Cantonment Areas EA                                                    (continued)
Camp Rudder Alternative 2
                                          STORM 25-Yr
SUB-AREA:
          Camp RuddeOutlet              .44688    69.       .943

STREAM REACH:
```

WinTR-20 Printed Page File Beginning of Input Data List
TR20.inp

WinTR-20: Version 1.10 0 0 0.05
Eglin Cantonment Areas EA
C-6 20 SPC No Action Alternative

SUB-AREA:
C-6 20 SPCOutlet .02188 98. .143

STREAM REACH:

STORM ANALYSIS:
25-Yr 11.77 Type MSE6 2

STRUCTURE RATING:

RAINFALL DISTRIBUTION:
Type MSE6 0.1

0.0	0.000713	0.00145	0.00221	0.00300
0.00380	0.00464	0.00549	0.00637	0.00727
0.00820	0.00915	0.01013	0.01112	0.01215
0.01319	0.01426	0.01535	0.01647	0.01761
0.01878	0.01996	0.02118	0.02241	0.02367
0.02495	0.02626	0.02759	0.02894	0.03032
0.03172	0.03315	0.03460	0.03607	0.03757
0.03909	0.04063	0.04220	0.04379	0.04540
0.04704	0.04871	0.05039	0.05210	0.05384
0.05559	0.05737	0.05918	0.06101	0.06286
0.06474	0.06664	0.06856	0.07051	0.07248
0.07447	0.07649	0.07853	0.08060	0.08269
0.08480	0.08694	0.08910	0.09129	0.09349
0.09573	0.09798	0.10026	0.10256	0.10489
0.10724	0.10962	0.11201	0.11444	0.11688
0.11935	0.12184	0.12436	0.12690	0.12947
0.13205	0.13467	0.13730	0.13996	0.14264
0.14535	0.14808	0.15083	0.15361	0.15641
0.15924	0.16327	0.16735	0.17148	0.17566
0.17990	0.18418	0.18851	0.19289	0.19732
0.20180	0.20632	0.21090	0.21553	0.22021
0.22494	0.23145	0.23857	0.24630	0.25465
0.26360	0.27316	0.28333	0.29411	0.30550
0.31750	0.33312	0.35347	0.38046	0.41660
0.47904	0.58340	0.61954	0.64653	0.66688
0.68250	0.69450	0.70589	0.71667	0.72684
0.73640	0.74535	0.75370	0.76143	0.76855
0.77506	0.77979	0.78447	0.78910	0.79368
0.79820	0.80268	0.80711	0.81149	0.81582
0.82010	0.82434	0.82852	0.83265	0.83673
0.84076	0.84359	0.84639	0.84917	0.85192
0.85465	0.85736	0.86004	0.86270	0.86533
0.86795	0.87053	0.87310	0.87564	0.87816
0.88065	0.88312	0.88556	0.88799	0.89038
0.89276	0.89511	0.89744	0.89974	0.90202
0.90427	0.90651	0.90871	0.91090	0.91306
0.91520	0.91731	0.91940	0.92147	0.92351
0.92553	0.92752	0.92949	0.93144	0.93336
0.93526	0.93714	0.93899	0.94082	0.94263
0.94441	0.94616	0.94790	0.94961	0.95129
0.95296	0.95460	0.95621	0.95780	0.95937
0.96091	0.96243	0.96393	0.96540	0.96685
0.96828	0.96968	0.97106	0.97241	0.97374
0.97505	0.97633	0.97759	0.97882	0.98004
0.98122	0.98239	0.98353	0.98465	0.98574
0.98681	0.98785	0.98888	0.98987	0.99085
0.99180	0.99273	0.99363	0.99451	0.99536
0.99620	0.99700	0.99779	0.99855	0.999287

GLOBAL OUTPUT:
2 0.05 YYYYN YYYYNN

WinTR-20: Version 1.10 0 0 0.05
Cantonment Areas EA (continued)
C-6 20 SPC No Action Alternative

SUB-AREA:
C-6 20 SPCOutlet .02188 98. .143

STREAM REACH:

WinTR-20 Printed Page File End of Input Data List

Eglin Cantonment Areas EA
C-6 20 SPC No Action Alternative

Name of printed page file:
TR20.out

STORM 25-Yr

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Peak Flow Time (hr)	Peak Flow Rate (cfs)	Peak Flow Rate (csm)
C-6 20 SPC	0.022		11.520		12.14	147.31	6732.84

Line Start Time (hr)	Flow Values @ time increment of 0.009 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
0.603	0.06	0.06	0.07	0.08	0.09	0.10	0.11
0.666	0.12	0.13	0.14	0.15	0.16	0.17	0.18
0.729	0.19	0.20	0.21	0.22	0.23	0.24	0.25
0.793	0.26	0.27	0.28	0.29	0.30	0.31	0.32
0.856	0.33	0.34	0.35	0.36	0.37	0.38	0.39
0.919	0.40	0.41	0.42	0.43	0.44	0.45	0.46
0.982	0.47	0.48	0.49	0.50	0.50	0.51	0.52
1.046	0.53	0.54	0.55	0.56	0.57	0.58	0.59
1.109	0.59	0.60	0.61	0.62	0.63	0.64	0.65
1.172	0.66	0.66	0.67	0.68	0.69	0.70	0.71
1.235	0.72	0.72	0.73	0.74	0.75	0.75	0.76
1.298	0.77	0.78	0.78	0.79	0.80	0.81	0.82
1.362	0.82	0.83	0.84	0.85	0.86	0.87	0.88
1.425	0.88	0.89	0.90	0.91	0.91	0.92	0.93
1.488	0.94	0.94	0.95	0.96	0.96	0.97	0.98
1.551	0.98	0.99	1.00	1.01	1.01	1.02	1.03
1.615	1.04	1.04	1.05	1.06	1.07	1.07	1.08
1.678	1.09	1.09	1.10	1.11	1.11	1.12	1.13
1.741	1.13	1.14	1.15	1.16	1.16	1.17	1.18
1.804	1.18	1.19	1.20	1.21	1.21	1.22	1.23
1.867	1.23	1.24	1.25	1.25	1.26	1.26	1.27
1.931	1.28	1.28	1.29	1.30	1.30	1.31	1.32
1.994	1.32	1.33	1.34	1.34	1.35	1.36	1.36
2.057	1.37	1.37	1.38	1.38	1.39	1.39	1.40
2.120	1.40	1.41	1.42	1.42	1.43	1.44	1.44
2.184	1.45	1.46	1.47	1.47	1.48	1.49	1.49
2.247	1.50	1.50	1.51	1.51	1.52	1.52	1.53
2.310	1.53	1.54	1.54	1.55	1.55	1.56	1.57
2.373	1.57	1.58	1.58	1.59	1.60	1.60	1.61
2.436	1.61	1.62	1.62	1.63	1.64	1.64	1.65
2.500	1.65	1.66	1.66	1.67	1.67	1.68	1.68
2.563	1.69	1.70	1.70	1.71	1.72	1.72	1.73
2.626	1.73	1.74	1.74	1.75	1.75	1.76	1.77
2.689	1.77	1.78	1.78	1.79	1.79	1.80	1.80
2.752	1.80	1.81	1.81	1.82	1.83	1.83	1.83
2.816	1.84	1.84	1.85	1.85	1.86	1.86	1.87
2.879	1.88	1.88	1.89	1.89	1.90	1.90	1.91

WinTR-20: Version 1.10 0 0 0.05
Cantonment Areas EA (continued)
C-6 20 SPC No Action Alternative

STORM 25-Yr

SUB-AREA:
C-6 20 SPCOutlet .02188 98. .143

STREAM REACH:

2.942	1.91	1.92	1.93	1.93	1.94	1.94	1.95
3.005	1.95	1.95	1.96	1.96	1.97	1.97	1.98
3.069	1.99	1.99	2.00	2.00	2.01	2.01	2.02

Eglin Cantonment Areas EA
C-6 20 SPC No Action Alternative

Line Start Time (hr)	Flow Values @ time increment of 0.009 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
3.132	2.02	2.03	2.03	2.04	2.04	2.05	2.05
3.195	2.06	2.06	2.07	2.07	2.08	2.08	2.08
3.258	2.09	2.09	2.10	2.10	2.11	2.11	2.12
3.321	2.12	2.12	2.13	2.13	2.14	2.14	2.15
3.385	2.16	2.16	2.17	2.17	2.18	2.18	2.19
3.448	2.19	2.20	2.20	2.21	2.21	2.21	2.22
3.511	2.22	2.23	2.23	2.24	2.24	2.24	2.25
3.574	2.25	2.26	2.26	2.27	2.27	2.27	2.28
3.638	2.28	2.29	2.29	2.30	2.30	2.31	2.31
3.701	2.32	2.32	2.33	2.33	2.34	2.34	2.35
3.764	2.35	2.36	2.36	2.36	2.37	2.37	2.38
3.827	2.38	2.38	2.39	2.39	2.40	2.40	2.41
3.890	2.41	2.41	2.42	2.42	2.43	2.43	2.43
3.954	2.44	2.44	2.45	2.45	2.46	2.46	2.47
4.017	2.47	2.48	2.48	2.49	2.49	2.50	2.50
4.080	2.51	2.52	2.52	2.53	2.53	2.53	2.54
4.143	2.54	2.55	2.55	2.55	2.56	2.56	2.56
4.207	2.57	2.57	2.57	2.58	2.58	2.58	2.59
4.270	2.59	2.60	2.60	2.61	2.61	2.62	2.62
4.333	2.62	2.63	2.63	2.64	2.64	2.65	2.66
4.396	2.66	2.67	2.67	2.67	2.68	2.68	2.69
4.459	2.69	2.69	2.70	2.70	2.70	2.71	2.71
4.523	2.71	2.71	2.72	2.72	2.73	2.73	2.73
4.586	2.74	2.74	2.75	2.75	2.76	2.76	2.77
4.649	2.77	2.78	2.78	2.79	2.79	2.80	2.80
4.712	2.81	2.81	2.82	2.82	2.82	2.83	2.83
4.776	2.84	2.84	2.85	2.85	2.85	2.86	2.86
4.839	2.86	2.87	2.87	2.87	2.88	2.88	2.89
4.902	2.89	2.89	2.90	2.90	2.90	2.91	2.91
4.965	2.92	2.92	2.93	2.93	2.94	2.94	2.95
5.028	2.95	2.95	2.96	2.96	2.97	2.97	2.98
5.092	2.98	2.98	2.99	2.99	2.99	3.00	3.00
5.155	3.00	3.01	3.01	3.02	3.02	3.02	3.03
5.218	3.03	3.03	3.04	3.04	3.04	3.05	3.05
5.281	3.06	3.06	3.07	3.07	3.08	3.08	3.09
5.345	3.09	3.09	3.10	3.10	3.11	3.11	3.11
5.408	3.12	3.12	3.12	3.13	3.13	3.13	3.14
5.471	3.14	3.15	3.15	3.15	3.16	3.16	3.16
5.534	3.17	3.17	3.17	3.18	3.18	3.19	3.19
5.597	3.20	3.20	3.21	3.21	3.22	3.22	3.22
5.661	3.23	3.23	3.24	3.24	3.24	3.25	3.25
5.724	3.25	3.26	3.26	3.26	3.27	3.27	3.28
5.787	3.28	3.29	3.29	3.30	3.30	3.31	3.31
5.850	3.31	3.32	3.32	3.33	3.33	3.33	3.34
5.914	3.34	3.34	3.35	3.35	3.35	3.36	3.36

WinTR-20: Version 1.10 0 0 0.05
Cantonment Areas EA (continued)
C-6 20 SPC No Action Alternative
STORM 25-Yr
SUB-AREA:
C-6 20 SPCOutlet .02188 98. .143

STREAM REACH:

5.977	3.36	3.37	3.37	3.37	3.38	3.38	3.38
6.040	3.39	3.39	3.40	3.40	3.41	3.41	3.42
6.103	3.42	3.42	3.43	3.43	3.44	3.44	3.44
6.166	3.45	3.45	3.46	3.46	3.46	3.47	3.47
6.230	3.47	3.48	3.48	3.49	3.49	3.49	3.50
6.293	3.50	3.51	3.51	3.52	3.52	3.52	3.53

Eglin Cantonment Areas EA
C-6 20 SPC No Action Alternative

Line Start Time (hr)	Flow Values @ time increment of 0.009 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
6.356	3.53	3.53	3.54	3.54	3.54	3.54	3.55
6.419	3.55	3.55	3.55	3.56	3.56	3.57	3.57
6.483	3.58	3.58	3.59	3.60	3.60	3.61	3.61
6.546	3.61	3.62	3.62	3.62	3.63	3.63	3.63
6.609	3.63	3.64	3.64	3.64	3.64	3.65	3.65
6.672	3.66	3.66	3.67	3.67	3.67	3.68	3.68
6.735	3.69	3.69	3.69	3.70	3.70	3.71	3.71
6.799	3.71	3.72	3.72	3.72	3.73	3.73	3.73
6.862	3.74	3.74	3.75	3.75	3.76	3.76	3.77
6.925	3.77	3.77	3.78	3.78	3.78	3.79	3.79
6.988	3.80	3.80	3.80	3.81	3.81	3.81	3.82
7.052	3.82	3.83	3.83	3.83	3.84	3.84	3.85
7.115	3.85	3.86	3.86	3.86	3.87	3.87	3.87
7.178	3.87	3.88	3.88	3.88	3.88	3.89	3.89
7.241	3.89	3.90	3.90	3.91	3.91	3.92	3.92
7.304	3.93	3.93	3.94	3.94	3.95	3.95	3.95
7.368	3.96	3.96	3.96	3.97	3.97	3.97	3.97
7.431	3.98	3.98	3.98	3.99	3.99	3.99	4.00
7.494	4.00	4.01	4.01	4.01	4.02	4.02	4.03
7.557	4.03	4.03	4.04	4.04	4.04	4.05	4.05
7.621	4.05	4.06	4.06	4.06	4.07	4.07	4.08
7.684	4.08	4.09	4.09	4.10	4.10	4.10	4.11
7.747	4.11	4.12	4.12	4.12	4.13	4.13	4.13
7.810	4.14	4.14	4.14	4.15	4.15	4.15	4.16
7.873	4.16	4.17	4.17	4.18	4.18	4.19	4.19
7.937	4.19	4.20	4.20	4.20	4.20	4.21	4.21
8.000	4.21	4.21	4.22	4.22	4.22	4.23	4.23
8.063	4.23	4.24	4.25	4.25	4.26	4.26	4.27
8.126	4.27	4.28	4.28	4.28	4.29	4.29	4.29
8.190	4.29	4.30	4.30	4.30	4.30	4.31	4.31
8.253	4.31	4.32	4.32	4.33	4.33	4.33	4.34
8.316	4.34	4.35	4.35	4.35	4.36	4.36	4.36
8.379	4.37	4.37	4.37	4.38	4.38	4.38	4.39
8.442	4.39	4.40	4.40	4.40	4.41	4.41	4.42
8.506	4.42	4.43	4.43	4.43	4.44	4.44	4.45
8.569	4.45	4.45	4.46	4.46	4.46	4.47	4.47
8.632	4.47	4.48	4.48	4.48	4.49	4.49	4.49
8.695	4.50	4.50	4.50	4.51	4.51	4.51	4.52
8.759	4.52	4.52	4.53	4.53	4.54	4.54	4.55
8.822	4.55	4.55	4.56	4.56	4.56	4.57	4.57
8.885	4.58	4.58	4.58	4.59	4.59	4.59	4.60
8.948	4.60	4.60	4.61	4.61	4.62	4.62	4.63

WinTR-20: Version 1.10 0 0 0.05
Cantonment Areas EA (continued)
C-6 20 SPC No Action Alternative

STORM 25-Yr

SUB-AREA:
C-6 20 SPCOutlet .02188 98. .143

STREAM REACH:

9.011	4.64	4.66	4.70	4.75	4.83	4.94	5.06
9.075	5.21	5.35	5.50	5.65	5.78	5.91	6.02
9.138	6.12	6.20	6.27	6.34	6.39	6.43	6.48
9.201	6.51	6.54	6.57	6.59	6.62	6.63	6.65
9.264	6.67	6.69	6.70	6.71	6.73	6.74	6.75
9.327	6.76	6.77	6.78	6.79	6.80	6.81	6.82
9.391	6.82	6.83	6.84	6.85	6.86	6.86	6.87
9.454	6.88	6.89	6.90	6.91	6.92	6.93	6.94
9.517	6.94	6.95	6.96	6.97	6.97	6.98	6.99

Eglin Cantonment Areas EA
C-6 20 SPC No Action Alternative

Line Start Time (hr)	Flow Values @ time increment of 0.009 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
9.580	7.00	7.00	7.01	7.02	7.02	7.03	7.04
9.644	7.04	7.05	7.06	7.07	7.07	7.08	7.09
9.707	7.10	7.10	7.11	7.12	7.13	7.13	7.14
9.770	7.15	7.16	7.17	7.17	7.18	7.19	7.19
9.833	7.20	7.21	7.22	7.22	7.23	7.24	7.25
9.896	7.26	7.26	7.27	7.28	7.29	7.29	7.30
9.960	7.31	7.32	7.33	7.33	7.34	7.35	7.36
10.023	7.36	7.37	7.38	7.38	7.39	7.40	7.40
10.086	7.41	7.42	7.42	7.43	7.44	7.44	7.45
10.149	7.46	7.47	7.47	7.48	7.49	7.50	7.51
10.213	7.52	7.53	7.53	7.54	7.55	7.56	7.57
10.276	7.58	7.58	7.59	7.60	7.61	7.61	7.62
10.339	7.63	7.64	7.64	7.65	7.66	7.67	7.68
10.402	7.68	7.69	7.70	7.71	7.71	7.72	7.73
10.465	7.74	7.74	7.75	7.76	7.77	7.79	7.82
10.529	7.87	7.95	8.06	8.22	8.41	8.62	8.84
10.592	9.06	9.28	9.49	9.68	9.87	10.04	10.19
10.655	10.34	10.49	10.63	10.77	10.90	11.02	11.13
10.718	11.23	11.33	11.43	11.53	11.63	11.73	11.84
10.782	11.95	12.05	12.15	12.24	12.33	12.41	12.50
10.845	12.59	12.68	12.78	12.88	12.99	13.09	13.18
10.908	13.27	13.36	13.45	13.53	13.62	13.71	13.80
10.971	13.90	14.00	14.10	14.19	14.28	14.36	14.45
11.034	14.53	14.61	14.70	14.80	14.90	15.00	15.10
11.098	15.19	15.28	15.37	15.45	15.53	15.62	15.71
11.161	15.80	15.90	16.00	16.10	16.20	16.29	16.37
11.224	16.46	16.54	16.63	16.72	16.81	16.91	17.01
11.287	17.11	17.20	17.29	17.38	17.47	17.55	17.64
11.351	17.72	17.82	17.92	18.02	18.12	18.21	18.30
11.414	18.39	18.47	18.56	18.64	18.73	18.83	18.93
11.477	19.03	19.12	19.22	19.32	19.43	19.56	19.74
11.540	19.97	20.26	20.63	21.06	21.51	21.98	22.45
11.603	22.91	23.36	23.82	24.30	24.81	25.37	25.99
11.667	26.67	27.37	28.08	28.77	29.43	30.08	30.74
11.730	31.42	32.13	32.92	33.79	34.74	35.73	36.72
11.793	37.70	38.64	39.55	40.47	41.42	42.41	43.49
11.856	44.69	46.00	47.37	48.75	50.10	51.41	52.74
11.920	54.21	55.87	57.80	60.14	62.95	66.18	69.66
11.983	73.26	76.82	80.30	83.71	87.23	90.94	94.92

WinTR-20: Version 1.10 0 0 0.05
Cantonment Areas EA (continued)
C-6 20 SPC No Action Alternative

STORM 25-Yr

SUB-AREA:
C-6 20 SPCOutlet .02188 98. .143

STREAM REACH:

12.046	99.36	104.44	110.09	116.09	122.21	128.24	134.08
12.109	139.22	143.30	146.12	147.31	146.48	143.48	138.73
12.172	132.71	125.91	118.81	111.60	104.68	98.13	92.04
12.236	86.55	81.81	77.62	73.77	70.24	67.01	64.06
12.299	61.38	58.99	56.83	54.84	53.01	51.31	49.67
12.362	48.06	46.50	45.01	43.61	42.30	41.09	39.96
12.425	38.90	37.89	36.93	35.98	35.02	34.06	33.13
12.489	32.23	31.39	30.60	29.86	29.16	28.50	27.86
12.552	27.22	26.57	25.91	25.25	24.61	24.00	23.44
12.615	22.92	22.45	22.03	21.66	21.34	21.05	20.78
12.678	20.54	20.32	20.12	19.95	19.79	19.64	19.50
12.741	19.37	19.25	19.12	18.99	18.87	18.75	18.64

Line Start Time (hr)	Flow Values @ time increment of 0.009 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
12.805	18.54	18.44	18.34	18.25	18.16	18.07	17.97
12.868	17.87	17.76	17.66	17.56	17.47	17.38	17.30
12.931	17.21	17.13	17.04	16.94	16.85	16.75	16.65
12.994	16.55	16.46	16.37	16.29	16.20	16.12	16.03
13.058	15.94	15.84	15.74	15.64	15.55	15.45	15.37
13.121	15.28	15.20	15.11	15.03	14.94	14.84	14.74
13.184	14.64	14.55	14.46	14.37	14.29	14.20	14.12
13.247	14.03	13.94	13.84	13.74	13.64	13.54	13.45
13.310	13.36	13.27	13.19	13.10	13.02	12.92	12.83
13.374	12.73	12.62	12.53	12.43	12.35	12.26	12.18
13.437	12.09	12.01	11.92	11.82	11.72	11.62	11.52
13.500	11.43	11.33	11.23	11.12	10.99	10.84	10.65
13.563	10.43	10.20	9.95	9.71	9.47	9.25	9.05
13.627	8.86	8.70	8.57	8.45	8.36	8.27	8.20
13.690	8.14	8.08	8.04	8.00	7.96	7.93	7.90
13.753	7.88	7.85	7.83	7.81	7.80	7.78	7.77
13.816	7.76	7.74	7.73	7.72	7.71	7.70	7.69
13.879	7.68	7.67	7.66	7.66	7.65	7.64	7.63
13.943	7.62	7.62	7.61	7.60	7.59	7.58	7.57
14.006	7.56	7.55	7.55	7.54	7.53	7.52	7.52
14.069	7.51	7.50	7.49	7.49	7.48	7.48	7.47
14.132	7.46	7.46	7.45	7.44	7.44	7.43	7.42
14.196	7.41	7.40	7.40	7.39	7.38	7.38	7.37
14.259	7.36	7.35	7.35	7.34	7.33	7.32	7.32
14.322	7.31	7.30	7.30	7.29	7.28	7.27	7.26
14.385	7.26	7.25	7.24	7.23	7.23	7.22	7.21
14.448	7.21	7.20	7.19	7.18	7.17	7.17	7.16
14.512	7.15	7.14	7.14	7.13	7.12	7.12	7.11
14.575	7.10	7.10	7.09	7.08	7.08	7.07	7.07
14.638	7.06	7.05	7.04	7.04	7.03	7.02	7.01
14.701	7.00	6.99	6.98	6.98	6.97	6.96	6.95
14.765	6.94	6.94	6.93	6.92	6.91	6.90	6.90
14.828	6.89	6.88	6.88	6.87	6.86	6.85	6.84
14.891	6.84	6.83	6.82	6.81	6.81	6.80	6.79
14.954	6.79	6.78	6.77	6.76	6.75	6.75	6.73
15.017	6.71	6.68	6.63	6.56	6.46	6.33	6.19

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Cantonment Areas EA (continued)
C-6 20 SPC No Action Alternative
STORM 25-Yr
SUB-AREA:
C-6 20 SPCOutlet .02188 98. .143

STREAM REACH:

15.081	6.05	5.89	5.74	5.60	5.47	5.35	5.25
15.144	5.16	5.09	5.03	4.97	4.93	4.89	4.85
15.207	4.82	4.80	4.77	4.75	4.74	4.72	4.71
15.270	4.70	4.69	4.68	4.67	4.66	4.65	4.65
15.333	4.64	4.63	4.63	4.62	4.62	4.61	4.61
15.397	4.60	4.60	4.59	4.59	4.58	4.58	4.58
15.460	4.57	4.57	4.57	4.56	4.56	4.55	4.55
15.523	4.55	4.55	4.54	4.54	4.54	4.53	4.53
15.586	4.53	4.52	4.52	4.52	4.51	4.51	4.51
15.650	4.50	4.50	4.50	4.49	4.49	4.48	4.48
15.713	4.48	4.47	4.47	4.46	4.46	4.46	4.45
15.776	4.45	4.45	4.44	4.44	4.44	4.43	4.43
15.839	4.43	4.42	4.42	4.41	4.41	4.41	4.40
15.902	4.40	4.39	4.39	4.39	4.38	4.38	4.38
15.966	4.37	4.37	4.37	4.37	4.37	4.36	4.36

Line Start Time (hr)	Flow Values @ time increment of 0.009 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
16.029	4.36	4.36	4.35	4.35	4.34	4.34	4.33
16.092	4.33	4.32	4.32	4.31	4.31	4.30	4.30
16.155	4.30	4.29	4.29	4.29	4.29	4.28	4.28
16.219	4.28	4.28	4.27	4.27	4.27	4.26	4.26
16.282	4.26	4.25	4.25	4.24	4.24	4.24	4.23
16.345	4.23	4.23	4.22	4.22	4.21	4.21	4.21
16.408	4.20	4.20	4.20	4.20	4.19	4.19	4.18
16.471	4.18	4.17	4.17	4.17	4.16	4.16	4.15
16.535	4.15	4.15	4.14	4.14	4.14	4.13	4.13
16.598	4.13	4.12	4.12	4.12	4.11	4.11	4.11
16.661	4.10	4.10	4.09	4.09	4.08	4.08	4.08
16.724	4.07	4.07	4.07	4.06	4.06	4.06	4.06
16.788	4.05	4.05	4.05	4.05	4.04	4.04	4.04
16.851	4.03	4.03	4.02	4.02	4.01	4.01	4.00
16.914	4.00	3.99	3.99	3.99	3.98	3.98	3.98
16.977	3.97	3.97	3.97	3.97	3.96	3.96	3.96
17.040	3.96	3.95	3.95	3.95	3.94	3.94	3.93
17.104	3.93	3.93	3.92	3.92	3.92	3.91	3.91
17.167	3.90	3.90	3.90	3.89	3.89	3.89	3.88
17.230	3.88	3.88	3.87	3.87	3.87	3.86	3.86
17.293	3.85	3.85	3.84	3.84	3.84	3.83	3.83
17.357	3.83	3.82	3.82	3.82	3.81	3.81	3.81
17.420	3.80	3.80	3.80	3.79	3.79	3.78	3.78
17.483	3.77	3.77	3.77	3.76	3.76	3.76	3.75
17.546	3.75	3.75	3.74	3.74	3.74	3.74	3.73
17.609	3.73	3.73	3.73	3.72	3.72	3.72	3.71
17.673	3.71	3.70	3.70	3.69	3.69	3.68	3.68
17.736	3.67	3.67	3.67	3.66	3.66	3.66	3.66
17.799	3.65	3.65	3.65	3.65	3.64	3.64	3.64
17.862	3.63	3.63	3.63	3.62	3.62	3.61	3.61
17.926	3.61	3.60	3.60	3.59	3.59	3.59	3.58
17.989	3.58	3.58	3.57	3.57	3.57	3.56	3.56
18.052	3.56	3.55	3.55	3.54	3.54	3.54	3.53

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Cantonment Areas EA (continued)
C-6 20 SPC No Action Alternative

STORM 25-Yr

SUB-AREA:
C-6 20 SPCOutlet .02188 98. .143

STREAM REACH:

18.115	3.53	3.52	3.52	3.52	3.51	3.51	3.51
18.178	3.50	3.50	3.49	3.49	3.49	3.49	3.48
18.242	3.48	3.48	3.47	3.47	3.47	3.46	3.46
18.305	3.46	3.45	3.45	3.45	3.45	3.44	3.44
18.368	3.43	3.43	3.42	3.42	3.42	3.41	3.41
18.431	3.40	3.40	3.40	3.39	3.39	3.39	3.38
18.495	3.38	3.38	3.37	3.37	3.37	3.36	3.36
18.558	3.36	3.35	3.35	3.34	3.34	3.33	3.33
18.621	3.33	3.32	3.32	3.31	3.31	3.31	3.30
18.684	3.30	3.30	3.29	3.29	3.29	3.28	3.28
18.747	3.28	3.28	3.27	3.27	3.27	3.26	3.26
18.811	3.26	3.25	3.25	3.25	3.24	3.24	3.24
18.874	3.23	3.23	3.22	3.22	3.21	3.21	3.21
18.937	3.20	3.20	3.20	3.19	3.19	3.18	3.18
19.000	3.18	3.17	3.17	3.17	3.17	3.16	3.16
19.064	3.16	3.15	3.15	3.15	3.14	3.14	3.14
19.127	3.13	3.13	3.13	3.12	3.12	3.12	3.11
19.190	3.11	3.10	3.10	3.09	3.09	3.09	3.08

Line Start Time (hr)	Flow Values @ time increment of 0.009 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
19.253	3.08	3.08	3.07	3.07	3.07	3.06	3.06
19.316	3.06	3.05	3.05	3.05	3.04	3.04	3.04
19.380	3.03	3.03	3.03	3.03	3.02	3.02	3.02
19.443	3.01	3.01	3.00	3.00	3.00	2.99	2.99
19.506	2.98	2.98	2.98	2.97	2.97	2.96	2.96
19.569	2.95	2.95	2.94	2.94	2.93	2.93	2.93
19.633	2.92	2.92	2.92	2.91	2.91	2.91	2.91
19.696	2.90	2.90	2.90	2.90	2.90	2.89	2.89
19.759	2.89	2.88	2.88	2.87	2.87	2.87	2.86
19.822	2.86	2.86	2.85	2.85	2.84	2.84	2.83
19.885	2.83	2.82	2.82	2.82	2.81	2.81	2.80
19.949	2.80	2.80	2.80	2.79	2.79	2.79	2.79
20.012	2.79	2.78	2.78	2.78	2.78	2.77	2.77
20.075	2.76	2.76	2.76	2.75	2.75	2.74	2.74
20.138	2.74	2.73	2.73	2.72	2.72	2.71	2.71
20.202	2.70	2.70	2.70	2.69	2.69	2.68	2.68
20.265	2.68	2.67	2.67	2.67	2.66	2.66	2.66
20.328	2.65	2.65	2.65	2.64	2.64	2.64	2.63
20.391	2.63	2.63	2.63	2.62	2.62	2.62	2.61
20.454	2.61	2.61	2.60	2.60	2.59	2.59	2.58
20.518	2.58	2.58	2.57	2.57	2.57	2.56	2.56
20.581	2.55	2.55	2.55	2.54	2.54	2.54	2.54
20.644	2.53	2.53	2.53	2.52	2.52	2.52	2.51
20.707	2.51	2.51	2.50	2.50	2.50	2.49	2.49
20.771	2.49	2.48	2.48	2.47	2.47	2.46	2.46
20.834	2.46	2.45	2.45	2.45	2.44	2.44	2.43
20.897	2.43	2.43	2.43	2.42	2.42	2.42	2.41
20.960	2.41	2.41	2.40	2.40	2.40	2.39	2.39
21.023	2.39	2.39	2.38	2.38	2.37	2.37	2.37
21.087	2.36	2.36	2.35	2.35	2.34	2.34	2.34

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Cantonment Areas EA (continued)
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SUB-AREA:
C-6 20 SPCOutlet .02188 98. .143

STREAM REACH:

21.150	2.33	2.33	2.33	2.32	2.32	2.32	2.31
21.213	2.31	2.31	2.30	2.30	2.30	2.29	2.29
21.276	2.28	2.28	2.27	2.27	2.27	2.26	2.26
21.339	2.26	2.25	2.25	2.24	2.24	2.24	2.23
21.403	2.23	2.23	2.22	2.22	2.22	2.22	2.21
21.466	2.21	2.21	2.20	2.20	2.20	2.19	2.19
21.529	2.19	2.18	2.18	2.18	2.17	2.17	2.16
21.592	2.16	2.15	2.15	2.15	2.14	2.14	2.14
21.656	2.13	2.13	2.13	2.12	2.12	2.11	2.11
21.719	2.11	2.11	2.10	2.10	2.09	2.09	2.09
21.782	2.08	2.08	2.07	2.07	2.06	2.06	2.06
21.845	2.05	2.05	2.05	2.05	2.04	2.04	2.04
21.908	2.04	2.04	2.03	2.03	2.03	2.02	2.02
21.972	2.01	2.01	2.00	2.00	1.99	1.99	1.98
22.035	1.98	1.98	1.97	1.97	1.97	1.96	1.96
22.098	1.96	1.96	1.95	1.95	1.95	1.95	1.94
22.161	1.94	1.94	1.93	1.93	1.92	1.92	1.91
22.225	1.91	1.91	1.90	1.90	1.90	1.89	1.89
22.288	1.89	1.88	1.88	1.88	1.87	1.87	1.87
22.351	1.86	1.86	1.86	1.85	1.85	1.84	1.84
22.414	1.83	1.83	1.83	1.82	1.82	1.82	1.81

Line Start Time (hr)	Flow Values @ time increment of 0.009 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
22.477	1.81	1.80	1.80	1.80	1.79	1.79	1.79
22.541	1.78	1.78	1.78	1.77	1.77	1.76	1.76
22.604	1.75	1.75	1.75	1.74	1.74	1.74	1.74
22.667	1.73	1.73	1.73	1.73	1.72	1.72	1.72
22.730	1.72	1.71	1.71	1.71	1.70	1.70	1.69
22.794	1.68	1.68	1.67	1.67	1.67	1.66	1.66
22.857	1.66	1.65	1.65	1.65	1.64	1.64	1.64
22.920	1.64	1.64	1.63	1.63	1.63	1.62	1.62
22.983	1.61	1.61	1.61	1.60	1.60	1.59	1.59
23.046	1.59	1.58	1.58	1.58	1.57	1.57	1.57
23.110	1.56	1.56	1.56	1.55	1.55	1.55	1.54
23.173	1.54	1.53	1.53	1.52	1.52	1.52	1.51
23.236	1.51	1.51	1.50	1.50	1.49	1.49	1.49
23.299	1.48	1.48	1.48	1.47	1.47	1.47	1.46
23.363	1.46	1.46	1.45	1.45	1.44	1.44	1.43
23.426	1.43	1.43	1.42	1.42	1.42	1.42	1.41
23.489	1.41	1.41	1.41	1.40	1.40	1.40	1.40
23.552	1.39	1.39	1.38	1.38	1.37	1.37	1.36
23.615	1.36	1.35	1.35	1.34	1.34	1.34	1.34
23.679	1.33	1.33	1.33	1.33	1.32	1.32	1.32
23.742	1.32	1.31	1.31	1.30	1.30	1.30	1.29
23.805	1.29	1.28	1.28	1.28	1.27	1.27	1.27
23.868	1.26	1.26	1.25	1.25	1.25	1.24	1.22
23.932	1.19	1.16	1.10	1.03	0.95	0.86	0.77
23.995	0.68	0.59	0.51	0.43	0.36	0.31	0.26
24.058	0.22	0.19	0.16	0.14	0.11	0.10	0.08
24.121	0.07	0.06					

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Cantonment Areas EA (continued)
C-6 20 SPC No Action Alternative
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SUB-AREA:
C-6 20 SPCOutlet .02188 98. .143

STREAM REACH:

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Peak Flow Time (hr)	Peak Flow Rate (cfs)	Peak Flow Rate (csm)
OUTLET	0.022		11.520		12.14	147.31	6732.84

Line Start Time (hr)	Flow Values @ time increment of 0.009 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
0.603	0.06	0.06	0.07	0.08	0.09	0.10	0.11
0.666	0.12	0.13	0.14	0.15	0.16	0.17	0.18
0.729	0.19	0.20	0.21	0.22	0.23	0.24	0.25
0.793	0.26	0.27	0.28	0.29	0.30	0.31	0.32
0.856	0.33	0.34	0.35	0.36	0.37	0.38	0.39
0.919	0.40	0.41	0.42	0.43	0.44	0.45	0.46
0.982	0.47	0.48	0.49	0.50	0.50	0.51	0.52
1.046	0.53	0.54	0.55	0.56	0.57	0.58	0.59
1.109	0.59	0.60	0.61	0.62	0.63	0.64	0.65
1.172	0.66	0.66	0.67	0.68	0.69	0.70	0.71
1.235	0.72	0.72	0.73	0.74	0.75	0.75	0.76
1.298	0.77	0.78	0.78	0.79	0.80	0.81	0.82
1.362	0.82	0.83	0.84	0.85	0.86	0.87	0.88

Line Start Time (hr)	Flow Values @ time increment of 0.009 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
1.425	0.88	0.89	0.90	0.91	0.91	0.92	0.93
1.488	0.94	0.94	0.95	0.96	0.96	0.97	0.98
1.551	0.98	0.99	1.00	1.01	1.01	1.02	1.03
1.615	1.04	1.04	1.05	1.06	1.07	1.07	1.08
1.678	1.09	1.09	1.10	1.11	1.11	1.12	1.13
1.741	1.13	1.14	1.15	1.16	1.16	1.17	1.18
1.804	1.18	1.19	1.20	1.21	1.21	1.22	1.23
1.867	1.23	1.24	1.25	1.25	1.26	1.26	1.27
1.931	1.28	1.28	1.29	1.30	1.30	1.31	1.32
1.994	1.32	1.33	1.34	1.34	1.35	1.36	1.36
2.057	1.37	1.37	1.38	1.38	1.39	1.39	1.40
2.120	1.40	1.41	1.42	1.42	1.43	1.44	1.44
2.184	1.45	1.46	1.47	1.47	1.48	1.49	1.49
2.247	1.50	1.50	1.51	1.51	1.52	1.52	1.53
2.310	1.53	1.54	1.54	1.55	1.55	1.56	1.57
2.373	1.57	1.58	1.58	1.59	1.60	1.60	1.61
2.436	1.61	1.62	1.62	1.63	1.64	1.64	1.65
2.500	1.65	1.66	1.66	1.67	1.67	1.68	1.68
2.563	1.69	1.70	1.70	1.71	1.72	1.72	1.73
2.626	1.73	1.74	1.74	1.75	1.75	1.76	1.77
2.689	1.77	1.78	1.78	1.79	1.79	1.80	1.80
2.752	1.80	1.81	1.81	1.82	1.83	1.83	1.83
2.816	1.84	1.84	1.85	1.85	1.86	1.86	1.87
2.879	1.88	1.88	1.89	1.89	1.90	1.90	1.91

WinTR-20: Version 1.10 0 0 0.05
Cantonment Areas EA (continued)
C-6 20 SPC No Action Alternative

STORM 25-Yr

SUB-AREA:
C-6 20 SPCOutlet .02188 98. .143

STREAM REACH:

2.942	1.91	1.92	1.93	1.93	1.94	1.94	1.95
3.005	1.95	1.95	1.96	1.96	1.97	1.97	1.98
3.069	1.99	1.99	2.00	2.00	2.01	2.01	2.02
3.132	2.02	2.03	2.03	2.04	2.04	2.05	2.05
3.195	2.06	2.06	2.07	2.07	2.08	2.08	2.08
3.258	2.09	2.09	2.10	2.10	2.11	2.11	2.12
3.321	2.12	2.12	2.13	2.13	2.14	2.14	2.15
3.385	2.16	2.16	2.17	2.17	2.18	2.18	2.19
3.448	2.19	2.20	2.20	2.21	2.21	2.21	2.22
3.511	2.22	2.23	2.23	2.24	2.24	2.24	2.25
3.574	2.25	2.26	2.26	2.27	2.27	2.27	2.28
3.638	2.28	2.29	2.29	2.30	2.30	2.31	2.31
3.701	2.32	2.32	2.33	2.33	2.34	2.34	2.35
3.764	2.35	2.36	2.36	2.36	2.37	2.37	2.38
3.827	2.38	2.38	2.39	2.39	2.40	2.40	2.41
3.890	2.41	2.41	2.42	2.42	2.43	2.43	2.43
3.954	2.44	2.44	2.45	2.45	2.46	2.46	2.47
4.017	2.47	2.48	2.48	2.49	2.49	2.50	2.50
4.080	2.51	2.52	2.52	2.53	2.53	2.53	2.54
4.143	2.54	2.55	2.55	2.55	2.56	2.56	2.56
4.207	2.57	2.57	2.57	2.58	2.58	2.58	2.59
4.270	2.59	2.60	2.60	2.61	2.61	2.62	2.62
4.333	2.62	2.63	2.63	2.64	2.64	2.65	2.66
4.396	2.66	2.67	2.67	2.67	2.68	2.68	2.69
4.459	2.69	2.69	2.70	2.70	2.70	2.71	2.71
4.523	2.71	2.71	2.72	2.72	2.73	2.73	2.73
4.586	2.74	2.74	2.75	2.75	2.76	2.76	2.77

Line Start Time (hr)	Flow Values @ time increment of 0.009 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
4.649	2.77	2.78	2.78	2.79	2.79	2.80	2.80
4.712	2.81	2.81	2.82	2.82	2.82	2.83	2.83
4.776	2.84	2.84	2.85	2.85	2.85	2.86	2.86
4.839	2.86	2.87	2.87	2.87	2.88	2.88	2.89
4.902	2.89	2.89	2.90	2.90	2.90	2.91	2.91
4.965	2.92	2.92	2.93	2.93	2.94	2.94	2.95
5.028	2.95	2.95	2.96	2.96	2.97	2.97	2.98
5.092	2.98	2.98	2.99	2.99	2.99	3.00	3.00
5.155	3.00	3.01	3.01	3.02	3.02	3.02	3.03
5.218	3.03	3.03	3.04	3.04	3.04	3.05	3.05
5.281	3.06	3.06	3.07	3.07	3.08	3.08	3.09
5.345	3.09	3.09	3.10	3.10	3.11	3.11	3.11
5.408	3.12	3.12	3.12	3.13	3.13	3.13	3.14
5.471	3.14	3.15	3.15	3.15	3.16	3.16	3.16
5.534	3.17	3.17	3.17	3.18	3.18	3.19	3.19
5.597	3.20	3.20	3.21	3.21	3.22	3.22	3.22
5.661	3.23	3.23	3.24	3.24	3.24	3.25	3.25
5.724	3.25	3.26	3.26	3.26	3.27	3.27	3.28
5.787	3.28	3.29	3.29	3.30	3.30	3.31	3.31
5.850	3.31	3.32	3.32	3.33	3.33	3.33	3.34
5.914	3.34	3.34	3.35	3.35	3.35	3.36	3.36

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Cantonment Areas EA (continued)
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STORM 25-Yr

SUB-AREA:
C-6 20 SPCOutlet .02188 98. .143

STREAM REACH:

5.977	3.36	3.37	3.37	3.37	3.38	3.38	3.38
6.040	3.39	3.39	3.40	3.40	3.41	3.41	3.42
6.103	3.42	3.42	3.43	3.43	3.44	3.44	3.44
6.166	3.45	3.45	3.46	3.46	3.46	3.47	3.47
6.230	3.47	3.48	3.48	3.49	3.49	3.49	3.50
6.293	3.50	3.51	3.51	3.52	3.52	3.52	3.53
6.356	3.53	3.53	3.54	3.54	3.54	3.54	3.55
6.419	3.55	3.55	3.55	3.56	3.56	3.57	3.57
6.483	3.58	3.58	3.59	3.60	3.60	3.61	3.61
6.546	3.61	3.62	3.62	3.62	3.63	3.63	3.63
6.609	3.63	3.64	3.64	3.64	3.64	3.65	3.65
6.672	3.66	3.66	3.67	3.67	3.67	3.68	3.68
6.735	3.69	3.69	3.69	3.70	3.70	3.71	3.71
6.799	3.71	3.72	3.72	3.72	3.73	3.73	3.73
6.862	3.74	3.74	3.75	3.75	3.76	3.76	3.77
6.925	3.77	3.77	3.78	3.78	3.78	3.79	3.79
6.988	3.80	3.80	3.80	3.81	3.81	3.81	3.82
7.052	3.82	3.83	3.83	3.83	3.84	3.84	3.85
7.115	3.85	3.86	3.86	3.86	3.87	3.87	3.87
7.178	3.87	3.88	3.88	3.88	3.88	3.89	3.89
7.241	3.89	3.90	3.90	3.91	3.91	3.92	3.92
7.304	3.93	3.93	3.94	3.94	3.95	3.95	3.95
7.368	3.96	3.96	3.96	3.97	3.97	3.97	3.97
7.431	3.98	3.98	3.98	3.99	3.99	3.99	4.00
7.494	4.00	4.01	4.01	4.01	4.02	4.02	4.03
7.557	4.03	4.03	4.04	4.04	4.04	4.05	4.05
7.621	4.05	4.06	4.06	4.06	4.07	4.07	4.08
7.684	4.08	4.09	4.09	4.10	4.10	4.10	4.11
7.747	4.11	4.12	4.12	4.12	4.13	4.13	4.13
7.810	4.14	4.14	4.14	4.15	4.15	4.15	4.16

Line Start Time (hr)	Flow Values @ time increment of 0.009 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
7.873	4.16	4.17	4.17	4.18	4.18	4.19	4.19
7.937	4.19	4.20	4.20	4.20	4.20	4.21	4.21
8.000	4.21	4.21	4.22	4.22	4.22	4.23	4.23
8.063	4.23	4.24	4.25	4.25	4.26	4.26	4.27
8.126	4.27	4.28	4.28	4.28	4.29	4.29	4.29
8.190	4.29	4.30	4.30	4.30	4.30	4.31	4.31
8.253	4.31	4.32	4.32	4.33	4.33	4.33	4.34
8.316	4.34	4.35	4.35	4.35	4.36	4.36	4.36
8.379	4.37	4.37	4.37	4.38	4.38	4.38	4.39
8.442	4.39	4.40	4.40	4.40	4.41	4.41	4.42
8.506	4.42	4.43	4.43	4.43	4.44	4.44	4.45
8.569	4.45	4.45	4.46	4.46	4.46	4.47	4.47
8.632	4.47	4.48	4.48	4.48	4.49	4.49	4.49
8.695	4.50	4.50	4.50	4.51	4.51	4.51	4.52
8.759	4.52	4.52	4.53	4.53	4.54	4.54	4.55
8.822	4.55	4.55	4.56	4.56	4.56	4.57	4.57
8.885	4.58	4.58	4.58	4.59	4.59	4.59	4.60
8.948	4.60	4.60	4.61	4.61	4.62	4.62	4.63

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Cantonment Areas EA (continued)
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SUB-AREA:
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STREAM REACH:

9.011	4.64	4.66	4.70	4.75	4.83	4.94	5.06
9.075	5.21	5.35	5.50	5.65	5.78	5.91	6.02
9.138	6.12	6.20	6.27	6.34	6.39	6.43	6.48
9.201	6.51	6.54	6.57	6.59	6.62	6.63	6.65
9.264	6.67	6.69	6.70	6.71	6.73	6.74	6.75
9.327	6.76	6.77	6.78	6.79	6.80	6.81	6.82
9.391	6.82	6.83	6.84	6.85	6.86	6.86	6.87
9.454	6.88	6.89	6.90	6.91	6.92	6.93	6.94
9.517	6.94	6.95	6.96	6.97	6.97	6.98	6.99
9.580	7.00	7.00	7.01	7.02	7.02	7.03	7.04
9.644	7.04	7.05	7.06	7.07	7.07	7.08	7.09
9.707	7.10	7.10	7.11	7.12	7.13	7.13	7.14
9.770	7.15	7.16	7.17	7.17	7.18	7.19	7.19
9.833	7.20	7.21	7.22	7.22	7.23	7.24	7.25
9.896	7.26	7.26	7.27	7.28	7.29	7.29	7.30
9.960	7.31	7.32	7.33	7.33	7.34	7.35	7.36
10.023	7.36	7.37	7.38	7.38	7.39	7.40	7.40
10.086	7.41	7.42	7.42	7.43	7.44	7.44	7.45
10.149	7.46	7.47	7.47	7.48	7.49	7.50	7.51
10.213	7.52	7.53	7.53	7.54	7.55	7.56	7.57
10.276	7.58	7.58	7.59	7.60	7.61	7.61	7.62
10.339	7.63	7.64	7.64	7.65	7.66	7.67	7.68
10.402	7.68	7.69	7.70	7.71	7.71	7.72	7.73
10.465	7.74	7.74	7.75	7.76	7.77	7.79	7.82
10.529	7.87	7.95	8.06	8.22	8.41	8.62	8.84
10.592	9.06	9.28	9.49	9.68	9.87	10.04	10.19
10.655	10.34	10.49	10.63	10.77	10.90	11.02	11.13
10.718	11.23	11.33	11.43	11.53	11.63	11.73	11.84
10.782	11.95	12.05	12.15	12.24	12.33	12.41	12.50
10.845	12.59	12.68	12.78	12.88	12.99	13.09	13.18
10.908	13.27	13.36	13.45	13.53	13.62	13.71	13.80
10.971	13.90	14.00	14.10	14.19	14.28	14.36	14.45
11.034	14.53	14.61	14.70	14.80	14.90	15.00	15.10

Line Start Time (hr)	Flow Values @ time increment of 0.009 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
11.098	15.19	15.28	15.37	15.45	15.53	15.62	15.71
11.161	15.80	15.90	16.00	16.10	16.20	16.29	16.37
11.224	16.46	16.54	16.63	16.72	16.81	16.91	17.01
11.287	17.11	17.20	17.29	17.38	17.47	17.55	17.64
11.351	17.72	17.82	17.92	18.02	18.12	18.21	18.30
11.414	18.39	18.47	18.56	18.64	18.73	18.83	18.93
11.477	19.03	19.12	19.22	19.32	19.43	19.56	19.74
11.540	19.97	20.26	20.63	21.06	21.51	21.98	22.45
11.603	22.91	23.36	23.82	24.30	24.81	25.37	25.99
11.667	26.67	27.37	28.08	28.77	29.43	30.08	30.74
11.730	31.42	32.13	32.92	33.79	34.74	35.73	36.72
11.793	37.70	38.64	39.55	40.47	41.42	42.41	43.49
11.856	44.69	46.00	47.37	48.75	50.10	51.41	52.74
11.920	54.21	55.87	57.80	60.14	62.95	66.18	69.66
11.983	73.26	76.82	80.30	83.71	87.23	90.94	94.92

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Cantonment Areas EA (continued)
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STREAM REACH:

12.046	99.36	104.44	110.09	116.09	122.21	128.24	134.08
12.109	139.22	143.30	146.12	147.31	146.48	143.48	138.73
12.172	132.71	125.91	118.81	111.60	104.68	98.13	92.04
12.236	86.55	81.81	77.62	73.77	70.24	67.01	64.06
12.299	61.38	58.99	56.83	54.84	53.01	51.31	49.67
12.362	48.06	46.50	45.01	43.61	42.30	41.09	39.96
12.425	38.90	37.89	36.93	35.98	35.02	34.06	33.13
12.489	32.23	31.39	30.60	29.86	29.16	28.50	27.86
12.552	27.22	26.57	25.91	25.25	24.61	24.00	23.44
12.615	22.92	22.45	22.03	21.66	21.34	21.05	20.78
12.678	20.54	20.32	20.12	19.95	19.79	19.64	19.50
12.741	19.37	19.25	19.12	18.99	18.87	18.75	18.64
12.805	18.54	18.44	18.34	18.25	18.16	18.07	17.97
12.868	17.87	17.76	17.66	17.56	17.47	17.38	17.30
12.931	17.21	17.13	17.04	16.94	16.85	16.75	16.65
12.994	16.55	16.46	16.37	16.29	16.20	16.12	16.03
13.058	15.94	15.84	15.74	15.64	15.55	15.45	15.37
13.121	15.28	15.20	15.11	15.03	14.94	14.84	14.74
13.184	14.64	14.55	14.46	14.37	14.29	14.20	14.12
13.247	14.03	13.94	13.84	13.74	13.64	13.54	13.45
13.310	13.36	13.27	13.19	13.10	13.02	12.92	12.83
13.374	12.73	12.62	12.53	12.43	12.35	12.26	12.18
13.437	12.09	12.01	11.92	11.82	11.72	11.62	11.52
13.500	11.43	11.33	11.23	11.12	10.99	10.84	10.65
13.563	10.43	10.20	9.95	9.71	9.47	9.25	9.05
13.627	8.86	8.70	8.57	8.45	8.36	8.27	8.20
13.690	8.14	8.08	8.04	8.00	7.96	7.93	7.90
13.753	7.88	7.85	7.83	7.81	7.80	7.78	7.77
13.816	7.76	7.74	7.73	7.72	7.71	7.70	7.69
13.879	7.68	7.67	7.66	7.66	7.65	7.64	7.63
13.943	7.62	7.62	7.61	7.60	7.59	7.58	7.57
14.006	7.56	7.55	7.55	7.54	7.53	7.52	7.52
14.069	7.51	7.50	7.49	7.49	7.48	7.48	7.47
14.132	7.46	7.46	7.45	7.44	7.44	7.43	7.42
14.196	7.41	7.40	7.40	7.39	7.38	7.38	7.37
14.259	7.36	7.35	7.35	7.34	7.33	7.32	7.32

Line Start Time (hr)	Flow Values @ time increment of 0.009 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
14.322	7.31	7.30	7.30	7.29	7.28	7.27	7.26
14.385	7.26	7.25	7.24	7.23	7.23	7.22	7.21
14.448	7.21	7.20	7.19	7.18	7.17	7.17	7.16
14.512	7.15	7.14	7.14	7.13	7.12	7.12	7.11
14.575	7.10	7.10	7.09	7.08	7.08	7.07	7.07
14.638	7.06	7.05	7.04	7.04	7.03	7.02	7.01
14.701	7.00	6.99	6.98	6.98	6.97	6.96	6.95
14.765	6.94	6.94	6.93	6.92	6.91	6.90	6.90
14.828	6.89	6.88	6.88	6.87	6.86	6.85	6.84
14.891	6.84	6.83	6.82	6.81	6.81	6.80	6.79
14.954	6.79	6.78	6.77	6.76	6.75	6.75	6.73
15.017	6.71	6.68	6.63	6.56	6.46	6.33	6.19

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Cantonment Areas EA (continued)
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STREAM REACH:

15.081	6.05	5.89	5.74	5.60	5.47	5.35	5.25
15.144	5.16	5.09	5.03	4.97	4.93	4.89	4.85
15.207	4.82	4.80	4.77	4.75	4.74	4.72	4.71
15.270	4.70	4.69	4.68	4.67	4.66	4.65	4.65
15.333	4.64	4.63	4.63	4.62	4.62	4.61	4.61
15.397	4.60	4.60	4.59	4.59	4.58	4.58	4.58
15.460	4.57	4.57	4.57	4.56	4.56	4.55	4.55
15.523	4.55	4.55	4.54	4.54	4.54	4.53	4.53
15.586	4.53	4.52	4.52	4.52	4.51	4.51	4.51
15.650	4.50	4.50	4.50	4.49	4.49	4.48	4.48
15.713	4.48	4.47	4.47	4.46	4.46	4.46	4.45
15.776	4.45	4.45	4.44	4.44	4.44	4.43	4.43
15.839	4.43	4.42	4.42	4.41	4.41	4.41	4.40
15.902	4.40	4.39	4.39	4.39	4.38	4.38	4.38
15.966	4.37	4.37	4.37	4.37	4.37	4.36	4.36
16.029	4.36	4.36	4.35	4.35	4.34	4.34	4.33
16.092	4.33	4.32	4.32	4.31	4.31	4.30	4.30
16.155	4.30	4.29	4.29	4.29	4.29	4.28	4.28
16.219	4.28	4.28	4.27	4.27	4.27	4.26	4.26
16.282	4.26	4.25	4.25	4.24	4.24	4.24	4.23
16.345	4.23	4.23	4.22	4.22	4.21	4.21	4.21
16.408	4.20	4.20	4.20	4.20	4.19	4.19	4.18
16.471	4.18	4.17	4.17	4.17	4.16	4.16	4.15
16.535	4.15	4.15	4.14	4.14	4.14	4.13	4.13
16.598	4.13	4.12	4.12	4.12	4.11	4.11	4.11
16.661	4.10	4.10	4.09	4.09	4.08	4.08	4.08
16.724	4.07	4.07	4.07	4.06	4.06	4.06	4.06
16.788	4.05	4.05	4.05	4.05	4.04	4.04	4.04
16.851	4.03	4.03	4.02	4.02	4.01	4.01	4.00
16.914	4.00	3.99	3.99	3.99	3.98	3.98	3.98
16.977	3.97	3.97	3.97	3.97	3.96	3.96	3.96
17.040	3.96	3.95	3.95	3.95	3.94	3.94	3.93
17.104	3.93	3.93	3.92	3.92	3.92	3.91	3.91
17.167	3.90	3.90	3.90	3.89	3.89	3.89	3.88
17.230	3.88	3.88	3.87	3.87	3.87	3.86	3.86
17.293	3.85	3.85	3.84	3.84	3.84	3.83	3.83
17.357	3.83	3.82	3.82	3.82	3.81	3.81	3.81
17.420	3.80	3.80	3.80	3.79	3.79	3.78	3.78
17.483	3.77	3.77	3.77	3.76	3.76	3.76	3.75

Line Start Time (hr)	Flow Values @ time increment of 0.009 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
17.546	3.75	3.75	3.74	3.74	3.74	3.74	3.73
17.609	3.73	3.73	3.73	3.72	3.72	3.72	3.71
17.673	3.71	3.70	3.70	3.69	3.69	3.68	3.68
17.736	3.67	3.67	3.67	3.66	3.66	3.66	3.66
17.799	3.65	3.65	3.65	3.65	3.64	3.64	3.64
17.862	3.63	3.63	3.63	3.62	3.62	3.61	3.61
17.926	3.61	3.60	3.60	3.59	3.59	3.59	3.58
17.989	3.58	3.58	3.57	3.57	3.57	3.56	3.56
18.052	3.56	3.55	3.55	3.54	3.54	3.54	3.53

WinTR-20: Version 1.10 0 0 0.05
Cantonment Areas EA (continued)
C-6 20 SPC No Action Alternative
STORM 25-Yr
SUB-AREA:
C-6 20 SPCOutlet .02188 98. .143

STREAM REACH:

18.115	3.53	3.52	3.52	3.52	3.51	3.51	3.51
18.178	3.50	3.50	3.49	3.49	3.49	3.49	3.48
18.242	3.48	3.48	3.47	3.47	3.47	3.46	3.46
18.305	3.46	3.45	3.45	3.45	3.45	3.44	3.44
18.368	3.43	3.43	3.42	3.42	3.42	3.41	3.41
18.431	3.40	3.40	3.40	3.39	3.39	3.39	3.38
18.495	3.38	3.38	3.37	3.37	3.37	3.36	3.36
18.558	3.36	3.35	3.35	3.34	3.34	3.33	3.33
18.621	3.33	3.32	3.32	3.31	3.31	3.31	3.30
18.684	3.30	3.30	3.29	3.29	3.29	3.28	3.28
18.747	3.28	3.28	3.27	3.27	3.27	3.26	3.26
18.811	3.26	3.25	3.25	3.25	3.24	3.24	3.24
18.874	3.23	3.23	3.22	3.22	3.21	3.21	3.21
18.937	3.20	3.20	3.20	3.19	3.19	3.18	3.18
19.000	3.18	3.17	3.17	3.17	3.17	3.16	3.16
19.064	3.16	3.15	3.15	3.15	3.14	3.14	3.14
19.127	3.13	3.13	3.13	3.12	3.12	3.12	3.11
19.190	3.11	3.10	3.10	3.09	3.09	3.09	3.08
19.253	3.08	3.08	3.07	3.07	3.07	3.06	3.06
19.316	3.06	3.05	3.05	3.05	3.04	3.04	3.04
19.380	3.03	3.03	3.03	3.03	3.02	3.02	3.02
19.443	3.01	3.01	3.00	3.00	3.00	2.99	2.99
19.506	2.98	2.98	2.98	2.97	2.97	2.96	2.96
19.569	2.95	2.95	2.94	2.94	2.93	2.93	2.93
19.633	2.92	2.92	2.92	2.91	2.91	2.91	2.91
19.696	2.90	2.90	2.90	2.90	2.90	2.89	2.89
19.759	2.89	2.88	2.88	2.87	2.87	2.87	2.86
19.822	2.86	2.86	2.85	2.85	2.84	2.84	2.83
19.885	2.83	2.82	2.82	2.82	2.81	2.81	2.80
19.949	2.80	2.80	2.80	2.79	2.79	2.79	2.79
20.012	2.79	2.78	2.78	2.78	2.78	2.77	2.77
20.075	2.76	2.76	2.76	2.75	2.75	2.74	2.74
20.138	2.74	2.73	2.73	2.72	2.72	2.71	2.71
20.202	2.70	2.70	2.70	2.69	2.69	2.68	2.68
20.265	2.68	2.67	2.67	2.67	2.66	2.66	2.66
20.328	2.65	2.65	2.65	2.64	2.64	2.64	2.63
20.391	2.63	2.63	2.63	2.62	2.62	2.62	2.61
20.454	2.61	2.61	2.60	2.60	2.59	2.59	2.58
20.518	2.58	2.58	2.57	2.57	2.57	2.56	2.56
20.581	2.55	2.55	2.55	2.54	2.54	2.54	2.54
20.644	2.53	2.53	2.53	2.52	2.52	2.52	2.51
20.707	2.51	2.51	2.50	2.50	2.50	2.49	2.49

Line Start Time (hr)	Flow Values @ time increment of 0.009 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
20.771	2.49	2.48	2.48	2.47	2.47	2.46	2.46
20.834	2.46	2.45	2.45	2.45	2.44	2.44	2.43
20.897	2.43	2.43	2.43	2.42	2.42	2.42	2.41
20.960	2.41	2.41	2.40	2.40	2.40	2.39	2.39
21.023	2.39	2.39	2.38	2.38	2.37	2.37	2.37
21.087	2.36	2.36	2.35	2.35	2.34	2.34	2.34

WinTR-20: Version 1.10 0 0 0.05
Cantonment Areas EA (continued)
C-6 20 SPC No Action Alternative

STORM 25-Yr

SUB-AREA:
C-6 20 SPCOutlet .02188 98. .143

STREAM REACH:

21.150	2.33	2.33	2.33	2.32	2.32	2.32	2.31
21.213	2.31	2.31	2.30	2.30	2.30	2.29	2.29
21.276	2.28	2.28	2.27	2.27	2.27	2.26	2.26
21.339	2.26	2.25	2.25	2.24	2.24	2.24	2.23
21.403	2.23	2.23	2.22	2.22	2.22	2.22	2.21
21.466	2.21	2.21	2.20	2.20	2.20	2.19	2.19
21.529	2.19	2.18	2.18	2.18	2.17	2.17	2.16
21.592	2.16	2.15	2.15	2.15	2.14	2.14	2.14
21.656	2.13	2.13	2.13	2.12	2.12	2.11	2.11
21.719	2.11	2.11	2.10	2.10	2.09	2.09	2.09
21.782	2.08	2.08	2.07	2.07	2.06	2.06	2.06
21.845	2.05	2.05	2.05	2.05	2.04	2.04	2.04
21.908	2.04	2.04	2.03	2.03	2.03	2.02	2.02
21.972	2.01	2.01	2.00	2.00	1.99	1.99	1.98
22.035	1.98	1.98	1.97	1.97	1.97	1.96	1.96
22.098	1.96	1.96	1.95	1.95	1.95	1.95	1.94
22.161	1.94	1.94	1.93	1.93	1.92	1.92	1.91
22.225	1.91	1.91	1.90	1.90	1.90	1.89	1.89
22.288	1.89	1.88	1.88	1.88	1.87	1.87	1.87
22.351	1.86	1.86	1.86	1.85	1.85	1.84	1.84
22.414	1.83	1.83	1.83	1.82	1.82	1.82	1.81
22.477	1.81	1.80	1.80	1.80	1.79	1.79	1.79
22.541	1.78	1.78	1.78	1.77	1.77	1.76	1.76
22.604	1.75	1.75	1.75	1.74	1.74	1.74	1.74
22.667	1.73	1.73	1.73	1.73	1.72	1.72	1.72
22.730	1.72	1.71	1.71	1.71	1.70	1.70	1.69
22.794	1.68	1.68	1.67	1.67	1.67	1.66	1.66
22.857	1.66	1.65	1.65	1.65	1.64	1.64	1.64
22.920	1.64	1.64	1.63	1.63	1.63	1.62	1.62
22.983	1.61	1.61	1.61	1.60	1.60	1.59	1.59
23.046	1.59	1.58	1.58	1.58	1.57	1.57	1.57
23.110	1.56	1.56	1.56	1.55	1.55	1.55	1.54
23.173	1.54	1.53	1.53	1.52	1.52	1.52	1.51
23.236	1.51	1.51	1.50	1.50	1.49	1.49	1.49
23.299	1.48	1.48	1.48	1.47	1.47	1.47	1.46
23.363	1.46	1.46	1.45	1.45	1.44	1.44	1.43
23.426	1.43	1.43	1.42	1.42	1.42	1.42	1.41
23.489	1.41	1.41	1.41	1.40	1.40	1.40	1.40
23.552	1.39	1.39	1.38	1.38	1.37	1.37	1.36
23.615	1.36	1.35	1.35	1.34	1.34	1.34	1.34
23.679	1.33	1.33	1.33	1.33	1.32	1.32	1.32
23.742	1.32	1.31	1.31	1.30	1.30	1.30	1.29
23.805	1.29	1.28	1.28	1.28	1.27	1.27	1.27
23.868	1.26	1.26	1.25	1.25	1.25	1.24	1.22
23.932	1.19	1.16	1.10	1.03	0.95	0.86	0.77

Eglin Cantonment Areas EA
C-6 20 SPC No Action Alternative

Line Start Time (hr)	Flow Values @ time increment of 0.009 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
23.995	0.68	0.59	0.51	0.43	0.36	0.31	0.26
24.058	0.22	0.19	0.16	0.14	0.11	0.10	0.08
24.121	0.07	0.06					

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WinTR-20: Version 1.10                  0         0         0.05
 Cantonment Areas EA                                                    (continued)
C-6 20 SPC No Action Alternative
                                          STORM 25-Yr
SUB-AREA:
          C-6 20 SPCOutlet              .02188    98.       .143

STREAM REACH:
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Eglin Cantonment Areas EA
C-6 20 SPC No Action Alternative

Area or Reach Identifier	Drainage Area (sq mi)	Alternate	Peak Flow by Storm 25-Yr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)

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WinTR-20: Version 1.10                  0         0         0.05
 Cantonment Areas EA                                                    (continued)
C-6 20 SPC No Action Alternative
                                          STORM 25-Yr
SUB-AREA:
          C-6 20 SPCOutlet              .02188    98.       .143

STREAM REACH:
C-6 20 SPC    0.022               147.31
OUTLET        0.022               147.31
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