DRAFT
INSTALLATION DEVELOPMENT ENVIRONMENTAL ASSESSMENT
AT
JOINT BASE CHARLESTON, SOUTH CAROLINA

Prepared for
Department of the Air Force
and
Department of the Navy

August 2023

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INSTALLATION DEVELOPMENT ENVIRONMENTAL ASSESSMENT
JOINT BASE CHARLESTON, SOUTH CAROLINA

AUGUST 2023

Lead Agency for the EA:	United States Air Force
Cooperating Agency:	United States Navy
Title of Proposed Action:	Installation Development at Joint Base Charleston
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ABSTRACT

This Environmental Assessment (EA) was prepared by the United States Air Force (USAF) and United States Navy (USN) in accordance with the National Environmental Policy Act (NEPA) of 1969, 42 United States Code 4321-4374, as implemented by the Council on Environmental Quality regulations, 40 Code of Federal Regulations (CFR) 1500–1508, USAF NEPA regulations 32 CFR 989, and USN NEPA regulations 32 CFR 775. The Proposed Action in this EA includes USAF, USN, and supported component missions' development of several facilities on approximately 60 acres of installation property at Joint Base Charleston (JBC). These developments include facilities and infrastructure construction, demolition, and additions/remodeling across the JBC-Air Base (JBC-AB), JBC-Weapons Station (JBC-WS), and the North Auxiliary Airfield (NAAF) installations. This EA addresses multiple alternatives for the Proposed Action, including a No Action Alternative, and evaluates the potential environmental impacts to the following resource areas: Air Installations Compatible Use Zones (AICUZ), land use, noise, air quality, water resources, safety and occupational health, hazardous materials, waste, biological and natural resources, cultural resources, earth resources, socioeconomic resources, environmental justice, and potential cumulative effects.

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1.0 EXECUTIVE SUMMARY

The United States Air Force (USAF) and United States Navy (USN) have prepared this Environmental Assessment (EA) to assess the potential environmental impacts of installation developments on approximately 60 acres of installation property at Joint Base Charleston (JBC), which consists of three primary installations: JBC-Air Base (JBC-AB), JBC-Weapons Station (JBC-WS), and the North Auxiliary Airfield (NAAF) (**Figure ES-1**).

This EA was prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, 42 United States Code 4321-4374, as implemented by the Council on Environmental Quality Regulations, 40 Code of Federal Regulations (CFR) 1500–1508, USAF NEPA regulations 32 CFR 989, and USN NEPA regulations 32 CFR 775.

The Proposed Action, detailed in Chapter 2 of this EA, encompasses USAF, USN, and supported component missions' development of several facilities, including infrastructure construction, demolition, and additions/remodeling across JBC-AB, JBC-WS, and NAAF installations. This EA addresses multiple alternatives for the Proposed Action, including a No Action Alternative, and evaluates the potential environmental impacts of the alternatives to resource areas.

ES.1 PURPOSE AND NEED FOR THE PROPOSED ACTION

The purpose of the Proposed Action is to meet current and future mission requirements and national security objectives associated with JBC. The Proposed Action is needed to address facilities and infrastructure not meeting the requirements and objectives necessary to support JBC missions. The Proposed Action would meet ongoing mission requirements associated with improving the efficiency and effectiveness of forces. Contributions by JBC to national security dictate that the installation implements planning for the next five fiscal years. To ensure readiness at the installation for any tasks assigned, projects must consider and be capable of supporting all functions inherent to the installation. These include operations and maintenance activities, security, administration, communications, billeting, supply and storage, training, transportation, and community quality of life.

ES.2 PROPOSED ACTION AND ALTERNATIVES

The Proposed Action, which is detailed in Chapter 2 of this EA, encompasses USAF, USN, and supported component missions' development across JBC-AB, JBC-WS, and NAAF installations.

The Nuclear Propulsion Training Unit (NPTU) proposes to expand its simulation training footprint with a New NPTU Training Facility, a supporting NPTU Substation, roadway improvements, and Old Tom Road Causeway improvements, and a multi-use path, collectively referred to as the NPTU Simulation Expansion. The New NPTU Training Facility would occupy a footprint of up to approximately 28 acres and would require two approximately 48,000-square foot (sf) High Bay Complexes, an approximately 105,000 sf Training Support Building, and supporting spaces and infrastructure, such as parking and access drives. The New NPTU Training Facility alternatives include the evaluation of four potential layouts/locations for the facility: a parcel south of the Red Bank Club and north of Old Tom Road, the southern portions of the same parcel with the inclusion of a parcel of land south of Old Tom Road, the Red Bank Golf Course, and a parcel north of the Naval Nuclear Propulsion Training Command (NNPTC).

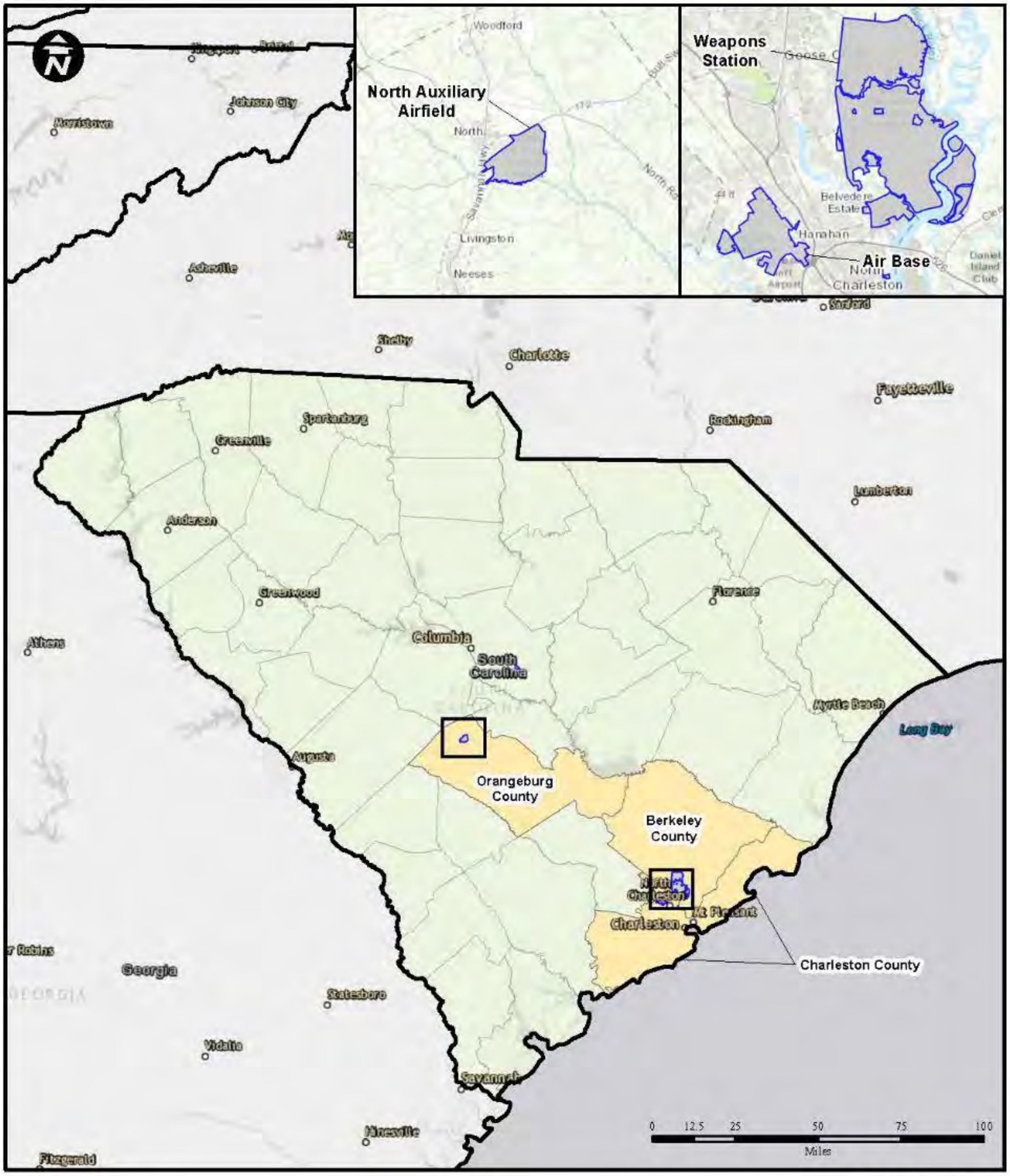

Figure ES-1
Installation Locations
Installation Development Environmental Assessment
Joint Base Charleston, South Carolina

The NPTU also proposes to construct a new NPTU Substation to support the New NPTU Training Facility. The NPTU Substation would include a 7.5/10.5 Megawatt 115 kV to 13.8 kV transformer, voltage regulator, three switch/breakers, and power lines from the substation to the new facility. The NPTU Substation alternatives include the evaluation of two potential locations for the facility: along Red Bank Road north of the proposed New NPTU Training Facility location for Alternative 1 and 2, and along Red Bank Road adjacent to Gate 18.

The NPTU Simulation Expansion has proposed modifications to the existing Old Tom Road Causeway just north of the Existing NPTU Facility parking areas. The existing narrow causeway (currently two 10-foot [ft]-wide vehicle travel lanes) would be widened to support two 12-ft-wide vehicle travel lanes and a multi-purpose (pedestrian/cycling) path. The roadway would also be raised approximately 2.0 ft to minimize the risk of regular occurring tidal flooding. The Old Tom Road Causeway improvement alternatives include three layouts: widening and raising the causeway for the lanes and pathway, widening and raising the causeway for the lanes but constructing the pathway as a separate elevated bridge, and raising but not widening the causeway for the lanes while constructing the pathway as a separate elevated bridge.

The USAF and supported component missions plan to construct two laser test ranges (LTRs) on JBC-WS: a 1.25-kilometer (km) LTR extending from an existing concrete pad in Complex D across Goose Creek to a parcel of land managed by the Naval Munitions Command, and 2.05 km Small Autonomous Unmanned Systems Research (SAUSR) LTR extending northeast at 71 degrees (˚) magnetic from the existing Naval Information Warfare Center (NIWC) SAUSR range. Each LTR would require 10 ft by 10 ft concrete pads at range point of origin and end nodes. A raised structure would be added to the pads for laser mounting at the end nodes. Vegetation clearing of a 30-ft wide corridor, including areas within the floodplain and in wetland areas, would be required along the entire length of the range to maintain line-of-sight. Alternative locations were considered for the LTRs but were not carried forward for detailed analysis, as discussed in Chapter 2. The alternatives included in this EA for the LTRs include the action and the no action alternative.

The USAF and supported component missions plan to construct a floating dock adjacent to the Goose Creek boatshed located on Goose Creek just off of the Cooper River. The floating dock would support the permanent mooring of a 42-ft survey vessel and the temporary mooring of a 32-ft survey vessel. The dock would mount to fender piles located on the northwest face of the existing covered boat shed. A 40-ft long aluminum gangway would be constructed, leading to the eight floating dock panels comprising the 60-ft long dock area. The alternatives included in this EA for the dock include the action and the no action alternative.

JBC proposed to demolish and dispose of the entire Pier Bravo structure, including piles, pile caps, beams/stringers, decking, railings, utilities, and building structures, including materials on the pier and within the pier structures in the Cooper River at JBC-WS. On September 5, 2022, a 600-ft tanker ship crashed into Pier Bravo, destroying approximately 100 ft of the pier's midsection. The pier continues to degrade as damaged materials fall from the pier and downstream into the Cooper River. There are no emergent concerns at this time; however inaction to resolve the degradation issues will erode the likelihood that the conditions surrounding the pier will remain stable.

JBC proposes to improve the existing Natural Resources Program (NRP) facility. These improvements include a new 130 ft by 30 ft storage shed for equipment, a new approximately

2,400 sf NRP administration building, and a new approximately 5,000 sf NRP maintenance building. The alternatives included in this EA for NRP facility include the action and the no action alternative.

JBC proposes to replace five dry well sewage lift stations (SLSs) and replace them with wet well SLSs. The existing SLSs would be demolished and backfilled. The new SLS facilities would include new a manhole/wet well, submersible pumps, 6-inch (in) emergency bypass line, grinders capable of handling solids and non-woven materials, and control system with alarms. The existing backup generators would be reused depending on their condition; new generators would be provided if existing generators were not able to be reused. The alternatives included in this EA for the SLSs include the action and the no action alternative.

JBC proposes to replace sections of the Water Distribution System (WDS) in three primary areas of JBC-WS. JBC would replace asbestos concrete, cast iron, and PVC piping comprising the WDS mains, including approximately 45,000 linear ft (lf) in the northern portion of JBC-WS, 28,500 lf in the central portion of JBC-WS, and 34,500 lf in the eastern portion of JBC-WS. The alternatives included in this EA for the WDS include the action and the no action alternative.

JBC proposes to improve the existing Engineering Complex at JBC-AB. Improvements include replacement/improvement of the existing twenty shops/storage buildings. Twelve facilities would be demolished and replaced with six new facilities. Engineering complex improvements would also include the replacement of the temporary Entomology Facility building with a permanent 2,870 sf facility of the same size. The alternatives included in this EA for the Engineering Complex include the action and the no action alternative.

JBC proposes to demolish derelict/decommissioned structures, including the water tower, and former dormitory. These structures are no longer in use and are in disrepair. The alternatives included in this EA for these structures include demolition or no action.

JBC proposes to improve the Ambulatory Care Center. Improvements include relocating the Mental Health department into the Medical/Dental Clinic and relocating the Logistics and Facility Management department into the Medical Warehouse. In addition, the project would demolish the current Mental Health/Education and Training/Resource Management facility and replace it with a new modern purpose-built Education and Training facility. The alternatives included in this EA for the Ambulatory Care Center include the action and the no action alternative.

JBC proposes to improve the runways and cargo areas at JBC-AB. USAF proposes to resurface the runways and install five hydrant fueling pits along an existing fuel supply line in aircraft parking spaces and add a 60,000 sf asphalt pavement cargo laydown area.

JBC proposes to demolish two existing aluminum munitions buildings and replace them with new Earth Covered Magazines (ECM) munitions facilities. The ECMs would be approximately 60 ft deep by 40 ft wide and include a concrete loading dock. The alternatives included in this EA for the munitions facilities include the action and the no action alternative.

JBC proposes to improve the Hazardous Materials (HAZMAT) Load and Unload Facility. The improvement would include repairs to the existing canopy and loading dock, and the demolition and replacement of the existing building with a 1,000 sf building. The alternatives included in this EA for the HAZMAT facilities include the action and the no action alternative.

USAF proposes to add an extension to the existing Bldg. 20 fire station at the NAAF. The proposed fire station would encompass the existing patio area along the southwest face of the station. Equipment, gear, and firefighting agents currently stored in the vehicle stall area would be moved to the new addition. A concrete driveway would be constructed to the structure leading to roll up doors. The alternatives included in this EA for the NAAF fire station include the action and the no action alternative.

ES.3 NO ACTION ALTERNATIVE

Analysis of the No Action Alternative provides a benchmark that enables decision makers to evaluate the environmental consequences of the Proposed Action. Council on Environmental Quality (CEQ) regulations at 40 CFR 1502.14(d) require that a No Action Alternative must be evaluated. No action means that the Proposed Action would not be implemented. Thus, baseline conditions would remain unchanged.

Under the No Action Alternative, JBC would not provide or complete the proposed installation developments to meet current and future mission requirements and national security objectives, or to meet ongoing mission requirements associated with improving the efficiency and effectiveness of forces. A no action decision would be a detriment to JBC's ability to meet current and future mission requirements and national security objectives. The No Action Alternative neither meets the need, nor the purpose of the Proposed Action but is carried forward as a baseline from which to compare the impacts of the Proposed Action and action alternatives.

ES.4 PREFERRED ALTERNATIVE AND ENVIRONMENTALLY PREFERRED ALTERNATIVE

The USAF and USN preferred alternative is Alternative 1 for each of the actions, with the exception of the New NPTU Training Facility and the Old Tom Road Causeway, for which the preferred alternative is Alternative 2. These preferences meet the purpose and need while balancing environmental impacts with mission requirements.

CEQ Regulations at 40 CFR 1505.2(b) also require that an environmentally preferable alternative be identified, which for this EA would be the No Action Alternative. While this alternative would have impacts, it would not introduce any new impacts different from those found now within the affected environment. The No Action Alternative, however, would not meet the purpose and need of the Proposed Action.

ES.5 ENVIRONMENTAL CONSEQUENCES

The table below (**Table ES-1**) provides a summary of potential impacts relative to each action alternative and the No Action Alternative at JCB-AB, JBC-WS, and the NAAF.

ES.6 ORGANIZATION OF THE EA

The Executive Summary provides a summary of the Proposed Action and alternatives. It also presents the potential environmental impacts related to each action alternative and the No Action Alternative. Chapter 1 provides the purpose and need for the Proposed Action and discusses the public involvement and scoping process. Chapter 2 describes the Proposed Action and alternatives in detail. Chapter 3 provides the definitions of the resources being analyzed as part of this EA, the potential environmental impacts of the alternatives, and an analysis of the cumulative impacts of the Proposed Action. Chapter 4 includes a list of preparers and contributors to this EA. Chapter 5 includes a list of reference material cited in the Draft EA. Appendix A includes a list of persons, agencies, and American Indian Tribes notified of scoping and Draft EA publication. Appendix B includes air quality analysis. Appendix C includes an Official Species List for JBC. Appendix D includes best management practices (BMPs) and avoidance and minimization measures (AMMs) for the Proposed Action. Appendix E contains BMPs to protect species from exposure to elevated noise levels. Appendix F includes socioeconomic and environmental justice data summaries for JBC and surrounding areas.

ES.7 PUBLIC COMMENT ON THE DOPAA

The DOPAA was circulated for review and comment to government agencies, local organizations, Native American tribes, and interested private citizens; was available for general review in public libraries in the communities affected by the Proposed Action; and was available online on the project website located at https://www.jbcharleston.jb.mil/Library/.

Input received on the DOPAA was used to prepare this Draft EA and included factual corrections, additions to existing information, and improvements to the analyses presented in the DOPAA. None of the received comments on the DOPAA resulted in substantive changes to the Proposed Action or alternatives, or the associated environmental consequences of the Proposed Action.

Table ES-1: Summary of Environmental Impacts for Action Alternatives

🟩 Negligible-Minor
🟨 Minor-Moderate
🟧 Moderate-Major
▨ Analyzed, No Impact or De Minimis
⬜ No Impact

	AICUZ/Land Use/Noise	Air Quality	Water Resources				Safety and Occupational Health		Hazardous Materials/Waste		
			Surface Waters	Floodplains	Wetlands	Groundwater	Construction/ Renovation Safety	Transportation Safety	Solid Waste	Hazardous Materials and Waste	Toxic Materials
NPTU Simulation Expansion: New Training Facility											
Alternative 1				🟨 Short-Term	🟨 Short-Term			🟩 Short-Term	🟩 Short-Term	▨	
Alternative 2 (Preferred)				🟩 Short-Term	🟩 Short-Term			🟩 Short-Term	🟩 Short-Term	▨	
Alternative 3			🟧 Long-Term	🟧 Short-Term	🟧 Short-Term			🟩 Short-Term	🟩 Short-Term	▨	
Alternative 4					🟧 Short-Term			🟩 Short-Term	🟩 Short-Term	▨	
NPTU Simulation Expansion: Substation											
Alternative 1 (Preferred)									🟩 Short-Term	▨	
Alternative 2									🟩 Short-Term	▨	
NPTU Simulation Expansion: Old Tom Road Causeway Improvements											
Alternative 1			🟩 Short-Term	🟩 Short-Term	🟨 Long-Term				🟩 Short-Term		
Alternative 2 (Preferred)			🟩 Short-Term	🟩 Short-Term	🟩 Long-Term				🟩 Short-Term		
Alternative 3			🟩 Short-Term	🟩 Short-Term	🟩 Long-Term				🟩 Short-Term		
Laser Test Ranges			🟨 Short-Term	🟩 Short-Term	🟩 Short-Term				🟩 Short-Term		
Goose Creek Floating Dock			🟨 Short-Term		🟩 Short-Term					🟩 Short-Term	
Pier Bravo Demolition			🟩 Short-Term		🟩 Short-Term				🟩 Short-Term	🟩 Short-Term	🟩 Long Term
Natural Resources Facilities				▨					🟩 Short-Term		🟩 Long Term
Sewer Lift Stations				🟩 Short-Term					🟩 Short-Term	▨	🟩 Long Term
Water Distribution System				🟩 Short-Term	🟩 Short-Term	▨			🟩 Short-Term	🟩 Short-Term	
Civil Engineering Complex: Shop									🟩 Short-Term		🟩 Long Term
Civil Engineering Complex: Entomology Facility									🟩 Short-Term		🟩 Long Term
Ambulatory Care Center									🟩 Short-Term		🟩 Long Term
Water Tower #2 Demolition									🟩 Short-Term		🟩 Long Term
Hydrant Pits									🟩 Short-Term	🟩 Short-Term	
Cargo Laydown Area									🟩 Short-Term		
Munitions Facilities									🟩 Short-Term		🟩 Long Term
HAZMAT Load and Unload Facility									🟩 Short-Term		🟩 Long Term
Dormitory Demolition									🟩 Short-Term		🟩 Long Term
NAAF Fire Station Addition									🟩 Short-Term		

Table ES-1: Summary of Environmental Impacts for Action Alternatives

🟩 Negligible-Minor
🟨 Minor-Moderate
🟧 Moderate-Major
▨ Analyzed, No Impact or De Minimis
⬜ No Impact

	Biological/Natural Resources			Cultural Resources		Earth Resources			Socioeconomic Resources/ Environmental Justice	
	Vegetation	Wildlife	Endangered, Threatened, and Sensitive Species	Archaeological Resources	Architectural Resource	Geology	Soils	Topography	Socioeconomics	Environmental Justice
NPTU Simulation Expansion: New Training Facility										
Alternative 1	🟩 Long-Term	🟩 Short-Term	▨				🟩 Long-Term	🟩 Long-Term		
Alternative 2 (Preferred)	🟩 Long-Term	🟩 Short-Term	▨				🟩 Long-Term	🟩 Long-Term		
Alternative 3	🟨 Long-Term	🟩 Short-Term	▨				🟨 Long-Term	🟩 Long-Term		
Alternative 4	🟧 Long-Term	🟩 Short-Term	▨				🟨 Long-Term	🟩 Long-Term		
NPTU Simulation Expansion: Substation										
Alternative 1 (Preferred)		🟩 Short-Term	▨				🟩 Short-Term			
Alternative 2		🟩 Short-Term	▨				🟩 Short-Term			
NPTU Simulation Expansion: Old Tom Road Causeway Improvements										
Alternative 1		🟩 Short-Term	▨					🟩 Long-Term		
Alternative 2 (Preferred)		🟩 Short-Term	▨					🟩 Long-Term		
Alternative 3		🟩 Short-Term	▨					🟩 Long-Term		
Laser Test Ranges	🟩 Long-Term	🟩 Short-Term	▨							
Goose Creek Floating Dock		🟩 Short-Term	▨							
Pier Bravo Demolition		🟩 Short-Term	▨							
Natural Resources Facilities	🟩 Long-Term	🟩 Short-Term	▨				🟩 Short-Term	🟩 Long-Term		
Sewer Lift Stations	🟩 Long-Term	🟩 Short-Term	▨				🟩 Short-Term			
Water Distribution System	🟩 Long-Term	🟩 Short-Term	▨				🟩 Short-Term			
Civil Engineering Complex: Shop							🟩 Short-Term			
Civil Engineering Complex: Entomology Facility							🟩 Short-Term			
Ambulatory Care Center							🟩 Short-Term			
Water Tower #2 Demolition										
Hydrant Pits										
Cargo Laydown Area	🟩 Long-Term	🟩 Short-Term	▨							
Munitions Facilities										
HAZMAT Load and Unload Facility										
Dormitory Demolition										
NAAF Fire Station Addition							🟩 Short-Term			

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GLOSSARY OF ABBREVIATIONS AND ACRONYMS

°	Degrees
%	Percent
628 ABW	628th Air Base Wing
628 CES	628th Civil Engineer Squadron
ACAM	Air Conformity Applicability Model
ACM	Asbestos Containing Materials
AICUZ	Air Installations Compatible Use Zones
AMM	Avoidance And Minimization Measures
AOC	Areas of Concern
APE	Area of Potential Effects
BGEPA	Bald And Golden Eagle Protection Act
BMP	Best Management Practice
Bldg.	Building
C&D	Construction and Demolition Waste
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO_{2e}	Carbon Dioxide Equivalents
CZC	Coastal Zone Consistency
CZMA	Coastal Zone Management Act
dB	Decibels
dBA	A-Weighted Decibel
dBP	Peak Decibels
DERP	Defense Environmental Restoration Program
DIPC	Dental Instrument Processing Center
DNL	Day-Night Sound Level
DoD	Department of Defense
DOE	Department of Energy
EA	Environmental Assessment
ECF	Entry Control Facility
ECM	Earth Covered Magazine
EFH	Essential Fish Habitat
EIAP	Environmental Impact Analysis Process
EO	Executive Order
ERP	Environmental Restoration Program
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FMP	Fishery Management Plan
FONPA	Finding of No Practicable Alternative
FONSI	Finding of No Significant Impact
FR	Federal Register
FSO	Free Space Optics
ft	Feet
FY	Fiscal Year
GHG	Greenhouse Gas
HAPC	Habitat Areas of Particular Concern

HAZMART	Hazardous Material Pharmacy
HAZMAT	Hazardous Materials
HDD	Horizontal Directional Drilling
HWMP	Hazardous Waste Management Plan
IHA	Incidental Harassment Authorization
IM/IT	Information Management/Information Technology
ISWMP	Installation Solid Waste Management Plan
JBC	Joint Base Charleston
JBC-AB	Joint Base Charleston-Air Base
JBC-WS	Joint Base Charleston-Weapons Station
km	Kilometer
kV	Kilovolt
LBP	Lead-Based Paint
L_{eq}	Equivalent Sound Level
L_{max}	Maximum Sound Level
LOA	Letter of Authorization
LTR	Laser Test Range
LUC	Land Use Controls
m	Meter
MILCON	Military Construction
MMPA	Marine Mammal Protection Act
MSA	Magnuson-Stephens Act
MSL	Mean Sea Level
MTS	Moored Training Ship
NAAF	North Auxiliary Airfield
NAAQS	National Ambient Air Quality Standards
Nm	Nanometer
NEPA	National Environmental Policy Act
NFA	No Further Action
NHPA	National Historic Preservation Act
NIWC	Naval Information Warfare Center
NLAA	Not Likely to Adversely Affect
NLEB	Northern Long-Eared Bat
NMFS	National Marine Fisheries Service
NNPP	Naval Nuclear Propulsion Program
NNPTC	Naval Nuclear Propulsion Training Command
NO_2	Nitrogen Dioxide
NPDES	National Pollutant Discharge Elimination System
NPTU	Nuclear Propulsion Training Unit
NRHP	National Register of Historic Places
NRP	Natural and Cultural Resources Program
O_3	Ozone
OCRM	Office of Ocean And Coastal Resource Management
OSHA	Occupational Health And Safety Act
Pb	Lead
PCB	Polychlorinated Biphenyls
PM_{10}	Particulate Matter Less Than or Equal to 10 Micrometers
$PM_{2.5}$	Particulate Matter Less Than or Equal to 2.5 Micrometers
PPTT	Propulsion Plant Team Trainers
PSD	Prevention of Significant Deterioration

PVC	Polyvinyl Chloride
RCRA	Resource Conservation and Recovery Act
RCW	Red-Cockaded Woodpecker
ROW	Right Of Way
SAUSR	Small Autonomous Unmanned Systems Research
SAV	Submerged Aquatic Vegetation
SCDAH	South Carolina Department of Archives and History
SCDHEC	South Carolina Department of Health And Environmental Control
SEL	Sound Exposure Level
sf	Square Feet
SHPO	State Historic Preservation Office
SLS	Sewer Lift Station
SO_2	Sulphur Dioxide
SOP	Standard Operating Procedure
SWMP	Storm Water Management Plan
SWMU	Solid Waste Management Unit
TCP	Traditional Cultural Properties
tons/yr	tons per year
UFC	Unified Facilities Criteria
U.S.	United States
USACE	United States Army Corps of Engineers
USAF	United States Air Force
U.S.C.	United States Code
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USMC	United States Marine Corps
USN	United States Navy
UST	Underground Storage Tank
WDS	Water Distribution System

1.0 PURPOSE AND NEED FOR THE ACTION

1.1 INTRODUCTION

This Installation Development Environmental Assessment (EA) intends to address the Proposed Action of implementing selected installation development projects on approximately 60 acres of installation property.

The National Environmental Policy Act (NEPA) (42 United States Code [U.S.C.] Section 4321-4347) is a federal statute requiring the identification and analysis of potential environmental impacts associated with proposed federal actions before those actions are taken. The intent of NEPA is to help decision-makers make well-informed decisions based on an understanding of the potential environmental consequences and take actions to protect, restore, or enhance the environment. NEPA established the Council on Environmental Quality (CEQ), which was charged with developing implementing regulations and ensuring federal agency compliance with NEPA. The CEQ regulations mandate that all federal agencies use a prescribed structured approach to environmental impact analysis. This approach also requires federal agencies to use an interdisciplinary and systematic approach in their decision-making process. This process evaluates potential environmental consequences associated with a proposed action and considers alternative courses of action.

The process for implementing NEPA is codified in the President's CEQ Regulations Implementing NEPA (Title 40 Code of Federal Regulations [CFR] 1500–1508). The September 14, 2020, version of CEQ NEPA rules is being used (87 Federal Register [FR] 23453-23470, as modified) by the CEQ NEPA Implementing Regulations Revisions Final Rule that became effective May 20, 2022, which directs federal agencies on how to implement the provisions of NEPA. The Naval Nuclear Propulsion Training Unit (NPTU) Simulation Expansion and Naval Information Warfare Center (NIWC) Laser Test Range (LTR) project would be funded with a Navy Military Construction (MILCON), so the United States Navy (USN) is therefore included as a cooperating agency. Therefore, this EA conforms to both USN and United States Air Force (USAF) NEPA processes. This Draft EA has also been prepared pursuant to CEQ regulations, as discussed above, 32 CFR 775, and 32 CFR 989, which outline the internal NEPA policies and responsibilities for the USN and USAF, respectively.

The CEQ was established to implement and oversee federal policy in this process. The CEQ regulations specify that an EA must be prepared to provide evidence and analysis for determining whether to prepare a Finding of No Significant Impact (FONSI) or Finding of No Practicable Alternative (FONPA), where a FONPA is appropriate (see **Section 1.4**), or whether the preparation of an Environmental Impact Statement (EIS) is necessary.

1.2 PROJECT LOCATION AND BACKGROUND

Joint Base Charleston (JBC) is supported by the USAF host unit, the 628th Air Base Wing (628 ABW), Air Mobility Command (AMC). JBC consists of three primary installations: JBC-Air Base (JBC-AB), JBC-Weapons Station (JBC-WS), and the NAAF (**Figure 1-1**). With more than 53 tenants, JBC is composed of Department of Homeland Security and USAF, USN, United States Army, United States Marine Corps (USMC), United States Coast Guard (USCG), and other Department of Defense (DoD) missions. JBC serves more than 79,000 personnel, including active-duty and reserve military members, civilian government employees and contractors, military family members, and retirees.

The 628th Civil Engineer Squadron (628 CES), a subordinate unit within the 628 ABW, is responsible for directing design, construction, maintenance, and repair activities on 2.6 billion dollars of base facility and infrastructure systems. Responsibilities cover 6,500 acres, 5 million square feet (sf) of floor space and 3.7 million square yards of pavement. The 628 CES provides base fire protection services, base disaster preparedness support, comprehensive environmental management services, and direct explosive ordnance disposal for local and worldwide DoD and Presidential support requirements. The 628 CES also provides full spectrum infrastructure and fire protection support to the NAAF training complex.

The three component installation properties are described in detail below:

Air Base

JBC-AB is located within the City of North Charleston in Charleston County, approximately 10 miles northwest of the City of Charleston (**Figure 1-2**). JBC-AB is a 3,733-acre USAF base under the command and control of the AMC. Units associated with the 628 ABW at JBC-AB include 13 squadrons, two groups, and one wing staff directorate. Tenants at JBC include the 437th Airlift Wing, the 315th Airlift Wing of the USAF Reserve Command, 1st Combat Camera Squadron; USAF Office of Special Investigations; and the 373rd Training Squadron, Air Education Training Command.

The 628 ABW provides installation support to 53 DoD and Federal agencies, servicing a total force of over 79,000 Airmen, Sailors, Soldiers, Marines, Coast Guardsmen, civilians, dependents and retirees on JBC-AB and JBC-WS. The 628 ABW maintains 2 billion dollars of physical infrastructure across 23,000 non-contiguous acres in order to provide mission-ready expeditionary Airmen to combatant commanders in support of joint and combined operations.

The 628 ABW provides support for JBC's joint-use airfield, sharing one 9,000-foot (ft) and one 7,000-ft long intersecting runways with Charleston International Airport. The base maintains the two runways and most of the taxiways, and security and crash rescue response for all flights.

Weapons Station

JBC-WS is located on the west bank of the Cooper River in Berkeley and Charleston Counties, approximately 10 miles upriver from the City of Charleston (**Figure 1-2**). It consists of four major land tracts totaling 16,307 acres. JBC-WS contains more than 40 tenant commands, including many training commands and units such as the Naval Nuclear Propulsion Training Command (NNPTC) and NPTU; Naval Consolidated Brig, Charleston; Mobile Mine Assembly Unit; Explosive Ordnance Detachments; USMC Reserve Center; and NIWC Atlantic. It also serves as a United States Army logistics hub.

The USN mission is, alongside United States (U.S.) allies and partners, to defend freedom, preserve economic prosperity, and keep the seas open and free. The Naval Nuclear Propulsion Program (NNPP) was established in 1948 and is a joint Department of Energy (DOE) and USN organization with responsibility for all matters pertaining to naval nuclear propulsion from design through disposal. The integrated relationship, authorities, and responsibilities between DOE and

USN for naval nuclear propulsion are specified in Executive Order (EO) 12344, *Naval Nuclear Propulsion Program* and codified in 50 U.S.C. 2511 and 50 U.S.C. 2406.The mission of NNPP is to provide the U.S. with safe, effective, and affordable naval nuclear propulsion plants and to ensure their continued safe and reliable operation through lifetime support, research and development, design, construction, specification, certification, testing, maintenance, and disposal.

NPTU is a command within the NNPP. It is NPTU's mission to provide prospective Naval nuclear propulsion plant operators and officers with training and certification for the operation of nuclear propulsion plants. Current training at NPTU consists of 6 months of practical instruction operating Naval nuclear reactor plants and Engine Room Team Trainers. The current 35-acre onshore NPTU training facility consists of three Training Support Buildings, a security access building, and parking lots. Along the shore of the Cooper River, the training facility includes two piers with Moored Training Ships (MTS) and various support barges.

North Auxiliary Airfield

The NAAF is located 85 miles northwest of JBC-AB and 3 miles east-southeast of the Town of North, South Carolina, in Orangeburg County (**Figure 1-2**). The 2,400-acre property contains one 10,000-ft and one 3,500-ft long runway used by multiple installations for C-17 Globemaster III aircrew training. The NAAF's isolated location provides low light pollution, making the airfield ideal for night assault and training operations. The only permanently assigned personnel at the NAAF include 12 firefighters, four Landing Zone Safety Officers, and two civilian groundskeepers assigned to the on-site fire station and air traffic control tower. Personnel from JBC-AB are assigned temporary duty positions for air traffic control and air-dropped pallet recovery.

The NAAF is used by aircrews from JBC and other military installations to practice takeoffs, landings, and airdrop operations at drop zones on the airfield. Aircraft are not permanently based at NAAF; however, aircraft based at JBC-AB conduct operations at NAAF on a regular basis.

1.3 PURPOSE AND NEED FOR THE ACTION

The purpose for the Proposed Action is to meet current and future mission requirements and national security objectives associated with JBC. The Proposed Action is needed to address facilities and infrastructure that are not meeting the requirements and objectives necessary to support JBC missions.

The Proposed Action would meet ongoing mission requirements associated with improving the efficiency and effectiveness of forces by enhancing their ability to expand; replacing older, substandard facilities with new buildings; and providing reliable utilities to support JBC. Continued development of infrastructure at JBC must consider future facilities construction, demolition, renovation, transportation needs, airfield alterations and enhancements, utilities improvements, land use planning, energy requirements, and development constraints and opportunities (**Table 1-1**).

Contributions by JBC to national security, as well as prospects for the assignment of additional missions in the future, dictate that the installation implement planning for the next 5 fiscal years. To ensure readiness at the installation for any tasks assigned, projects must consider, and be capable of supporting all functions inherent to the installation. These include operations and maintenance activities, security, administration, communications, billeting, supply and storage, training, transportation, and community quality of life.

Individual purpose and need statements for proposed projects are provided in **Table 1-1**.

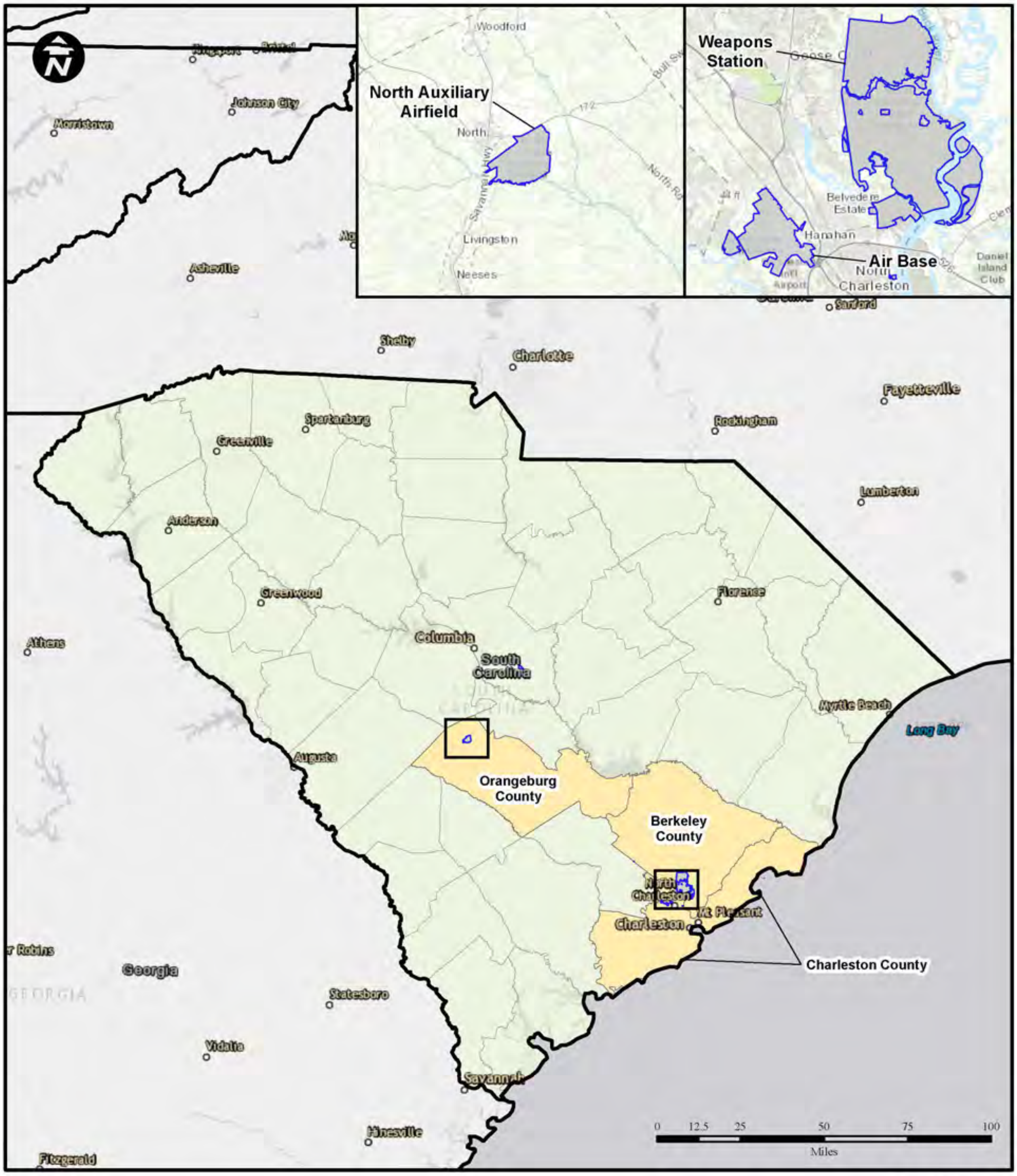
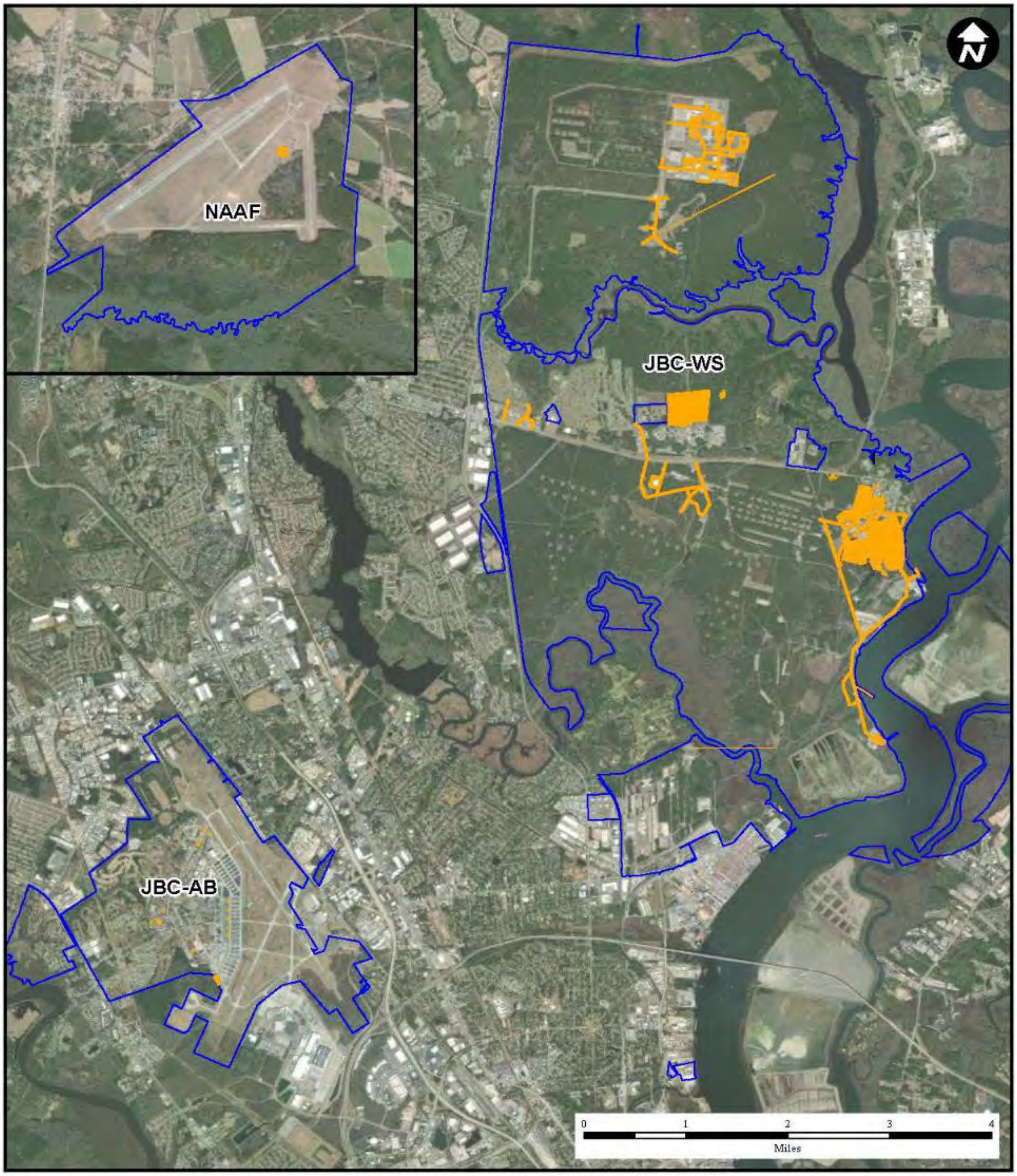


Figure 1-1
Installation Locations
Installation Development Environmental Assessment
Joint Base Charleston, South Carolina



Legend

🟧 Proposed

☐ Installation Boundary

Figure 1-2

Proposed Action Locations

Installation Development Environmental Assessment
Joint Base Charleston, South Carolina

Table 1-1: Purpose and Need

Proposed Action Component	Location	Purpose	Need
NPTU Simulation Expansion: New NPTU Training Facility	JBC-WS	The purpose is to modernize and optimize NPTU simulator training facilities with Propulsion Plant Team Trainers (PPTT) updated technology which lowers cost to operate, reduces environmental risk, and improves training efficiency.	The Proposed Action is needed to support optimization in training of operators to meet the Fleet's Naval nuclear operator manning requirements. These training requirements must be met to ensure nuclear-powered warships would be sufficiently staffed with trained reactor plant operators and officers to perform missions vital to national security.
NPTU Simulation Expansion: Substation	JBC-WS	The purpose of the Proposed Action is to provide the New NPTU Training Facility with redundant electrical feeds capable of supporting a service life of 50 or more years.	The Proposed Action is needed to increase the reliability of New NPTU Training Facility power sources, minimize the risk of power outages, and alleviate risks caused by aging equipment in existing substations. Existing outdated electrical infrastructure was built in the 1970s with an expected service life of 40 years.
NPTU Simulation Expansion: Old Tom Road Causeway Improvements	JBC-WS	The purpose of the Proposed Action is to provide a safer method of pedestrian access and egress from the Existing NPTU Facility through construction of a multi-purpose pathway along Old Tom Road.	The Proposed Action is needed to increase the safety and reliability of transportation between the Existing NPTU Facility and the New NPTU Training Facility. There is currently no protected method of pedestrian access between the facilities along Old Tom Road.
Laser Test Ranges	JBC-WS	The purpose is to prepare NIWC Atlantic for future work in Free Space Optics (FSO) Communications systems in support of upcoming requirements from the USMC and USN. The ranges will permit the development, engineering, evaluation, and testing of optics/laser-based systems. In addition, the ranges will position NIWC Atlantic to become the technology experts to help train future warfighters and engineers in optics/laser-based systems.	NIWC Atlantic currently lacks laser testing facilities of any significant length and the construction of the two new ranges will fill this gap. Laser test ranges for the anticipated USMC and USN optics/laser-based systems require a stable working platform with appropriately sized infrastructure to provide a baseline testing environment. The various classifications and anticipated use-case scenarios of the laser systems require two separate environments with a limited chance for unwanted outside testing variables. One environment is required for land-based testing and one for littoral environment testing.
Goose Creek Floating Dock	JBC-WS	The purpose of the Proposed Action is to construct a floating dock adjacent to the Goose Creek Boatshed (Building [Bldg.] 3127) serving as an access point for vessel launching and recovery at the nearby boat ramp.	The Proposed Action is needed to address limited mooring options and meet United States Army Corps of Engineers (USACE) vessel mooring requirements. Commercial mooring options are very limited in the Upper Cooper River, and the new floating dock would remove this limitation.
Pier Bravo Demolition	JBC-WS	The purpose of the Proposed Action is to remove potentially hazardous infrastructure through the demolition of Pier Bravo at JBC-WS.	The Proposed Action is needed to avoid further degradation, safety concerns, and debris field expansion due to the degrading dock. Pieces of the pier continue to fall into the Cooper River, and complete removal of the dock is needed to remove this hazard.

Proposed Action Component	Location	Purpose	Need
Natural Resources Facilities	JBC-WS	The purpose of the Proposed Action is to construct a new administration facility, new Forestry/Wildland/Maintenance facility, and a covered storage facility for Natural and Cultural Resources Program (NRP) vehicles and equipment, and to extend the site boundaries of the existing compound to accommodate the new buildings.	The Proposed Action is needed to address inadequate facility maintenance and readiness. The storage facility is over capacity, leading to increased building wear and decreased personnel efficiency.
Sewer Lift Stations	JBC-WS	The purpose of the Proposed Action is to repair and replace five dry well sewage lift stations (SLS) at JBC-WS with new wet well sewage lift stations.	The existing SLS are integral to waste management at JBC-WS. The proposed Action is needed to upgrade current facilities with modern equipment to provide reliable waste management infrastructure.
Water Distribution System	JBC-WS	To replace asbestos concrete, cast iron, and Polyvinyl chloride (PVC) piping in three distinct areas (North, Central, and East) within JBC-WS.	The proposed Action is needed to improve the reliability of service, maintain the operational capacity, and minimize costly emergency repairs. Infrastructure in the project area has exceeded its service life and degradation of the distribution system has resulted in costly annual operations and maintenance.
Civil Engineering Complex: Shop	JBC-AB	The purpose of the Proposed Action is to consolidate the Civil Engineer Maintenance Shops and storage facilities with the administration, engineering, operations, and readiness functions to create a modern, conveniently located, and properly configured multi-facility complex.	The Proposed Action is needed to strengthen the civil engineer function to maximize potential to meet future diverse mission requirements as a vital inter-theater airlift hub. Substandard, inefficient, and geographically separated shop facilities hinder productivity and effectiveness in providing facility and infrastructure maintenance.
Civil Engineering Complex: Entomology Facility	JBC-AB	The purpose of the Proposed Action is to replace the deteriorated and unsafe existing Entomology Facility (Bldg. 717) by constructing a new facility within the proposed Civil Engineering Complex area.	Substandard facility hinders effectiveness of providing pest and wildlife control needed to ensure availability of JBC as a vital inter-theater airlift hub. The current Entomology Shop is also within the 7:1 Lateral Glide Slope to Runway 15. The presence of mold is a health hazard to personnel, and the proximity to other facilities is a danger to those facilities. The inadequate and inefficient facility is hindering productivity. The Proposed Action is needed because the risks to health, comfort of personnel, and safety of the building will not be addressed without providing a new facility.
Ambulatory Care Center	JBC-AB	The purpose of the Proposed Action is to demolish and replace Bldg. 1000 with a new education and training facility, construct an addition to Bldg. 1001, relocate the Mental Health clinic into the existing	The Proposed Action is needed to optimize the efficiency of clinical and logistics operations and reduce facility footprint and associated operations costs caused by deteriorating building infrastructure. The building's infrastructure is deteriorating and at the end of its useful life.

Proposed Action Component	Location	Purpose	Need
		Medical/Dental Clinic, and relocate Logistics and Facility Management into the Medical Warehouse.	
Water Tower #2 Demolition	JBC-AB	The purpose of the Proposed Action is to demolish Water Tower #2 (Bldg. 84104) at JBC-AB.	The Proposed Action is needed to avoid eliminating unnecessary refurbishment/maintenance costs.
Hydrant Pits	JBC-AB	The purpose of the Proposed Action is to construct five hydrant fuel pits at aircraft parking spots 60-64 on the JBC-AB flightline.	The existing parking spots fuel aircraft via truck, not fuel hydrants as with other parking areas. The Proposed Action is needed to reduce operational inefficiencies resulting from the current fueling method.
Cargo Laydown Area	JBC-AB	The purpose of the Proposed Action is to construct approximately new asphalt pavement for a cargo laydown area on the southwest side of the airfield at JBC-AB.	Current cargo laydown areas are experiencing shared space use conflicts and double handling, utilizing aircraft parking spots for storage. The proposed Action is needed to increase operational efficiency by providing a designated accessible laydown area for the storage of palletized supplies/equipment.
Munitions Facilities	JBC-AB	The purpose of the Proposed Action is to remove and replace the deteriorated Bldgs. 2194 and 2196 and replace them with an updated Earth Covered Magazine (ECM) munitions facility.	Bldgs. 2194 and 2196 are past their service life and have deteriorated through years of use and disrepair. The Proposed Action is needed to enhance security of both the munitions magazines and the base itself, resulting in a decrease in the blast arc radius and a reduction in alarm malfunctions.
Hazardous Materials (HAZMAT) Load and Unload Facility	JBC-AB	The purpose of the Proposed Action is to repair the deteriorated load/unload dock portion of Bldg. 2190.	Bldg. 2190 is past its service life and has deteriorated through years of use and disrepair. The Proposed Action is needed to reduce disproportionate investment of dwindling operations and maintenance account resources.
Dormitory Demolition	JBC-AB	The purpose of the Proposed Action is to demolish the degrading Bldg. 246 Dormitory.	The building’s infrastructure is deteriorating and at the end of its useful life. The Proposed Action is needed to reduce disproportionate investment of dwindling operations and maintenance account resources.
NAAF Fire Station Addition	NAAF	The purpose of the Proposed Action is to construct an addition to JBC Fire Department Station 3 (Bldg. 168) at North Auxiliary Airfield to provide a safer operations environment for personnel and prolong the lifespan of equipment.	The Proposed Action is needed to free up space in the existing fire station and allow for controlled storage of specialized firefighting and wildland equipment, agent, and gear.

1.4 DECISIONS TO BE MADE

The decision to be made is the selection of an alternative for JBC to support the proposed installation developments at the base. This EA evaluates the potential environmental consequences of implementing the Proposed Action as described in **Section 2.0**.

Based on the analyses conducted in support of this EA, the USAF and supported component missions will make one of three decisions regarding the Proposed Action:

1. Choose the alternative for each proposed action component that best meets the purpose of and need for this project and sign a FONSI and/or FONPA, allowing implementation of the selected alternative;
2. Initiate preparation of an EIS if it is determined that significant impacts would occur as a result of implementation of the action alternatives; or
3. Select the no action alternative, whereby the Proposed Action would not be implemented. As required by NEPA and its implementing regulations established by CEQ, preparation of an environmental document must precede final decisions regarding a federal action and be available to inform decision-makers of the potential environmental impacts. JBC can also defer a decision and not pick any of the alternatives.

1.5 COOPERATING AGENCY AND INTERGOVERNMENTAL COORDINATION/COORDINATION

1.5.1 Cooperating Agencies

Given the role of the 628 CES as the host unit responsible for facilities maintenance and long-range planning at JBC, the USAF will retain responsibility as the Lead Agency for this EA pursuant to 40 CFR 1501.7, Lead Agencies. The USN will serve as a cooperating agency, as a number of the proposed actions directly involve USN commands, and because the installation is a Joint Base. The USN would be involved primarily with the NIWC LTR and NPTU Simulation Expansion Proposed Actions.

1.5.2 Interagency and Intergovernmental Coordination

NEPA ensures that environmental information is made available to the public during the decision-making process and prior to actions being taken. The premise of NEPA is that the quality of federal decisions will be enhanced if proponents provide information on their actions to state and local governments and the public and involve them in the planning process.

Because the Proposed Action area is within and nearby the 100-year floodplains and wetland areas, it is recommended by the Federal Emergency Management Agency (FEMA) 2015 Guidelines for Implementing EO 11988 and EO 13690 to follow the requirements of EO 11988.

1.5.3 Public, American Indian Tribe, and Agency Review of DOPAA

The USAF notified and invited comment on the DOPAA for this Draft EA from government agencies, local organizations, Native American tribes, and interested private citizens. The DOPAA was made available for general review in public libraries in the communities potentially affected by the Proposed Action and online on the project website located at https://www.jbcharleston.jb.mil/Library/.

Input received on the DOPAA was used to prepare this Draft EA. Modifications to the DOPAA, incorporated as Chapters 1 and 2 of this Draft EA include factual corrections, additions to existing information, and improvements to the analyses presented in the DOPAA. None of the received comments resulted in substantive changes to the Proposed Action components or alternatives, or the associated environmental consequences of the Proposed Action. However, it should be noted that eight of the Proposed Action components included in the DOPAA have been removed from the EA due to project timing. These components are no longer included in this EA and will be reviewed individually by JBC for NEPA compliance prior to initialization should they progress in the future.

1.5.4 Draft EA 30-Day Public Comment Period

A Notice of Availability (NOA) for the Draft EA and FONSI and FONPA was published in *The Post and Courier* in Charleston, South Carolina and *The State* in Columbia, South Carolina. Publication of the NOA initiates a 30-day public review period, which will be held from August 7, 2023, through September 5, 2023. Copies of the Draft EA and unsigned Draft FONSI/FONPA are available at the Dorchester Road Regional Library in North Charleston, South Carolina and the JBC-WS Branch Library in Goose Creek, South Carolina. These documents are available on the internet at the JBC environmental website. At the same time, copies of the Draft EA and FONSI/FONPA were distributed to federal, state, and local agencies and applicable Federally recognized Native American Tribes.

Applicable and relevant comments received will be addressed in the Final EA. **Appendix A** includes the list of individuals notified of the publication of the Drat EA, including federal, state, and local agencies, federally-recognized American Indian Tribes, and political leaders representing towns and municipalities surrounding the activities in the Proposed Action. JBC's record of responses and Draft EA consultation strategy regarding National Historic Preservation Act (NHPA) Section 106, Section 7 of the Endangered Species Act (ESA), Magnuson-Stephens Act (MSA), Marine Mammal Protection Act (MMPA), Coastal Zone Management Act (CZMA), Floodplains and Wetlands, and Government-to-Government Consultations is presented in **Appendix A**.

2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

This section describes the Proposed Action and Alternatives. CEQ Regulations for implementing the Procedural Provisions of NEPA (Title 40 CFR 1500–1508) specify that an EA must include a No Action Alternative against which potential impacts can be compared (CEQ 2023). The No Action Alternative is also required under Naval Operations Manual OPNAV M-5090.1. The USAF Environmental Impact Analysis Process (EIAP), codified at 32 CFR 989.8, and USN's NEPA implementation polices, 32 CFR 775.3(a)(2) states that a reasonable range of alternatives for achieving the purpose(s) of the Proposed Action should be developed and carefully considered. The purpose of the No Action Alternative is to assess any environmental consequences that may occur if the Proposed Action is not implemented.

2.1 PROPOSED ACTION

The USAF and supported component missions propose to develop several facilities on approximately 60 acres of installation property at JBC. The Proposed Action includes facilities and infrastructure construction, demolition, and additions/remodeling across the JBC-AB, JBC-WS, and NAAF installations. The Proposed Action and alternatives are described in **Sections 2.1.1** through **2.1.19**. The locations of all developments are detailed in **Figures 2-1 through 2-11**.

Demolition activities under the Proposed Action would include removal of facility waste, removal of hazardous waste, if applicable, and utilization of heavy machinery for structure teardown. Inspections would be conducted in facilities to be demolished with a potential to contain asbestos. Removal and disposal of asbestos would be stipulated in project designs and carried out in strict compliance with all applicable federal, state, and local laws, rules, regulations, and standards.

JBC has identified project-specific alternatives for the Proposed Action that may meet requirements for the proposed developments. The following sections provide descriptions of the alternatives. Note that the NPTU proposes to expand its simulation training footprint with a New NPTU Training Facility, a supporting NPTU Substation, roadway improvements, Old Tom Road Causeway improvements, and a multiuse path, collectively referred to herein as the NPTU Simulation Expansion.

2.1.1 NPTU Simulation Expansion: New NPTU Training Facility

The NPTU proposes to expand its simulation training footprint. The New NPTU Training Facility would require additional high-bay construction to house training simulators and supporting spaces (**Figure 2-1**). This project facilitates retirement of operating training submarines moored in the Cooper River. The development is broken into two MILCON projects; one placed in Fiscal Year (FY) 2026 (MILCON P200) with a 3 year construction window (December 2026 to December 2029), and another project placed in FY33 (Future MILCON) with a 2 year construction window (December 2033 to December 2035). The proposed New NPTU Training Facility would be actively used 24 hours a day, 5 days a week. The proposed facility expansion includes the following design elements:

- One approximately 105,000 sf Training Support Building
- Two approximately 48,000 sf High Bay Complex (includes High Bay & Support Spaces) (one in FY26, and the other in FY33)

- Drop-off/Pick up Lanes
- Parking lot that is up to approximately 13 acres (3.3 acres previously developed) (majority constructed in FY26, with the remaining spots constructed in FY33)
- Stormwater Retention Pond(s)
- North Access Drive

The New NPTU Training Facility will avoid constructing both high bays simultaneously. Due to the complexity of the design, fabrication, installation, and testing of the PPTTs, only two simulators (one high bay) can be completed within the first 7 years after completion of the proposed FY26 MILCON. The second high bay is scheduled for construction under an FY33 MILCON. This EA investigates the completed proposed New NPTU Training Facility footprint depicted in Alternatives 1 and 2 with both high bays.

The stormwater retention pond(s) would be sized to accommodate the entire New NPTU Training Facility including the future High Bay Complex. The locations of the pond(s) will be based on considerations of existing drainage patterns and will be sized to meet stormwater drainage requirements. The pond(s) would be located within the lowest elevations to minimize excavation cost and utilize existing topographic grades. The area required for stormwater retention is subject to final stormwater modeling, engineering, and state and local permitting requirements.

There are four potential locations/site layouts for the New NPTU Training Facility, described as Alternatives 1 through 4 in **Sections 2.1.1.1, 2.1.1.2, 2.1.1.3,** and **2.1.1.4**. These locations are based on proximity to the Existing NPTU Facility and are required to be built outside of blast arc areas at JBC-WS, per DoD 6055.9M (DoD Ammunition and Explosives Safety Standards: General Explosives Safety Information and Requirements). A design charette was not produced for Alternatives 3 and 4; therefore, no defined site plan is available, and the exact location of the new facilities has been generalized.

The NPTU Simulation Expansion Project includes the following: the New NPTU Training Facility (Training Support Building and two High Bays), NPTU Simulation Expansion Substation (**Section 2.1.2**), and the Old Tom Road Causeway Improvements (**Section 2.1.3**). The proposed NPTU Substation and causeway improvements are ancillary projects of the New NPTU Training Facility, serving to support future NPTU mission requirements.

2.1.1.1 Alternative 1

The New NPTU Training Facility components described in **Section 2.1.1** would be developed in the forested parcel south of the Redbank Club and north of Old Tom Road (**Figure 2-1**). A portion of the parcel, as shown in **Figure 2-1**, would be cleared of vegetation before construction activities began. Construction would take place in two phases. The first phase would include all mentioned facility components, utility infrastructure, stormwater retention features, Red Bank Road improvements, majority of parking, and one high bay complex located north of the training support building. The second phase would include the construction of an additional high bay complex on the western side of the training support building and the remaining parking. The phased construction of the high bay complexes is necessary to avoid one of the high bays lying dormant for 7 to 8 years due to the planned simulator delivery and installation schedule.

The New NPTU Training Facility components described in Section 2.1.1 would occupy a footprint of up to approximately 28 acres, including 1.7 acres of wetlands (**Figure 2-1**).The buildings within this project area would be placed on the non-wetland portion of the footprint. The nearby stormwater retention pond and a portion of the north access drive would occur within the wetland portion of the footprint.

Roadway improvements along Red Bank Road would be necessary to alleviate current traffic deficiencies that may be exacerbated by increased traffic from the new facility. These improvements are shown in **Figure 2-1** and described below:

- Deceleration Lanes
  Deceleration lanes are proposed to the two existing roads and the two proposed roads that would provide vehicular access to the New NPTU Training Facility from Red Bank Road.
- Old Tom Road and Red Bank Road Intersection Improvements
  This intersection provides the only ingress-egress access to the Existing NPTU Facility to and from the north and south. Additionally, it is one of the major access driveways for the New NPTU Training Facility and the road serves the munitions area to the west. To improve existing intersection deficiencies and to accommodate future traffic, the following improvements are proposed:
    - Dedicated right-turn lane for traffic heading north on Red Bank Road. This improvement on Old Tom Road allows traffic coming from the Existing NPTU Facility to turn right (north) within a dedicated turn lane, reducing vehicular queuing.
    - North bound merge lane on Red Bank Road. This additional lane would better accommodate the northbound traffic coming from the Existing NPTU Facility as well as traffic exiting the New NPTU Training Facility from Old Tom Road, also heading north. The lane would allow traffic to merge onto Red Bank Road.
    - Improved pedestrian sidewalks and road crossings.
    - Other intersection improvements including pavement markings, signage, and better definition of pavement edges and parking areas around the existing fire station.
- Modifications to the Cote Bas Road Intersection with Red Bank Road
  The addition of the above-described northbound merge lane on Red Bank Road would require eliminating the southerly Cote Bas roadway into the adjacent residential neighborhood. The remaining section of Cote Bas Road within the residential neighborhood would terminate at a new cul-de-sac turnaround. This modification would also require a new four-way intersection providing access to the residential neighborhood from Cote Bas Road at the existing intersection currently serving the Security Building. This roadway is proposed as one of the four access roads to the New NPTU Training Facility.

2.1.1.2 Alternative 2 (Preferred)

Under Alternative 2, the New NPTU Training Facility would be sited in the same area as described in Alternative 1 but would also be allowed to utilize a 7.6-acre parcel of land south of Old Tom Road, as shown in **Figure 2-1**. A portion of this parcel, as shown in **Figure 2-1**, would be cleared of vegetation before construction activities began. As part of the decision-making process to develop the site layout in Alternative 1, studies were conducted to minimize wetland impacts. One such study determined impacts to the 1.7-acre wetland in the north parcel could be reduced by utilizing a two-story Training Support Building, reconfiguring the North Access Drive, and shifting some of the parking to the parcel of land south of Old Tom Road. A conceptual site design for this alternative maintained the overall site footprint of up to approximately 28 acres but would reduce wetland impacts from approximately 1.7 acres to 0.25 acres (**Figure 2-1**). Personnel would be parking south of Old Tom Road, requiring frequent transit across the road to access the expansion facility and vehicles. The development would also occur within Solid Waste Management Unit (SWMU) Site S36.

Roadway improvements required under Alternative 2 would be the same as those detailed in Alternative 1 (**Section 2.1.1.1**).

2.1.1.3 Alternative 3

Under Alternative 3, the New NPTU Training Facility would be sited on the current Red Bank Golf Course (**Figure 2-1**). This location would be the closest to the current NPTU but is located partially within the blast arc. The location would also occupy over 8 acres of wetland. A significant portion of the site is located within floodplains and hurricane storm surge predictions which poses risk to the resiliency of the site operation and equipment.

2.1.1.4 Alternative 4

Under Alternative 4 the New NPTU Training Facility would be sited north of the NNPTC (**Figure 2-1**). The facility would be collocated with current NNPTC facilities. The transit between the current and proposed expansion is the greatest of the four action alternatives and would require passage through two security checkpoints for inter-site visits along with traffic congestion concerns on Redbank Road. This location would also occupy over 16 acres of isolated wetlands.

2.1.1.5 No Action Alternative

The No Action Alternative would not construct the New NPTU Training Facility at JBC-WS. Training activities would continue to be conducted solely at the Existing NPTU Facility. The current facilities and critical training platforms will reach End of Life in the late 2030s and failure to replace these assets will effectively shut down the NPTU student training mission and de-man the nuclear fleet. The larger size of the new PPTTs cannot be accommodated in NPTU Charleston's existing facilities. This alternative does not meet screening criteria. The No Action Alternative does not facilitate retirement of operating training submarines moored in the Cooper River.

2.1.2 NPTU Simulation Expansion: Substation

The NPTU Simulation Expansion proposes to construct a new 10.5 megavolt amp substation to support Unified Facilities Criteria (UFC) 3-550-01 Exterior Electrical Power Distribution requirements for redundant electrical feeds for mission essential facilities. The NPTU Substation would include a 7.5/10.5 Megawatt 115 kilovolt (kV) to 13.8 kV transformer, voltage regulator, three switch/breakers, and power lines from the substation to the New NPTU Training Facility. The proposed substation would tie to existing Dominion Energy 115 kV lines, providing new electrical gear to provide reliable and dedicated power to better support the New NPTU Training Facility's service life of 50 or more years. In addition to benefits the new substation would provide for the New NPTU Training Facility, there is potential that the Existing NPTU Facility would be connected to the new substation to serve as a primary or redundant feed to eliminate the concerns with the aging infrastructure that supplies the Existing NPTU Facility. The aging 115 kV Red Bank Road Substation would not be demolished under the Proposed Action.

Construction would take place during a 6- to 12-month period coinciding with the FY26 construction window for the New NPTU Training Facility. The Substation would be located in one of two locations in close proximity to the New NPTU Training Facility, as shown in **Figure 2-1** and below. The alternatives are located near, but not within, 100-year floodplain and wetland areas.

2.1.2.1 Alternative 1 (Preferred): Red Bank Road

Under Alternative 1, a 1,500-ft circumference security fence would surround the substation facility. Missile Haul Road would be diverted south of the substation along a 1,450-ft track through pine forest. Dominion Energy would be able to easily access the substation due to its location on the JBC-WS perimeter. Lines could potentially be placed underground, which is preferred vice overhead lines for reliability. The closest location to the New NPTU Training Facility would be approximately 1/4 mile.

2.1.2.2 Alternative 2: Red Bank Road by Gate 18

Under Alternative 2, the site design would mirror that of Alternative 1; however, full-build plans are currently unavailable. A portion of the existing Waterfront Express Feeder distribution could be used for power distribution. Underground lines are preferred but may not be feasible. The site would be located approximately 1 mile from the New NPTU Training Facility.

2.1.2.3 No Action Alternative

The No Action Alternative would not construct the NPTU Substation at JBC-WS. Current outdated electrical infrastructure would continue to be used. The redundant electrical feeds needed to meet mission essential facility requirements would not be constructed; therefore, this alternative does not meet screening criteria.

2.1.3 NPTU Simulation Expansion: Old Tom Road Causeway Improvements

The NPTU Simulation Expansion has proposed modifications to the existing causeway just north of the Existing NPTU Facility parking areas (**Figure 2-1**). A section of Old Tom Road crosses between a tidal pond and the Cooper River at this approximately 500-ft-long causeway. These two bodies of water are connected by a culvert, which the causeway passes over, and water flow is managed by a weir system. The roadway would also be raised approximately 2 ft (to match connecting road elevations of 6 ft North American Vertical Datum of 1988 (NAVD88) to minimize the risk of recurring tidal flooding. In addition, communication and power lines would be buried within the causeway to support the new expansion site.

The 6-ft-wide multi-use path is the recommended sidewalk width per UFC 3-201-01 and is sized to support pedestrians, cyclists, and golf carts. The multi-use path would extend from the Old Tom Road Causeway along Old Tom Road to the New NPTU Training Facility, connecting the two sites for pedestrian traffic **(Figure 2-1)**. This path would be located on the side of Old Tom Road, which minimizes environmental impact and disruption to adjacent facilities, and is expected to be on the side of Old Tom Road opposite the Cooper River. The number of times the pathway crosses Old Tom Road must be minimized for pedestrian safety. This causeway improvement would impact up to 0.46 acre of tidal wetlands at the causeway.

Construction of these elements would take place during a 2 to 3 month period coinciding with the FY26 construction window for the New NPTU Training Facility. The three development alternatives presented for the Old Tom Road Causeway Improvements are described in detail in **Section 2.1.3.1, 2.1.3.2,** and **2.1.3.3**.

2.1.3.1 Alternative 1

The causeway north of the Existing NPTU Facility parking areas would be raised and widened to provide safe passage of vehicular, bicycle, and pedestrian traffic as described in **Section 2.1.3** and depicted in **Figure 2-1**. The Proposed Action would also construct the 6-foot wide multi-use path for the pedestrian / cycling traffic using fill material for construction. Old Tom Road would still be widened at the causeway to support two 12-foot-wide vehicle travel lanes, and the road elevation would be raised approximately 2 ft to minimize the risk of tidal flooding.

The water management function of the weir and culvert system would be maintained. A multi-use pathway would be constructed extending approximately 1 mile north from the Existing NPTU Facility to the proposed New NPTU Training Facility. The proposed pathway would cross the Cooper River tributary and be incorporated into the causeway improvements as mentioned above. Wetland impacts under Alternative 1 would be approximately 0.46 acre.

2.1.3.2 Alternative 2 (Preferred)

The Proposed Action described in Alternative 1 would modify the pedestrian pathway to be constructed as a separate elevated bridge. The overall width of the causeway would be reduced relative to Alternative 1. Wetland impacts under Alternative 2 would be approximately 0.3 acre.

2.1.3.3 Alternative 3

The proposed action in **Section 2.1.3** and under Alternative 1 and 2 would be modified to install the multi-use bridge and raise the road elevation approximately 2 ft to minimize the risk of tidal flooding. However, Old Tom Road at the causeway would not be widened from two 10-ft-wide lanes to two 12-ft-wide vehicle travel lanes. This alternative would reduce the width of the causeway, thereby reducing the amount of fill material required. This would reduce the wetland impact to approximately 0.25 acre. This alternative does not address the concern of the narrow roadway at the causeway.

2.1.3.4 No Action Alternative

The No Action Alternative would not raise or widen Old Tom Road north of the Existing NPTU Facility at JBC-WS. The existing causeway would continue to support all vehicle traffic flow to and from the NPTU from northern portions of the base. The road would continue to flood periodically throughout the year. Unsafe conditions would persist as pedestrians and cyclists would continue to use the roadway to access the Existing NPTU Facility. This alternative does not meet screening criteria.

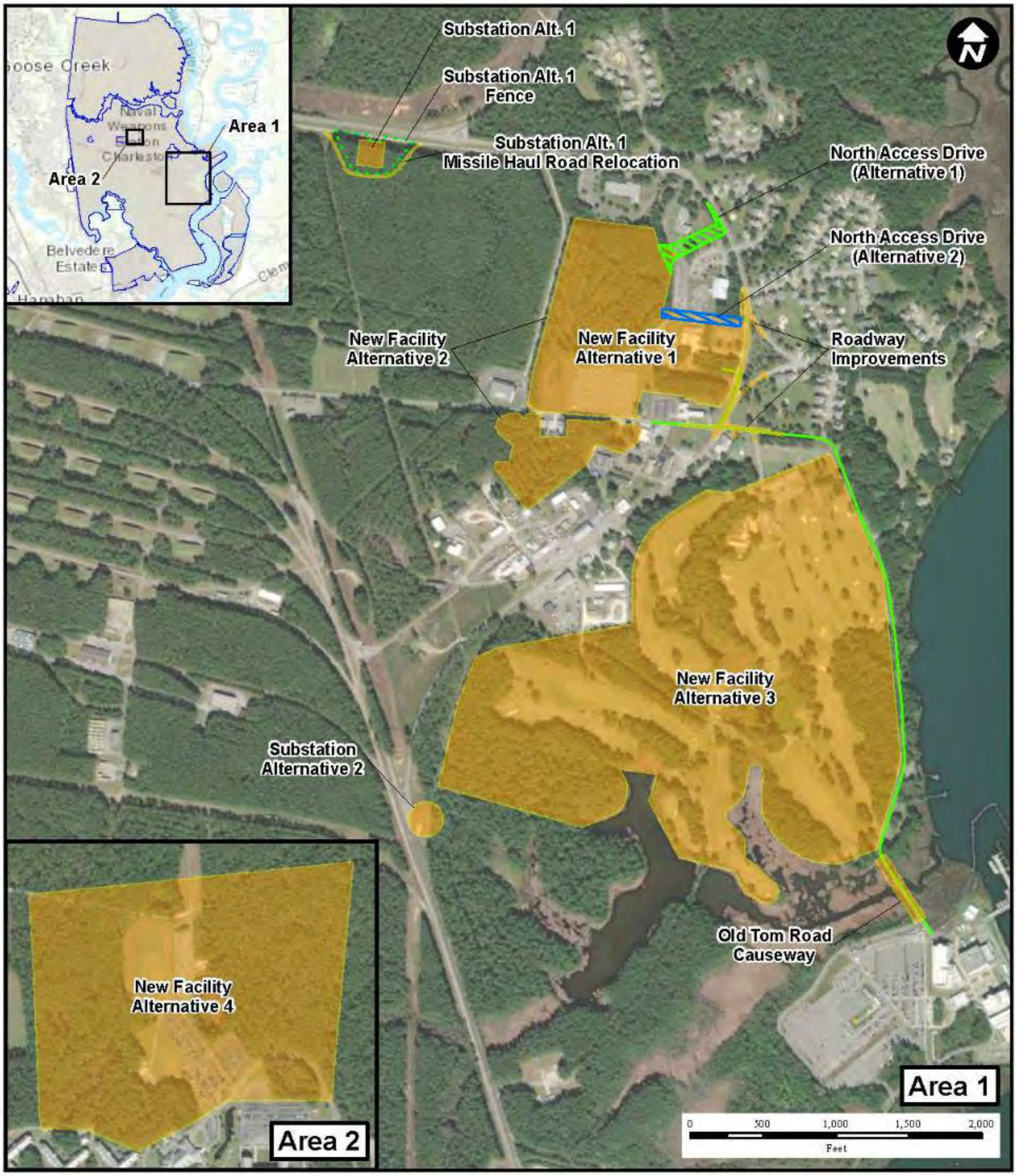


Figure 2-1

NPTU Simulation Expansion

Installation Development Environmental Assessment
Joint Base Charleston, South Carolina

2.1.4 Laser Test Ranges

The USAF and supported component missions plan to construct two FSO LTRs on JBC-WS property **(Figure 2-2)**. The LTRs will require a stable working platform with appropriately sized infrastructure to provide a baseline testing environment. Each range would require a 10 ft by 10 ft concrete pad at range point of origin and end nodes. Pads would include an electrical stub-up for equipment power. A raised structure would be added to the pads for laser mounting at the end nodes. Testing would be conducted from a small mobile trailer at the point of origin. The mobile trailer would require only minor electrical installation of a new water-proof power pedestal for regular, but temporary, use. Vegetation clearing would be required along the entire length of the range. Following clearing, vegetation would be maintained on an as-needed basis utilizing chemical and/or mechanical maintenance. Laser testing would take place multiple times a year for up to 1-week intervals. The frequency of testing may vary at each site. NIWC would provide traffic control at either end of the testing activity to ensure any Small Autonomous Unmanned Systems Research (SAUSR) Range traffic was cleared prior to laser operation. Use of the laser would be coordinated with other SAUSR stakeholders to minimize disruptions and work could be scheduled during off-peak hours or weekends, if required. Development is anticipated to begin in FY24.

2.1.4.1 Alternative 1

The USAF and supported component missions have identified two locations for the construction of two communications LTRs (**Figure 2-2**). The various classifications and anticipated use-case scenarios of the laser systems require two separate environments, ground-based and water-based, with limited chance for unwanted outside testing variables. Under Alternative 1, both ranges, discussed below, would be constructed in the described locations.

1.25 km Goose Creek Crossing

The 1.25-kilometer (km) Goose Creek Crossing LTR is to be a water-borne testing environment to be utilized to record environmental conditions of littoral areas that may affect laser use. The path over Goose Creek was selected to establish a “baseline” water-borne environment that represents a more operationally relevant environment and introduces more atmospheric effects from the water/marsh. The range’s proximity to the adjacent Grace Hopper bridge provides a means of boat traffic and safety monitoring. In addition, the availability of infrastructure within Area D of the South Annex of JBC-WS makes the range a convenient and significantly more economical upgrade compared to other alternatives, which are described in **Section 2.4**.

The 1.25- km LTR would extend from an existing concrete pad in Complex D to a parcel of land managed by the Naval Munitions Command. The end-node would be a gravel bed with surface-set concrete anchors to support the laser back drop. A 30-ft-wide clearing of trees from the concrete pad to Goose Creek shore would be required for a clear angle to the range end node. Goose Creek is topographically lower than the LTR platforms and would not pose a specular hazard. Long-term vegetation maintenance would be required to ensure an unobstructed line-of-sight and reduce incendiary hazards.

2.05 km SAUSR Test Range at 71˚

The 2.05 km SAUSR Range LTR is to be a testing environment with intermediate concrete pads provided for recording environmental conditions that may affect laser use. The ground-based path was selected to establish a "baseline" ground environment that would minimize unexpected/ unpredictable hazards and avoid reflective hazards along the laser path, such as, but not limited to railroad tracks, fences, standing water, and road signs. The range's proximity to the existing SAUSR range infrastructure makes it a convenient and significantly more economical upgrade compared to other alternatives, which are described in **Section 2.4**.

The 2.05 km SAUSR Range LTR would extend northeast at 71 degrees (˚) magnetic from the NIWC SAUSR range. The first 1804 ft of the proposed range is managed and cleared NIWC property. A 1640-ft extension would continue northeast into forested areas. A 3281-ft extension would continue from the 1640-ft extension endpoint, for a total of 6726 ft. At the beginning of the 1804-ft range and at each extension end node, a concrete pad would be constructed to support laser test equipment, totaling four concrete pads. A 30-ft-wide vegetation corridor would be cleared to ground level from the range property extending through the forested areas. Long-term vegetation maintenance would be required to ensure an unobstructed line-of-sight and reduce incendiary hazards.

2.1.4.2 No Action Alternative

The No Action Alternative would not construct LTRs at JBC-WS. This alternative would result in the inability of NIWC Atlantic to perform research. There would be no advancements in FSO capabilities and skills, and research could not be performed. USMC and USN capability requirements would not be met.

2.1.5 Goose Creek Floating Dock

The USAF and supported component missions plan to construct a floating dock adjacent to the Goose Creek boatshed located on Goose Creek, a tributary of the Cooper River **(Figure 2-3**). The floating dock would be approximately 90-ft-long to support the permanent mooring of a 42-ft survey vessel and temporary mooring of a 32-ft survey vessel. The dock would mount to fender piles located on the northwest face of the existing covered boat shed, with approximately 7 piles installed as in-water anchors. A 40-ft-long aluminum gangway would be constructed, leading to the 8 floating dock panels comprising the 60-ft-long dock area. Development is anticipated to begin in FY25.

2.1.5.1 Alternative 1

Under Alternative 1, the Goose Creek floating dock would be constructed along the northwest face of the boatshed structure along Goose Creek (**Figure 2-3**). The anticipated work includes driving piles for the support of the floating dock and access dock to connect to the existing boatshed structure, construction of an access pier that would connect to existing bay opening of boatshed, and installation of a gangway and floating dock. Electrical and water line connections would connect to existing Boatshed infrastructure or land side utilities.

2.1.5.2 No Action Alternative

The No Action Alternative would not construct a floating dock along Goose Creek at JBC-WS. Vessels would be subject to retracted space availability and limited space.

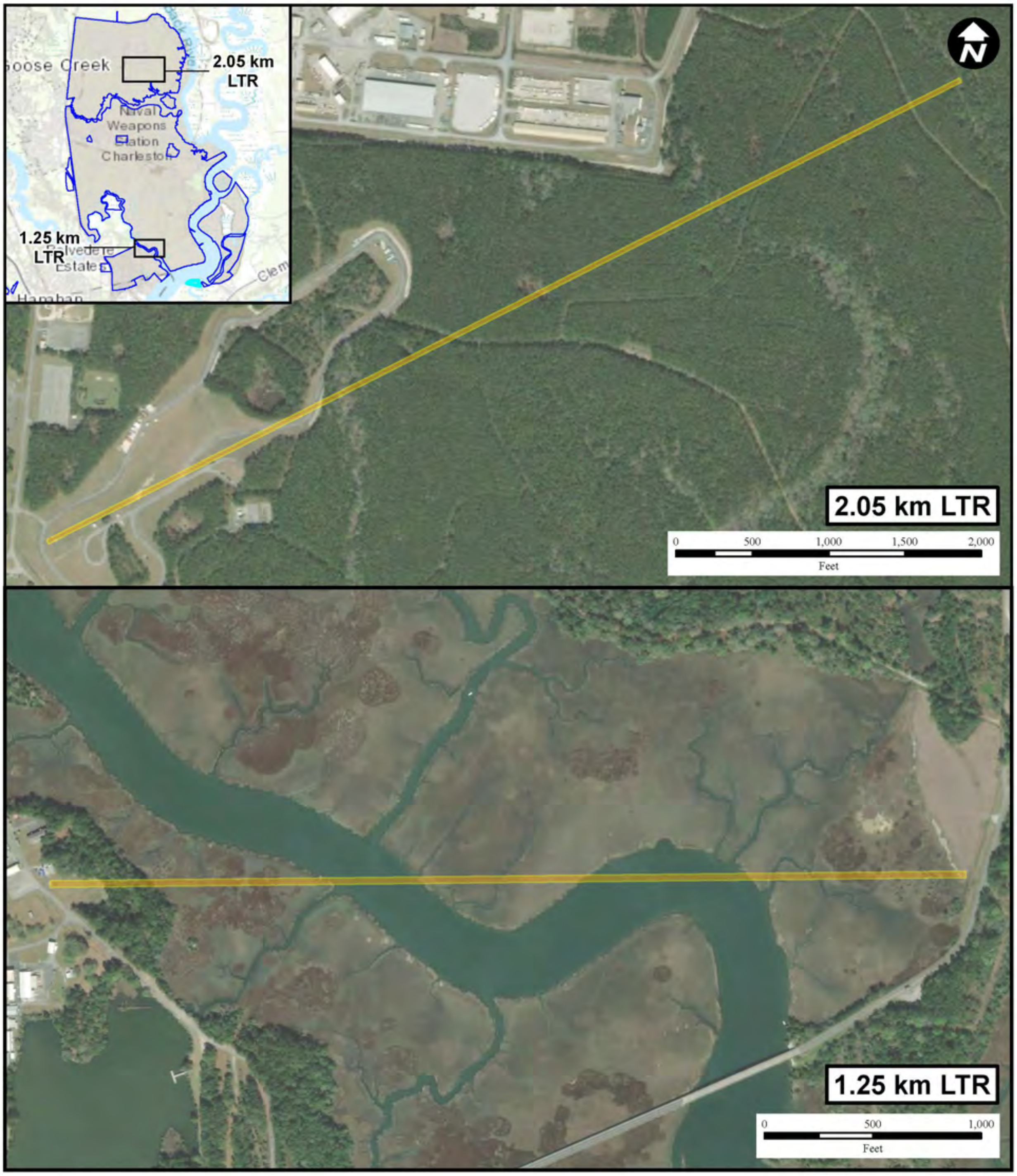


Figure 2-2

Laser Test Ranges

Installation Development Environmental Assessment
Joint Base Charleston, South Carolina

2.1.6 Pier Bravo Demolition

On September 5, 2022, a 600-ft tanker ship crashed into Pier Bravo, destroying approximately 100 ft of the pier's midsection. The pier continues to degrade as damaged materials fall from the pier and downstream into the Cooper River. There are no emergent concerns at this time, however inaction to resolve the degradation issues will erode the likelihood that the conditions surrounding the pier will remain stable.

The Proposed Action would demolish and dispose of the entire pier structure including piles, pile caps, beams/stringers, decking, railings, utilities, building structures, including materials on the pier and within the pier structures Pier Bravo in the Cooper River at JBC-WS (**Figure 2-3**). Demolition is anticipated to begin in FY27; however, this timeline is subject to change. Specifics of the proposed demolition activities are unavailable; therefore, reasonably foreseeable impacts will be identified and analyzed. Best Management Practices to be implemented during demolition activities include, but are not limited to:

- Floating rafts placed under the pier to catch demolition debris,
- Floating boom system to provide perimeter containment of incidental floatable materials,
- Hazardous materials removal as required,
- Utilization of a floating crane to move demolished materials to barges,
- Utilization of utility barges for removed piles to minimize potential releases of creosote, petroleum sheens, and turbidity in the river, and
- Implementation of erosion and sedimentation control measures.

2.1.6.1 Alternative 1

Under Alternative 1, Pier Bravo would be demolished as described in **Section 2.1.6** and shown in **Figure 2-3**. This would remove the unusable and now deteriorating infrastructure from the Cooper River waterway and reduce associated hazards.

2.1.6.2 No Action Alternative

Under the No Action Alternative, Pier Bravo would be left in place. There would be no demolition activities. The existing damaged dock would continue to degrade, releasing concrete, wood, and other component materials into the Cooper River. This may have potential impacts on marine mammals, which would violate selection standards outlined in **Section 2.2**.

The purpose and need of the Proposed Action is to demolish Pier Bravo to avoid degradation, safety concerns and debris field expansion. Leaving Pier Bravo in place under the No-Action Alternative would not meet the purpose and need of the Proposed Action. Therefore, selection of this alternative is not viable.

Legend

🟧 Proposed Action

☐ Installation Boundary

Figure 2-3

Weapons Station Waterfront Proposed Actions
Installation Development Environmental Assessment
Joint Base Charleston, South Carolina

2.1.7 Natural Resources Facilities

The proposed NRP Storage Facility consists of a roofed, open-sided structure with enclosed storage area on one end. This structure would cover a 130 ft by 30 ft concrete pad with electrical outlets, compressed air lines, and overhead lighting. The area around the facility would need to be cleared of timber, site prepped and finished with gravel. A security fence connected to the existing fence would enclose the entire facility. The proposed facility site is approximately 170 ft by 225 ft and is immediately adjacent to the current fenced NRP Compound (**Figure 2-4**).

The storage area would contain mission-critical equipment/vehicles including, but not limited to one fire truck, two farm tractors, one forestry skidder, one skid-steer, four pick-up trucks, four utility-terrain vehicles, four all-terrain vehicles, four trailers, two portable fuel tanks, and multiple attachments. Most of this equipment is employed in the Wildland Fire Program preventing wildfire and protecting mission-critical infrastructure including the base's power grid, munitions storage areas, and the wildland/urban interface.

A new administration facility would also be constructed. The new facility would be approximately 2,400 sf, providing offices and storage space for Natural and Cultural Resources personnel. This would include a conference room, rest rooms, shower area with benches and lockers, kitchen/break room, common area for office machines and drafting table, and a storage closet.

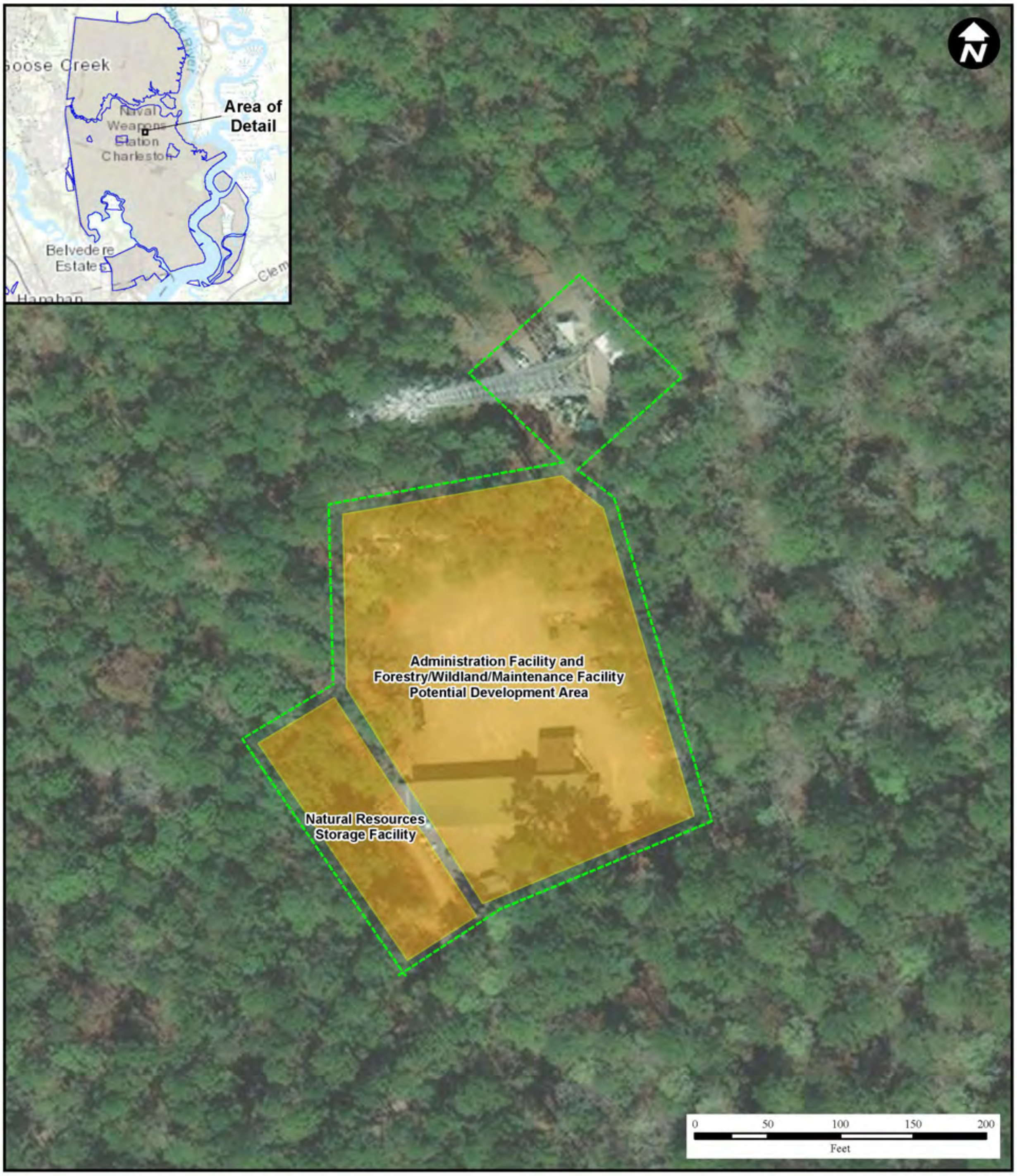
A new Forestry/Wildland/Maintenance facility would be constructed with lights, climate control, and two large rollup drive through garage bay doors. The facility would be approximately 5000 sf. The existing septic tank would be replaced, and sewer systems would be tied into the existing main. Development is anticipated to begin in FY25.

2.1.7.1 Alternative 1

Under the Proposed Action, the vehicle storage facility would be constructed near the current Natural Resources offices (**Figure 2-4**). The proposed facility would construct a 130 ft by 30 ft concrete pad with roofed shelter, and a security fence along the perimeter.

2.1.7.2 No Action Alternative

The No Action Alternative would not construct the storage facility near the Natural Resources offices at JBC-WS. Personnel would continue to leave vehicles/equipment parked in an open exposed environment, leading to increased equipment and vehicle wear. The Natural Resources Department would continue to use an outdated structure for storage.



Legend

- 🟧 Proposed Action
- - - - - Security Fence
- ☐ Installation Boundary

Figure 2-4

Natural Resources Storage Facility
Installation Development Environmental Assessment
Joint Base Charleston, South Carolina

2.1.8 Sewer Lift Stations

The Proposed Action would replace five dry well sewage lift stations with wet well SLSs (**Figure 2-5**). The existing SLSs 66, 310, 709, 730, and 1389 would be demolished and backfilled. New submersible pumps would be installed using corrosion resistant materials and standard industry designs. The new SLS facilities would include a new manhole/wet well, pumps, 6-inch emergency bypass line, grinders capable of handling solids and non-woven materials, and control system with alarms. Three pumps of the same size would be installed at each SLS. Units would have capacity such that, with any unit out of service, the remaining units would have capacity to handle the design peak hourly flow. The existing backup generators would be reused depending on their condition. New generators would be provided in the event existing generators were not able to be reused. Development is anticipated to begin in FY25.

Proposed location-specific design criteria are as follows:

- SLS 310 – New perimeter fence would be constructed.
- SLS 709 and 1389 – Existing fence around generator would be removed and replaced with a new perimeter fence.
- SLS 730 – Existing generator currently wired to the building to provide backup power would be constructed on existing 6 ft x 10 ft concrete pad located behind the building.

2.1.8.1 Alternative 1

Under Alternative 1, the wet well SLSs would replace all five dry well sewage lift stations and replace them with wet well SLSs as described in **Section 2.1.8** and shown in **Figure 2-5**.

2.1.8.2 No Action Alternative

The No Action Alternative would not replace existing sewage lift stations. Existing infrastructure would operate until failure, potentially reducing the waste management capabilities of JBC-WS.

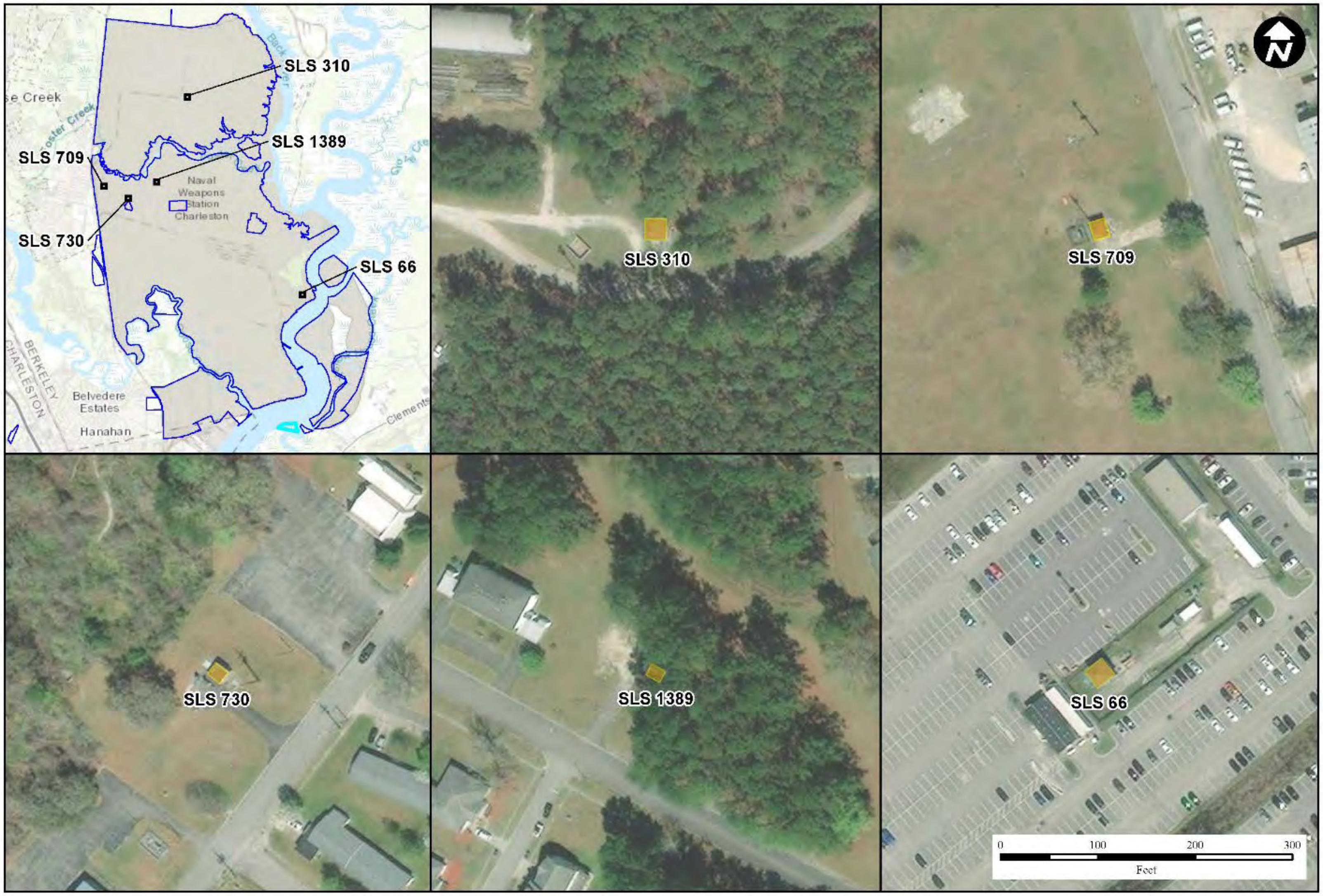


Figure 2-5

Sewer Lift Stations

Installation Development Environmental Assessment
Joint Base Charleston, South Carolina

2.1.9 Water Distribution System

Water Distribution System (WDS) replacements would occur in three primary areas of JBC-WS designated as North, Central, and East for the purpose of this assessment (**Figure 2-6**). Development is anticipated to begin in FY25. The water line installation method of horizontal directional drilling (HDD), also known as directional boring, would be used to drill underneath potential wetlands. All areas of the site disturbed by demolition and new construction would be graded to provide positive drainage with no standing water. Site disturbance would be limited to the installation of the new water main and services. Silt fence would be provided along specified edges of the project site.

Table 2-1: Water Distribution System Developments

JBC-WS Location	Proposed Action Developments	Location
North	Replace the approximately 45,000 lf of asbestos concrete, cast iron, and PVC piping comprising the water distribution mains.	Army Field Support Battalion and Federal Law Enforcement Training Center areas of JBC-WS.
Central	Replace the approximately 28,500 lf of asbestos concrete, cast iron, and PVC piping.	North of Red Bank Road on Jefferson Avenue, Boone Avenue, and Fletcher Street; and the ordnance area, south of Red Bank Road at JBC-WS.
East	Replace valves and approximately 34,500 lf of asbestos concrete, cast iron, and PVC piping. Additional improvements would include increasing the 6 inch lines to 8 inch lines from the water tower along Quality Circle, Red Bank Road, and across Old Tom Road to Building 1670, replacing a single 12 inch main from Red Bank Road to Wilkinson Way and abandoning the 10 inch loop, and replacing the 10 inch line with an 8 inch line from Wilkinson Way to Building 907. Old 10 inch and 12 inch mains along Red Bank Road would be replaced with a single 12 inch main. 32 fire hydrants would be installed at all locations of existing hydrants and every 1,000 lf. Existing fire service lines and domestic water mains would be cut, capped, and tied to the new water lines once all new lines have been tested and approved.	Eastside and Waterfront districts of JBC-WS

2.1.9.1 Alternative 1

Under Alternative 1, all proposed WDS infrastructure would be constructed as detailed in **Section 2.1.9** and shown in **Figure 2-6**. Replacement of the existing infrastructure would improve the reliability of service and maintain the operational capacity of missions at JBC-WS.

2.1.9.2 No Action Alternative

Under the No Action Alternative, none of the proposed infrastructure would be constructed at JBC-WS. There would be an increased likelihood of failure of pipeline elements and resulting costly repairs.

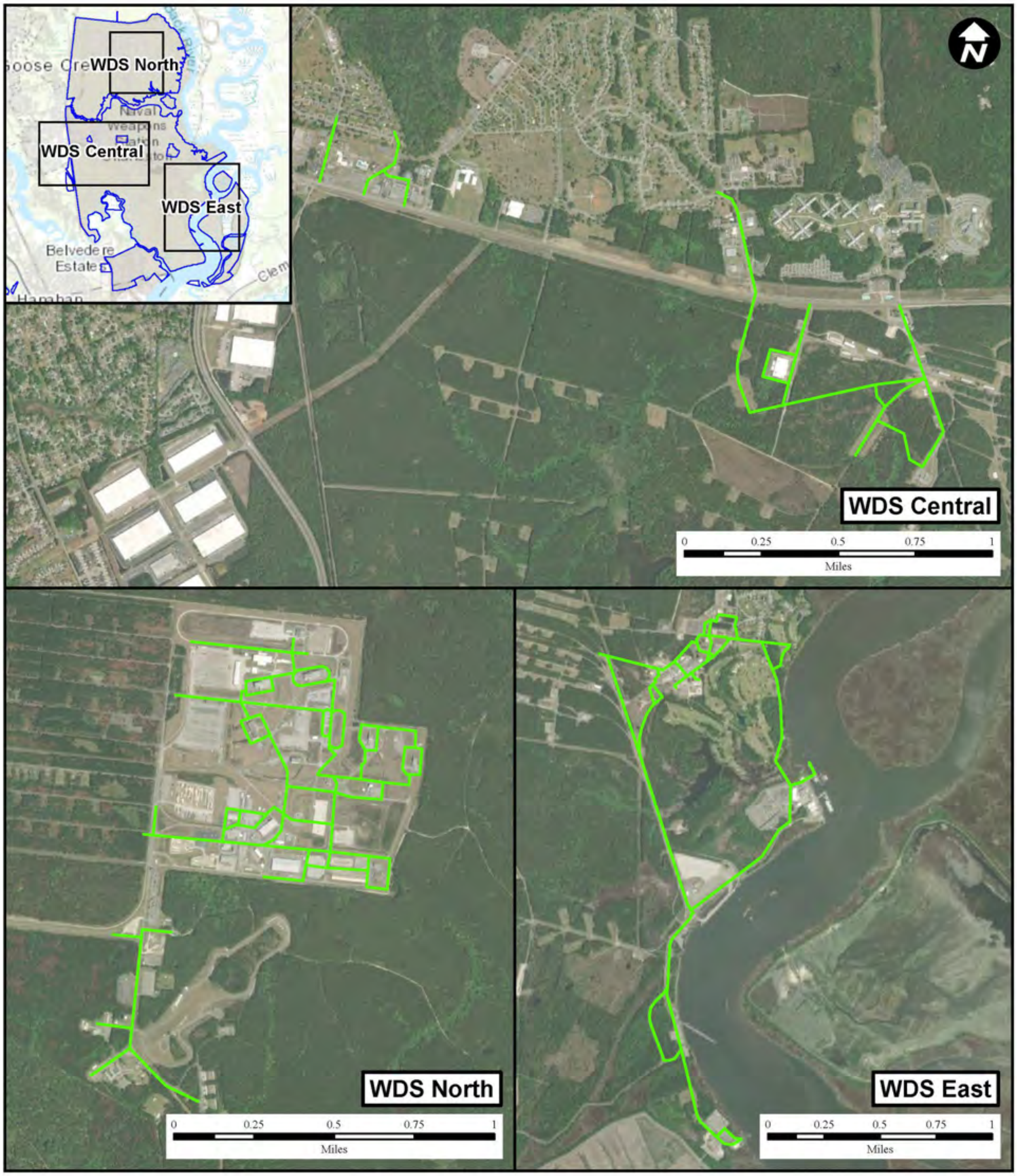


Figure 2-6

Water Distribution System
Installation Development Environmental Assessment
Joint Base Charleston, South Carolina

2.1.10 Civil Engineering Complex: Shop

The operations function at JBC-AB is supported by 20 shops and storage buildings with a mean age of 35 years. This Proposed Action would include: construction of six new facilities totaling 44,509 sf with reinforced concrete foundations and floor slabs in conformance with local seismic requirements; brick veneer/split-faced block exterior finishes and standing seam sloped metal roofs in accordance with base Architectural Compatibility Plan; communications support for voice and data systems, fire detection/alarm systems, pavements with curbs/gutters, fire suppression sprinkler systems, sidewalks, security fencing, site restoration, and landscaping. Twelve existing facilities would be demolished along with associated pavements. The 12 facilities include Bldg. 635 (Storage Shed), Bldg. 660 (Maintenance Shop), Bldg. 670 (Storage Shed), Bldg. 714 (Maintenance Shop), Bldg. 716 (Storage), Bldg. 717 (Maintenance Shop), three storage sheds (with undetermined building numbers), and storage sheds 2-6, 2-7, and PB5 (**Figure 2-7**). Development is anticipated to begin in FY30.

Shop equipment would be relocated, and environmental remediation would be conducted as necessary and required. Facilities would be designed as permanent construction in accordance with the DoD UFC 1-200-01, General Building requirements.

2.1.10.1 Alternative 1

The Proposed Action would develop all proposed elements detailed in **Section 2.1.10** and shown in **Figure 2-7**. The Proposed Action would create a modern, conveniently located, and properly configured multi-facility complex required to efficiently meet mission needs.

2.1.10.2 No Action Alternative

The No Action Alternative would not develop the Civil Engineering Shop Complex. The inadequate and inefficient shops and storage buildings would continue to hinder productivity. Energy inefficient, substandard, and obsolete facilities would continue to be maintained, requiring a disproportionate investment of dwindling operations and maintenance account resources.

2.1.11 Civil Engineering Complex: Entomology Facility

The existing Entomology Facility (Bldg. 717), originally constructed in 1982, is inadequate for extended use and beyond its useful life. The facility is of wood construction and was built as a temporary facility and is still in continuous use. The exterior siding dates from the original construction and contains severely deteriorating asbestos shingles, which pose potential health and safety risks and can no longer be repaired with similar materials. The flat roof demands continuous repair, the fire alarm systems are outdated, and the Heating, Ventilation, and Air Conditioning (HVAC) and dust collection systems are ineffective, energy inefficient, and obsolete.

The Proposed Action would construct a 2,870 sf Entomology Facility with: reinforced concrete foundation and floor slabs, brick veneer/split-faced block exterior finishes and standing seam sloped metal roof, communications support for voice and data systems, fire detection/alarm systems, pavements with curbs/gutters, fire suppression sprinkler systems, sidewalks, security fencing, site restoration, and landscaping. The facility would be designed and constructed in accordance with Armed Forces Pest Management Board Technical Guide 17, Military Handbook

Design of Pest Management Facilities. Construction of the new facility would include the demolition of the existing 2,870 sf facility (**Figure 2-7**). Development is anticipated to begin in FY28.

2.1.11.1 Alternative 1

Alternative 1 would demolish the existing Entomology Facility and construct a new facility within the proposed Civil Engineering Complex. The new facility would include all elements described in **Section 2.1.11**.

2.1.11.2 No Action Alternative

The inadequate and inefficient facility is hindering the productivity of Entomology personnel. Continued use of substandard, failing facilities would adversely affect 628 CES operations and result in failure to meet mission requirements.

2.1.12 Ambulatory Care Center

The scope of the Proposed Action is to consolidate the clinical operations by relocating the Mental Health department into the Medical/Dental Clinic (Bldg. 364), and to consolidate logistics operations by relocating the Logistics and Facility Management department into the Medical Warehouse (Bldg. 1001). This project would include realigning, right-sizing, and modernizing the Dental clinic (including Dental Instrument Processing Center [DIPC]), thereby creating space for the Information Management/Information Technology (IM/IT) department and the Resource Management department. In addition, the project would demolish the current Mental Health/Education and Training/Resource Management facility (Bldg. 1000) and replace it with a new modern purpose-built Education and Training facility (New Bldg. 1000). Facilities to be developed under this proposed Action are depicted in **Figure 2-8**. Development is anticipated to begin in FY23.

The right-sizing of the Dental clinic would enable the relocation of IM/IT and Resource Management into excess Dental clinic space, upgrade Dental Radiography, and upgrade DIPC to a modern three-room layout. Relocating IM/IT to the second floor of Bldg. 364 within excess Dental clinic space would allow the relocation of Mental Health into the Medical/Dental Clinic.

The Education and Training department experiences disruptions during trainings as visitors/staff traverse through class spaces to other areas in the department. The Proposed Action would demolish Bldg. 1000 and construct a replacement facility (New Bldg. 1000) for Education and Training to optimize training and preparedness for home station and deployment operations.

2.1.12.1 Alternative 1

The Proposed Bldg. 364 alterations would relocate and reconfigure areas for a Biomedical Equipment Room, Logistics Equipment Storage, Staff Lounge, Janitor’s Closet, and a Communications Room, as described in **Section 2.1.12**. The building would include renovations to the Dental clinic, IM/IT, Resource Management, Mental Health, and biomedical engineering/ equipment technician/technologist (BMET) areas, totaling approximately 11,200 sf.

The New Bldg. 1000 Education and Training facility would add approximately 2,300 sf of office, classroom, lobby, communication, and facilities space for the Education and Training Department.

Bldg. 364, Bldg. 1001, and the new Bldg. 1000 would utilize existing water sewer, and power systems. Bldg. 1001, the new addition, would add approximately 2,200 sf of facilities space for Facility Management, Logistics, Next Generation Diagnostic Systems (NGDS) Laboratories, and a storage and communications room.

2.1.12.2 No Action Alternative

The No Action Alternative would not develop the new ambulatory care center. The existing medical facilities would stay in place. Infrastructure would continue to degrade and near end of life.

2.1.13 Water Tower #2 Demolition

The Proposed Action would demolish Water Tower #2 (**Figure 2-8**). The tower no longer supports water supply and distribution to JBC, and the physical condition of the tank cannot support further use for this purpose. Typical demolition activities would be conducted as described in **Section 2.0**. Demolition is anticipated to begin in FY25.

2.1.13.1 Alternative 1

Under Alternative 1, Water Tower #2 would be demolished as described in **Section 2.1.13**.

2.1.13.2 No Action Alternative

The No Action Alternative would not demolish Water Tower #2. To maintain structural integrity and safety for the surrounding structures, the tower would undergo costly improvements that would not contribute to any existing mission.

Figure 2-7

JBC-AB North

Installation Development Environmental Assessment
Joint Base Charleston, South Carolina

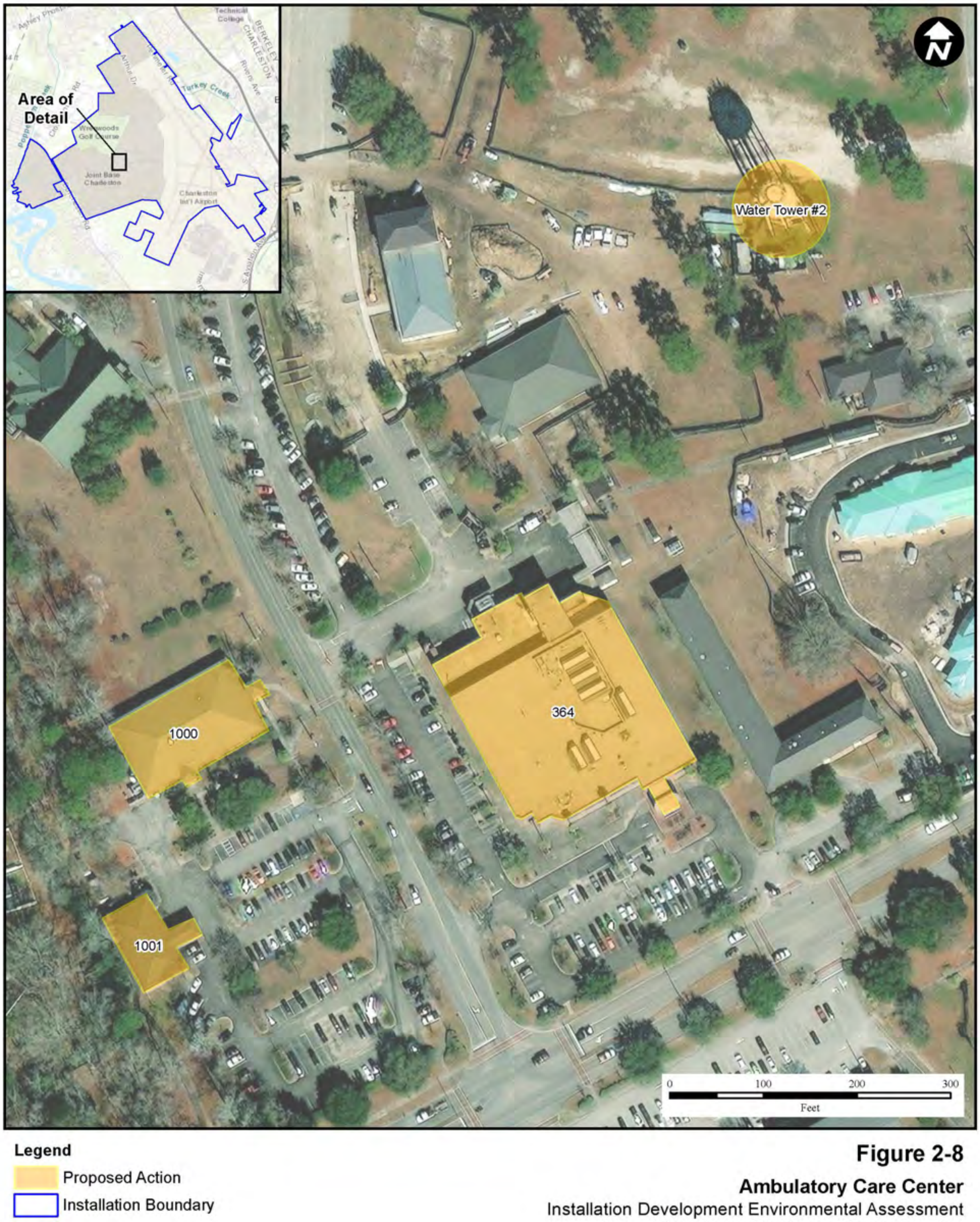


Figure 2-8

Ambulatory Care Center

Installation Development Environmental Assessment
Joint Base Charleston, South Carolina

Legend

🟧 Proposed

▭ Parking Ramp Repair

▭ Installation Boundary

Figure 2-9

Flightline Proposed Actions
Installation Development Environmental Assessment
Joint Base Charleston, South Carolina

2.1.14 Hydrant Pits

The Proposed Action would construct five hydrant fueling pits in aircraft parking spaces 60 through 64 (**Figure 2-9**). Aircraft parked in these spots are currently refueled by truck. The hydrant pits would tie into the existing fuel supply main underlying the parking spots. Development is anticipated to begin in FY25.

2.1.14.1 Alternative 1

Under Alternative 1, all five hydrant fueling pits would be constructed as described in **Section 2.1.14**. Efficiency would be gained as fueling trucks would no longer be required.

2.1.14.2 No Action Alternative

Under the No Action Alternative, no hydrant pits would be constructed. Aircraft refueling would continue via fuel trucks.

2.1.15 Cargo Laydown Area

The 437th Aerial Port Squadron requires an additional cargo lay-down area on the southwest side of the airfield directly south of Bldg. 184. Currently the 437th Aerial Port Squadron is utilizing aircraft parking spots 33 and 35 for storage of materials, leading to operational inefficiencies. The Proposed Action would prepare the existing forested and grass site for construction of a cargo laydown area while implementing appropriate stormwater design measures. Development is anticipated to begin in FY27.

2.1.15.1 Alternative 1

The Proposed Action would provide approximately 60,000 sf of new asphalt pavement for the storage of palletized supplies/equipment on the southwest side of the JBC-AB airfield. Construction activities would involve installation of heavy duty asphalt pavement, site lighting, striping, curbs & gutters, and erosion control measures. Approximately 70 percent (%) of the site is forested and would require removal of trees and grubbing of stumps/roots. The exact location would need to remain clear of taxiway wingtip clearance (137 ft from centerline), runway lateral clearance (1,000 ft from centerline), and transition surface (7:1).

2.1.15.2 No Action Alternative

The No Action Alternative would not develop the cargo laydown area. Cargo would continue to be stored in aircraft parking spots. The 437th Aerial Port Squadron would continue to experience inefficiencies due to lack of space.

2.1.16 Munitions Facilities

The Proposed Action would demolish the existing aluminum Buildings 2194 and 2196 to be replaced with new ECM munitions facilities (**Figure 2-10**). The ECMs would be approximately 60 ft deep by 40 ft wide and include a concrete loading dock. The new facilities would also be constructed to provide electricity, communication, a lighting protection system, and a security system. The facilities would tie into existing power infrastructure. Interior elements include a pallet roller system, rolling blast door, new HVAC system, fire protection system, and new plumbing. Development is anticipated to begin in FY23.

2.1.16.1 Alternative 1

Under Alternative 1, the existing Buildings 2194 and 2196 would be demolished and replaced with the new facilities described in **Section 2.1.16**. All associated infrastructure would be built. Two other alternatives were considered but eliminated from further consideration, as discussed in **Section 2.4.7**.

2.1.16.2 No Action Alternative

Under the No Action Alternative, there would be no construction to replace the degrading facilities. The building materials would continue to degrade leading to unsafe conditions and potential security hazards.

2.1.17 HAZMAT Load and Unload Facility

The Proposed Action would construct an approximately 1,000 sf single story facility consisting of concrete foundation, concrete floor slab, metal building with sloped standing seam metal roof, including all utilities. Office, bathroom/shower, communications room, and lounge areas would also be constructed.

Repairs would be made to the existing canopy, loading dock spalls, joint seal, bumpers, and edging. An electricity, water, sewer, communication, lighting protection system, fire and security system would be constructed as needed.

Site demolition would include demolition of existing Bldg. 2190 (**Figure 2-10**), pavement cuts for utility installation, grading the site in preparation for the new building, and demolition of the adjacent blast wall. Development is anticipated to begin in FY23.

2.1.17.1 Alternative 1

Under Alternative 1, the existing Bldg. 2190 (**Figure 2-10**) would be demolished and replaced with a new facility containing all elements described in **Section 2.1.17**. All associated infrastructure would be built. Several other alternatives were considered but eliminated from further consideration, as discussed in **Section 2.4.6**.

2.1.17.2 No Action Alternative

Under the No Action Alternative, there would be no construction to replace the degrading facility. The building materials would continue to degrade leading to unsafe conditions and potential security hazards.

2.1.18 Dormitory Demolition

The Proposed Action would demolish the dormitory (Bldg. 246) (**Figure 2-10**). The existing facility was constructed in 1954 and is past its useful life. Typical demolition activities would be conducted as described in **Section 2.0**. Demolition is anticipated to begin in FY26.

2.1.18.1 Alternative 1

Under Alternative 1, the Bldg. 246 dormitory would be demolished as described in **Section 2.1.18**.

2.1.18.2 No Action Alternative

The No Action Alternative would not demolish the Bldg. 246 dormitory. The dormitory would continue to degrade in place.

2.1.19 NAAF Fire Station Addition

The USAF and supported component missions plan to add an extension to the existing Bldg. 20 fire station at the NAAF (**Figure 2-11**). The proposed fire station would encompass the existing patio area along the southwest face of the station. Equipment, gear, and firefighting agents currently stored in the vehicle stall area would be moved to the new addition. A concrete driveway would be constructed leading to roll up doors.

The proposed additions would require the removal of an existing retaining wall and additions to the concrete pad. Lighting and power outlets would be required within the new structure as well as a driveway leading to and from the new structure. The two driveways would lead to two roll up doors, which would be constructed on either side of the new structure, and measure approximately 10 ft wide by 50 ft in length. The current area of the concrete pad measures 21 ft by 28 ft, the area of the requested extension would measure 36 ft, 2 in long, 12 ft high, and 21 ft wide. Development is anticipated to begin in FY30.

2.1.19.1 Alternative 1

Under Alternative 1, the NAAF Fire Station Addition would be constructed as described in **Section 2.1.19**.

2.1.19.2 No Action Alternative

No addition would be made to the NAAF Fire Station. The firefighter personnel would continue to experience lack of storage and resulting operational inefficiencies.

Figure 2-10

JBC-AB South Area

Installation Development Environmental Assessment
Joint Base Charleston, South Carolina

Figure 2-11

NAAF Fire Station Addition
Installation Development Environmental Assessment
Joint Base Charleston, South Carolina

2.2 SELECTION STANDARDS

NEPA and CEQ regulations mandate the consideration of reasonable action alternatives to accomplish the Proposed Action. "Reasonable alternatives" are those that could also be utilized to meet the purpose of and need for the Proposed Action. Per the requirements of 32 CFR 989, the USAF EIAP regulations, and 32 CFR 775, the USN policy for implementing NEPA, selection standards are used to help determine feasibility of each action alternative, including potential facilities requirements and the extent to which each action alternative would fulfill the purpose and need for the Proposed Action. This section outlines the selection standards that were used by the USAF, USN, and supported component missions to develop and analyze these alternatives.

Each development would adhere to applicable selection standards described below:

- Fulfill current mission requirements.
- Maximize reuse of existing resources, to include personnel and facilities, to the maximum extent feasible for efficient and cost-effective operations.
- Follow design guidelines outlined in the JBC Architectural Compatibility Plan and Installation Facilities Standards.
- Meet current force protection measures outlined in USAF Instruction 32-1024 *Standard Facility Requirements* (SecAF 2011), UFC 4-010-01 *Department of Defense Minimum Antiterrorism Standards for Buildings* (DoD 2020), the Americans with Disabilities Act of 1990, and Architectural Barriers Act of 1968.
- Meet current criteria outlined in UFC 3-260-01*, Airfield and Heliport Planning and Design*, the USAF Handbook 32-7084 (DoD 2019), *Air Installations Compatible Use Zones (AICUZ) Program Manager's Guide*, and other airfield UFC regulations.
- Result in no significant adverse impacts to nearby wetlands or floodplains.
- Result in no adverse impacts to protected species including, but not limited to, the northern long-eared bat (*Myotis septentrionalis*), red-cockaded woodpecker (*Picoides borealis*), wood stork (*Mycteria americana*), frosted flatwoods salamander (*Ambystoma cingulatum*), American chaffseed (*Schwalbea americana*), Canby's dropwort (*Oxypolis canbyi*), pondberry (*Lindera melissifolia*), West Indian manatee (*Trichechus manatus*), turtles (green [*Chelonia mydas*], Kemp's ridley [*Lepidochelys kempii*], leatherback [*Dermochelys coriacea*], and loggerhead [*Caretta caretta*]), and Atlantic sturgeon (*Acipenser oxyrinchus*).
- Result in no significant adverse impacts to marine mammals including, but not limited to, the West Indian manatee (*Trichechus manatus*).

2.3 SCREENING OF ALTERNATIVES

Alternatives for the proposed installation facilities were developed using the criteria described above to identify suitable development alternatives.

The selection standards described in **Section 2.2** were applied to these alternatives to determine which alternative(s) could meet facility development requirements and would fulfill the purpose and need for the action.

The alternatives that are included in this EA meet the selection standards described in **Section 2.2**.

2.4 ALTERNATIVES CONSIDERED BUT NOT CARRIED FORWARD FOR DETAILED ANALYSIS

Alternatives that were initially considered but failed to meet the selection standards were screened from further analysis. The alternatives that were considered but not carried forward for detailed analysis are detailed below in **Table 2-2**.

Table 2-2: Alternatives Considered but Not Carried Forward for Detailed Analysis

Proposed Action	Eliminated Alternative	Justification for Elimination
NPTU Simulation Expansion: Substation	Location Within Munitions Area	NPTU proposed to construct a new substation in the JBC-WS munitions area approximately 1/2 mile west of the proposed New Facility Alternative 1. The location would offer closer proximity to the New Facility than Substation Alternatives 1 and 2. This alternative was eliminated as the substation would be located within the explosive safety arc and did meet screening criteria.
NPTU Simulation Expansion: Old Tom Road Causeway	No Multi-Use Path	This alternative would only raise the road elevation by approximately 2 ft to minimize the risk of tidal flooding. The widening of Old Tom Road at the causeway would be eliminated. The multi-use path from the causeway to the New NPTU Training Facility would be eliminated. This alternative would reduce the width of the causeway, thereby reducing the amount of fill material required. However, this alternative does not meet screening criteria to provide a safe passage for pedestrians/cyclists, as detailed in the installation Standard Facility Requirements, and only addresses the tidal flooding concern.
Laser Test Ranges	Single LTR Selection	This alternative would select either the 1.25 km LTR or the 2.05 km LTR, but not both. Two separate ranges with varying distances allow for the simulation of different training environments. FSO optics are very susceptible to atmospheric attenuation and beam divergence angle. Two ranges provide a diverse range of localized environmental factors, with one in a marine environment, and the other in a forested environment. This alternative would not meet mission requirements.
	850 m SAUSR Test Range at 57˚	This alternative would utilize the same origin point as Alternative 1, extending northeast at 57˚. A site survey noted that items behind the topographically-elevated roadway may present a specular hazard if wet conditions existed, which would restrict laser activities during these conditions, and would therefore not meet mission requirements.
	1 km SAUSR Test Range at 72˚	This alternative would utilize the same origin point as Alternative 1, extending northeast at 72°. As described in Section 2.4.3.1, this alternative would not meet mission requirements due to specular hazards from wet conditions.

Table 2-2: Alternatives Considered but Not Carried Forward for Detailed Analysis

Proposed Action	Eliminated Alternative	Justification for Elimination
	Forest Access Road Test Range Location I	This alternative would construct a test range on a forest access road in JBC-WS. The range would both limit access to the forest road and incur a higher maintenance load than the SAUSR range. Several specular hazards were observed in a nearby site survey including standing water near the firing point, reflective roadway signs, reflective topographically-elevated roadway posing hazards when wet, reflective railway tracks, and reflective power lines. Additionally, several forest access roads pass through the NPTU blast arc, so transit to the target site would require driving several miles out of the way to access the target site and would not meet mission requirements.
	Forest Access Road Test Range Location II	This alternative would construct a laser firing site and target site on either side of Forest Creek to establish a test range. This alternative would require tapping into high voltage transmission lines and accessing geographically remote areas of the base, resulting in larger natural resource impacts compared to the other alternatives.
Natural Resources Storage Facility	Use of Existing Building	This alternative would utilize an existing building at the JBC-WS. There is no known building with adequate space, support facilities, or proximity to the Natural Resources Department that would support this alternative. This alternative did not meet selection standards to maximize existing resources and was disqualified from further analysis.
	Renting Space Off-Base	This alternative would rent an off-base facility for the storage and maintenance of NRP equipment and vehicles. The logistics of moving equipment between an off-base facility and on-base work site would be detrimental to crew efficiency and effectiveness. This alternative did not meet selection standards to maximize existing resources and was disqualified from further analysis.
Civil Engineering Complex	Entomology Facility Additions/Repairs	This alternative would involve constructing additions and conducting renovations to the existing Entomology Facility. Based on the potential benefits of the available alternatives, new construction was determined to be the most safety-conscious and cost-effective option. Therefore, the alternative was removed from further consideration.
Munitions Facilities and HAZMAT Load and Unload Facility	Butler Munitions Bunker	This alternative would involve demolition of the current facility and construction of a new Butler Facility made of pre-engineered metal building envelope. Further consideration for choosing this alternative would have to take in to account the lead-time is greater than one year from the notice to proceed due to manufacturing and supply chain issues. This alternative did not meet installation facilities standards and was disqualified from further analysis.
	Consolidated Earth-Covered Munitions Bunker/Load and Unload Facility	This alternative would involve consolidating the remaining two bunkers with the load/unload facility by constructing a larger butler/earth covered bunker. It would involve storing ammunition and explosives of different classes that cannot be stored together and would require changes in utilization of facilities that affect ammunition and explosives storage separation distances causing issues to the mission due to workarounds. This alternative is unreasonable and did not meet installation facilities standards. It was therefore disqualified from further analysis.

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 SCOPE OF THE ANALYSIS

This section describes the affected environment, environmental consequences, and cumulative effects for implementation of the Proposed Action, the proposed alternatives, and the No Action Alternative.

Descriptions of the project elements and environmental resources provide the basis for analysis of potential effects on the environment from the Proposed Action and No Action Alternative. Site-specific information presented in this section is derived from on-site evaluation and information obtained from JBC personnel, historical reports, and available public information resources. General and relevant background information regarding JBC is also provided in multiple basewide management plans.

This EA analyzes the potential impacts of 19 proposed installation development projects. To avoid repetitive language while addressing a multitude of projects, a preliminary analysis was conducted to identify the Proposed Actions that would have no adverse impacts to the subject resource areas. **Table 3-1** provides a summary of environmental impacts, displaying which projects were identified to have a potential impact. All projects marked with a color and/or a short or long-term designation are detailed in the following sections. All projects marked with a white or blank cell were identified to have no impacts in the preliminary analysis. All figures pertaining to the analysis in Section 3 focus chiefly on proposed developments which have identified impacts, or where justification for elimination from detailed analysis is required.

Under the No Action Alternative for all proposed projects, the degradation of structures otherwise proposed for demolition would continue. The degradation of these structures within their existing footprints would maintain the status quo. Additional environmental impacts are not anticipated, with the exception being the Pier Bravo Demolition. Under the No Action Alternative, Pier Bravo would continue to degrade. Environmental impacts would include debris falling into the river, such as treated timber and other materials that could impact water quality and aquatic habitats. Navigational safety would be impacted, and there would be an increased potential for environmental and human health safety risks (e.g., collisions).

Proposed actions with identified impacts, however minor, are detailed in the sections below.

Table 3-1: Summary of Environmental Impacts for Action Alternatives

🟩 Negligible-Minor 🟨 Minor-Moderate 🟧 Moderate-Major ▨ Analyzed, No Impact or De Minimis ⬜ No Impact	AICUZ/Land Use/Noise	Air Quality	Water Resources				Safety and Occupational Health		Hazardous Materials/Waste		
			Surface Waters	Floodplains	Wetlands	Groundwater	Construction/ Renovation Safety	Transportation Safety	Solid Waste	Hazardous Materials and Waste	Toxic Materials
NPTU Simulation Expansion: New Training Facility											
Alternative 1				🟨 Short-Term	🟨 Short-Term			🟩 Short-Term	🟩 Short-Term	▨	
Alternative 2 (Preferred)				🟩 Short-Term	🟩 Short-Term			🟩 Short-Term	🟩 Short-Term	▨	
Alternative 3			🟧 Long-Term	🟧 Short-Term	🟧 Short-Term			🟩 Short-Term	🟩 Short-Term	▨	
Alternative 4					🟧 Short-Term			🟩 Short-Term	🟩 Short-Term	▨	
NPTU Simulation Expansion: Substation											
Alternative 1 (Preferred)									🟩 Short-Term	▨	
Alternative 2									🟩 Short-Term	▨	
NPTU Simulation Expansion: Old Tom Road Causeway Improvements											
Alternative 1			🟩 Short-Term	🟩 Short-Term	🟨 Long-Term				🟩 Short-Term		
Alternative 2 (Preferred)			🟩 Short-Term	🟩 Short-Term	🟩 Long-Term				🟩 Short-Term		
Alternative 3			🟩 Short-Term	🟩 Short-Term	🟩 Long-Term				🟩 Short-Term		
Laser Test Ranges			🟨 Short-Term	🟩 Short-Term	🟩 Short-Term				🟩 Short-Term		
Goose Creek Floating Dock			🟨 Short-Term		🟩 Short-Term					🟩 Short-Term	
Pier Bravo Demolition			🟩 Short-Term		🟩 Short-Term				🟩 Short-Term	🟩 Short-Term	🟩 Long Term
Natural Resources Facilities				▨					🟩 Short-Term		🟩 Long Term
Sewer Lift Stations				🟩 Short-Term					🟩 Short-Term	▨	🟩 Long Term
Water Distribution System				🟩 Short-Term	🟩 Short-Term	▨			🟩 Short-Term	🟩 Short-Term	
Civil Engineering Complex: Shop									🟩 Short-Term		🟩 Long Term
Civil Engineering Complex: Entomology Facility									🟩 Short-Term		🟩 Long Term
Ambulatory Care Center									🟩 Short-Term		🟩 Long Term
Water Tower #2 Demolition									🟩 Short-Term		🟩 Long Term
Hydrant Pits									🟩 Short-Term	🟩 Short-Term	
Cargo Laydown Area									🟩 Short-Term		
Munitions Facilities									🟩 Short-Term		🟩 Long Term
HAZMAT Load and Unload Facility									🟩 Short-Term		🟩 Long Term
Dormitory Demolition									🟩 Short-Term		🟩 Long Term
NAAF Fire Station Addition									🟩 Short-Term		

Table 3-1: Summary of Environmental Impacts for Action Alternatives

🟩 Negligible-Minor 🟨 Minor-Moderate 🟧 Moderate-Major ▨ Analyzed, No Impact or De Minimis ⬜ No Impact	Biological/Natural Resources			Cultural Resources		Earth Resources			Socioeconomic Resources/ Environmental Justice	
	Vegetation	Wildlife	Endangered, Threatened, and Sensitive Species	Archaeological Resources	Architectural Resource	Geology	Soils	Topography	Socioeconomics	Environmental Justice
NPTU Simulation Expansion: New Training Facility										
Alternative 1	🟩 Long-Term	🟩 Short-Term	▨				🟩 Long-Term	🟩 Long-Term		
Alternative 2 (Preferred)	🟩 Long-Term	🟩 Short-Term	▨				🟩 Long-Term	🟩 Long-Term		
Alternative 3	🟨 Long-Term	🟩 Short-Term	▨				🟨 Long-Term	🟩 Long-Term		
Alternative 4	🟧 Long-Term	🟩 Short-Term	▨				🟨 Long-Term	🟩 Long-Term		
NPTU Simulation Expansion: Substation										
Alternative 1 (Preferred)		🟩 Short-Term	▨				🟩 Short-Term			
Alternative 2		🟩 Short-Term	▨				🟩 Short-Term			
NPTU Simulation Expansion: Old Tom Road Causeway Improvements										
Alternative 1		🟩 Short-Term	▨					🟩 Long-Term		
Alternative 2 (Preferred)		🟩 Short-Term	▨					🟩 Long-Term		
Alternative 3		🟩 Short-Term	▨					🟩 Long-Term		
Laser Test Ranges	🟩 Long-Term	🟩 Short-Term	▨							
Goose Creek Floating Dock		🟩 Short-Term	▨							
Pier Bravo Demolition		🟩 Short-Term	▨							
Natural Resources Facilities	🟩 Long-Term	🟩 Short-Term	▨				🟩 Short-Term	🟩 Long-Term		
Sewer Lift Stations	🟩 Long-Term	🟩 Short-Term	▨				🟩 Short-Term			
Water Distribution System	🟩 Long-Term	🟩 Short-Term	▨				🟩 Short-Term			
Civil Engineering Complex: Shop							🟩 Short-Term			
Civil Engineering Complex: Entomology Facility							🟩 Short-Term			
Ambulatory Care Center							🟩 Short-Term			
Water Tower #2 Demolition										
Hydrant Pits										
Cargo Laydown Area	🟩 Long-Term	🟩 Short-Term	▨							
Munitions Facilities										
HAZMAT Load and Unload Facility										
Dormitory Demolition										
NAAF Fire Station Addition							🟩 Short-Term			

3.2 AICUZ/LAND USE/NOISE

Noise is any sound that is undesirable and interferes with communication, can cause hearing damage, or is otherwise annoying (FICON 1992). How humans respond to noise depends on the type of noise, its source, distance, sensitivity of the receptor, and time of day.

Sound is measured in decibels (dB), a logarithmic unit of measure. An A-weighted decibel (dBA) scale is used to refine sound measurement by emphasizing frequencies most audible to the human ear. The normal human ear does not hear all frequencies equally well. A-weighting adjusts for this sensitivity. Unless otherwise noted, all decibel measurements presented in the following noise analysis are dBA. Sounds encountered in daily life and their sound levels are provided in **Table 3-2**.

Table 3-2: Common Sounds and Their Levels

Outdoor	Sound Level (dBA)	Indoor
Jet flyover at 1,000 ft	100	Rock band
Gas lawnmower at 3 ft	90	Food blender at 3 ft
Downtown (large city)	80	Garbage disposal
Heavy traffic at 150 ft	70	Vacuum cleaner at 10 ft
Normal conversation	60	Normal speech at 3 ft
Quiet urban daytime	50	Dishwasher in next room
Quiet urban nighttime	40	Theater, large conference room

Source: Harris 1998
Note: dBA = A-weighted decibel

These common sounds are typically associated with steady noise levels, although few noises are constant; therefore, additional noise metrics have been developed to describe noise including:

- Sound Exposure Level (SEL) – SEL represents the level of a one-second-long constant sound that would generate the same energy as the actual time-varying noise event.
- Day-Night Sound Level (DNL) – DNL is the average sound energy in a 24-hour period with penalty added to the nighttime levels. Because of the potential to be particularly intrusive, noise events occurring between 10:00 p.m. and 7:00 a.m. are assessed with a 10 dB penalty when calculating DNL.
- Maximum Sound Level (L_{max}) – L_{max} is the maximum sound level of an acoustic event in decibels.
- Equivalent Sound Level (L_{eq}) - L_{eq} is the steady-state sound level in decibels averaged over a specified period of time. L_{eq} is equivalent to the DNL without the added nighttime penalty.
- Peak (dBP) - Peak is a single-event sound level without frequency weighting. Peak is the highest instantaneous sound pressure level produced at that instance.

3.2.1 Regulatory Overview

The Noise Control Act of 1972 directs federal agencies to comply with applicable federal, state, and local noise control regulations. The USAF's land use guidelines for noise exposure are outlined in Air Force Instruction (AFI) 32-1015, *Integrated Installation Planning*. **Table 3-3** provides a general overview of recommended noise limits from aircraft operations for land use planning purposes. These recommended noise limits are consistent with Federal Aviation Administration (FAA) criteria (FAA 2015).

Table 3-3: Recommended Noise Limits for Land Use Planning

General Level of Noise	Percent Highly Annoyed	Aircraft Noise (DNL)	Small Arms (dBP)	General Recommended Uses
Low	<13%	< 65 dBA	< 87	Noise-sensitive land uses acceptable
Moderate	13%-37%	65–75 dBA	87–104	Noise-sensitive land uses normally not recommended
High	>37%	> 75 dBA	> 104	Noise-sensitive land uses not recommended

Source: USAF 2016, FAA 2015

3.2.2 Existing Conditions

JBC-AB: Aircraft operated at JBC-AB includes both military and civil aircraft, which includes commercial aircraft flown into Charleston International Airport. Sensitive receptors near JBC-AB include Lambs Elementary School and Midland Park Elementary School, both of which are approximately 0.25 mile from the boundary. Housing areas surround most of the JBC-AB boundary, with the nearest sensitive receptors less than 0.01 mile from the boundary (USAF 2015).

Existing noise levels from aircraft operations and resulting noise exposure were determined through aircraft noise modeling associated with the JBC and NAAF Installation Compatible Use Zone Study (USAF 2019b). The C-17 is the main military aircraft that contributes to the 2019 AICUZ contours. The current noise contours are largely influenced by commercial aircraft operations from Charleston International Airport. The 65 dB DNL noise contour extends beyond the northern boundary of the installation approximately 2.5 miles to the northeast into Berkeley County and 2.6 miles to the northwest within Charleston County. It also stretches out to the southwest approximately 2.4 miles and southeast 2.4 miles within Charleston County.

The 75 dB DNL noise contour extends beyond the installation boundary 0.5 mile to the northeast, 0.1 mile to the northwest, 0.3 mile to the southwest, and 0.2 mile to the southeast.

Figure 3-1 shows the AICUZ noise contours for JBC-AB.

JBC-WS: Most of JBC-WS is remote, and the surrounding lands to the north and east are generally unpopulated. The nearest sensitive receptors outside JBC-WS include Sedgefield Middle School and Goose Creek High School, both approximately 0.5 mile from the JBC-WS boundary, and housing along the western side of North Rhett Avenue. The nearest hospital is Trident Medical Center, approximately 4 miles west of JBC-WS and approximately 3.5 miles north of JBC-AB. Sensitive receptors within JBC-WS include the East and West Side Housing Districts and Marrington Middle School (USAF 2015).

NAAF: The 2019 AICUZ noise contours for NAAF (**Figure 3-2**) are based on current year operations. The C-17 is a main contributor to the 2019 AICUZ contours.

The 65 dB DNL noise contours fall within Orangeburg County and extend beyond the northern boundary of the installation approximately 2.9 miles to the northeast and 2.3 miles to the southwest. It also stretches out to the south approximately 0.7 mile and to the north 0.2 mile.

The 75 dB DNL noise contour is within the installation boundary, except to the northeast where it extends beyond the installation boundary 1.2 miles and boarders the installation boundary to the north.

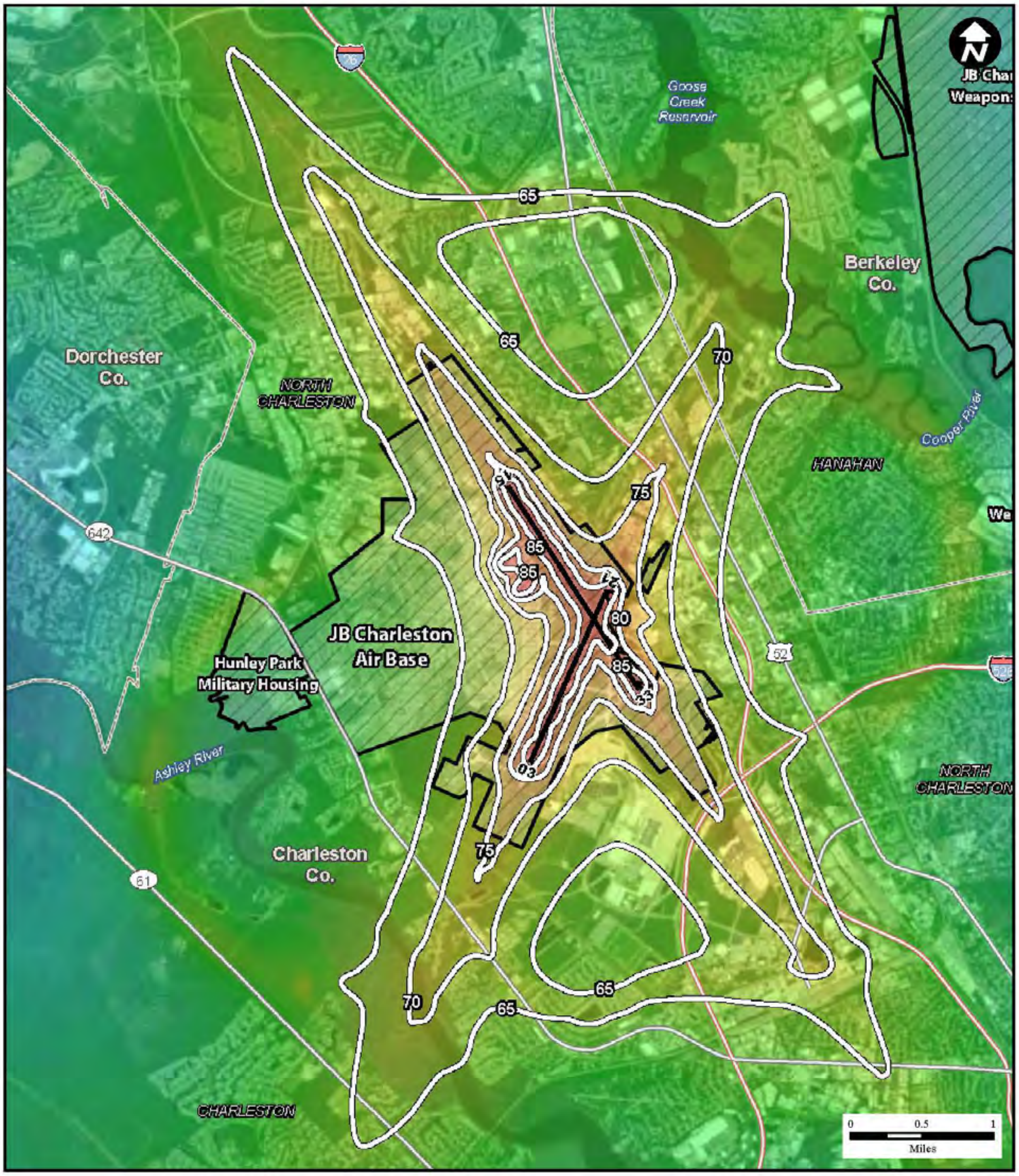


Figure 3-1

AICUZ Noise Contours
Air Base
Installation Development Environmental Assessment
Joint Base Charleston, South Carolina

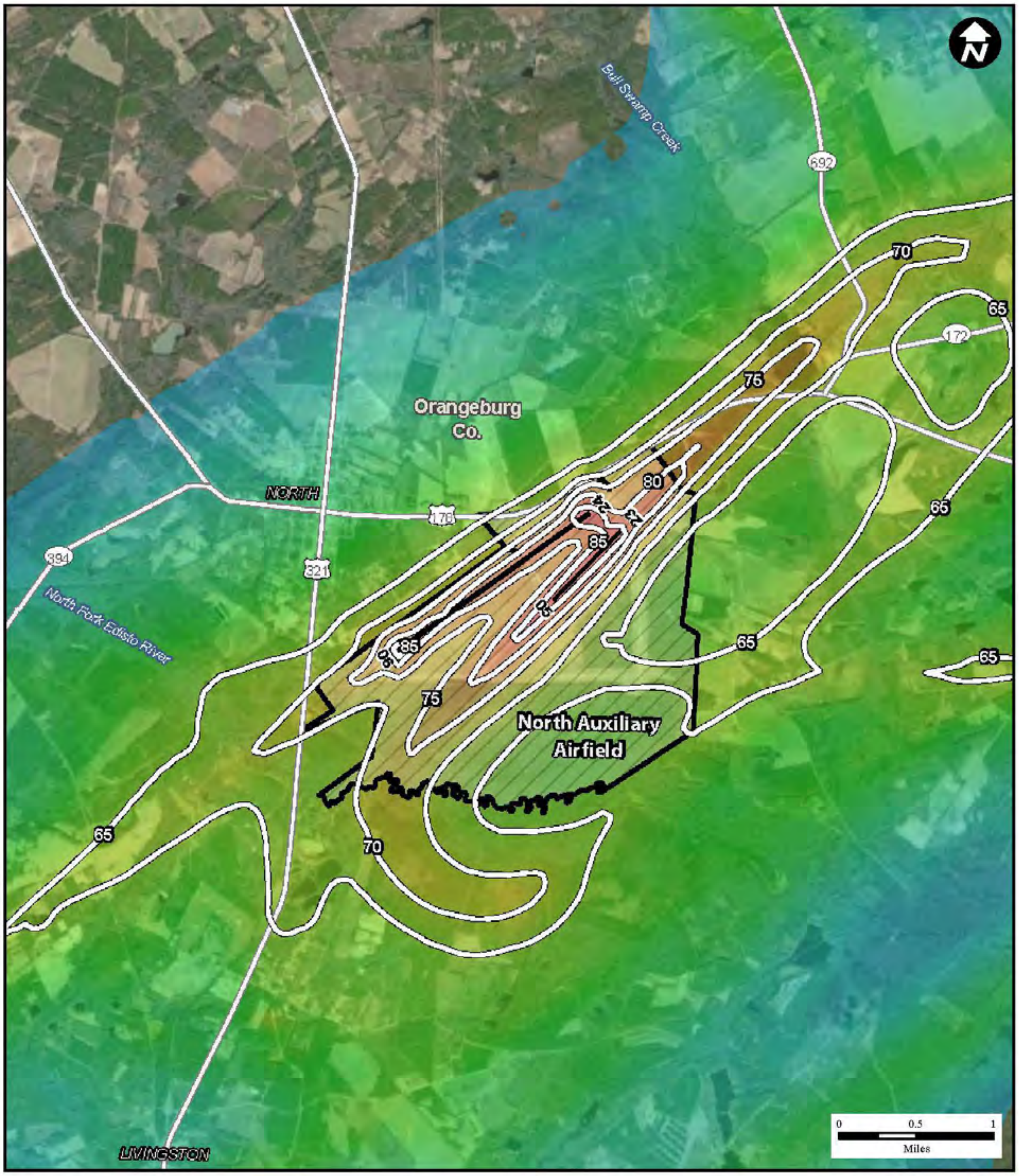


Figure 3-2

AICUZ Noise Contours NAAF

Installation Development Environmental Assessment
Joint Base Charleston, South Carolina

3.2.3 Environmental Consequences

Approach to Analysis

The Federal Highway Administration's Roadway Construction Noise Model was used to project both demolition construction noise levels using equipment specification noise levels. The nearest sensitive receptor noise levels were calculated for each proposed development (**Table 3-4**). Given the proximity of demolition or construction activities to an active airfield, daily aircraft operations would result in greater noise levels than any short-term demolition or construction activities, and construction noise levels would not impact existing building operations. Sensitive receptors within JBC would experience a temporary noise level increase, and sensitive receptors beyond the bases' boundary would not experience an increase. Construction noise levels associated with development would temporarily increase noise levels of the area but would not be significant.

Table 3-4: Proposed Demolition and Construction Noise Levels

Project	Receptor		Demolition		Construction	
	Description	Distance (ft)	Noise Level (L_{eq})	Noise Level (L_{max})	Noise Level (L_{eq})	Noise Level (L_{max})
NPTU Simulation Expansion: New NPTU Training Facility Alternative 1	Residence	200	78	78	75	73
NPTU Simulation Expansion: New NPTU Training Facility Alternative 2	Residence	550	69	69	66	64
NPTU Simulation Expansion: New NPTU Training Facility Alternative 3	Residence	185	79	79	76	74
NPTU Simulation Expansion: New NPTU Training Facility Alternative 4	Residence Hall	50	90	90	87	85
NPTU Simulation Expansion: Substation	Residence	2,000	58	58	55	53
NPTU Simulation Expansion: Old Tom Road Causeway Improvements	Residence	50	90	90	87	85
Laser Test Ranges	Office Building Fire Station	200	78	78	75	73
Goose Creek Floating Dock	Lounge	250	76	76	73	71
Pier Bravo Demolition	N/A	100	84	84	81	79
Natural Resources Facilities	Building	1,800	59	59	56	54
Sewer Lift Stations	Building	150	80	80	77	75
Water Distribution System	Residence	150	80	80	77	75
Civil Engineering Complex: Shop	Camp Site	1,400	61	61	58	56
Civil Engineering Complex: Entomology Facility	RV Park	1,300	62	62	59	57
Ambulatory Care Center	Residence	140	81	81	78	76
Water Tower #2 Demolition	Church	700	67	67	64	62
Hydrant Pits	Flight Line	Flight Line	Flight Line	Flight Line	Flight Line	Flight Line

Project	Receptor		Demolition		Construction	
	Description	Distance (ft)	Noise Level (L_{eq})	Noise Level (L_{max})	Noise Level (L_{eq})	Noise Level (L_{max})
Cargo Laydown Area	Flight Line	Flight Line	Flight Line	Flight Line	Flight Line	Flight Line
Munitions Facilities	Residence School	2,300	57	57	54	52
HAZMAT Load and Unload Facility	Residence School	2,800	55	55	52	50
Dormitory Demolition	Residence Hall	50	90	90	87	85
NAAF Fire Station Addition	Fire Station	Flight Line	Flight Line	Flight Line	Flight Line	Flight Line

Source: WSP 2023

Note: L_{eq} = noise level equivalent in decibels; L_{max}=maximum noise level in decibels; n/a=not applicable

A temporary increase in maximum noise levels associated with haul truck operations would occur along local roadways where residences are within 50-ft of the roadway (**Table 3-4**). Noise levels would be similar to what residences experience when semi-tractor trailers operate on these roads; however, the frequency with which residences experience these noise levels would increase. While the frequency of increased noise would occur, haul truck operations would be short-term; therefore, impacts would not be significant. Noise associated with the operation and use of Proposed Action components is expected to be de minimis.

3.2.3.1 Impacts Summary

Noise emissions from the Proposed Action components were calculated on an individual basis but are analyzed cumulatively to determine impacts to the noise environment. The Proposed Action detailed in **Section 2.1** is anticipated to only result in a noise level increase during the construction, demolition, or renovation activities associated with the development process. The noise level increase during development would be short-term and temporary. Impacts associated with any potential increases to levels of vehicle traffic would be negligible given the existing noise environment. Therefore, there would be no significant impacts to the noise environment as a result of the Proposed Action or alternatives.

Land use under the New NPTU Expansion Facility Alternatives would be modified. Alternatives 1 and 2 would result in minor reduction of Forest use area, converting it to Industrial use. The Red Bank Golf Course area to be utilized under Alternative 3 is currently designated for Outdoor Recreation. The land use would be modified to Industrial, reducing the overall Outdoor Recreation area by approximately 25 acres.

A portion of the Cargo Laydown Area would be located in an area designated as a Forest land use. This parcel would be converted to an Industrial land use area.

Proposed Actions that would result in no adverse impacts are detailed in **Table 3-1**.

3.3 AIR QUALITY

3.3.1 Affected Environment

3.3.1.1 Ambient Air Quality Standards

Section 108 of the Clean Air Act requires that the United States Environmental Protection Agency (USEPA) establish National Ambient Air Quality Standards (NAAQS) for six common air pollutants (known as criteria air pollutants): carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), Ozone (O_3), sulfur dioxide (SO_2), and particulate matter with a diameter less than or equal to 2.5 micrometers ($PM_{2.5}$) and less than or equal to 10 micrometers (PM_{10}). The NAAQS are standards to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly, as well as to protect public welfare, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings.

Each state has the authority to adopt standards that are more stringent than those established under the federal program. **Table 3-5** provides the ambient air quality standards set forth by the USEPA for South Carolina.

Table 3-5: Ambient Air Quality Standards

Criteria Pollutant	Measuring Interval	Standard Level
SO_2	3 hours (secondary)	1300 μg/m^3 or 0.5 ppm
	24 hours (primary)	365 μg/m^3 or 0.14 ppm
	Annual (primary)	80 μg/m^3 or 0.030 ppm
	1 hour (secondary)	75 ppb
PM_{10}	24 hours	150 μg/m^3
$PM_{2.5}$	24 hours (primary)	35 μg/m^3
	Annual (primary)	12 μg/m^3
	24 hours (secondary)	35 μg/m^3
	Annual (secondary)	15 μg/m^3
CO	1 hour (no secondary)	40 mg/m^3 or 35 ppm
	8 hours (no secondary)	10 mg/m^3 or 9 ppm
O_3	8 hours (2008)	0.075 ppm
	8 Hours (2015)	0.070 ppm
NO_2	Annual	100 μg/m^3 or 0.053 ppm or 53 ppb
	1 hour	100 ppb
Pb	Rolling 3-month average	0.15 μg/m^3

Notes: ppb = parts per billion; ppm = parts per million; μg/m^3 = micrograms per cubic meter; mg/m^3 = milligrams per cubic meter
Source: USEPA 2022

3.3.1.2 Local Air Quality

Berkeley, Charleston, and Orangeburg Counties are in attainment for all NAAQS parameters (USEPA 2023c). The Charleston Interstate Air Quality Control Region (AQCR) includes Berkeley and Charleston Counties. The Augusta-Aiken Interstate AQCR includes Orangeburg County. According to 40 CFR 81, no Class I areas are located within 6.2 miles of JBC (USEPA 2023).

Several South Carolina Air Monitoring Network stations are located or were located near JBC. All of these monitors are located within Charleston County. In combination, these stations measure SO_2, PM_{10}, $PM_{2.5}$, O_3, and NO_2 concentrations. A design value is a statistic that describes the air quality status of a given location relative to the level of the NAAQS. USEPA has computed county-level design values for Charleston County based upon data collected at the monitoring stations; county-level design values have not been computed for Berkeley or Orangeburg County.

JBC is located in an area that is clearly in attainment with the NAAQS for CO, PM_{10}, $PM_{2.5}$, and SO_2. The area is questionably in attainment with the NAAQS for O_3, NO_2, and lead.

3.3.1.3 Greenhouse Gases and Climate Change

CEQ's *Final Guidance on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change* [Aug 2016] advises agencies to quantify direct and indirect impacts from Greenhouse Gas (GHG) emissions for proposed actions. The EIAP Guide doesn't specify a significant level of emissions but suggests using significance indicators. Indicators provide evidence to the potential significance of GHG emissions on air quality. The USEPA requires GHG emissions exceeding 75,000 short tons annually of carbon dioxide equivalents (CO_{2e}), to undergo a Best Available Control Technology (BACT) analysis under the Prevention of Significant Deterioration (PSD) permit program. Climate change effects on proposed actions and the environment should be considered. This value was used as the significance indicator for this EA. The effects of climate change are included in Section 6.4 of the Air Quality EIAP Guide. For smaller projects, minimal discussion of air quality environmental impacts is required for qualitative assessments; however, the effect of climate change on, and from, the Proposed Action is assessed subjectively.

Air emissions associated with each Proposed Action component are calculated by the Air Conformity Applicability Model (ACAM). ACAM calculates air emissions for each proposed action. Results are described in **Section 3.3.2**.

3.3.1.4 Air Emission Sources at JBC

JBC-WS and JBC-AB are both permitted as conditional major sources of air pollution under permit numbers CM-0420-0014 and CM-0560-0019, respectively. Both installations would have the potential to emit greater than 100 tons per year (tons/yr) of at least one criteria pollutant but have accepted federally-enforceable permit conditions to limit their emissions of any criteria pollutant to less than 100 tons/yr. NAAF does not currently have an air permit because the stationary sources result in minimal air pollution emissions.

Air emission sources at JBC-WS and JBC-AB include boilers, water heaters, space heaters, generators, paint booths, and gasoline dispensing facilities. In addition, JBC-AB's air emission sources include aircraft refueling operations, storage tanks, aircraft engine test cells, and an aircraft corrosion control facility.

Air pollutants emitted from the sources at each installation include CO, NO_x, Pb, PM_{10}, $PM_{2.5}$, SO_2, volatile organic compounds (VOC), hazardous air pollutants, and GHG. In addition to stationary sources, JBC operates numerous mobile air emission sources. These include ground vehicles (e.g., trucks, cars, construction equipment), aircraft, and aerospace ground equipment. Mobile sources are not regulated under South Carolina's air quality permitting program.

3.3.1.5 Approach to Analysis

For air quality impact assessments, significance is defined by the degree to which the effects of a Proposed Action component could potentially affect public health or safety. Air quality impact significance is defined by an action's potential to cause or contribute to a new violation of one or more of the primary NAAQSs. In other words:

- Insignificant = Action does not cause or contribute to exceeding one or more NAAQSs
- Significant = Action does cause or contribute to exceeding one or more NAAQSs

JBC is located in an air quality attainment area; however, there are no established significant thresholds for attainment areas. As defined by the PSD regulation [40 CFR 52.21(b)(1)(i)], a major stationary source is one that emits or has the potential to emit greater than 250 ton/yr of a criteria pollutant. This threshold is one of the Clean Air Act's triggers for a new major source or a source making a major modification in an attainment area. In accordance with USAF guidance (USAF 2020), in an area that is clearly in attainment with the NAAQS, such as JBC, the 250 ton/yr PSD threshold is an indicator of potentially significant air quality impacts for NEPA.

In accordance with USAF guidance (USAF 2020), in an area that is near nonattainment, lower emission thresholds, as defined by the General Conformity Rule, are used as an indicator of potentially significant air quality impacts for NEPA. The General Conformity de minimis values are 100 tons/yr for CO, NO_x, PM_{10}, $PM_{2.5}$, SO_2, and VOC, and 25 tons/yr for Pb [40 CFR 93.153(b)(1) and (2)]. For JBC, the insignificant indicators are identified in **Table 3-6**.

Table 3-6: Air Quality Insignificant Indicators for JBC

Criteria Pollutant	Insignificant Indicator (tons/yr)
VOC	100
NO_x	100
CO	250
SO_x	250
PM_{10}	250
$PM_{2.5}$	250
Pb	25

The Proposed Action components that would emit (or have the potential to emit) less than 250 tons/yr of a criteria pollutant less than the values defined in **Table 3-6** would be deemed insignificant. This is because the indicator would suggest that the action would not cause or contribute to exceeding one or more of the National Ambient Air Quality Standards (NAAQS).

Each GHG is assigned a global warming potential, which is the ability to trap heat, and is standardized to carbon dioxide (CO_2), which has a global warming potential value of 1. The GHG is multiplied by its global warming potential to calculate the total equivalent emissions of CO_{2e}. To evaluate GHG emissions, air emission estimates were calculated using ACAM in terms of CO_{2e}.

The Significance Indication Analysis as described in Section 6.3.1 of the Air Quality EIAP Guide (CEQ 2016) was then implemented. On October 3, 2016, USEPA proposed establishing a de minimis value of GHGs or “Significant Emissions Rate” of 75,000 tons/yr CO_{2e} from stationary sources as a basis for requiring sources to obtain a Title V permit if the sources were not otherwise required to obtain a Title V permit. As a result of this rule proposal, the 75,000 tons/yr CO_{2e} has been used as an indicator of de minimis significance; actions resulting in less than 75,000 tons/yr CO_{2e} of GHG emissions are considered de minimis (too trivial or minor to merit consideration) and not significant enough to warrant further NEPA analysis.

The Proposed Action was considered as directed in Section 6.4 of the Air Quality EIAP Guide to determine the effects of climate change (AFCEC 2019). As with the GHG analysis, actions resulting in less than 75,000 tons/yr CO_{2e} of GHG emissions have been considered de minimis (too trivial or minor to merit consideration) and not significant enough to warrant further NEPA analysis.

3.3.2 Environmental Consequences

Effects on air quality were based on estimated direct and indirect emissions associated with the Proposed Action components. In order to present a conservative analysis, The Proposed Action includes elements that are anticipated to occur on various schedules; however, air emissions were calculated assuming that all elements would be initiated within a 2-year period. Arbitrarily, those portions of the Proposed Action that are described in **Sections 2.1.1** through **2.1.10** were assumed to be initiated at the beginning of calendar year 2024 while those described in Sections **2.1.11** through **2.1.19** were assumed to be initiated at the beginning of calendar year 2025. While this assumption results in conservatively high emissions estimates per year, the ACAM results demonstrate that transient emissions and CO_{2e} emissions would be less than the insignificant indicator values and do not warrant further NEPA analysis. The Proposed Action would have a negligible indirect impact on climate change.

Estimated emissions from a proposed federal action are typically compared with the relevant national and state standards to assess the potential for increases in pollutant concentrations. Results of the ACAM analyses are presented in **Appendix B** and summarized in **Table 3-7**. Note that where multiple alternatives have been identified for specific elements of the Proposed Action, ACAM was only used to evaluate the Preferred Alternative. In all instances but two, the Preferred Alternative is identified as Alternative 1. For the NPTU Simulation Expansion: New NPTU Training Facility and the Old Tom Road Causeway, the Preferred Alternative is identified as Alternative 2. Given that the results of the ACAM analyses demonstrate that the Proposed Action results in air emissions well below the insignificant indicators, additional ACAM analyses are not warranted to capture the other alternatives being considered.

Short-term, minor, adverse effects on air quality would be expected from the implementation of the Proposed Action; however, these effects would result in no significant impacts. Long-term, minor, adverse, and beneficial effects on air quality would be expected from the Proposed Action;

however, these effects would not be significant. The demolition of older and less energy efficient buildings would remove older and less efficient boilers, furnaces, and emergency generators from the installation and decrease air emissions. Evaluated cumulatively with the beneficial impacts, the Proposed Action would not result in long-term adverse effects on air emissions at JBC.

Table 3-7: Summary of Air Quality Impacts from the Proposed Action

Calendar Year	Air Pollutant Emissions (tons per year)							
	VOC	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$	Pb	CO_{2e}
2024	4.29	9.21	11.74	0.03	113.66	0.34	0.00	2,829
2025	1.77	7.35	9.58	0.02	72.12	0.28	0.00	2,336
2026	0.10	1.51	1.26	0.02	0.12	0.12	0.00	1,749
Insignificant Indicator	100	100	250	250	250	250	25	75,000
Significant Impact?	No	No	No	No	No	No	No	No

3.4 WATER RESOURCES

3.4.1 Affected Environment

Water resources include wetlands, floodplains, surface waters, and groundwater. Surface water resources include wetlands, lakes, rivers, and streams. Groundwater includes the subsurface hydrologic resources of the physical environment. Groundwater often is described in terms of depth to aquifer or water table, water quality, and surrounding geologic composition.

3.4.1.1 Surface Waters

JBC-AB borders the north bank of the Ashley River, which includes a tidal marsh; this section of the river is on the South Carolina 303(d) List of Impaired Waters for turbidity, pH, and enterococci bacteria (**Figure 3-3**). In addition to the Ashley River, Popperdam Creek flows through the tidal marsh, while three small headwater streams, including Golf Course Creek, Runway Creek, and Turkey Creek, flow through JBC-AB.

JBC-WS is located along the western bank of the Cooper River; this section of the river is on the South Carolina 303(d) List of Impaired Waters for mercury (**Figure 3-4**). The Cooper River has a mean tidal range of 5.2 ft, with a normal low tide of 1.1 ft and a high tide of 6.3 ft. There are approximately 22 miles of marsh and river frontage (USAF 2015, SCDHEC 2023a, 2023b).

Two major creeks also cross JBC-WS, Foster Creek to the north and Goose Creek to the south. Foster Creek is listed on the South Carolina 303(d) list for dissolved oxygen, while the Back River just downstream of the confluence with Foster Creek is listed for dissolved oxygen and mercury. Goose Creek, at the Henry E. Brown, Jr. Boulevard Bridge, is listed on the South Carolina 303(d) list for enterococci bacteria (USAF 2015, SCDHEC 2023a, 2023b).

The NAAF drains to Bull Swamp Creek to the east and to the North Fork of the Edisto River to the south (**Figure 3-5**). The North Fork of the Edisto River is listed on the South Carolina 303(d) list for mercury near its convergence with Bull Swamp Creek downstream of the NAAF.

Stormwater at JBC is managed under multiple National Pollutant Discharge Elimination System (NPDES) permits for discharge of stormwater from industrial activities (Permit No. SCR000000) for stormwater discharges associated with construction and demolition (Permit No. SCR100000). Permits are obtained from, and with approval from, the South Carolina Department of Health and Environmental Control (SCDHEC). These permits are based on requirements of the Clean Water Act (33 U.S.C. Sections 1251 et seq.) and South Carolina Pollution Control Act (South Carolina Code Sections 48-1-10 et seq.) that dischargers of pollutants apply for and receive permits for the discharges. Additional requirements are established in SCR 61-9, Water Pollution Control Permits, and SCR 61-9.122.26, Stormwater Discharges. For stormwater runoff associated with construction and demolition activities, NPDES Permit SCR100000 would be the applicable permit for the Proposed Action. Each Proposed Action component will follow plan and site-specific stormwater requirements detailed in Section 7.4 of the JBC Stormwater Management Plan (USAF 2022). Each land disturbance project is required to have some form of a Construction Stormwater Pollution Prevention Plan (SWPPP). Not all construction projects require a formal SWPPP under the NPDES program; however, the JBC Environmental Office requests that some form of erosion control be used at every job/project. Stormwater programs would be addressed by the contractor conducting the development activity (USAF 2022b).

The Energy Independence and Security Act (EISA) of 2007 Section 438 (42 U.S.C. 17094) and UFC 3-210-10, Low-Impact Development (as amended, 2020) include requirements for the management of stormwater on federal facilities. Any development project involving a federal facility with a footprint that exceeds 5,000 sf is required to use site planning, design, construction, and maintenance strategies to maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of flow. This includes Low-Impact-Development strategies such as reducing the footprint of developments located in impervious areas, utilizing permeable paving materials, and siting impervious structures in areas of the poorest soil types where possible (USAF 2022b). Low-impact-development strategies for reduction of impervious surfaces will be implemented on a per-project basis.

JBC's SWMP includes technical criteria, technical requirements, and references for the planning and design of applicable DoD projects to comply with stormwater requirements under EISA Section 438 and the Deputy Under Secretary of Defense DoD policy on implementation of stormwater requirements Section 438 (USAF 2022b).

3.4.1.2 Floodplains

Floodplains are low areas next to bodies of water that are periodically covered in water. They are defined by the 100-year and 500-year floods, which have a 1% and 0.2% annual chance of occurring, respectively. JBC uses Colorado State University's floodplain maps, which were developed with high-quality data and modeling, to provide updated and accurate flood maps. These maps meet the criteria in EO 13690 and Office of the Secretary of Defense directive-type memorandum and have been endorsed by FEMA.

The western portion of JBC-AB is located within the 100-year floodplain, associated with the Ashley River and Popperdam Creek, along with isolated low-laying areas. The Proposed Actions at JBC-AB are not located within or adjacent to a designated 100-year floodplain (**Figure 3-6**) (SCDHEC 2023b, FEMA 2023).

The north, east, and south portions of JBC-WS are located within the 100-year floodplain, associated with Foster Creek, the Cooper River, and Goose Creek, respectively, and along with isolated low-laying areas. The 100-year floodplain elevation at JBC-WS ranges from 8.5 to 10.5 ft above mean sea level (MSL) (USN 2003, SCDHEC 2023b, FEMA 2023).

The 100-year floodplain at the NAAF is located along the North Fork of the Edisto River along the southern in the portion of the NAAF. However, the Proposed Action at NAAF is not located within or adjacent to a designated 100-year floodplain (**Figure 3-7**) (USAF 2015, SCDHEC 2023b, FEMA 2023).

The design phase of projects included under the Proposed Action would address any operational vulnerabilities associated with floodplains.

3.4.1.3 Wetlands

40 CFR Section 120.2(1) defines Jurisdictional Waters to include various types of bodies of water such as lakes, ponds, wetlands, and tributaries, which are, may be, or have been used for commerce, including waters subject to tides, and adjacent wetlands. Wetlands were field delineated per Section 404 of the Clean Water Act using the routine methods described in the USACE Wetlands Delineation Manual (USACE 1987) (Manual) and the USACE Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0) (USACE 2010) (Regional Supplement). Areas delineated include the New NPTU Training Facility Alternatives 1 and 2, Old Tom Road Causeway, and the LTRs.

Wetlands along the southern periphery of JBC-AB were historically disturbed by phosphate mining. However, the proposed action at JBC-AB is not adjacent to wetland areas (**Figure 3-13**) (USN 2003, USAF 2015).

JBC-WS has approximately 4,400 acres of wetlands, including salt marsh, brackish marsh, freshwater marsh, and forested wetlands. Emergent and scrub-shrub palustrine wetlands cover approximately 1,500 acres, tidally influenced estuarine emergent wetlands cover approximately 1,800 acres, and approximately 2,600 acres of JBC-WS are covered by palustrine, lacustrine, and riverine freshwater wetlands. Forested wetlands cover approximately 200 acres on JBC-WS and typically occur in small, isolated depressions or along narrow natural drainage-ways of ponds or marshes (USN 2003, USAF 2015).

The Old Tom Road Causeway crosses a tidal creek tributary of the Cooper River (**Figure 3-15**). This area is an open water and emergent saltwater marsh associated with the Cooper River and is dominated by saltmarsh cordgrass (*Spartina alterniflora*) and black needlerush (*Juncus roemerianus*), with smaller components of eastern baccharis (*Baccharis halimifolia*) and false willow (*B. angustifolia*).

The shorelines within the Proposed Action areas include narrow bands of saltmarsh cordgrass and black needlerush immediately adjacent to armored shoreline where the piers and docks are connected to uplands.

There are four wetlands at the NAAF totaling approximately 430 acres. However, the Proposed Action at NAAF are not located within or adjacent to a wetland area (**Figure 3-15**) (North Wind Inc. 2008, USAF 2015).

3.4.1.4 Groundwater

JBC-WS and JBC-AB are in the lower Coastal Plain. The NAAF is in the Coastal Plain but closer to the boundary of the Piedmont. Aquifers in the Coastal Plain and in the vicinity of JBC-WS and JBC-AB from oldest to youngest include the Middendorf, Black Creek, and Peede; of the Cretaceous aquifer system; the Ellenton, Black Mingo, Tertiary Sand, and Tertiary Limestone of the Tertiary aquifer system; and the Orangeburg Group, Cooper Group, and Ladson Formation of the shallow aquifer system (Aucott and Speiran 1985; North Wind Inc. 2008, USAF 2015).

Aquifers of the Cretaceous system are generally more than 300 ft below the surface. The Black Mingo, Tertiary Sand, and Tertiary Limestone aquifers overlay the older units and are generally 50 ft below the surface but can be shallower at JBC-WS and JBC-AB. Shallow aquifers can be less than 2 ft from the surface in some areas (e.g., drainages and wetlands) and are typically confined within 50 ft from the surface. Groundwater depth is shallow in many areas at both JBC-WS and JBC-AB (SCDHEC 2001, USN 2003, USGS 2008, North Wind, Inc. 2008, USAF 2015).

Relief at the NAAF is moderate (50 to 60 ft) except where steep slopes descend into the North Fork of the Edisto River’s floodplain. The NAAF relies solely on external utilities for water and does not have any water wells (North Wind Inc. 2008, USAF 2015).

3.4.2 Environmental Consequences

A Proposed Action could have a significant effect on water resources if any the following were to occur:

- Substantially reduce water availability or supply to existing users;
- Overdraft groundwater basins;
- Exceed safe annual yield of water supply sources;
- Substantially and adversely affect water quality;
- Endanger public health by creating or worsening health hazard conditions;
- Threaten or damage unique hydrologic characteristics; or
- Violate established laws or regulations adopted to protect water resources.

Proposed Actions were evaluated individually to determine impacts to water resources. Proposed Actions that would result in no adverse impacts are detailed in **Table 3-1**. Proposed Actions with identified impacts, however minor, are detailed in the sections below.

A Coastal Zone Consistency (CZC) determination has been developed in parallel with this EA, indicating that the Proposed Action is consistent with the CZMA (16 U.S.C. 1456; 15 CFR 930). An early coordination letter was distributed to SCDHEC – Office of Ocean and Coastal Resource Management (OCRM) on February 3, 2023, but no early coordination comments have been received at this time. Concurrent with the NOA of the Draft EA, a CZC request letter has been distributed to OCRM for their review of the Draft EA and for their concurrence with the Draft CZC determination. Received agency comments and guidance from the CZC process will be incorporated into the Final EA in accordance with the CZMA.

3.4.2.1 Surface Waters

The Proposed Actions at JBC-AB and NAAF are anticipated to have no significant impacts on surface waters, because these proposed demolition, construction, or infrastructure actions would not occur within or in the vicinity of surface water resources (**Figure 3-3** and **3-5**).

Proposed Actions within or in the vicinity of surface water resources at JBC-WS include the NPTU Alternative 3, Old Tom Road Causeway, LTRs, Pier Bravo Demolition, and the Goose Creek floating dock (**Figure 3-4**). All actions would be performed in accordance with BMPs and permit requirements (e.g., stormwater and USACE permit conditions, sedimentation and erosion control plans, etc.).

NPTU Alternative 3 includes surface waters along and within the Red Bank Golf Course, including Wilson Pond and Georgie Pond, and their associated drainages that flow south and east into a Cooper River tidal creek that subsequently flows under the Old Tom Road Causeway. Impacts to surface waters are anticipated to be minor to moderate but could be major under Alternative 3 due to the large footprint and displacement of the existing golf course. Increase from stormwater runoff is expected from the proposed impervious cover, such as buildings, sidewalks, drives, and parking areas. However, the Proposed Action would include new stormwater facilities, including a retention basin, to minimize and mitigate stormwater impacts. As a result, the New NPTU Training Facility alternatives are anticipated to have no significant impacts but may have minor indirect impacts on stormwater.

The Old Tom Road Causeway action alternatives would have similar impacts related to the construction of the causeway improvements; the reduction of fill for Alternatives 2 and 3 would generally be offset by the additional impacts associated with the bridge required for the multi-use pathway. No long-term significant impacts are anticipated, impacts would be limited to a nominal (short) culvert extension for surface waters, and finished grades and structures would be inert, and flow, capacity, and water quality are not anticipated to be impacted. Temporary impacts are anticipated to be limited to runoff (e.g., turbidity) associated with ground disturbance and slope fill and/or structural support placement for the bridge during construction. The narrow expansion width of the causeway for wider travel lanes and the multi-use pathway is not anticipated to result in a significant change in stormwater produced along Old Tom Road. As a result, the Old Tom Road Causeway improvement alternatives are anticipated to have no significant impacts but may have minor impacts to surface water resources.

No clearing or construction of the proposed 1.25 km Goose Creek LTR and 2.05 km SAUSR LTR is proposed within surface water resources. Temporary Impacts would be limited to ground disturbance during construction and clearing, and the construction of impervious cover associated with the node concrete pads. The proposed LTRs are anticipated to have no significant impacts but may have negligible to minor impacts to stormwater or surface water resources.

The Goose Creek floating dock would temporarily impact Goose Creek during construction. Anticipated impacts are limited to substrate disturbance during the installation of piles, and the low potential for small spills when working over water. As a result, the Goose Creek floating dock is anticipated to have no significant impacts but may have negligible to minor impacts to surface water resources.

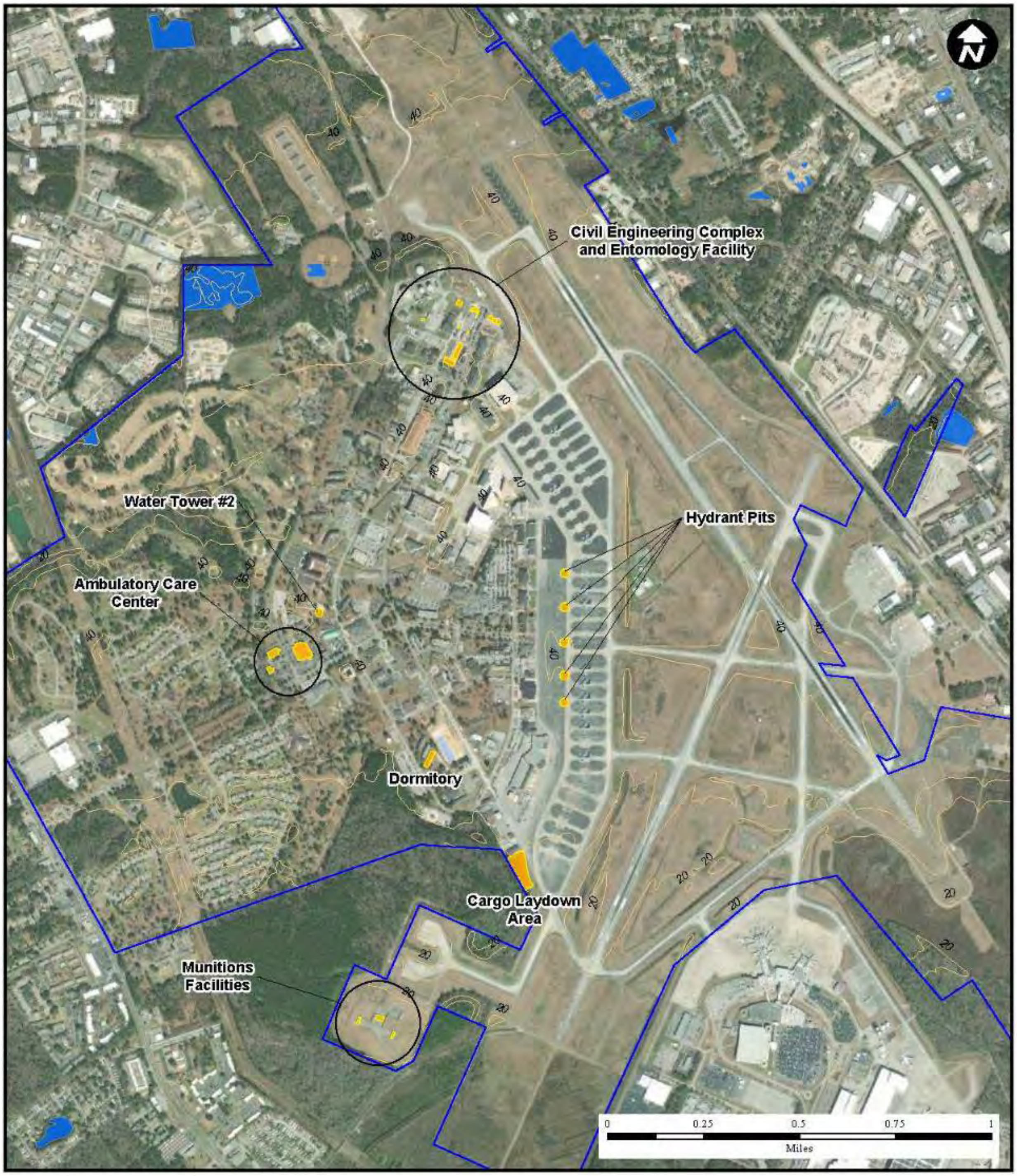


Figure 3-3
Topography and Surface Water
Air Base
Installation Development Environmental Assessment
Joint Base Charleston, South Carolina

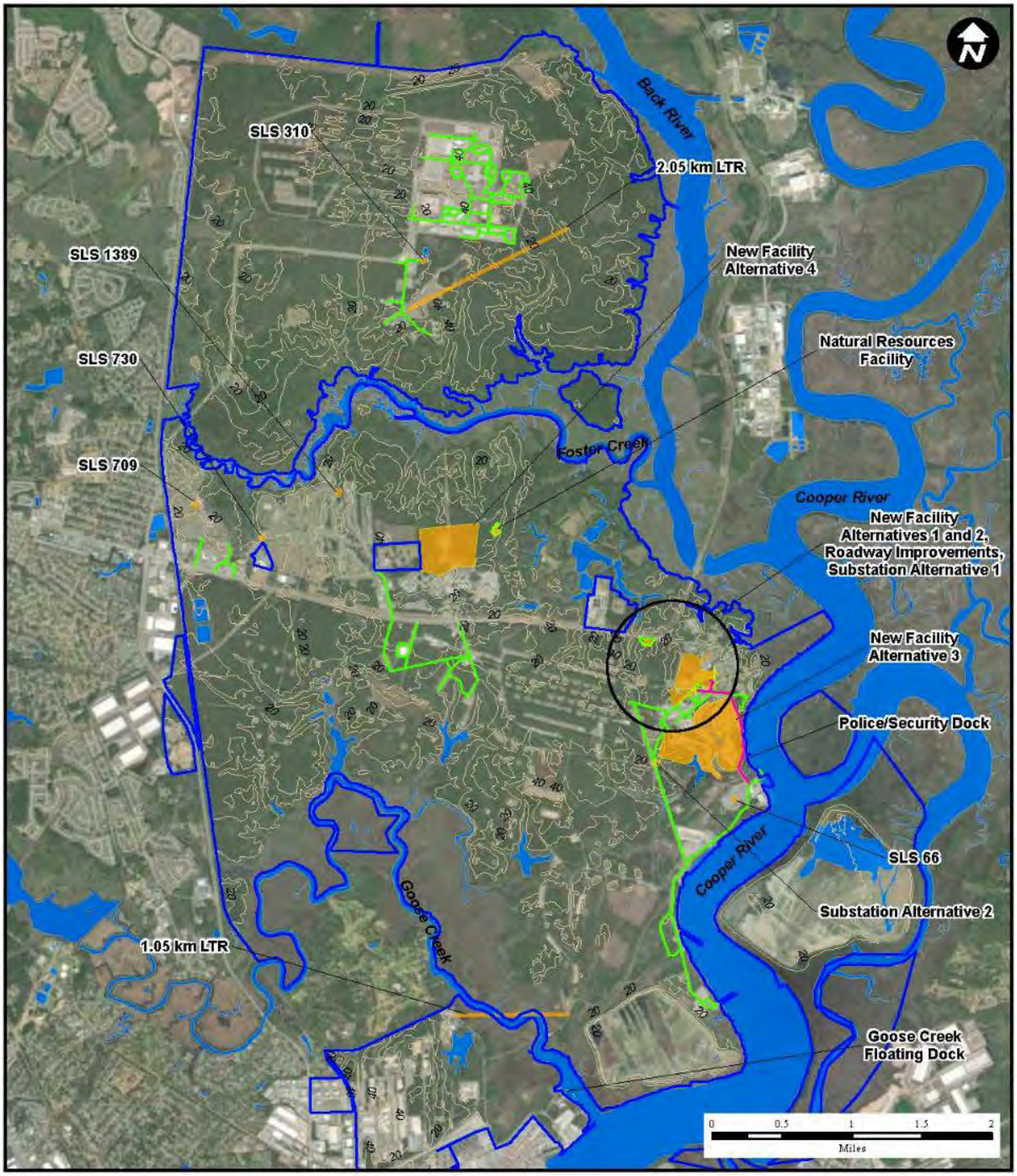


Figure 3-4

Topography and Surface Water Weapons Station

Installation Development Environmental Assessment
Joint Base Charleston, South Carolina

Figure 3-5

Topography and Surface Water
NAAF Fire Station Addition

Installation Development Environmental Assessment
Joint Base Charleston, South Carolina

The Pier Bravo demolition would temporarily impact the Cooper River during construction. Anticipated impacts are limited to substrate disturbance during the removal of piles (e.g., turbidity, debris, etc.), and the small potential for small spills when working over water. However, this action would be performed in accordance with BMPs and permit requirements. As a result, the Pier Bravo demolition is anticipated to have no significant impacts but may have negligible to minor impacts to surface water resources, with long term improvement associated with the removal of treated timber piles.

3.4.2.2 Floodplains

The Proposed Action at JBC-AB and NAAF would have no significant impacts on floodplains because these actions would not occur within or in the vicinity of floodplains.

The Proposed Action at JBC-WS, located within or in the vicinity of floodplain, include the LTRs, NPTU multi-use pathway, NPTU Substation Alternative 2, Old Tom Road Causeway improvements, the natural resources facility, SLSs, and WDS.

New NPTU Training Facility Alternatives 1, 2, and 3 are partly located within floodplains (**Figure 3-8**). The floodplain areas under Alternatives 1 and 2 include wetland areas north and south of Old Tom Road, totaling approximately 1.7 and 0.25 acres, respectively. Alternative 3 has a large portion within the floodplain (approximately 80 acres of the approximately 140-acre golf course). Alternative 4 has no floodplain impact. Alternatives 1 and 2 would lead to a partial loss of floodplain function due to stormwater retention facilities and a small portion of the north access drive. However, buildings and structures would not be within the floodplain. Alternative 3 would result in a larger loss of floodplain function, and the stormwater facilities may not accommodate the flood capacity associated with the Cooper River. As a result, Alternatives 1 and 2 are expected to have no significant impacts but may have minor to moderate floodplain impacts, while Alternative 3 is anticipated to have moderate to major impacts.

The southern portion of the NPTU multi-use pathway along Old Tom Road (adjacent to the Red Bank Golf Course and causeway) is located within the 100-year floodplain associated with the Cooper River (**Figure 3-8**). The pathway is proposed within the existing Right of Way (ROW) of Old Tom Road that has been previously developed and maintained. The pathway would be primarily ground level and would not obstruct the flow of floodplain waters. In addition, given the small scale (i.e., width) of the pathway, it is not anticipated to be a significant change in use from the existing ROW of Old Tom Road. Due to the scale of the pathway, the developed nature of the ROW, and the adherence to BMPs and applicable regulations and conditions, the action is anticipated to have no significant impacts but may have negligible to minor indirect impacts to floodplains.

NPTU Substation Alternative 2 is located near, but not within, the 100-year floodplain (**Figure 3-8**). The proposed action would avoid construction of the substation within the floodplain. Construction of NPTU Substation Alternative 2 is anticipated to have no impact on floodplain areas, floodplain capacity and flow, and floodplain use.

The Old Tom Road Causeway action alternatives would have similar impacts related to the construction of the causeway improvements within floodplain areas (**Figure 3-8**); the reduction of fill for Alternatives 2 and 3 would generally be offset by the additional impacts associated with the bridge required for the multi-use pathway. The alternatives would include widening of the causeway with a narrow strip of fill within the floodplain adjacent to the existing causeway and/or the construction of a pathway bridge. The causeway culvert extension and the bridge would be designed not to impede flow. The action alternatives would represent a minor loss of floodplains, but are not anticipated to significantly change storage capacity, flow, or connectivity of floodplains. Due to the scale of the alternatives, and the adherence to BMPs and applicable regulations and conditions, floodplain impacts are anticipated to be minor.

The 1.25 km Goose Creek LTR would result in negligible indirect impacts to floodplains (**Figure 3-9**). Clearing and maintaining of range vegetation is not anticipated to change storage capacity, flow, or connectivity of floodplains. In addition, the origin node pad is proposed for a previously cleared and developed area of Complex D and the end node pad is proposed on land cleared and maintained by the Naval Munitions Command and would not be a significant change in use. Footprints of the node pads are de minimis in respect to the available floodplains at JBC. Due to the scale of the pads, developed nature of the node areas, and the adherence to BMPs and applicable regulations and conditions, floodplain impacts are anticipated to be negligible to minor.

The proposed 2.05 km SAUSR LTR would result in negligible indirect impacts to floodplains (**Figure 3-9**). Proposed development within the floodplain along the LTR is limited to the construction of three 10 ft by 10 ft concrete pads for the end nodes (the origin node pad is located outside of the floodplain), and the clearing of woody vegetation to maintain line-of-sight. Due to the scale of each pad, and the adherence to BMPs and applicable regulations and conditions, floodplain impacts are anticipated to be negligible to minor.

The natural resources facility is located near, but not within, the 100-year floodplain (**Figure 3-10**). The proposed action would avoid construction of the facility within the floodplain by expanding on the opposite side of the existing facility from the floodplain areas. Construction of the natural resources facility is anticipated to have no effect on floodplains.

SLS 66 is located within the 100-year floodplain and SLS 730 is located directly adjacent to the 100-year floodplain and within the 500-year floodplain, and SLS 709 is located within the 500-year floodplain (**Figure 3-11**). The proposed action would not represent a change in use or capacity of the floodplain. The SLSs are anticipated to have no long-term effects on floodplain use and represent no net changes to floodplain capacity or flow. As a result, the proposed SLSs are anticipated to have negligible impacts on floodplains.

Portions of the Central and East WDS are located within the 100-year floodplain (**Figure 3-12**). These areas are within the existing ROWs and easements. As the WDS system is underground, floodplain impacts are limited to temporary disturbance during construction for the replacement of pipe and installation of hydrants. No long-term direct impacts to floodplains are anticipated. As a result, the proposed WDS repairs are anticipated to have negligible impacts to floodplains.

In-water Proposed Action components at JBC-WS (i.e., Goose Creek floating dock and Pier Bravo) are primarily located within the open waters of the Cooper River and Goose Creek, but these actions may also include shoreline interactions located within the 100-year floodplain (**Figure 2-3**). However, these actions do not propose a change to the existing use or capacity of the already-developed areas or to further develop these associated shorelines and would not impede the flow of floodplain waters. As a result, the in-water Proposed Action components are anticipated to have no or negligible impacts on floodplains.

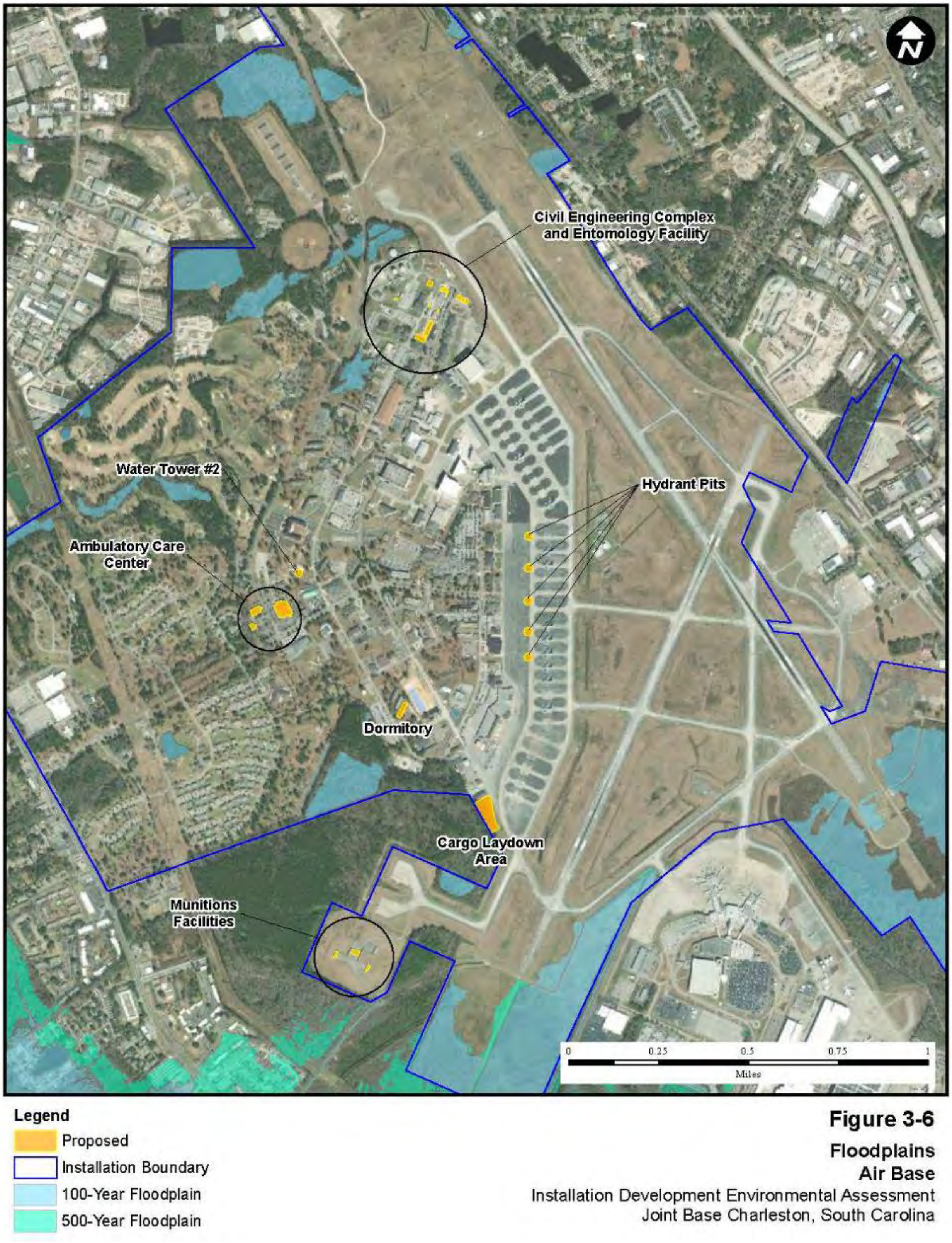


Figure 3-6

Floodplains
Air Base
Installation Development Environmental Assessment
Joint Base Charleston, South Carolina

Figure 3-7

Floodplains
NAAF

Installation Development Environmental Assessment
Joint Base Charleston, South Carolina

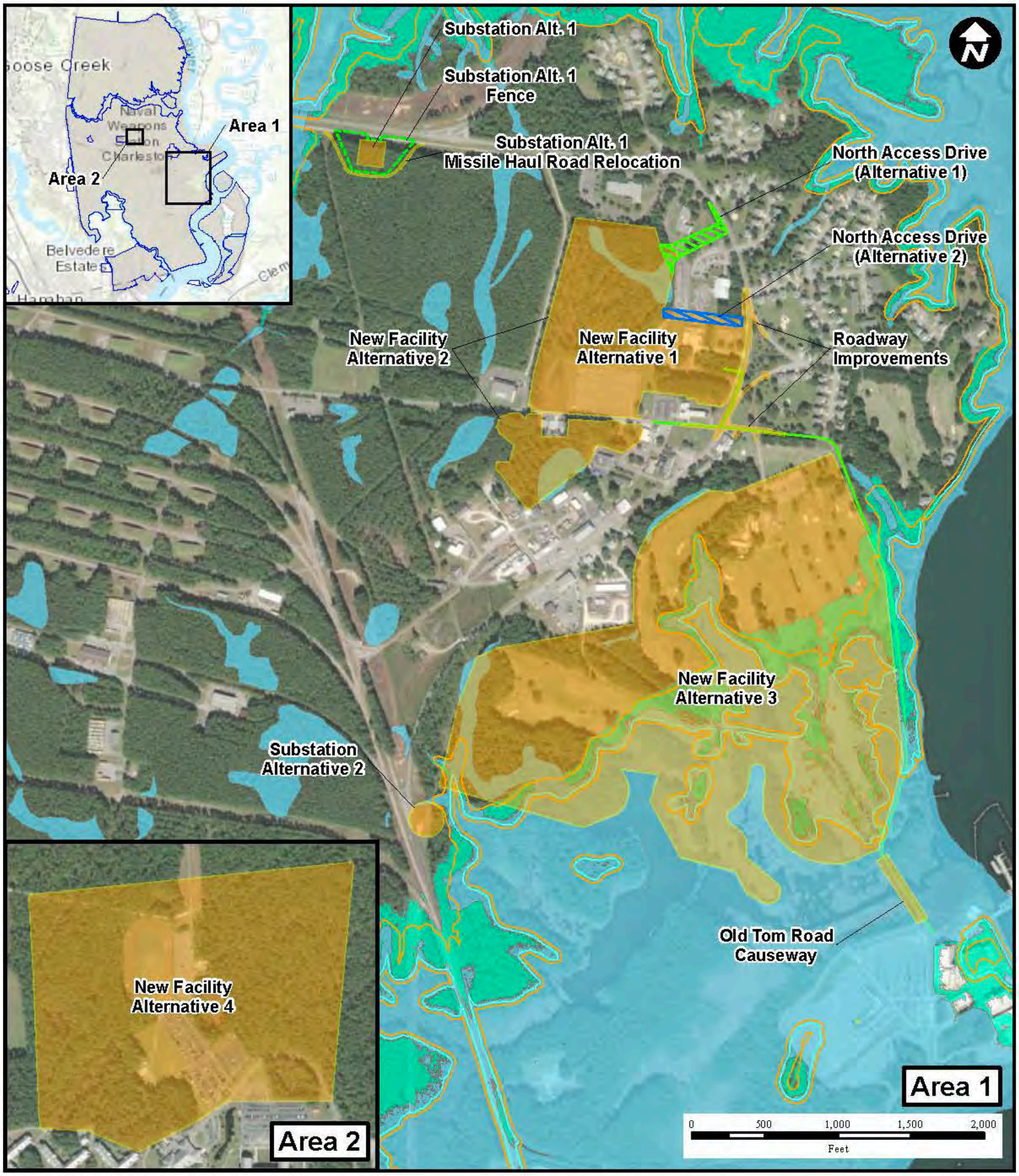


Figure 3-8

Floodplains
NPTU Simulation Expansion

Installation Development Environmental Assessment
Joint Base Charleston, South Carolina

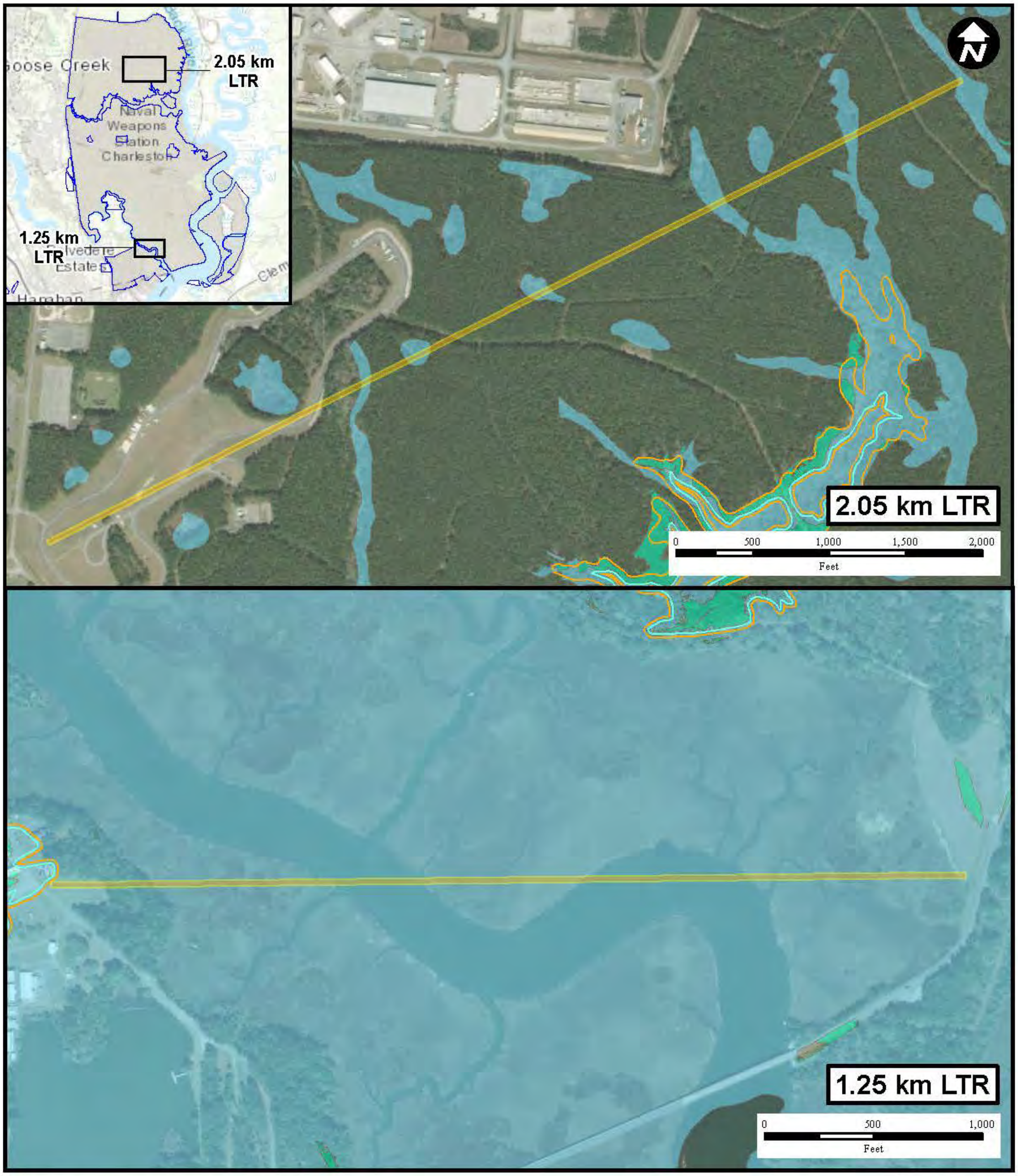


Figure 3-9

Floodplains
Laser Test Ranges
Installation Development Environmental Assessment
Joint Base Charleston, South Carolina

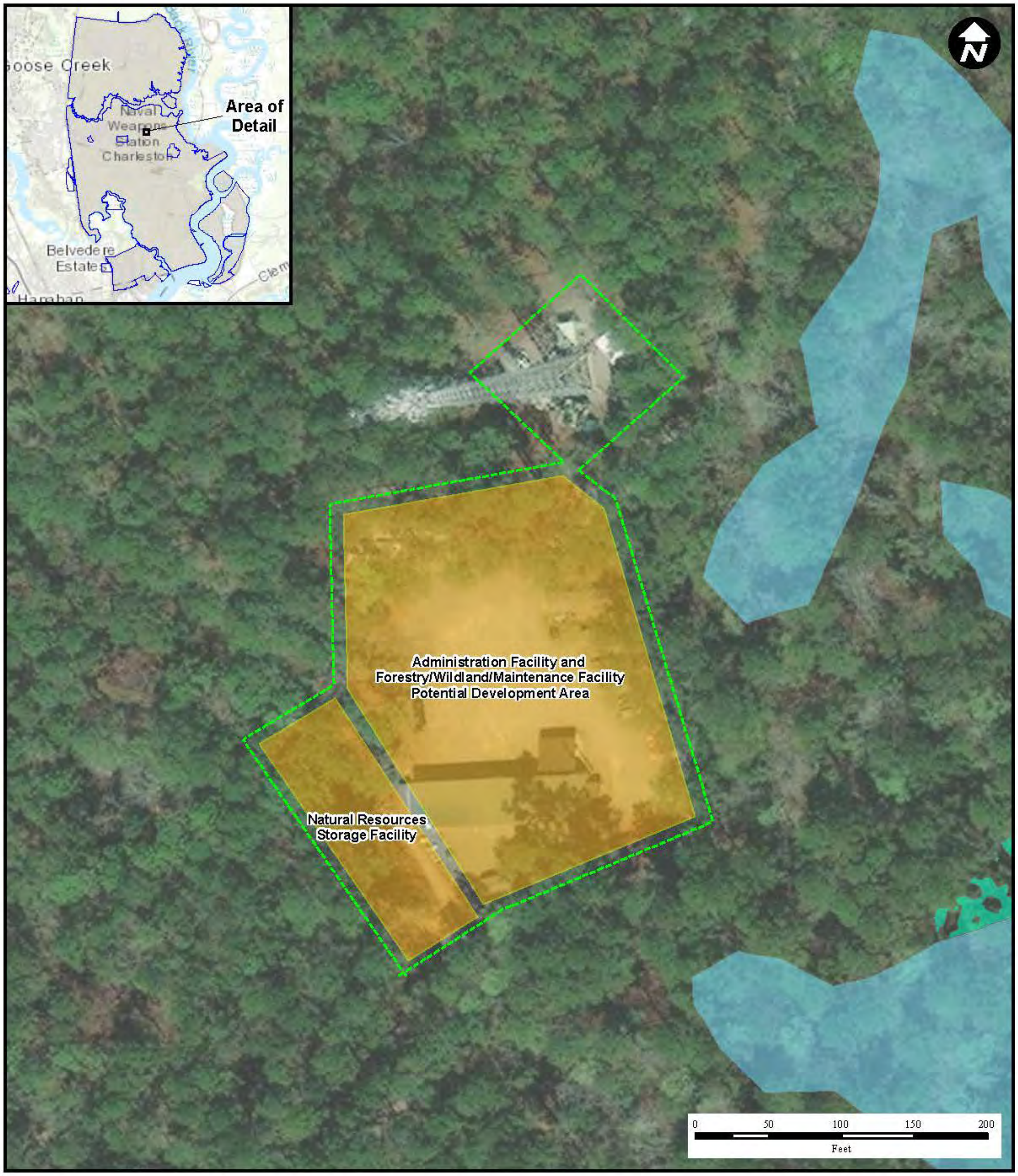


Figure 3-10

Floodplains

Natural Resources Storage Facility

Installation Development Environmental Assessment
Joint Base Charleston, South Carolina

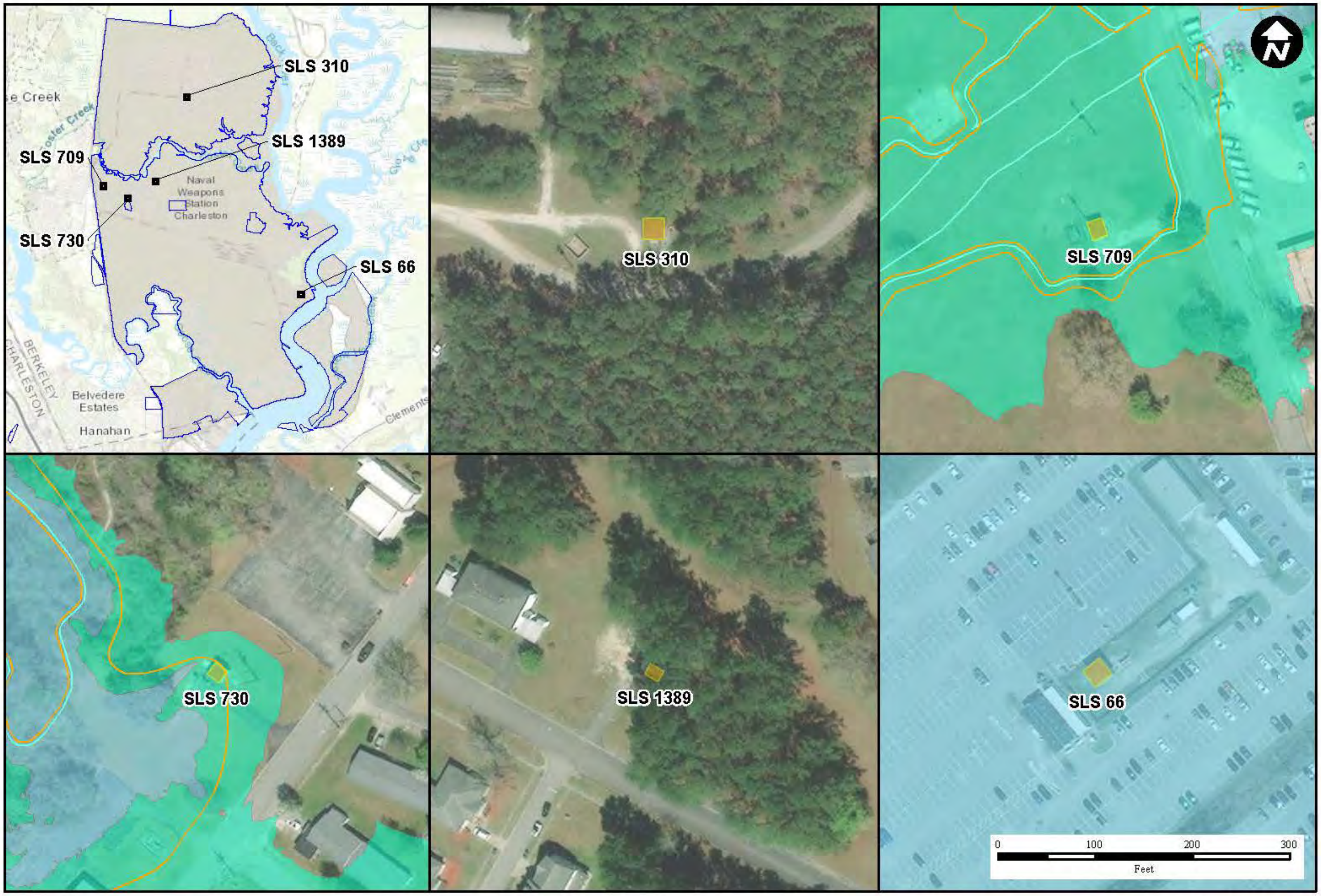


Figure 3-11

Floodplains
Sewer Lift Stations
Installation Development Environmental Assessment
Joint Base Charleston, South Carolina

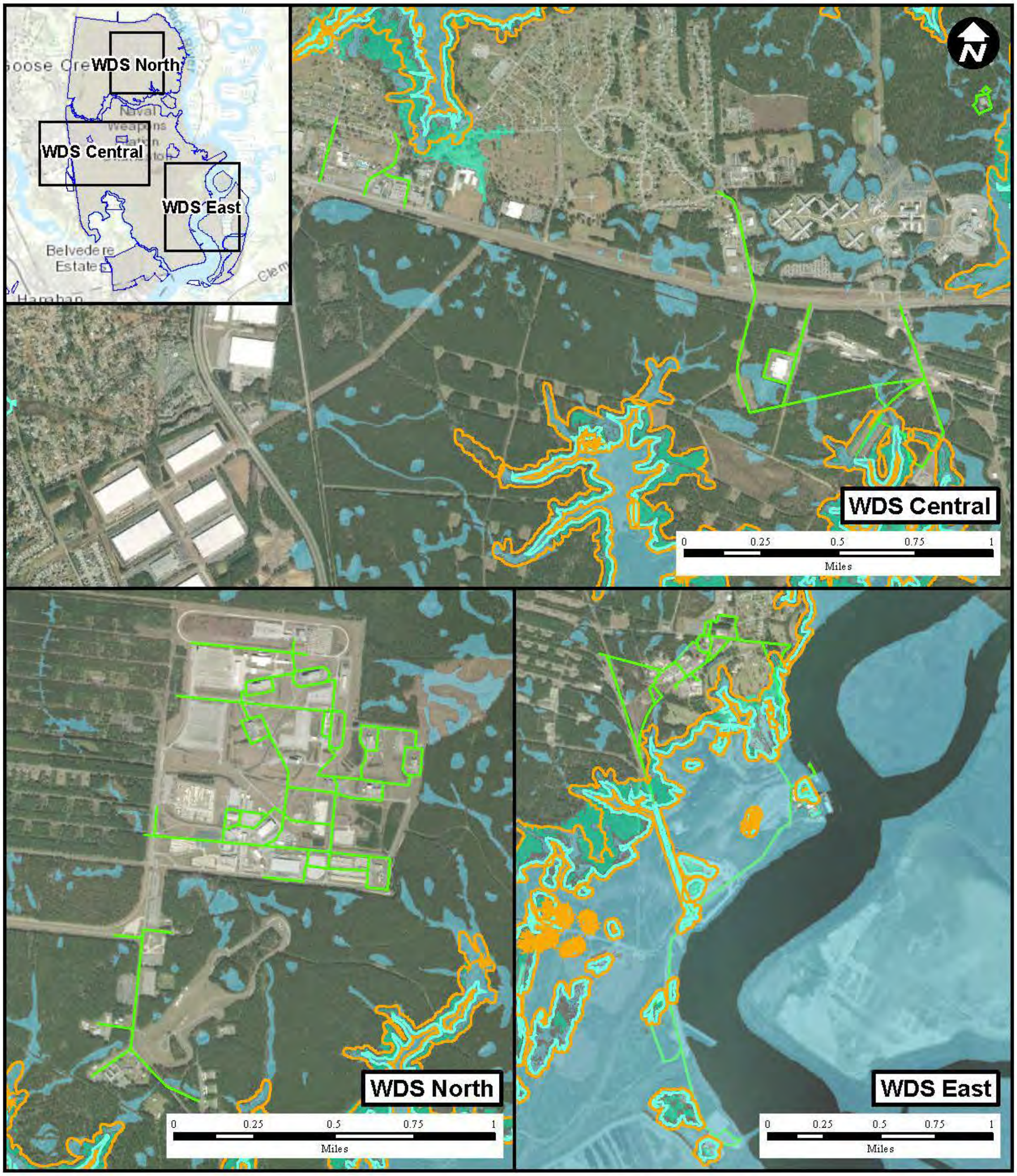


Figure 3-12

Floodplains
Water Distribution System
Installation Development Environmental Assessment
Joint Base Charleston, South Carolina

3.4.2.3 Wetlands

The Proposed Action at JBC-AB and NAAF would have no significant impacts on wetlands because these actions would not occur within or in the vicinity of wetlands (**Figure 3-13 and 3-14**).

Proposed Actions at JBC-WS located within or in the vicinity of the wetlands include the New NPTU Training Facility, multi-use pathway, Old Tom Road Causeway improvements, LTRs, and WDS.

The New NPTU Training Facility alternatives would result in indirect wetland impacts (**Figure 3-15**). Alternative 1 would result in the loss of up to approximately 1.7 acres of wetlands in the northern portion of the parcel to accommodate a stormwater retention pond and a small portion of the north access drive. Alternative 2 reduces wetland impact relative to Alternative 1 by utilizing a two-story Training Support Building, reconfiguring the North Access Drive, and shifting some of the parking to the parcel of land south of Old Tom Road and would result in the loss of up to approximately 0.25 acre of wetlands. Alternative 3 would result in the loss of up to approximately 8 acres of wetlands. Alternative 4 would result in the loss of up to approximately 16 acres of wetlands. Wetland impacts from the alternatives would be permitted through USACE, jointly with the OCRM, to ensure wetland impacts are appropriately avoided, minimized, and mitigated in accordance federal and state regulations. The proposed New NPTU Training Facility would also adhere to USACE permit conditions and BMPs. As a result, impacts to wetlands from Alternatives 1 and 2 are anticipated to be minor to moderate, while the impacts associated with Alternatives 3 and 4 are anticipated to moderate to major.

The maintained portions of NPTU multi-use pathway ROW are not located within wetlands but are adjacent to potential wetland areas in some locations. It is not anticipated that the construction of the pathway would require impacts to wetlands. However, if the pathway alignment required impacts to wetlands, they would be limited to perpendicular culvert or bridge crossings of existing drainage areas. If required, impacts would be permitted through USACE jointly with OCRM. As a result, the NPTU multi-use pathway is anticipated to have no significant impacts to wetlands but may result in negligible indirect impacts to wetlands.

NPTU Substation Alternative 2 is located near, but not within, wetlands (**Figure 3-8**). The proposed action would avoid construction of the substation within wetland areas. Construction of NPTU Substation Alternative 2 is anticipated to have no impact on wetlands.

The Old Tom Road Causeway alternatives would result in wetland impacts (**Figure 3-15**). Under Alternative 1, the widening of the existing causeway would require permanent impacts to wetlands along the edge of the causeway, approximately 0.46 acre. Alternatives 2 and 3 would reduce these impacts but would require impacts associated with a multi-use pathway bridge. Impacts for the causeway improvement alternatives would be permitted through USACE jointly with OCRM. As a result, Alternative 1 is anticipated to have minor impacts to wetlands. Alternatives 2 and 3 are anticipated to result in negligible to minor wetland impacts.

The western portion of the 1.25 km Goose Creek LTR would involve converting a 30-ft wide by 200 ft long corridor from mixed forested to herbaceous wetlands. The corridor passes through 0.14 acre of freshwater wetland (**Figure 3-16**). No impacts are anticipated to the wetland marsh areas associated with Goose Creek. The 2.05 km SAUSR LTR would result in the conversion of a 30 ft corridor through freshwater wetlands from planted pinelands to herbaceous wetlands (**Figure 3-16**). The angle of the 2.05 km LTR was selected because it is roughly perpendicular to the wetland swales and limits clearing required to the maximum extent practicable. As the wetland area within the LTR, approximately 0.82 acre, would not be lost, the conversion would allow the wetlands to maintain storage and filtering capacity in an herbaceous community. Impacts would be limited to initial clearing of the wetland and the maintaining of the wetland in an herbaceous state. Wetland impacts would be permitted through USACE jointly with OCRM. As a result, the 1.25 km Goose Creek LTR and 2.05 km SAUSR LTR are anticipated to have no significant impacts but may have minor impacts on wetlands.

The JBC WDS repairs are within the existing ROWs and easements. Generally, the ROW and easements are not located within wetlands, but some areas may be within or adjacent to potential wetland areas. As the WDS system is underground, the water line installation method of HDD would be used to drill underneath potential wetlands to avoid impacts. However, de minimis impacts may be required for bore pits or trenches. If required, impacts would be permitted through USACE jointly with OCRM. As a result, the WDS repairs are anticipated to have no significant impacts but may result in negligible indirect impacts.

In-water Proposed Action components at JBC-WS (i.e., Goose Creek floating dock and Pier Bravo) are primarily located within the open waters of the Cooper River and Goose Creek (**Figure 3-15**). The shorelines in these areas include narrow bands of marsh immediately adjacent to armored shoreline where the piers and docks are connected to uplands. Impacts for the pier demolition are limited to temporary impacts during construction and demolition; no permanent wetland or open water impacts are anticipated. The Goose Creek floating dock would result in a permanent loss of open waters associated with the installation of piles, but the footprint of the open waters loss would be negligible to minor. Wetland and open water impacts would be permitted through USACE jointly with OCRM. As a result, in-water actions are anticipated to have no significant impacts but may have negligible to minor impacts on wetlands and open waters.

Figure 3-13

Wetlands
Air Base
Installation Development Environmental Assessment
Joint Base Charleston, South Carolina

Figure 3-14

Wetlands
NAAF

Installation Development Environmental Assessment
Joint Base Charleston, South Carolina

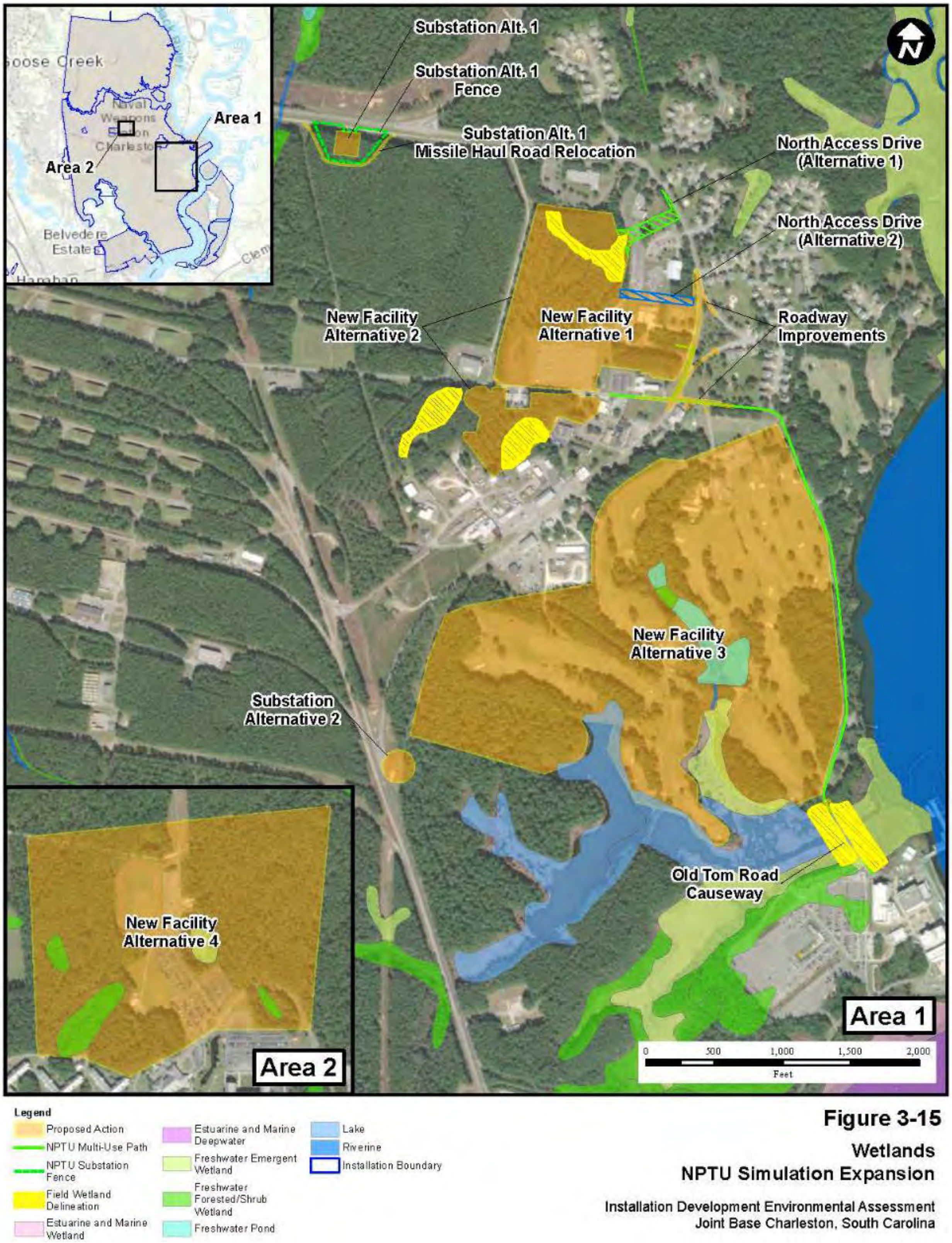


Figure 3-15
Wetlands
NPTU Simulation Expansion

Installation Development Environmental Assessment
Joint Base Charleston, South Carolina

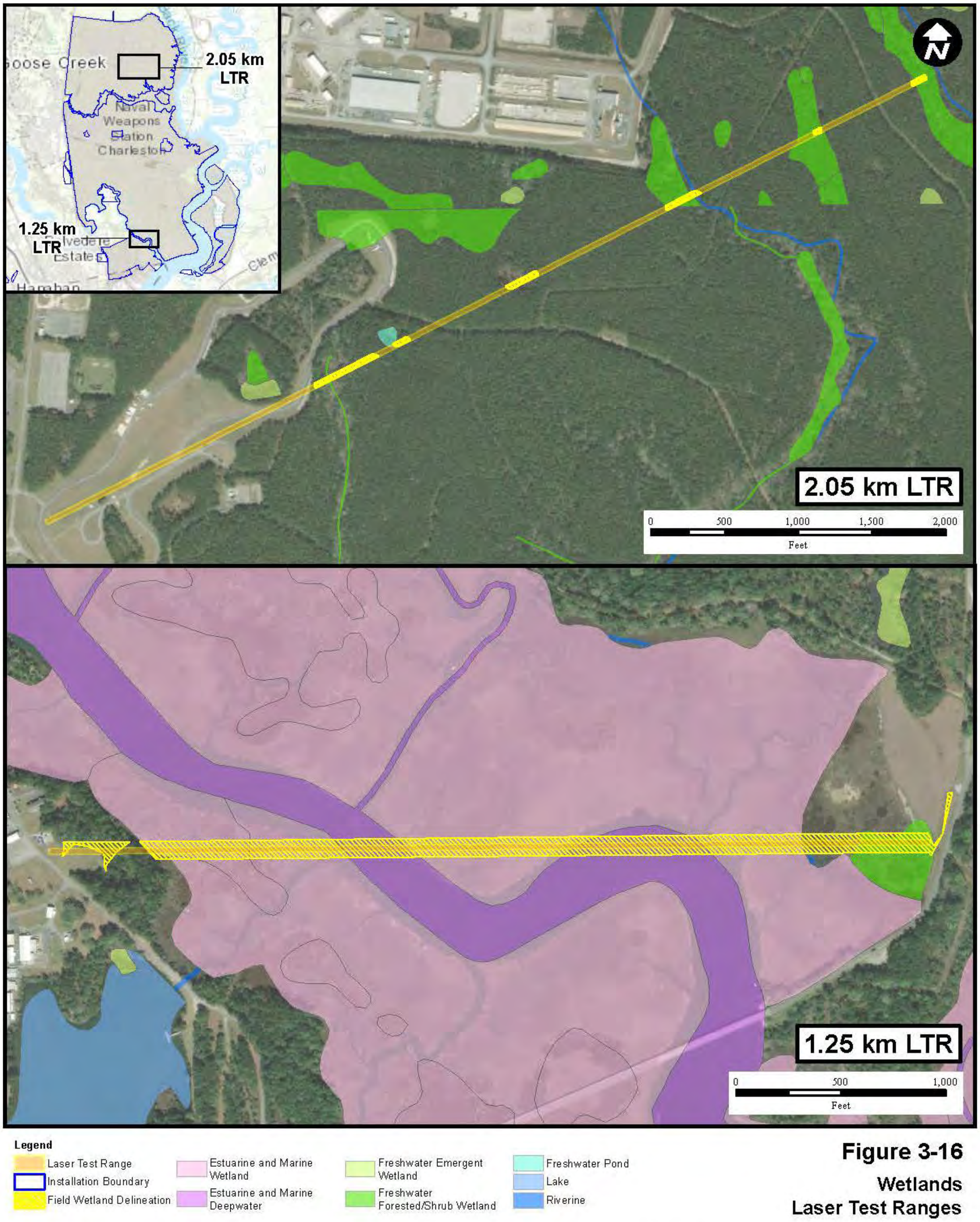


Figure 3-16
Wetlands
Laser Test Ranges

Installation Development Environmental Assessment
Joint Base Charleston, South Carolina

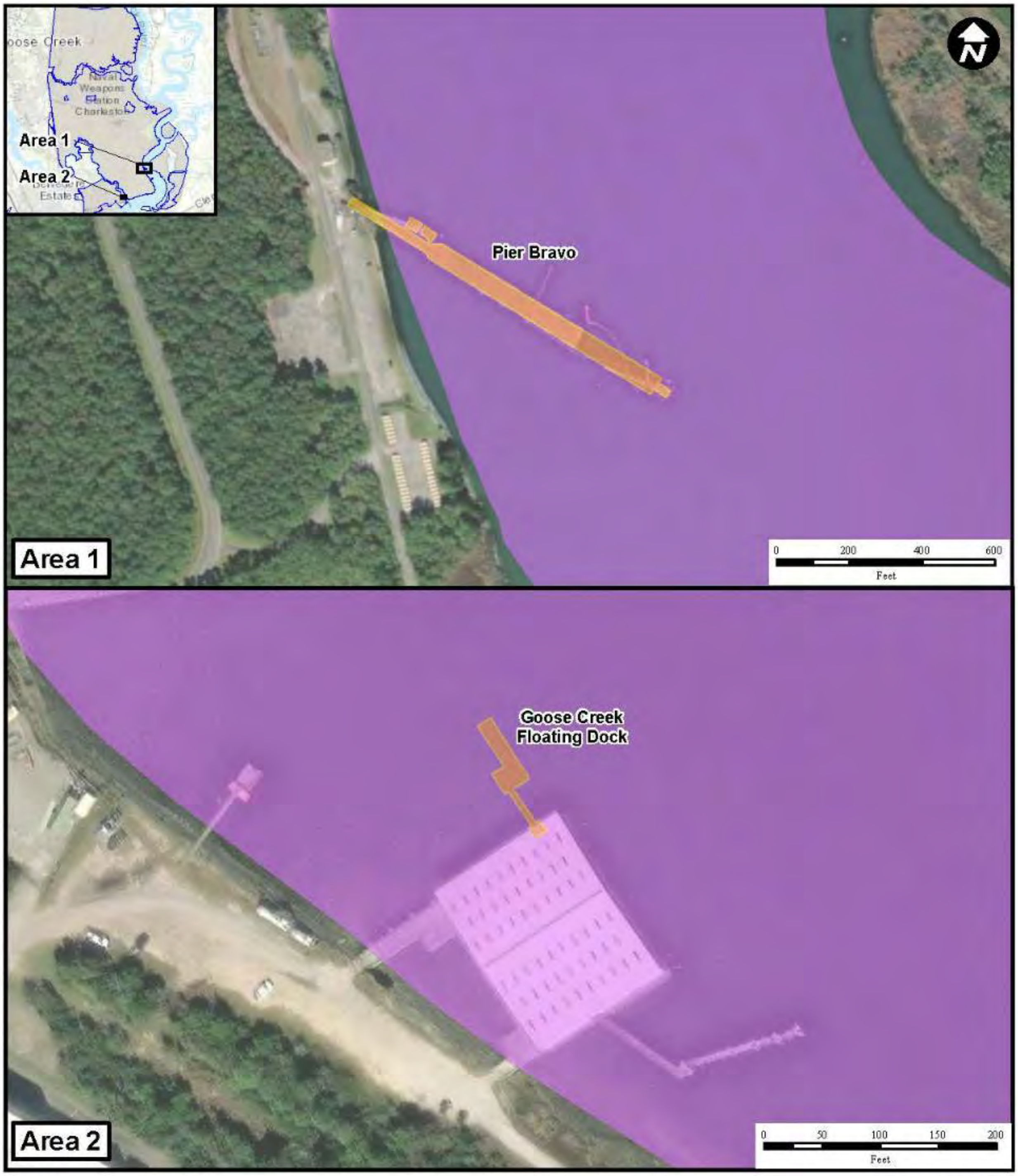


Figure 3-17

Wetlands

Weapons Station Waterfront Proposed Actions

Installation Development Environmental Assessment
Joint Base Charleston, South Carolina

3.4.2.4 Groundwater

The proposed action would have no significant impacts on groundwater. None of the Proposed Action components would require use of groundwater, and demolition and construction activities would not require excavation to the depth of groundwater. In addition, the actions would not affect the recharge of groundwater. Impacts to water supply for these alternatives would be limited to nominal temporary water use during construction and demolition (e.g., concrete mixing, spraying for dust control, etc.); no significant impacts or long-term impacts are anticipated.

3.5 SAFETY AND OCCUPATIONAL HEALTH

3.5.1 Affected Environment

At JBC, safety issues are those that directly affect the protection of human life and property, and principally involve aviation, munitions, and fire prevention. In addition, JBC personnel are protected by observing Occupational Health And Safety Act (OSHA) standards, AFIs and/or USN Safety and Occupational Health standards as appropriate, and the JBC safety and Resource Conservation and Recovery Act (RCRA) requirements, as described in **Section 3.6**, Hazardous Materials/Waste.

Safety and accident hazards can often be identified and reduced or eliminated. Necessary elements for an accident-prone situation include the presence of the hazard itself, together with the exposed and susceptible population. Hazardous activities can include construction, demolition, transportation, maintenance and repair activities, the creation of noisy environments, and certain military activities. This analysis addresses the safety implications from construction, demolition, renovation, and transportation activities associated with the Proposed Actions. The safety-related region of influence for this EA corresponds to the footprints of the individual Proposed Action components where construction, demolition, renovation, and operational activities would occur, as shown in **Figure 2-1** through **2-11**.

3.5.1.1 Construction/Demolition/Renovation Safety

Occupational safety and health involve the protection of human life and property. Personnel would follow Environmental, Health and Safety Policy and Procedures and OSHA requirements. Any work on installation property would also abide by JBC’s health and safety requirements as applicable. Adherence to asbestos worker protection measures, including National Emission Standards for Hazardous Air Pollutants regulations, would ensure worker protection where potential Asbestos Containing Materials (ACM) are anticipated or encountered.

3.5.1.2 Transportation Safety

The subject installations are located within Charleston County (JBC-AB and JBC-WS), Berkeley County (JBC-WS), and Orangeburg County (NAAF).

Major highway routes in the vicinity of JBC include Interstate 26 and Interstate 526, four U.S. Highways, U.S. Routes 17, 52, 78, and 176, and ten state routes. These routes provide access to major Charleston metropolitan area cities including Charleston, North Charleston, Mount Pleasant, Summerville, and Goose Creek. Highways in the vicinity of NAAF include U.S. Highways 178 and 321, and three state routes. The majority of vehicle traffic to and from the

NAAF occurs along Highway 178 from the Orangeburg, SC metropolitan area approximately 12 miles southeast of the property.

Ground transportation within the installations consists of a network of roadways for vehicular transportation of personnel. Activities associated with the proposed action would occur within or near the existing developments and/or their adjacent parking areas. These areas are served by a network of existing paved roads and parking areas.

3.5.1.3 Laser Hazards

FSO communication systems, such as those used in the 1.25 km and 2.05 km LTRs, typically operate in the wavelength of 780–1,600 nanometer (nm). This range falls between the Near Infrared (700–1,400 nm) and the Far Infrared (beyond 1,400 nm) regions. The portion that falls within the Near Infrared region is considered as the retinal hazard region. Typical FSO communications systems are designed to operate in the eye-safe wavelength and slightly higher in power to transmit over a certain range. Therefore, they usually fall into a Class 1M laser classification, designated as “safe with no viewing aids”. Examples of viewing aids include prescription eyeglasses, binoculars, or telescopes (Jin Wei Lai 2016).

3.5.2 Environmental Consequences

Proposed Action components were evaluated individually to determine impacts to safety and occupational health. The proposed developments were comprehensively evaluated for their impact on safety and occupational health due to all actions related to construction, demolition, renovation, or a combination thereof. The Proposed Action components were analyzed as a whole due to the similarities in their respective development categories.

3.5.2.1 Construction/Demolition/Renovation Safety

During construction, demolition, and renovation of the Proposed Actions, construction safety would be an inherent priority. JBC requires its contractors and heavy equipment operators to adhere to all applicable safety regulations and guidelines. Direct construction adverse impacts would be negligible, localized, and short-term. No significant impacts are expected.

During construction, demolition, and renovation, work would be scheduled to minimize any interruptions to utility services and avoid disturbance to on-base personnel. Also, any brief interruptions while switching from old infrastructure would be scheduled through the Base outage process to minimize potential impacts. There are no plans for extended durations of utility outages. Direct adverse impacts would be negligible, localized, and short-term. No indirect impacts are expected.

All new facilities would be constructed to meet OSHA Standards and compatible with the applicable DoD, USAF, USN, and JBC design standards. Additionally, the new facilities would be compatible with the applicable DoD antiterrorism/force protection requirements per the UFC and comply with sustainable design principles as mandated by EO 13990, *Protecting Public Health and the Environment and Restoring Science To Tackle the Climate Crisis*. The NPTU Simulation Expansion elements will be constructed to USN Safety and Occupational Health (NAVOSH) Standards, which includes military-unique standards for simulated shipboard environments. The

NAVOSH Program requirements are tailored to meet the militarily unique aspects of the fleet, including the combat roles of warships.

3.5.2.2 Transportation Safety

JBC is serviced by a network of existing paved roadways. There would be a temporary increase in traffic from vehicles and equipment during construction. These activities would require the temporary employment of workers. Through development of the New NPTU Training Facility and the Old Tom Road Causeway Improvements, temporary minor short-term, and direct adverse impacts are anticipated due to potential reroutes or road closures associated with the proposed construction. Long-term direct positive impacts are anticipated as a result of reduced traffic flow

with the construction of the multi-use pathway and the improved causeway. Both would provide a safer transportation environment for personnel commuting on and off base to the New NPTU Training Facility and associated facilities. No indirect impacts are expected.

Once construction is completed, transportation patterns are expected to revert to pre-construction/renovation direction and frequency. Sufficient parking would be available in the new lot constructed as a part of the New Facility.

All other Proposed Action components would result in temporary negligible impacts to the traffic environment. Intermittent traffic delays, detours, and temporary road closures may occur in the vicinity of the proposed developments. To avoid congestion impacts, deliveries could be scheduled outside peak traffic times and alternate access gates could be utilized. Additionally, heavy construction vehicles may be stored on-site for the project's duration, resulting in minimal extra trips. Traffic delays would be temporary in nature, ending once construction activities have ceased. As a result, no long-term or significant impacts on transportation infrastructure are anticipated from the Proposed Actions.

3.5.2.3 Laser Hazards

The NIWC Atlantic laser ranges, as defined the Secretary of the Navy Instruction (SECNAVINST) 5100.14E and Office of the Chief of Naval Operations Instruction (OPNAVINST) 5100.27, are approved laser firing ranges and can safely support firing Class I to IV laser systems. The laser classification, power output, and identification/mitigation of the associated hazards (catastrophic, critical, moderate, negligible) is part of the NIWC Atlantic Laser Safety Standard Operating Procedure (SOP). The SOP has been developed to designate regulations and procedures for outdoor use of laser products at the NIWC Atlantic laser range facilities. The SOP complies with the parameters specified by the Range Laser Safety Certification Report (RLSC) from the Naval Surface Warfare Center – Dahlgren, the Department of the Navy Technical Lead Agent (TLA) for Laser Safety.

Prior to any outdoor laser usage, a Navy personnel with Laser Safety Specialist (LSS) certification will conduct a laser hazard evaluation of the laser product. If the LSS determines that the accessible emissions from the laser product are at or below the Class 3R accessible emissions limit (AEL), then the requesting employee will submit to the command Laser Systems Safety Office (LSSO) a test plan to outline the laser products to be used, laser eye protection, alignment/test procedures, authorized personnel, and emergency procedures. If the laser product exceeds the Class 3R AEL, then the requesting employee will submit a data package to the Navy Laser Safety Review Board chair as instructed in the OPNAVINST 5100.27B.

Prior to conducting operations, all testing will be coordinated with surrounding JBC stakeholders for situational awareness and warning signs/markers will be posted around the installation to warn and prohibit entry by unauthorized personnel. Testing will be conducted at one week intervals, two to three times a year (NIWC 2021, NIWC 2022). The command LSSO or Technical Laser Safety Office (TLSO) will act as a safety officer and preside over laser testing at all times to ensure all personnel within the range area are familiar with the associated hazards and the laser testing SOPs. Vehicle and boat traffic control will also be monitored and controlled to avoid any unintentional personnel access to the ranges. All laser testing activity will be suspended at any time the safety of the general public or local wildlife is in question.

Due to the implementation of proper hazard control measures and compliance with applicable safety standards, no adverse impacts are expected to the safety environment from the Proposed Action LTR ranges.

3.6 HAZARDOUS MATERIALS/WASTE

3.6.1 Affected Environment

3.6.1.1 Solid Waste

Solid wastes (municipal and industrial) are generated from all areas of JBC, including housing, municipal operations, office complexes, industrial facilities, and construction/demolition areas. Solid waste is managed in accordance with the JBC Installation Solid Waste Management Plan (ISWMP) that establishes an integrated approach to managing solid waste issues at JBC (USAF 2020).

Construction and Demolition Waste (C&D) is recycled, when possible, with a diversion rate of 60%. Municipal Solid Waste (MSW) such as waste from offices, commissaries, food service operations, warehouses, base exchange (BX), schools, laboratories, and dormitories, is recycled with a diversion rate of 40%. Contractors would use the Bees Ferry landfill for JBC-AB and the Berkeley County Water and Sanitation Authority landfill for JBC-WS, located in Charleston and Berkeley County, respectively (USAF 2020). The JBC ISWMP does not provide details for waste disposal at the NAAF, however there are several eligible C&D-accepting facilities in the Orangeburg county region, including the Orangeburg County Landfill.

In South Carolina, landfills are classified Class 1, 2 or 3 as defined in SCR61-107.19 Part III. Municipal and industrial SWs are disposed in a Class 3 landfill. C&D debris, and other materials as prescribed in the regulation, are disposed in a Class 2 landfill. The Bees Ferry landfill is 312 acres and is permitted to accept 317,000 tons of class 3 waste per year (SCDHEC 2022). This landfill does not accept C&D, therefore any waste generated at JBC-AB may be transported to the Berkeley County Water and Sanitation landfill (Charleston County, 2019). Bees Ferry has the capacity to accept waste for another 19 years (SCDHEC 2022) using existing permitted space. The Berkeley County Water and Sanitation landfill occupies 195 acres in southern Berkeley County and is permitted to accept up to 215,000 tons of class 2 solid waste per year and

1,000,000 tons of class 3 solid waste per year. This landfill has the capacity to accept waste for another 12 years using existing permitted space (SCDHEC 2022). This facility accepts C&D. The Orangeburg County Landfill accepts 81,000 tons of class 2 solid waste per year and has the capacity to accept for another 32 years.

Solid waste storage and collection at JBC is primarily the responsibility of the 628 CES/CEO who has contracted these activities. Solid waste collection is the responsibility of the solid waste management contractors. Contractors would be required to recycle construction, renovation, and demolition debris to the maximum extent practicable in accordance with installation policy. Recycled material is tracked by type, weight, and income from, or cost for, recycling. Construction, renovation, and demolition debris such as concrete, asphalt, and rebar is also recycled, and debris that cannot be recycled is properly disposed of offsite in a C&D landfill. Recycling collection is done separately from solid waste collection, and therefore does not impact collection of solid waste from buildings or dumpsters.

Solid waste collection and storage at the NAAF would be conducted in concurrence with existing solid waste plans present at the NAAF.

3.6.1.2 Hazardous Materials and Waste

JBC uses hazardous materials in its day-to-day operations and has implemented a hazardous waste management process that includes the use of a Hazardous Material Pharmacy (HAZMART). The HAZMART includes a storage facility and procedures to control the acquisition, storage, issue, and disposal of hazardous materials. HAZMART works with the Environmental Management, Bio-environmental, and Safety Offices to ensure only approved products are used and waste is minimized. Contractors on the base must provide information about any hazardous materials they bring on site.

Hazardous wastes generated from site operations are stored and handled according to the JBC-AB RCRA Part B permit (SC3 570 024 460) and JBC-WS RCRA Part B permit (SC8 170 022 620). The NAAF does not have a RCRA Part B permit. JBC-AB and JBC-WS are regulated as Large Quantity Generators of hazardous waste and maintain the USEPA Identification Numbers SC3570024460 and SC8170022620, respectively. Hazardous waste at JBC-AB and JBC-WS is primarily generated by base operations including aircraft maintenance, transportation, army prepositioning activities, and other tenant activities. In the latest Biennial Waste Report to USEPA detailing generation volumes in 2019, JBC-AB and JBC-WS reported generating 30.4 tons and 47.6 tons of waste of hazardous waste, respectively (USEPA 2023a and 2023b). The NAAF is not registered as a Large Quantity Generator. The NAAF is a separate entity from JBC-AB and JBC-WS and disposes of their own waste accordingly.

JBC has implemented a Hazardous Waste Management Plan (HWMP) that identifies hazardous waste generation areas and addresses the proper labeling, storage, and handling of these wastes, as well as record keeping, spill contingency and response requirements, and education and training of appropriate personnel (USAF 2019c). All hazardous waste generated by contractors is handled and disposed of in accordance with federal, state, local, and USAF regulations, with coordination of the 628 CES for manifest signatures.

The DoD established the Defense Environmental Restoration Program (DERP) to facilitate thorough investigation and cleanup of contaminated sites on military installations. The Installation Restoration Program (IRP) and the Military Munitions Response Program (MMRP) are components of the DERP. 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.

The Environmental Restoration Program (ERP) is JBC's initiative to address DERP. The ERP is used by the USAF and supported component missions to identify, characterize, clean up, and restore sites contaminated with toxic and hazardous substances, low-level radioactive materials, petroleum products, or other pollutants and contaminants. The ERP has established a process to evaluate past disposal sites, control the migration of contaminants, identify potential hazards to human health and the environment, and remediate the sites. JBC-AB and JBC-WS contain 51 and 83 active and closed ERP sites, respectively. These areas are commonly referred to as SWMUs and Areas of Concern (AOC). No active ERP sites occur at NAAF.

New facilities can be constructed within certain ERP sites depending on the level of contamination, clean-up efforts, and land use controls (LUC). Approval of new construction within ERP sites must be obtained from the Facilities Utilization Board and coordinated with the 628th Civil Engineering Squadron/Asset Management Flight (628 CES/CEAN) and SCDHEC.

3.6.1.3 PFAS Chemicals

The DoD has identified certain per- and polyfluoroalkyl substances (PFAS) as emerging contaminants of concern which affected installations across the USAF. Perfluorooctane sulfonate (PFOS), perfluorooctanoic acid (PFOA), and perfluorobutanesulfonic acid (PFBS) are components of Aqueous Film Forming Foam (AFFF) that the USAF began using in the 1970s as a firefighting agent to extinguish petroleum fires.

JBC-AB and the NAAF both contain fire stations, which have historically been used as PFAS storage sites. Details on the history of PFAS storage in these areas are provided in **Section 3.6.2.2**.

SWMU 52 at JBC-AB is the site of a fire trainer retired in 1992. The trainer was used approximately once every six weeks, however information regarding which extinguishing agents were used on the fires was not available. Therefore, it is unknown whether AFFF was used at this training area. No Proposed Action components are located within close proximity to SWMU 52.

JBC-AB, JBC-WS, and the NAAF all contain fire stations, which have historically been used as PFAS storage sites. Any available details on the history of PFAS storage in these areas is provided in **Section 3.6.2.3**.

On March 14, 2023, USEPA announced the proposed National Primary Drinking Water Regulation (NPDWR) for six PFAS including PFOA, PFOS, perfluorononanoic acid (PFNA), hexafluoropropylene oxide dimer acid (HFPO-DA, commonly known as GenX Chemicals), perfluorohexane sulfonic acid (PFHxS), and PFBS. The proposed PFAS NPDWR does not require any action until it is finalized. USEPA anticipates finalizing the regulation by the end of

2023 (USEPA 2023e). Establishment of Maximum Contaminant Levels (MCLs) is forthcoming. JBC will abide by all sampling and reporting requirements outlined in upcoming PFAS guidelines.

Should PFAS contaminated soils be identified during construction or demolition activities, disposal of contaminated soil would be required to be disposed of per the most recent USAF PFAS disposal guidelines at the time of development.

3.6.1.4 Toxic Materials

Toxic materials (ACM, lead-based paint (LBP), polychlorinated biphenyls (PCBs), etc.) are regulated under the Toxic Substance Control Act, as promulgated by the USEPA. All identified and potential ACM, LBP, and PCB-containing materials at JBC are addressed and managed in accordance with applicable state and federal regulations. Construction, demolition, and renovation activities in older buildings and infrastructure could result in the generation of toxic wastes (including refrigerants, mercury, asbestos, and LBP). These toxic wastes would be removed, managed, and disposed of prior to and/or during the demolition in accordance with their respective management plans. The presence of any on-site toxic materials would be addressed as part of construction and demolition efforts. Applicable asbestos worker protection measures and adherence to National Emission Standards for Hazardous Air Pollutants regulations would ensure proper handing and safety requirements are met.

3.6.2 Environmental Consequences

Proposed Action components were evaluated individually to determine impacts due to hazardous materials and waste generation. Actions which would result in no adverse impacts are detailed in **Table 3-1**. Proposed Action components with identified impacts, however minor, are detailed in the sections below.

3.6.2.1 Solid Waste

Construction of the New NPTU Training Facility under Alternatives 1, 2, 3, or 4 would result in negligible short-term direct impacts on solid waste generation and disposal as a result of an increase of solid waste generated during construction and renovation activities. After construction and renovation, solid waste generated would be associated with the general trash items disposed of by facility personnel (e.g., food, paper, plastic, etc.). Solid waste would be handled and managed in accordance with JBC's ISWMP. Construction of the NPTU Substation Alternatives 1 and 2, and Old Tom Road Causeway Alternatives 1, 2, and 3 would also result in generation of negligible amounts of solid wastes associated with construction activities. Impacts are expected to be negligible short-term direct impacts to solid-waste generation.

Development of the Laser Test Ranges, Natural Resources Facilities, WDS, and Cargo Laydown Area would result in negligible short-term direct impacts on solid waste generation as a result of tree clearing activities. Green waste generated would be disposed of as detailed by JBC's ISWMP. Solid waste would be generated by the Natural Resources Facility and Cargo Laydown area development as a result of construction activities.

Demolition of Pier Bravo, Water Tower #2, and Dormitory would result in negligible short-term direct impacts on solid waste generation due to material generated during demolition activities.

Development of the NAAF Fire Station Addition would result in negligible short-term direct impacts on solid waste generation as a result of construction activities. Solid waste would be handled and managed in accordance with the JBC's ISWMP.

Several Proposed Action components involve both construction and demolition activities. These include the Sewer Lift Stations, Civil Engineering Complex Shop and Entomology Facility, Munitions Facilities, Ambulatory Care Center, and Hydrant Pit additions. Removal of C&D would be managed in accordance with JBC's ISWMP. Impacts are expected to be negligible short-term direct impacts on solid waste generation. No significant impacts are anticipated.

3.6.2.2 Hazardous Materials and Waste

All fuels and other hazardous materials associated with the Proposed Action would be stored and used in compliance with the regulations and procedures already in place at JBC. Disposal of hazardous waste would be conducted in accordance with applicable regulations and in compliance with JBC's HWMP. Management and recycling of any wastes from proposed construction, demolition, and renovation activities would be managed per the JBC HWMP and JBC ISWMP as appropriate. If a new waste accumulation point is required, the location must be selected in coordination with the Base Hazardous Waste Program Manager. The 628 CES Hazardous Waste Program Manager will designate a location for the point that will minimize the threat of the waste stream to human health or the environment in the event of a release. JBC will comply with the location requirements detailed in JBC's HWMP Section 7.5, *Accumulation Area Management* (USAF 2019c).

Hazardous waste from construction and renovation activities would be managed and disposed of in a manner consistent with the most current HWMP. By maintaining normal procedures via compliance with the management and operations plans, only negligible short-term adverse impacts are anticipated. Construction, demolition, renovation, and generator maintenance under the Proposed Action have the potential to produce very small amounts of hazardous waste above the current waste levels, which would result in negligible long-term impacts to hazardous waste generation and disposal. Overall, no significant impacts are anticipated.

Several elements under the proposed action are located near existing ERP sites at JBC (USAF 2023). ERP sites in the proposed action area are described in **Table 3-8** and shown in **Figures 3-18** through **3-24**.

Table 3-8: ERP Sites Near Proposed Action Area

SWMU/ AOC	Solid Waste Management Unit (SWMU) / Area of Concern (AOC) Description	ERP/ MMRP #	Corrective Action Status	Figure
AOC-B-2	The previous site of a 10,000 gallon Underground Storage Tank (UST) that was used to supply fuel oil to residential boilers for heating purposes. The UST was removed in 1995. In 1997, petroleum constituents were detected in the soil and groundwater. In 2018, in accordance with the 2017 Corrective Action Plan, 1,712 tons of excavated soil were removed from the site. The area was backfilled and 1,500 lbs of chemical oxidant were injected into 26 injection points. (AECOM, 2022a)	TU927	SCDHEC Approved CAP (March 14, 2022)	3-18 3-22
AOC-B-4	AOC-B-4 Building 324 Toluene Concentrations Detected in Groundwater Map.	N/A	NFA	3-22
AOC-G	AOC-G was in operation from the mid-1950s until the 1980s, and during that time, treated wastewater was discharged via outfall into the Cooper River.	ST042	NFA	3-18 3-21 3-22
SWMU 16	The site was the primary landfill used for disposal of solid and liquid wastes generated at JBC-WS between 1941 and 1978.	LF016	NFA	3-19
SWMU 17	The Old Southside Missile and Waste Oil Disposal Area is located in the southern part of JBC-WS, immediately east of SWMU 16. The site was used primarily for surface disposal of solid waste, but oil and missile components were also disposed at the site.	DA017	NFA	3-19 3-22
SWMU 20	Munitions wash area located in the Old South Annex section of JBC-WS.	XE006	NFA	3-19
SWMU 25	Munitions disposal area located at the Old South Annex section of JBC-WS.	XE005	NFA	3-20
SWMU 28	SWMU 28 consists of five underground, industrial waste concrete tanks in the vicinity of Bldgs. 3817 and 3818, located in the South Annex. The tanks were used to collect discharge and other effluent from the buildings.	TU028	NFA	3-20
SWMU 35	Railcar sandblasting area located in the southside of JBC-WS.	CG035	NFA	3-18 3-22
SWMU 36	During its operation, SWMU 36 was an unpaved site serving as the accumulation point for wastes throughout the Naval Weapon Station. Containers were not adequately protected from the weather during storage.	SA036	NFA	3-18 3-22
SWMU 37	Recycling Laydown Area located at the old southside area of JBC-WS.	SA051	NFA	
SWMU 39	Ditch located near building 17 in the old southside section of JBC-WS.	DD054	NFA	3-18 3-22
SWMU 40	The oil contamination could come from three sources: A UST, an Above-Ground Storage Tank (AST), and the former carpenter and joiner shop. Oil contamination is suspected in soil, surface, and groundwater.	CG040	NFA	3-20

Table 3-8: ERP Sites Near Proposed Action Area

SWMU/ AOC	Solid Waste Management Unit (SWMU) / Area of Concern (AOC) Description	ERP/ MMRP #	Corrective Action Status	Figure
SWMU 41	Ditch located near building 320 on the northside of JBC-WS.	DD059	NFA	3-19 3-22
SWMU 42	Ditch located near building 354 on the northside of JBC-WS.	DD064	NFA	3-19 3-22
SWMU 43	RM-2 waste accumulation area. No further action is required for this site.	N/A	NFA	3-23
SWMU 50	Motor Painting Building (Building 354) is located at the northside section of JBC-WS.	ID079	NFA	3-19 3-22
SWMU 54	Carpentry shop located at building 76 at the southside of JBC-WS.	ID082	NFA	3-22
SWMU 60-A	Industrial sanitary sewer lines located on the southside of JBC-WS.	WL060	NFA	3-22
SWMU 60-C	Industrial sanitary sewer lines located on the southside of JBC-WS.	WL060	NFA	3-22
SWMU 83	Oil/Water separator located in building 239.	SS039	NFA	3-20 3-22 3-24
SWMU 137	Entomology shop. LUCs include Groundwater Use Restrictions, Land Use Change Notification. Annual groundwater monitoring for Volatile Organic Compounds (VOCs) and pesticides is required. (AECOM, 2022b)	OT016	CMS (6/30/2008)	3-23
SWMU 139	Former Haz waste storage area no.1. LUCs include Groundwater Use Restrictions, Land Use Change Notification. Annual groundwater monitoring for VOCs and pesticides is required. (AECOM, 2022b)	SD018	RACR (11/10/2009)	3-23
SWMU 147	Fuel hydrant system and UST behind building 672.	TU538	NFA	3-23
TU-929	Building #922 is an active filling station on the Southside. Two USTs holding gasoline were removed and replaced in 1993. Elevated levels of petroleum constituents in the soil and groundwater.	TU929	SCDHEC Approved CAP	3-18 3-22
TU-933	Building #724 is an active filling station. A 1,000 gallon "used oil" UST is located at this location lacked secondary containment and leaked. Elevate petroleum constituents were found at the location.	TU933	NFA	3-22 3-23
TU-936	This site was a filling station located in the POLARIS Missile Facility, Atlantic (POMFLANT). Two USTs were located after the building was demolished and removed in 1996. In 2000 testing found that petroleum constituents were located in the soil and groundwater. In 2002, a groundwater extraction system was installed at the site. All tanks have been removed from the site.	TU936	SCDHEC Approved CAP	3-19 3-22

Source: SCDHEC 2019, AECOM 2018, USAF 2023

Definitions: CAP = Corrective Action Plan; CMS = Corrective Measures Study; NFA = No Further Action; RACR = Removal Action Completion Report

There is potential for hazardous materials and waste generation due to the New NPTU Training Facility construction. Negligible long-term impacts to hazardous waste generation and disposal are expected. The Proposed Action has the potential to temporarily produce very small amounts of hazardous waste above the current waste levels, which would result in negligible short-term impacts to hazardous waste generation and disposal. No indirect impacts are expected. As discussed in this section, wastes would be managed per the JBC HWMP as appropriate. Alternative 2 would be located within SWMU 36 and 37 (**Figure 3-18**). The current site design would involve the southern parcel being utilized as a parking lot. In this case, exposure to hazardous materials is unlikely due to the asphalt lot serving as an impervious barrier between personnel and soil/groundwater; therefore, no impacts are expected. Two ERP sites, SWMU 39 and AOC B-2 are located along the borders of New Facility Alternative 3 (**Figure 3-18**). AOC B-2 is still an active ERP site with recently conducted remediation activities. Due to their non-proximal location, no impacts due to hazardous materials are expected.

The proposed NPTU Substation has the potential to contain mineral oil as a potential insulator medium in transformer equipment. Substation Alternatives 1 and 2 are expected to increase the presence of hazardous materials; however, modern design and spill control procedures greatly reduce the likelihood of release or exposure. Therefore, no direct impacts are expected.

The 1.25 km LTR would involve tree clearing through SWMU 20 and construction of a gravel bed with surface-set concrete anchors within SWMUs 16 and 17 (**Figure 3-19**). No exposure to hazardous waste is expected in these areas due to minimal ground disturbance during construction activities.

Both Pier Bravo and the Goose Creek Floating Dock are located within proximity to ERP sites (**Figure 3-20**). Based on the characteristics of these sites as detailed in **Table 3-8**, no impacts from hazardous waste generated from ERP sites are expected. Pier Bravo is currently degrading after a vessel-strike. Concrete, wood, and other component materials are being released into the Cooper River. It is not known at this time whether hazardous construction materials are being released into the river; however, there is potential for short term negligible impacts due to degraded materials being released into the marine environment over time.

SLS 66 is located directly within AOC-G; however, the site has received an NFA, and no impacts are expected (**Figure 3-21**).

The proposed WDS would intersect several ERP sites. Active sites intersected by the WDS include TU-936 (WDS North), TU-929 (WDS East) and AOC-B-2 (WDS East) (AECOM 2018) (**Figure 3-22**). These sites are currently under remediation by JBC. Development of these pipeline sections will be conducted in accordance with the JBC HWMP, and ERP sites would be avoided if at all possible. No short-term minor adverse effects are expected due to the generation of potentially hazardous soil wastes.

The Hydrant Pit construction would utilize hazardous materials in the form of petroleum fuels (**Figure 3-23**). The Proposed Action would not add to JBC's total hazardous materials volume, but any spills onto porous media such as asphalt and concrete have the potential to generate hazardous waste should removal activities take place in the future. The proposed Hydrant Pit action is expected to have short-term minor adverse effects to hazardous materials generation in the future.

3.6.2.3 PFAS Chemicals

In 2016, 269 five-gallon jugs (1,345 gallons) of AFFF were stored in the NAAF Fire Station western bay. Five firefighting vehicles were at the station, with a combined AFFF storage capacity of 1,976 gallons. No spills, leaks, or accidental discharges of AFFF at the station have been reported. However, equipment is rinsed in the paved area north of the bays, and small amounts may have run off into a low-lying area with two drainage ditches/ pits north of the building. There have been no emergency responses involving the use of AFFF. No direct or indirect hazardous materials impacts are expected as a result of PFAS exposure or release at this site. No significant impacts are anticipated as a result of PFAS containing chemicals.

The NAAF contains a Foam Test Area consisting of a newly constructed pond at the woods' edge in the southern corner of NAAF. No PFAS containing compounds are used in this location. The NAAF also contains a former Fire Training Area. The Fire Training Area was approximately 2,000 ft east of the main 230/50 runway for NAAF in the northeastern corner of the field and approximately 1,200 ft south of the installation boundary. The site was used intermittently between 1979 and 1986. Firefighting agents containing PFAS compounds were not used.

3.6.2.4 Toxic Materials

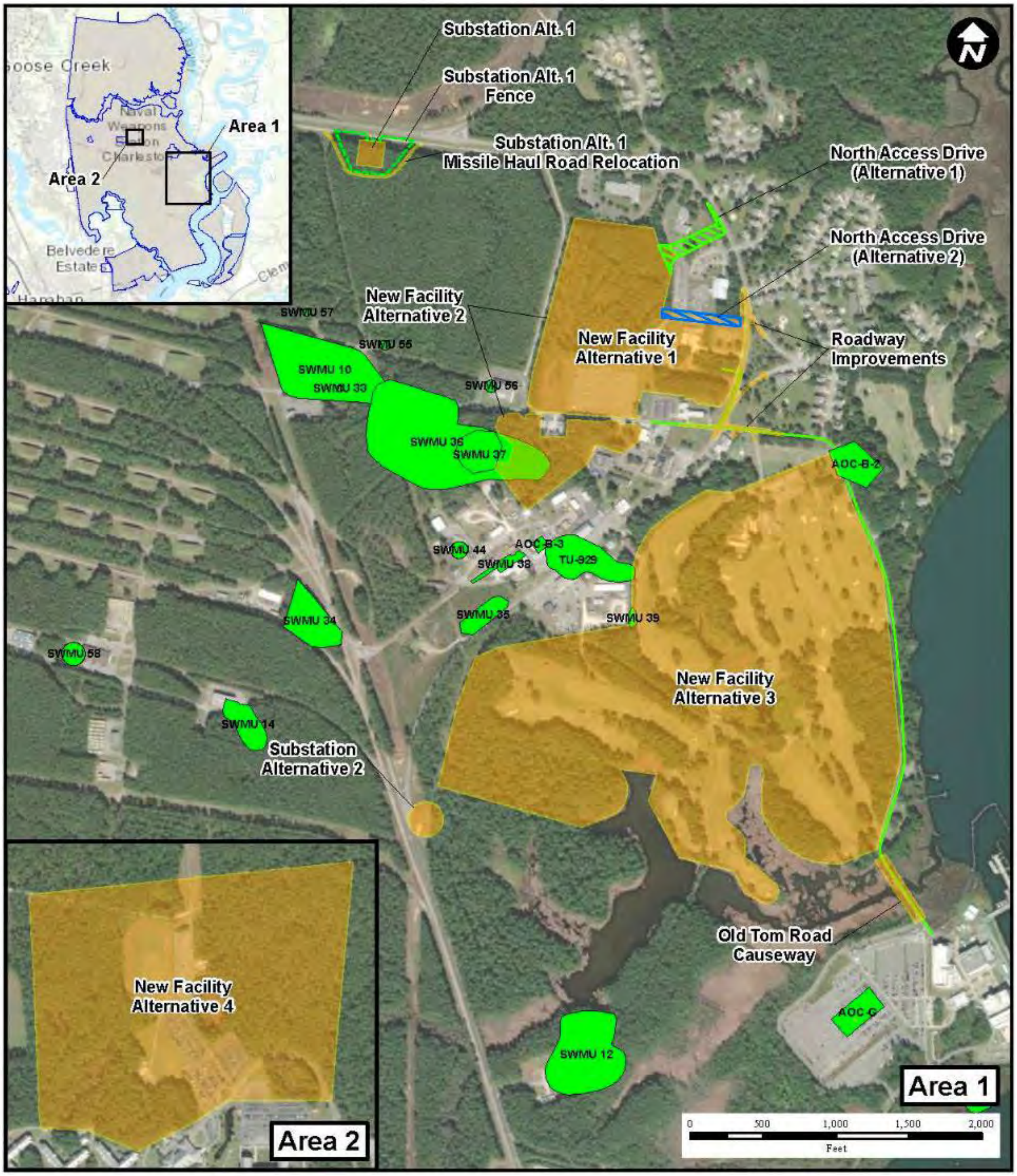
Construction, demolition, and renovation activities in older buildings and infrastructure could result in the generation of toxic wastes (such as refrigerants, mercury, asbestos, LBP, and PCBs). These toxic wastes would be removed, managed, and disposed of prior to and/or during the demolition in accordance with their respective management plans. Universal wastes (fluorescent bulbs) from light fixtures would be stored and handled in accordance with JBC's HWMP.

Short-term minor adverse effects associated with ACM and LBP could be expected. Asbestos was used in construction materials until an USEPA-initiated ban in 1989. LBP was in widespread use until 1978, when Congress banned all lead paint sales in the United States. Some of the buildings scheduled for demolition may contain both ACM and LBP. Buildings would be subject to a site-specific survey for ACM and LBP prior to initiation of renovation or demolition. Asbestos abatement during construction and renovation would be implemented per Asbestos Hazard Emergency Response Act regulations and contractors doing this work would be properly licensed through SCDHEC. Facilities containing LBP can be demolished without removing the LBP; however, all LBP-contaminated construction debris would be disposed of at a USEPA-approved landfill. These materials would be properly characterized, handled, and disposed of in accordance with the JBC Lead-Based Paint Management Plan, HWMP, and USAF policy. Contractors would be required to adhere to all federal, state, and local regulations in addition to actions designated by the JBC Environmental Department.

The Civil Engineering Complex Entomology facility contains deteriorating asbestos shingles from the original construction that may pose health risks if not repaired. Demolition activities would generate ACM, which would be shipped to a USEPA-approved landfill as detailed above.

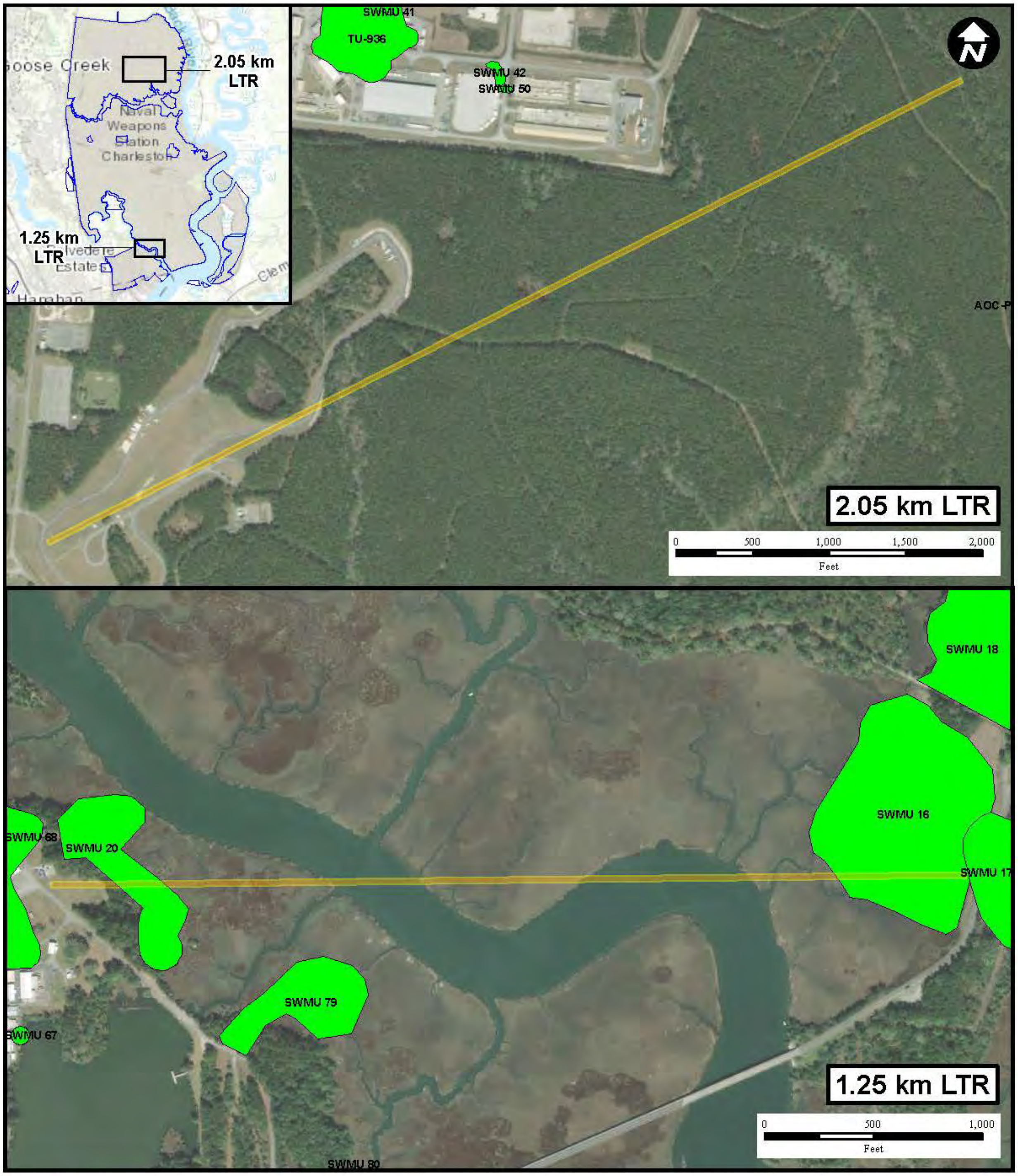
Buildings built before 1978 have the potential to contain ACM or LBP. Therefore, based on the age of facilities to be demolished, the proposed activities associated with the Pier Bravo, Natural Resources Facilities, Sewer Lift Stations, Civil Engineering Complex Shop and Entomology Facility, Ambulatory Care Center, Water Tower #2, Munitions Facilities, HAZMAT Load and

Unload Facilities, and Dormitory actions have the potential to generate toxic wastes during demolition activities. Long-term negligible adverse effects would be expected due to the additional disposal of ACM and LBP in USEPA-approved landfills. However, there would be long-term negligible beneficial effects due to reduced exposure to and maintenance of ACM and LBP due to elimination of ACM and LBP in buildings. No significant impacts are anticipated from toxic materials.



Legend
🟧 Proposed Action
NPTU Multi-Use Path
NPTU Substation Fence
🟩 ERP Sites
☐ Installation Boundary

Figure 3-18
ERP Sites
NPTU Simulation Expansion
Installation Development Environmental Assessment
Joint Base Charleston, South Carolina



Legend

🟨 Laser Test Range

🟩 ERP Sites

☐ Installation Boundary

Figure 3-19

ERP Sites

Laser Test Ranges

Installation Development Environmental Assessment
Joint Base Charleston, South Carolina

Figure 3-20
ERP Sites
Weapons Station Waterfront Proposed Actions
Installation Development Environmental Assessment
Joint Base Charleston, South Carolina

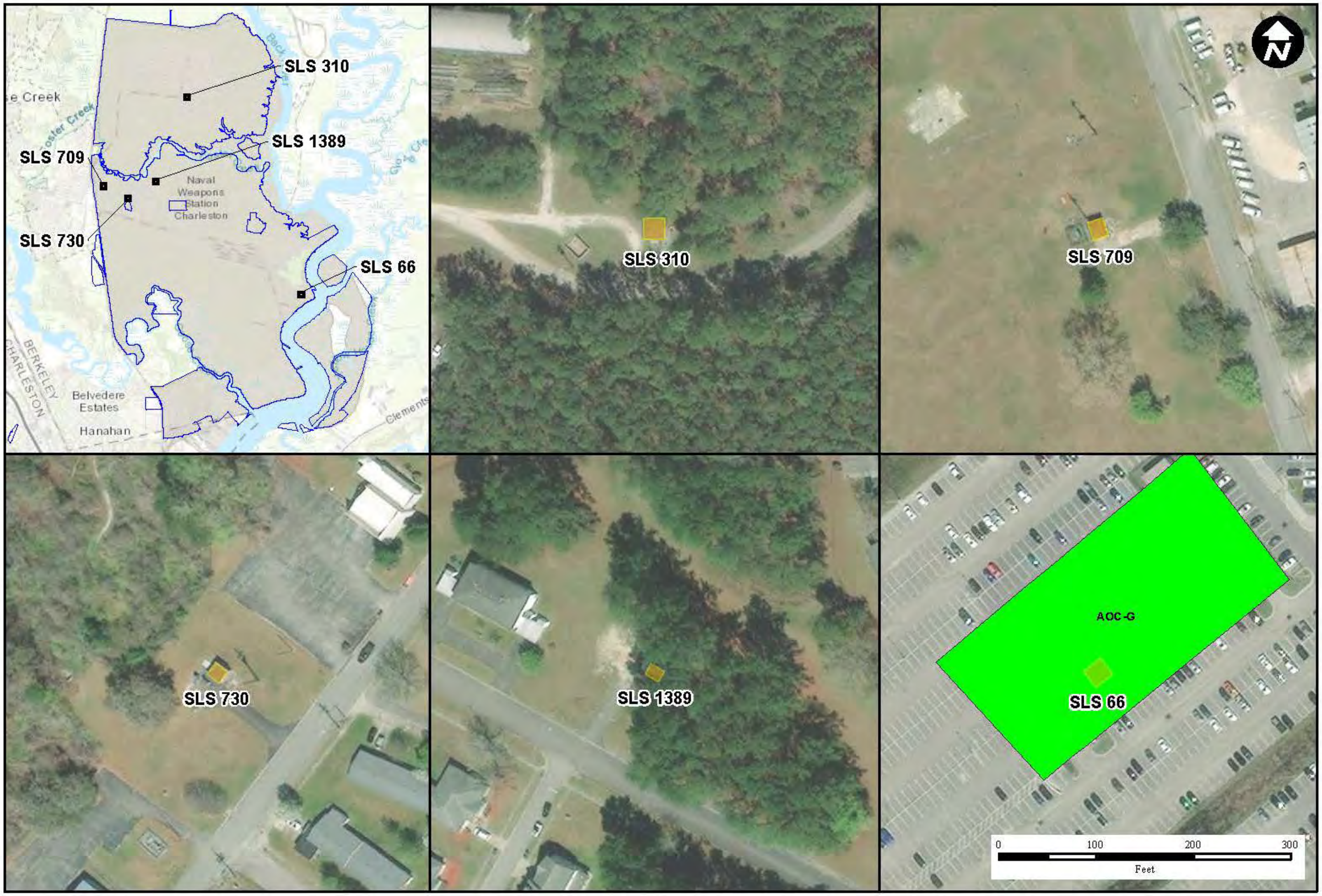


Figure 3-21

ERP Sites
Sewer Lift Stations

Installation Development Environmental Assessment
Joint Base Charleston, South Carolina

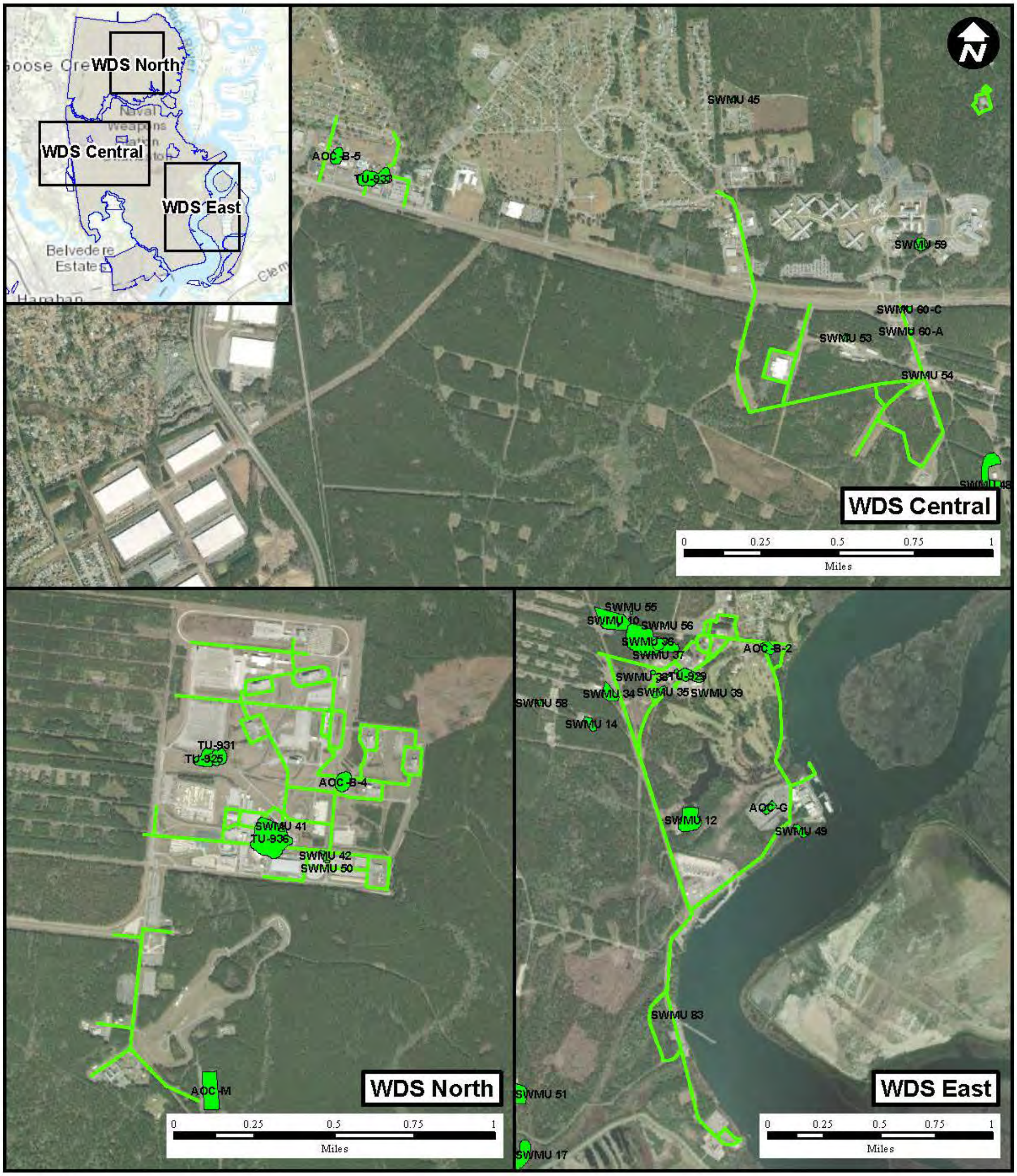


Figure 3-22

ERP Sites
Water Distribution System

Installation Development Environmental Assessment
Joint Base Charleston, South Carolina

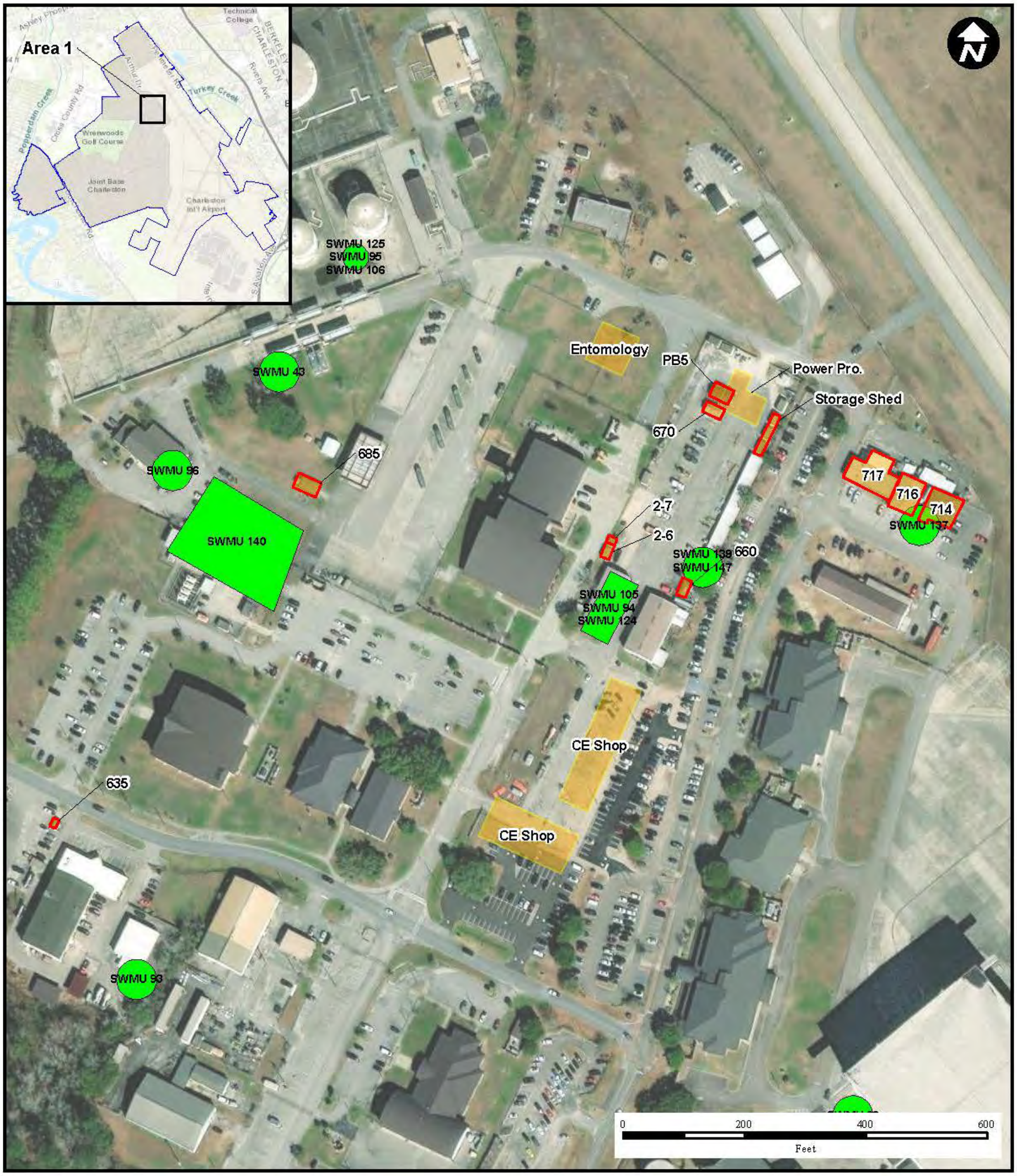


Figure 3-23
ERP Sites
JBC-AB North
Installation Development Environmental Assessment
Joint Base Charleston, South Carolina

Figure 3-24

ERP Sites
JBC-AB South Area

Installation Development Environmental Assessment
Joint Base Charleston, South Carolina

3.7 BIOLOGICAL/NATURAL RESOURCES

3.7.1 Affected Environment

Biological resources can be defined as native or naturalized plants and animals and the habitats in which they exist. Resources of particular concern may be designated by the United States Fish and Wildlife Service (USFWS) and as federally protected species under the ESA or MMPA, or as federally protected habitats (e.g., critical habitat and essential fish habitat [EFH]). Sensitive habitats also include plant communities that are unusual or of limited distribution, wetlands, and important seasonal use areas for wildlife (e.g., breeding areas, migration routes, and crucial summer and winter habitats). The following sections provide an overview of the vegetation, wildlife, and protected species and habitats within the proposed action areas.

Descriptions of vegetation, wildlife, and protected species and wildlife community associations at JBC are provided in the base's Integrated Natural Resources Management Plans (INRMP) (USN 2003, North Wind Inc. 2008).

3.7.1.1 Vegetation

The majority of the action areas within this EA occur in previously developed areas such as existing buildings, complexes, and ROWs that consist of either no vegetation or landscaped spaces and lawns where vegetation is manicured and maintained. Large portions of JBC are comprised of planted pine forests within timber management and production, with over 11,000 acres of forest lands.

The Cooper River estuary at JBC includes a combination of salt marsh, brackish marsh, freshwater marsh, and open water areas, part of a larger regional area contains over 425,000 acres of marshes (Purcell et al. 2019). Vegetation in these estuarine wetlands is primarily an herbaceous community, the low marsh is typically heavily dominated by saltmarsh cordgrass while the high marsh is typically dominated by black needlerush.

Vegetation types found in and around JBC are further detailed in **Table 3-9**.

Table 3-9: Potentially Occurring Vegetation within the JBC Installation Development Project Areas

Vegetation	Common Name	Scientific Name	Observed Area
Maintained Areas	Bahiagrass	*Paspalum notatum*	Local
	Fescue	*Festuca spp.*	
	Centipede grass	*Eremochloa ophiuroides*	
	Bermudagrass	*Cynodon dactylon*	
	Big blue lilyturf	*Liriope muscari*	Regional
	Crape myrtle	*Lagerstroemia spp.*	
	Holly	*Ilex* spp.	
	Wax myrtle	*Morella cerifera*	
	Dogwood	*Cornus florida*	
	Cabbage palmetto	*Sabal palmetto*	
Planted Pinelands,	Loblolly pine	*Pinus taeda*	Canopy
	Longleaf pine	*Pinus palustris*	

Table 3-9: Potentially Occurring Vegetation within the JBC Installation Development Project Areas

Vegetation	Common Name	Scientific Name	Observed Area
Mixed Hardwood Forest	Live Oak	*Quercus virginiana*	
	Sweetgum	*Liquidambar styraciflua*	Understory
	Eastern baccharis	*Baccharis halimifolia*	
	Red maple	*Acer rubrum*	
	Water oak	*Quercus nigra*	
	Willow oak	*Quercus phellos*	
	Wax myrtle	*Myrica cerifera*	
	Dogwood	*Cornus florida*	
	Yaupon	*Ilex vomitoria*	
	Chinese privet	*Ligustrum sinense*	
	American holly	*Ilex opaca*	
	Red bay	*Persea borbonia*	Mesic and Wetland Areas
	Giant cane	*Arundinaria gigantea*	
	Switchcane	*Arundinaria tecta*	
	Sweet bay	*Magnolia virginiana*	
	Honeysuckle	*Lonicera japonica*	Ground Cover
	Privet	*Ligustrum sinense*	
	Bracken fern	*Pteridium aquilinum*	
	Blackberries	*Rubus* spp.	
	Greenbriers	*Smilax* spp.	
Estuarine Wetland	Saltmarsh cordgrass	*Spartina alterniflora*	Low Marsh
	Black needlerush	*Juncus roemerianus*	High Marsh
	Sea oxeye	*Borrichia frutescens*	Local
	Sea lavender	*Limonium nashii*	
	Glassworts	*Salicornia spp.*	
	Salt wort	*Batis maritima*	
	Coast dropseed	*Sporobolus virginicus*	
	Saltgrass	*Distichlis spicata*	
	Eastern baccharis	*Baccharis halimifolia*	
	False willow	*Baccharis angustifolia*	
	High-tide bush	*Iva frutescens*	
	Sedges	*Carex* spp.	
	Rushes	*Juncus* spp.	

Source: USN 2003, USAF 2015

3.7.1.2 Wildlife

JBC supports a variety of game and non-game fish and wildlife species, though the action areas primarily consist of generalist species and birds adapted to urban and disturbed habitats. In addition, University of Montana and Tetra Tech conducted acoustic surveys for bats from 2016 to 2019 that recorded 12 species of bats at JBC-AB, 11 species of bats at JBC-WS, and 12 species of bats at the NAAF (USN 2003, Tetra Tech 2019).

Fish habitats on and around JBC action areas includes estuarine waters of the Cooper River, adjacent tidal freshwater wetlands, saltmarshes, brackish marshes, tidal flats, and tidal creeks, such as Goose Creek.

Wildlife found in and around JBC are further detailed in **Table 3-10**.

Table 3-10: Potentially Occurring Wildlife within the JBC Installation Development Project Areas

Wildlife	Common Name	Scientific Name	Observed Area
Generalist Species	White-tailed deer	*Odocoileus virginianus*	Local and Regional
	Opossum	*Didelphis virginiana*	
	Raccoon	*Procyon lotor*	
	Eastern cottontail rabbit	*Sylvilagus floridanus*	
	Armadillo	*Dasypus novemcinctus*	
	Gray squirrel	*Sciurus carolinensis*	
Birds	Northern cardinal	*Cardinalis cardinalis*	
	Pine warbler	*Setophaga pinus*	
	Red-bellied woodpecker	*Melanerpes carolinus*	
	Carolina wren	*Thryothorus ludovicianus*	
	Eastern towhee	*Pipilo erythrophthalmus*	
	Mourning dove	*Zenaida macroura*	
	Laughing gull	*Leucophaeus atricilla*	
	Great black-backed gull	*Larus marinus*	
	Common grackle	*Quiscalus quiscula*	
Transient Species	Wild turkey	*Meleagris gallopavo*	Regional
	Fox squirrel	*Sciurus niger*	
	Feral hog	*Sus scrofa*	
	Black bear	*Ursus americanus*	
Aquatic Organisms	Spotted trout	*Cynoscion nebulosus*	Saltwater
	Summer flounder	*Paralichthys dentatus*	
	Red drum	*Sciaenops ocellatus*	
	Atlantic croaker	*Micropogonias undulatus*	
	Black drum	*Pogonias cromis*	
	Atlantic menhaden	*Brevoortia tyrannus*	
	Tilefish	*Malacanthus spp.*	
	White shrimp	*Litopenaeus setiferus*	
	Brown shrimp	*Farfantepenaeus aztecus*	
	Blue crab	*Callinectes sapidus*	
	Largemouth bass	*Micropterus salmoides*	Freshwater
	Bluegill	*Lepomis macrochirus*	
	Crappie	*Pomoxis* spp.	

Source: ASMFC 2023, North Wind Inc. 2008, USN 2003, USAF 2015

3.7.1.3 Protected Species and Habitats

As part of the evaluation process, information was requested from the USFWS South Carolina Ecological Services Field Office and the National Marine Fisheries Service (NMFS), also known as the National Oceanic and Atmospheric Administration (NOAA) Fisheries, Southeast Regional

Office, for species that are listed as endangered, threatened, and proposed for listing as endangered or threatened under the ESA that have the potential to occur in the action area, as well as designated or proposed critical habitat. Note that the NMFS list included species for the entire NOAA Fisheries Southeast Region. These species were reviewed based on known ranges and habitats, and the list was narrowed to species with the potential to occur in the vicinity of the action area. As a result, three mammals, seven birds, four reptiles, one insect, three fish, and three plants were identified with the potential to occur in the action area (**Table 3-11**; **Appendix C**). The NRP at JBC manages the aquatic environment at JBC, ensuring avoidance and minimization of impacts to federally listed species.

The MSA requires federal agencies to consult with NMFS on activities that may adversely affect EFH. EFH includes those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (16 U.S.C. 1801 et seq.). NMFS's online EFH Mapper indicates that there are six EFH designations within the vicinity of the action area; no Habitat Areas of Particular Concern (HAPC) or EFH areas protected from fishing were identified in the vicinity of the action areas (**Appendix C**) (NMFS 2023h).

Table 3-11: Potentially Occurring Federally Listed Species within the JBC Installation Development Project Areas

Common Name	Scientific Name	Federal Status
Mammals		
Northern long-eared bat	*Myotis septentrionalis*	E
Tricolored bat	*Perimyotis subflavus*	PE
West Indian manatee	*Trichechus manatus*	T
Birds		
Bachman's warbler	*Vermivora bachmanii*	E
Bald eagle	*Haliaeetus leucocephalus*	BGEPA
Eastern black rail	*Laterallus jamaicensis*	T
Piping plover	*Charadrius melodus*	T
Red knot	*Calidris canutus rufa*	T
Red-cockaded woodpecker	*Picoides borealis*	E
Wood stork	*Mycteria americana*	T
Reptiles		
Green turtle	*Chelonia mydas*	T
Kemp's ridley turtle	*Lepidochelys kempii*	E
Leatherback turtle	*Dermochelys coriacea*	E
Loggerhead turtle	*Caretta caretta*	T
Insects		
Monarch butterfly	*Danaus plexippus*	C
Fishes		
Atlantic sturgeon	*Acipenser oxyrinchus*	E
Scalloped hammerhead shark	*Sphyrna lewini*	T
Shortnose sturgeon	*Acipenser brevirostrum*	E
Plants		
American chaffseed	*Schwalbea americana*	E
Canby's dropwort	*Oxypolis canbyi*	E
Pondberry	*Lindera melissifolia*	E

Federal Status: BGEPA – Bald and Golden Eagle Protection Act, C – Candidate Species, E – Endangered, PE – Proposed Endangered, T – Threatened.

EFH is defined as those waters and substrates necessary to support fish for spawning, breeding, feeding, or growth to maturity. EFH was first established in 1996 with the reauthorization of the MSA, which requires NMFS to designate EFH for species managed under federal Fishery Management Plans (FMPs). This requires the cooperation of NMFS, Regional Fishery Management Councils, Federal and State agencies, resource users, and others to protect, conserve, and enhance EFH. The South Atlantic Fishery Management Council (SAFMC), Mid-Atlantic Fishery Management Council (MAFMC), and Atlantic States Marine Fisheries Commission (ASMFC) are responsible for management and protection of EFH in South Carolina, with the exception of Highly Migratory Species (e.g., tunas, some sharks, swordfish, billfish, etc.), which are managed by NMFS (NMFS 2006, NMFS 2009).

EFH is specifically designated by Regional Fisheries Management Councils or NMFS for species included in the FMPs under their respective jurisdiction, which are subsequently approved by NMFS. EFH is typically defined and included within an FMP or habitat plan (e.g., Habitat Plan for the South Atlantic Region [SAFMC 1998a, SAFMC 1998b]), or the definition of EFH is included via a plan amendment. These definitions provide detailed descriptions of the nature and extent of the designated EFH (e.g., depths, substrate types, salinity, geographic extent, etc.). As a result, EFH designations include a suite of different habitat types across a specific geographic region. The federal regulations that implement the EFH program also encourage Regional Fishery Management Councils and NMFS to designate HAPCs within EFH designation areas to highlight priority areas for conservation and management.

NMFS's online EFH Mapper indicates that there are six EFH designations within the vicinity of the action area summarized in **Table 3-12** below, while EFH designation definitions are provided in **Appendix C**. In addition to EFH, two HAPCs, Coastal Inlets and Summer Flounder SAV, were noted as potentially occurring in the vicinity of the Proposed Action. Detailed region-wide mapping of these HAPCs is not available, so local review must be used to determine their presence in a particular area. The Charleston Harbor inlet is located more than 10 miles downstream of the action areas, and the action areas do not contain beds of SAV, as the areas of in-water work occur in deepwater habitats with armored shorelines. HAPCs are not anticipated to occur within the action area. No EFHAs were identified in the vicinity of the action area (**Appendix C**) (NMFS 2023h).

Table 3-12: Designated EFH within the JBC Installation Development Project Areas

EFH Designation	Lifestage Designated	Council	FMP
Blue Fish (*Pomatomus saltatrix*)	Juvenile, Adult	MAFMC	Bluefish
Summer Flounder (*Paralichthys dentatus*)	Larvae, Juvenile, Adult	MAFMC	Summer Flounder, Scup, and Black Sea Bass
Snapper-Grouper Complex	All	SAFMC	Snapper-Grouper Complex
Blacktip Shark (*Carcharhinus limbatus*)	Juvenile, Adult	NMFS	Atlantic Highly Migratory Species
Spinner Shark (*C. brevipinna*)	Neonate	NMFS	Atlantic Highly Migratory Species
Tiger Shark (*Galeocerdo cuvieri*)	Juvenile, Adult	NMFS	Atlantic Highly Migratory Species

Source: ASMFC 2023, FishBase 2023, NMFS 1998a, NMFS 1998b, NMFS 2023i, NMFS 2023j, NMFS 1999, NMFS 2023h, NOAA 1983, SAFMC 2023

The EFH designations in **Table 3-12** include multiple subcomponents (i.e., habitat types) within the geographic area of the Proposed Action. These EFH subcomponents have significant overlap between the different EFH designations. As a result, EFH in **Section 3.7.2.3.7** is discussed by habitat type within the action area, rather than by FMP-level EFH designation. EFH habitat types within the action area include limited areas of estuarine emergent wetlands, estuarine unconsolidated bottom (i.e., soft sediments), estuarine water column, and limited areas of artificial hard bottom.

De minimis areas of estuarine emergent wetland occur along the Old Tom Road Causeway. The banks of the causeway are steep, dropping from upland areas into the tidal channel consisting of open water (i.e., unconsolidated bottom and water column), and limiting the emergent wetlands to very narrow bands along the causeway toe slope. Based on the steep slopes, limited cover is provided for species with adjacent deep water and heavy predation pressure. It is anticipated that these emergent areas represent de minimis areas of poor quality EFH.

Unconsolidated bottom and water column habitats occur within the Old Tom Road Causeway, Pier Bravo, the Goose Creek floating dock action areas, while limited areas of artificial hard bottom habitats also occur. Unconsolidated bottom and water column habitats include the natural habitats of the Copper River and Goose Creek, while artificial hard bottom habitats in these areas include rip rap, shore armoring, and piles associated with shoreline and in-water development along the Copper River and Goose Creek.

3.7.2 Environmental Consequences

A proposed action could have a significant effect on biological resources if any the following were to occur:

- The proposed action results in a “take” of a protected species;
- The proposed action results in the removal or adversely modifying of a protected habitat;
- Species or habitats of high concern are adversely affected over relatively large areas; or
- Population size or distribution of a species of high concern is reduced.

Proposed Action components were evaluated individually to determine impacts to biological and natural resources. Proposed Action components that would result in no adverse impacts are detailed in **Table 3-1**. Proposed Action components with identified impacts, however minor, are detailed in the sections below. As described in this section, no significant impacts are anticipated.

3.7.2.1 Vegetation

Maintained Areas

The Proposed Action components (i.e., NPTU Substation, SLSs, WDS, civil engineering complex, ambulatory care center, water tower, fire stations, munitions facilities, HAZMAT facility, and dormitory) would result in negligible adverse effects to the vegetation within maintained areas. As these actions would occur in improved areas, they would primarily affect non-forested upland and urban communities and would not represent impacts to natural vegetative communities. Negligible adverse effects on vegetation would be expected from temporary disturbances during the action (e.g., trampling and removal). However, landscaping and lawns impacted by the proposed action would be restored or replaced in-kind following construction, if appropriate and practical.

The New NPTU Training Facility Alternative 3 would require the loss of approximately 25 acres of the Red Bank Golf Course, and likely additional losses outside the footprint of the New NPTU Training Facility that would be associated with the reorganization and realignment of the golf course. Though these areas are primarily maintained, the golf course does contain non-maintained and natural sections of forested, scrub-shrub, and herbaceous communities that would be impacted. As a result, indirect vegetation impacts are anticipated to be moderate.

Planted Pinelands

The Proposed Action components (i.e., New NPTU Training Facility alternatives, the 2.05 km SAUSR LTR, and natural resources facility) would have negligible to moderate adverse effects on planted pinelands. As these actions would occur in managed pinelands, they would affect maintained pine communities and would not represent impacts to natural forest communities. JBC would consider 10 U.S.C. 2665, *Sale of Certain Interests in Land; Logs*, as applicable, when disposing of removed vegetation.

The New NPTU Training Facility Alternatives 1 and 2 would have similar footprints that would result in comparable minor adverse effects from the permanent loss of planted pinelands for the New NPTU Training Facility. The alternatives would require the clearing of approximately 10 to 15 acres of active pinelands that are within developed areas of JBC (i.e., not within large contiguous forested tracts). In contrast, Alternative 4 would require the clearing of approximately 25 acres that are within a large contiguous forest between developed areas and the natural forested areas along Foster Creek. The new construction would result in the permanent loss of these pinelands for the New NPTU Training Facility. However, given the scale of the project in reference to the over 11,000 acres of forest lands in active management at JBC, and that Alternatives 1 and 2 are within developed areas of JBC (i.e., not within large contiguous forested tracts), impacts are anticipated to be minor for Alternatives 1 and 2, and moderate for Alternative 3.

The 2.05 km SAUSR LTR would result in the conversion of a 30 ft corridor, approximately 4921 ft in length, or approximately 3.4 acres, from forested vegetation to herbaceous ground-level vegetation along the LTR. However, the proposed alignment of the range was specifically selected to reduce impacts, as the first 1804 ft of the proposed range is managed and cleared NIWC property. As a result, the area between the origin point and the first end point will not require clearing or a change in use, resulting in a 25% reduction of potential clearing impacts. The area from the first end point to the third end point that would require a 30 ft corridor is located within an area of active timber production, which is disturbed and regularly maintained (e.g., a 30 ft corridor is similar to the thinning that occurs between timber rows). As a result, indirect impacts are expected to be minor.

The natural resources facility would have negligible adverse effects on planted pinelands as result in the permanent loss of less than 0.2 acre of planted pinelands. Given the scale of the project in reference to the over 11,000 acres of forest lands in active management at JBC, and that the facility is directly adjacent to the existing developed natural resource facility, impacts are anticipated to be negligible.

Mixed Hardwood Forest

The Proposed Action components (i.e., 1.25 km Goose Creek LTR and cargo laydown area, and actions that occur along ROW include mixed forests along the periphery or adjacent to the ROW, such as the NPTU Substation, SLSs, and WDS) would have negligible adverse effects on mixed hardwood forest.

The western portion of the 1.25 km Goose Creek LTR would result in the conversion of a 30 ft corridor, approximately 200 ft in length, or approximately 0.14 acre, from mixed forested vegetation to herbaceous ground-level vegetation along the LTR. This area is previously disturbed and is located adjacent to existing developed areas within Complex D. It should also be noted that the proposed alignment was specifically selected to avoid large live oak trees in the direct vicinity of the origin point and coincides with a narrowing of the mixed hardwood forest between Complex D and Goose Creek (i.e., reduces the required clearing of forest). Given the scale of the project in reference to the over 11,000 acres of managed JBC forests, avoidance and minimization planning, indirect impacts are anticipated to be negligible to minor.

The cargo laydown area would have an impact on mixed hardwood forest as a result in the permanent loss of less than 0.7 acre. This area has been previously disturbed, with a poor quality (i.e., early successional), young mixed forest with a mowed and maintained grass perimeter and is located within the runway ROW directly adjacent to parking ramps (i.e., isolated from contiguous mature mixed forest tracts to the west). Given the scale of the project, the quality of the forest, and location within developed and maintained areas, indirect impacts are anticipated to be negligible to minor.

Actions that occur along ROW, such as the NPTU Substation, SLSs, and WDS, may require negligible clearing or maintenance (e.g., trimming), as needed during construction activities. Though these actions are not located within mixed forests or propose clearing of large forested areas, mixed forest are present along the periphery or adjacent to the ROW. Given the scale of the potential clearing, the location within/adjacent to maintained ROW areas, indirect impacts are anticipated to be reasonably foreseeable and negligible.

Estuarine Wetlands

The Proposed Action components (i.e., Old Tom Road Causeway, 1.25 km Goose Creek LTR, Goose Creek floating dock, and Pier Bravo) would have minor to negligible adverse effects on estuarine vegetation. Refer to **Section 3.4.2.3** for a discussion of environmental consequences and mitigation actions in reference to overall wetland impacts.

The improvements (e.g., widening) of the Old Tom Road Causeway would result in the minor impacts to estuarine vegetation resulting from the permanent loss of vegetation along the length of one side of the causeway (approximately 0.2 acres of vegetated wetland areas) to accommodate the safety improvements for travel and flood risks. Given the regional 425,000 acres of marshes, impacts from any of the Old Tom Road Causeway alternatives is expected to be minor (Purcell et al. 2019).

The 1.25 km Goose Creek LTR would have negligible indirect impacts to estuarine vegetation. Clearing within Goose Creek and its associated marsh is not proposed, as the area is topographically low and is a natural herbaceous community (i.e., below the unobstructed line-of-sight requirements). Clearing between the origin point and end point within the Goose Creek marsh, if necessary, would be limited to hand clearing isolated shrubs that obstruct the line of sight. However, as the marsh in this area is nearly a monoculture of saltmarsh cordgrass and black needlerush, required clearing is unlikely, and if it were to be required, would be limited to a sparse handful of shrubs. As a result, impacts are anticipated to be negligible.

The Goose Creek floating dock is not anticipated to impact estuarine vegetation. The proposed design is intended to avoid marsh impacts. The floating dock will be located directly adjacent to the existing boathouse and connected with a gangway over deep/open water, eliminating the need of an approximately 200 ft pier that would otherwise be required for access between the floating dock and the shoreline, which avoids the disruption and shading of estuarine vegetation.

The Pier Bravo demolition would have negligible impacts to estuarine vegetation. The pier is located in deep water, with estuarine vegetation limited to narrow bands of saltmarsh cordgrass and black needlerush immediately adjacent to armored shoreline where the piers are connected to uplands. The limited short-term impacts to vegetation during construction (e.g., removal, trampling, or shading) would be offset by long-term improvements resulting from the pier removal and reduction of shading within the Cooper River littoral zones for marsh vegetation.

3.7.2.2 Wildlife

The proposed action would result in negligible to minor direct and indirect adverse effects on wildlife due to disturbances from noise, demolition and construction activities, and heavy equipment use, as well as habitat conversion or loss.

The Proposed Action components within developed and maintained areas (NPTU Substation, SLSs, WDS, civil engineering complex, ambulatory care center, water tower, fire station, munitions facilities, HAZMAT facility, and dormitory) would result in negligible adverse effects to wildlife. Most wildlife in the vicinity of these actions are species that are tolerant of noise and human activity common in urban environments. Anticipated impacts would be limited to disturbance and area avoidance by species during construction (i.e., species would potentially avoid areas temporarily due to the elevated human activity associated with construction).

The Proposed Action components within mixed hardwood forests and pinelands (New NPTU Training Facility alternatives, the 2.05 km SAUSR LTR, 1.25 km Goose Creek LTR, the cargo laydown area, and natural resources facility) would have negligible to minor adverse effects to wildlife.

The New NPTU Training Facility alternatives have similar footprints that would result in loss of approximately 10 to 15 acres planted pinelands (Alternatives 1 and 2), 25 acres of golf course (Alternative 3), and 25 acres of pinelands (Alternative 4), within or adjacent developed portions of JBC (i.e., wildlife displacement). However, given the scale of the project in reference to the over 11,000 acres of forest lands at JBC, that the proposed alternatives are within or adjacent to developed areas of JBC (i.e., not within large contiguous forested tracts), and the generally poor quality of habitats in these pineland tracts, indirect impacts are anticipated to be minor.

The 2.05 km SAUSR LTR would result in the conversion of a 30 ft corridor from forested pinelands to herbaceous ground-level vegetation along the LTR. The loss of canopy trees is common within these managed pinelands; impacts associated with the construction of the LTR would be generally consistent with the regular thinning that occurs of timber rows or between timber rows. It is anticipated that the wildlife within these managed pinelands is accustomed to regular pineland management, and the construction of the LTR would result in minimal indirect impacts, limited to area avoidance by species during construction and periodic use due to the elevated human activity.

The western portion of the 1.25 km Goose Creek LTR has been previously disturbed. The LTR alignment was specifically selected to avoid large live oak trees in the direct vicinity of the origin point and coincides with a narrowing of the mixed hardwood forest between Complex D and Goose Creek (i.e., reduces the required clearing of forest). Given the scale of the project, avoidance and minimization planning, and availability of adjacent habitats, impacts are anticipated to be negligible.

The cargo laydown area would result in the permanent loss of less than 0.7 acre (i.e., wildlife displacement). However, this area is located within the runway ROW directly adjacent to parking ramps, where wildlife use if likely limited to foraging birds and small mammals (e.g., gray squirrel). Given the scale of the project, the quality of the forest, and location within developed and maintained areas, indirect impacts to wildlife are anticipated to be minor.

The natural resources facility would result in the permanent loss of less than 0.2 acre of planted pinelands. Given the scale of the project in reference to the over 11,000 acres of forest lands in active management at JBC and the larger adjacent pinelands, that the wildlife within these managed pinelands is accustomed to displacement during management activities, and that the facility is directly adjacent to the existing developed natural resource facility, indirect impacts are anticipated to be negligible to minor.

The action area for in-water actions (Old Tom Road Causeway, Goose Creek floating dock, and Pier Bravo) do not represent significant gains or losses of fish and wildlife habitats and would have negligible to minor adverse effects to wildlife.

The tidal creek that runs under the Old Tom Road Causeway would be impacted by the extension of the culvert to widen the causeway. However, the conversion of mud channel to culvert would not affect fish passage and access to the habitats upstream. The loss associated with the extension is considered de minimis due to the scale of the proposed action in the context of the Cooper River estuary. Wildlife and fish impacts are anticipated to be limited to area avoidance by species during construction due to the elevated human activity and habitat loss limited to de minis mud channel impacts associated with the culvert extension and narrow strip of marsh along Old Tom Road Causeway.

The new Goose Creek floating dock would be located in deeper water and would not shade Submerged Aquatic Vegetation (SAV) habitats, and it is anticipated that the minimal footprint of the substrate disturbance associated with the pilings would be self-mitigated by the added hard-surface vertical structure and cover provided by the piles and dock following installation. Wildlife and fish impacts are anticipated to be limited to area avoidance by species during construction due to the elevated human activity.

The demolition of Pier Bravo would result in the removal of treated timber piles from the marine environment. This would represent a net gain in bottom habitat with the removal of pier piles but would also represent a loss of hard-surface vertical structure. The removal of treated timber and the return to natural estuarine substrates are anticipated to offset the loss of vertical structure. Wildlife impacts are anticipated to be limited to area avoidance by species during construction due to the elevated human activity.

3.7.2.3 Protected Species and Habitats

In addition to the design considerations, the Proposed Action components would adhere to BMPs and avoidance and minimization measures (AMMs) to limit impacts to terrestrials and aquatic resources (e.g., erosion and sedimentation controls, spill plans, contractor briefings, environmental health and safety plans, etc.). USAF and USN will also adhere to USACE permit conditions, and the conditions of other permits and approvals, where applicable (e.g., floodplain work, land disturbances, stream buffer variances, etc.).

To reduce impacts on the environment, USAF and USN will comply with the AMMs included in **Appendix D**. These AMMs are a combination of USFWS standard BMPs with previous cooperation and correspondence with agencies and agency recommendations. Measures also include USAF and USN's requirement for the contractor to meet and address all environmental conditions and considerations. All workers associated with this project, irrespective of their employment arrangement or affiliation (e.g., military personnel, civilian contractors, etc.), shall be fully briefed on these measures and the requirement to adhere to them for the duration of their involvement in the Proposed Action.

Based on the habitat evaluation, analysis of stressors, discussions/communications with USFWS and NMFS, and the implementation of BMPs and AMMs, the USAF and USN have determined that the proposed action would have no significant impacts and have insignificant indirect impacts, or the likelihood of impacts would be discountable for ESA-listed species. For the ESA-listed species with the potential to occur within the action areas, a determination of "may affect, not likely to adversely affect" has been made, as summarized in **Table 3-13** and discussed in the following sections.

Prior to the development of the Draft EA, early coordination letters were distributed on February 3, 2023, to USFWS, NMFS, and the South Carolina Department of Natural Resources (SCDNR). Received agency comments from early coordination were incorporated into the Draft EA analysis of the Proposed Action. Concurrent with the NOA of the Draft EA, consultation letters have been distributed to USFWS, NMFS, and SCDNR, to review the Draft EA and the incorporation of their early coordination comments. Received agency comments and guidance from the consultation process will be incorporated into the Final EA in accordance with the NHPA, ESA, MSA, and MMPA. The Proposed Action is not anticipated to result in the "take" of marine mammals or other species protected under the MMPA and ESA.

The potential for species and habitat impacts are inherently similar based on project location and activity type, such as in-water work actions or actions with tree clearing. As many species are anticipated to have no effect from the Proposed Action, and in order to streamline the analysis, environmental consequences in this section are discussed on a per-species basis rather than a proposed action- or alternative-basis. Actions that may affect a species or habitat are discussed in the individual determinations for the potentially affected species or habitat in the sections below.

Table 3-13: Potential for Effect for Federally Listed Species within the JBC Installation Development Project Areas

Common Name	Scientific Name	Federal Status	Effect Determination
Mammals			
Northern long-eared bat	*Myotis septentrionalis*	E	NE
Tricolored bat	*Perimyotis subflavus*	PE	NLAA
West Indian manatee	*Trichechus manatus*	T	NLAA
Birds			
Bachman's warbler	*Vermivora bachmanii*	E	NE
Bald eagle	*Haliaeetus leucocephalus*	BGEPA	NLAA
Eastern black rail	*Laterallus jamaicensis*	T	NE
Piping plover	*Charadrius melodus*	T	NE
Red knot	*Calidris canutus rufa*	T	NE
Red-cockaded woodpecker	*Picoides borealis*	E	NE
Wood stork	*Mycteria americana*	T	NLAA
Reptiles			
Green turtle	*Chelonia mydas*	T	NLAA
Kemp's ridley turtle	*Lepidochelys kempii*	E	NLAA
Leatherback turtle	*Dermochelys coriacea*	E	NE
Loggerhead turtle	*Caretta caretta*	T	NLAA
Insects			
Monarch butterfly	*Danaus plexippus*	C	NE
Fishes			
Atlantic sturgeon	*Acipenser oxyrinchus*	E	NLAA
Scalloped hammerhead shark	*Sphyrna lewini*	T	NLAA
Shortnose sturgeon	*Acipenser brevirostrum*	E	NLAA
Plants			
American chaffseed	*Schwalbea americana*	E	NE
Canby's dropwort	*Oxypolis canbyi*	E	NE
Pondberry	*Lindera melissifolia*	E	NE

Federal Status: BGEPA – Bald and Golden Eagle Protection Act, C – Candidate Species, E – Endangered, PE – Proposed Endangered, T – Threatened. Effect Determination: NE – No Effect, NLAA – Not Likely to Adversely Affect.

3.7.2.3.1 Mammals

Northern long-eared bat (NLEB) (*Myotis septentrionalis*)

NLEB surveys were conducted from 2016 to 2019 including 14 stations across JBC over the equivalent of 1,252 detector-nights. Despite the extensive studies, no NLEBs were documented at JBC (USFWS 2023a). NLEB is not anticipated to occur at JBC, and as a result, the proposed action is anticipated to have no effect on the NLEB.

Tricolored bat (*Perimyotis subflavus*)

Tricolored bat surveys were conducted from 2016 to 2019 including 14 stations across JBC over the equivalent of 1,252 detector-nights. These surveys recorded passes of tricolored bats at JBC-AB, JBC-WS, and NAAF. There are no known tricolored bat winter hibernacula within JBC. However, in the southern United States, where caves are sparse, tricolored bats are often found roosting in road-associated culverts. During the spring, summer, and fall, tricolored bats are found in forested habitats where they roost in trees, primarily among leaves of live or recently dead deciduous hardwood trees, but may also be found in Spanish moss, pine trees, and occasionally human structures (USFWS 2023b). As a result, the potential for tricolor bats presence at JBC is conservatively assumed year-round.

Proposed Action components may require a tricolored bat review by the JBC Natural Resources Program prior to construction, such as the visual inspection of culverts (e.g., Old Tom Causeway culvert) for bats prior to construction or demolition. As stated in **Appendix D,** tree clearing activities would be conducted during the inactive bat season to the maximum extent practicable, from November 15th through March 31st, to avoid negative impacts to tricolored bats. If it is determined that tree clearing must occur during the active season, JBC will consult with the USFWS regarding protected bats. USAF and USN are committed to individual action reviews for tricolored bats, as needed, USFWS. Given these commitments, the potential impacts are anticipated to be de minimis with guidance from USFWS. As a result, the proposed action may affect but is not likely to adversely affect the tricolored bat.

West Indian manatee (*Trichechus manatus*)

A formal SAV survey has not been conducted within the action areas, but informal visual surveys were conducted from shore and from the existing piers during the habitat surveys conducted at JBC. The Goose Creek floating dock and pier demolitions are located in deeper waters where no SAV was observed. In addition, no SAV was observed along the Old Tom Road Causeway, while habitats were limited to shallow marsh banks dominated by saltmarsh cordgrass and black needlerush, and mud tidal channel. The action areas are marginally suitable foraging habitats, long-term foraging or residence is not anticipated. In addition, deeper waters may be used for access to intersecting creeks and travel to preferred foraging habitats. As a result, the potential foraging is expected to be de minimis, while potential occurrence of West Indian manatee in the action area is anticipated to primarily consist of transient individuals.

West Indian manatee have the potential to occur within the action area for in-water actions (USFWS 2023c, USFWS 2023d). However, the potential is considered low and would likely be limited to transient individuals in warmer months during manatee migration (i.e., April through August).

In-water construction or demolition can require a MMPA Letter of Authorization (LOA) or Incidental Harassment Authorization (IHA) to harass marine mammals due to SELs in the water (this also applies to non-ESA listed marine mammals, such as common bottlenose dolphins [*Tursiops truncatus*]). However, a LOA or IHA is not anticipated for the Proposed Action, as a review of potential Proposed Action noise levels, and its relation to AMM mitigation of exposure is provided in **Appendix E**. As stated in **Appendix D** and **Appendix E**, the BMPs for proposed in-water actions developed a mandatory shut-down range of 100 m (328 ft) (when marine animals are within 100 m (328 ft) of in-water hammering, pile driving, etc.). The Proposed Action is not anticipated to result in the “take” of marine mammals.

As a result, anticipated potential impacts to the species are limited to the species temporarily avoiding the area during construction due to elevated human activity. Given the scale of the proposed action with respect to the available habitats in the Cooper River estuary, these potential impacts are anticipated to be de minimis. The proposed action may affect but is not anticipated to adversely affect the West Indian manatee. If it is determined that potential exposure could exceed Level B, JBC will consult with NOAA regarding the project, and obtain an IHA or LOA, as directed by NOAA.

3.7.2.3.2 Birds

Bachman's warbler (*Vermivora bachmanii*)
USFWS recommended the removal of the species from the endangered species list due to extinction on September 30, 2021 (USFWS 2015, USFWS 2023e). Bachman's warbler is not anticipated to occur at JBC, and the proposed action is anticipated to have no effect on the Bachman's warbler.

Bald Eagle (*Haliaeetus leucocephalus*)
No bald eagle nests or suitable nesting trees were found in the action areas during pedestrian habitat surveys. The observed suitable eagle habitats were limited to foraging areas near in-water projects on an active military base and associated ports (USFWS 2023f). Considering the BMPs and AMMs, anticipated potential impacts to the species are limited to the species temporarily avoiding the area during construction. The proposed action is not likely to have significant indirect impacts on the bald eagle, given the scale of the action and the available large waterbody habitats in the area.

Eastern black rail (*Laterallus jamaicensis*)
The marsh habitats within the action area are limited to open (i.e., no canopy cover) narrow bands of saltmarsh cordgrass and black needlerush adjacent to armored shoreline and the Old Tom Road Causeway within an active military base. As the eastern black rail inhabits marshes with high stem densities and dense canopy cover, the action area is not anticipated to be suitable habitat for the species (USFWS 2023g, USFWS 2023h). The eastern black rail is not anticipated to occur within the action area and the proposed action is anticipated to have no effect on the eastern black rail.

Piping plover (*Charadrius melodus*)
Piping plovers use wide, flat, open, sandy beaches with very little grass or other vegetation where they feed and nest (USFWS 2023i, USFWS 2023j). The shoreline habitats within action area are armored and/or vegetated marsh adjacent to deeper waters (i.e., beaches or mudflats are not present). The action area is not anticipated to be suitable habitat for the species. Therefore, piping plovers are not anticipated to occur within the action area and the proposed action is anticipated to have no effect on the piping plover.

Red knot (*Calidris canutus rufa*)
The red knot over-winters all along the South Carolina coast, primarily on sandy beaches and mud flats and roosts on inlets of barrier beaches and islands in South Carolina in the fall and winter (SCDNR 2023a, USFWS 2023k, USFWS 2023l). The action area is not anticipated to be suitable habitat for the species. Therefore, red knots are not anticipated to occur within the action area and the proposed action is anticipated to have no effect on the red knot.

Red-cockaded woodpecker (RCW) (*Picoides borealis*)
RCWs inhabit mature pine forests that lack a hardwood understory (SCDNR 2023b, USFWS 2023m). The planted pinelands within the action area are in timber management and the pines do not reach suitable ages for RCWs. Further, the observed understory is generally dense or

semi-open scrub-shrub with hardwood species and lacks the requisite open and herbaceous understory for the species. Therefore, RCWs are not anticipated to occur within the action area and the proposed action is anticipated to have no effect on the RCW.

Wood stork (*Mycteria americana*)
There are no known wood stork colonies within the action area, and suitable nesting trees were not observed during the pedestrian habitat surveys (SCDNR 2023c, USFWS 2023o). Anticipated potential impacts to the species are limited to the species temporarily avoiding the area during construction of in-water actions. Given the scale of the proposed action with respect to the available freshwater and estuarine wetland habitats within coastal South Carolina and the immediate area, these potential temporary impacts are anticipated to be de minimis. The proposed action is not likely to adversely affect the wood stork.

Migratory Birds
There is potential for migratory birds, including Birds of Conservation Concern, to occur within the action areas. Based on information provided by the USFWS, the most likely occurrence of migratory birds during their respective breeding seasons is generally March through August. However, USAF and USN propose to implement the AMMs, including the migratory bird Nationwide Standard Conservation Measures, to the maximum extent practicable (**Appendix D**). Noting these measures, anticipated potential impacts to migratory birds are limited to birds temporarily avoiding the area during construction due to increased human activity. Given the implementation of AMMs, the scale of the proposed action with respect to the available migratory bird habitats within coastal South Carolina and the immediate area, and the location of the actions within an active military base, these potential indirect impacts are anticipated to be de minimis to minor.

3.7.2.3.3 Reptiles

Green turtle (*Chelonia mydas*)
The green turtle has the potential to occur in the Goose Creek and Cooper River action areas for in-water work (NMFS 2015, NMFS 2023a). Post-recruitment juvenile and adult green turtles sheltering and foraging in the Cooper River estuary are the life stages with the potential to be affected by the proposed activities. Considering the BMPs and AMMs, anticipated potential impacts to the species are limited to temporary area avoidance during construction. Given the scale of the proposed action with respect to the available habitats within the Cooper River estuary, these potential indirect impacts are anticipated to be de minimis. The proposed action is not likely to adversely affect the green turtle.

Kemp’s ridley turtle (*Lepidochelys kempii*)
The Kemp’s ridley turtle has the potential to occur in the Goose Creek and Cooper River action areas for in-water work. Post-recruitment juvenile and adult Kemp’s ridley turtles sheltering and foraging in the Cooper River estuary are the life stages most likely to be affected by the proposed activities (NMFS and USFWS 2015, NMFS 2023b). Anticipated potential indirect impacts to the species are limited to the species temporarily avoiding the area during construction. Given the BMPs and AMMs, and scale of the proposed action with respect to the available habitats within the Cooper River estuary, these potential indirect impacts are anticipated to be de minimis. The proposed action is not likely to adversely affect the Kemp’s ridley turtle.

Leatherback turtle (*Dermochelys coriacea*)

Based on the description of the proposed action and the species profile of the leatherback turtle, the leatherback turtle is not anticipated to occur within the inshore waters of the Cooper River in any of its various life stages and the proposed action is anticipated to have no effect on the leatherback turtle (NMFS and USFWS 2020, NMFS 2023c).

Loggerhead turtle (*Caretta caretta*)

The loggerhead turtle has the potential to occur in the Goose Creek and Cooper River action areas for in-water work. Post-recruitment juvenile and adult loggerhead turtles sheltering and foraging in the Cooper River estuary are the life stages most likely to be affected by the proposed activities (NMFS 2009, NMFS 2023d). Anticipated potential impacts to the species are limited to the species temporarily avoiding the area during construction. Given the BMPs and AMMs, and scale of the proposed action with respect to the available habitats within the Cooper River estuary, these potential indirect impacts are anticipated to be de minimis. The proposed action is not likely to adversely affect the loggerhead turtle.

3.7.2.3.4 Insects

Monarch Butterfly (*Danaus plexippus*)

The monarch butterfly requires milkweed for breeding plant host species (USFWS 2023p). The herbaceous habitats within the action area are limited to maintained areas or estuarine marsh. No monarch butterflies, mature flowering plant species (e.g., goldenrods, asters, coneflowers, etc.), or breeding host plant species (i.e., milkweeds) were observed within the action area herbaceous habitats during spring pedestrian habitat surveys. The monarch butterfly is not anticipated to occur within the action area and the proposed action is anticipated to have no effect on the monarch butterfly.

3.7.2.3.5 Fishes

Atlantic Sturgeon (*Acipenser oxyrinchus*)

Atlantic sturgeon have the potential to occur in the Goose Creek and Cooper River action areas for in-water work. Juvenile, subadult, and adult sturgeon transiting, sheltering, or foraging in the lower Cooper River estuary are the life stages most likely to be affected by the proposed activities (Kynard et. al. 2002, Laney et. al. 2007, NMFS 2023e, SCDNR 2023d). Given that potential spawning habitats are located far upstream of the action area, anticipated potential impacts to the species are limited to the species temporarily avoiding foraging habitats during construction. Considering the BMPs and AMMs, and scale of the proposed action with respect to the available habitats within the Cooper River, these potential indirect impacts are anticipated to be de minimis. The proposed action is not likely to adversely affect the Atlantic sturgeon.

Scalloped hammerhead shark (*Sphyrna lewini*)

The scalloped hammerhead shark has the potential to occur in the Goose Creek and Cooper River action areas. Pups, juveniles, and adults have the potential to occur in coastal and estuarine environments (FLMNH 2023, NMFS 2023f, SCDNR 2015). Anticipated potential impacts to the species are limited to the species temporarily avoiding the area during construction. Based on the BMPs and AMMs, and scale of the proposed action with respect to the available habitats within the Cooper River, these potential indirect impacts are anticipated to be de minimis. The proposed action is not likely to adversely affect the scalloped hammerhead shark.

Shortnose sturgeon (*Acipenser brevirostrum*)
Shortnose sturgeon have the potential to occur in the Goose Creek and Cooper River action areas. Shortnose sturgeon generally move upstream in spring and back downstream in fall and winter; however, these movements usually occur above the saltwater/freshwater interface, which is located upstream of the action areas (Kynard et. al. 2002, NMFS 2023g). Given that predominant habitats are located upstream of the action area, anticipated occurrence is low, anticipated potential impacts to shortnose sturgeon are limited to the species temporarily avoiding foraging habitats during construction. Considering the BMPs and AMMs, and scale of the proposed action with respect to the available habitats within the Cooper River, these potential impacts are anticipated to be de minimis. The proposed action is not likely to adversely affect the shortnose sturgeon.

3.7.2.3.6 Plants

American chaffseed (*Schwalbea americana*)
American chaffseed occurs in pine flatwoods, fire-maintained savannas, ecotones between peat wetlands and xeric soils, and other open grass-sedge systems (USFWS 2023q). The pine forests within the action area lack peaty wetlands and the requisite areas upslope with an open and herbaceous understory for the species. American chaffseed is not anticipated to occur within the action area and the proposed action is anticipated to have no effect on American chaffseed.

Canby’s dropwort (*Oxypolis canbyi*)
Canby’s dropwort occurs in pond cypress savannahs, the shallows and edges of cypress/pond pine sloughs, ponds, and wet pine savannas (SCDNR 2023e, USFWS 2023r). The pine forests within the action area that are in active timber management are subject to frequent disturbance, and do not contain the requisite cypress or pond pine sloughs, ponds, or open wet savannas. Therefore, Canby’s dropwort is not anticipated to occur within the action area and the proposed action is anticipated to have no effect on Canby’s dropwort.

Pondberry (*Lindera melissifolia*)
Known locations of pondberry within Berkeley County occur in Francis Marion National Forest in pineland ponds and limestone sinks (Porcher 1994, SCDNR 2023f, USFWS 2023s). These wet pineland depressions or limestone sinks do not occur within the action area, as such, it is not anticipated to be suitable habitat for the species. Therefore, pondberry is not anticipated to occur within the action area and the proposed action is anticipated to have no effect on pondberry.

3.7.2.3.7 Essential Fish Habitat

An adverse effect to EFH includes direct or indirect physical, chemical, or biological alterations, and can encompass changes to waters or substrates, species and their habitats, quality or quantity of EFH, or changes to ecosystem components. The Proposed Action would include the repair, construction, and demolition of marine structures. However, the Proposed Action is not anticipated to result in adverse effects to EFH. As discussed in **Section 3.7.1.3**, the EFH designations in **Table 3-12** include significant overlap between the different EFH designations with regard to habitat type. As a result, EFH in this section is assessed by habitat type, rather than by FMP-level EFH designation.

The new Goose Creek floating dock would be located in deeper water and would not shade emergent wetland habitats. It is anticipated that the minimal footprint of the substrate disturbance of unconsolidated bottom habitats (approximately 7 piles) would be self-mitigated by the added hard bottom habitats consisting of vertical structure and cover provided by the piles and dock following installation. In-water materials (e.g., reinforced plastic piles or concrete piles) for the Goose Creek floating dock would be inert and are expected to have no effect on estuarine water column habitats.

The proposed action would include in the removal of treated timber piles from the marine environment with the demolition of Pier Bravo, resulting in improvements to estuarine water column habitats. This would also result a net gain in unconsolidated bottom habitat with the removal of pier piles but would also represent a loss of hard-surface vertical structure. The improvements to estuarine water column habitats and the return of unconsolidated bottom habitats are anticipated to offset the loss of vertical structure.

EFH along the tidal creek that runs under the Old Tom Road Causeway would be impacted by the extension of the culvert to widen the causeway. However, as discussed in **Section 3.7.1.3**, the estuarine emergent wetland habitats represent de minimis areas of poor quality EFH along the causeway. In addition, the conversion of mud channel to culvert would not affect fish passage and access to the habitats upstream. The unconsolidated bottom habitat loss associated with the short culvert extension is considered de minimis due to the scale of the proposed action in the context of the Cooper River estuary. In-water materials (e.g., culvert extension and clean fill) for the causeway would be inert and are expected to have no effect on estuarine water column habitats.

In addition to in-water work, other components of the Proposed Action have the potential for direct short-term effects to the water column EFH in the project vicinity. Increases in turbidity and total suspended solids are anticipated but would be minimized and mitigated with project design in concert with the AMMs from **Appendix D**. BMPs that minimize erosion and migration of sediments and prevent oil, tar, trash, debris, and pollutants from entering the waters or wetlands will be implemented during construction. The Proposed Action will also be completed in an expeditious manner to minimize the period of disturbance. Long-term, no adverse effects to the water column are expected from the Proposed Action.

3.8 CULTURAL RESOURCES

This discussion of cultural resources includes prehistoric and historic archaeological sites; historic buildings, structures, and districts; and physical entities and human-made or natural features important to a culture, a subculture, or a community for traditional, religious, or other reasons. Cultural resources can be divided into three major categories:

- Archaeological resources (prehistoric and historic) are locations where human activity measurably altered the earth or left deposits of physical remains.
- Architectural resources include standing buildings, structures, landscapes, and other built-environment resources of historic or aesthetic significance.
- Traditional Cultural Properties (TCPs) may include archaeological resources, structures, neighborhoods, prominent topographic features, habitat, plants, animals, and minerals that Native Americans or other groups consider essential for the preservation of traditional culture.

In addition to architectural and cultural resource data on file with JBC, the ArchSite Subscriber Geographic Information System (GIS) maintained by the South Carolina Institute of Archaeology and Anthropology (SCIAA), and the South Carolina Department of Archives and History (SCDAH) was also consulted (ArchSite 2023).

There are no identified TCPs at JBC. It is USAF policy to identify sites sacred or important to Native Americans early in the planning process through coordination with federally recognized Tribes. The coordination process assists the USAF in identifying potential TCPs at JBC that are not currently known. Coordination letters were sent to federally-recognized Native American Tribes, and no sites of religious or cultural significance were identified for the proposed projects in this EA. Accordingly, there will be no significant impacts on any TCPs.

3.8.1 Affected Environment

Cultural resources listed in the National Register of Historic Places (NRHP) or eligible for listing in the NRHP are “historic properties” as defined by the NHPA. The list was established under the NHPA and is administered by the National Park Service on behalf of the Secretary of the Interior. The NRHP includes properties on public and private land. Properties can be determined eligible for listing in the NRHP by the Secretary of the Interior or by a federal agency official with concurrence from the applicable State Historic Preservation Officer. A NRHP-eligible property has the same protections as a property listed in the NRHP. The historic properties include archaeological and architectural resources.

The JBC conducted inventories of cultural resources at JBC-WS to identify historic properties that are listed or eligible for listing in the NRHP (USAF 2021).

3.8.1.1 Archaeological Resources

The USAF and supported component missions determined that the area of potential effects (APE) for archaeological resources includes the area encompassed by the construction boundaries of the Proposed Action. Boundaries for each proposed action are detailed in **Figures 2-1** to **2-11**.

Air Base

Prior to 2010, cultural resource surveys determined that JBC-AB had not potential for archaeological sites or historic architecture; however, through a recent property transfer, JBC-AB acquired one NRHP-eligible property, the Michaux French Botanical Garden site (USAF 2021). The garden is located approximately 0.98 mile from the nearest proposed project (Hydrant Pits) and has no potential for development as part of the proposed action.

Weapons Station

Nine cultural resources survey projects with archaeological investigation components have been conducted at JBC-WS, resulting in the identification of 130 archaeological sites (ArchSite 2023; USAF 2021). All 13,324 surveyable acres (i.e., undisturbed and accessible acres) of JBC-WS have been surveyed and inventoried. Twelve archaeological sites on the base are individually eligible for listing in the NRHP, and 13 are contributing resources to one of two NRHP-eligible Historic Districts. The remaining sites are not eligible for listing in the NRHP. None of these sites are within the APE for archaeological resources.

In 1996, the USN conducted an archaeological survey of the (then) proposed NNPTC facility and associated areas. This survey covered all but the northernmost portion of the APE, and no archaeological sites were identified (USAF 2021). In 1999, the USN conducted another archaeological survey of JBC-WS that included the northernmost portion of the APE, in which no archaeological sites were identified (USAF 2021).

The Defense Fuel Supply Point Petroleum, Oil, and Liquids (DFSP POL) area at JBC-WS was assessed to determine the need for an archaeological survey. It was determined the DFSP POL area does not merit archaeological survey. The State Historic Preservation Office (SHPO) concurred with this finding (USAF 2021).

NAAF

In 1984 the National Park Service (NPS) conducted a preliminary cultural resource survey of JBC-AB and the NAAF. The conclusion was that there was no chance for discovery of significant archeological resources at JBC-AB but further surveys at the NAAF were recommended (USAF 2021). The NPS also assessed World War II-era buildings and structures on JBC-AB. Four buildings were inventoried, and none were considered eligible for the NRHP. The SHPO concurred with these findings (USAF 2021).

In 1984, a survey of approximately 1,150 undeveloped acres at the NAAF resulted in the discovery of six prehistoric campsites and 11 historical archeological sites. None of the 17 sites were considered eligible for inclusion in the NRHP due to lack of research potential and poor site integrity. The SCDAH concurred with the findings. The SHPO concurred with the findings. This report also indicated the Robinson Family Cemetery was located south of Runway 9. Personnel could not confirm the cemetery location, and it is speculated the cemetery was relocated prior to runway construction (USAF 2021).

3.8.1.2 Architectural Resources

The APE for architectural resources includes the area encompassed by the construction boundaries of the Proposed Actions. Boundaries for each proposed action are detailed in **Figures 2-1** to **2-11**.

Air Base

None of the Word War II-era properties inventoried and evaluated at JBC-AB were determined to be eligible for the NRHP. A base-wide inventory and evaluation of potentially significant Cold War-era buildings and structures located on JBC-AB was conducted in 1995. The final report indicated that none of the investigated buildings and structures were eligible for the NRHP. The SCDAH concurred with the findings of the World War II and Cold War property surveys (USAF 2021).

Weapons Station

JBC-WS has one NRHP-eligible architectural historic district, the Polaris Missile Magazine Historic District, composed of 114 resources associated with the Polaris Submarine Launched Ballistic Missile (SLBM) system, including 108 reinforced-concrete missile storage magazines, five support buildings, and a railroad track. The historic district is significant under Criteria A and C for its association with the Polaris Fleet Ballistic Missile Weapons program and has exceptional importance under Criteria Consideration G within the context of the Cold War. SHPO concurred with the eligibility of the district. Since the initial survey and evaluation in 2003, nine of the contributing resources have been demolished. Section 106 requirements have been fulfilled for the Polaris Missile Magazine Historic District under the Program Comment for World War II and Cold War Era (1939– 1974) Ammunition Storage Facilities (USAF 2021). In September 2011, the Advisory Council on Historic Preservation (ACHP) accepted the main report and the site-specific report as required under the Program Comment, fulfilling all of the requirements. Therefore, all of the Section 106 requirements for the district have been fulfilled (USAF 2021).

A total of 141 architectural resources at JBC-WS are NRHP-eligible under the Cold War Era Unaccompanied Personnel Housing Program Comment (USAF 2021) and World War II and Cold War Era Ammunition Storage Facilities Program Comment (USAF 2021). An additional 624 resources are NRHP-eligible under the Housing Public/Private Venture (PPV) Programmatic Agreement (PA) and Capehart-Wherry Housing Program Comment (USAF 2021). Section 106 responsibilities for these 766 historic properties are covered under their respective Program Comments.

NAAF

The NAAF contains no known properties eligible for the NRHP (USAF 2021).

3.8.2 Environmental Consequences

Proposed Action components were evaluated individually to determine impacts to archaeological and architectural resources. Proposed Action components that would result in no adverse impacts are detailed in **Table 3-1**. Proposed Action components with identified impacts, however minor, are detailed in the sections below. As described in the following section, no significant impacts are anticipated.

3.8.2.1 Archaeological Resources

The Proposed Action would have no direct effect on known archaeological resources. No projects are proposed in any areas where known archaeological resources are present. No Proposed Action components would affect historic properties. If any unanticipated discoveries of archaeological materials are made, work would be temporarily halted, and the procedures outlined in the Integrated Cultural Resource Management Plan (ICRMP) and *Cultural Discoveries* Standard Operating Procedure for would be followed. The Proposed Action would have no indirect effects on archaeological resources because it would not facilitate access to previously remote sites and thus contribute to their disturbance and would not impact the setting of any significant archaeological sites. If an unexpected discovery consists of Native American human remains, funerary objects, sacred objects, or objects of cultural patrimony, all ground-disturbing activities must stop, and the Cultural Resources Manager (CRM), Security Forces, Air Force Office of Special Investigations (AFOSI), the State Archaeologist, and the associated tribes must be contacted prior to resumption of ground-disturbing activities. The provisions of the Native American Graves Protection and Repatriation Act (NAGPRA) would apply, and the regulations outlined in 43 CFR 10 would be followed. Additionally, the ACHP's "Policy Statement Regarding Treatment of Burial Sites, Human Remains, and Funerary Objects" must be followed. South Carolina Code of Laws Chapter 17, Section 16-17-600 applies to unmarked human remains.

3.8.2.2 Architectural Resources

The Proposed Action would have no direct effect on historic buildings and structures. There are no known NRHP-listed or NRHP-eligible historic buildings or structures located within or near the APE. No Proposed Action components would affect historic properties. The APE for architectural resources includes the area encompassed by the construction boundaries the Proposed Actions as detailed in **Figures 2-1** to **2-11**, and areas with a direct line of sight of the Proposed Actions, or viewshed, of the historic properties. However, Bldgs. 2190, 2194, and 2196 in the South Area of JBC-AB (**Figure 2-10**) are located within the boundaries of the Lambs Phosphate Mining Complex (Historic Resource Number 7916), which is an historic district that contributes to the eligibility of the NRHP-Listed Ashely River Historic District. Further consultation with SHPO prior to work on these buildings is recommended to ensure the proposed actions do not impact the eligibility of the historic district. Although the other proposed actions in the JBC-AB South Area and the Flightline Proposed Actions associated with the runway and ramp areas are within 0.5 mile of the boundary of the Lambs Phosphate Mining Complex, these improvements will not alter the existing appearance and will not impact the viewshed. The nearest proposed actions within JBC-WS are the northern laser testing range (**Figure 2-2**), the SLS 310 (**Figure 2-5**), and the WDS North (**Figure 2-6**) that are both located within 0.5 mile southeast of the Polaris Missile Magazine Historic District (detailed above). These proposed improvements are not anticipated to impact the viewshed of this eligible historic district. All other proposed action locations are farther than 0.5 mile from the nearest NRHP-Listed or Eligible historic resource and are not anticipated to negatively impact the viewshed of any of these resources (ArchSite 2023). SHPO concurrence to support this determination is forthcoming.

3.9 EARTH RESOURCES

3.9.1 Affected Environment

3.9.1.1 Geology

The Pleistocene geological composition of the JBC-AB and JBC-WS region contains recent fluvial sands, back barrier muds (i.e., marsh) and barrier beach sands aged less than 3 million years. Additional information regarding the soil composition in the proposed action areas was obtained from the Soil Survey of Berkeley County (SCDNR 2023). Underlying the two properties is the Cooper Marl geologic formation, formed 40 to 25 million years ago in the Oligocene Age. It can be found about 60 ft below ground surface and is composed of deposits of glauconite (a greenish mineral of the mica group) and foraminifera (marine protozoan having a linear, spiral, or concentric shell) that range from 30 to 200 ft in thickness. Santee Limestone underlies the Cooper Marl. The Santee Limestone is from the Eocene Age and is approximately 250 ft thick (NAVFAC 2003b).

The NAAF is located 85 miles northwest of JBC-AB and 3 miles east-southeast of the Town of North, South Carolina, in Orangeburg County. The NAAF is located within the Coastal Plain and has a geological composition which consists of Paleocene, Eocene and Holocene features (SCDNR 2022a). Paleocene sediments are well developed in the Charleston embayment but are thin and poorly represented in this area. Eocene elements are dominated by profusely fossiliferous, marine carbonates. The upper Coastal Plain consists of Cretaceous through Eocene units.

3.9.1.2 Soils

The soils underlying JBC were identified and assessed using the US Department of Agriculture (USDA) Soil Survey Geographic database (USDA-NRCS 2023). Additional Information regarding the soil composition in the proposed action areas was obtained from the Soil Survey of Berkeley County. JBC is underlain with Pleistocene features containing recent fluvial sands, back barrier muds (i.e., marsh) and barrier beach sands that are less than 3 million years.

The predominant soil types at JBC-AB are fine sand, sand and sandy loam. Sand and sandy loam are typical surface soils, and clay content generally increases with depth. The soils at JBC-WS primarily consist of sandy clay, clays, and some deep sands (**Figure 3-25** through **3-28**). The soil types present at the NAAF predominantly contain sandy loams. Soils at JBC-AB, JBC-WS, and NAAF are classified as farmland soils of statewide important, prime farmland, and unique farmland.

3.9.1.3 Topography

JBC-AB, JBC-WS, and NAAF are located within the Atlantic Coastal Plain region of South Carolina, which is characterized by marine terraces formed during periods of higher sea levels during the Pleistocene Period. In some areas, terraces have been covered by Holocene Period deposits. The area is composed of marine terraces that formed during the Pleistocene Period when sea levels were high. JBC-AB lies on a crystalline basement consisting of diabase, basalt, and metasedimentary rock; the basement is similar in character and age to igneous and metamorphic rock in the adjacent Piedmont physiographic province. JBC-WS lies within the Outer Coastal Plain of South Carolina.

The NAAF lies on the Inner Coastal Plain physiographic province of South Carolina, which is characterized by moderately sloped, irregularly shaped, and rounded contours. The surficial geology consists of thin marine sediment layers that have formed on the terraces. The topography is relatively flat, with the surface elevations varying from an average of 15 to 45 ft above MSL at JBC-AB, 49 ft above MSL to sea level at JBC-WS, and 61 to 100 ft above MSL at the NAAF.

3.9.2 Environmental Consequences

3.9.2.1 Geology

Geologic resources would remain unaffected by the Proposed Action components because there is no substantial excavation associated with this action that would impact site geology. Therefore, the proposed action would not directly or indirectly impact geology, and no significant impacts are anticipated.

3.9.2.2 Soils

Under New NPTU Training Facility Alternative 1, ground disturbance due to grading and facility construction activities could result in soil erosion within the project area. The use of permit-required BMPs would reduce any potential impacts from erosion during these activities. There would be localized short-term effects on soils related to the construction activities. Long-term direct impacts to soil and soil quality would result from soil disturbance within the forested areas due to the stormwater retention pond. The impacts from NPTU Training Facility Alternative 3 would be similar to the impacts under Alternative 1 and 2 (considered short-term negligible impacts). The impacts from NPTU Training Facility Alternative 4 would be similar to those seen in Alternative 3.

NPTU Substation Alternatives 1 and 2 would result in ground disturbances and potential temporary impacts to soils, as trenching would be required for the installation of underground utility lines. There would be negligible, localized short-term effects on soils related to construction due to disturbance. No long-term impacts to soils are anticipated. There would, however, be minor short-term indirect impact to soils due to trenching. Additionally, no indirect impacts are expected.

Development of the Natural Resources facility would result in localized short-term negligible effects on soils due to timber clearing to prepare the site for construction. No long-term impacts to soil are anticipated. There would, however, be minor short-term indirect impacts to soils due to alteration of existing soils as a result of trenching. Additionally, no indirect impacts are expected.

The five existing SLSs would be demolished and backfilled. Implementation of BMPs would be required to control erosion. SLS wells would be transitioned from dry well SLSs to wet well SLSs. Impacts would be limited to general area disturbance within the existing SLS footprints during construction, no additional environmental impacts are anticipated from the perspective of updating the type of SLSs. The ground disturbing upgrades, as well as the backfilling of demolished SLSs would have minor short-term indirect impacts to the soils.

There would be negligible, localized short-term effects on soils from the development of the WDS due to disturbance of approximately 2.8 acres for the removal and installation of piping. No long-term impacts to soils are anticipated. There would, however, be minor short-term indirect impacts to soils due to alteration of existing soils from HDD. Ground disturbance due to grading and construction activities could result in soil erosion within the project area. The use of permit required BMPs would reduce any potential impacts from erosion during these activities.

Development of the Civil Engineering Complex Shop and Entomology Facility and Ambulatory Care Center would require minor disturbance to soils during construction and demolition activities. There would be negligible, localized short-term effects on soils due to disturbance from the development activities.

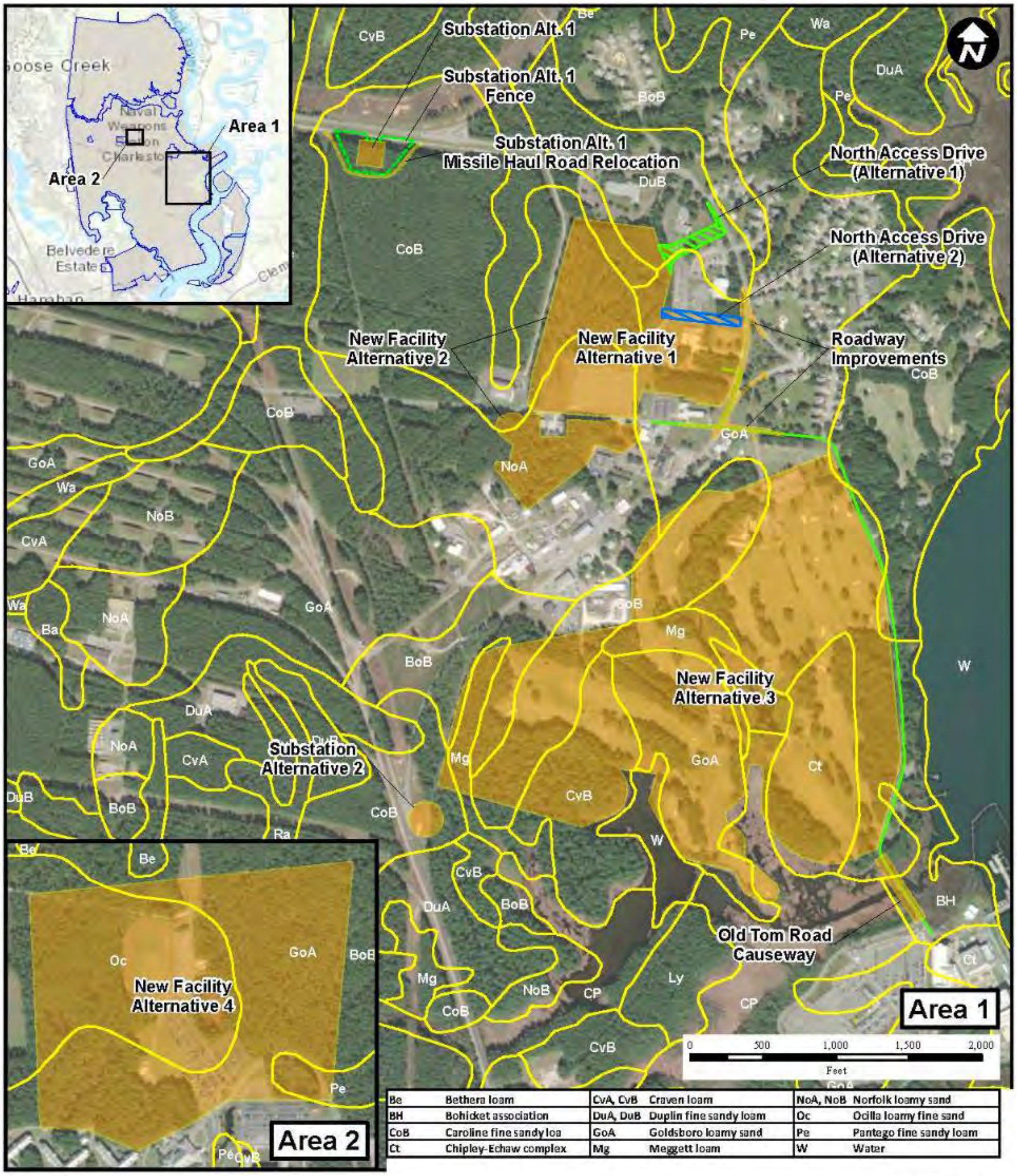
The NAAF Fire Station Addition would result in negligible, localized short-term effects on soils related to construction of the two driveways and the extensions of the existing concrete pad. No long-term impacts to soils are anticipated.

3.9.2.3 Topography

The construction of the New NPTU Training Facility would include the development of two high bay complexes. The addition of the construction of the two high-bay complexes, parking areas, and stormwater retention pond would require grading of the existing topography. Minor direct, long-term effects are anticipated to topography as a result of all four alternatives.

Development of the Old Tom Road Causeway under Alternatives 1, 2, and 3 would result in minor long-term impacts to topography. The topography in the vicinity of the causeway would change with the widening and raising of the causeway which would require fill and a standard pavement pouring. The changes to topography surrounding the wetland and steam habitat that would be filled for would be minor. The remaining proposed action components would not directly or indirectly impact topography.

Construction of the Natural Resources Facilities would require the area around the facility to be cleared, site prepped, and finished with gravel. Construction of the proposed action would result in minor topography changes. Clearing of timber and grading of the area around the facility would be required during construction, and result in negligible long-term impacts to topography.



Be	Bethera loam	CvA, CvB	Craven loam	NoA, NoB	Norfolk loamy sand
BH	Bohicket association	DuA, DuB	Duplin fine sandy loam	Oc	Ocilla loamy fine sand
CoB	Caroline fine sandy loa	GoA	Goldsboro loamy sand	Pe	Pantego fine sandy loam
Ct	Chipley-Echaw complex	Mg	Meggett loam	W	Water

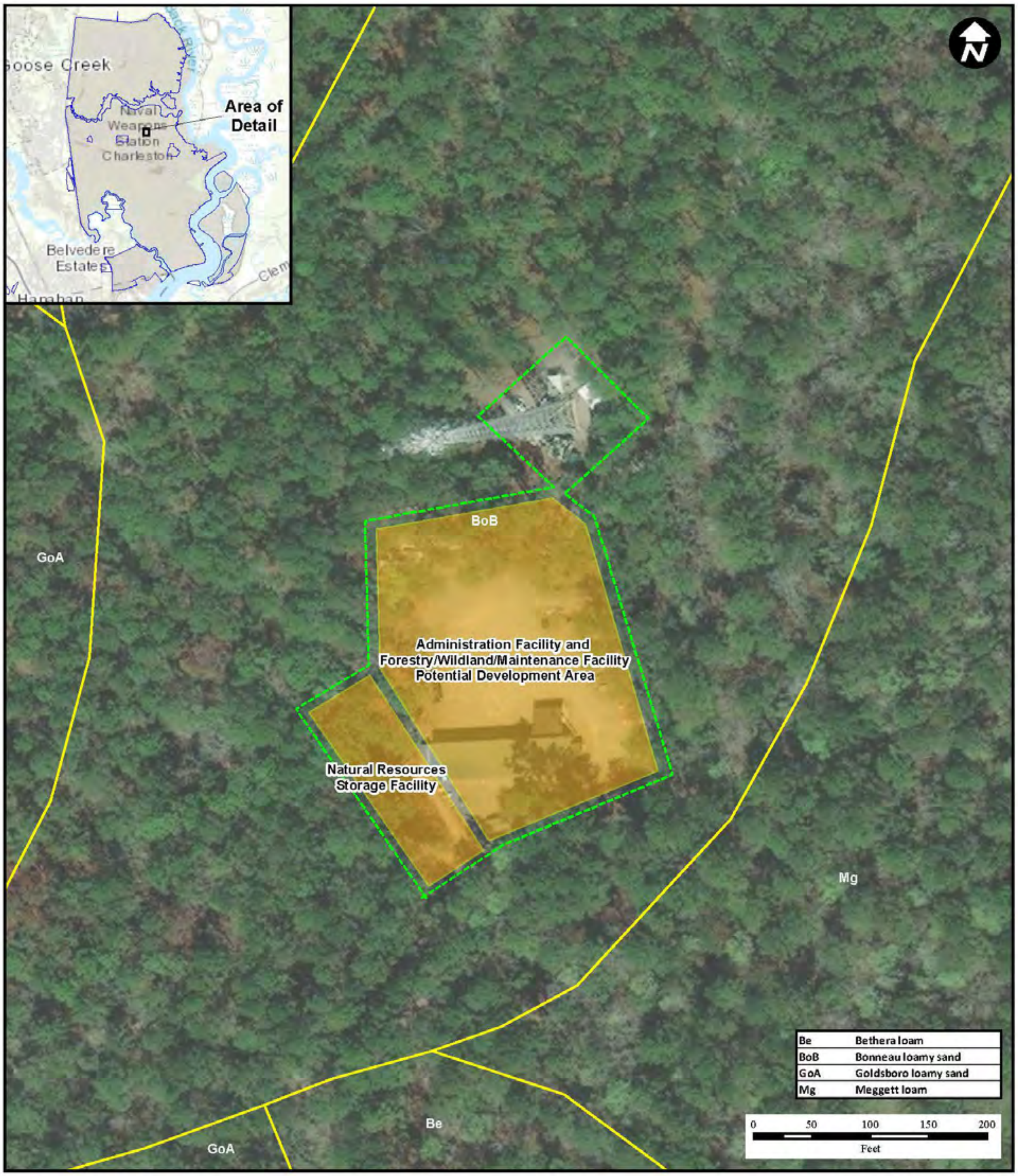
Legend
- Proposed
- NPTU Multi-Use Path
- NPTU Substation Fence
- Soil Unit
- Installation Boundary

Figure 3-25

Soils

NPTU Simulation Expansion

Installation Development Environmental Assessment
Joint Base Charleston, South Carolina



Legend

- 🟧 Proposed Action
- ‐‐‐ Security Fence
- ▭ Soil Unit
- ▭ Installation Boundary

Figure 3-26

Soils

Natural Resources Storage Facility

Installation Development Environmental Assessment
Joint Base Charleston, South Carolina

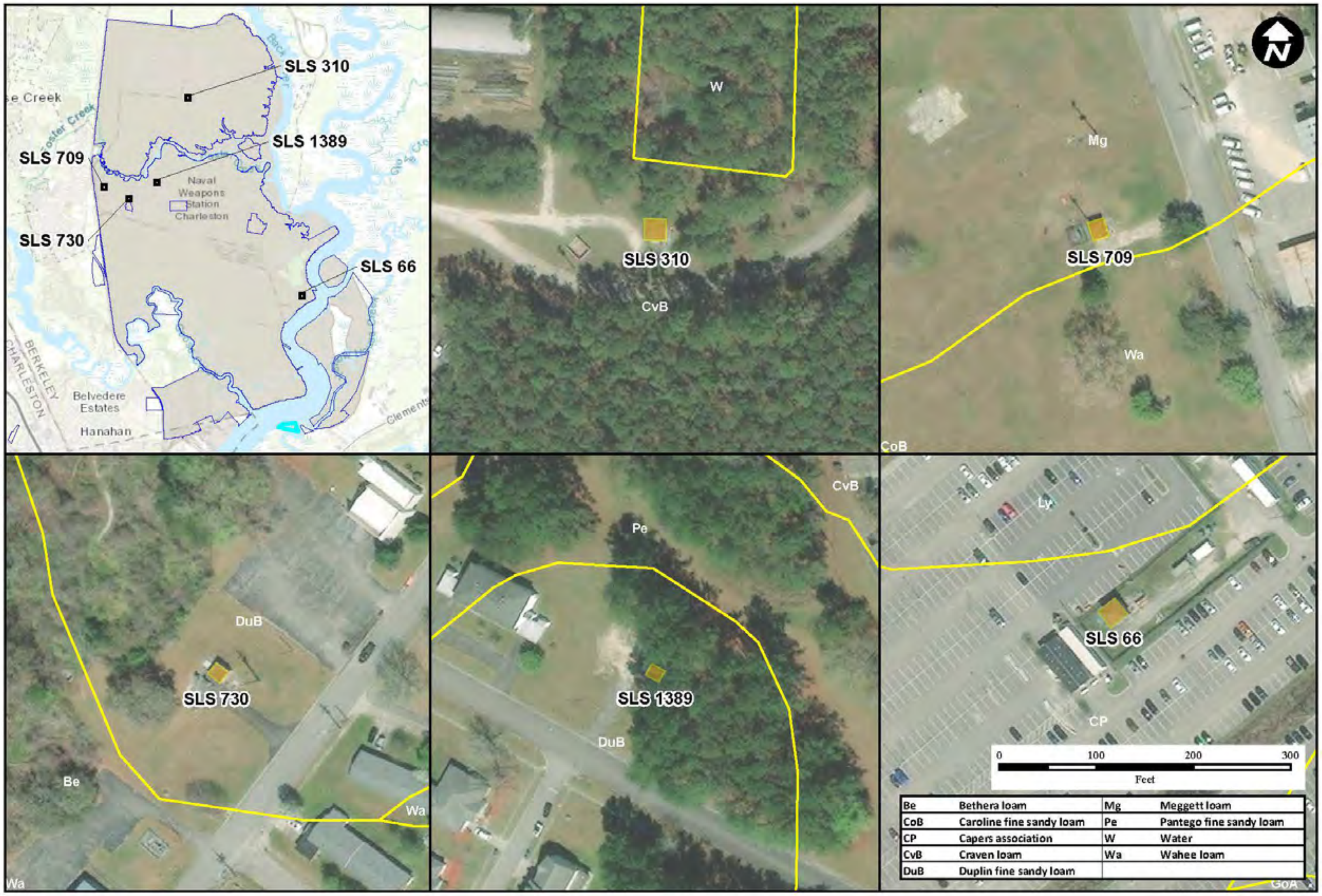
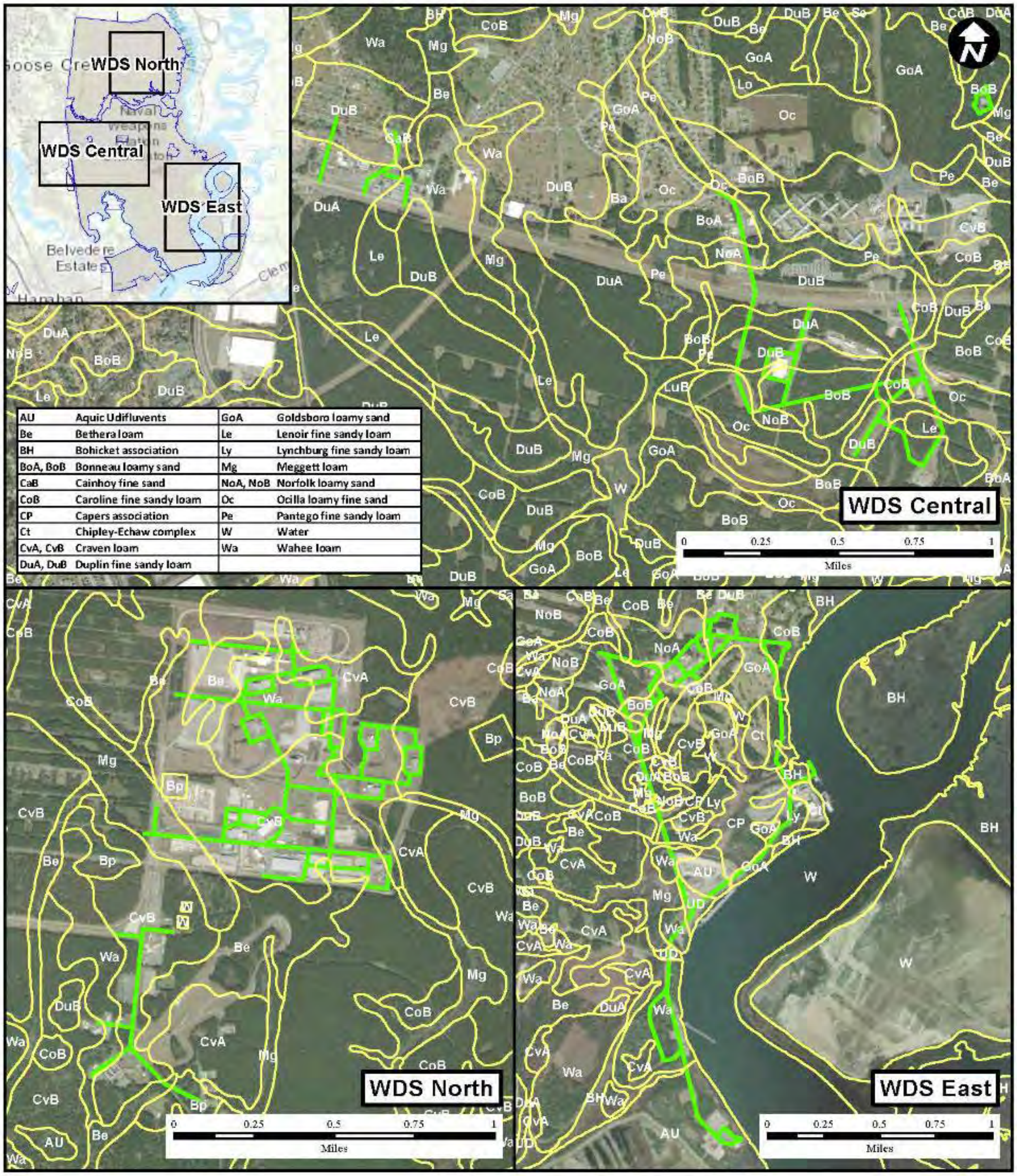


Figure 3-27
Soils
Sewer Lift Stations
Installation Development Environmental Assessment
Joint Base Charleston, South Carolina



AU	Aquic Udifluvents	GoA	Goldsboro loamy sand
Be	Bethera loam	Le	Lenoir fine sandy loam
BH	Bohicket association	Ly	Lynchburg fine sandy loam
BoA, BoB	Bonneau loamy sand	Mg	Meggett loam
CaB	Cainhoy fine sand	NoA, NoB	Norfolk loamy sand
CoB	Caroline fine sandy loam	Oc	Ocilla loamy fine sand
CP	Capers association	Pe	Pantego fine sandy loam
Ct	Chipley-Echaw complex	W	Water
CvA, CvB	Craven loam	Wa	Wahee loam
DuA, DuB	Duplin fine sandy loam		

Figure 3-28

Soils

Water Distribution System

Installation Development Environmental Assessment
Joint Base Charleston, South Carolina

3.10 SOCIOECONOMIC RESOURCES/ENVIRONMENTAL JUSTICE

3.10.1 Affected Environment

Socioeconomic resources include the basic attributes and resources associated with the human environment. In particular, this includes population and economic activity. Economic activity typically encompasses employment, personal income, and industrial growth. Additionally, EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, and EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks* require consideration of environmental justice issues and health and safety risks to children.

The proposed action was evaluated using demographic data including population characteristics, race, ethnicity, poverty status, educational level, and other broad indicators. A minority population is defined as a group of people and/or community experiencing common conditions of exposure or impact that consists of persons classified by the U.S. Census Bureau as a race other than white. A low-income population is defined as a population whose median household income is at or below the U.S. Department of Health and Human Services poverty guidelines.

A wide range of demographic descriptors were evaluated using the EPA's Environmental Justice Screening and Mapping Tool, EJScreen to represent the "social vulnerability" characteristics of a disadvantaged population. Minority Population, Low-Income Population, Limited English Speaking Population, Population with less than a High School Education, Population less than five years of age, and Population greater than 64 years of age were demographic indicators that were analyzed in the region of the Proposed Action components. EJScreen community reports for the regions surrounding JBC-AB, JBC-WS, and the NAAF are included in **Appendix F**.

The population of the Charleston region is composed of various demographics. Of the region, 74.1% self-identified as white according to the 2021 Census estimates. Among other races,

19.6% identified as black or African American, 0.3% identified as American Indian or Alaska Native, 1.8% identified as Asian, 0.2% identified as Native Hawaiian and Other Pacific Islander, 2.6% indicated two or more races (USCB 2023).

The evaluation of environmental justice is designed to:

- Focus attention of federal agencies on the human health and environmental conditions in minority communities and low-income communities with the goal of achieving environmental justice.
- Foster nondiscrimination in federal programs that may substantially affect human health or the environment.
- Give minority communities and low-income communities greater opportunities for public participation in, and access to, public information on matters relating to human health and environmental conditions.

3.10.1.1 Socioeconomics

The Charleston region contains the largest military presence in South Carolina. The U.S. Military has a $10.8 billion economic impact annually on the Charleston region, supporting 68,529 jobs. The JBC plays an important role in the Charleston region, providing jobs to over 50,303 personnel with a total of approximate $8.7 billion in economic impact annually on South Carolina's economy, with $3.6 billion in labor income (BLS 2022).

Industrial sectors that are most impacted by JBC include architecture and engineering related services, professional, scientific, and technical services, construction, real estate, insurance, wholesale trade, and medical related services.

Areas immediately surrounding JBC-WS have an unemployment rate of 30%, and JBC-AB has an unemployment rate of 52 to 65% (EPA 2022). Limited English speaking populations within the 96th percentile are located between JBC-AB and JBC-WS in Hanahan, SC and along the northern border of JBC-AB in North Charleston. These areas also contain populations in the mid-90th percentile for individuals with less than a high school education, and children under the age of 5, both of which are indicators of lower socioeconomic-status areas (USEPA 2023d). The western region of Orangeburg County where NAAF is located has a 91% unemployment rate. Orangeburg County has a 26.5% poverty rate, and Charleston County has a poverty rate of 13.8% (USCB 2016). Communities south of NAAF contain high proportions of individuals over the age of 64 (85th percentile), and individuals with less than a high school education (92nd percentile) (USEPA 2023d).

3.10.1.2 Environmental Justice

An environmental justice analysis was conducted in accordance with EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, to consider disproportionately high and adverse impacts on minority and low-income populations in the surrounding community resulting from the Proposed Action. JBC-AB and JBC-WS are located in a region where 60 to 70% of the population is considered low-income. Communities in this area fall between 80 and 96th percentile of low income communities in the United States (USEPA 2023d). The lowest income population resides southwest of JBC-AB and JBC-WS and south and west of the intersection of Redbank Road and Henry E Brown Jr. Boulevard. Most of the low-income population is located within the city of Charleston and on the outskirts of Berkeley County (USEPA 2023d).

NAAF is surrounded by low-income communities to the northwest and northeast, with most citizens falling within the 81 to 90th percentile of communities considered low-income in the United States.

3.10.2 Environmental Consequences

3.10.2.1 Socioeconomics

The Proposed Action components at JBC-AB and JBC-WS would require temporary construction personnel. JBC would attempt to hire temporary construction staff from the local population. Hiring staff from the local community would result in temporary impacts toward lowering the county unemployment rates. However, beneficial impacts resulting from construction payrolls and materials purchased would be negligible on a regional scale.

Upon completion, the proposed action would provide additional economic stimulus to the regional economy through increased annual expenditures associated with operating and maintaining the newly developed roads, buildings, and infrastructure projects.

There would be no anticipated population increase within the Charleston region as a result of the Proposed Action, which would result in less than significant socioeconomic impacts. Implementation of the Proposed Action components would not disrupt or divide established communities.

Therefore, negligible short-term benefits and minor long-term benefits are anticipated to socioeconomic factors at or near JBC-AB and JBC-WS as a result of implementation of this alternative. Additionally, no significant indirect impacts are expected.

Impacts to the socioeconomic of the regions surrounding NAAF would be similar to those described for the Proposed Actions at JBC-AB and JBC-WS (no impacts).

3.10.2.2 Environmental Justice

No significant adverse environmental impacts would occur as a result of the proposed developments, and no populations (minority, low-income, or otherwise) would be disproportionately impacted.

Noise impacts from the Proposed Action would be short-term and temporary (**Section 3.2.3.1**) and would not affect known minority or low-income populations. Given that no minority or low-income populations would have access to or be within the Proposed Action boundary, minority or low-income populations would not be disproportionately impacted by the Proposed Action, and there would be no significant impacts to environmental justice.

3.11 CUMULATIVE EFFECTS

This section describes the approach used to analyze potential cumulative impacts associated with the Proposed Action and all the remaining non-selected proposed construction, demolition, and renovation projects in the context of potential interactions with other past, present, and reasonably foreseeable actions in the region.

The CEQ regulations implementing NEPA (40 CFR 1508.1) dictate that cumulative impacts analyses should be limited to the impacts that can be evaluated meaningfully by the decision-makers. The guidelines further indicate that the area to use in defining the cumulative impacts geographical boundary should extend to the point at which the resource is no longer affected significantly (CEQ 2020).

Cumulative impacts refer to the adverse effect on resources in a region when the incremental impacts of proposed projects combine with the environmental impacts of past, present, and foreseeable actions. Actions that are similar to the proposed projects or affect similar environmental resources, are located nearby, and have occurred, are ongoing, or are foreseeable can contribute to cumulative impacts. To be considered cumulative, these impacts must be related in space and time. The analysis of cumulative impacts in this EA follows CEQ, USN, and USAF guidance (CEQ 1997) and provides a systematic approach for assessing cumulative impacts. The analysis period for the proposed action and non-selected projects is approximately 5 years. Most potential cumulative effects are limited to the boundaries of the JBC, except for certain resource areas and locations near the runways. Off-post development projects are independent of proposed projects on JBC and are spatially separated. Therefore, no interaction effects are anticipated beyond incremental short-term additions to regional air emissions, incremental changes in impervious surfaces within shared watersheds, and incremental loss of vegetative communities and wildlife habitat.

The potential for other past, present, and reasonably foreseeable future actions to interact with the Proposed Action to create cumulative effects varies among resource areas. Considered projects are discussed for each resource area with a potential for cumulative impacts. Projects with no potential to interact are not discussed for these resource areas.

3.11.1 Relevant Past, Present, and Foreseeable Future Actions

Past activities are the activities and actions that have occurred within the geographic scope of the cumulative effects analysis and shaped the current environmental conditions of the project area. The effects of these past activities and actions are now part of the existing environment and are included in the description of the affected environment. Reasonably foreseeable actions are those that have been planned and could be completed within the timeframe of projects addressed in this EA.

Past Actions

Facilities Expansion at Naval Nuclear Power Training Unit Charleston. An EA was prepared and the FONSI and FONPA was signed in 2012 to provide infrastructure improvements needed to accommodate current and future increases in student numbers at the NPTU. The Proposed Action included demolishing, renovating, and upgrading existing facilities; constructing new academic and training facilities; relocating MTS support systems; increasing the number of parking spaces; expanding pier facilities to support uninterrupted MTS operation and training during the transition to the newer MTSs; and implementing improved security and access measures.

Charleston International Airport and Boeing Charleston Factory. Charleston International Airport and the Boeing Charleston Factory are adjacent to and utilize some of the runway and supporting infrastructure owned by the USAF at JBC-AB. Projects at either of those locations could overlap construction and demolition projects proposed at JBC-AB. Boeing acquired 320 acres in addition to the 265 acres currently leased at Charleston International Airport in March 2012. Some or all of this land could be used to expand existing aircraft assembly operations at that facility. Cumulative losses of vegetation and wildlife habitat and increases in impervious surfaces and corresponding increases in stormwater runoff could occur. The improvement projects were expected to result in minor short-term adverse effects, localized to individual project areas, on the noise environment, air quality, and water resources shared with JBC-AB and the loss of approximately 1.9 acres of mowed and maintained vegetation.

South Carolina Department of Transportation (SCDOT), S-29 Red Bank Road Safety Improvements. SCDOT conducted an operational and safety analysis and engineering design for a 1.3-mile section of Red Bank Road (S-29) between Eagle Road (S-251) and Garwood Road (S-585). This project evaluated the traffic safety improvements, including the raising of medians, sidewalks, and street lights. A public meeting was held on March 14, 2019. The proposed project schedule had a preliminary design completed in the summer of 2019, right-of-way acquisition, as needed, in the winter of 2019, the final design was completed in the spring of 2020, and was constructed in the summer of 2020.

Recent Developments

Construct Entry Control Facility/Perimeter Security/Commercial Vehicle Inspection. The USAF proposed to construct a new Entry Control Facility (ECF) with a new guard house and guard booths for the privately owned vehicle (POV) lanes, and a new Commercial Vehicle Inspection (CVI) area with a search office and truck X-ray. The ECF will also have an active vehicle barrier and an overwatch building. The ECF will have two inbound outbound POV/commercial vehicle lanes off Red Bank Road with a raised median between the lanes. Security fencing will be provided along the perimeter of the base next to Red Bank Road and will tie into the new ECF to create a secure perimeter around the base. The goal of the ECF is to eliminate all but one entrance and make a main access point for the base. The north side of Red Bank Road is preferred for the new ECF. The new ECF project will require the widening of Red Bank Road.

Foreseeable Future Actions

Orangeburg-Berkley Transmission Main. The USACE prepared an EA and FONSI in August 2022 for the installation of a 20-inch potable water transmission main beginning southwest of the Town of Holly Hill, South Carolina and extending into Berkeley County, northeast of the Town of Ridgeville, South Carolina. The water transmission line will be the main connection of the Lake Marion Regional Water System to the Lake Moultrie Regional Water System. The additional capacity will support existing and future development needs that currently includes over 210,000 people located in Moncks Corner, Summerville, Goose Creek and Unincorporated Berkeley County.

Atlantic Intracoastal Waterway Maintenance Dredging. The USACE proposes to continue the ongoing Atlantic Intracoastal Waterway Federal Navigation maintenance dredging Project in South Carolina. The majority of sediments dredged from the waterway would be transported via pipeline to 90 existing upland disposal areas located adjacent to the channel and two existing in-water disposal areas. The USACE Charleston District is preparing a draft EA and FONSI for this project.

3.11.2 Magnitude and Significance of Cumulative Effects

3.11.2.1 Scope of Analysis

This section summarizes the potential for cumulative impacts for the resource areas having the potential for cumulative impacts; those with no potential for cumulative impacts are not discussed further.

3.11.2.2 AICUZ/Land Use/Noise

None of the identified Proposed Action components at JBC would substantially change the noise environment. Construction, demolition, and renovation projects at JBC would occur, but they would not create significant noise impacts in combination with the Proposed Action. These activities would result in a temporary increase in noise during site development only. Therefore, implementation of the Proposed Action would not incrementally contribute to the noise environment associated with other past, present, or reasonably foreseeable future actions within the Region of Influence, and no cumulative impacts have been identified.

3.11.2.3 Air Quality

The Proposed Action detailed in **Section 2.1** is anticipated to only result in a noise level increase during the construction, demolition, or renovation activities associated with the development process. The noise level increase during development would be short-term and temporary. Impacts associated with any potential increases to levels of vehicle traffic would be negligible given the existing noise environment. Therefore, there would be no significant impacts to the noise environment as a result of the Proposed Action or alternatives.

3.11.2.4 Water Resources

Indirect cumulative impacts to water resources could occur during construction and demolition and following construction projects. The Proposed Action would have long-term minor impacts on surface waters, except for the New NPTU Training Facility Alternative 3, which could have moderate to major impacts associated with Wilson Pond and Georgie Pond. Potential effects to surface waters would be confined within the boundaries of JBC except for in-water Proposed Action components. BMPs and design features would minimize the potential for indirect impacts to offsite waters.

Planned improvements along Goose Creek and the Cooper River could coincide with other projects on and adjacent to these surface waters downstream of JBC. Other than in the Goose Creek and Cooper River vicinity, there is little potential for interaction of all the proposed projects with other past, present, and reasonably foreseeable projects outside installation boundaries.

However, these inputs (e.g., runoff, turbidity, etc.) would be de minimis, would be subject to BMP and permit adherence mitigations, and would not cumulatively result in significant impacts to water resources.

The Proposed Action would have long-term negligible to minor impacts on the 100-year floodplain, except for the New NPTU Training Facility Alternative 3, which could have moderate impacts. Construction of the actions would primarily be outside of the floodplain or within a previously disturbed area (e.g., SLSs, WDS, NPTU multi-use pathway, etc.) and no additional encroachment into the floodplain would result, except for the negligible impacts associated with the LTRs, and the impacts associated with the New NPTU Training Facility and Old Tom Road Causeway alternatives. Therefore, cumulative impacts to flood zones with other projects planned for JBC would minor cumulative impacts that could occur through incremental increases in floodplain encroachment.

The Proposed Action would have long-term minor impacts on wetlands, except for the New NPTU Training Facility Alternatives 3 and 4, which could have moderate to major impacts due to the increased wetland acreages anticipated to be impacted. However, impacts would be permitted through USACE jointly with SCDHEC-OCRM review to ensure wetland impacts are appropriately avoided, minimized, and mitigated. Proposed Action components within the boundaries of JBC and unrelated off-post projects may incrementally contribute to impacts to wetland resources, though contribution to cumulative impacts to wetlands from implementation of the proposed projects is anticipated to be minor.

The amount of impervious surface at JBC-AB, JBC-WS, and the NAAF would increase by up to approximately 30 acres following implementation of all the proposed projects and could be additive with unrelated projects planned or potentially occurring within the same timeframe. Construction and postconstruction stormwater BMPs and new management systems (e.g., New NPTU Training Facility stormwater pond system) would limit impacts, although minor cumulative impacts could occur through incremental increases in scour and sedimentation.

Projects within the boundaries of JBC and unrelated off-post projects may incrementally contribute to impacts to water supply, though contribution to cumulative impacts to water supply from the Proposed Action is anticipated to be negligible. Because the Proposed Actions would have no impacts to groundwater, there would be no contribution to cumulative impacts to groundwater from implementation of the Proposed Action.

3.11.2.5 Safety and Occupational Health

JBC requires its contractors and heavy equipment operators to adhere to all applicable safety regulations and guidelines. Direct construction, demolition, and renovation adverse impacts would be negligible, localized, and short-term. No indirect impacts are expected from the Proposed Action. Development activities would result in a temporary increase in traffic from vehicles and equipment. Once construction is completed, transportation patterns are expected to revert to pre-construction/renovation direction and frequency. Temporary negligible impacts to the traffic environment would occur. Intermittent traffic delays, detours, and temporary road closures may occur in the vicinity of the proposed developments. Potential congestion impacts could be avoided or minimized by scheduling truck deliveries outside of the peak inbound traffic time and by using different access gates. As a result, no long-term or significant impacts on transportation infrastructure are anticipated from the Proposed Action.

3.11.2.6 Hazardous Materials/Waste

Hazardous materials such as fuels for equipment and vehicles would be managed in accordance with applicable federal, state, and local regulations to prevent accidental releases, and the discovery of hazardous/toxic materials during construction of the various projects would be handled in accordance with applicable procedures detailed in JBC's HWMP. If not recyclable, it is anticipated that hazardous/toxic materials would be disposed in appropriately permitted disposal facilities in compliance and accordance with local, state, and federal waste regulations if recycling/reuse are not viable options. It is unlikely that solid or hazardous waste materials from the other relevant projects would be generated during the same time period. There would be no significant incremental adverse cumulative effects on hazardous materials/waste generation or disposal to local landfills from implementation of the Proposed Action.

3.11.2.7 Biological/Natural Resources

Minor cumulative impacts to vegetation and terrestrial biological habitat would occur as the result of the proposed action and all the non-selected proposed projects, except for the New NPTU Training Facility Alternatives 3 and 4, which could have moderate impacts. The Proposed Action would result in the loss of up to 15 to 20 acres of forest, primarily planted managed pinelands, under the New NPTU Training Facility Alternatives 1 or 2, or up to 30 acres under New NPTU Training Facility Alternatives 3 and 4. In-water actions would have negligible impacts to aquatic species, as most of the in-water actions are self-mitigating for aquatic habitats or minor in scale. The losses would be additive with the conversion of land or aquatic habitats from other past and reasonably foreseeable future activities. Impacts to vegetation resulting from the proposed projects would be confined within the boundary of JBC and would comply with AFI 32-7001 *Conservation and Management of Cultural and Natural Resources* and guidelines for the cutting and sale of timber. Because it is anticipated that there would be no loss of species or special habitat types, it is not expected that impacts of the proposed projects would interact with off-post actions to affect regional vegetation or wildlife.

Implementation of the Proposed Action is not anticipated to adversely affect protected species, critical habitats, or EFH. No direct adverse impacts to species or habitats are anticipated. In addition to the design considerations, USAF and USN (and their respective contractors) would adhere to BMPs and AMMs to limit the potential for impacts to terrestrials and aquatic resources and would comply with permits conditions and approvals. Because the Proposed Action would have no adverse impacts to species or habitats, there would be no contribution to cumulative impacts to protected species or habitats from implementation of the Proposed Action.

3.11.2.8 Cultural Resources

There would be no significant incremental adverse cumulative effects on cultural resources. There are no projects located in areas where known archaeological sites or historical properties are present. Inadvertent discovery of cultural resources would trigger standard operating procedures detailed in JBC's ICRMP so as not to disturb the integrity of the resources. The Proposed Action would not facilitate access to previously remote sites or contribute to their disturbance.

3.11.2.9 Earth Resources

The Proposed Action would not result in significant impacts to the geology of the region. Temporary minor short-term impacts to soils due to disturbance from construction would occur during construction of the proposed projects; New NPTU Training Facility, NPTU Substation, Natural Resource Facilities, Civil Engineering Complex: Shop, Civil Engineering Complex: Entomology Facility, Ambulatory Care Center, and NAAF Fire Station Addition. Localized negligible short-term impacts from the construction of the Sewer Lift Stations and the Waste Distribution Systems would occur due to groundbreaking activities required for construction. However, with the use of standard BMPs for prevention of erosion and sedimentation, impacts to soils would be negligible and short term. Relevant past, present, and future actions that include construction of new facilities at the same time as the Proposed Action may cumulatively affect soils at JBC-AB, JBC-WS, and NAAF.

The Proposed Action under the Natural Resources Facilities would result in minor direct long-term impacts to topography. Minor changes to the topography within the vicinity of the Old Tom Road Causeway would be caused from the raising of the road elevation and the filling and pavement pouring within wetland and stream areas under the proposed causeway development. Additionally, the construction of the two high-bay complexes would raise the foundation of the facility to facilitate the bays, however there would be no significant impacts to topography.

3.11.2.10 Socioeconomic Resources/Environmental Justice

All of the development projects would involve the purchase of goods and services and short-term employment during construction. Although construction would only represent a short-term injection of funds into the community, all the projects together would represent a benefit to the local economy. Additionally, during construction the nearby economy would see an increase in consumer spending due to the influx of workers in the region working on construction of the proposed projects. However, there would be no major increase in long-term personnel associated at JBC. Therefore, there would be no significant cumulative impacts on the economy. No minority, low-income, or other populations would be disproportionately impacted as a result of the cumulative impact of these projects. Overall, there is expected to be a minor incremental beneficial cumulative effect on the local economy.

The Region of Influence for environmental justice communities does not equal or exceed the community of comparison; therefore, disproportionate impacts to minority and low-income populations by the Proposed Action would not be anticipated. In addition, no significant negative environmental or human health impacts would be expected to occur as a result of the Proposed Action. Some short-term impacts associated with construction including increased truck traffic, as well as noise, dust, and release of air emissions may occur; however, these impacts would be expected to be short term and minor and would not be significant. Therefore, there would be no significant cumulative impacts that would result in adverse human health or environmental effects on minority or low-income populations. There would also be no significant cumulative impacts on environmental health risks and safety that would disproportionately affect children.

3.11.3 Summary of Cumulative Effects

There would be no incremental adverse cumulative effects on the noise environment, surface waters, protected species or critical habitats, groundwater, archaeological or architectural resources, and socioeconomics or environmental justice when compared to past, present, and foreseeable future effects from other relevant actions in the project area due to avoidance of the resource impacts during the implementation of the Proposed Action or any of the action alternatives in this EA.

The Proposed Action would result in insignificant adverse effects on vegetation, biological habitat, stormwater, wetlands, safety and occupational health, when compared to past, present, and foreseeable future effects from other relevant actions in the project area, there would be no significant incremental adverse cumulative effects due to the small magnitude and/or short, temporary duration of effects from implementation of the Proposed Action or any of the action alternatives in this EA.

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Appendix A

Public, American Indian Tribe, and Agencies Notified of DOPAA and Draft EA

Federal, State, and Local Agencies

Federal Agencies

- U.S. Fish and Wildlife Service
- US EPA, Region IV Regulatory Division
- USACE Charleston Regulatory Office
- United States Coast Guard, Sector Charleston
- National Oceanic and Atmospheric Administration (NOAA) Southeast Regional Office
- National Marine Fisheries Services - Charleston Branch Office
- U.S. Army Corps of Engineers - Charleston District

State Agencies

- South Carolina Department of Health and Environmental Control, Region 7
- South Carolina State Clearinghouse for Intergovernmental Review
- SCDNR Director of Environmental Programs
- SCDHEC - Office of Ocean and Coastal Resource Management (OCRM)
- South Carolina Dept of Archives and History, Deputy State Historic Preservation Officer
- State Historic Preservation Office - Advisory Council of Historic Properties

Local Agencies

- Town of North, South Carolina Mayor
- City of Goose Creek, South Carolina - Mayor
- City of Hanahan, South Carolina - Mayor
- City of North Charleston, South Carolina - Mayor
- North Charleston Department of Planning
- Berkeley County Planning and Zoning Department
- Charleston County Zoning and Planning Department
- Community Development Division County of Orangeburg, SC
- Charleston Waterkeeper
- South Carolina Chapter Sierra Club

Federal Officials

- U.S. Senator Lindsey Graham
- U.S. Senator Tim Scott
- District 1 U.S. Representative Nancy Mace (JBC-AB)
- District 6 U.S. Representative James Clyburn (JBC-WS)
- District 2 U.S. Representative Joe Wilson (NAAF)

State Officials

- South Carolina Governor Henry McMaster
- District 113 State Representative Marvin R. Pendarvis (JBC-AB)
- District 42 State Senator Marlon E. Kimpson (JBC-AB)
- District 99 State Representative Mark Smith (JBC-WS)
- District 103 State Representative Carl L. Anderson (JBC-WS)
- District 37 State Senator Larry Grooms (JBC-WS)
- District 44 State Senator Brian Adams (JBC-WS)
- District 93 State Representative Russell L. Ott (NAAF)
- District 40 State Senator Brad Hutto (NAAF)

Tribal Governments

- Absentee-Shawnee Tribe of Oklahoma
- Catawba Indian Nation
- Chickasaw Nation
- Eastern Band of Cherokee Indians
- Eastern Shawnee Tribe of Oklahoma
- Muskogee (Creek) Nation
- United Keetoowah Band of Cherokee
- Alabama-Quassarte Tribal Town
- Kialegee Tribal Town
- Miccosukee Tribe of Indians
- Poarch Band of Creek Indians
- Seminole Nation of Oklahoma
- Shawnee Tribe
- Thlopthlocco Tribal Town
- Seminole Tribe of Florida

Public, American Indian Tribe, and Agency Review and Consultation Strategies

1. **National Historic Preservation Act (NHPA) Section 106**

Detailed discussion of NHPA Section 106 compliance is provided in Draft EA **Section 3.8.1.2**.

The South Carolina Department of Archives and History (SCDAH) State Historic Preservation Office responded to JBC's request for comment on the DOPAA in a letter on February 15, 2023. The SCDAH State Historic Preservation Office (SHPO) letter included suggested strategies for evaluation of cultural resources data. These strategies are incorporated into the analysis and findings described in Draft EA **Section 3.8**. The Catawba Indian Nation Tribal Historic Preservation Officer (THPO) responded to JBC's request for comment on the DOPAA in a letter dated February 17, 2023. The Catawba Indian Nation stated that the Proposed Action is not within the tribe's area of interest, and that no NHPA Section 106 consultation is required. The Catawba Nation also requested that Phase I surveys be conducted in areas where ground disturbance is required, and to be notified if artifacts or human remains are discovered during the development phase of the Proposed Action.

The Muscogee (Creek) Nation Tribal Archaeologist responded to JBC's request for comment on the DOPAA in an email dated March 16, 2023. The Muscogee (Creek) Nation email stated that more information is required to make a determination of impacts for the Proposed Action.

The Poarch Band of Indians THPO, responded to JBC's request for comment on the DOPAA in a letter dated February 24, 2023. The Poarch Band of Indians letter stated that more information is required to make a determination of impacts for the Proposed Action.

A detailed package containing JBC cultural resource reports, historical analyses, and geospatial data was provided via email to the Muscogee (Creek) Nation Tribal Archaeologist and the Poarch Band of Indians THPO on May 8, 2023. No additional comments have been received at this time.

All comments received regarding NHPA Section 106 compliance were incorporated into the Draft EA and/or Cultural Resources Survey, as applicable. JBC Cultural Resources Evaluation, dated March 2023, documents the JBC rationale and finding that the Proposed Action described in this Draft EA results in no historic properties affected. JBC requested concurrence from 15 THPOs as well as the SHPO on the finding of no historic properties affected. Concurrence was requested by the end of the 30-day Draft EA public comment period.

2. **Section 7 of the Endangered Species Act (ESA)**

Detailed discussion on ESA Section 7 compliance is included in Draft EA **Section 3.7.2.3**.

The SCDNR responded to JBC's request for comment on the DOPAA on March 6, 2023. The SCDNR letter detailed the presence of floodplains, sensitive species, and sensitive habitats within the project area. Comments received were incorporated into the Draft EA. In addition, the USFWS provided early coordination on several species populations of interest. Details and findings from ongoing correspondence are included in the Draft EA. JBC considered comments received during DOPAA review and early coordination meetings and concluded that the Proposed Action may effect, not likely to adversely affect Endangered Species. However, JBC notes that actions that involve tree clearing may require informal or formal consultation with USFWS depending on the proposed activities and timing. JBC committed within its analysis to future individual action reviews for tricolored bats, as needed, with the JBC Natural Resources Program working with the appropriate Agency (i.e., consultation, adoption of conservation measures, etc.) to ensure the avoidance and minimization of potential impacts to tricolored bats. JBC submitted a request for concurrence on the findings from United States Fish and Wildlife Service and NOAA Fisheries via informal consultation on August 7, 2023. Consultations will be complete prior to the issue of the FONSI/FONPA.

3. **Magnuson-Stephens Act (MSA)**

Detailed discussion of Magnuson-Stephens Act (MSA) compliance is provided in Draft EA **Section 3.7**. JBC analyzed potential impacts to Essential Fish Habitat from the Proposed Action and concluded that the Proposed Action is not anticipated to have adverse effect on Essential Fish Habitat. JBC submitted a request for concurrence on the findings from NOAA Fisheries via informal consultation on August 7, 2023. Consultations will be complete prior to the issue of the FONSI/FONPA.

Considering Section 106 of the National Historic Preservation Act (NHPA), Section 7 of the Endangered Species Act (ESA), the MSA (50 CFR 600), the Marine Mammal Protection Act (MMPA), and implementing regulations, early coordination was conducted with the South Carolina SHPO, the U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), and South Carolina Department of Natural Resources (SCDNR). Prior to the development of the Draft EA, early coordination letters were distributed on February 3, 2023. Received agency comments from early coordination were incorporated into the Draft EA analysis of the Proposed Action as detailed below. Concurrent with the NOA of the Draft EA, consultation letters have been distributed to the SHPO, USFWS, NMFS, and SCDNR to review the Draft EA and the incorporation of their early coordination comments. Received agency comments and guidance from the consultation process will be incorporated into the Final EA in accordance with the NHPA, ESA, MSA, and MMPA.

The SCDNR responded on March 6, 2023, to detail the presence of floodplains, sensitive species, and sensitive habitats within the project area. Comments were received and incorporated into the Draft EA. In addition, the USFWS provided early coordination on several species populations of interest. Details and findings from ongoing correspondence are included in the Draft EA. Further details on Section 7 compliance are located in Draft EA **Section 3.7.2.3**. As stated above, consultation letters have been distributed to SCDNR and USFWS for their review of the Draft EA and the incorporation of their early coordination comments. The results of the consultation process will be assimilated into the Final EA in accordance with the ESA.

4. **Marine Mammal Protection Act (MMPA)**

Detailed Discussion of MMPA is included in Draft EA **Section 3.7.1.3**. JBC evaluated potential impacts on marine mammals, including Endangered Species, and determined that effects from the proposed action are unlikely to affect marine mammals. JBC submitted a request for concurrence on the findings from NOAA Fisheries via informal consultation on August 7, 2023. Consultations will be complete prior to the issue of the FONSI/FONPA.

5. **Coastal Zone Management Act (CZMA)**

JBC analyzed potential impacts to the coastal zone from the Proposed Action and made a federal consistency determination under CZMA. JBC submitted a request for concurrence on the findings from South Carolina Department of Health and Environmental Control's (SCDHEC) Office of Ocean and Coastal Resource Management (OCRM) on August 7, 2023. SCDHEC-OCRM concurrence will be completed prior to the issue of the FONSI/FONPA.

6. **Floodplains and Wetlands**

The USAF published early notice (i.e., at least 30 days prior to the release of the Draft EA) that the Proposed Actions would occur near a floodplain and wetland in The Post and Courier in Charleston, South Carolina on February 5, 2023, and The State in Columbia, South Carolina on February 12, 2023. The 30-day comment period for public and agency input on these projects ended on 13 March 2023 lasted for 30 days following publication. No public comments were received during the review period.

7. **Government-to-Government Consultation**

Executive Order 13175, "Consultation and Coordination with Indian Tribal Governments", dated November 6, 2000, requires each federal agency to have an accountable process to ensure meaningful and timely input by tribal officials in the development of regulatory policies that have tribal implications. The tribal coordination process is distinct from NEPA consultation or the Interagency/Intergovernmental Coordination For Environmental Planning processes and requires separate notification of all relevant tribes. The JBC point-of-contact for Native American tribes is the Installation Commander.

JBC concluded that the USAF is not required to request government-to-government consultation for the actions described in this EA because there are no know adverse impacts to Tribal interests, and none of the Tribes contacted during DOPAA review requested government-to-government consultation.

Federally recognized tribes that are affiliated historically with the JBC geographic region were notified of the DOPAA and invited to comment in letters sent on February 3, 2023. The same fifteen Tribes were also notified of the Draft EA and invited to comment.

Appendix B

Air Quality Analysis

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 Manual 32-7002, Environmental Compliance and Pollution Prevention; the Environmental Impact Analysis Process (EIAP, 32 CFR 989); and the General Conformity Rule (GCR, 40 CFR 93 Subpart B). This report provides a summary of the ACAM analysis.

a. Action Location:
Base: CHARLESTON AFB
State: South Carolina
County(s): Charleston
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: Installation Development Environmental Assessment at Joint Base Charleston, South Carolina

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2024

e. Action Description:

The USAF and supported component missions propose to develop several facilities on approximately 125 acres of installation property at JBC. The proposed action includes facilities and infrastructure construction, demolition, and additions/remodeling across the JBC-AB, JBC-WS, and NAAF installations.

Demolition activities under the proposed action would include removal of facility waste, removal of hazardous waste if applicable, and utilization of heavy machinery for structure teardown. Inspections would be conducted in facilities to be demolished with a potential to contain asbestos. Removal and disposal of asbestos would be stipulated in project designs and carried out in strict compliance with all applicable federal, state, and local laws, rules, regulations, and standards.

For air quality modeling purposes, one half of the individual projects associated with the proposed action (identified below as activities 2.1.1 through 2.1.14) were arbitrarily assumed to be initiated in January 2025. The other half of the projects (identified below as activities 2.1.15 through 2.1.27) were arbitrarily assumed to be initiated in January 2025. Activity 2.1.28 represents steady state operation of the previous 27 activities and was assumed to be initiated in January 2026.

In all cases, the Preferred Alternative was modeled in ACAM. For all but one of the projects, the Preferred Alternative is also identified as Alternative 1. For the NPTU Simulation Expansion: New Training Facility the Preferred Alternative is identified as Alternative 2.

f. Point of Contact:

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Phone Number:	4436175054

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

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

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

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

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

Analysis Summary:

2024

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	4.293	100	No
NOx	9.209	100	No
CO	11.741	250	No
SOx	0.029	250	No
PM 10	113.656	250	Yes
PM 2.5	0.341	250	No
Pb	0.000	25	No
NH3	0.009	250	No
CO2e	2828.5		

2025

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	1.773	100	No
NOx	7.348	100	No
CO	9.584	250	No
SOx	0.023	250	No
PM 10	72.115	250	No
PM 2.5	0.284	250	No
Pb	0.000	25	No
NH3	0.008	250	No
CO2e	2335.7		

2026

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR

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

		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.095	100	No
NOx	1.511	100	No
CO	1.258	250	No
SOx	0.022	250	No
PM 10	0.124	250	No
PM 2.5	0.124	250	No
Pb	0.000	25	No
NH3	0.000	250	No
CO2e	1748.5		

2027 - (Steady State)

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.095	100	No
NOx	1.511	100	No
CO	1.258	250	No
SOx	0.022	250	No
PM 10	0.124	250	No
PM 2.5	0.124	250	No
Pb	0.000	25	No
NH3	0.000	250	No
CO2e	1748.5		

The estimated annual net emissions associated with this action temporarily exceed the insignificance indicators. However, the steady state estimated annual net emissions are below the insignificance indicators showing no significant long-term impact to air quality. Therefore, the action will not cause or contribute to an exceedance on one or more NAAQSs. No further air assessment is needed.

marcel.briguglio
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Date: 2023.04.14 13:55:25 -04'00'

Marcel Briguglio, Junior Engineer

4/14/2023
DATE

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location

Base: CHARLESTON AFB
State: South Carolina
County(s): Charleston
Regulatory Area(s): NOT IN A REGULATORY AREA

- Action Title: Installation Development Environmental Assessment at Joint Base Charleston, South Carolina

- Project Number/s (if applicable):

- Projected Action Start Date: 1 / 2024

- Action Purpose and Need:

The purpose for the Proposed Action is to meet current and future mission requirements and national security objectives associated with JBC. The Proposed Action is needed to address facilities and infrastructure that are not meeting the requirements and objectives necessary to support JBC missions.

The Proposed Action would meet ongoing mission requirements associated with improving the efficiency and effectiveness of forces by enhancing their ability to expand; replacing older, substandard facilities with new buildings; and providing reliable utilities to support JBC. Continued development of infrastructure at JBC must consider future facilities construction, demolition, renovation, transportation needs, airfield alterations and enhancements, utilities improvements, land use planning, energy requirements, and development constraints and opportunities.

Contributions by JBC to national security, as well as prospects for the assignment of additional missions in the future, dictate that the installation implement planning for the next 5 fiscal years. To ensure readiness at the installation for any tasks assigned, projects must consider, and be capable of supporting, all functions inherent to the installation. These include operations and maintenance activities, security, administration, communications, billeting, supply and storage, training, transportation, and community quality of life.

- Action Description:

The USAF and supported component missions propose to develop several facilities on approximately 60 acres of installation property at JBC. The proposed action includes facilities and infrastructure construction, demolition, and additions/remodeling across the JBC-AB, JBC-WS, and NAAF installations.

Demolition activities under the proposed action would include removal of facility waste, removal of hazardous waste if applicable, and utilization of heavy machinery for structure teardown. Inspections would be conducted in facilities to be demolished with a potential to contain asbestos. Removal and disposal of asbestos would be stipulated in project designs and carried out in strict compliance with all applicable federal, state, and local laws, rules, regulations, and standards.

For air quality modeling purposes, one half of the individual projects associated with the proposed action (identified below as activities 2.1.1 through 2.1.10) were arbitrarily assumed to be initiated in January 2024. The other half of the projects (identified below as activities 2.1.11 through 2.1.19) were arbitrarily assumed to be initiated in January 2025. Activity 2.1.20 represents steady state operation of the previous 19 activities and was assumed to be initiated in January 2026.

In all cases, the Preferred Alternative was modeled in ACAM. For all but one of the projects, the Preferred Alternative is also identified as Alternative 1. For the NPTU Simulation Expansion: New Training Facility the Preferred Alternative is identified as Alternative 2.

- Point of Contact

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

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Email:	marcel.briguglio@wsp.com
Phone Number:	4436175054

- Activity List:

Activity Type		Activity Title
2.	Construction / Demolition	2.1.1 NPTU Simulation Expansion: New Training Facility
3.	Construction / Demolition	2.1.2 NPTU Simulation Expansion: Substation
4.	Construction / Demolition	2.1.3 NPTU Simulation Expansion: Old Tom Road Causeway Improvements
5.	Construction / Demolition	2.1.4 Laser Test Ranges
6.	Construction / Demolition	2.1.5 Goose Creek Floating Dock
7.	Construction / Demolition	2.1.6 Pier Bravo Demolition
8.	Construction / Demolition	2.1.7 Natural Resources Facilities
9.	Construction / Demolition	2.1.8 Sewer Lift Stations
10.	Construction / Demolition	2.1.9 Water Distribution System
11.	Construction / Demolition	2.1.10 Civil Engineering Complex: Shop
12.	Construction / Demolition	2.1.11 Civil Engineering Complex: Entomology Facility
13.	Construction / Demolition	2.1.12 Ambulatory Care Center
14.	Construction / Demolition	2.1.13 Water Tower #2 Demolition
15.	Construction / Demolition	2.1.14 Hydrant Pits
16.	Construction / Demolition	2.1.15 Cargo Layout Area
17.	Construction / Demolition	2.1.16 Munitions Facility
18.	Construction / Demolition	2.1.17 HAZMAT Load and Unload Facility
19.	Construction / Demolition	2.1.18 Dormitory Demolition
20.	Construction / Demolition	2.1.19 NAAF Fire Station Addition
21.	Heating	2.1.20 Heating of New Buildings

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: Charleston

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2.1.1 NPTU Simulation Expansion: New Training Facility

- Activity Description:

The NPTU proposes to expand its simulation training footprint. Expansion of the NPTU would require additional high-bay construction housing training simulators and supporting spaces. The proposed New NPTU Training Facility would be actively used 24 hours a day, 5 days a week. The proposed facility expansion includes the following design elements:

- One approximately 105,000 sf Training Support Building
- Two approximately 48,000 sf High Bay Complex (includes High Bay & Support Spaces) (one in FY26, and the other in FY33)
- Drop-off/Pick up Lanes

- Parking lot that is up to approximately 13 acres (3.3 acres previously developed) (majority constructed in FY26, with the remaining spots constructed in FY33)
- Stormwater Retention Pond(s)
- North Access Drive

The New NPTU Training Facility will avoid constructing both high bays simultaneously. Due to the complexity of the design, fabrication, installation, and testing of the PPTTs, only two simulators (one high bay) can be completed within the first 7 years after completion of the proposed FY26 MILCON. The second high bay is scheduled for construction under an FY33 MILCON. This EA investigates the completed proposed New NPTU Training Facility footprint depicted in Alternatives 1 and 2 with both high bays.

The stormwater retention pond(s) would be sized to accommodate the entire New NPTU Training Facility including the future High Bay Complex. The locations of the pond(s) will be based on considerations of existing drainage patterns and will be sized to meet stormwater drainage requirements. The pond(s) would be located within the lowest elevations to minimize excavation cost and utilize existing topographic grades. The area required for stormwater retention is subject to final stormwater modeling, engineering, and state and local permitting requirements.

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

- Activity End Date
Indefinite: False
End Month: 2
End Month: 2025

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	2.215833
SO_x	0.014037
NO_x	4.887728
CO	5.273831
PM 10	86.203554

Pollutant	Total Emissions (TONs)
PM 2.5	0.185870
Pb	0.000000
NH_3	0.004292
CO_2e	1394.0

2.1 Site Grading Phase

2.1.1 Site Grading Phase Timeline Assumptions

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

- Phase Duration
Number of Month: 5
Number of Days: 0

2.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 1729332
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 3970

- Site Grading Default Settings

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	1	8
Graders Composite	1	8
Other Construction Equipment 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

2.1.3 Site Grading Phase Emission Factor(s)

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

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

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.293	000.002	000.224	003.418	000.007	000.006		000.023	00323.554
LDGT	000.377	000.003	000.397	004.865	000.008	000.007		000.024	00417.210

HDGV	000.730	000.005	000.988	014.840	000.019	000.017		000.044	00772.703
LDDV	000.102	000.003	000.133	002.620	000.004	000.004		000.008	00314.924
LDDT	000.240	000.004	000.378	004.471	000.007	000.006		000.008	00446.943
HDDV	000.547	000.013	005.142	001.878	000.171	000.157		000.029	01524.102
MC	002.687	000.003	000.716	013.172	000.027	000.024		000.054	00395.768

2.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

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

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

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

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

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

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

- Worker Trips Emissions per Phase

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

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

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

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

2.2 Building Construction Phase

2.2.1 Building Construction Phase Timeline Assumptions

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

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

2.2.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 119740
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

2.2.3 Building Construction Phase Emission Factor(s)

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

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

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.293	000.002	000.224	003.418	000.007	000.006		000.023	00323.554
LDGT	000.377	000.003	000.397	004.865	000.008	000.007		000.024	00417.210
HDGV	000.730	000.005	000.988	014.840	000.019	000.017		000.044	00772.703
LDDV	000.102	000.003	000.133	002.620	000.004	000.004		000.008	00314.924
LDDT	000.240	000.004	000.378	004.471	000.007	000.006		000.008	00446.943
HDDV	000.547	000.013	005.142	001.878	000.171	000.157		000.029	01524.102
MC	002.687	000.003	000.716	013.172	000.027	000.024		000.054	00395.768

2.2.4 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

2.3 Architectural Coatings Phase

2.3.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
Start Quarter: 1
Start Year: 2024

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

2.3.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 119740
Number of Units: N/A

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

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

- Worker Trips Vehicle Mixture (%)

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

2.3.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO$_x$	NO$_x$	CO	PM 10	PM 2.5	Pb	NH$_3$	CO$_2$e
LDGV	000.293	000.002	000.224	003.418	000.007	000.006		000.023	00323.554
LDGT	000.377	000.003	000.397	004.865	000.008	000.007		000.024	00417.210
HDGV	000.730	000.005	000.988	014.840	000.019	000.017		000.044	00772.703
LDDV	000.102	000.003	000.133	002.620	000.004	000.004		000.008	00314.924
LDDT	000.240	000.004	000.378	004.471	000.007	000.006		000.008	00446.943
HDDV	000.547	000.013	005.142	001.878	000.171	000.157		000.029	01524.102
MC	002.687	000.003	000.716	013.172	000.027	000.024		000.054	00395.768

2.3.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

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

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

VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

2.4 Paving Phase

2.4.1 Paving Phase Timeline Assumptions

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

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

2.4.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 182205

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Paving Equipment Composite	2	6
Rollers Composite	1	7

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

2.4.3 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$_2$e**
Emission Factors	0.0584	0.0013	0.2523	0.5090	0.0100	0.0100	0.0052	119.71
Graders Composite								
	VOC	**SO$_x$**	**NO$_x$**	**CO**	**PM 10**	**PM 2.5**	**CH$_4$**	**CO$_2$e**
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	**SO$_x$**	**NO$_x$**	**CO**	**PM 10**	**PM 2.5**	**CH$_4$**	**CO$_2$e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO$_x$**	**NO$_x$**	**CO**	**PM 10**	**PM 2.5**	**CH$_4$**	**CO$_2$e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Scrapers Composite								
	VOC	**SO$_x$**	**NO$_x$**	**CO**	**PM 10**	**PM 2.5**	**CH$_4$**	**CO$_2$e**
Emission Factors	0.1564	0.0026	0.9241	0.7301	0.0368	0.0368	0.0141	262.83
Tractors/Loaders/Backhoes Composite								
	VOC	**SO$_x$**	**NO$_x$**	**CO**	**PM 10**	**PM 2.5**	**CH$_4$**	**CO$_2$e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

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

	VOC	**SO$_x$**	**NO$_x$**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH$_3$**	**CO$_2$e**
LDGV	000.293	000.002	000.224	003.418	000.007	000.006		000.023	00323.554
LDGT	000.377	000.003	000.397	004.865	000.008	000.007		000.024	00417.210
HDGV	000.730	000.005	000.988	014.840	000.019	000.017		000.044	00772.703
LDDV	000.102	000.003	000.133	002.620	000.004	000.004		000.008	00314.924
LDDT	000.240	000.004	000.378	004.471	000.007	000.006		000.008	00446.943
HDDV	000.547	000.013	005.142	001.878	000.171	000.157		000.029	01524.102
MC	002.687	000.003	000.716	013.172	000.027	000.024		000.054	00395.768

2.4.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

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

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

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

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

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

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

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

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

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

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

3. Construction / Demolition

3.1 General Information & Timeline Assumptions

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

- Activity Title: 2.1.2 NPTU Simulation Expansion: Substation

- Activity Description:
The NPTU Simulation Expansion proposes to construct a new 10.5 megavolt amp substation to support Unified Facilities Criteria (UFC) 3-550-01 Exterior Electrical Power Distribution requirements for redundant electrical feeds for mission essential facilities. The NPTU Substation would include a 7.5/10.5 Megawatt 115 kilovolt (kV) to 13.8 kV transformer, voltage regulator, three switch/breakers, and power lines from the substation to the New NPTU Training Facility. The proposed substation would tie to existing Dominion Energy 115 kV lines, providing new electrical gear to provide reliable and dedicated power to better support the New NPTU Training

Facility's service life of 50 or more years. In addition to benefits the new substation would provide for the New NPTU Training Facility, there is potential that the Existing NPTU Facility would be connected to the new substation to serve as a primary or redundant feed to eliminate the concerns with the aging infrastructure that supplies the Existing NPTU Facility. The aging 115 kV Red Bank Road Substation would not be demolished under the Proposed Action.

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

- Activity End Date
Indefinite: False
End Month: 8
End Month: 2024

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.687438
SO_x	0.003216
NO_x	1.058070
CO	1.453503
PM 10	0.144002

Pollutant	Total Emissions (TONs)
PM 2.5	0.038356
Pb	0.000000
NH_3	0.001234
CO_2e	311.4

3.1 Site Grading Phase

3.1.1 Site Grading Phase Timeline Assumptions

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

- Phase Duration
Number of Month: 0
Number of Days: 5

3.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 43560
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 100

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

- Construction Exhaust (default)

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

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Vehicle Exhaust

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

3.1.3 Site Grading Phase Emission Factor(s)

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

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.293	000.002	000.224	003.418	000.007	000.006		000.023	00323.554
LDGT	000.377	000.003	000.397	004.865	000.008	000.007		000.024	00417.210
HDGV	000.730	000.005	000.988	014.840	000.019	000.017		000.044	00772.703
LDDV	000.102	000.003	000.133	002.620	000.004	000.004		000.008	00314.924
LDDT	000.240	000.004	000.378	004.471	000.007	000.006		000.008	00446.943
HDDV	000.547	000.013	005.142	001.878	000.171	000.157		000.029	01524.102
MC	002.687	000.003	000.716	013.172	000.027	000.024		000.054	00395.768

3.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

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

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

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

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

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

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

- Worker Trips Emissions per Phase

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

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

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

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

3.2 Trenching/Excavating Phase

3.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date

Start Month:	1
Start Quarter:	1
Start Year:	2024

- Phase Duration

Number of Month: 0
Number of Days: 3

3.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 3960
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

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

- Construction Exhaust (default)

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

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

3.2.3 Trenching / Excavating Phase Emission Factor(s)

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

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e

LDGV	000.293	000.002	000.224	003.418	000.007	000.006		000.023	00323.554
LDGT	000.377	000.003	000.397	004.865	000.008	000.007		000.024	00417.210
HDGV	000.730	000.005	000.988	014.840	000.019	000.017		000.044	00772.703
LDDV	000.102	000.003	000.133	002.620	000.004	000.004		000.008	00314.924
LDDT	000.240	000.004	000.378	004.471	000.007	000.006		000.008	00446.943
HDDV	000.547	000.013	005.142	001.878	000.171	000.157		000.029	01524.102
MC	002.687	000.003	000.716	013.172	000.027	000.024		000.054	00395.768

3.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

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

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

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

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

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

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

- Worker Trips Emissions per Phase

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

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

NE: Number of Construction Equipment

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

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

3.3 Building Construction Phase

3.3.1 Building Construction Phase Timeline Assumptions

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

- Phase Duration
Number of Month: 8
Number of Days: 0

3.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 43560
Height of Building (ft): 14
Number of Units: N/A

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	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

3.3.3 Building Construction Phase Emission Factor(s)

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

Cranes Composite

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0715	0.0013	0.4600	0.3758	0.0161	0.0161	0.0064	128.78

Forklifts Composite

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0246	0.0006	0.0973	0.2146	0.0029	0.0029	0.0022	54.451

Generator Sets Composite

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0303	0.0006	0.2464	0.2674	0.0091	0.0091	0.0027	61.061

Tractors/Loaders/Backhoes Composite

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

Welders Composite

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0227	0.0003	0.1427	0.1752	0.0059	0.0059	0.0020	25.653

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.293	000.002	000.224	003.418	000.007	000.006		000.023	00323.554
LDGT	000.377	000.003	000.397	004.865	000.008	000.007		000.024	00417.210
HDGV	000.730	000.005	000.988	014.840	000.019	000.017		000.044	00772.703
LDDV	000.102	000.003	000.133	002.620	000.004	000.004		000.008	00314.924
LDDT	000.240	000.004	000.378	004.471	000.007	000.006		000.008	00446.943
HDDV	000.547	000.013	005.142	001.878	000.171	000.157		000.029	01524.102
MC	002.687	000.003	000.716	013.172	000.027	000.024		000.054	00395.768

3.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

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

3.4 Architectural Coatings Phase

3.4.1 Architectural Coatings Phase Timeline Assumptions

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

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

3.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 43560
Number of Units: N/A

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

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

- Worker Trips Vehicle Mixture (%)

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

3.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.293	000.002	000.224	003.418	000.007	000.006		000.023	00323.554
LDGT	000.377	000.003	000.397	004.865	000.008	000.007		000.024	00417.210
HDGV	000.730	000.005	000.988	014.840	000.019	000.017		000.044	00772.703
LDDV	000.102	000.003	000.133	002.620	000.004	000.004		000.008	00314.924
LDDT	000.240	000.004	000.378	004.471	000.007	000.006		000.008	00446.943
HDDV	000.547	000.013	005.142	001.878	000.171	000.157		000.029	01524.102
MC	002.687	000.003	000.716	013.172	000.027	000.024		000.054	00395.768

3.4.4 Architectural Coatings Phase Formula(s)

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

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

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

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

4. Construction / Demolition

4.1 General Information & Timeline Assumptions

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

- Activity Title: 2.1.3 NPTU Simulation Expansion: Old Tom Road Causeway Improvements

- Activity Description:

The NPTU Simulation Expansion has proposed modifications to the existing causeway just north of the Existing NPTU Facility parking areas. A section of Old Tom Road crosses between a tidal pond and the Cooper River at this approximately 500-ft-long causeway. These two bodies of water are connected by a culvert, which the causeway passes over, and water flow is managed by a weir system. The roadway would also be raised approximately 2 ft (to match connecting road elevations of 6 ft North American Vertical Datum of 1988 (NAVD88) to minimize the risk of recurring tidal flooding. In addition, communication and power lines would be buried within the causeway to support the new expansion site.

The 6-ft-wide multi-use path is the recommended sidewalk width per UFC 3-201-01 and is sized to support pedestrians, cyclists, and golf carts. The multi-use path would extend from the Old Tom Road Causeway along Old Tom Road to the New NPTU Training Facility, connecting the two sites for pedestrian traffic. This path would be located on the side of Old Tom Road, which minimizes environmental impact and disruption to adjacent facilities, and is expected to be on the side of Old Tom Road opposite the Cooper River. The number of times the pathway crosses Old Tom Road must be minimized for pedestrian safety.

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

- Activity End Date
Indefinite: False
End Month: 1
End Month: 2024

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.008714
SO_x	0.000138

Pollutant	Total Emissions (TONs)
PM 2.5	0.002019
Pb	0.000000

NO_x	0.048874
CO	0.057405
PM 10	0.013506

NH_3	0.000045
CO_2e	13.8

4.1 Site Grading Phase

4.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
Start Quarter: 1
Start Year: 2024

- Phase Duration

Number of Month: 0
Number of Days: 5

4.1.2 Site Grading Phase Assumptions

- General Site Grading Information

Area of Site to be Graded (ft^2): 5000
Amount of Material to be Hauled On-Site (yd^3): 375
Amount of Material to be Hauled Off-Site (yd^3): 0

- Site Grading Default Settings

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

- Construction Exhaust (default)

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

- Vehicle Exhaust

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

4.1.3 Site Grading Phase Emission Factor(s)

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

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

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

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.293	000.002	000.224	003.418	000.007	000.006		000.023	00323.554
LDGT	000.377	000.003	000.397	004.865	000.008	000.007		000.024	00417.210
HDGV	000.730	000.005	000.988	014.840	000.019	000.017		000.044	00772.703
LDDV	000.102	000.003	000.133	002.620	000.004	000.004		000.008	00314.924
LDDT	000.240	000.004	000.378	004.471	000.007	000.006		000.008	00446.943
HDDV	000.547	000.013	005.142	001.878	000.171	000.157		000.029	01524.102
MC	002.687	000.003	000.716	013.172	000.027	000.024		000.054	00395.768

4.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

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

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

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

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

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

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

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

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

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

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

4.2 Paving Phase

4.2.1 Paving Phase Timeline Assumptions

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

- Phase Duration
Number of Month: 0
Number of Days: 4

4.2.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 7000

- 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
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

4.2.3 Paving Phase Emission Factor(s)

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

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.293	000.002	000.224	003.418	000.007	000.006		000.023	00323.554
LDGT	000.377	000.003	000.397	004.865	000.008	000.007		000.024	00417.210
HDGV	000.730	000.005	000.988	014.840	000.019	000.017		000.044	00772.703
LDDV	000.102	000.003	000.133	002.620	000.004	000.004		000.008	00314.924
LDDT	000.240	000.004	000.378	004.471	000.007	000.006		000.008	00446.943
HDDV	000.547	000.013	005.142	001.878	000.171	000.157		000.029	01524.102
MC	002.687	000.003	000.716	013.172	000.027	000.024		000.054	00395.768

4.2.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

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

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

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

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

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

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

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

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

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

5. Construction / Demolition

5.1 General Information & Timeline Assumptions

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

- Activity Title: 2.1.4 Laser Test Ranges

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Activity Description:

The USAF and supported component missions plan to construct two FSO LTRs on JBC-WS. The LTRs will require a stable working platform with appropriately sized infrastructure to provide a baseline testing environment. Each range would require a 10 ft by 10 ft concrete pad at range point of origin and end nodes. Pads would include an electrical stub-up for equipment power. A raised structure would be added to the pads for laser mounting at the end nodes. Testing would be conducted from a small mobile trailer at the point of origin. The mobile trailer would require only minor electrical installation of a new water-proof power pedestal for regular, but temporary, use. Vegetation clearing would be required along the entire length of the range. Following clearing, vegetation would be maintained on an as-needed basis utilizing chemical and/or mechanical maintenance. Laser testing would take place multiple times a year for up to 1-week intervals. The frequency of testing may vary at each site. NIWC would provide traffic control at either end of the testing activity to ensure any Small Autonomous Unmanned Systems Research (SAUSR) Range traffic was cleared prior to laser operation. Use of the laser would be coordinated with other SAUSR stakeholders to minimize disruptions and work could be scheduled during off-peak hours or weekends, if required.

- Activity Start Date

Start Month: 1
Start Month: 2024

- Activity End Date

Indefinite: False
End Month: 1
End Month: 2024

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.043637
SO_x	0.000796
NO_x	0.243638
CO	0.314822
PM 10	3.269733

Pollutant	Total Emissions (TONs)
PM 2.5	0.009251
Pb	0.000000
NH_3	0.000136
CO_2e	78.0

5.1 Site Grading Phase

5.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
Start Quarter: 1
Start Year: 2024

- Phase Duration

Number of Month: 1
Number of Days: 0

5.1.2 Site Grading Phase Assumptions

- General Site Grading Information

Area of Site to be Graded (ft^2): 327752
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 775

- Site Grading Default Settings

Default Settings Used: Yes

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	1	8
Graders Composite	1	8
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	8
Tractors/Loaders/Backhoes Composite	3	8

- Vehicle Exhaust

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

5.1.3 Site Grading Phase Emission Factor(s)

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

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

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.293	000.002	000.224	003.418	000.007	000.006		000.023	00323.554
LDGT	000.377	000.003	000.397	004.865	000.008	000.007		000.024	00417.210
HDGV	000.730	000.005	000.988	014.840	000.019	000.017		000.044	00772.703
LDDV	000.102	000.003	000.133	002.620	000.004	000.004		000.008	00314.924
LDDT	000.240	000.004	000.378	004.471	000.007	000.006		000.008	00446.943
HDDV	000.547	000.013	005.142	001.878	000.171	000.157		000.029	01524.102
MC	002.687	000.003	000.716	013.172	000.027	000.024		000.054	00395.768

5.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

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

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

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

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

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

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

- Worker Trips Emissions per Phase

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

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

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

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

5.2 Building Construction Phase

5.2.1 Building Construction Phase Timeline Assumptions

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

- Phase Duration
Number of Month: 0
Number of Days: 5

5.2.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 400
Height of Building (ft): 0.5
Number of Units: N/A

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

- Construction Exhaust (default)

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

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

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

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC

POVs	0	0	0	0	0	100.00	0

5.2.3 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$_2$e**
Emission Factors	0.0715	0.0013	0.4600	0.3758	0.0161	0.0161	0.0064	128.78
Forklifts Composite								
	VOC	**SO$_x$**	**NO$_x$**	**CO**	**PM 10**	**PM 2.5**	**CH$_4$**	**CO$_2$e**
Emission Factors	0.0246	0.0006	0.0973	0.2146	0.0029	0.0029	0.0022	54.451
Tractors/Loaders/Backhoes Composite								
	VOC	**SO$_x$**	**NO$_x$**	**CO**	**PM 10**	**PM 2.5**	**CH$_4$**	**CO$_2$e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

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

	VOC	**SO$_x$**	**NO$_x$**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH$_3$**	**CO$_2$e**
LDGV	000.293	000.002	000.224	003.418	000.007	000.006		000.023	00323.554
LDGT	000.377	000.003	000.397	004.865	000.008	000.007		000.024	00417.210
HDGV	000.730	000.005	000.988	014.840	000.019	000.017		000.044	00772.703
LDDV	000.102	000.003	000.133	002.620	000.004	000.004		000.008	00314.924
LDDT	000.240	000.004	000.378	004.471	000.007	000.006		000.008	00446.943
HDDV	000.547	000.013	005.142	001.878	000.171	000.157		000.029	01524.102
MC	002.687	000.003	000.716	013.172	000.027	000.024		000.054	00395.768

5.2.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

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

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

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

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

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

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

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

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

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

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

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

6. Construction / Demolition

6.1 General Information & Timeline Assumptions

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

- Activity Title: 2.1.5 Goose Creek Floating Dock

- Activity Description:

The USAF and supported component missions plan to construct a floating dock adjacent to the Goose Creek boatshed located on the Cooper River. The floating dock would be approximately 90 ft long to support the permanent mooring of a 42-ft survey vessel and temporary mooring of a 32-ft survey vessel. The dock would mount to fender piles located on the northwest face of the existing covered boat shed. A 40 ft long aluminum gangway would be constructed, leading to the eight floating dock panels comprising the 60 ft long dock area.

- Activity Start Date

Start Month: 1
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 1
End Month: 2024

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.026064
SO_x	0.000203
NO_x	0.050833
CO	0.088239
PM 10	0.001691

Pollutant	Total Emissions (TONs)
PM 2.5	0.001688
Pb	0.000000
NH_3	0.000074
CO_2e	19.6

6.1 Building Construction Phase

6.1.1 Building Construction Phase Timeline Assumptions

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

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

6.1.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 1353
Height of Building (ft): 1
Number of Units: N/A

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

- Construction Exhaust (default)

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

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

- Vendor Trips

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

- Vendor Trips Vehicle Mixture (%)

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

6.1.3 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$_2$e**
Emission Factors	0.0715	0.0013	0.4600	0.3758	0.0161	0.0161	0.0064	128.78
Forklifts Composite								
	VOC	**SO$_x$**	**NO$_x$**	**CO**	**PM 10**	**PM 2.5**	**CH$_4$**	**CO$_2$e**
Emission Factors	0.0246	0.0006	0.0973	0.2146	0.0029	0.0029	0.0022	54.451
Tractors/Loaders/Backhoes Composite								
	VOC	**SO$_x$**	**NO$_x$**	**CO**	**PM 10**	**PM 2.5**	**CH$_4$**	**CO$_2$e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

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

	VOC	SO$_x$	NO$_x$	CO	PM 10	PM 2.5	Pb	NH$_3$	CO$_2$e
LDGV	000.293	000.002	000.224	003.418	000.007	000.006		000.023	00323.554
LDGT	000.377	000.003	000.397	004.865	000.008	000.007		000.024	00417.210
HDGV	000.730	000.005	000.988	014.840	000.019	000.017		000.044	00772.703
LDDV	000.102	000.003	000.133	002.620	000.004	000.004		000.008	00314.924
LDDT	000.240	000.004	000.378	004.471	000.007	000.006		000.008	00446.943
HDDV	000.547	000.013	005.142	001.878	000.171	000.157		000.029	01524.102
MC	002.687	000.003	000.716	013.172	000.027	000.024		000.054	00395.768

6.1.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)

BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

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

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

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

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

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

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

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

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

6.2 Architectural Coatings Phase

6.2.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 1

Start Quarter: 1
Start Year: 2024

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

6.2.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 1353
Number of Units: N/A

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

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

- Worker Trips Vehicle Mixture (%)

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

6.2.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.293	000.002	000.224	003.418	000.007	000.006		000.023	00323.554
LDGT	000.377	000.003	000.397	004.865	000.008	000.007		000.024	00417.210
HDGV	000.730	000.005	000.988	014.840	000.019	000.017		000.044	00772.703
LDDV	000.102	000.003	000.133	002.620	000.004	000.004		000.008	00314.924
LDDT	000.240	000.004	000.378	004.471	000.007	000.006		000.008	00446.943
HDDV	000.547	000.013	005.142	001.878	000.171	000.157		000.029	01524.102
MC	002.687	000.003	000.716	013.172	000.027	000.024		000.054	00395.768

6.2.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

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

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

2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

7. Construction / Demolition

7.1 General Information & Timeline Assumptions

- Activity Location

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

- Activity Title: 2.1.6 Pier Bravo Demolition

- Activity Description:

The proposed action would demolish and dispose of the entire pier structure including piles, pile caps, beams/stringers, decking, railings, utilities, building structures, including materials on the pier and within the pier structures Pier Bravo in the Cooper River at JBC-WS (Figure 2-3). Specifics of proposed the demolition activities are unavailable, therefore reasonably foreseeable impacts will be identified and analyzed. These requirements include, but are not limited to:

- Floating rafts placed under the pier to catch demolition debris,
- Floating boom system to provide perimeter containment of incidental floatable materials,
- Hazardous materials (such as lead-based paint and materials containing asbestos) removal as required,
- Utilization of a floating crane to move demolished materials to barges,
- Utilization of utility barges for removed piles to minimize potential releases of creosote, petroleum sheens, and turbidity in the river, and
- Implementation of erosion and sedimentation control measures.

- Activity Start Date

Start Month: 1
Start Month: 2024

- Activity End Date

Indefinite: False
End Month: 3
End Month: 2024

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.033615
SO_x	0.000589
NO_x	0.210481
CO	0.297661
PM 10	0.108746

Pollutant	Total Emissions (TONs)
PM 2.5	0.007778
Pb	0.000000
NH_3	0.000311
CO_2e	59.2

7.1 Demolition Phase

7.1.1 Demolition Phase Timeline Assumptions

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

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

7.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 48044
Height of Building to be demolished (ft): 10

- Default Settings Used: Yes

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

- Construction Exhaust (default)

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

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

7.1.3 Demolition Phase Emission Factor(s)

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

Concrete/Industrial Saws Composite								
	VOC	**SO$_x$**	**NO$_x$**	**CO**	**PM 10**	**PM 2.5**	**CH$_4$**	**CO$_2$e**
Emission Factors	0.0357	0.0006	0.2608	0.3715	0.0109	0.0109	0.0032	58.544
Rubber Tired Dozers Composite								
	VOC	**SO$_x$**	**NO$_x$**	**CO**	**PM 10**	**PM 2.5**	**CH$_4$**	**CO$_2$e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47

Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

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

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.293	000.002	000.224	003.418	000.007	000.006		000.023	00323.554
LDGT	000.377	000.003	000.397	004.865	000.008	000.007		000.024	00417.210
HDGV	000.730	000.005	000.988	014.840	000.019	000.017		000.044	00772.703
LDDV	000.102	000.003	000.133	002.620	000.004	000.004		000.008	00314.924
LDDT	000.240	000.004	000.378	004.471	000.007	000.006		000.008	00446.943
HDDV	000.547	000.013	005.142	001.878	000.171	000.157		000.029	01524.102
MC	002.687	000.003	000.716	013.172	000.027	000.024		000.054	00395.768

7.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

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

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

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

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

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

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

- Worker Trips Emissions per Phase

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

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

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

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

8. Construction / Demolition

8.1 General Information & Timeline Assumptions

- Activity Location

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

- Activity Title: 2.1.7 Natural Resources Facilities

- Activity Description:

The proposed NRP Storage Facility consists of a roofed, open-sided structure with enclosed storage area on one end. This structure would cover a 130 ft by 30 ft concrete pad with electrical outlets, compressed air lines, and overhead lighting. The area around the facility would need to be cleared of timber, site prepped and finished with gravel. A security fence connected to existing fence would enclose the entire facility. The proposed facility site is approximately 170 ft by 225 ft and is immediately adjacent to current fenced NRP Compound.

The storage area would contain mission-critical equipment/vehicles including, but not limited to one fire truck, two farm tractors, one forestry skidder, one skid-steer, four pick-up trucks, four utility-terrain vehicles, four all-terrain vehicles, four trailers, two portable fuel tanks, and multiple attachments (bush hogs, blowers, disks, blades, grapples, augers, forks, etc.). Most of this equipment is employed in the Wildland Fire Program preventing wildfire and protecting mission-critical infrastructure including the base's power grid, munitions storage areas, and the wildland/urban interface.

A new administration facility would also be constructed. The new facility would be approximately 2,400 sf, providing offices and storage space for Natural and Cultural Resources personnel. This would include a conference room, rest rooms, shower area with benches & lockers, kitchen/break room, common area for office machines and drafting table, and a storage closet.

A new Forestry/Wildland/Maintenance facility would be constructed with lights, climate control, and two large rollup drive through garage bay doors. The facility would be approximately 5000 sf. The existing septic tank would be replaced, and sewer systems would be tied into the existing main.

- Activity Start Date

Start Month: 1
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 4
End Month: 2024

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.178672
SO_x	0.000937
NO_x	0.248216
CO	0.382323
PM 10	0.096250

Pollutant	Total Emissions (TONs)
PM 2.5	0.008388
Pb	0.000000
NH_3	0.000332
CO_2e	91.4

8.1 Site Grading Phase

8.1.1 Site Grading Phase Timeline Assumptions

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

- Phase Duration
Number of Month: 0
Number of Days: 5

8.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 38250
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 100

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

- Construction Exhaust (default)

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

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

8.1.3 Site Grading Phase Emission Factor(s)

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

Graders Composite								
	VOC	**SO$_x$**	**NO$_x$**	**CO**	**PM 10**	**PM 2.5**	**CH$_4$**	**CO$_2$e**
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	**SO$_x$**	**NO$_x$**	**CO**	**PM 10**	**PM 2.5**	**CH$_4$**	**CO$_2$e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO$_x$**	**NO$_x$**	**CO**	**PM 10**	**PM 2.5**	**CH$_4$**	**CO$_2$e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	**SO$_x$**	**NO$_x$**	**CO**	**PM 10**	**PM 2.5**	**CH$_4$**	**CO$_2$e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

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

	VOC	SO$_x$	NO$_x$	CO	PM 10	PM 2.5	Pb	NH$_3$	CO$_2$e
LDGV	000.293	000.002	000.224	003.418	000.007	000.006		000.023	00323.554
LDGT	000.377	000.003	000.397	004.865	000.008	000.007		000.024	00417.210
HDGV	000.730	000.005	000.988	014.840	000.019	000.017		000.044	00772.703
LDDV	000.102	000.003	000.133	002.620	000.004	000.004		000.008	00314.924
LDDT	000.240	000.004	000.378	004.471	000.007	000.006		000.008	00446.943
HDDV	000.547	000.013	005.142	001.878	000.171	000.157		000.029	01524.102
MC	002.687	000.003	000.716	013.172	000.027	000.024		000.054	00395.768

8.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

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

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

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

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

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

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

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

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

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

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

8.2 Building Construction Phase

8.2.1 Building Construction Phase Timeline Assumptions

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

- Phase Duration
Number of Month: 4
Number of Days: 0

8.2.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 11300
Height of Building (ft): 14
Number of Units: N/A

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

- Construction Exhaust (default)

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

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

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

- Vendor Trips Vehicle Mixture (%)

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

8.2.3 Building Construction Phase Emission Factor(s)

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

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0715	0.0013	0.4600	0.3758	0.0161	0.0161	0.0064	128.78
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0246	0.0006	0.0973	0.2146	0.0029	0.0029	0.0022	54.451
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.293	000.002	000.224	003.418	000.007	000.006		000.023	00323.554
LDGT	000.377	000.003	000.397	004.865	000.008	000.007		000.024	00417.210
HDGV	000.730	000.005	000.988	014.840	000.019	000.017		000.044	00772.703
LDDV	000.102	000.003	000.133	002.620	000.004	000.004		000.008	00314.924
LDDT	000.240	000.004	000.378	004.471	000.007	000.006		000.008	00446.943
HDDV	000.547	000.013	005.142	001.878	000.171	000.157		000.029	01524.102

MC	002.687	000.003	000.716	013.172	000.027	000.024		000.054	00395.768

8.2.4 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

8.3 Architectural Coatings Phase

8.3.1 Architectural Coatings Phase Timeline Assumptions

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

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

8.3.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 11300
Number of Units: N/A

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

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

- Worker Trips Vehicle Mixture (%)

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

8.3.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.293	000.002	000.224	003.418	000.007	000.006		000.023	00323.554
LDGT	000.377	000.003	000.397	004.865	000.008	000.007		000.024	00417.210
HDGV	000.730	000.005	000.988	014.840	000.019	000.017		000.044	00772.703
LDDV	000.102	000.003	000.133	002.620	000.004	000.004		000.008	00314.924
LDDT	000.240	000.004	000.378	004.471	000.007	000.006		000.008	00446.943
HDDV	000.547	000.013	005.142	001.878	000.171	000.157		000.029	01524.102
MC	002.687	000.003	000.716	013.172	000.027	000.024		000.054	00395.768

8.3.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

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

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

- Off-Gassing Emissions per Phase

$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

9. Construction / Demolition

9.1 General Information & Timeline Assumptions

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

- Activity Title: 2.1.8 Sewer Lift Stations

- Activity Description:

The proposed action would replace five dry well sewage lift stations and replace them with wet well SLSs. The existing SLSs 66, 310, 709, 730, and 1389 would be demolished and backfilled. New submersible pumps would be installed using corrosion resistant materials and standard industry designs. The new SLS facilities would include new a manhole/wet well, pumps, 6-inch (in) emergency bypass line, grinders capable of handling solids and non-woven materials, and control system with alarms. Three pumps of the same size would be installed at each SLS. Units would have capacity such that, with any unit out of service, the remaining units would have capacity to handle the design peak hourly flow. The existing backup generators would be reused depending on their condition. New generators would be provided in the event existing generators were not able to be reused. Proposed location-specific design criteria are as follows:

- SLS 310 – New perimeter fence would be constructed.
- SLS 709 and 1389 – Existing fence around generator would be removed and replaced with a new perimeter fence.

- SLS 730 – Existing generator currently wired to the building to provide backup power would be constructed on existing 6 ft x 10 ft concrete pad located behind the

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

- Activity End Date
Indefinite: False
End Month: 5
End Month: 2024

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.081231
SO_x	0.001189
NO_x	0.317640
CO	0.523495
PM 10	0.015926

Pollutant	Total Emissions (TONs)
PM 2.5	0.010839
Pb	0.000000
NH_3	0.000357
CO_2e	115.0

9.1 Demolition Phase

9.1.1 Demolition Phase Timeline Assumptions

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

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

9.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 1722
Height of Building to be demolished (ft): 14

- Default Settings Used: Yes

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

- Construction Exhaust (default)

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

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

9.1.3 Demolition Phase Emission Factor(s)

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

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0357	0.0006	0.2608	0.3715	0.0109	0.0109	0.0032	58.544
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.293	000.002	000.224	003.418	000.007	000.006		000.023	00323.554
LDGT	000.377	000.003	000.397	004.865	000.008	000.007		000.024	00417.210
HDGV	000.730	000.005	000.988	014.840	000.019	000.017		000.044	00772.703
LDDV	000.102	000.003	000.133	002.620	000.004	000.004		000.008	00314.924
LDDT	000.240	000.004	000.378	004.471	000.007	000.006		000.008	00446.943
HDDV	000.547	000.013	005.142	001.878	000.171	000.157		000.029	01524.102
MC	002.687	000.003	000.716	013.172	000.027	000.024		000.054	00395.768

9.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

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

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

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

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

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

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

- Worker Trips Emissions per Phase

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

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

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

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

9.2 Building Construction Phase

9.2.1 Building Construction Phase Timeline Assumptions

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

- Phase Duration
Number of Month: 5
Number of Days: 0

9.2.2 Building Construction Phase Assumptions

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- General Building Construction Information

Building Category:	Office or Industrial
Area of Building (ft^2):	1722
Height of Building (ft):	14
Number of Units:	N/A

- Building Construction Default Settings

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

- Construction Exhaust (default)

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

- Vehicle Exhaust

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

- Vendor Trips

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

- Vendor Trips Vehicle Mixture (%)

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

9.2.3 Building Construction Phase Emission Factor(s)

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

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0715	0.0013	0.4600	0.3758	0.0161	0.0161	0.0064	128.78
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0246	0.0006	0.0973	0.2146	0.0029	0.0029	0.0022	54.451
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.293	000.002	000.224	003.418	000.007	000.006		000.023	00323.554

LDGT	000.377	000.003	000.397	004.865	000.008	000.007		000.024	00417.210
HDGV	000.730	000.005	000.988	014.840	000.019	000.017		000.044	00772.703
LDDV	000.102	000.003	000.133	002.620	000.004	000.004		000.008	00314.924
LDDT	000.240	000.004	000.378	004.471	000.007	000.006		000.008	00446.943
HDDV	000.547	000.013	005.142	001.878	000.171	000.157		000.029	01524.102
MC	002.687	000.003	000.716	013.172	000.027	000.024		000.054	00395.768

9.2.4 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

9.3 Architectural Coatings Phase

9.3.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
Start Quarter: 1
Start Year: 2024

- Phase Duration

Number of Month: 0
Number of Days: 10

9.3.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information

Building Category: Non-Residential
Total Square Footage (ft^2): 1722
Number of Units: N/A

- Architectural Coatings Default Settings

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

9.3.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.293	000.002	000.224	003.418	000.007	000.006		000.023	00323.554
LDGT	000.377	000.003	000.397	004.865	000.008	000.007		000.024	00417.210

HDGV	000.730	000.005	000.988	014.840	000.019	000.017		000.044	00772.703
LDDV	000.102	000.003	000.133	002.620	000.004	000.004		000.008	00314.924
LDDT	000.240	000.004	000.378	004.471	000.007	000.006		000.008	00446.943
HDDV	000.547	000.013	005.142	001.878	000.171	000.157		000.029	01524.102
MC	002.687	000.003	000.716	013.172	000.027	000.024		000.054	00395.768

9.3.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

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

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

- Off-Gassing Emissions per Phase

$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

10. Construction / Demolition

10.1 General Information & Timeline Assumptions

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

- Activity Title: 2.1.9 Water Distribution System

- Activity Description:

Water System replacements would occur in three primary areas of JBC-WS designated as North, Central, and East for the purpose of this assessment. The water line installation method of horizontal directional drilling (HDD), also known as directional boring, would be used to drill underneath potential wetlands. All areas of the site disturbed by demolition and new construction would be graded to provide positive drainage with no standing water. Site disturbance would be limited to the installation of the new water main and services. Silt fence would be provided along specified edges of the project site.

Construction de-watering would potentially be required to remove storm water or ground water from bore pits, trenches, and other excavations on the construction site. This removal involves the pumping of the water to an upland grassy location.
North
The proposed action for the North JBC-WS Water Distribution System (WDS) would replace the approximately 45,000 lf of asbestos concrete, cast iron, and PVC piping comprising the water distribution mains at the ASLAC and FLETC areas of the Weapons Station.
Central
The proposed action for the Central JBC-WS Water Distribution System would replace the approximately 28,500 lf of asbestos concrete, cast iron, and PVC piping comprising the water distribution mains north of Red Bank Road on Jefferson Avenue, Boone Avenue, and Fletcher Street; and the ordnance area, south of Red Bank Road.
East
The proposed action for the East JBC-WS Water Distribution System would replace valves,
32 fire hydrants, and the approximately 34,500 lf of asbestos concrete, cast iron, and PVC piping comprising the water distribution mains at the Eastside and Waterfront districts of JBC-WS. Additional improvements would include increasing the 6 in lines to 8 in lines from the water tower along Quality Circle, Red Bank Road, and across Old Tom Road to Building 1670, replacing a single 12 in main from Red Bank Road to Wilkinson Way and abandoning the 10 in loop, and replacing the 10 in line with an 8 in line from Wilkinson Way to Building 907. Old 10 in and 12 in mains along Red Bank Road would be replaced with a single 12 in main. Thirty-two fire hydrants would be installed at all locations of existing hydrants and every 1,000 lf. Existing fire service lines and domestic water mains would be cut, capped, and tied to the new water lines once all new lines have been tested and approved.

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

- Activity End Date
Indefinite: False
End Month: 8
End Month: 2024

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.151970
SO_x	0.003156
NO_x	0.728846
CO	1.229535
PM 10	23.651305

Pollutant	Total Emissions (TONs)
PM 2.5	0.026730
Pb	0.000000
NH_3	0.000411
CO_2e	297.9

10.1 Trenching/Excavating Phase

10.1.1 Trenching / Excavating Phase Timeline Assumptions

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

- Phase Duration
Number of Month: 7
Number of Days: 10

10.1.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information

Area of Site to be Trenched/Excavated (ft^2): 324000
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

- Trenching Default Settings

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

- Construction Exhaust (default)

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

- Vehicle Exhaust

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

10.1.3 Trenching / Excavating Phase Emission Factor(s)

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

- 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	000.592	000.007	000.647	005.164	000.011	000.010		000.034	00370.678
LDGT	000.812	000.010	001.118	008.512	000.013	000.011		000.034	00495.417
HDGV	001.391	000.015	002.875	025.081	000.030	000.027		000.045	00773.953
LDDV	000.235	000.003	000.316	003.691	000.007	000.006		000.008	00379.060
LDDT	000.541	000.005	000.844	007.509	000.008	000.008		000.008	00590.633
HDDV	000.905	000.014	008.879	002.962	000.376	000.346		000.030	01603.762
MC	002.812	000.008	000.742	014.997	000.028	000.025		000.050	00394.982

10.1.4 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

11. Construction / Demolition

11.1 General Information & Timeline Assumptions

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Activity Location
County: Charleston; Charleston
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 2.1.10 Civil Engineering Complex: Shop

- Activity Description:

The operations function at JBC-AB is supported by twenty shops and storage buildings with a mean age of thirty-five years. This proposed action would include: construction of six new facilities totaling 4,135 square m (sm) with reinforced concrete foundations and floor slabs in conformance with local seismic requirements; brick veneer/split-faced block exterior finishes and standing seam sloped metal roofs in accordance with base Architectural Compatibility Plan; communications support for voice and data systems, fire detection/alarm systems, pavements with curbs/gutters, fire suppression sprinkler systems, sidewalks, security fencing, site restoration, and landscaping. Twelve existing facilities would be demolished along with associated pavements. The twelve facilities include building 635 (Storage Shed), 660 (Maintenance Shop), 670 (Storage Shed), 714 (Maintenance Shop), 716 (Storage), Bldg. 717 (Maintenance Shop), three storage sheds (with undetermined building numbers), and storage sheds 2-6, 2-7, and PB5.

Shop equipment would be relocated, and environmental remediation would be conducted as necessary and required. Facilities would be designed as permanent construction in accordance with the DoD UFC 1-200-01, General Building requirements.

The proposed action would also involve the construction of six new facilities totaling 4,135 sm.

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

- Activity End Date
Indefinite: False
End Month: 8
End Month: 2024

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.708466
SO_x	0.003430
NO_x	1.143546
CO	1.591059
PM 10	0.068312

Pollutant	Total Emissions (TONs)
PM 2.5	0.041523
Pb	0.000000
NH_3	0.001366
CO_2e	333.0

11.1 Demolition Phase

11.1.1 Demolition Phase Timeline Assumptions

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

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

11.1.2 Demolition Phase Assumptions

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- General Demolition Information

Area of Building to be demolished (ft^2): 9039
Height of Building to be demolished (ft): 14

- Default Settings Used: Yes

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

- Construction Exhaust (default)

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

- Vehicle Exhaust

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

11.1.3 Demolition Phase Emission Factor(s)

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

Concrete/Industrial Saws Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0357	0.0006	0.2608	0.3715	0.0109	0.0109	0.0032	58.544
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.293	000.002	000.224	003.418	000.007	000.006		000.023	00323.554
LDGT	000.377	000.003	000.397	004.865	000.008	000.007		000.024	00417.210
HDGV	000.730	000.005	000.988	014.840	000.019	000.017		000.044	00772.703
LDDV	000.102	000.003	000.133	002.620	000.004	000.004		000.008	00314.924
LDDT	000.240	000.004	000.378	004.471	000.007	000.006		000.008	00446.943
HDDV	000.547	000.013	005.142	001.878	000.171	000.157		000.029	01524.102
MC	002.687	000.003	000.716	013.172	000.027	000.024		000.054	00395.768

11.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD} = (0.00042 * BA * BH) / 2000$

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

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

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

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

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

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

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

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

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

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

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

11.2 Building Construction Phase

11.2.1 Building Construction Phase Timeline Assumptions

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

- Phase Duration
Number of Month: 8
Number of Days: 0

11.2.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 44243
Height of Building (ft): 14
Number of Units: N/A

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	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

11.2.3 Building Construction Phase Emission Factor(s)

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

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

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.293	000.002	000.224	003.418	000.007	000.006		000.023	00323.554
LDGT	000.377	000.003	000.397	004.865	000.008	000.007		000.024	00417.210
HDGV	000.730	000.005	000.988	014.840	000.019	000.017		000.044	00772.703
LDDV	000.102	000.003	000.133	002.620	000.004	000.004		000.008	00314.924
LDDT	000.240	000.004	000.378	004.471	000.007	000.006		000.008	00446.943
HDDV	000.547	000.013	005.142	001.878	000.171	000.157		000.029	01524.102
MC	002.687	000.003	000.716	013.172	000.027	000.024		000.054	00395.768

11.2.4 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

11.3 Architectural Coatings Phase

11.3.1 Architectural Coatings Phase Timeline Assumptions

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

- Phase Duration

Number of Month: 2
Number of Days: 0

11.3.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information

Building Category: Non-Residential
Total Square Footage (ft^2): 44243
Number of Units: N/A

- Architectural Coatings Default Settings

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

11.3.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.293	000.002	000.224	003.418	000.007	000.006		000.023	00323.554
LDGT	000.377	000.003	000.397	004.865	000.008	000.007		000.024	00417.210
HDGV	000.730	000.005	000.988	014.840	000.019	000.017		000.044	00772.703
LDDV	000.102	000.003	000.133	002.620	000.004	000.004		000.008	00314.924
LDDT	000.240	000.004	000.378	004.471	000.007	000.006		000.008	00446.943
HDDV	000.547	000.013	005.142	001.878	000.171	000.157		000.029	01524.102
MC	002.687	000.003	000.716	013.172	000.027	000.024		000.054	00395.768

11.3.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

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

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

- Off-Gassing Emissions per Phase

VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

12. Construction / Demolition

12.1 General Information & Timeline Assumptions

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

- Activity Title: 2.1.11 Civil Engineering Complex: Entomology Facility

- Activity Description:

The existing Entomology Facility (Bldg. 717), originally constructed in 1982, is inadequate for extended use and beyond its useful life. The facility is of wood construction and was built as a temporary facility and is still in continuous use. The exterior siding dates from the original construction and contains severely deteriorating asbestos shingles, which pose potential health and safety risks and can no longer be repaired with similar materials. The flat roof demands continuous repair, the fire alarm systems are outdated, and the HVAC and dust collection systems are ineffective, energy inefficient, and obsolete.

The proposed action would construct a 2,870 sf Entomology Facility with: reinforced concrete foundation and floor slabs, brick veneer/split-faced block exterior finishes and standing seam sloped metal roof, communications support for voice and data systems, fire detection/alarm systems, pavements with curbs/gutters, fire suppression sprinkler systems, sidewalks, security fencing, site restoration, and landscaping. The facility would designed and constructed in accordance with Armed Forces Pest Management Board Technical Guide 17, Military Handbook - Design of Pest Management Facilities. Construction of the new facility would include the demolition of the existing 2,870 sf facility.

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

- Activity End Date
Indefinite: False
End Month: 4
End Month: 2025

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.082997
SO_x	0.000998
NO_x	0.250305
CO	0.441355
PM 10	0.021118

Pollutant	Total Emissions (TONs)
PM 2.5	0.008095
Pb	0.000000
NH_3	0.000335
CO_2e	96.9

12.1 Demolition Phase

12.1.1 Demolition Phase Timeline Assumptions

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

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

12.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 4419
Height of Building to be demolished (ft): 14

- Default Settings Used: Yes

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
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

12.1.3 Demolition Phase Emission Factor(s)

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

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

Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.293	000.002	000.224	003.418	000.007	000.006		000.023	00323.554
LDGT	000.377	000.003	000.397	004.865	000.008	000.007		000.024	00417.210
HDGV	000.730	000.005	000.988	014.840	000.019	000.017		000.044	00772.703
LDDV	000.102	000.003	000.133	002.620	000.004	000.004		000.008	00314.924
LDDT	000.240	000.004	000.378	004.471	000.007	000.006		000.008	00446.943
HDDV	000.547	000.013	005.142	001.878	000.171	000.157		000.029	01524.102
MC	002.687	000.003	000.716	013.172	000.027	000.024		000.054	00395.768

12.1.4 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

12.2 Building Construction Phase

12.2.1 Building Construction Phase Timeline Assumptions

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

- Phase Duration
Number of Month: 4
Number of Days: 0

12.2.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 2870
Height of Building (ft): 14
Number of Units: N/A

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

- Construction Exhaust (default)

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

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

- Vendor Trips

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

- Vendor Trips Vehicle Mixture (%)

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

12.2.3 Building Construction Phase Emission Factor(s)

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

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0680	0.0013	0.4222	0.3737	0.0143	0.0143	0.0061	128.77
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0236	0.0006	0.0859	0.2147	0.0025	0.0025	0.0021	54.449
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.293	000.002	000.224	003.418	000.007	000.006		000.023	00323.554
LDGT	000.377	000.003	000.397	004.865	000.008	000.007		000.024	00417.210
HDGV	000.730	000.005	000.988	014.840	000.019	000.017		000.044	00772.703
LDDV	000.102	000.003	000.133	002.620	000.004	000.004		000.008	00314.924
LDDT	000.240	000.004	000.378	004.471	000.007	000.006		000.008	00446.943
HDDV	000.547	000.013	005.142	001.878	000.171	000.157		000.029	01524.102
MC	002.687	000.003	000.716	013.172	000.027	000.024		000.054	00395.768

12.2.4 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

12.3 Architectural Coatings Phase

12.3.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 0
Number of Days: 10

12.3.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 2870
Number of Units: N/A

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

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

- Worker Trips Vehicle Mixture (%)

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

12.3.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.293	000.002	000.224	003.418	000.007	000.006		000.023	00323.554
LDGT	000.377	000.003	000.397	004.865	000.008	000.007		000.024	00417.210
HDGV	000.730	000.005	000.988	014.840	000.019	000.017		000.044	00772.703
LDDV	000.102	000.003	000.133	002.620	000.004	000.004		000.008	00314.924
LDDT	000.240	000.004	000.378	004.471	000.007	000.006		000.008	00446.943
HDDV	000.547	000.013	005.142	001.878	000.171	000.157		000.029	01524.102
MC	002.687	000.003	000.716	013.172	000.027	000.024		000.054	00395.768

12.3.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

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

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

VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

13. Construction / Demolition

13.1 General Information & Timeline Assumptions

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

- Activity Title: 2.1.12 Ambulatory Care Center

- Activity Description:

The scope of the proposed action is to consolidate the clinical operations by relocating the Mental Health department into the Medical/Dental Clinic (Bldg. 364), and to consolidate logistics operations by relocating the Logistics and Facility Management department into the Medical Warehouse (Bldg. 1001). This project would include realigning, right-sizing, and modernizing Dental (including Dental Instrument Processing Center [DIPC]), thereby creating space for the Information Management/Information Technology (IM/IT) department and the Resource Management department. In addition, the project would demolish the current Mental Health/Education and Training/Resource Management facility (Bldg. 1000) and replace it with a new modern purpose-built Education and Training facility (New Bldg. 1000). The proposed action would optimize the efficiency of clinical and logistics operations and reduce the facility footprint and associated operations costs.
The existing DIPC is a two-room outdated layout which is not suited for modern dental instrument processing and sterilization operations. The right-sizing of Dental would enable the relocation of IM/IT and Resource Management into excess Dental space, upgrade Dental Radiography, and upgrade DIPC to a modern three-room layout.
IM/IT is currently located on the first floor of the Medical/Dental Clinic within prime clinical area. Relocating IM/IT to the second floor of Bldg. 364 within excess Dental space would allow the relocation of Mental Health into the Medical/Dental Clinic.
Mental Health is the only clinical department geographically separated from the Medical/Dental Clinic which impacts operations and is an inconvenience for patients and staff. Relocating Mental Health would optimize operational efficiency of clinical operations and lead to patient satisfaction and optimized outcomes.
The Education and Training department experiences disruptions during trainings as visitors/staff traverse through class spaces to other areas in the department. The proposed action would demolish Bldg. 1000 and construct a replacement facility (New Bldg. 1000) for Education and Training to optimize training and preparedness for home station

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

- Activity End Date
Indefinite: False

End Month: 3
End Month: 2025

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.086980
SO_x	0.001161
NO_x	0.325911
CO	0.549121
PM 10	0.050576

Pollutant	Total Emissions (TONs)
PM 2.5	0.010868
Pb	0.000000
NH_3	0.000420
CO_2e	113.7

13.1 Demolition Phase

13.1.1 Demolition Phase Timeline Assumptions

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

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

13.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 13489
Height of Building to be demolished (ft): 14

- Default Settings Used: Yes

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
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

13.1.3 Demolition Phase Emission Factor(s)

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

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

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

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.293	000.002	000.224	003.418	000.007	000.006		000.023	00323.554
LDGT	000.377	000.003	000.397	004.865	000.008	000.007		000.024	00417.210
HDGV	000.730	000.005	000.988	014.840	000.019	000.017		000.044	00772.703
LDDV	000.102	000.003	000.133	002.620	000.004	000.004		000.008	00314.924
LDDT	000.240	000.004	000.378	004.471	000.007	000.006		000.008	00446.943
HDDV	000.547	000.013	005.142	001.878	000.171	000.157		000.029	01524.102
MC	002.687	000.003	000.716	013.172	000.027	000.024		000.054	00395.768

13.1.4 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

13.2 Building Construction Phase

13.2.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month:	1
Start Quarter:	1
Start Year:	2025

- Phase Duration

Number of Month:	3
Number of Days:	0

13.2.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category:	Office or Industrial
Area of Building (ft^2):	2300
Height of Building (ft):	14
Number of Units:	N/A

- Building Construction Default Settings

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

- Construction Exhaust (default)

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

- Vehicle Exhaust

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

- Vendor Trips

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

- Vendor Trips Vehicle Mixture (%)

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

13.2.3 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$_2$e**
Emission Factors	0.0680	0.0013	0.4222	0.3737	0.0143	0.0143	0.0061	128.77
Forklifts Composite								
	VOC	**SO$_x$**	**NO$_x$**	**CO**	**PM 10**	**PM 2.5**	**CH$_4$**	**CO$_2$e**
Emission Factors	0.0236	0.0006	0.0859	0.2147	0.0025	0.0025	0.0021	54.449
Tractors/Loaders/Backhoes Composite								
	VOC	**SO$_x$**	**NO$_x$**	**CO**	**PM 10**	**PM 2.5**	**CH$_4$**	**CO$_2$e**
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

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

	VOC	SO$_x$	NO$_x$	CO	PM 10	PM 2.5	Pb	NH$_3$	CO$_2$e
LDGV	000.293	000.002	000.224	003.418	000.007	000.006		000.023	00323.554
LDGT	000.377	000.003	000.397	004.865	000.008	000.007		000.024	00417.210
HDGV	000.730	000.005	000.988	014.840	000.019	000.017		000.044	00772.703
LDDV	000.102	000.003	000.133	002.620	000.004	000.004		000.008	00314.924
LDDT	000.240	000.004	000.378	004.471	000.007	000.006		000.008	00446.943
HDDV	000.547	000.013	005.142	001.878	000.171	000.157		000.029	01524.102
MC	002.687	000.003	000.716	013.172	000.027	000.024		000.054	00395.768

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

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

13.3 Architectural Coatings Phase

13.3.1 Architectural Coatings Phase Timeline Assumptions

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

- Phase Duration
Number of Month: 0
Number of Days: 10

13.3.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 2300
Number of Units: N/A

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

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

- Worker Trips Vehicle Mixture (%)

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

13.3.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.293	000.002	000.224	003.418	000.007	000.006		000.023	00323.554
LDGT	000.377	000.003	000.397	004.865	000.008	000.007		000.024	00417.210
HDGV	000.730	000.005	000.988	014.840	000.019	000.017		000.044	00772.703
LDDV	000.102	000.003	000.133	002.620	000.004	000.004		000.008	00314.924
LDDT	000.240	000.004	000.378	004.471	000.007	000.006		000.008	00446.943
HDDV	000.547	000.013	005.142	001.878	000.171	000.157		000.029	01524.102
MC	002.687	000.003	000.716	013.172	000.027	000.024		000.054	00395.768

13.3.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

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

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

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

14. Construction / Demolition

14.1 General Information & Timeline Assumptions

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

- Activity Title: 2.1.13 Water Tower #2 Demolition

- Activity Description:
The proposed action would demolish Water Tower #2 (Figure 2-9). The tower no longer supports water supply and distribution to JBC, and the physical condition of the tank cannot support further use for this purpose. Typical demolition activities will be conducted.

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

- Activity End Date
Indefinite: False
End Month: 3
End Month: 2025

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.030960
SO_x	0.000556

Pollutant	Total Emissions (TONs)
PM 2.5	0.006466
Pb	0.000000

NO_x	0.186530		NH_3	0.000239
CO	0.291938		CO_2e	55.4
PM 10	0.056452			

14.1 Demolition Phase

14.1.1 Demolition Phase Timeline Assumptions

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

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

14.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 8494
Height of Building to be demolished (ft): 28

- 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

14.1.3 Demolition Phase Emission Factor(s)

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

Concrete/Industrial Saws Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**

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

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.293	000.002	000.224	003.418	000.007	000.006		000.023	00323.554
LDGT	000.377	000.003	000.397	004.865	000.008	000.007		000.024	00417.210
HDGV	000.730	000.005	000.988	014.840	000.019	000.017		000.044	00772.703
LDDV	000.102	000.003	000.133	002.620	000.004	000.004		000.008	00314.924
LDDT	000.240	000.004	000.378	004.471	000.007	000.006		000.008	00446.943
HDDV	000.547	000.013	005.142	001.878	000.171	000.157		000.029	01524.102
MC	002.687	000.003	000.716	013.172	000.027	000.024		000.054	00395.768

14.1.4 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

15. Construction / Demolition

15.1 General Information & Timeline Assumptions

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

- Activity Title: 2.1.14 Hydrant Pits

- Activity Description:

The proposed action would construct five hydrant fueling pits in aircraft parking spaces 60 through 64. Aircraft parked in these spots are currently refueled by truck. The hydrant pits would tie into the existing fuel supply main underlying the parking spots.

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

- Activity End Date
Indefinite: False
End Month: 4
End Month: 2025

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.097548
SO_x	0.000820
NO_x	0.191542
CO	0.342624

Pollutant	Total Emissions (TONs)
PM 2.5	0.006045
Pb	0.000000
NH_3	0.000260
CO_2e	79.2

PM 10	0.006072			

15.1 Building Construction Phase

15.1.1 Building Construction Phase Timeline Assumptions

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

- Phase Duration
Number of Month: 4
Number of Days: 0

15.1.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 5000
Height of Building (ft): 14
Number of Units: N/A

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

- Construction Exhaust (default)

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

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

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

- Vendor Trips Vehicle Mixture (%)

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

15.1.3 Building Construction Phase Emission Factor(s)

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

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0680	0.0013	0.4222	0.3737	0.0143	0.0143	0.0061	128.77
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0236	0.0006	0.0859	0.2147	0.0025	0.0025	0.0021	54.449
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

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

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.293	000.002	000.224	003.418	000.007	000.006		000.023	00323.554
LDGT	000.377	000.003	000.397	004.865	000.008	000.007		000.024	00417.210
HDGV	000.730	000.005	000.988	014.840	000.019	000.017		000.044	00772.703
LDDV	000.102	000.003	000.133	002.620	000.004	000.004		000.008	00314.924
LDDT	000.240	000.004	000.378	004.471	000.007	000.006		000.008	00446.943
HDDV	000.547	000.013	005.142	001.878	000.171	000.157		000.029	01524.102
MC	002.687	000.003	000.716	013.172	000.027	000.024		000.054	00395.768

15.1.4 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

15.2 Architectural Coatings Phase

15.2.1 Architectural Coatings Phase Timeline Assumptions

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

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

15.2.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 5000
Number of Units: N/A

- Architectural Coatings Default Settings

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

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

- Worker Trips Vehicle Mixture (%)

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

15.2.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.293	000.002	000.224	003.418	000.007	000.006		000.023	00323.554
LDGT	000.377	000.003	000.397	004.865	000.008	000.007		000.024	00417.210
HDGV	000.730	000.005	000.988	014.840	000.019	000.017		000.044	00772.703
LDDV	000.102	000.003	000.133	002.620	000.004	000.004		000.008	00314.924
LDDT	000.240	000.004	000.378	004.471	000.007	000.006		000.008	00446.943
HDDV	000.547	000.013	005.142	001.878	000.171	000.157		000.029	01524.102
MC	002.687	000.003	000.716	013.172	000.027	000.024		000.054	00395.768

15.2.4 Architectural Coatings Phase Formula(s)

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

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

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

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

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

16. Construction / Demolition

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

16.1 General Information & Timeline Assumptions

- Activity Location

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

- Activity Title: 2.1.15 Cargo Layout Area

- Activity Description:

The 437th Aerial Port Squadron requires as much space as possible for an additional cargo lay-down area on the southwest side of the airfield directly south of Bldg. 184. Currently the 437th Aerial Port Squadron is utilizing aircraft parking spots 33 and 35 for storage of materials, leading to operational inefficiencies. The proposed action would prepare the existing forested and grass site for construction of a cargo laydown area while implementing Low Impact Designand Leadership in Energy and Environmental Design (LEED) compliant construction practices.

- Activity Start Date

Start Month: 1
Start Month: 2025

- Activity End Date

Indefinite: False
End Month: 1
End Month: 2025

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.006670
SO_x	0.000069
NO_x	0.027626
CO	0.037339
PM 10	0.001309

Pollutant	Total Emissions (TONs)
PM 2.5	0.001300
Pb	0.000000
NH_3	0.000044
CO_2e	6.9

16.1 Paving Phase

16.1.1 Paving Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
Start Quarter: 1
Start Year: 2025

- Phase Duration

Number of Month: 0
Number of Days: 6

16.1.2 Paving Phase Assumptions

- General Paving Information

Paving Area (ft^2): 60000

- 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

16.1.3 Paving Phase Emission Factor(s)

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

- 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	000.592	000.007	000.647	005.164	000.011	000.010		000.034	00370.678
LDGT	000.812	000.010	001.118	008.512	000.013	000.011		000.034	00495.417
HDGV	001.391	000.015	002.875	025.081	000.030	000.027		000.045	00773.953
LDDV	000.235	000.003	000.316	003.691	000.007	000.006		000.008	00379.060
LDDT	000.541	000.005	000.844	007.509	000.008	000.008		000.008	00590.633
HDDV	000.905	000.014	008.879	002.962	000.376	000.346		000.030	01603.762
MC	002.812	000.008	000.742	014.997	000.028	000.025		000.050	00394.982

16.1.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)

0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

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

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

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

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

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

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

17. Construction / Demolition

17.1 General Information & Timeline Assumptions

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

- Activity Title: 2.1.16 Munitions Facility

- Activity Description:
The proposed action would demolish the existing aluminum Buildings 2194 and 2196 to be replaced with new ECM munitions facilities. The ECMs would be approximately 60 ft deep by 40 ft wide and include a concrete

loading dock. The new facilities would also be constructed to provide electricity, communication, a lighting protection system, and a security system. The facilities would tie into existing power infrastructure. Interior elements include a pallet roller system, rolling blast door, new HVAC system, fire protection system

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

- Activity End Date
Indefinite: False
End Month: 3
End Month: 2025

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.095768
SO_x	0.000803
NO_x	0.206836
CO	0.354647
PM 10	0.022083

Pollutant	Total Emissions (TONs)
PM 2.5	0.006720
Pb	0.000000
NH_3	0.000281
CO_2e	78.2

17.1 Demolition Phase

17.1.1 Demolition Phase Timeline Assumptions

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

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

17.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 5213
Height of Building to be demolished (ft): 14

- Default Settings Used: Yes

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
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

17.1.3 Demolition Phase Emission Factor(s)

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

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

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.293	000.002	000.224	003.418	000.007	000.006		000.023	00323.554
LDGT	000.377	000.003	000.397	004.865	000.008	000.007		000.024	00417.210
HDGV	000.730	000.005	000.988	014.840	000.019	000.017		000.044	00772.703
LDDV	000.102	000.003	000.133	002.620	000.004	000.004		000.008	00314.924
LDDT	000.240	000.004	000.378	004.471	000.007	000.006		000.008	00446.943
HDDV	000.547	000.013	005.142	001.878	000.171	000.157		000.029	01524.102
MC	002.687	000.003	000.716	013.172	000.027	000.024		000.054	00395.768

17.1.4 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

17.2 Building Construction Phase

17.2.1 Building Construction Phase Timeline Assumptions

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

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

17.2.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial
Area of Building (ft^2): 4800
Height of Building (ft): 14
Number of Units: N/A

- Building Construction Default Settings

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

- Construction Exhaust (default)

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

- Vehicle Exhaust

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

- Vendor Trips

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

- Vendor Trips Vehicle Mixture (%)

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

17.2.3 Building Construction Phase Emission Factor(s)

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

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0680	0.0013	0.4222	0.3737	0.0143	0.0143	0.0061	128.77
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0236	0.0006	0.0859	0.2147	0.0025	0.0025	0.0021	54.449
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e

LDGV	000.293	000.002	000.224	003.418	000.007	000.006		000.023	00323.554
LDGT	000.377	000.003	000.397	004.865	000.008	000.007		000.024	00417.210
HDGV	000.730	000.005	000.988	014.840	000.019	000.017		000.044	00772.703
LDDV	000.102	000.003	000.133	002.620	000.004	000.004		000.008	00314.924
LDDT	000.240	000.004	000.378	004.471	000.007	000.006		000.008	00446.943
HDDV	000.547	000.013	005.142	001.878	000.171	000.157		000.029	01524.102
MC	002.687	000.003	000.716	013.172	000.027	000.024		000.054	00395.768

17.2.4 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

17.3 Architectural Coatings Phase

17.3.1 Architectural Coatings Phase Timeline Assumptions

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

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

17.3.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 4800
Number of Units: N/A

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

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

- Worker Trips Vehicle Mixture (%)

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

17.3.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.293	000.002	000.224	003.418	000.007	000.006		000.023	00323.554

LDGT	000.377	000.003	000.397	004.865	000.008	000.007		000.024	00417.210
HDGV	000.730	000.005	000.988	014.840	000.019	000.017		000.044	00772.703
LDDV	000.102	000.003	000.133	002.620	000.004	000.004		000.008	00314.924
LDDT	000.240	000.004	000.378	004.471	000.007	000.006		000.008	00446.943
HDDV	000.547	000.013	005.142	001.878	000.171	000.157		000.029	01524.102
MC	002.687	000.003	000.716	013.172	000.027	000.024		000.054	00395.768

17.3.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

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

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

- Off-Gassing Emissions per Phase

$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

18. Construction / Demolition

18.1 General Information & Timeline Assumptions

- Activity Location

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

- Activity Title: 2.1.17 HAZMAT Load and Unload Facility

- Activity Description:

The proposed action would construct an approximately 1,000 sf single story facility consisting of concrete foundation, concrete floor slab, metal building with sloped standing seam metal roof, including all utilities. Office, bathroom/shower, communications room, and lounge areas would also be constructed.
Repairs would be made to the existing canopy, loading dock spalls, joint seal, bumpers, and edging. An electricity, water, sewer, communication, lighting protection system, fire and security system would be constructed as needed.

Site demolition would include demolition of existing Bldg. 2190, pavement cuts for utility installation, grading the site in preparation for the new building, and demolition of the adjacent blast wall.

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

- Activity End Date
Indefinite: False
End Month: 3
End Month: 2025

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.044224
SO_x	0.000666
NO_x	0.160025
CO	0.287541
PM 10	0.008072

Pollutant	Total Emissions (TONs)
PM 2.5	0.005118
Pb	0.000000
NH_3	0.000198
CO_2e	64.3

18.1 Demolition Phase

18.1.1 Demolition Phase Timeline Assumptions

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

- Phase Duration
Number of Month: 0
Number of Days: 10

18.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 1000
Height of Building to be demolished (ft): 14

- Default Settings Used: Yes

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
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

18.1.3 Demolition Phase Emission Factor(s)

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

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

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.293	000.002	000.224	003.418	000.007	000.006		000.023	00323.554
LDGT	000.377	000.003	000.397	004.865	000.008	000.007		000.024	00417.210
HDGV	000.730	000.005	000.988	014.840	000.019	000.017		000.044	00772.703
LDDV	000.102	000.003	000.133	002.620	000.004	000.004		000.008	00314.924
LDDT	000.240	000.004	000.378	004.471	000.007	000.006		000.008	00446.943
HDDV	000.547	000.013	005.142	001.878	000.171	000.157		000.029	01524.102
MC	002.687	000.003	000.716	013.172	000.027	000.024		000.054	00395.768

18.1.4 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

18.2 Building Construction Phase

18.2.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
Start Quarter: 1
Start Year: 2025

- Phase Duration

Number of Month: 3
Number of Days: 0

18.2.2 Building Construction Phase Assumptions

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- General Building Construction Information

Building Category: Office or Industrial
Area of Building (ft^2): 1000
Height of Building (ft): 14
Number of Units: N/A

- Building Construction Default Settings

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

- Construction Exhaust (default)

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

- Vehicle Exhaust

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

- Vendor Trips

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

- Vendor Trips Vehicle Mixture (%)

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

18.2.3 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$_2$e**
Emission Factors	0.0680	0.0013	0.4222	0.3737	0.0143	0.0143	0.0061	128.77
Forklifts Composite								
	VOC	**SO$_x$**	**NO$_x$**	**CO**	**PM 10**	**PM 2.5**	**CH$_4$**	**CO$_2$e**
Emission Factors	0.0236	0.0006	0.0859	0.2147	0.0025	0.0025	0.0021	54.449
Tractors/Loaders/Backhoes Composite								
	VOC	**SO$_x$**	**NO$_x$**	**CO**	**PM 10**	**PM 2.5**	**CH$_4$**	**CO$_2$e**
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

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

	VOC	SO$_x$	NO$_x$	CO	PM 10	PM 2.5	Pb	NH$_3$	CO$_2$e
LDGV	000.293	000.002	000.224	003.418	000.007	000.006		000.023	00323.554

LDGT	000.377	000.003	000.397	004.865	000.008	000.007		000.024	00417.210
HDGV	000.730	000.005	000.988	014.840	000.019	000.017		000.044	00772.703
LDDV	000.102	000.003	000.133	002.620	000.004	000.004		000.008	00314.924
LDDT	000.240	000.004	000.378	004.471	000.007	000.006		000.008	00446.943
HDDV	000.547	000.013	005.142	001.878	000.171	000.157		000.029	01524.102
MC	002.687	000.003	000.716	013.172	000.027	000.024		000.054	00395.768

18.2.4 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

18.3 Architectural Coatings Phase

18.3.1 Architectural Coatings Phase Timeline Assumptions

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

- Phase Duration
Number of Month: 0
Number of Days: 5

18.3.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 1000
Number of Units: N/A

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

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

- Worker Trips Vehicle Mixture (%)

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

18.3.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.293	000.002	000.224	003.418	000.007	000.006		000.023	00323.554
LDGT	000.377	000.003	000.397	004.865	000.008	000.007		000.024	00417.210

HDGV	000.730	000.005	000.988	014.840	000.019	000.017		000.044	00772.703
LDDV	000.102	000.003	000.133	002.620	000.004	000.004		000.008	00314.924
LDDT	000.240	000.004	000.378	004.471	000.007	000.006		000.008	00446.943
HDDV	000.547	000.013	005.142	001.878	000.171	000.157		000.029	01524.102
MC	002.687	000.003	000.716	013.172	000.027	000.024		000.054	00395.768

18.3.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

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

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

- Off-Gassing Emissions per Phase

$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

19. Construction / Demolition

19.1 General Information & Timeline Assumptions

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

- Activity Title: 2.1.18 Dormitory Demolition

- Activity Description:

The proposed action would demolish the Bldg. 246 dormitory. The existing facility was constructed in 1954 and is past its useful life. Typical demolition activities will be conducted.

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

- Activity End Date

Indefinite: False
End Month: 3
End Month: 2025

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.032811
SO_x	0.000600
NO_x	0.203930
CO	0.298292
PM 10	0.126641

Pollutant	Total Emissions (TONs)
PM 2.5	0.006998
Pb	0.000000
NH_3	0.000337
CO_2e	60.6

19.1 Demolition Phase

19.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
Start Quarter: 1
Start Year: 2025

- Phase Duration

Number of Month: 3
Number of Days: 0

19.1.2 Demolition Phase Assumptions

- General Demolition Information

Area of Building to be demolished (ft^2): 13555
Height of Building to be demolished (ft): 42

- 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

19.1.3 Demolition Phase Emission Factor(s)

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

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

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.293	000.002	000.224	003.418	000.007	000.006		000.023	00323.554
LDGT	000.377	000.003	000.397	004.865	000.008	000.007		000.024	00417.210
HDGV	000.730	000.005	000.988	014.840	000.019	000.017		000.044	00772.703
LDDV	000.102	000.003	000.133	002.620	000.004	000.004		000.008	00314.924
LDDT	000.240	000.004	000.378	004.471	000.007	000.006		000.008	00446.943
HDDV	000.547	000.013	005.142	001.878	000.171	000.157		000.029	01524.102
MC	002.687	000.003	000.716	013.172	000.027	000.024		000.054	00395.768

19.1.4 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

20. Construction / Demolition

20.1 General Information & Timeline Assumptions

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

- Activity Title: 2.1.19 NAAF Fire Station Addition

- Activity Description:
The USAF and supported component missions plan to add an extension to the existing Bldg. 20 fire station at the NAAF. The proposed fire station would encompass the existing patio area along the southwest face of the station. Equipment, gear, and firefighting agents currently stored in the vehicle stall area would be moved to the new addition. A concrete driveway would be constructed to the structure leading to roll up doors.
The proposed additions and would require the removal of an existing retaining wall, & additions to the concrete pad. Lighting and power outlets would be required within the new structure as well as a driveway leading to and from the new structure. The two driveways would lead to two roll up doors, which would be constructed on either side of the new structure, and measure approximately 10 ft wide by 50 ft in length. The current area of the concrete pad measures 21ft x 28 ft, the area of the requested extension would measure 36 ft 2 in long, 12 ft high, and 21 ft wide.

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

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

- Activity End Date
Indefinite: False
End Month: 2
End Month: 2025

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.028355
SO_x	0.000404
NO_x	0.093561
CO	0.170505
PM 10	0.002963

Pollutant	Total Emissions (TONs)
PM 2.5	0.002955
Pb	0.000000
NH_3	0.000118
CO_2e	39.0

20.1 Building Construction Phase

20.1.1 Building Construction Phase Timeline Assumptions

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

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

20.1.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 760
Height of Building (ft): 14
Number of Units: N/A

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

- Construction Exhaust (default)

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

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

- Vendor Trips

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

- Vendor Trips Vehicle Mixture (%)

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

20.1.3 Building Construction Phase Emission Factor(s)

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

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0680	0.0013	0.4222	0.3737	0.0143	0.0143	0.0061	128.77
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0236	0.0006	0.0859	0.2147	0.0025	0.0025	0.0021	54.449
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.293	000.002	000.224	003.418	000.007	000.006		000.023	00323.554
LDGT	000.377	000.003	000.397	004.865	000.008	000.007		000.024	00417.210
HDGV	000.730	000.005	000.988	014.840	000.019	000.017		000.044	00772.703
LDDV	000.102	000.003	000.133	002.620	000.004	000.004		000.008	00314.924
LDDT	000.240	000.004	000.378	004.471	000.007	000.006		000.008	00446.943
HDDV	000.547	000.013	005.142	001.878	000.171	000.157		000.029	01524.102
MC	002.687	000.003	000.716	013.172	000.027	000.024		000.054	00395.768

20.1.4 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

20.2 Architectural Coatings Phase

20.2.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 0
Number of Days: 5

20.2.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 760
Number of Units: N/A

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

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

- Worker Trips Vehicle Mixture (%)

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

20.2.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO$_x$	NO$_x$	CO	PM 10	PM 2.5	Pb	NH$_3$	CO$_2$e
LDGV	000.293	000.002	000.224	003.418	000.007	000.006		000.023	00323.554
LDGT	000.377	000.003	000.397	004.865	000.008	000.007		000.024	00417.210
HDGV	000.730	000.005	000.988	014.840	000.019	000.017		000.044	00772.703
LDDV	000.102	000.003	000.133	002.620	000.004	000.004		000.008	00314.924
LDDT	000.240	000.004	000.378	004.471	000.007	000.006		000.008	00446.943
HDDV	000.547	000.013	005.142	001.878	000.171	000.157		000.029	01524.102
MC	002.687	000.003	000.716	013.172	000.027	000.024		000.054	00395.768

20.2.4 Architectural Coatings Phase Formula(s)

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

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

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

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

VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

21. Heating

21.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

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

- Activity Title: 2.1.20 Heating of New Buildings

- Activity Description:
As part of the new construction, a new natural gas boiler will be installed and provide heating for the newly constructed buildings

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

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.079539
SO_x	0.008677
NO_x	1.446171
CO	1.214784
PM 10	0.109909

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.109909
Pb	0.000000
NH_3	0.000000
CO_2e	1741.0

21.2 Heating Assumptions

- Heating
Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method
Area of floorspace to be heated (ft^2): 304000
Type of fuel: Natural Gas

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

Type of boiler/furnace:	Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value (MMBtu/ft^3):	0.00105
Energy Intensity (MMBtu/ft^2):	0.0999

- Default Settings Used: No

- Boiler/Furnace Usage
Operating Time Per Year (hours): 8760

21.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000000 scf)

VOC	SO$_x$	NO$_x$	CO	PM 10	PM 2.5	Pb	NH$_3$	CO$_2$e
5.5	0.6	100	84	7.6	7.6			120390

21.4 Heating Formula(s)

- Heating Fuel Consumption ft^3 per Year

FC_{HER}= HA * EI / HV / 1000000

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method
HA: Area of floorspace to be heated (ft^2)
EI: Energy Intensity Requirement (MMBtu/ft^2)
HV: Heat Value (MMBTU/ft^3)
1000000: Conversion Factor

- Heating Emissions per Year

HE_{POL}= FC * EF_{POL} / 2000

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

Appendix C

IPaC Report

United States Department of the Interior

FISH AND WILDLIFE SERVICE
South Carolina Ecological Services
176 Croghan Spur Road, Suite 200
Charleston, SC 29407-7558
Phone: (843) 727-4707 Fax: (843) 727-4218

In Reply Refer To:
Project Code: 2022-0014081
Project Name: Joint Base Charleston

July 19, 2023

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

To Whom It May Concern:

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

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

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

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

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

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

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

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

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

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

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Migratory Birds
- Marine Mammals
- Wetlands

OFFICIAL SPECIES LIST

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

This species list is provided by:

South Carolina Ecological Services
176 Croghan Spur Road, Suite 200
Charleston, SC 29407-7558
(843) 727-4707

PROJECT SUMMARY

Project Code:	2022-0014081
Project Name:	Joint Base Charleston
Project Type:	Military Development
Project Description:	Installation Development Projects

Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@32.956525049999996,-79.93829899412292,14z

Counties: Berkeley , Charleston , and Orangeburg counties, South Carolina

ENDANGERED SPECIES ACT SPECIES

There is a total of 17 threatened, endangered, or candidate species on this species list.

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

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

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

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

MAMMALS

NAME	STATUS
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Endangered
Tricolored Bat *Perimyotis subflavus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10515	Proposed Endangered
West Indian Manatee *Trichechus manatus* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. ***This species is also protected by the Marine Mammal Protection Act, and may have additional consultation requirements.*** Species profile: https://ecos.fws.gov/ecp/species/4469	Threatened

BIRDS

NAME	STATUS
Bachman's Warbler (=wood) *Vermivora bachmanii* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/3232	Endangered
Eastern Black Rail *Laterallus jamaicensis ssp. jamaicensis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10477	Threatened
Piping Plover *Charadrius melodus* Population: [Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered. There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6039	Threatened
Red Knot *Calidris canutus rufa* There is **proposed** critical habitat for this species. Species profile: https://ecos.fws.gov/ecp/species/1864	Threatened
Red-cockaded Woodpecker *Picoides borealis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7614	Endangered
Wood Stork *Mycteria americana* Population: AL, FL, GA, MS, NC, SC No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/8477	Threatened

REPTILES

NAME	STATUS
Green Sea Turtle *Chelonia mydas* Population: North Atlantic DPS There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6199	Threatened
Kemp's Ridley Sea Turtle *Lepidochelys kempii* There is **proposed** critical habitat for this species. Species profile: https://ecos.fws.gov/ecp/species/5523	Endangered
Leatherback Sea Turtle *Dermochelys coriacea* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/1493	Endangered
Loggerhead Sea Turtle *Caretta caretta* Population: Northwest Atlantic Ocean DPS There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/1110	Threatened

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

FLOWERING PLANTS

NAME	STATUS
American Chaffseed *Schwalbea americana* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1286	Endangered
Canby's Dropwort *Oxypolis canbyi* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7738	Endangered
Pondberry *Lindera melissifolia* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1279	Endangered

CRITICAL HABITATS

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

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

USFWS NATIONAL WILDLIFE REFUGE LANDS AND FISH HATCHERIES

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

MIGRATORY BIRDS

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

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1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
American Kestrel *Falco sparverius paulus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9587	Breeds Apr 1 to Aug 31
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds Sep 1 to Jul 31

NAME	BREEDING SEASON
Black Skimmer *Rynchops niger* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/5234	Breeds May 20 to Sep 15
Brown-headed Nuthatch *Sitta pusilla* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds Mar 1 to Jul 15
Chimney Swift *Chaetura pelagica* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Mar 15 to Aug 25
Eastern Whip-poor-will *Antrostomus vociferus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Aug 20
Gull-billed Tern *Gelochelidon nilotica* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9501	Breeds May 1 to Jul 31
Kentucky Warbler *Oporornis formosus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 20 to Aug 20
King Rail *Rallus elegans* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8936	Breeds May 1 to Sep 5
Lesser Yellowlegs *Tringa flavipes* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9679	Breeds elsewhere
Painted Bunting *Passerina ciris* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds Apr 25 to Aug 15
Prairie Warbler *Dendroica discolor* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Jul 31
Prothonotary Warbler *Protonotaria citrea* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 1 to Jul 31
Red-headed Woodpecker *Melanerpes erythrocephalus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Sep 10

NAME	BREEDING SEASON
Rusty Blackbird *Euphagus carolinus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds elsewhere
Short-billed Dowitcher *Limnodromus griseus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9480	Breeds elsewhere
Swallow-tailed Kite *Elanoides forficatus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8938	Breeds Mar 10 to Jun 30
Willet *Tringa semipalmata* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 20 to Aug 5
Wood Thrush *Hylocichla mustelina* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Aug 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (🟩)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence

in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.

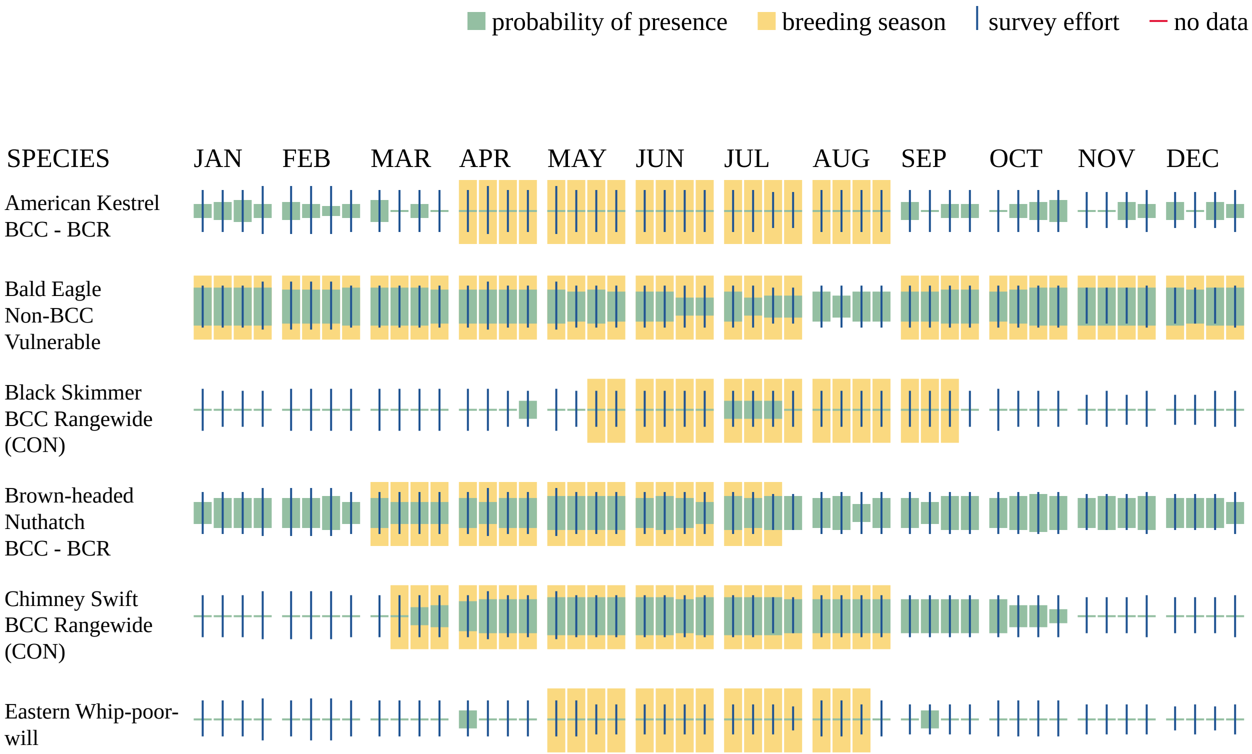
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

Breeding Season (🟨)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

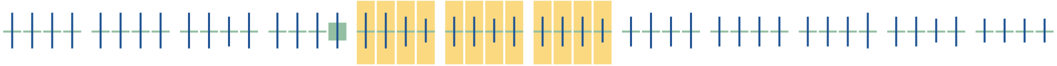
No Data (−)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

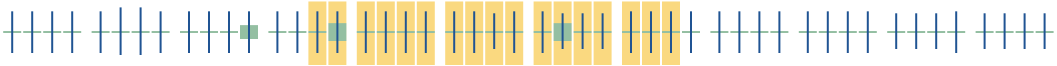


BCC Rangewide
(CON)

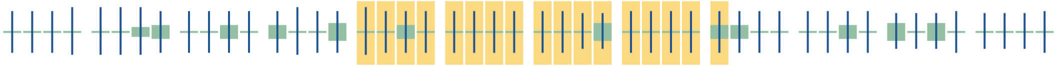
Gull-billed Tern
BCC Rangewide
(CON)



Kentucky Warbler
BCC Rangewide
(CON)

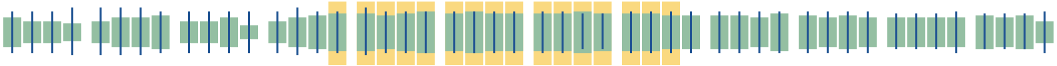


King Rail
BCC Rangewide
(CON)

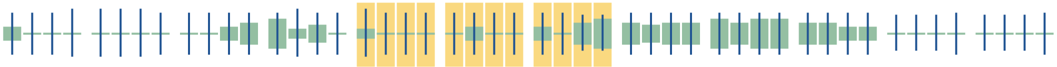


Lesser Yellowlegs
BCC Rangewide
(CON)

Painted Bunting
BCC - BCR

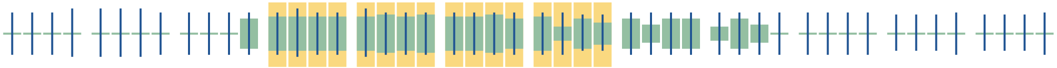


Prairie Warbler
BCC Rangewide
(CON)

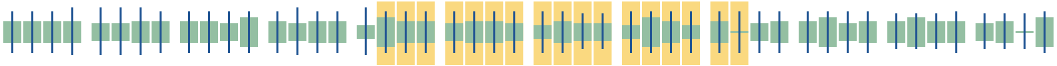


SPECIES JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

Prothonotary
Warbler
BCC Rangewide
(CON)



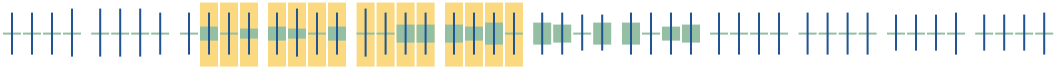
Red-headed
Woodpecker
BCC Rangewide
(CON)



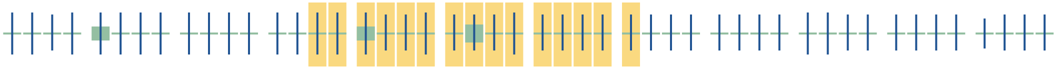
Rusty Blackbird
BCC - BCR

Short-billed
Dowitcher
BCC Rangewide
(CON)

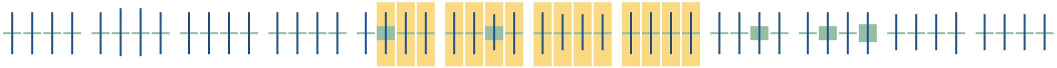
Swallow-tailed Kite
BCC Rangewide
(CON)



Willet
BCC Rangewide
(CON)



Wood Thrush
BCC Rangewide
(CON)



Additional information can be found using the following links:

- Birds of Conservation Concern https://www.fws.gov/program/migratory-birds/species

- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf

MIGRATORY BIRDS FAQ

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?
Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects
For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?
If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

MARINE MAMMALS

Marine mammals are protected under the Marine Mammal Protection Act. Some are also protected under the Endangered Species Act[1] and the Convention on International Trade in Endangered Species of Wild Fauna and Flora[2].

The responsibilities for the protection, conservation, and management of marine mammals are shared by the U.S. Fish and Wildlife Service [responsible for otters, walruses, polar bears, manatees, and dugongs] and NOAA Fisheries[3] [responsible for seals, sea lions, whales, dolphins, and porpoises]. Marine mammals under the responsibility of NOAA Fisheries are **not** shown on this list; for additional information on those species please visit the Marine Mammals page of the NOAA Fisheries website.

The Marine Mammal Protection Act prohibits the take of marine mammals and further coordination may be necessary for project evaluation. Please contact the U.S. Fish and Wildlife Service Field Office shown.

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1. The Endangered Species Act (ESA) of 1973.
2. The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is a treaty to ensure that international trade in plants and animals does not threaten their survival in the wild.
3. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

NAME

West Indian Manatee *Trichechus manatus*
Species profile: https://ecos.fws.gov/ecp/species/4469

WETLANDS

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

ESTUARINE AND MARINE DEEPWATER

- E1UBL

RIVERINE

- R1UBV

FRESHWATER EMERGENT WETLAND

- PEM1Fh
- PEM1R

LAKE

- L1UBHh

FRESHWATER FORESTED/SHRUB WETLAND

- PFO1C

IPAC USER CONTACT INFORMATION

Agency:	WSP USA Environment & Infrastructure, Inc.
Name:	Paul Haywood
Address:	1075 Big Shanty Road NW
Address Line 2:	Suite 100
City:	Kennesaw
State:	GA
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Email	haywookp@gmail.com
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LEAD AGENCY CONTACT INFORMATION

Lead Agency: Air Force

Threatened and Endangered Species Lists Southeast Region

Threatened and Endangered Species and Critical Habitats Under NOAA Fisheries Jurisdiction

Species	Listing Status	Recovery Plan	Critical Habitat
Green sea turtle	Threatened - North and South Atlantic Distinct Population Segment (81 FR 20057; April 6, 2016)	October 1991	63 FR 46693; September 2, 1998
Kemp's ridley sea turtle	Endangered (35 FR 18319; December 2, 1970)	September 2011	None
Leatherback sea turtle	Endangered (35 FR 8491; June 2, 1970)	April 1992	44 FR 17710; March 23, 1979
Loggerhead sea turtle	Threatened - Northwest Atlantic Ocean Distinct Population Segment (76 FR 58868; September 22, 2011)	December 2008	79 FR 39856; July 10, 2014
Hawksbill sea turtle	Endangered (35 FR 8491; June 2, 1970)	December 1993	63 FR 46693; September 2, 1998
Smalltooth sawfish	U.S. Distinct Population Segment Endangered (68 FR 15674; April 1, 2003)	January 2009	72 FR 45353; October 2, 2009

Species	Listing Status	Recovery Plan	Critical Habitat
Shortnose sturgeon	Endangered (32 FR 4001; March 11, 1967)	December 1998	None
Atlantic sturgeon	Endangered - South Atlantic and Carolina Distinct Population Segment (77 FR 5914; February 6, 2012)	2018 Recovery Outline	82 FR 39160; August 10, 2017
Gulf sturgeon	Threatened (56 FR 49653; September 30, 1991)	September 1995	68 FR 13370; March 19, 2003
Nassau grouper	Threatened (81 FR 42268; June 29, 2016)	2018 Recovery Outline	None
Oceanic whitetip shark	Threatened (83 FR 4153; January 30, 2018)	2018 Recovery Outline	None
Giant manta ray	Threatened (83 FR 2916; January 22, 2018)	2019 Recovery Outline	None
Scalloped hammerhead shark	Central and Southwest Atlantic Distinct Population Segment - Threatened (79 FR 38213; July 3, 2014)	None	None
Elkhorn coral	Threatened (71 FR 26852; May 9, 2006)	March 2015	73 FR 72210; November 26, 2008
Staghorn coral	Threatened (71 FR 26852; May 9, 2006)	March 2015	73 FR 72210; November 26, 2008
Boulder star coral	Threatened (79 FR 53851; September 10, 2014)	None	None
Mountainous star coral	Threatened (79 FR 53851; September 10, 2014)	None	None
Lobed star coral	Threatened (79 FR 53851; September 10, 2014)	None	None
Rough cactus coral	Threatened (79 FR 53851; September 10, 2014)	None	None
Pillar coral	Threatened (79 FR 53851; September 10, 2014)	None	None

Species	Listing Status	Recovery Plan	Critical Habitat
Fin whale	Endangered (35 FR 18319/ December 2, 1970)	August 2010	None
Sperm whale	Endangered (35 FR 18319; December 2, 1970)	December 2010	None
Sei whale	Endangered (35 FR 12222/ December 2, 1970)	December 2011	None
Blue whale	Endangered (35 FR 18319/ December 2, 1970)	July 1998	None
North Atlantic right whale	Endangered (35 FR 18319; December 2, 1970)	June 2005	81 FR 4837; January 27, 2016
Rice's whale	Endangered (84 FR 15446, April 15, 2019); Name Change (86 FR 47022; August 23, 2021)	September 2020 Recovery Outline	None

Last updated by Southeast Regional Office on July 21, 2022

EFH Mapper Report

EFH Data Notice

Essential Fish Habitat (EFH) is defined by textual descriptions contained in the fishery management plans developed by the regional fishery management councils. In most cases mapping data can not fully represent the complexity of the habitats that make up EFH. This report should be used for general interest queries only and should not be interpreted as a definitive evaluation of EFH at this location. A location-specific evaluation of EFH for any official purposes must be performed by a regional expert. Please refer to the following links for the appropriate regional resources.

Southeast Regional Office
Atlantic Highly Migratory Species Management Division

Query Results

Degrees, Minutes, Seconds: Latitude = 32º 54' 31" N, Longitude = 80º 3' 8" W
Decimal Degrees: Latitude = 32.909, Longitude = -79.948

The query location intersects with spatial data representing EFH and/or HAPCs for the following species/management units.

EFH

Link	Data Caveats	Species/Management Unit	Lifestage(s) Found at Location	Management Council	FMP
📄	?	Blacktip Shark (Atlantic Stock)	Juvenile/Adult, Neonate	Secretarial	Amendment 10 to the 2006 Consolidated HMS FMP: EFH
📄	?	Bluefish	Juvenile	Mid-Atlantic	Bluefish
📄	?	Snapper Grouper	ALL	South Atlantic	Snapper Grouper
📄	?	Spinner Shark	Neonate	Secretarial	Amendment 10 to the 2006 Consolidated HMS FMP: EFH
📄	?	Summer Flounder	Adult, Juvenile, Larvae	Mid-Atlantic	Summer Flounder, Scup, Black Sea Bass
📄	?	Tiger Shark	Juvenile/Adult	Secretarial	Amendment 10 to the 2006 Consolidated HMS FMP: EFH

Pacific Salmon EFH

No Pacific Salmon Essential Fish Habitat (EFH) were identified at the report location.

Atlantic Salmon

No Atlantic Salmon were identified at the report location.

HAPCs

Link	Data Caveats	HAPC Name	Management Council
⚠	?	Coastal Inlets	South Atlantic Fishery Management Council
⚠	?	Summer Flounder SAV	Mid-Atlantic Fishery Management Council

EFH Areas Protected from Fishing

No EFH Areas Protected from Fishing (EFHA) were identified at the report location.

Spatial data does not currently exist for all the managed species in this area. The following is a list of species or management units for which there is no spatial data.
****For links to all EFH text descriptions see the complete data inventory:** [open data inventory -->]

South Atlantic Shrimp EFH,
Brown Shrimp,
Pink Shrimp,
Rock Shrimp,
White Shrimp,
South Atlantic Dolphin Wahoo EFH,
Wahoo,
South Atlantic Sargassum EFH,
Sargassum,
South Atlantic HAPCs,
Coastal Migratory Pelagics,
Golden Crab,
Sargassum,
Secretarial EFH,
Bigeye Sand Tiger Shark,
Bigeye Sixgill Shark,
Caribbean Sharpnose Shark,
Galapagos Shark,
Narrowtooth Shark,
Sevengill Shark,
Sixgill Shark,

Spatial data does not currently exist for all the managed species in this area. The following is a list of species or management units for which there is no spatial data. ****For links to all EFH text descriptions see the complete data inventory: open data inventory -->**
Smooth Hammerhead Shark, Smalltail Shark

depth (Parsons and Hoffmayer 2007). Large numbers of YOY blacktips were collected north of Dauphin Island, in the lower reaches of the Mobile Bay, Fort Morgan, Sand Island, north of Horn Island, and near the mouth of Bay St. Louis, with high catch-per-unit-effort occurring in May and June and the highest in July when waters were about 29 to 33 °C (Parsons and Hoffmayer 2007).

Essential Fish Habitat for Blacktip Shark (Atlantic Stock)

Figure G 288 - Figure G 299

Neonate/YOY (≤ 59 cm FL): In Atlantic Ocean coastal areas out to 20 m depth contour from northern Florida through areas with muddy bottoms in Georgia and the seaward side of coastal islands of the Carolinas, at depths of 2 to 4 m.

Juvenile (60-125 cm FL) and Adult (≥ 126 cm FL):

EFH is in Atlantic coastal areas from Florida to the Maryland/Virginia line (northern extent of EFH is Chincoteague Island), including the mouth of Chesapeake Bay and adjacent coastal areas along the Delmarva Peninsula. EFH is also in South Carolina Inlets, estuarine, and nearshore waters (including Winyah Bay and North Inlet) associated with water temperatures ranging from 19 to 33 °C, salinities ranging from 13 to 37 ppt, water depth ranging from 2.4 to 12.8 m, and DO ranging from 4.3-6.1 mg/L in shell, sand, and rocky habitats. EFH also ranges from northern Cape Canaveral (~28°40' N lat.) south to the Key Biscayne area (~27°04' N lat.) in water depths of 3 to 11 m.

Summary of Changes Made to EFH

EFH boundaries published in Amendment 1 have been updated in Final Amendment 10. Amendment 1 established EFH for a single stock of blacktip sharks. However, the blacktip shark stock was split into two regional stocks in 2012 due to the results of scientific research presented during the SEDAR 29 stock assessment. NMFS manages each stock separately; therefore, delineation of separate EFH boundaries for Atlantic and Gulf of Mexico stocks would be consistent with current management strategies. EFH boundaries of the neonate/ YOY blacktip shark EFH for the Atlantic stock were expanded between Myrtle Beach (approximately) and northeastern Florida due to the incorporation of new data into the Kernal Density Estimation/ 95 Percent Volume Contour models. The juvenile and adult blacktip shark EFH boundaries for the Atlantic stock were expanded to near-continuous coverage from Chincoteague to the southern boundary to Key Biscayne, Florida due to the incorporation of new data into the Kernal Density Estimation/ 95 Percent Volume Contour models.

In Final Amendment 10, the juvenile and adult EFH boundaries for both the Gulf of Mexico and Atlantic stocks were extended from those in Draft Amendment 10 to the management boundary between the two stocks off southeastern Florida. As explained in Section 2.1 under the description of Alternative 2 and in Appendix H (see "Approaches Used to Analyze and Map Data" for a review on how data were adjusted along features), this update was included in response to public comments and comments from the SEFSC recommending that these changes be made in order to reflect all available information on distribution and habitat utilization, and thus meets the requirement that these updates be based on the best scientific information.

Essential Fish Habitat for Blacktip Shark (Gulf of Mexico Stock)

Figure G 30 – Figure G 31

Neonate/YOY (≤ 61 cm FL): Coastal areas, including estuaries, out to the 30 m depth contour in the Gulf of Mexico from the Florida Keys to southern Texas. Yankeetown of the west coast of Florida is one of the most productive blacktip shark nurseries, followed by Charlotte Harbor, Tampa Bay, Ten Thousand Islands, and the Florida Keys. Important EFH includes central Louisiana's nearshore coastal waters important pupping and nursery areas, such as habitats north of Dauphin Island, in the lower reaches of the Mobile Bay, Fort Morgan, Sand Island, north of Horn Island, and near the mouth of Bay St. Louis. . Neonates EFH is associated with water temperatures ranging from 20.8 to 32.2 °C, salinities ranging from 22.4 to 36.4 ppt, water depth ranging from 0.9 to 7.6 m, and DO ranging from 4.32 to 7.7 mg/L in silt, sand, mud, and seagrass habitats.

Juvenile (62 to 118 cm FL) and Adult ((≥ 119 cm FL):

Coastal areas out to 100 m depth contour in the Gulf of Mexico from the Florida Keys to southern Texas. EFH also includes coastal areas of Mississippi and Louisiana, including Mississippi Sound, Mobile Bay, Terrebonne Bay, Timbalier Bay, and Chandeleur Sound. EFH is associated with water temperatures ranging from 19.8 to 32.2 °C, salinities ranging from 7.0 to 36.8 ppt, water depth ranging from 0.7 to 9.4 m, and DO ranging from 4.28 to 8.30 mg/L. EFH includes multiple types of substrate - silt, sand, mud, and seagrass habitats.

Found in water temperatures ranging from 21.5 to 31.1 °C, salinities ranging from 22.3 to 34.7 ppt, water depths ranging from 0.9 to 6.6 m, and DO levels ranging from 5.22 to 7.49 mg/L in silt, sand, mud, and seagrass habitats.

Large Coastal Sharks

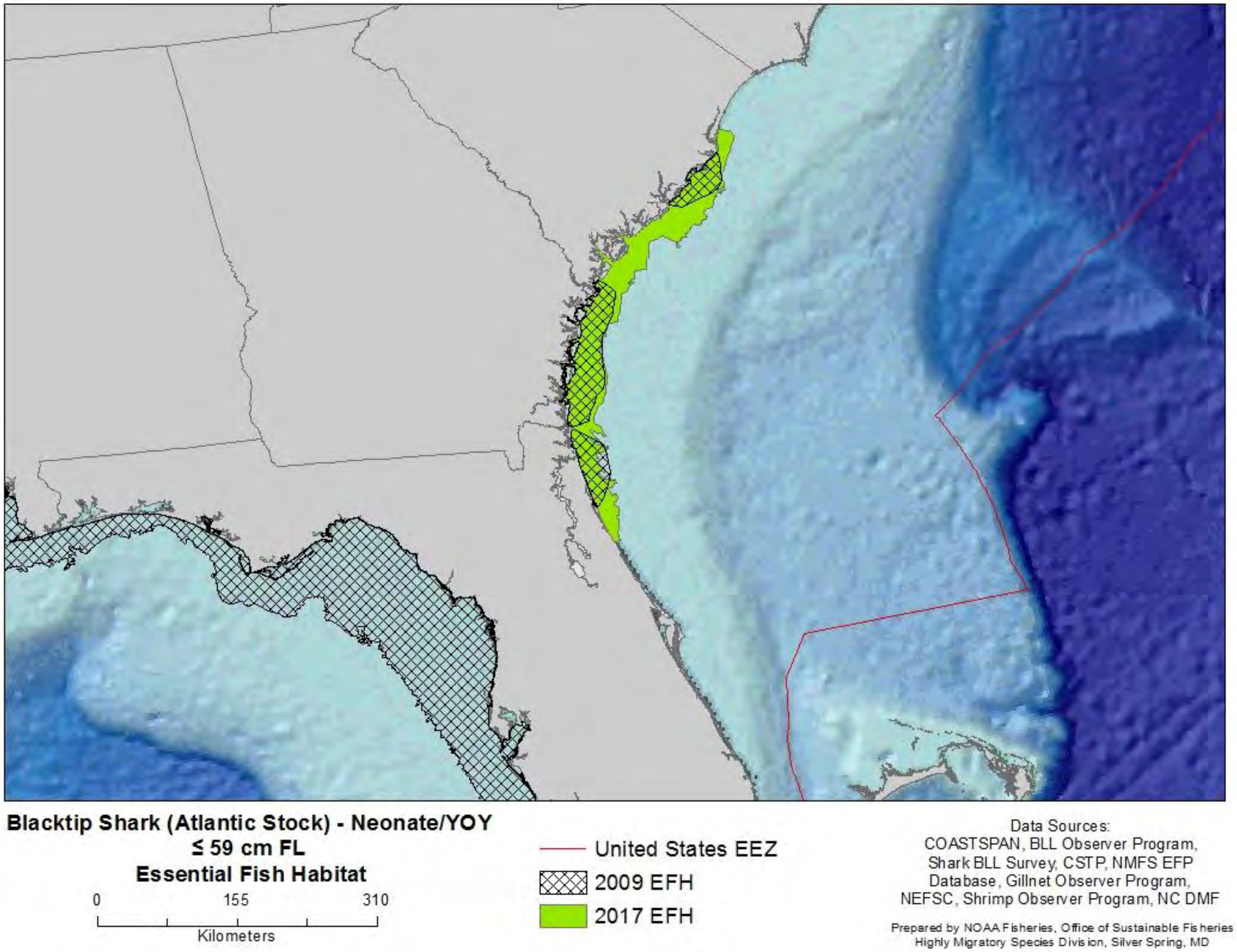

Figure G 28 **Blacktip Shark (Atlantic Stock) – Neonate/YOY**

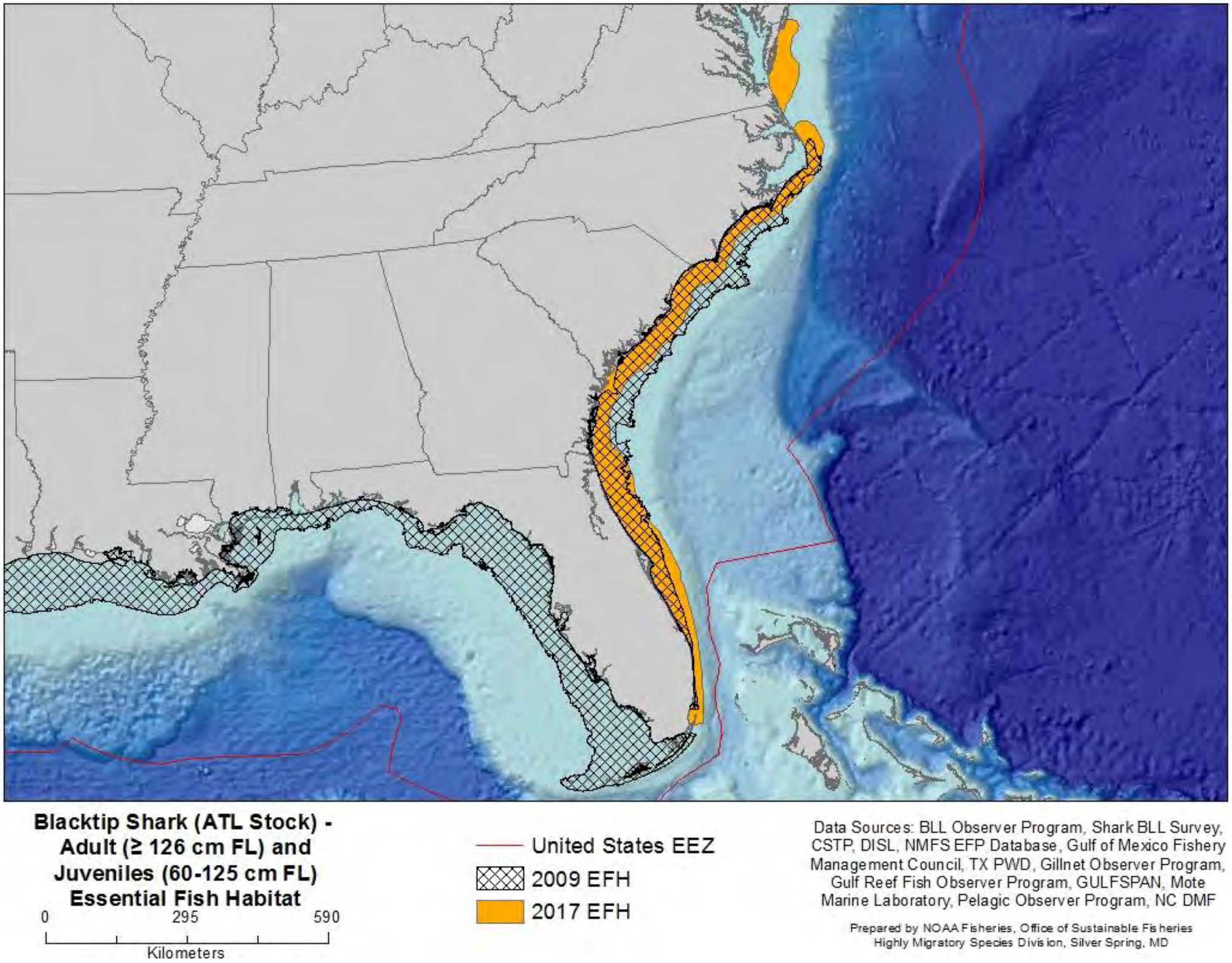

Figure G 29 **Blacktip Shark (Atlantic Stock) – Juvenile and Adult Combined**

EFH Text Descriptions for Bluefish (*Pomatomus saltatrix*)

Eggs: 1) North of Cape Hatteras, pelagic waters found over the continental shelf (from the coast out to the limits of the EEZ) at mid-shelf depths, from Montauk Point, NY south to Cape Hatteras in the highest 90% of the area where bluefish eggs were collected in the MARMAP surveys; and 2) South of Cape Hatteras, 100% of the pelagic waters over the continental shelf (from the coast out to the eastern wall of the Gulf Stream) through Key West, Florida at mid-shelf depths. Bluefish eggs are generally not collected in estuarine waters and thus there is no EFH designation inshore. Generally, bluefish eggs are collected between April through August in temperatures greater than 64°F (18 °C) and normal shelf salinities (> 31 ppt).

Larvae: 1) North of Cape Hatteras, pelagic waters found over the continental shelf (from the coast out to the limits of the EEZl most commonly above 49 ft (15 m), from Montauk Point, New York south to Cape Hatteras, in the highest 90% of the area where bluefish larvae were collected during the MARMAP surveys; 2) South of Cape Hatteras, 100% of the pelagic waters greater than 15 meters over the continental shelf (from the coast out to the eastern wall of the Gulf Stream) through Key West, Florida; and 3) the "slope sea" and Gulf Stream between latitudes 29° 00 N and 40° 00 N. Bluefish larvae are not generally collected inshore, so there is no EFH designation inshore for larvae. Generally, bluefish larvae are collected April through September in temperatures greater than 64 °F (18 °C) in normal shelf salinities (> 30 ppt).

Juveniles (<35 cm TL): 1) North of Cape Hatteras, pelagic waters found over the continental shelf (from the coast out to the limits of the EEZ) from Nantucket Island, Massachusetts south to Cape Hatteras, in the highest 90% of the area where juvenile bluefish are collected in the NEFSC trawl survey; 2) South of Cape Hatteras, 100% of the pelagic waters over the continental shelf (from the coast out to the eastern wall of the Gulf Stream) through Key West, Florida; 3) the "slope sea" and Gulf Stream between latitudes 29° 00 N and 40° 00 N; and 4) all major estuaries between Penobscot Bay, Maine and St. Johns River, Florida. Generally juvenile bluefish occur in North Atlantic estuaries from June through October, Mid-Atlantic estuaries from May through October, and South Atlantic estuaries March through December, within the "mixing" and "seawater" zones. Distribution of juveniles by temperature, salinity, and depth over the continental shelf is undescribed

Adults (≥35 cm TL): 1) North of Cape Hatteras, over the continental shelf (from the coast out to the limits of the EEZ), from Cape Cod Bay, Massachusetts south to Cape Hatteras, in the highest 90% of the area where adult bluefish were collected in the NEFSC trawl survey; 2) South of Cape Hatteras, 100% of the pelagic waters over the continental shelf (from the coast out to the eastern wall of the Gulf Stream) through Key West, Florida; and 3) all major estuaries between Penobscot Bay, Maine and St. Johns River, Florida. Adult bluefish are found in North Atlantic estuaries from June through October, Mid-Atlantic estuaries from April through October, and in South Atlantic estuaries from May through January in the "mixing" and "seawater" zones. Bluefish adults are highly migratory and distribution varies seasonally end according to the size of the individuals comprising the schools. Bluefish are generally found in normal shelf salinities (> 25 ppt).

Source: Amendment 1 to the Bluefish Fishery Management Plan, Mid-Atlantic Fishery Management Council, 1998.

Fishery Management Plan, Regulatory Impact Review, and Final Environmental Impact Statement for the Snapper Grouper Fishery of the South Atlantic Region (1983)

EFH Designation Boundary
SAFMC's EFH designation for snapper grouper species applies to all waters from the EEZ to the landward most influence of the tide, from the Virginia/North Carolina border to the Dry Tortugas in the Florida Keys (Figure 1). Within this area, the specific habitats and locations that are EFH are listed below.

EFH Designations in the Comprehensive Amendment for Snapper Grouper (SAFMC 1998b)
Essential Fish Habitat (EFH) for snapper-grouper species includes coral reefs, live/hard bottom, submerged aquatic vegetation, artificial reefs and medium to high profile outcroppings on and around the shelf break zone from shore to at least 600 feet (but to at least 2000 feet for wreckfish) where the annual water temperature range is sufficiently warm to maintain adult populations of members of this largely tropical complex. EFH includes the spawning area in the water column above the adult habitat and the additional pelagic environment, including *Sargassum*, required for larval survival and growth up to and including settlement. In addition, the Gulf Stream is an essential fish habitat because it provides a mechanism to disperse snapper grouper larvae.

For specific life stages of estuarine dependent and nearshore snapper-grouper species, EFH includes areas inshore of the 100-foot contour, such as attached macroalgae; submerged rooted vascular plants (seagrasses); estuarine emergent vegetated wetlands (saltmarshes, brackish marsh); tidal creeks; estuarine scrub/shrub (mangrove fringe); oyster reefs and shell banks; unconsolidated bottom (soft sediments); artificial reefs; and coral reefs and live/hard bottom.

Areas which meet the criteria for EFH-Habitat Areas of Particular Concern (EFH-HAPCs) for species in the snapper-grouper management unit include medium to high profile offshore hard bottoms where spawning normally occurs; localities of known or likely periodic spawning aggregations; nearshore hard bottom areas; The Point, The Ten Fathom Ledge, and Big Rock (North Carolina); The Charleston Bump (South Carolina); mangrove habitat; seagrass habitat; oyster/shell habitat; all coastal inlets; all state-designated nursery habitats of particular importance to snapper grouper (e.g., Primary and Secondary Nursery Areas designated in North Carolina); pelagic and benthic *Sargassum*; Hoyt Hills for wreckfish; the Oculina Bank Habitat Area of Particular Concern; all hermatypic coral habitats and reefs; manganese outcroppings on the Blake Plateau; and Council-designated Artificial Reef Special Management Zones (SMZs).

EFH Designations in CEBA-2 for Snapper Grouper (SAFMC 2011)
EFH-HAPCs for golden tilefish includes irregular bottom comprised of troughs and terraces inter-mingled with sand, mud, or shell hash bottom. Mud-clay bottoms in depths of 150-300 meters are HAPC. Golden tilefish are generally found in 80-540 meters, but most commonly found in 200-meter depths.

EFH-HAPC for blueline tilefish includes irregular bottom habitats along the shelf edge in 45-65 meters depth; shelf break; or upper slope along the 100-fathom contour (150-225 meters); hardbottom habitats characterized as rock overhangs, rock outcrops, manganese-phosphorite rock slab formations, or rocky reefs in the South Atlantic Bight; and the Georgetown Hole (Charleston Lumps) off Georgetown, SC.

EFH-HAPCs for the snapper grouper complex include the following deepwater marine protected areas (MPAs) as designated in Snapper Grouper Amendment 14:

- Snowy Grouper Wreck MPA
- Northern South Carolina MPA
- Edisto MPA
- Charleston Deep Artificial Reef MPA
- Georgia MPA
- North Florida MPA
- St. Lucie Hump MPA
- East Hump MPA

Clarifications to the Designations for Snapper Grouper

1. The public and resource agencies have requested a complete list of the localities of known or likely periodic spawning aggregations. SAFMC intends to provide this list on its website as soon as practicable.

2. Coastal inlets include the throat of the inlet as well as shoal complexes associated with the inlets (Figure 2). Shoals formed by waters moving landward through the inlet are referred to as flood tidal shoals, and shoals formed by waters moving waterward through the inlet are referred to as ebb tidal shoals.

3. Designated SMZ is EFH-HAPC: The Council has determined that a designated SMZ meets the criteria for an EFH-HAPC designation, and the Council intends that all SMZs designated under the Snapper Grouper FMP also be designated as EFH-HAPCs under the Snapper Grouper FMP.

The Council established the special management zone (SMZ) designation process in 1983 in the Snapper Grouper FMP, and SMZs have been designated in federal waters off North Carolina, South Carolina, Georgia, and Florida since that time. The purpose of the original SMZ designation process, and the subsequent specification of SMZs, was to protect snapper grouper populations at the relatively small, permitted artificial reef sites and "create fishing opportunities that would not otherwise exist." Thus, the SMZ designation process was centered around protecting the relatively small habitats, which are known to attract desirable snapper grouper species.

Similarly, in the Comprehensive Ecosystem-Based Amendment 1 (CE-BA1, 2010), the Council has designated essential fish habitat (EFH) areas and EFH habitat areas of particular concern (HAPC) under the Snapper Grouper FMP. Under the Magnuson-Stevens Act, FMPs are required to describe and identify EFH and to minimize the adverse effects of fishing on such habitat to the extent practicable. An EFH-HAPC designation adds an additional layer to the EFH designation.

Under the Snapper Grouper FMP, EFH-HAPCs are designated based upon ecological importance, susceptibility to human-induced environmental degradation, susceptibility to stress from development, or rarity of habitat type. The Council determined in CE-BA 1 that the Council-designated SMZs met the criteria to be EFH-HAPCs for species included in the Snapper Grouper FMP. Since CE-BA 1, the Council has designated additional SMZs in the Snapper Grouper FMP. The SMZ and EFH-HAPC designations serve similar purposes in pursuit of identifying and protecting valuable and unique habitat for the benefit of fish populations, which are important to both fish and fishers.

4. The public and resource agencies have requested a complete list of the State protected areas with marine and or estuarine waters that function as nursery habitat and/or that are designated as EFH or EFH-HAPC for Council-managed species. Appendix 1 contains a complete list of protected areas which may function as nursery habitats of species managed by the SAFMC.

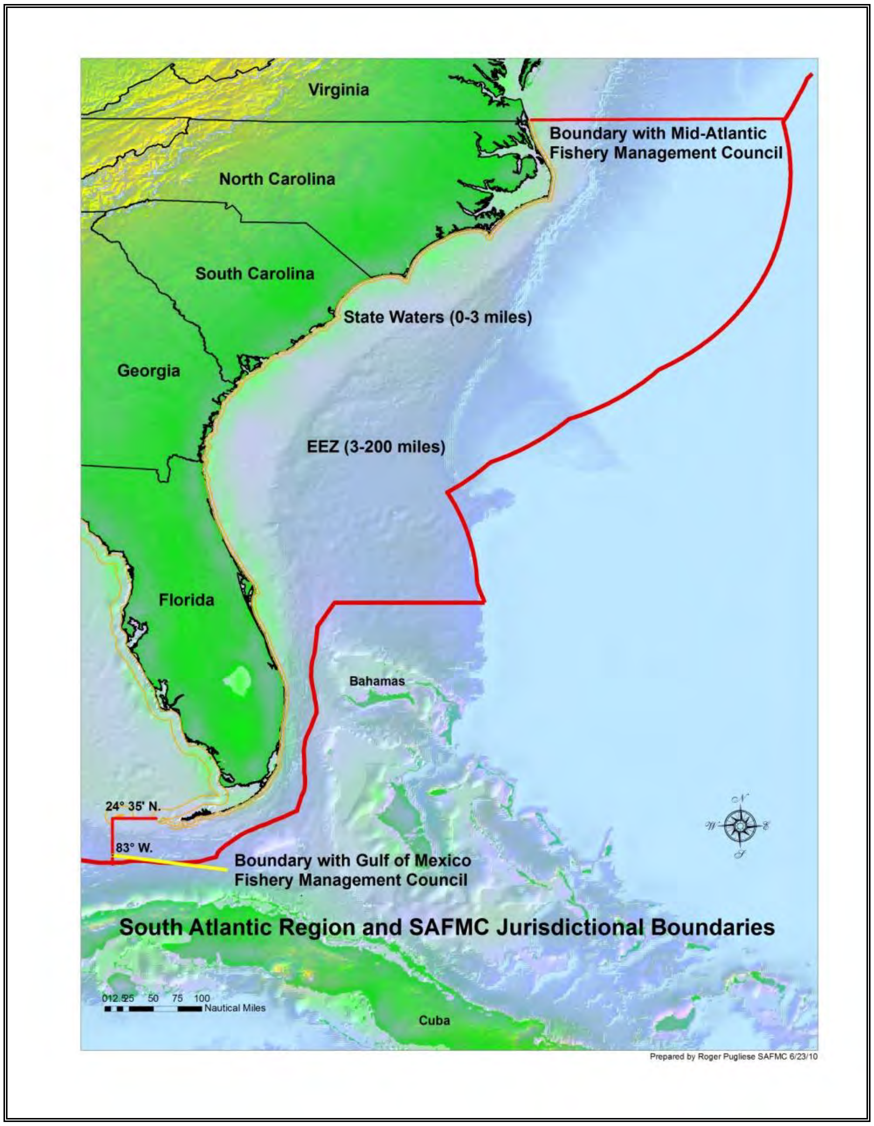

Figure 1. Unless otherwise specified in an EFH designation, SAFMC's EFH designations apply to all waters from the EEZ to the landward most influence of the tide, from the Virginia/North Carolina border to the Dry Tortugas in the Florida Keys.

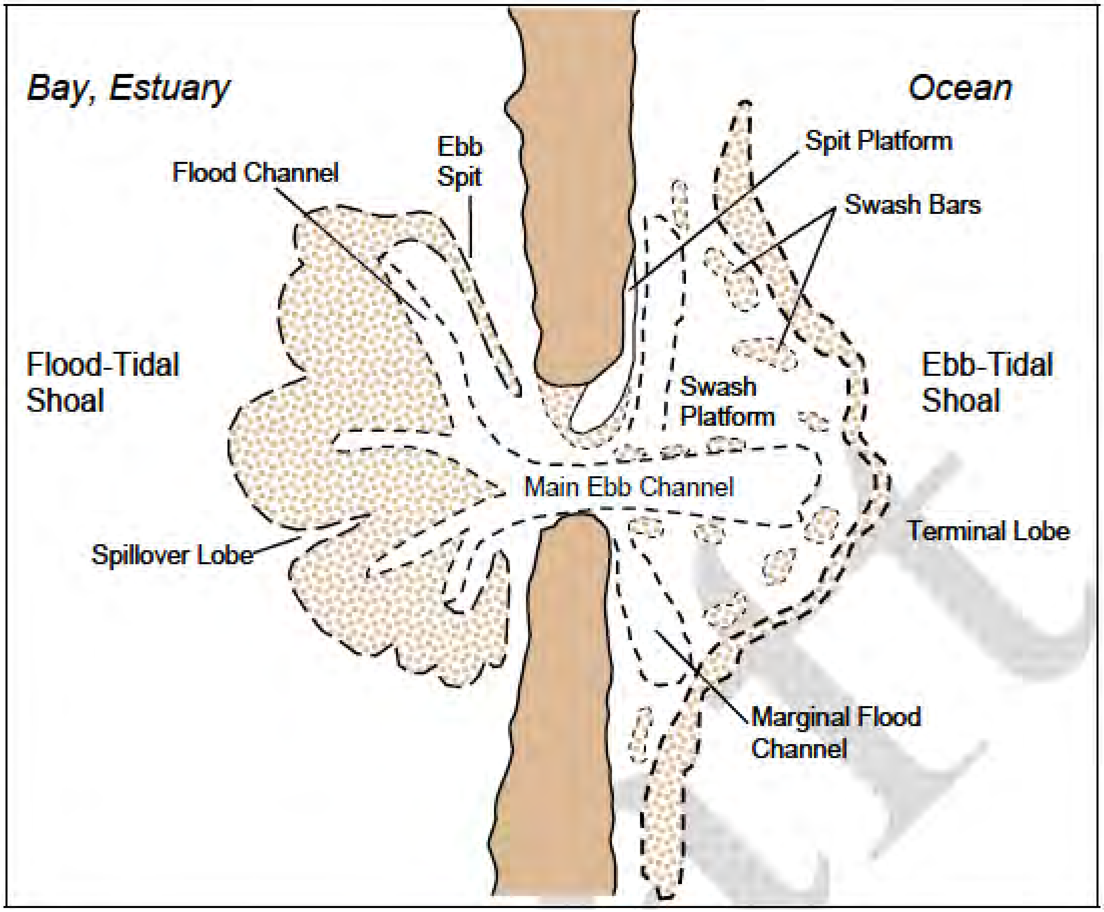

Figure 2. Components of a tidal inlet. (Source U.S. Army Corps of Engineers)

Appendix 1 (continued). State-Designated Areas—South Carolina.

In South Carolina, DHEC R. 61-69 designates Outstanding Resources Waters. Those estuarine Outstanding Resources Waters within coastal counties are state-designated areas that may function as nursery habitats of species managed by the SAFMC; the table below lists those estuarine Outstanding Resources Waters.

Waterbody	County	Description
Bass Creek	Beaufort	The entire creek tributary to May River
Bull Creek	Beaufort	The entire creek tributary to the Cooper River and May River
Callawassie Creek	Beaufort	The entire creek tributary to the Colleton River
Chechessee Creek	Beaufort	The entire creek tributary to the Colleton River and the Chechessee River
Colleton River	Beaufort	The entire stream tributary to the Chechessee River
Cooper River	Beaufort	The river form New River to Ramshorn Creek
May River	Beaufort	The entire stream tributary to Calibogue Sound
Okatie River	Beaufort	The entire river tributary to Colleton River
Sawmill Creek	Beaufort	The entire creek tributary to Colleton River
Adams Creek	Charleston	The entire creek tributary to Bohicket Creek
Bailey Creek	Charleston	The entire creek tributary to St. Pierre Creek
Big bay Creek	Charleston	The entire creek tributary to the South Edisto River
Bohicket Creek	Charleston	The entire creek tributary from North Edisto River to Church Creek
Bull's Bay	Charleston	The entire Bay
Bullyard Sound	Charleston	The entire Sound
Cape Romain Harbor	Charleston	The entire Harbor
Caper's Inlet	Charleston	The entire stream tributary to the Atlantic Ocean
Church Creek	Charleston	That portion of the creek from Wadmalaw Sound to Ravens Point
Copahee Sound	Charleston	The entire Sound
Dawhoo River	Charleston	The entire river from The South Edisto River to the North Edisto River
Fishing Creek	Charleston	From its headwaters to a point 2 miles from its mouth
Fishing Creek	Charleston	From a point 2 miles from its mouth to its confluence with St. Pierre Creek
Fishing Creek	Charleston	The entire creek tributary to Dawhoo River
Frampton Creek	Charleston	The entire creek tributary to Frampton Inlet

Waterbody	County	Description
Frampton Inlet	Charleston	The entire inlet tributary to the Atlantic Ocean
Garden Creek	Charleston	The entire creek tributary to Toogoodoo Creek
Gibson Creek	Charleston	The entire creek tributary to Wadmalaw River
Intracoastal Waterway	Charleston	That portion of the waterway from Gibson Creek to the confluence of Wadmalaw Sound and Stono River
Intracoastal Waterway	Charleston	From Dawho River to Gibson Creek
Jeremy Inlet	Charleston	The entire inlet tributary to the Atlantic Ocean
Leadenwah Creek	Charleston	The entire creek tributary to the North Edisto River
Long Creek	Charleston	The entire creek tributary to Steamboat Creek
Lower Toogoodoo Creek	Charleston	From a point 3 miles from its mouth to its confluence with Toogoodoo Creek
Mark Bay	Charleston	The entire Bay
Mcleod Creek	Charleston	The entire creek tributary to the North Edisto River (Also called Tom Point Creek)
Milton Creek	Charleston	The entire creek tributary to St. Pierre Creek
Mud Creek	Charleston	The entire creek tributary to the South Edisto River
North Edisto River	Charleston	From its headwaters to the Intracoastal Waterway
North Edisto River	Charleston	From Steamboat Creek to the Atlantic Ocean
Ocella Creek	Charleston	The entire creek tributary to the North Edisto River
Oyster House Creek	Charleston	The entire stream tributary to Wadmalaw River
Price Inlet	Charleston	The entire stream tributary to the Atlantic Ocean
Privateer Creek	Charleston	The entire creek tributary to the North Edisto River
Russell Creek	Charleston	The entire creek tributary to Dawho River
Sand Creek	Charleston	The entire creek tributary to Steamboat Creek
Scott Creek	Charleston	The entire creek from Big Bay Creek to Jeremy Inlet
Shingle Creek	Charleston	The entire creek tributary to St. Pierre Creek
South Creek	Charleston	The entire creek tributary to Ocella Creek
St. Pierre Creek	Charleston	The entire creek tributary to the South Edisto River
Steamoat Creek	Charleston	The entire creek tributary to the North Edisto River
Store Creek	Charleston	The entire creek tributary to St. Pierre Creek
Swinton Creek	Charleston	The entire creek tributary to Lower Toogoodoo Creek
Tom Point Creek	Charleston	The entire creek tributary to the North Edisto River (Also Called McLeod Creek)

Waterbody	County	Description
Toogoodoo Creek	Charleston	The entire creek tributary to the North Edisto River
Townsend River	Charleston	The entire river tributary to Frampton Inlet
Wadmalaw River	Charleston	The entire river from Wadmalaw Sound to the North Edisto River
Wadmalaw Sound	Charleston	The entire sound
Westbank Creek	Charleston	The entire creek tributary to the North Edisto River
Whooping Island Creek	Charleston	The entire creek tributary to Steamboat Creek
Edisto River	Charleston, Colleton	From U.S. 17 to its confluence with the Dawhoo River and the South Edisto River
South Edisto River	Charleston, Colleton	From Dawhoo River to Mud Creek
Alligator Creek	Colleton	The entire creek tributary to the South Edisto River
Mosquito Creek	Colleton	That portion of the creek from Bull Cut to the South Edisto River
Sampson Island Creek	Colleton	The entire creek tributary to the South Edisto River
Bass Hole Bay	Georgetown	The entire bay between Old Man Creek and Debidue Creek
Bly Creek	Georgetown	The entire creek tributary to Old Man Creek
Bob's Garden Creek	Georgetown	The entire creek tributary to Jones Creek
Boor Creek	Georgetown	The entire creek between Jones Creek and Wood Creek
Bread and Butter Creek	Georgetown	The entire creek tributary to Town Creek
Clambank Creek	Georgetown	The entire creek tributary to Town Creek
Cooks Creek	Georgetown	The entire creek between Old Man Creek and Debidue Creek
Crabhaul Creek	Georgetown	The entire creek tributary to Old Man Creek
Debidue Creek	Georgetown	That portion of the ck from confluence with Cooks Creek to North Inlet and all tidal creeks including those on western shore between Bass Hole Bay & Cooks Ck
Duck Creek	Georgetown	The entire creek tributary to Jones Creek
Jones Creek	Georgetown	That portion of the creek from a point midway between its confluence with Duck Creek and Noble Slough to North Inlet
North Inlet	Georgetown	The entire inlet tributary to the Atlantic Ocean
North Santee River	Georgetown	From 1000 feet below the Intracoastal Waterway to the Atlantic Ocean
Old Man Creek	Georgetown	The entire creek tributary to Town Creek
Sea Creek Bay	Georgetown	The entire bay tributary to Old Man Creek

Waterbody	County	Description
Sixty Bass Creek	Georgetown	That portion of the creek from a point 0.4 mile from its confluence with Town Creek to North Inlet
South Santee River	Georgetown	From 1000 feet below the Intracoastal Waterway to the Atlantic Ocean
Town Creek	Georgetown	That portion of the creek from its eastern confluence with Clambank Creek to North Inlet
Wood Creek	Georgetown	The entire creek between Boor Creek and Jones Creek
Little Pee Dee River	Horry, Marion	That portion from the confluence with Lumber River to the confluence with Great Pee Dee River

beaches and in the bays of Texas during the summer months, and juvenile spinner sharks also have been found in the coastal waters of Mississippi and Louisiana and along the beaches of Tampa Bay in Florida. During an independent gillnet survey in the Gulf of Mexico, large abundance of juvenile spinner sharks were found in general areas off northwest of Florida (Bethea et al. 2014), with larger juveniles have been captured off Sarasota and Tampa Bay (Hueter and Tyminski 2007).

Essential Fish Habitat for Spinner Shark:

Figure G 45 – Figure G 46

Neonate/YOY (≤ 57 cm FL): In the Atlantic Ocean EFH includes coastal areas between Cape Hatteras, North Carolina and the Florida Keys. EFH in the Gulf of Mexico includes coastal areas surrounding the Florida Keys and from the Big Bend Region to southern Texas. Gulf of Mexico EFH consists of sandy bottom areas where sea surface temperatures range from 24.5 to 30.5 °C and mean salinity is around 36 ppt.

Juveniles and Adults (> 57 cm FL): EFH in the Atlantic Ocean includes coastal areas between North Carolina and Florida. Juvenile spinner shark EFH is associated with temperatures of 21.9 to 30.1 °C, salinities of 21.0 to 36.2 ppt, and DO 3.5 to 5.0 mL/L. Juvenile and adult EFH in the Gulf of Mexico includes coastal areas from Apalachicola, Florida to southern Texas. In all locations, juveniles EFH extends from shore to depths to 20m, whereas adult EFH extends from shore to 90m in depth.

Summary of Changes Made to EFH

EFH boundaries published in Amendment 1 have been updated in Final Amendment 10. Boundaries of the neonate/YOY spinner shark EFH were enlarged slightly to include coastal areas in eastern Louisiana, and areas from Mississippi to northern Florida due to the incorporation of new data into the Kernal Density Estimation/95 Percent Volume Contour models. Juvenile and adult spinner shark EFH is considered similar and was combined in Amendment 10 based on scientific recommendations from the NEFSC and SEFSC. The juvenile and adult spinner shark EFH were adjusted slightly to include more offshore areas in the existing EFH, and remove areas from Cedar Key, Florida to the Florida Keys, due to incorporation of new data into the Kernal Density Estimation/95 Percent Volume Contour models and based on scientific recommendations from the SEFSC.

There were no changes to EFH boundaries for spinner shark from Draft Amendment 10 to Final Amendment 10.

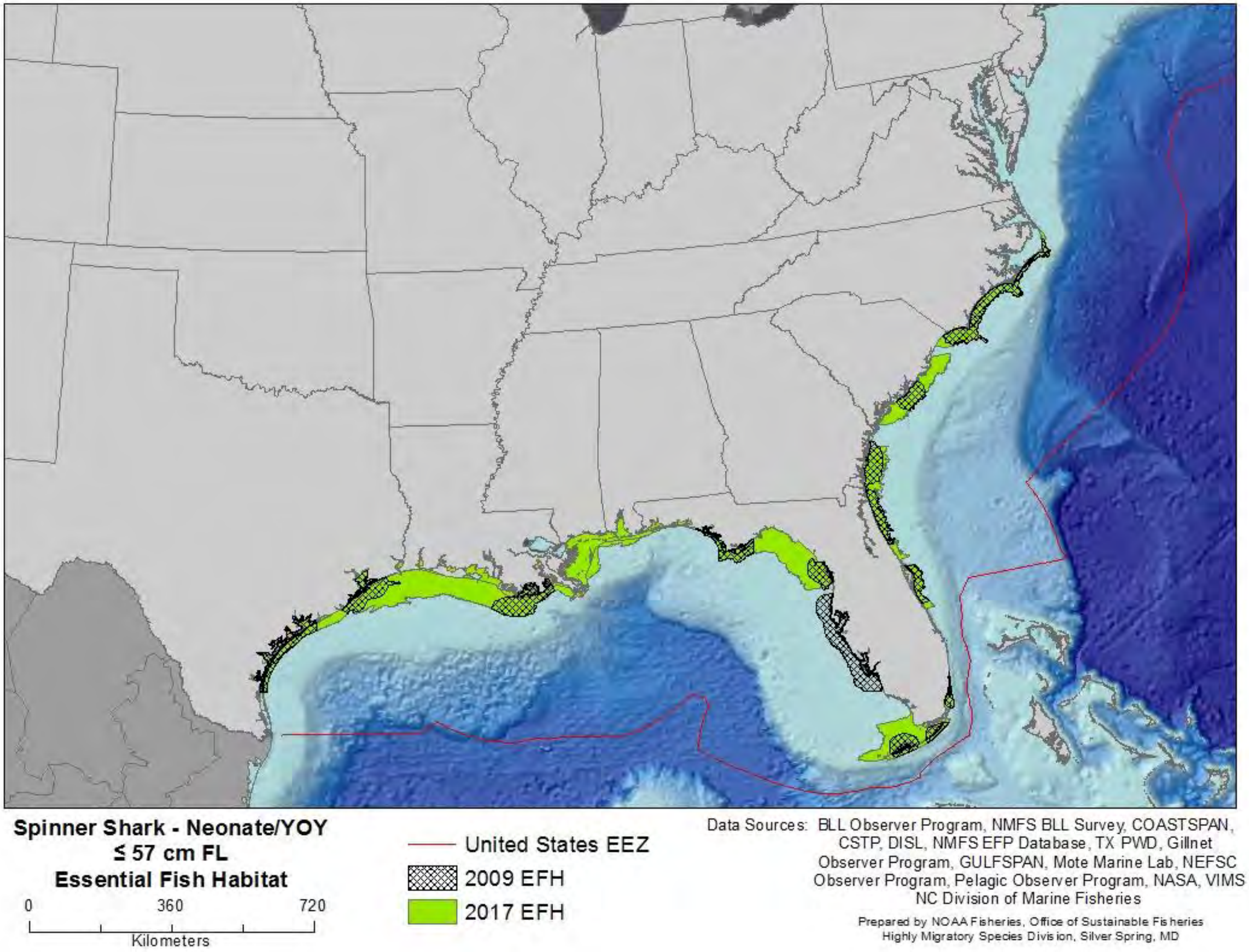

Figure G 45 **Spinner Shark - Neonate/YOY**

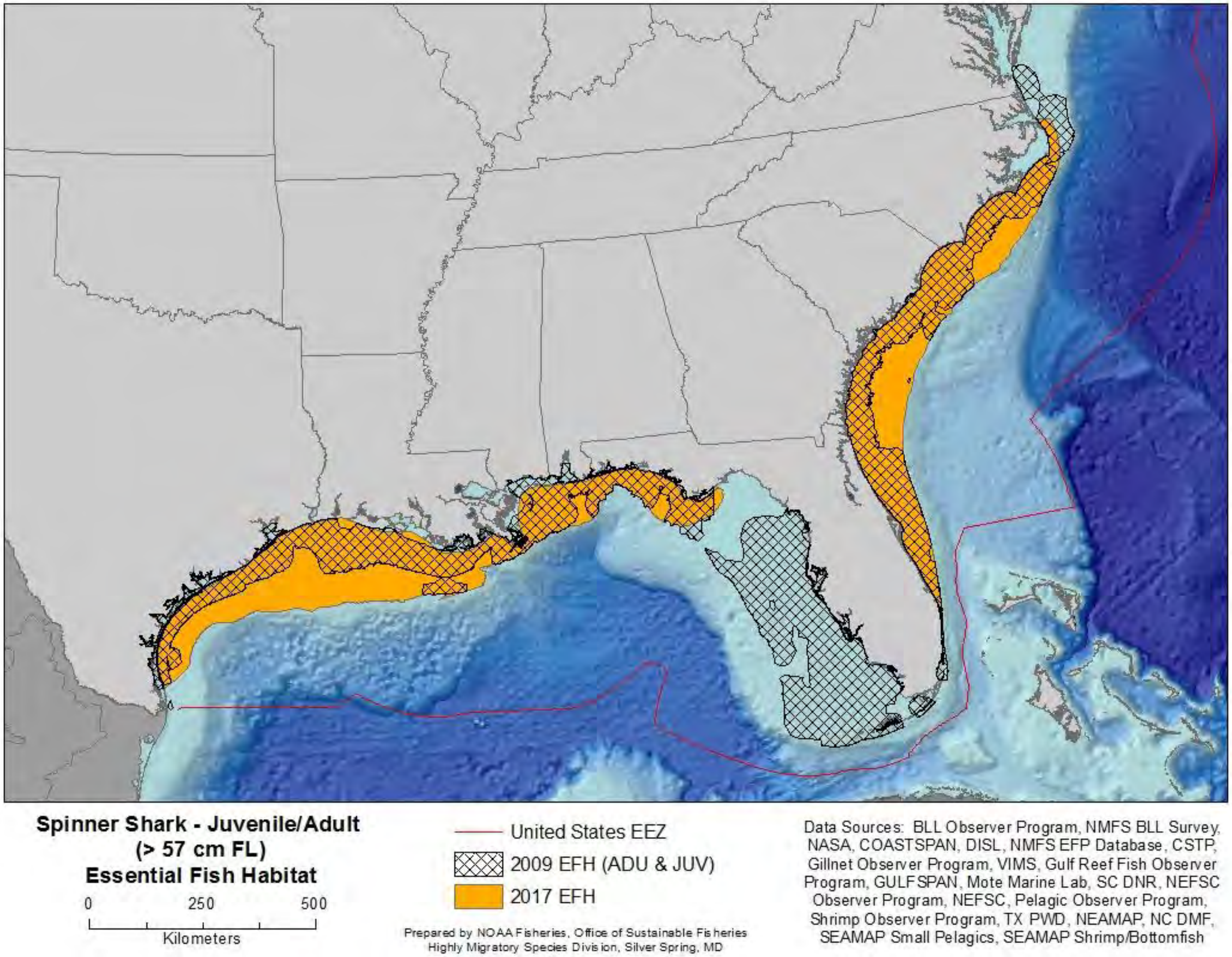

Figure G 46 **Spinner Shark – Juvenile and Adult Combined**

EFH Text Descriptions for Summer Flounder (*Paralichthys dentatus*)

Eggs: 1) North of Cape Hatteras, EFH is the pelagic waters found over the continental shelf (from the coast out to the limits of the EEZ), from the Gulf of Maine to Cape Hatteras, North Carolina, in the highest 90% of the all the ranked ten-minute squares for the area where summer flounder eggs are collected in the MARMAP survey. 2) South of Cape Hatteras, EFH is the waters over the continental shelf (from the coast out to the limits of the EEZ), from Cape Hatteras, North Carolina to Cape Canaveral, Florida, to depths of 360 ft. In general, summer flounder eggs are found between October and May, being most abundant between Cape Cod and Cape Hatteras, with the heaviest concentrations within 9 miles of shore off New Jersey and New York. Eggs are most commonly collected at depths of 30 to 360 ft.

Larvae: 1) North of Cape Hatteras, EFH is the pelagic waters found over the continental shelf (from the coast out to the limits of the EEZ), from the Gulf of Maine to Cape Hatteras, North Carolina, in the highest 90% of all the ranked ten-minute squares for the area where summer flounder larvae are collected in the MARMAP survey. 2) South of Cape Hatteras, EFH is the nearshore waters of the continental shelf (from the coast out to the limits of the EEZ), from Cape Hatteras, North Carolina to Cape Canaveral Florida, in nearshore waters out to 50 miles from shore. 3) Inshore, EFH is all the estuaries where summer flounder were identified as being present (rare, common, abundant, or highly abundant) in the ELMR database, in the "mixing" (defined in ELMR as 0.5 to 25.0 ppt) and "seawater" (defined in ELMR as greater than 25 ppt) salinity zones. In general, summer flounder larvae are most abundant nearshore (12-50 miles from shore) at depths between 30 to 230 ft. They are most frequently found in the northern part of the Mid-Atlantic Bight from September to February, and in the southern part from November to May.

Juveniles (<28 cm TL): 1) North of Cape Hatteras, EFH is the demersal waters over the continental shelf (from the coast out to the limits of the EEZ), from the Gulf of Maine to Cape Hatteras, North Carolina, in the highest 90% of all the ranked ten-minute squares for the area where juvenile summer flounder are collected in the NEFSC trawl survey. 2) South of Cape Hatteras, EFH is the waters over the continental shelf (from the coast out to the limits of the EEZ) to depths of 500 ft, from Cape Hatteras, North Carolina to Cape Canaveral, Florida. 3) Inshore, EFH is all of the estuaries where summer flounder were identified as being present (rare, common, abundant, or highly abundant) in the ELMR database for the "mixing" and "seawater" salinity zones. In general, juveniles use several estuarine habitats as nursery areas, including salt marsh creeks, seagrass beds, mudflats, and open bay areas in water temperatures greater than 37 °F and salinities from 10 to 30 ppt range.

Adults (≥28 cm TL): 1) North of Cape Hatteras, EFH is the demersal waters over the continental shelf (from the coast out to the limits of the EEZ), from the Gulf of Maine to Cape Hatteras, North Carolina, in the highest 90% of all the ranked ten-minute squares for the area where adult summer flounder are collected in the NEFSC trawl survey. 2) South of Cape Hatteras, EFH is the waters over the continental shelf (from the coast out to the limits of the EEZ) to depths of

500 ft, from Cape Hatteras, North Carolina to Cape Canaveral, Florida. 3) Inshore, EFH is the estuaries where summer flounder were identified as being common, abundant, or highly abundant in the ELMR database for the "mixing" and "seawater" salinity zones. Generally, summer flounder inhabit shallow coastal and estuarine waters during warmer months and move offshore on the outer continental shelf at depths of 500 ft in colder months.

Source: Amendment 12 to the Summer Flounder, Scup, and Black Sea Bass Fishery Management Plan, Mid-Atlantic Fishery Management Council, 1998.

Although neonate tiger sharks are frequently caught in the northern Gulf of Mexico, the locations of pupping or nursery areas in this basin have not been identified (Driggers et al. 2008). However, Driggers et al. (2008) found areas of highest abundance of tiger shark neonates to be between 83° and 88° W long. and 93° and 95° W long. Hueter and Tyminski (2007) report YOY collected during surveys in water depths 20 to 50 m in July and August along the Louisiana, Mississippi, Alabama, and Florida coasts, and older juveniles occasionally along the central Florida Gulf coast.

Essential Fish Habitat for Tiger Shark

Figure G 47 – Figure G 48

Neonate/YOY (≤ 101 cm FL): EFH in the Atlantic Ocean includes coastal areas from the North Carolina/Virginia border to the Florida Keys. EFH in the Gulf of Mexico includes coastal and offshore areas, between the Florida Keys and Alabama.

Juveniles (102 - 266 cm TL) and Adults (> 266 cm TL):

EFH in the Atlantic Ocean extends from offshore pelagic habitats associated with the continental shelf break at the seaward extent of the U.S. EEZ boundary (south of Georges Bank, off Massachusetts) to the Florida Keys, inclusive of offshore portions of the Blake Plateau. EFH in the Gulf of Mexico includes pelagic and coastal habitats between Tampa Bay, Florida BayandFlorida Keys, and the edge of the West Florida Shelf; and an area extending from off eastern Louisiana, Mississippi, and Alabama to offshore pelagic habitats in the central Gulf of Mexico. Grass flats in the Gulf of Mexico are considered feeding areas, and are included as EFH. EFH also includes coastal and pelagic habitats surrounding Puerto Rico (except on the northwest side of the island) and the U.S. Virgin Islands.

Summary of Changes Made to EFH

EFH boundaries published in Amendment 1 have been updated in Final Amendment 10. Boundaries of the neonate/ YOY tiger shark EFH were adjusted to include coastal areas from the Florida Panhandle to the Florida Keys due to the new data incorporated into the Kernal Density Estimation/ 95 Percent Volume Contour models and scientific recommendations from the SEFSC. The juvenile and adult tiger shark EFH were combined due to similarity in habitat utilization, expanded in the U.S. Caribbean, and enlarged to include offshore areas from eastern Louisiana to Mobile, Alabama and coastal waters from Palm Harbor, Florida to the Florida Keys. These edits were made based on new data incorporated into the Kernal Density Estimation/ 95 Percent Volume Contour models and scientific recommendations from the SEFSC and NEFSC.

There were no changes to EFH boundaries for tiger sharks from Draft Amendment 10 to Final Amendment 10.

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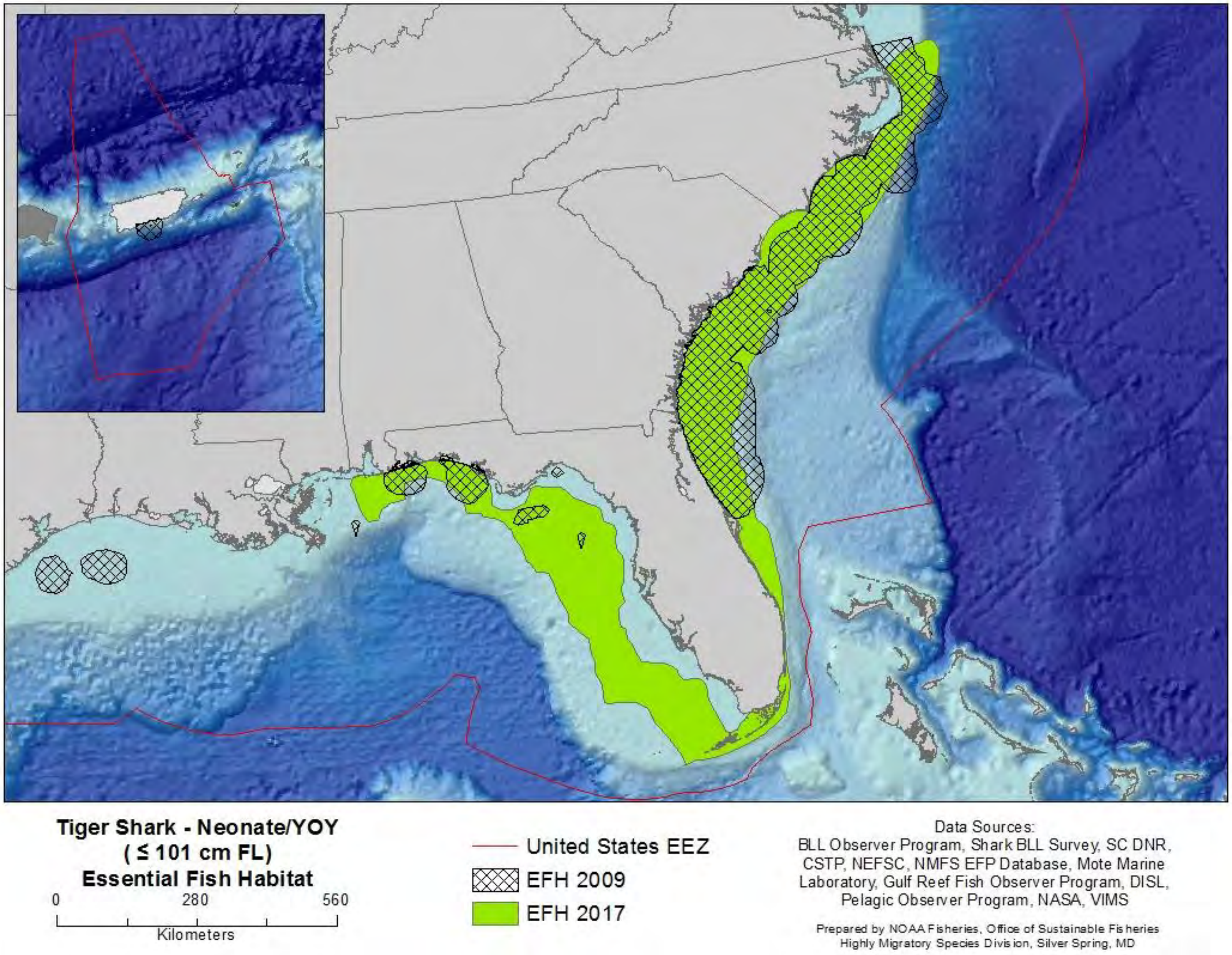

Tiger Shark - Neonate/YOY
(≤ 101 cm FL)
Essential Fish Habitat

Data Sources:
BLL Observer Program, Shark BLL Survey, SC DNR, CSTP, NEFSC, NMFS EFP Database, Mote Marine Laboratory, Gulf Reef Fish Observer Program, DISL, Pelagic Observer Program, NASA, VIMS

Prepared by NOAA Fisheries, Office of Sustainable Fisheries
Highly Migratory Species Division, Silver Spring, MD

Figure G 47 **Tiger Shark - Neonate**

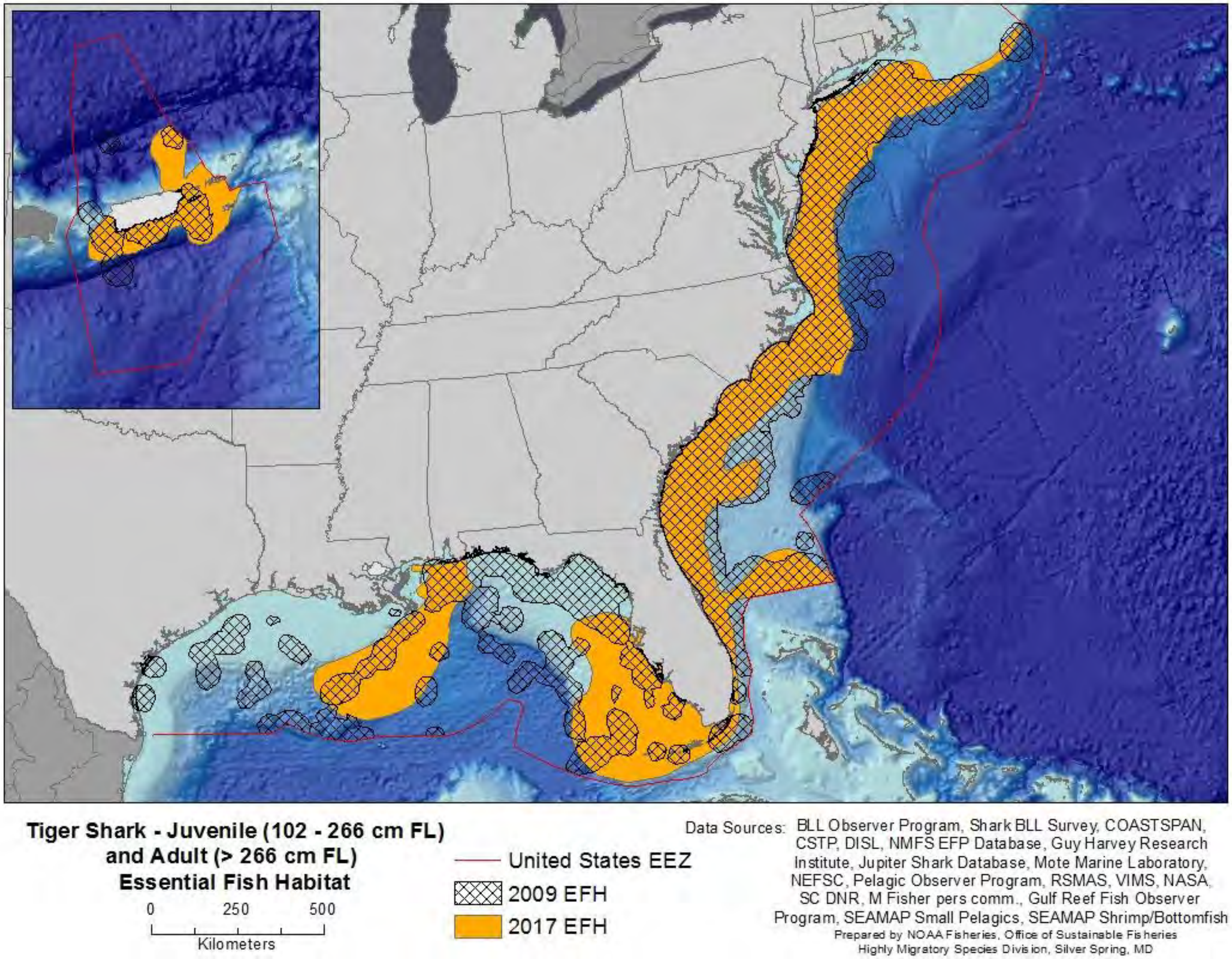

Figure G 48 **Tiger Shark – Juvenile and Adult Combined**

Appendix D

Avoidance and Minimization Measures

Avoidance and Minimization Measures

The Proposed Action would adhere to BMPs and AMMs to limit impacts to terrestrials and aquatic resources (e.g., erosion and sedimentation controls, spill plan, contractor briefings, environmental health and safety plan, etc.). USAF and USN will also adhere to the USACE permit conditions, and the conditions other permits and approval, where applicable (e.g., floodplain work, land disturbance, stream buffer variance, etc.).

To reduce impacts on the environment, USAF and USN will comply with the following AMMs. The following measures and BMPs are a combination of USFWS, NMFS, and SCDNR standard BMPs, previous cooperation and correspondence with agencies and agency recommendations. Measures also include USAF and USN's requirement for the contractor to meet and address all environmental conditions and considerations. All workers associated with this project, irrespective of their employment arrangement or affiliation (e.g., military personnel, civilian contractors, etc.), shall be fully briefed on these measures and the requirement to adhere to them for the duration of their involvement in this project.

A. Constant vigilance shall be kept for the presence of protected species during all aspects of the Proposed Action.

1. All construction personnel will be made aware that there are civil and criminal penalties for harming, harassing, or killing protected species which are protected under law, including the ESA and MMPA.
2. All vessels associated with the construction project shall operate at idle speeds (i.e., no wake) at all times while in the immediate area and while in water where the draft of the vessel provides less than a 4 ft clearance from the bottom. All vessels will follow routes of deep water whenever possible.
3. Siltation or turbidity barriers shall be made of material in which protected species cannot become entangled, shall be properly secured, and shall be regularly monitored to avoid entanglement or entrapment.
4. All on-site project personnel are responsible for observing water-related activities for the presence of protected species. All in-water operations, including vessels, must be shut down if a protected species (e.g., manatee, turtles, sturgeon, etc.) comes within 50m of the operation. Activities will not resume until the protected species has moved beyond the 50 m (164 ft) radius of the project operation, or until 30 minutes elapses if the species has not reappeared within 50 m (164 ft) of the operation. Animals must not be herded away or harassed into leaving.
5. Any collision with or injury to a protected species shall be reported immediately to the South Carolina Department of Natural Resources (SCDNR) at 1-800-922-5431. Any collision and/or injury should also be reported to the USFWS (1-904-731-3336). In the event of a collision and/or injury, work shall stop immediately until clearance to resume is received from the project manager.

B. No contamination of the marine environment shall result from project-related activities.

1. A contingency plan to control toxic materials shall be developed and followed to prevent toxic materials from entering or remaining in the marine environment during the project.
2. Appropriate materials to contain and clean potential spills shall be stored at the work site and be readily available.
3. All project-related materials and equipment to be placed or operated in the water shall be free of pollutants.
4. The project manager and heavy equipment operators shall perform daily pre-work equipment inspections for cleanliness and leaks. All heavy equipment operations shall be postponed or halted should a leak be detected and shall not proceed until the leak is repaired and equipment cleaned.
5. Fueling of land-based vehicles and equipment shall take place at least 50 ft away from the water (and away from drains), preferably over an impervious surface.
6. A plan shall be developed and followed to prevent debris and other wastes from entering or remaining in the marine environment during the project. All debris, unsalvageable materials, and general wastes shall be properly contained and disposed of at an approved upland disposal site.
7. Runoff, turbidity, and siltation from project-related work shall be minimized and contained through the appropriate use of erosion control practices, effective silt containment devices, and the curtailment of work during adverse weather and tidal/flow conditions.
8. A silt curtain shall be used during construction activities that surrounds the work area to limit turbidity and other water quality impacts associated with substrate disturbance.

C. Additional measures shall be taken during pile-driving or similar impulsive noise producing activities (e.g., jack hammering, vibratory installation, etc.).

1. Special attention will be given to ensure that no ESA-listed marine animals are within 100 m (164 ft) of pile driving or other intensive impulsive noise activities, and that those operations will immediately shut down should an ESA-listed animal enter the action area within that range.
2. Equipment operators will employ "soft starts"' when initiating driving to reduce initial in-water sound exposure levels (SELs). The soft start method is intended to be a warning mechanism for fauna so that they can vacate the area before maximum hammer energy is reached.

D. Additional measures shall be taken for the protection of bats.

1. As a conservation measure, tree clearing activities shall be conducted during the inactive bat season to the maximum extent practicable, from November 15th through March 31st, to avoid negative impacts to cavity- and tree-roosting bats. If it is determined that tree clearing must occur during the active season, from April 1st through November 15th, JBC will consult with the USFWS regarding protected bats.

2. Temporary lighting shall be directed away from forested areas during any Proposed Action activities conducted between dusk and dawn during the active season, from April 1st through November 15th.
3. When installing new or replacing existing permanent lights in the vicinity of forested areas, downward-facing or full cutoff lenses shall be used and lighting directed away from forested areas to the maximum extent practicable, with the goal of limiting “uplight” and “backlight” as low as practicable.

E. Additional measures shall be taken for the protection of migratory birds, the National Standard Conservation Measures, included below. These measures should be employed at project development sites with the goal of reducing impacts to migratory birds and their habitats.

Appendix E

Potential Species Exposure to Elevated Noise

Potential Species Exposure to Elevated Noise Levels

Background

Proposed Action construction activities (e.g., dredging, pile driving, etc.) may produce in-air and in-water sound levels capable of injury or adverse behavioral modifications for marine species. Effects would vary with the frequency, intensity, and duration of the sound source, and the hearing characteristics of the affected animal. Effects may include physical injury and/or permanent hearing damage, also referred to as permanent threshold shifts (PTS), behavioral impacts through temporarily reduced sensitivity also referred to as temporary threshold shifts (TTS), temporarily masked communications or acoustic environmental cues, and modified behavior such as attraction or avoidance.

The effects thresholds currently used by National Marine Fisheries Service (NMFS) are marine mammal specific and based on levels of harassment, as defined by the Marine Mammal Protection Act (MMPA). For exposure to sounds in water, ≥180 logarithmic decibels (dB) is the threshold for Level A harassment (i.e., injury and/or PTS) for cetaceans. The threshold for Level B harassment for all marine mammals in the form of TTS and other behavioral impacts is ≥160 dB for impulsive noises and ≥120 dB for continuous noises. However, NMFS developed and revised the acoustic technical guidance for assessing the effects of anthropogenic sound on marine mammal species which identifies the received levels, or thresholds, at which individual marine mammals are predicted to experience changes in their hearing sensitivity for acute, incidental exposure to underwater anthropogenic sound sources. The exposure sounds levels were revised for five hearing groups. The threshold for PTS onset ranges from a sound exposure level (SEL) of 155 to 203 dB (202 to 232 dB peak sound pressure) for impulsive noises, and an SEL of 173 to 219 dB for non-impulsive noises. The threshold for TTS ranges from an SEL of 140 to 188 dB (196 to 226 dB peak sound pressure) for impulsive noises, and an SEL of 153 to 199 dB for non-impulsive noises. Acoustics and their effects on sea turtles, sharks, corals, and other marine life have been studied much less than marine mammals. Currently, no acoustic thresholds have been established for sea turtles or sharks. Consequently, the marine mammal thresholds are used for the other species herein, under the assumption that they are likely conservative (NMFS and USACE 2017, NMFS 2018).

The most commonly used unit of measure for sound is dB. In water, sound pressure is typically referenced to a baseline of one micropascal (1 µPa), versus the 20 µPa baseline used for in-air measurements; as a result, 26 dB is added to an in-air measurement to convert to an appropriate in-water value. (Bradley and Stern 2008).

Transmission loss (attenuation of sound intensity over distance) varies according to several factors in water, including depth, bottom type, sea surface condition, salinity, and turbidity. Sound energy dissipates through mechanisms such as spreading, scattering, and absorption:

- Spreading refers to the apparent decrease in sound energy at any given point on the wave front because the sound energy is spread across an increasing area as the wave front radiates outward from the source. In unbounded homogenous water, sound spreads out spherically, losing as much as 7 dB with each doubling of range. Toward the other end of the spectrum, sound expands cylindrically when vertically bounded such as by the surface and substrate, losing only about 3 dB with each doubling of range;

- Scattering refers to the sound energy that leaves the wave front when it “bounces” off of a surface or particles in the water; and
- Absorption refers to the energy that is lost through conversion to heat due to friction. Irregular substrates, rough surface waters, and particulates in the water column increase scattering loss, while soft substrates, such as mud and silt increase absorption loss. Sound typically dissipates more rapidly in shallow, turbid waters over soft substrates. The shallow nearshore waters of harbors and marinas, with silt and mud substrates, are considered poor environments for acoustic propagation (Bradley and Stern 2008; NMFS and USACE 2017; 74 FR 18492).

BMP Development

Accurately predicting received noise levels at a given range (isopleth) requires complex equations and detailed information that is rarely available. Typically, predictions are made by estimating spreading loss based on the equations for spherical spreading and for cylindrical spreading, however actual spreading loss is thought to be somewhere between the two, with absorption and scattering increasing the loss. As a result, NMFS utilizes the following standard equation for received sound levels (RL) in the absence of site-specific transmission loss data:

RLs = Source Level – 15log(range from source in meters)

Pile driving likely represents the most intense potential SELs related to the Proposed Action. The United States Navy (USN) conducted a study of pile-driving noise measurements at Atlantic Fleet naval installations ranging from 24-inch concrete piles to 48-inch steel piles. Average SELs ranged from 137 to 186 dB (158 to 211 dB peak sound pressure) (NAVFAC 2017, USN 2022).

Based on the loudest estimated SEL of 186 dB for pile driving and using the above equation for attenuation suggests that the 180 dB isopleth (i.e., PTS threshold for impulsive noises) is approximately 8.2 ft from the source, while the 160 dB isopleth (i.e., TTS threshold for impulsive noises) is approximately 177 ft from the source.

As a result, the proposed best management practices (BMPs) for proposed in-water actions include a mandatory shut-down range of 100 m (328 ft) (when ESA-listed marine animals are within 100 m (328 ft) of in-water hammering, pile driving, etc.). This BMP intends to safeguard that no ESA-listed marine animals are exposed to sound levels near the TTS threshold, and that potential exposure falls below the MMPA Level A and Level B harassment thresholds, though animals may experience an insignificant level of behavioral modification in the form of temporary avoidance of the area during construction activities. Subsequently, the United States Air Force (USAF) and USN propose to adopt the following BMPs for in-water work at Joint Base Charleston to mitigate protected species potential SELs related to Proposed Action:

1. Acoustic analysis of prospective projects shall support the expectation that the 160 dB isopleth falls within a 100 m (328 ft) shut-down range for impulsive sound sources.

2. Special attention will be given that no ESA-listed marine animals are within 100 m (328 ft) of pile driving, and that those operations will immediately shut-down should an ESA-listed animal enter the action area within that range.
3. Equipment operators will employ "soft starts"' when initiating activities to reduce initial SLs. The soft start method is intended to be a warning mechanism for fauna so that they can vacate the area before maximum operation is reached.

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NATIONWIDE STANDARD CONSERVATION MEASURES

Listed below are effective measures that should be employed at all project development sites nationwide with the goal of reducing impacts to birds and their habitats. These measures are grouped into three categories: General, Habitat Protection, and Stressor Management. These measures may be updated through time. We recommend checking the Conservation Measures website regularly for the most up-to-date list.

1. General Measures

a. Educate all employees, contractors, and/or site visitors of relevant rules and regulations that protect wildlife. See the Service webpage on Regulations and Policies for more information on regulations that protect migratory birds.
b. Prior to removal of an inactive nest, ensure that the nest is not protected under the Endangered Species Act (ESA) or the Bald and Golden Eagle Protection Act (BGEPA). Nests protected under ESA or BGEPA cannot be removed without a valid permit.
    i. See the Service Nest Destruction Policy
c. Do not collect birds (live or dead) or their parts (e.g., feathers) or nests without a valid permit. Please visit the Service permits page for more information on permits and permit applications.
d. Provide enclosed solid waste receptacles at all project areas. Non-hazardous solid waste (trash) would be collected and deposited in the on-site receptacles. Solid waste would be collected and disposed of by a local waste disposal contractor. For more information about solid waste and how to properly dispose of it, see the EPA Non-Hazardous Waste website.
e. Report any incidental take of a migratory bird, to the local Service Office of Law Enforcement.
f. Consult and follow applicable Service industry guidance.

2. Habitat Protection

a. Minimize project creep by clearly delineating and maintaining project boundaries (including staging areas).
b. Consult all local, State, and Federal regulations for the development of an appropriate buffer distance between development site and any wetland or waterway. For more information on wetland protection regulations see the Clean Water Act sections 401 and 404.
c. Maximize use of disturbed land for all project activities (i.e., siting, lay-down areas, and construction).
d. Implement standard soil erosion and dust control measures. For example:
    i. Establish vegetation cover to stabilize soil
    ii. Use erosion blankets to prevent soil loss
    iii. Water bare soil to prevent wind erosion and dust issues

3. Stressor Management

Stressor: Vegetation Removal

Conservation Goal: Avoid direct take of adults, chicks, or eggs.

Conservation Measure 1: Schedule all vegetation removal, trimming, and grading of vegetated areas outside of the peak bird breeding season to the maximum extent practicable. Use available resources, such as internet-based tools (e.g., the FWS's Information, Planning and Conservation system and Avian Knowledge Network) to identify peak breeding months for local bird species; or, contact local Service Migratory Bird Program Office for breeding bird information.

Conservation Measure 2: When project activities cannot occur outside the bird nesting season, conduct surveys prior to scheduled activity to determine if active nests are present within the area of impact and buffer any nesting locations found during surveys.

1) Generally, the surveys should be conducted no more than five days prior to scheduled activity.
2) Timing and dimensions of the area to be surveyed vary and will depend on the nature of the project, location, and expected level of vegetation disturbance.
3) If active nests or breeding behavior (e.g., courtship, nest building, territorial defense, etc.) are detected during these surveys, no vegetation removal activities should be conducted until nestlings have fledged or the nest fails or breeding behaviors are no longer observed. If the activity must occur, establish a buffer zone around the nest and no activities will occur within that zone until nestlings have fledged and left the nest area. The dimension of the buffer zone will depend on the proposed activity, habitat type, and species present and should be coordinated with the local or regional Service office.
4) When establishing a buffer zone, construct a barrier (e.g., plastic fencing) to protect the area. If the fence is knocked down or destroyed, work will suspend wholly, or in part, until the fence is satisfactorily repaired.
5) When establishing a buffer zone, a qualified biologist will be present onsite to serve as a biological monitor during vegetation clearing and grading activities to ensure no take of migratory birds occurs. Prior to vegetation clearing, the monitor will ensure that the limits of construction have been properly staked and are readily identifiable. Any associated project activities that are inconsistent with the applicable conservation measures, and activities that may result in the take of migratory birds will be immediately halted and reported to the appropriate Service office within 24 hours.
6) If establishing a buffer zone is not feasible, contact the Service for guidance to minimize impacts to migratory birds associated with the proposed project or removal of an active nest. Active nests may only be removed if you receive a permit from your local Migratory Bird Permit Office. A permit may authorize active nest removal by a qualified biologist with bird handling experience or by a permitted bird rehabilitator.

Conservation Measure 3: Prepare a vegetation maintenance plan that outlines vegetation maintenance activities and schedules so that direct bird impacts do not occur.

Stressor: Invasive Species Introduction

Conservation Goal: Prevent the introduction of invasive plants.

Conservation Measure 1: Prepare a weed abatement plan that outlines the areas where weed abatement is required and the schedule and method of activities to ensure bird impacts are avoided.

Conservation Measure 2: For temporary and permanent habitat restoration/enhancement, use only native and local (when possible) seed and plant stock.

Conservation Measure 3: Consider creating vehicle wash stations prior to entering sensitive habitat areas to prevent accidental introduction of non-native plants.

Conservation Measure 4: Remove invasive/exotic species that pose an attractive nuisance to migratory birds.

Stressor: Artificial Lighting

Conservation Goal: Prevent increase in lighting of native habitats during the bird breeding season.

Conservation Measure 1: To the maximum extent practicable, limit construction activities to the time between dawn and dusk to avoid the illumination of adjacent habitat areas.

Conservation Measure 2: If construction activity time restrictions are not possible, use down shielding or directional lighting to avoid light trespass into bird habitat (i.e., use a 'Cobra' style light rather than an omnidirectional light system to direct light down to the roadbed). To the maximum extent practicable, while allowing for public safety, low intensity energy saving lighting (e.g. low pressure sodium lamps) will be used.

Conservation Measure 3: Minimize illumination of lighting on associated construction or operation structures by using motion sensors or heat sensors.

Conservation Measure 5: Bright white light, such as metal halide, halogen, fluorescent, mercury vapor and incandescent lamps should *not* be used.

Stressor: Human Disturbance

Conservation Goal: Minimize prolonged human presence near nesting birds during construction and maintenance actions.

Conservation Measure 1: Restrict unauthorized access to natural areas adjacent to the project site by erecting a barrier and/or avoidance buffers (e.g., gate, fence, wall) to minimize foot traffic and off-road vehicle uses.

Stressor: Collision

Conservation Goal: Minimize collision risk with project infrastructure and vehicles.

Conservation Measure 1: Minimize collision risk with project infrastructure (e.g., temporary and permanent) by increasing visibility through appropriate marking and design features (e.g., lighting, wire marking, etc.).

Conservation Measure 2: On bridge crossing areas with adjacent riparian, beach, estuary, or other bird habitat, use fencing or metal bridge poles (Sebastian Poles) that extend to the height of the tallest vehicles that will use the structure.

Conservation Measure 3: Install wildlife friendly culverts so rodents and small mammals can travel under any new roadways instead of over them. This may help reduce raptor deaths associated with being struck while tracking prey or scavenging road kill on the roadway.

Conservation Measure 4: Remove road-kill carcasses regularly to prevent scavenging and bird congregations along roadways.

Conservation Measure 5: Avoid planting “desirable” fruited or preferred nesting vegetation in medians or Rights of Way.

Conservation Measure 6: Eliminate use of steady burning lights on tall structures (e.g., >200 ft).

Stressor: Entrapment

Conservation Goal: Prevent birds from becoming trapped in project structures or perching and nesting in project areas that may endanger them.

Conservation Measure 1: Minimize entrapment and entanglement hazards through project design measures that may include:

1. Installing anti-perching devices on facilities/equipment where birds may commonly nest or perch
2. Covering or enclosing all potential nesting surfaces on the structure with mesh netting, chicken wire fencing, or other suitable exclusion material prior to the nesting season to prevent birds from establishing new nests. The netting, fencing, or other material must have no opening or mesh size greater than 19 mm and must be maintained until the structure is removed.
3. Cap pipes and cover/seal all small dark spaces where birds may enter and become trapped.

Conservation Measure 2: Use the appropriate deterrents to prevent birds from nesting on structures where they cause conflicts, may endanger themselves, or create a human health and safety hazard.

1. During the time that the birds are trying to build or occupy their nests (generally , between April and August, depending on the geographic location), potential nesting

surfaces should be monitored at least once every three days for any nesting activity, especially where bird use of structures is likely to cause take. It is permissible to remove non-active nests (without birds or eggs), partially completed nests, or new nests as they are built (prior to occupation). If birds have started to build any nests, the nests shall be removed before they are completed. Water shall not be used to remove the nests if nests are located within 50 feet of any surface waters.

2. If an active nest becomes established (i.e., there are eggs or young in the nest), all work that could result in abandonment or destruction of the nest shall be avoided until the young have fledged or the nest is unoccupied. Construction activities that may displace birds after they have laid their eggs and before the young have fledged should not be permitted. If the project continues into the following spring, this cycle shall be repeated. When work on the structure is complete, all netting shall be removed and properly disposed of.

Stressor: Noise

Conservation Goal: Prevent the increase in noise above ambient levels during the nesting bird breeding season.

Conservation Measure 1: Minimize an increase in noise above ambient levels during project construction by installing temporary structural barriers such as sand bags

Conservation Measure 2: Avoid permanent additions to ambient noise levels from the proposed project by using baffle boxes or sound walls.

Stressor: Chemical Contamination

Conservation Goal: Prevent the introduction of chemicals contaminants into the environment.

Conservation Measure 1: Avoid chemical contamination of the project area by implementing a Hazardous Materials Plan. For more information on hazardous waste and how to properly manage hazardous waste, see the EPA Hazardous Waste website.

Conservation Measure 2: Avoid soil contamination by using drip pans underneath equipment and containment zones at construction sites and when refueling vehicles or equipment.

Conservation Measure 3: Avoid contaminating natural aquatic and wetland systems with runoff by limiting all equipment maintenance, staging laydown, and dispensing of fuel, oil, etc., to designated upland areas.

Conservation Measure 4: Any use of pesticides or rodenticides shall comply with the applicable Federal and State laws.

1. Choose non-chemical alternatives when appropriate
2. Pesticides shall be used only in accordance with their registered uses and in accordance with the manufacturer's instructions to limit access to non-target species.

3. For general measures to reducing wildlife exposure to pesticides, see EPA's Pesticides: Environmental Effects website.

Stressor: Fire

Conservation Goal: Minimize fire potential from project-related activities.

Conservation Measure 1: Reduce fire hazards from vehicles and human activities (e.g., use spark arrestors on power equipment, avoid driving vehicles off road).

Conservation Measure 2: Consider fire potential when developing vegetation management plans by planting temporary impact areas with a palate of low-growing, sparse, fire resistant native species that meet with the approval of the County Fire Department and local FWS Office.

Appendix F

EJScreen Community Report

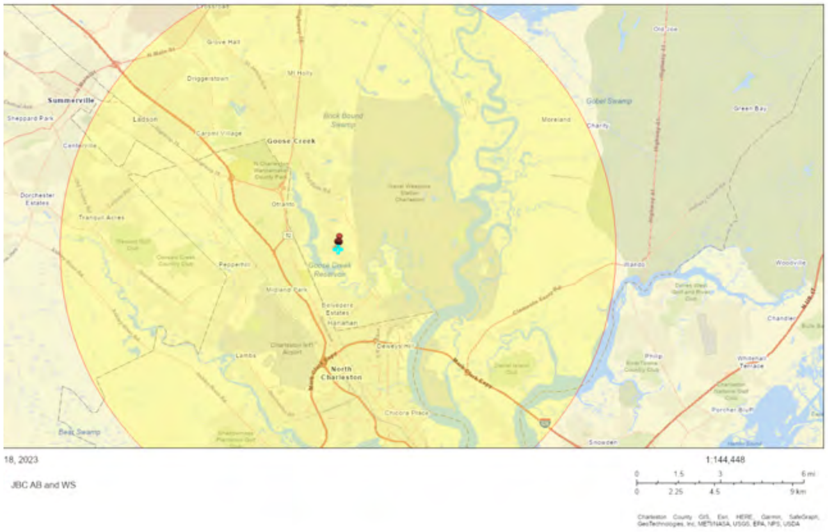
EPA

EJScreen Community Report

This report provides environmental and socioeconomic information for user-defined areas, and combines that data into environmental justice and supplemental indexes.

Hanahan, SC

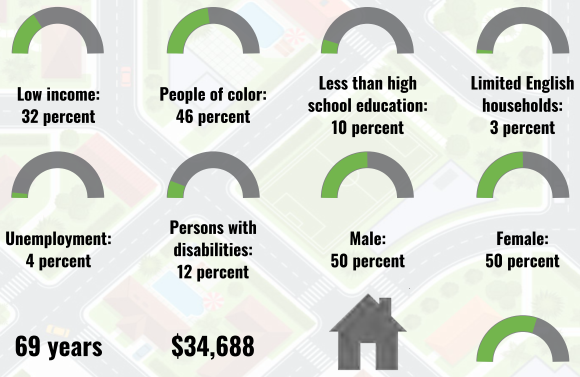
10 miles Ring Centered at 32.941832,-80.010699
Population: 358,437
Area in square miles: 314.03



LANGUAGES SPOKEN AT HOME

LANGUAGE	PERCENT
English	89%
Spanish	7%
Other Indo-European	1%
Tagalog (including Filipino)	1%
Total Non-English	11%

COMMUNITY INFORMATION



Low income: 32 percent

People of color: 46 percent

Less than high school education: 10 percent

Limited English households: 3 percent

Unemployment: 4 percent

Persons with disabilities: 12 percent

Male: 50 percent

Female: 50 percent

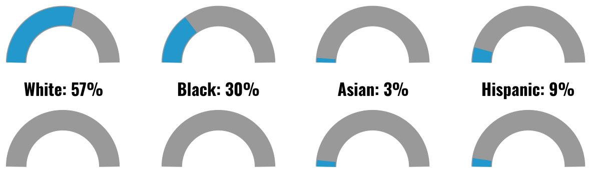
69 years
Average life expectancy

$34,688
Per capita income

Number of households: 140,473

Owner occupied: 60 percent

BREAKDOWN BY RACE



White: 57%

Black: 30%

Asian: 3%

Hispanic: 9%

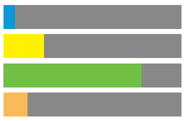
American Indian: 0%

Hawaiian/Pacific Islander: 0%

Other race: 4%

Two or more races: 5%

BREAKDOWN BY AGE



From Ages 1 to 4	6%
From Ages 1 to 18	23%
From Ages 18 and up	77%
From Ages 65 and up	13%

LIMITED ENGLISH SPEAKING BREAKDOWN

Speak Spanish	73%
Speak Other Indo-European Languages	16%
Speak Asian-Pacific Island Languages	11%
Speak Other Languages	0%

Notes: Numbers may not sum to totals due to rounding. Hispanic popultion can be of any race.
Source: U.S. Census Bureau, American Community Survey (ACS) 2017 -2021. Life expectancy data comes from the Centers for Disease Control.

www.epa.gov/ejscreen

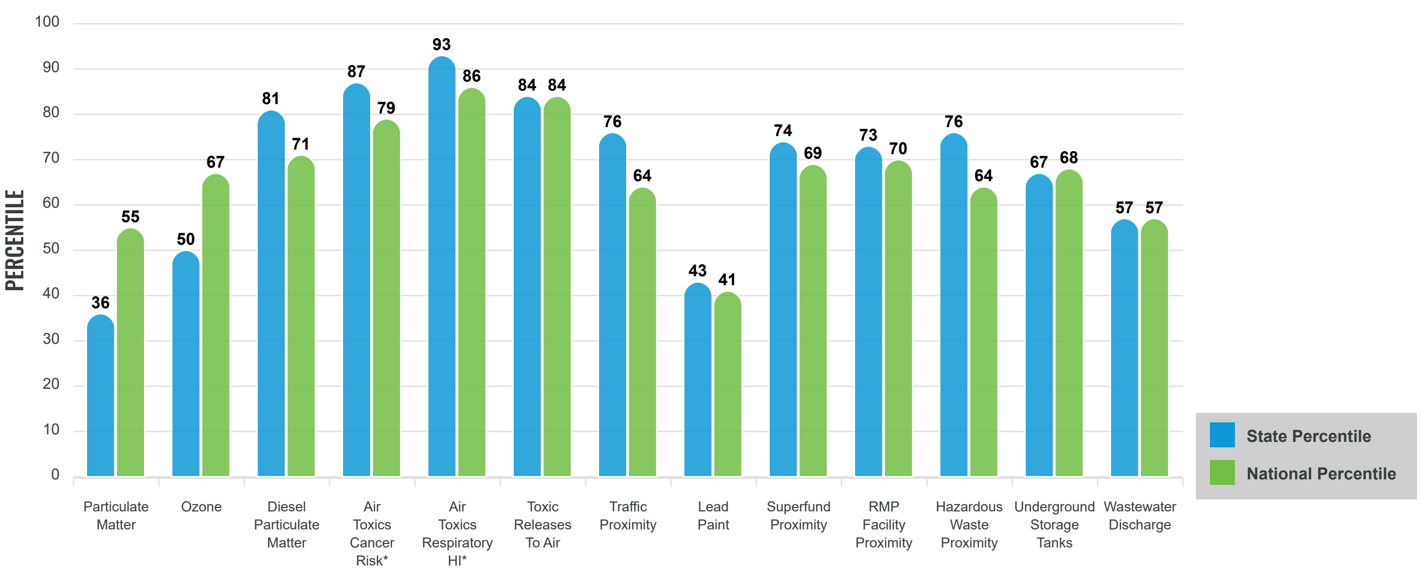
Environmental Justice & Supplemental Indexes

The environmental justice and supplemental indexes are a combination of environmental and socioeconomic information. There are thirteen EJ indexes and supplemental indexes in EJScreen reflecting the 13 environmental indicators. The indexes for a selected area are compared to those for all other locations in the state or nation. For more information and calculation details on the EJ and supplemental indexes, please visit the EJScreen website.

EJ INDEXES

The EJ indexes help users screen for potential EJ concerns. To do this, the EJ index combines data on low income and people of color populations with a single environmental indicator.

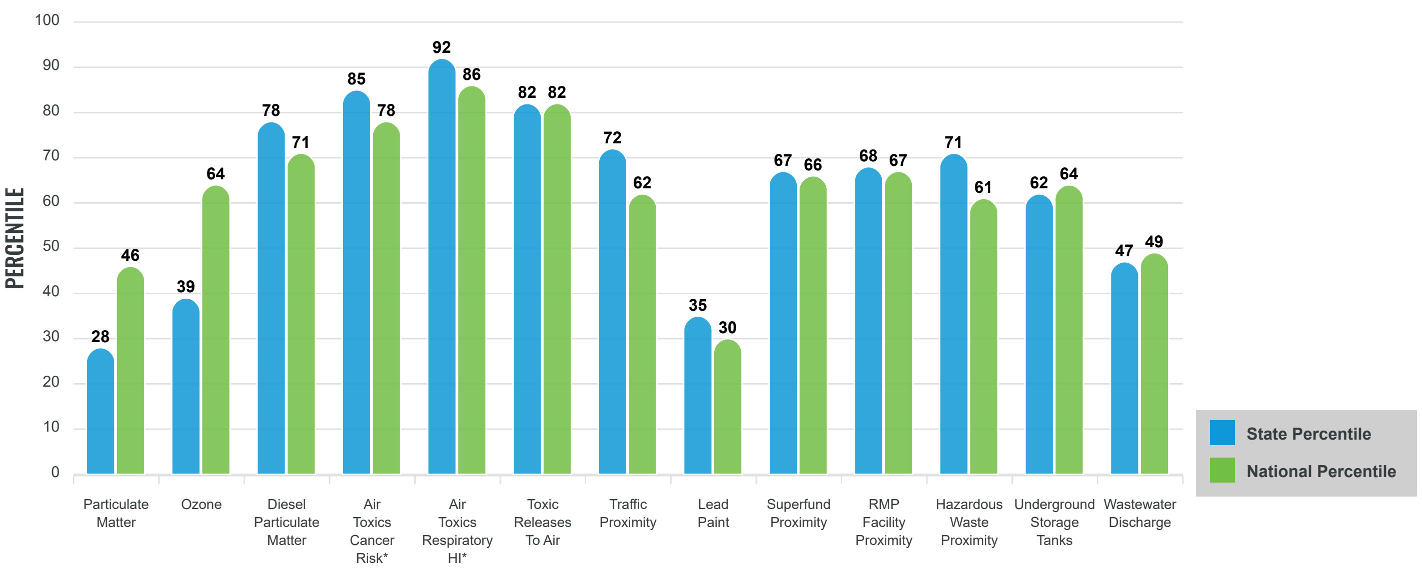
EJ INDEXES FOR THE SELECTED LOCATION



SUPPLEMENTAL INDEXES

The supplemental indexes offer a different perspective on community-level vulnerability. They combine data on percent low-income, percent linguistically isolated, percent less than high school education, percent unemployed, and low life expectancy with a single environmental indicator.

SUPPLEMENTAL INDEXES FOR THE SELECTED LOCATION



These percentiles provide perspective on how the selected block group or buffer area compares to the entire state or nation.

Report for 10 miles Ring Centered at 32.941832,-80.010699

www.epa.gov/ejscreen

EJScreen Environmental and Socioeconomic Indicators Data

SELECTED VARIABLES	VALUE	STATE AVERAGE	PERCENTILE IN STATE	USA AVERAGE	PERCENTILE IN USA
POLLUTION AND SOURCES					
Particulate Matter ($\mu g/m^3$)	7.67	8.07	24	8.08	36
Ozone (ppb)	61.6	62.6	35	61.6	54
Diesel Particulate Matter ($\mu g/m^3$)	0.289	0.188	83	0.261	66
Air Toxics Cancer Risk* (lifetime risk per million)	34	31	4	28	35
Air Toxics Respiratory HI*	0.64	0.41	97	0.31	92
Toxic Releases to Air	9,200	3,000	92	4,600	92
Traffic Proximity (daily traffic count/distance to road)	120	63	85	210	61
Lead Paint (% Pre-1960 Housing)	0.085	0.16	47	0.3	33
Superfund Proximity (site count/km distance)	0.12	0.091	82	0.13	73
RMP Facility Proximity (facility count/km distance)	0.49	0.3	83	0.43	76
Hazardous Waste Proximity (facility count/km distance)	0.8	0.42	84	1.9	57
Underground Storage Tanks (count/km^2)	2.6	2.9	68	3.9	64
Wastewater Discharge (toxicity-weighted concentration/m distance)	2	1	96	22	93
SOCIOECONOMIC INDICATORS					
Demographic Index	39%	37%	56	35%	63
Supplemental Demographic Index	14%	15%	44	14%	55
People of Color	46%	38%	64	39%	63
Low Income	31%	36%	44	31%	57
Unemployment Rate	4%	6%	53	6%	53
Limited English Speaking Households	3%	1%	86	5%	68
Less Than High School Education	10%	13%	47	12%	57
Under Age 5	6%	5%	65	6%	63
Over Age 64	13%	19%	29	17%	38
Low Life Expectancy	19%	21%	23	20%	41

*Diesel particulate matter, air toxics cancer risk, and air toxics respiratory hazard index are from the EPA's Air Toxics Data Update, which is the Agency's ongoing, comprehensive evaluation of air toxics in the United States. This effort aims to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that the air toxics data presented here provide broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. Cancer risks and hazard indices from the Air Toxics Data Update are reported to one significant figure and any additional significant figures here are due to rounding. More information on the Air Toxics Data Update can be found at: https://www.epa.gov/haps/air-toxics-data-update.

Sites reporting to EPA within defined area:

Superfund	2
Hazardous Waste, Treatment, Storage, and Disposal Facilities	23
Water Dischargers	143
Air Pollution	256
Brownfields	34
Toxic Release Inventory	87

Other community features within defined area:

Schools	132
Hospitals	17
Places of Worship	98

Other environmental data:

Air Non-attainment	No
Impaired Waters	Yes

Selected location contains American Indian Reservation Lands*	No
Selected location contains a "Justice40 (CEJST)" disadvantaged community	Yes
Selected location contains an EPA IRA disadvantaged community	Yes

Report for 10 miles Ring Centered at 32.941832,-80.010699

www.epa.gov/ejscreen

EJScreen Environmental and Socioeconomic Indicators Data

HEALTH INDICATORS

INDICATOR	HEALTH VALUE	STATE AVERAGE	STATE PERCENTILE	US AVERAGE	US PERCENTILE
Low Life Expectancy	19%	21%	23	20%	41
Heart Disease	5.1	6.8	15	6.1	28
Asthma	10.1	10.4	43	10	58
Cancer	5	6.4	10	6.1	24
Persons with Disabilities	11.6%	15%	28	13.4%	43

CLIMATE INDICATORS

INDICATOR	HEALTH VALUE	STATE AVERAGE	STATE PERCENTILE	US AVERAGE	US PERCENTILE
Flood Risk	13%	12%	75	12%	74
Wildfire Risk	54%	19%	81	14%	86

CRITICAL SERVICE GAPS

INDICATOR	HEALTH VALUE	STATE AVERAGE	STATE PERCENTILE	US AVERAGE	US PERCENTILE
Broadband Internet	17%	19%	52	14%	67
Lack of Health Insurance	14%	11%	72	9%	80
Housing Burden	Yes	N/A	N/A	N/A	N/A
Transportation Access	Yes	N/A	N/A	N/A	N/A
Food Desert	Yes	N/A	N/A	N/A	N/A

Footnotes

Report for 10 miles Ring Centered at 32.941832,-80.010699

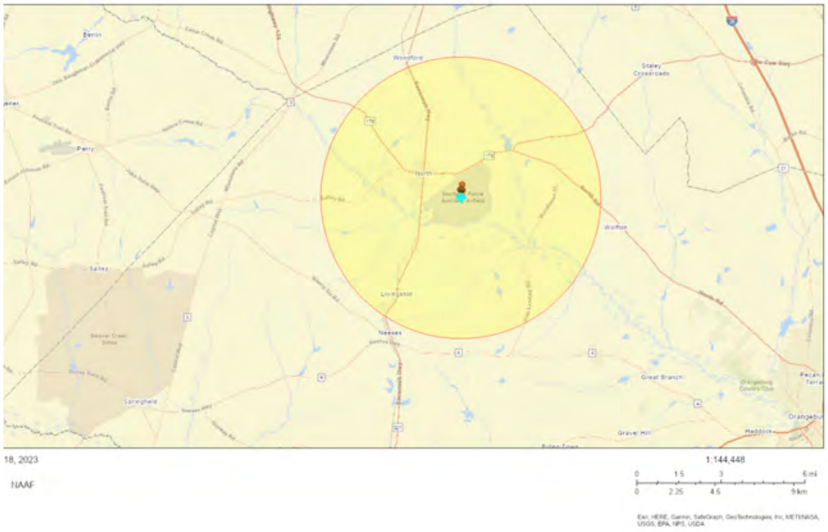
EPA

EJScreen Community Report

This report provides environmental and socioeconomic information for user-defined areas, and combines that data into environmental justice and supplemental indexes.

Orangeburg County, SC

5 miles Ring Centered at 33.602742,-81.079806
Population: 3,012
Area in square miles: 78.53



COMMUNITY INFORMATION

Low income: 50 percent

People of color: 50 percent

Less than high school education: 19 percent

Limited English households: 0 percent

Unemployment: 7 percent

Persons with disabilities: 17 percent

Male: 49 percent

Female: 51 percent

74 years Average life expectancy

$25,393 Per capita income

Number of households: 1,254

Owner occupied: 77 percent

BREAKDOWN BY RACE

White: 51%

Black: 45%

Asian: 1%

Hispanic: 1%

American Indian: 2%

Hawaiian/Pacific Islander: 0%

Other race: 0%

Two or more races: 2%

BREAKDOWN BY AGE

From Ages 1 to 4	7%
From Ages 1 to 18	20%
From Ages 18 and up	80%
From Ages 65 and up	20%

LIMITED ENGLISH SPEAKING BREAKDOWN

Speak Spanish	0%
Speak Other Indo-European Languages	0%
Speak Asian-Pacific Island Languages	0%
Speak Other Languages	0%

Notes: Numbers may not sum to totals due to rounding. Hispanic popultion can be of any race.
Source: U.S. Census Bureau, American Community Survey (ACS) 2017 -2021. Life expectancy data comes from the Centers for Disease Control.

LANGUAGES SPOKEN AT HOME

LANGUAGE	PERCENT
English	98%
Spanish	1%
Total Non-English	2%

www.epa.gov/ejscreen

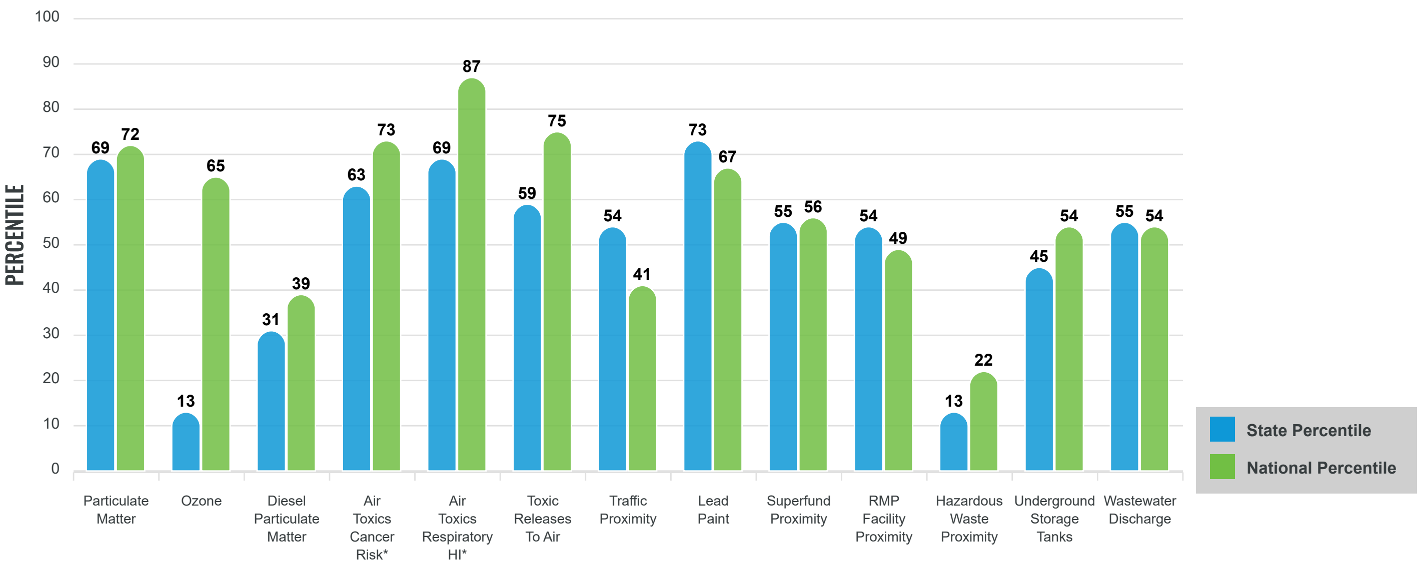
Environmental Justice & Supplemental Indexes

The environmental justice and supplemental indexes are a combination of environmental and socioeconomic information. There are thirteen EJ indexes and supplemental indexes in EJScreen reflecting the 13 environmental indicators. The indexes for a selected area are compared to those for all other locations in the state or nation. For more information and calculation details on the EJ and supplemental indexes, please visit the EJScreen website.

EJ INDEXES

The EJ indexes help users screen for potential EJ concerns. To do this, the EJ index combines data on low income and people of color populations with a single environmental indicator.

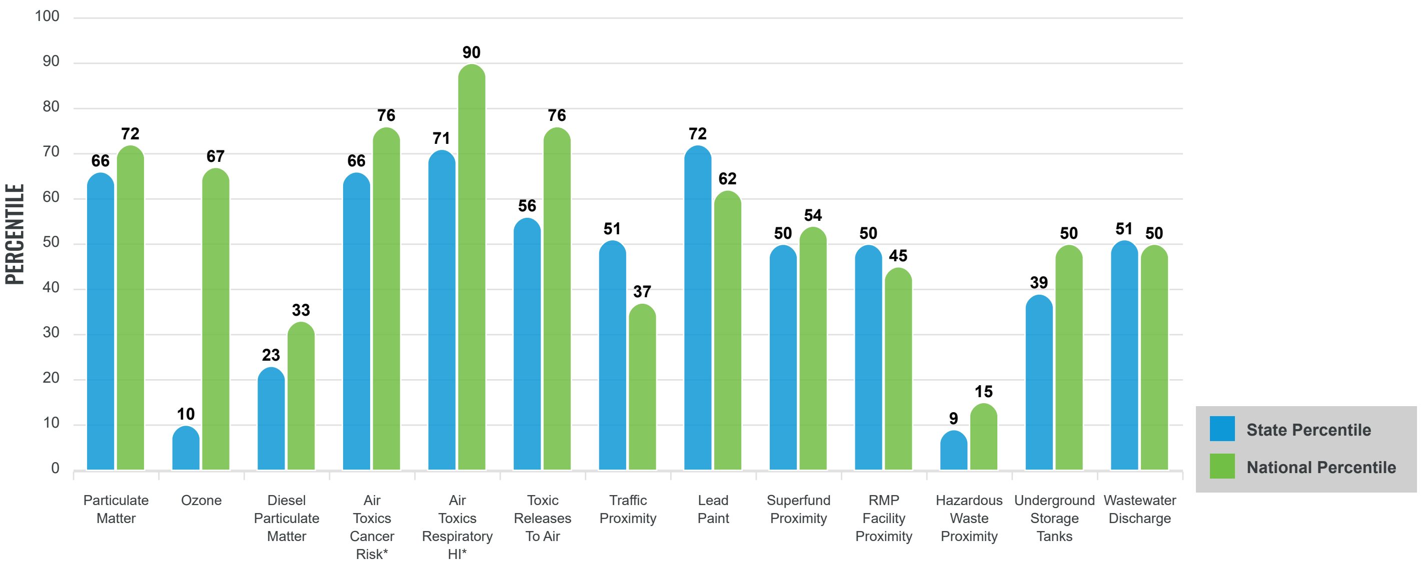
EJ INDEXES FOR THE SELECTED LOCATION



SUPPLEMENTAL INDEXES

The supplemental indexes offer a different perspective on community-level vulnerability. They combine data on percent low-income, percent linguistically isolated, percent less than high school education, percent unemployed, and low life expectancy with a single environmental indicator.

SUPPLEMENTAL INDEXES FOR THE SELECTED LOCATION



These percentiles provide perspective on how the selected block group or buffer area compares to the entire state or nation.

Report for 5 miles Ring Centered at 33.602742,-81.079806

www.epa.gov/ejscreen

EJScreen Environmental and Socioeconomic Indicators Data

SELECTED VARIABLES	VALUE	STATE AVERAGE	PERCENTILE IN STATE	USA AVERAGE	PERCENTILE IN USA
POLLUTION AND SOURCES					
Particulate Matter (µg/m^3)	8.09	8.07	46	8.08	47
Ozone (ppb)	59.9	62.6	6	61.6	39
Diesel Particulate Matter (µg/m^3)	0.101	0.188	15	0.261	16
Air Toxics Cancer Risk* (lifetime risk per million)	30	31	4	28	35
Air Toxics Respiratory HI*	0.4	0.41	18	0.31	70
Toxic Releases to Air	690	3,000	37	4,600	52
Traffic Proximity (daily traffic count/distance to road)	13	63	32	210	19
Lead Paint (% Pre-1960 Housing)	0.13	0.16	59	0.3	40
Superfund Proximity (site count/km distance)	0.03	0.091	31	0.13	28
RMP Facility Proximity (facility count/km distance)	0.085	0.3	30	0.43	24
Hazardous Waste Proximity (facility count/km distance)	0.043	0.42	6	1.9	8
Underground Storage Tanks (count/km^2)	0.18	2.9	25	3.9	31
Wastewater Discharge (toxicity-weighted concentration/m distance)	6.9E-05	1	33	22	28
SOCIOECONOMIC INDICATORS					
Demographic Index	50%	37%	72	35%	74
Supplemental Demographic Index	20%	15%	76	14%	79
People of Color	50%	38%	68	39%	66
Low Income	50%	36%	74	31%	80
Unemployment Rate	7%	6%	72	6%	72
Limited English Speaking Households	0%	1%	0	5%	0
Less Than High School Education	19%	13%	75	12%	79
Under Age 5	7%	5%	72	6%	70
Over Age 64	20%	19%	61	17%	67
Low Life Expectancy	24%	21%	76	20%	88

*Diesel particulate matter, air toxics cancer risk, and air toxics respiratory hazard index are from the EPA's Air Toxics Data Update, which is the Agency's ongoing, comprehensive evaluation of air toxics in the United States. This effort aims to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that the air toxics data presented here provide broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. Cancer risks and hazard indices from the Air Toxics Data Update are reported to one significant figure and any additional significant figures here are due to rounding. More information on the Air Toxics Data Update can be found at: https://www.epa.gov/haps/air-toxics-data-update.

Sites reporting to EPA within defined area:

Superfund	0
Hazardous Waste, Treatment, Storage, and Disposal Facilities	0
Water Dischargers	5
Air Pollution	0
Brownfields	0
Toxic Release Inventory	0

Other community features within defined area:

Schools	9
Hospitals	0
Places of Worship	12

Other environmental data:

Air Non-attainment	No
Impaired Waters	Yes

Selected location contains American Indian Reservation Lands*	No
Selected location contains a "Justice40 (CEJST)" disadvantaged community	Yes
Selected location contains an EPA IRA disadvantaged community	Yes

Report for 5 miles Ring Centered at 33.602742,-81.079806

EJScreen Environmental and Socioeconomic Indicators Data

HEALTH INDICATORS

INDICATOR	HEALTH VALUE	STATE AVERAGE	STATE PERCENTILE	US AVERAGE	US PERCENTILE
Low Life Expectancy	24%	21%	76	20%	88
Heart Disease	8	6.8	72	6.1	83
Asthma	11.3	10.4	73	10	82
Cancer	6.4	6.4	49	6.1	52
Persons with Disabilities	15.2%	15%	54	13.4%	66

CLIMATE INDICATORS

INDICATOR	HEALTH VALUE	STATE AVERAGE	STATE PERCENTILE	US AVERAGE	US PERCENTILE
Flood Risk	10%	12%	65	12%	65
Wildfire Risk	20%	19%	72	14%	83

CRITICAL SERVICE GAPS

INDICATOR	HEALTH VALUE	STATE AVERAGE	STATE PERCENTILE	US AVERAGE	US PERCENTILE
Broadband Internet	32%	19%	81	14%	90
Lack of Health Insurance	11%	11%	56	9%	72
Housing Burden	No	N/A	N/A	N/A	N/A
Transportation Access	Yes	N/A	N/A	N/A	N/A
Food Desert	No	N/A	N/A	N/A	N/A

Footnotes

Report for 5 miles Ring Centered at 33.602742,-81.079806