DRAFT
ENVIRONMENTAL ASSESSMENT

Hot Cargo Loading Area and Munitions Storage Area at Joint Base McGuire-Dix-Lakehurst, New Jersey

U.S. AIR FORCE
JOINT BASE MCGUIRE-DIX-LAKEHURST, NJ 08641



May 2021

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DRAFT FINDING OF NO SIGNIFICANT IMPACT (FONSI)

AND

FINDING OF NO PRACTICABLE ALTERNATIVE (FONPA)

HOT CARGO LOADING AREA AND MUNITIONS STORAGE AREA

JOINT BASE MCGUIRE-DIX-LAKEHURST, NEW JERSEY

Pursuant to provisions of the National Environmental Policy Act (NEPA), Title 42 United States Code (USC) Sections 4321 to 4347, implemented by Council on Environmental Quality (CEQ) Regulations, Title 40 Code of Federal Regulations (CFR) §§1500-1508, and 32 CFR §989, Environmental Impact Analysis Process (EIAP), the U.S. Air Force (USAF) assessed the potential impacts on the natural and human environment associated with the Hot Cargo Loading Area and Munitions Storage Area, Joint Base McGuire-Dix-Lakehurst, New Jersey.

PURPOSE AND NEED FOR THE PROPOSED ACTION

The purpose of the Proposed Action is to provide a fully operational and efficient hot cargo loading area (HCLA) pad and munitions storage area (MSA) in the McGuire area of JB MDL that are compliant with applicable Unified Facilities Criteria (UFC) requirements. The Proposed Action is needed because the existing HCLA pads and portions of the existing MSA in the McGuire area are nonoperational and do not meet applicable UFC requirements. A new HCLA pad and new MSA facilities are necessary to increase the reliability, safety, and cargo capacity of the HCLA pad and MSA to allow the USAF to safely and efficiently airlift, transport, and store munitions at the McGuire area of JB MDL.

DESCRIPTION OF THE PROPOSED ACTION

Under the Proposed Action, the USAF proposes to construct a new HCLA pad and MSA facilities in the McGuire area of JB MDL. The proposed HCLA pad is sited at the current location of HCLA pad 1 at the existing dual HCLA pads within the McGuire area of JB MDL. The proposed MSA facilities are sited at the existing MSA in the northeastern corner of the McGuire area of JB MDL. The proposed HCLA and MSA includes construction and operation of a HCLA pad and MSA facilities with associated utilities and site improvements. The proposed HCLA pad would replace the existing dual non-functioning HCLA pads with a properly sited, larger HCLA pad. The proposed MSA facilities would add 27 concrete earth-covered igloos and other support facilities at the existing MSA. The new HCLA pad and MSA facilities would be designed and constructed in compliance with applicable Department of Defense UFC requirements.

The proposed HCLA pad would include construction of a 162,195-square-foot (ft^2) HCLA apron of rigid pavement with 50-foot asphalt shoulders sized for parking aircraft; a 50,399-ft^2 taxiway apron with 25-foot shoulders connecting to Taxiway "Lima"; 17,091 ft^2 of pavement for the staging area; shoulder, taxiway edge, and high mast exterior area lighting; pavement markings; stormwater drainage system; and security fencing. Other components that would be constructed at the proposed HCLA pad include aircraft tie-down and grounding points, and utilities (telephone service, electricity for apron and airfield lighting, water/fire hydrant). A temporary

access road would be constructed for use during the construction phase to connect the HCLA pad taxiway to the transient munitions storage building that is east of the proposed HCLA pad. Additionally, approximately 0.44 acres of wetlands and transition areas within the HCLA project area would be impacted by the Proposed Action, including 0.3 acres of wetland to be filled as a result of the new HCLA pad. Construction of the HCLA pad is anticipated to take 18 months to complete and would conclude in Fiscal Year 2023. Construction of the proposed HCLA pad would temporarily disturb up to 15.5 acres of ground surface and result in a permanent increase of approximately 1.8 acres of impervious surface.

Construction of the proposed MSA facilities would require demolition of approximately 6,534 ft^2 of existing buildings. Additionally, 29,802 ft^2 of pavement (e.g., concrete pads, roadways, sidewalks), 1,164 ft^2 of gravel, and 3,809 linear feet of security fencing would be removed. Portions of some existing infrastructure, such as a water line, sanitary sewer line, and an out-of-service monitoring well, would be abandoned in place and capped. Two earthen berms would be removed from their existing locations, with the material reused during construction. The proposed MSA facilities would include construction of 15,517 ft^2 of munitions storage consisting of 27 single-bay concrete earth-covered igloos in a multi-cubicle configuration, a 2,745-ft^2 munitions maintenance administration facility, a 1,157-ft^2 addition to an existing munitions maintenance shop, 54,030 ft^2 of new concrete and asphalt pavement, site improvements, utilities (electrical, water, sewer), 3,752 linear feet of security fencing, fiber optic communications duct bank, environmental remediation, and all necessary site support. Stormwater drainage infrastructure, including trickle channels and three concrete spreader weirs with downstream vegetative filters and associated piping, would be constructed within the proposed MSA project area to supplement existing stormwater drainage infrastructure. Approximately 0.04 acres of transition areas within the MSA project area would be impacted by grading activities. Construction of the proposed MSA facilities is anticipated to begin in October 2021 and conclude in October 2023. Construction of the proposed MSA facilities would temporarily disturb up to 9.5 acres of ground surface and result in a permanent increase of approximately 1 acre of impervious surface.

ALTERNATIVES ELIMINATED FROM FURTHER CONSIDERATION

This EA has considered all reasonable alternatives under the CEQ regulation, 40 CFR §1502.14(a), which states that all reasonable alternatives that have been eliminated must be briefly discussed. The following alternatives have been eliminated: The USAF considered use of the Dix area Army ammunition supply point and the Lakehurst MSA to accommodate the munitions to be stored at the proposed MSA facilities; however, both sites were not considered viable alternatives. The proposed MSA at the Dix area Army ammunition supply point and the Lakehurst MSA would require munitions to be transported long distances (more than 6 miles) on installation and unsecured public roadways from the McGuire airfield to either the Dix or Lakehurst areas. Therefore, use of the Dix area Army ammunition supply point and the Lakehurst MSA was eliminated due to inadequate location siting. The USAF considered other locations for the proposed MSA facilities within the existing MSA at McGuire; however, the existing MSA facilities are constrained by the MSA quantity distance arcs that must avoid a fuel tank to the south and the installation boundary to the north. This alternative was eliminated due to quantity distance arc constraints.

The proposed HCLA pad site is the only location able to comply with selection standards, including a location adjacent to existing runways, taxiways, and roads; 1,250-foot quantity-

distance separation distance from other aircraft, permanent structures, and normal operating stations for flight line personnel; and minimal impact on other quantity-distance separation distances and critical infrastructure, including the transient munitions storage facility and air traffic control tower that are east and southeast of the proposed HCLA site, respectively.

DESCRIPTION OF THE NO ACTION ALTERNATIVE

The EIAP (32 CFR § 989.8[d]) requires consideration of the No Action Alternative. Under the No Action Alternative, the USAF would not construct a new UFC compliant HCLA pad and MSA and supporting facilities within the McGuire area of JB MDL. The HCLA pads and portions of the MSA would continue to be nonoperational and out of compliance with UFC requirements; thus, requiring inefficient workarounds. The No Action Alternative would not satisfy the purpose of and need for the Proposed Action.

SUMMARY OF ENVIRONMENTAL FINDINGS

The USAF has analyzed and concluded that the Proposed Action would not have any significant adverse effects to the following resource areas: air quality; noise; geology; topography and soils; water resources; biological resources; cultural resources; hazardous materials and wastes; infrastructure; and safety. Land use, socioeconomics, and environmental justice were considered for potential impacts, determined to not be affected by the Proposed Action, and therefore eliminated from detailed analysis. Additionally, no significant adverse impacts would result from activities associated with the Proposed Action when considering reasonably foreseeable planned actions. Summaries of each resource area are provided herein:

Air Quality

Construction and demolition activities would result in short-term, minor, adverse impacts on air quality. Construction-related emissions would be produced from combustion engines used in heavy equipment, heavy duty diesel vehicles hauling materials and debris, and construction personnel commuting daily to and from the project areas. Fugitive dust emissions would occur from ground disturbance, land clearing, grading, excavation, trenching, and vehicular travel in unpaved areas. Such emissions would be temporary in nature and would only result when such activities are occurring. Adverse effects on air quality would be minimized through proper maintenance of equipment, reducing equipment idling, and implementing fugitive dust controls. Long-term, negligible, adverse impacts on air quality would occur from combustible fuel heating systems at the proposed MSA facilities. Air emissions from heating systems would not increase JB MDL's potential to emit above emissions source thresholds, and the capacity of the systems is likely to be low enough that they would not need to be added to the existing Title V operating permit. The ongoing impacts of climate change within New Jersey, such as changes in precipitation patterns, increased frequency and severity of flood and drought events, and disruption of natural ecosystems, are unlikely to affect construction or operation of the proposed HCLA pad and MSA facilities. Therefore, adverse effects of climate change on the Proposed Action would not occur.

Noise

Short-term, negligible, adverse impacts to noise would occur due to construction and demolition related activities within the project areas. It is anticipated that due to the substantial distances between the closest sensitive noise receptors and construction equipment, the intermittent nature of construction activities, and the sound attenuation from existing structures, noise impacts

during demolition and construction activities within the HCLA and MSA project areas would be temporary and negligible (i.e., less than 65 dBA). No long-term noise impacts are anticipated from implementation of the Proposed Action as noise levels within the project areas would remain unchanged after construction activities are complete.

Geology, Topography, and Soils

Construction activities such as demolition, excavation and grading would result in short-term, minor, adverse impacts to geology, topography, and soils within the HCLA and MSA project areas. JB MDL would minimize temporary earth disturbances during construction through implementation of construction and restoration measures outlined in a Soil Erosion and Sediment Control Plan certified by the Burlington County Soil Conservation District. Long-term, minor, adverse impacts to geology, topography, and soils would result where impervious surfaces are proposed. Grading and the addition of cement modified subgrade material and pavement for runway improvements would compact underlying soils within the project areas. Soil productivity and capability of soils to produce vegetative biomass would be eliminated within the footprint of proposed impervious surfaces, including roadways and buildings. The McGuire area of JB MDL is defined as an urbanized area by the U.S. Census Bureau; and as such, activities within the HCLA and MSA project areas are not subject to the Farmland Policy Protection Act. Therefore, the Proposed Action would not result in impacts to Prime Farmland, Unique Farmland, or Farmland of Statewide or Local Importance soils.

Water Resources

The Proposed Action would result in short- and long-term, minor, adverse impacts on groundwater quality and recharge due to an increase in impervious surfaces. However, stormwater management infrastructure would be designed and constructed to ensure that adequate infiltration and groundwater recharge occur in the immediate area in accordance with the New Jersey Department of Environmental Protection's (NJDEP) Stormwater Management Rules (New Jersey Administrative Code [N.J.A.C.] 7:8), Leadership in Energy and Environmental Design Stormwater Management criteria, and the Energy Independence and Security Act of 2007, Section 438 "Stormwater Run-off Requirements for Federal Development Projects".

During construction, there may be short-term, minor, adverse impacts to the proximal surface waters as a result of soil erosion and sedimentation from earth disturbing activities. However, soil erosion and sediment control measures required by the Burlington County Soil Conservation District would be implemented and maintained in accordance with a certified Soil Erosion and Sediment Control Plan to protect proximate surface waters during construction.

Moderate, long-term, adverse impacts to wetlands would occur within the HCLA project area from filling 0.3 acres of wetland for the new HCLA pad and the installation of a stormwater pipe and fences in wetlands and, potentially, associated transition areas. Additionally, short-term, minor, impacts to surface waters are anticipated at the MSA project area due to grading and fencing activities proposed within, potentially, wetland transition areas. Before any construction activities may occur, it is anticipated that a NJDEP Freshwater Wetlands Individual Permit would be required to authorize activities regulated by the Freshwater Wetlands Protection Act (N.J.S.A. 13:9B-1 et seq.) and its implementing Rules (N.J.A.C. 7:7A), including impacts to freshwater wetlands and transition areas, and mitigation. The USAF would conduct mitigation for wetland losses in accordance with N.J.A.C. 7:7A-11. A mitigation proposal would either be

submitted to the NJDEP for review and approval concurrent with the Freshwater Wetlands Individual Permit application or no later than 90 calendar days prior to the initiation of regulated activities authorized by the Freshwater Wetlands Individual Permit. No floodplain mapping currently exists for the HCLA and MSA project areas; and thus, a NJDEP Flood Hazard Area Verification would be required to determine if any proposed work would be situated within a flood hazard area. Based upon the findings of the Flood Hazard Area Verification, a NJDEP Flood Hazard Area Individual Permit may be required to authorize regulated activities proposed within the flood hazard area.

Biological Resources

On April 15, 2021, JB MDL received correspondence from the U.S. Fish and Wildlife Service (USFWS) that the USFWS was unable to determine if Knieskern's beaked-rush (*Rhynchospora knieskernii*), a Federally threatened and State endangered plant species, would be affected by the Proposed Action at the HCLA project area. The USFWS recommended that a qualified botanist conduct a habitat suitability survey for Knieskern's beaked-rush as soon as possible within the grasslands in and within the vicinity of the proposed limits of disturbance. If the habitat suitability survey identifies the presence of Knieskern's beaked-rush, JB MDL would coordinate with the USFWS to ensure the Proposed Action would not result in significant adverse impacts. Consultation with the USFWS is ongoing.

Implementation of the Proposed Action would result in long-term, minor, adverse impacts to biological resources at the HCLA project area due to the loss of 0.3 acres of wetland and 0.42 acres of grassland habitats. The existing wetland does not possess habitat functions and values typically associated with a wetland due to its small size, modified vegetation due to a prescribed mowing regime, and modified hydrology. As a result, this wetland does not currently provide critical wildlife habitat for grassland birds or other special status species observed at JB MDL. The USAF would mitigate for wetland impacts to provide equitable replacement of the habitat functions and values lost. A mitigation plan would be developed during final design of the proposed HCLA pad subsequent to the evaluation of proposed wetland impacts within the EA and will require approval from the NJDEP during the permit review process. Additionally, after construction is complete, any temporarily disturbed grassland habitat would be restored with warm-season native bunch grasses. The grassland habitat contiguous with the HCLA project area would continue to provide habitat to grassland bird species.

Implementation of the Proposed Action would result in short-term, minor, adverse impacts to biological resources at the MSA project area due to the disturbance of potential transition areas and noise during demolition and construction activities. Wildlife may temporarily leave the project area during construction and relocate to alternative locations, both on and off base; however, it is anticipated that fauna would return to the project area and surrounding habitats after construction is complete. The JB MDL Natural Resources Manager would periodically monitor the project area during land clearing operations for the presence of special status species. If any special status species are encountered, construction personnel would be required to contact JB MDL Natural Resources Staff immediately.

[[Preparer's Note: Biological Resources will be updated with the results of and correspondence relating to USFWS' Section 7 review.]].

Cultural Resources

Portions of the HCLA Area of Potential Effects (APE) are located in Cultural Resources Sensitivity Area 3, as identified in the JB MDL Integrated Cultural Resources Management Plan (ICRMP). No historically significant archaeological or architectural resources have been previously identified in the HCLA APE nor were any identified as a result of an architectural resources investigation conducted in March 2021. A Phase I Cultural Resources Survey was conducted at the HCLA project area to confirm the presence or absence of archaeological and architectural resources eligible for listing in the National Register of Historic Places (NRHP). No historically significant archeological or architectural sites were identified as a result of a March 2021 survey of the HCLA. The MSA APE is outside of cultural resources sensitivity areas identified in the JB MDL ICRMP and all proposed activities at the MSA would occur within previously disturbed areas; therefore, archaeological resources are unlikely to be intact within the project area. Architectural resources in the MSA project area were previously determined not eligible for NRHP listing or subject to the Program Comment on World War II and Cold War-Era (1939–1974) Ammunition Storage Facilities. Based on previous surveys, low potential exists at the McGuire area of JB MDL for Native American remains and cultural objects. If archeological sites or cultural artifacts are inadvertently discovered during ground-disturbing activities, all disturbance activity would cease, the JB MDL Installation Cultural Resources Manager would be contacted, and all necessary actions would be taken pursuant to the JB MDL ICRMP.

[[Preparer's Note: Cultural Resources will be updated with results of and correspondence relating to Section 106 review.]]

Infrastructure

Short-term, negligible, adverse impacts on utility systems, including the electrical system, water supply system, wastewater system, natural gas supply, and communications, could occur during construction and demolition activities when service lines are disconnected from or connected to existing JB MDL utility infrastructure. Short-term, negligible, adverse impacts on the liquid fuel system would occur from consumption of fuels during construction and demolition. Stormwater management would be affected temporarily due to temporary ground disturbance during construction and demolition, and permanently due to the increase of impervious surfaces by 2.8 acres. Solid waste would be generated during construction and demolition, although contractors would be required to recycle construction and demolition debris, such as scrap metals, clean fill material, asphalt, and cement, in accordance with applicable federal and installation policies. Short-term, minor, adverse impacts on gate access and installation roadways could occur from construction vehicles and workers commuting daily to the project areas, and delivery and hauling of construction supplies and materials under the Proposed Action.

Hazardous Materials and Waste

Short- and long-term, negligible, adverse impacts would occur from the use of hazardous materials and petroleum products and generation of hazardous wastes during construction and demolition as well as operation of the Proposed Action. Aircraft fueling and deicing would occur on the proposed HCLA pad in accordance with installation processes and procedures. No new chemicals or toxic substances would be used or stored long-term at the proposed HCLA pad or MSA facilities. The quantity of hazardous wastes generated would be negligible, and properly disposed of. Compliance with the installation hazardous materials management; spill prevention,

control and countermeasures; stormwater pollution prevention; and hazardous waste management plans would minimize any potential impacts. Short-term, minor, adverse impacts from toxic substances could occur from the proposed demolition and renovation of buildings potentially containing asbestos-containing materials, lead-based paint, and polychlorinated biphenyls that could be disturbed. Short-term, minor to moderate, adverse impacts on environmental contamination would occur due to construction in contaminated sites, including Installation Restoration Program Site FT008 and Military Munitions Response Program Site XU874a. Prior to construction activities, coordination with the JB MDL Environmental Restoration Program, Weapons Safety, and Explosives Ordnance Disposal offices would be conducted to ensure that ground disturbance would not conflict with ongoing remediation and investigation activities at Site FT008 and Site XU874a. No impacts from radon are anticipated.

Safety

Short-term, negligible to minor, adverse impacts on safety would occur during demolition and construction due to exposure of construction personnel to the inherent safety hazards associated with demolition and construction projects, including work within established quantity distance arcs. To minimize safety risks, construction personnel would use appropriate personal protective equipment and adhere to safety standards outlined in a site-specific health and safety plan. No handling or transporting of munitions would occur while construction personnel are within the quantity distance arcs, which would minimize potential explosive safety risks. Any ground disturbance at the HCLA project area within Military Munitions Response Program Site XU874a would require an unexploded ordnance/munitions and explosives of concern sweep conducted by certified explosive ordnance disposal contractors prior to the start of work. However, all demolition and construction occurring within the project areas would be monitored for potential unexploded ordnance. Increased construction traffic could affect emergency services vehicle response times resulting in negligible, adverse impacts. However, most construction equipment would be kept either onsite or at appropriate staging areas during the construction period, thus reducing potential impacts on emergency services. Long-term, minor to moderate, beneficial impacts would result under the Proposed Action as the proposed HCLA pad and MSA facilities would be designed and constructed in compliance with UFC requirements allowing the USAF to safely and efficiently airlift, transport, and store munitions at the McGuire area of JB MDL.

MITIGATION

As the proponent for the Proposed Action, the USAF will be responsible for ensuring that the required mitigation described in the environmental findings section above and within the EA are approved by NJDEP prior to taking any specific action identified within this FONSI/FONPA.

PUBLIC REVIEW AND COMMENT

A Notice of Early Public Review was published in the *Asbury Park Press* and *Burlington County Times* on February 17, 2021 announcing the commencement of the EA, detailing that the action would take place in a wetland and seeking advanced public comment. No public comments were received on the Notice of Early Public Review. Additionally, public notice was published in the *Asbury Park Press* and *Burlington County Times* announcing the availability of the Draft EA and Draft FONSI/FONPA for public review and comment on May 11, 2021. The documents were made available for review during a 30-day public comment period from May 11, 2021 through June 10, 2021. Copies of the Draft EA and Draft FONSI/FONPA were also made available for public review at the Manchester Branch of the Ocean County Library and the Pemberton Branch

of the Burlington County Library. All public and agency comments received were addressed in the Final EA.

Tribal consultation letters were mailed to federally recognized tribes on February 11, 2021. Additional attempts to contact tribal representatives were made throughout the duration of EA development by the USAF.

FINDING OF NO SIGNIFICANT IMPACT

Based on my review of the facts and analyses contained in the attached EA, conducted under the provisions of NEPA, CEQ Regulations, and 32 CFR § 989, I conclude that the Preferred Alternative (the Proposed Action) would not result in significant environmental impacts, either by itself or with other known projects. Accordingly, an Environmental Impact Statement is not required. This analysis fulfills the requirements of NEPA, the President's CEQ 40 CFR §§ 1500-1508 and the Air Force EIAP regulations at 32 CFR § 989. The signing of this Finding of No Significant Impact completes the EIAP.

A Mitigation and Monitoring Plan will be developed and implemented by the USAF prior to any action being taken, but no later than 90 days from the date of this FONSI.

FINDING OF NO PRACTICABLE ALTERNATIVE

Pursuant to Executive Order(s) 11988 and 11990, and the authority delegated by the Secretary of the Air Force Order 791.1, I find there is no practicable alternative to completing the Proposed Action, which will impact wetlands, as described in the attached EA. The EA analyzed whether an alternative location or design could avoid impacts to wetlands, but because the planned configuration is required to accommodate new regulations for airplane turning radii, line up with the new jet fuel hydrant system, and avoid the quantity distance arc of the transient munitions storage building, no practicable alternative exists. This finding fulfills both the requirements of the referenced Executive Orders and the EIAP regulation, 32 CFR § 989.14 for a Finding of No Practicable Alternative.

Carl Champion, P.E., USAF Installation Environmental Supervisor	Date

Attachment A: Environmental Assessment

Cover Sheet

Draft Environmental Assessment for Hot Cargo Loading Area and Munitions Storage Area at Joint Base McGuire-Dix-Lakehurst, New Jersey

Responsible Agencies: U.S. Air Force (USAF), Air Mobility Command, 87th Air Base Wing.

Affected Location: Joint Base McGuire-Dix-Lakehurst (JB MDL), New Jersey.

Report Designation: Draft Environmental Assessment

Abstract: JB MDL has identified a need to construct and operate a new hot cargo loading area (HCLA) pad to replace the existing dual non-functioning HCLA pads and new munitions storage and supporting facilities at the existing munitions storage area (MSA) at the McGuire area of JB MDL. The existing HCLA pads and portions of the existing MSA at the McGuire area are nonoperational, inefficient, and are not compliant with Department of Defense Unified Facilities Criteria (UFC) requirements. The proposed HCLA pad and MSA facilities would be compliant with applicable UFC requirements and enable JB MDL to safely and efficiently airlift, transport, and store munitions. The Proposed Action includes construction and operation of a HCLA pad and MSA facilities with associated utilities and site improvements. The proposed HCLA pad would require demolition of two existing HCLA pads and construction of a properly sized HCLA apron, taxiway apron, exterior area lighting, pavement markings, stormwater drainage system, and security fencing. The proposed MSA facilities would require demolition of three existing buildings and construction of 27 single-bay concrete earth-covered igloos, a munitions maintenance administration facility, an addition to the existing munitions maintenance shop, fiber optic communications duct bank, stormwater drainage infrastructure, and security fencing.

This Draft Environmental Assessment (EA) supports the USAF Environmental Impact Analysis Process for the proposed project. This Draft EA analyzes the potential for environmental and socioeconomic impacts associated with the Proposed Action and alternatives, including the No Action Alternative. In addition, this Draft EA has determined that a Finding of No Significant Impact/Finding of No Practical Alternative is applicable for the Proposed Action and that an Environmental Impact Statement is not required.

Comments and inquiries regarding this document should be directed by mail to 87th Air Base Wing Public Affairs Office, 2901 Falcon Lane, Suite 235, Joint Base McGuire-Dix-Lakehurst, New Jersey 08641, or by email to 87.abw.pa@us.af.mil.

PRIVACY ADVISORY

This Draft EA is being provided for public comment in accordance with the National Environmental Policy Act (NEPA), the President's Council on Environmental Quality NEPA Regulations (40 Code of Federal Regulations §§ 1500–1508), and 32 Code of Federal Regulations § 989, *Environmental Impact Analysis Process*.

The Environmental Impact Analysis Process provides an opportunity for public input on USAF decision-making, allows the public to offer inputs on alternative ways for USAF to accomplish what it is proposing, and solicits comments on USAF's analysis of environmental effects.

Public commenting allows USAF to make better, informed decisions. Letters or other written or oral comments provided may be published in the Final EA. As required by law, comments provided will be addressed in the Final EA and made available to the public. Providing personal information is voluntary. Any personal information provided will be used only to identify your desire to make a statement during the public comment portion of any public meetings or hearings or to fulfill requests for copies of the EA or associated documents. Private addresses will be compiled to develop a mailing list for those requesting copies of the EA. However, only the names of the individuals making comments and specific comments will be disclosed. Personal information, home addresses, telephone numbers, and email addresses will not be published in the Final EA.

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List of Acronyms

5G3	General Permit for Construction Activities
ACM	asbestos-containing material
AFMAN	Air Force Manual
AMC	Air Mobility Command
APE	Area of Potential Effects
BMP	Best Management Practice
CEA	Classification Exception Area
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO_2e	carbon dioxide equivalent
dB	decibel
dBA	decibel A-weighted
DNL	Day-Night Average Sound Level
DoD	Department of Defense
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
FONPA	Finding of No Practical Alternative
FONSI	Finding of No Significant Impact
ft^2	square feet
GHG	greenhouse gas
HCLA	hot cargo loading area
IBD	inhabited building distance
INRMP	Integrated Natural Resources Management Plan
IRP	Installation Restoration Program
JB MDL	Joint Base McGuire-Dix-Lakehurst
LBP	lead-based paint
MEC	munitions and explosives of concern
mgd	million gallons per day
MMRP	Military Munitions Response Program
MSA	munitions storage area
N.J.A.C.	New Jersey Administrative Code
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act of 1969
NEW	net explosive weight
NHPA	National Historic Preservation Act
NJ HPO	New Jersey Historic Preservation Office
NJDEP	New Jersey Department of Environmental Protection
NJPDES	New Jersey Pollutant Discharge Elimination System

NLEB	northern long-eared bat
NO_x	nitrogen oxide
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
O_3	ozone
PCB	polychlorinated biphenyl
pCi/L	picocuries per liter
PEM	palustrine emergent
PFAS	per- and polyfluoroalkyl substances
PM_{10}	particulate matter measured less than or equal to 10 microns in diameter
$PM_{2.5}$	particulate matter measured less than or equal to 2.5 microns in diameter
PPE	personal protective equipment
PTRD	public traffic route distance
QD	quantity-distance
SESC	Soil Erosion and Sediment Control
SO_X	sulfur oxide
SWPPP	Storm Water Pollution Prevention Plan
tpy	tons per year
UFC	Unified Facilities Criteria
UNT	unnamed tributary
USAF	U.S. Air Force
USC	United States Code
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
UXO	unexploded ordnance
VOC	volatile organic compound
WHPA	Well Head Protection Area
WRA	Well Restriction Area

1. PURPOSE AND NEED FOR THE PROPOSED ACTION

1.1 Introduction

The U.S. Air Force (USAF) proposes to construct a new hot cargo loading area (HCLA) pad to replace the existing dual non-functioning HCLA pads and new munitions storage and supporting facilities at the existing munitions storage area (MSA) at the McGuire area of Joint Base McGuire-Dix-Lakehurst (JB MDL). The existing HCLA pads and portions of the existing MSA at the McGuire area are nonoperational, inefficient, and are not compliant with Department of Defense (DoD) Unified Facilities Criteria (UFC) requirements. The proposed HCLA pad and MSA facilities would be compliant with applicable UFC requirements and enable JB MDL to safely and efficiently airlift, transport, and store munitions.

This Environmental Assessment (EA) has been prepared to evaluate the potential environmental and socioeconomic impacts resulting from the Proposed Action and alternatives, including the No Action Alternative. This EA has been prepared in accordance with the National Environmental Policy Act of 1969 (NEPA), as amended, and the Council on Environmental Quality (CEQ) Regulations for implementing the NEPA (40 Code of Federal Regulations [CFR] §§ 1500–1508). USAF is also required to comply with USAF NEPA-implementing regulations, 32 CFR § 989, as amended.

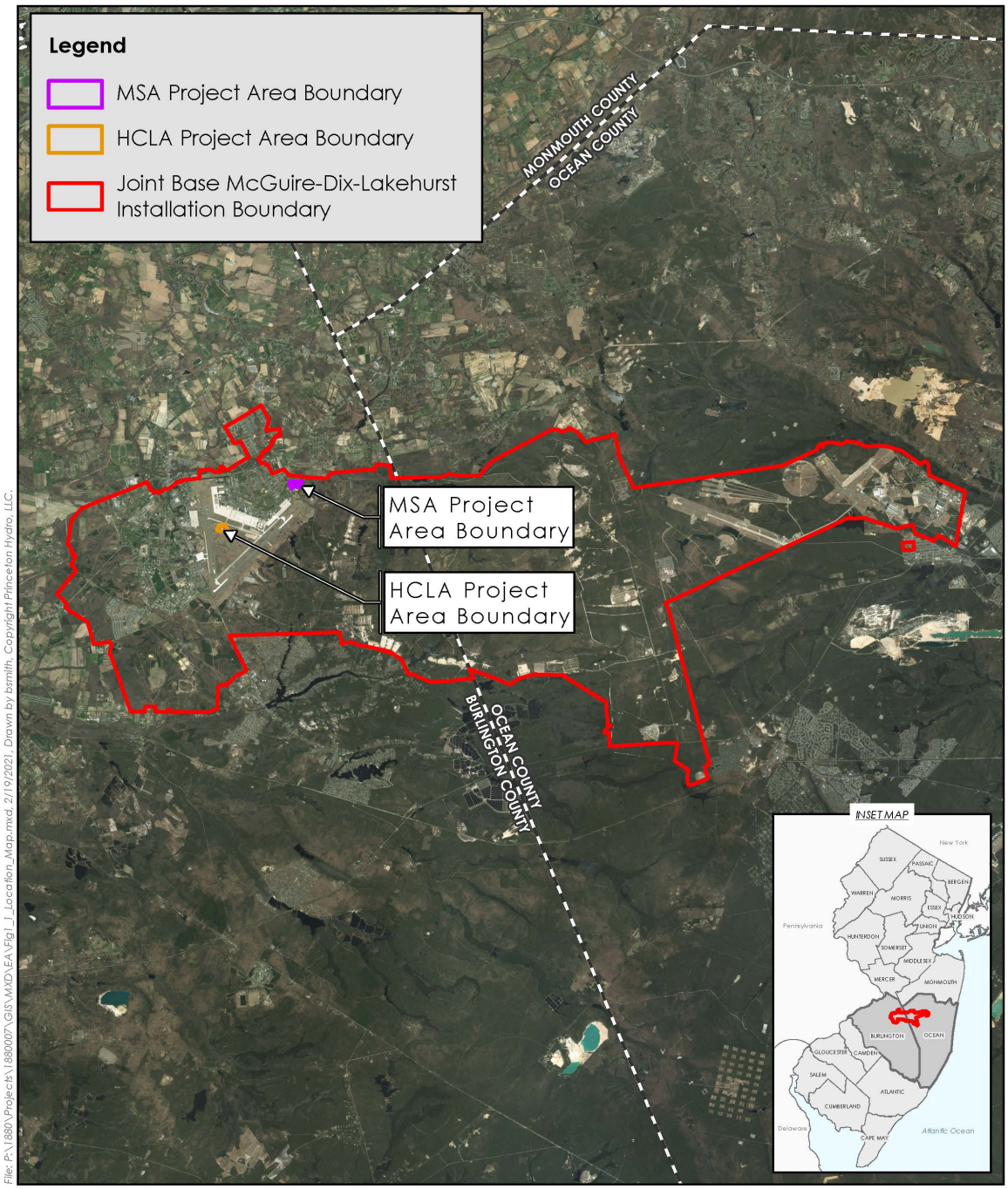
1.2 Project Location

JB MDL spans more than 20 miles west to east within Burlington and Ocean counties in central New Jersey. JB MDL encompasses a total of 42,000 acres, of which the McGuire area occupies 3,562 acres in the northwestern portion of the installation. The sites for the proposed HCLA pad and MSA facilities are within the McGuire area of JB MDL. Specifically, the site of the proposed HCLA pad is at the existing dual HCLA pads within the McGuire Airfield in the center of the McGuire area; and the proposed MSA facilities are at the existing MSA in the northeastern portion of the McGuire area (see **Figure 1-1**).

1.3 Purpose of and Need for the Proposed Action

The purpose of the Proposed Action is to provide a fully operational and efficient HCLA pad and MSA in the McGuire area of JB MDL that are compliant with applicable UFC requirements. The Proposed Action is needed because the existing HCLA pads and portions of the existing MSA in the McGuire area are nonoperational and do not meet applicable UFC requirements. A new HCLA pad and new MSA facilities are necessary to increase the reliability, safety, and cargo capacity of the HCLA pad and MSA to allow USAF to safely and efficiently airlift, transport, and store munitions at the McGuire area of JB MDL.

The existing McGuire area HCLA pads are closed due to improper sizing and permanent obstructions within the HCLA pad footprints. As such, large aircraft (e.g., C-5 and 747) requiring hazardous cargo upload/download must be parked on one of three taxiways at McGuire Airfield. The use of these taxiways creates issues including total closure of the taxiway, denial of use of the HCLA pads by smaller aircraft, and misuse for loading/unloading operations, which, in turn, impedes other aircraft from using McGuire Airfield. Waivers are required for smaller aircraft to use the HCLA pads due to the lack of required distance (37.5 feet) from a taxiway centerline to the edge of the pavement at HCLA pad 1, and because a permanent obstruction (Building 1147,



PROPOSED ACTION LOCATION MAP

HOT CARGO LOADING AREA (HCLA) & MUNITIONS STORAGE AREA (MSA)
ENVIRONMENTAL ASSESSMENT
JOINT BASE MCGUIRE-DIX-LAKEHURST
BURLINGTON COUNTY, NEW JERSEY

NOTES:
1. Project area boundaries and installation boundary provided by JBMDL, 787th Civil Engineer Squadron.
2. 2015 orthoimagery obtained from NJ Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGIS).

0 7,000 14,000 Feet

Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet

Figure 1-1. Proposed Action Location Map

a small shed) is too close (86 feet) to the taxiway centerline at HCLA pad 2 for larger aircraft to safely pass. Additionally, the pavement and lighting at the HCLA pads are in poor condition.

The four 30-bay multi-cube magazines (120 total bays) at the existing McGuire area MSA cannot be used at full capacity because allowable net explosive weight (NEW) and munitions incompatibilities require minimum distances between stored items, rendering many bays unusable as munitions storage. The current MSA configuration limits storage of hazard class 1.1 and 1.2 munitions to 66 pounds NEW. Storage of munitions in excess of this amount must be accommodated at the Dix area Army ammunition supply point, which requires the munitions to be transported approximately 6 miles on unsecured public roads. Additionally, multiple bays at the existing MSA, particularly those in Building 1918, are deteriorated, rendering them nonoperational, and new supporting infrastructure is needed to update communications and intrusion detection systems.

1.4 Scope of the Environmental Assessment

The scope of this EA includes the Proposed Action, alternatives considered, a description of the existing environment, and direct impacts, including those for reasonably foreseeable environmental trends and planned actions. The scope of the Proposed Action and the range of alternatives considered are presented in **Section 2**. The USAF NEPA-implementing regulations, 32 CFR § 989, as amended, require the consideration of the No Action Alternative, which is analyzed to provide the baseline against which the environmental impacts of implementing the range of alternatives addressed can be compared.

This EA identifies the environmental impacts of the Proposed Action and alternatives on affected resource areas. Per CEQ regulations (40 CFR § 1501.9[f][1]), only resource areas that apply to the Proposed Action and alternatives are analyzed. This EA addresses the following resource areas: air quality, noise, geological resources, water resources, biological resources, cultural resources, hazardous materials and wastes, infrastructure, and safety. Land use, environmental justice, and socioeconomics were determined to not be affected by the Proposed Action and were therefore eliminated from further review.

1.5 NEPA and Other Compliance Requirements

The NEPA is a federal law requiring the analysis of potential environmental impacts associated with proposed federal actions prior to implementation. The intent of the NEPA is to inform decisions based on potential environmental consequences and take action(s) to protect, restore, or enhance the environment. The NEPA established the CEQ, which is charged with developing implementing regulations and ensuring federal agency compliance with the NEPA. The CEQ regulations mandate all federal agencies use a prescribed approach to environmental impact analysis. The approach includes an evaluation of the potential environmental consequences associated with a proposed action and consideration of alternative courses of action.

The process for implementing the NEPA is outlined in 40 CFR §§ 1500–1508, *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act.* These CEQ regulations specify that an EA be prepared to determine whether a Finding of No Significant Impact (FONSI) is appropriate or if the preparation of an Environmental Impact Statement (EIS) is necessary. An EA considers the effects of a proposed action on the human environment, which includes the natural and physical environment. It uses a systematic, interdisciplinary approach to evaluate a proposed action and possible alternatives and must disclose all considerations to the public. An EA can aid in an agency's compliance with NEPA when an EIS is unnecessary and facilitate the preparation of an EIS when one is required.

USAF regulations under 32 CFR § 989 provide procedures for an environmental impact analysis for the USAF to comply with the NEPA and CEQ NEPA regulations. Air Force Policy Directive 32-70, *Environmental Considerations in Air Force Programs and Activities,* states that the USAF will comply with applicable federal, state, and local environmental laws and regulations, including the NEPA. If significant impacts are predicted under the NEPA, then the USAF would decide whether to conduct mitigation to reduce impacts below the level of significance, prepare an EIS, or abandon the Proposed Action. The EA also will be used to guide the USAF in implementing the Proposed Action in a manner consistent with USAF standards for environmental stewardship should the Proposed Action be approved for implementation.

Executive Order (EO) 11988, *Floodplain Management*, and EO 11990, *Protection of Wetlands*, require that a Finding of No Practicable Alternative (FONPA) accompany a FONSI for actions that involve action in a floodplain or new construction in a wetland. The FONPA provides a discussion for why no practicable alternatives exist for avoiding impacts on these resources. A FONPA is necessary for construction of the new HCLA pad due to unavoidable direct impacts to wetlands within the proposed footprint of the new HCLA pad.

1.6 Stakeholder Coordination and Public Involvement

1.6.1 Intergovernmental Coordination

EO 12372, *Intergovernmental Review of Federal Programs*, as amended by EO 12416 with the same title and supplemented by EO 13132, *Federalism*, requires federal agencies to provide opportunities for consultation by elected officials of state and local governments that could be affected by a federal proposal. Through the intergovernmental coordination process, the USAF notifies relevant federal, state, and local agencies of a proposed action and alternatives and provides them with sufficient time to make known their environmental concerns specific to the action. The process also provides the USAF with the opportunity to cooperate with and consider state and local views in implementing the federal proposal. **Section 7** contains the intergovernmental coordination list and **Appendix A** contains documentation of intergovernmental coordination.

1.6.2 Government to Government Coordination and Consultation

The National Historic Preservation Act (NHPA) requires federal agencies to consult with Native American tribal governments to identify cultural resources that may be adversely affected by the agency's proposed action. Consistent with the NHPA, DoD Instruction 4710.02, *DoD Interactions with Federally Recognized Tribes*, and Department of the Air Force Instruction 90-2002, *Interactions with Federally Recognized Tribes*, federally recognized tribes that are historically affiliated with the JB MDL geographic region are invited to consult on all proposed undertakings that potentially affect properties of cultural, historical, or religious significance to the tribes. The tribal consultation process is distinct from NEPA consultation with federal, state, and local governments or the intergovernmental coordination process, and it requires separate consultation with all relevant tribes. The timelines for tribal consultation are also distinct from those of other consultations. The JB MDL point-of-contact for Native American tribes is the Installation Commander. The Installation Commander has designated the JB MDL Environmental Supervisor (787 CES/CEIE) as the Installation Tribal Liaison Officer in accordance with Department of the Air Force Instruction 90-2002, *Interactions with Federally Recognized Tribes*. In September 2011, the Installation Commander invited three federally recognized tribes (Delaware Nation, Delaware Tribe of Indians, and Stockbridge Munsee Community) to engage in government-to-government consultation. On December 9, 2011, the Stockbridge Munsee Community indicated that JB MDL is not located within a county the tribe

has an interest in. However, the Delaware Nation and Delaware Tribe of Indians expressed interest in government-to-government consultation with JB MDL.

A description of the Proposed Action and alternatives and invitations to participate in government-to-government consultations were sent to the Delaware Nation and Delaware Tribe of Indians on February 11, 2021. **Section 7** contains the Native American tribal governments coordinated or consulted with regarding the Proposed Action and **Appendix A** contains all records of correspondence.

[[Preparer's Note: Section 1.6.2 and Appendix A will be updated with outcomes of and correspondence relating to tribal participation in the Section 106 consultation process.]]

1.6.3 Other Agency Consultation

Per the requirements of Section 106 of the NHPA and implementing regulations (36 CFR § 800) and Section 7 of the Endangered Species Act and implementing regulations (50 CFR Part 402), including the Migratory Bird Treaty Act, findings of effect and requests for concurrence, where appropriate, have been transmitted to the New Jersey Historic Preservation Office (NJ HPO) and the United States Fish and Wildlife Service (USFWS), respectively. Results of ongoing consultations and records of correspondence with these agencies are included in **Appendix A**.

[[Preparer's Note: Section 1.6.3 and Appendix A will be updated with outcomes of and correspondence relating to Section 106 and Section 7 consultation processes.]]

1.6.4 Public Involvement

NEPA requirements help ensure environmental information is made available to the public during the decision-making process and prior to an action's implementation. A premise of NEPA is that the quality of federal decisions will be enhanced if the public is involved in the planning process.

The Proposed Action is subject to the requirements and objectives of EO 11990, *Protection of Wetlands,* because it has the potential to be located in wetlands. As such, a Notice of Early Public Review was published in the Burlington County Times and Asbury Park Press on February 17, 2021, describing the Proposed Action and announcing its potential to be located in wetlands. Copies of the newspaper affidavits are provided in **Appendix B**. This notice was required by EO 11990 and made available to the public in accordance with 32 CFR § 989.24(c) and Air Force Manual 32-7003, *Environmental Conservation,* for actions proposed in wetlands. The Notice of Early Public Review requested public comments to determine if there are any public concerns regarding the Proposed Action's potential to impact wetland areas and provided an address to which public comments could be submitted. No public comments were received in response to the Notice of Early Public Review.

A Notice of Availability was published in the Burlington County Times and Asbury Park Press on May 11, 2021 announcing the 30-day availability of the Draft EA and Draft FONSI/FONPA for review. The Notice of Availability invites the public and agencies to review and comment on the Draft EA and Draft FONSI/FONPA. The Draft EA and Draft FONSI/FONPA have been made available for public review at the Manchester Branch of the Ocean County Library, the Tom's River Branch of the Ocean County Library, and the Pemberton Branch of the Burlington County Library.

2. DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

As discussed in **Section 1.5**, the NEPA process provides for an evaluation of potential environmental consequences associated with a proposed action and considers alternative courses of action. Reasonable alternatives must satisfy the purpose of and need for the Proposed Action, as defined in **Section 1.3**. In addition, CEQ guidance recommends the inclusion of a No Action Alternative against which potential impacts would be compared. While the No Action Alternative would not satisfy the purpose of or need for the Proposed Action, it is analyzed in detail in accordance with USAF NEPA-implementing regulations (32 CFR § 989, as amended).

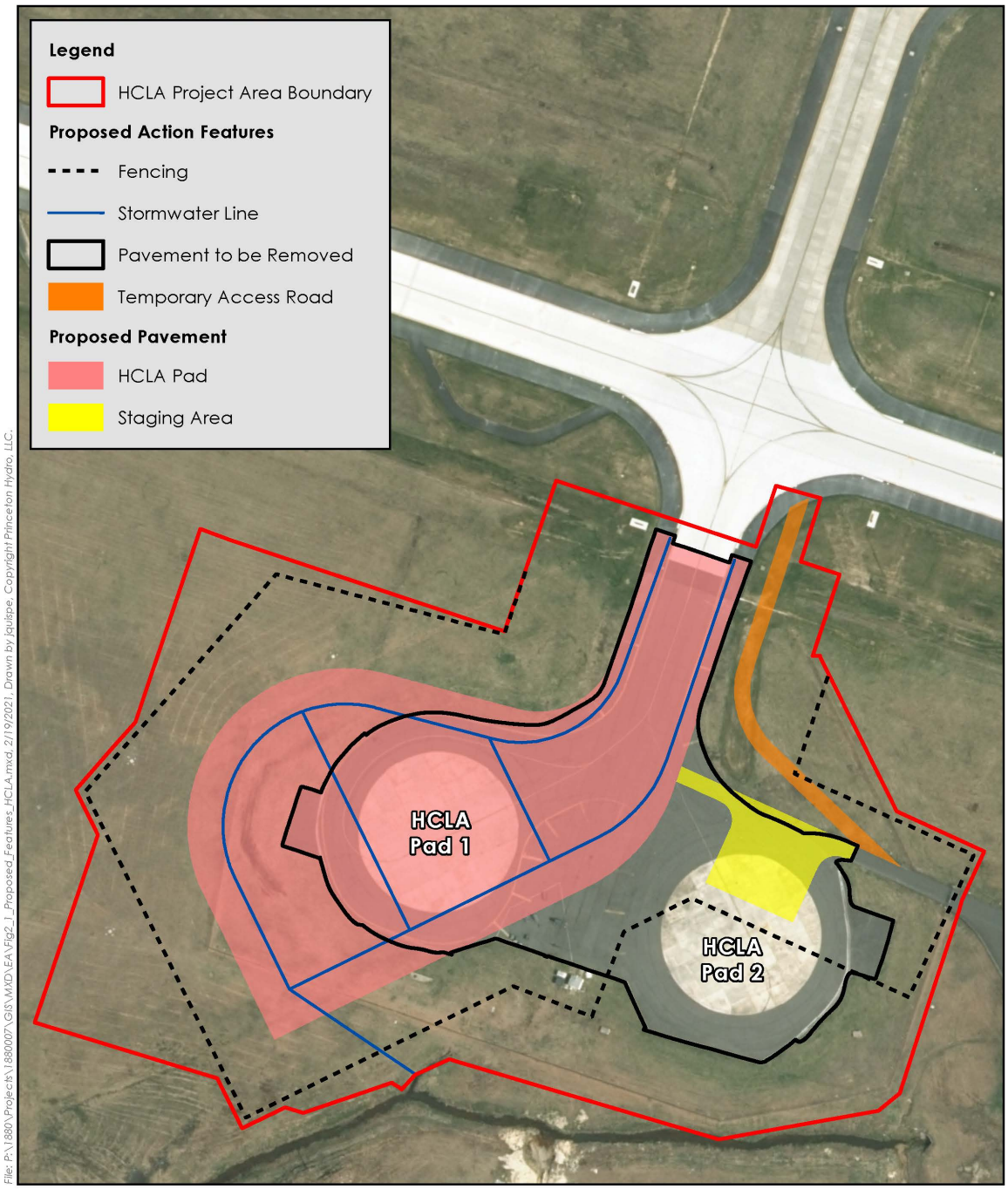
2.1 Proposed Action

USAF proposes to construct a new HCLA pad and MSA facilities in the McGuire area of JB MDL. The proposed HCLA pad is sited at the current location of HCLA pad 1 at the existing dual HCLA pads within the McGuire Airfield in the center of the McGuire area. The proposed MSA facilities are sited at the existing MSA in the northeastern corner of the McGuire area.

The Proposed Action includes construction and operation of a HCLA pad and MSA facilities with associated utilities and site improvements. The proposed HCLA pad would replace the existing dual non-functioning HCLA pads with a properly sited, larger HCLA pad. The proposed MSA facilities would add 27 concrete earth-covered igloos and other support facilities at the existing MSA. The new HCLA pad and MSA facilities would be designed and constructed in compliance with applicable UFC requirements including UFC 4-010-01, *DoD Minimum Antiterrorism Standards for Buildings*, for the MSA facilities, and UFC 3-260-01, *Airfield and Heliport Planning and Design*, for the HCLA pad. Additionally, the design of the MSA facilities would comply with criteria established in the Air Force Corporate Facilities Standards and, if applicable, the Installation Facilities Standards.

HCLA Pad. Construction of the proposed HCLA pad requires demolition and removal of existing infrastructure, including approximately 229,489 square feet (ft^2) of pavement comprised of two HCLA pads (aprons and shoulders), HCLA taxiway and shoulders, portions of the asphalt access road to the transient munitions storage building, and other support pavement; taxiway edge lighting and apron area lighting including associated cable, conduit, and manholes; 1,805 linear feet of fencing on the west, south, and east sides of the HCLA pads; 4,675 linear feet of conduit duct banks; stormwater drainage infrastructure, including trench drains, storm drain structures (inlets, headwall, and storage vault), and connecting storm drain pipes; and the hydrant fuel pit from HCLA pad 2 (see **Figure 2-1** and **Table 2-1**). Additionally, approximately 0.44 acres of wetlands and transition areas within the HCLA project area would be impacted by the Proposed Action, including 0.3 acres of wetland to be filled by the new HCLA pad.

The proposed HCLA pad would include construction of a 162,195 ft^2 HCLA apron of rigid pavement with 50-foot asphalt shoulders sized for parking C-5 and 747 aircraft; a 50,399 ft^2 taxiway apron with 25-foot shoulders connecting to Taxiway "Lima"; 17,091 ft^2 of pavement for the staging area; shoulder, taxiway edge, and high mast exterior area lighting; pavement markings; stormwater drainage system; and security fencing. Other components that would be constructed at the proposed HCLA pad include aircraft tie-down and grounding points, and utilities (telephone service, electricity for apron and airfield lighting, water/fire hydrant).



PROPOSED HCLA PAD COMPONENTS

HOT CARGO LOADING AREA (HCLA) & MUNITIONS STORAGE AREA (MSA)
ENVIRONMENTAL ASSESSMENT
JOINT BASE MCGUIRE-DIX-LAKEHURST
BURLINGTON COUNTY, NEW JERSEY

NOTES:
1. Proposed features provided by JBMDL, 787th Civil Engineer Squadron. Project area boundary approximated based upon proposed features.
2. 2015 orthoimagery obtained from NJ Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGIS).

0 80 160 Feet

Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet

Figure 2-1. Proposed HCLA Pad Components

Table 2-1. Proposed Action Demolition and Construction

Demolition	Area/Linear Feet	Location
Security fencing	1,805 linear feet 3,809 linear feet	HCLA pad MSA
Pavement removal	229,489 ft^2 29,802 ft^2	HCLA pad MSA
Temporary ground disturbance	Up to 15.5 acres Up to 9.5 acres	HCLA pad MSA
Building 1913 (administration facility)	958 ft^2	MSA
Building 1918 (multi-cube magazine with 30 bays)	5,479 ft^2	MSA
Building 1939 (vacant shed)	97 ft^2	MSA
Earth berms	5,052 ft^2	MSA
Construction	**Area/Linear Feet**	**Location**
HCLA pad apron with shoulder	162,195 ft^2	HCLA pad
Taxiway with shoulder	50,399 ft^2	HCLA pad
Taxiway edge/shoulder lighting	1,650 linear feet	HCLA pad
Temporary access road	10,474 ft^2	HCLA pad
Other permanent pavement (roads, sidewalks, pads, etc.)	17,091 ft^2 54,030 ft^2	HCLA pad MSA
Demolition	**Area/Linear Feet**	**Location**
Fencing	2,750 linear feet 3,752 linear feet	HCLA pad MSA
27 munitions storage igloos	15,517 ft^2	MSA
Munitions administration facility	2,745 ft^2	MSA
Addition to munitions maintenance shop	1,157 ft^2	MSA

A temporary access road would be constructed for use during the construction phase to connect the HCLA pad taxiway to the transient munitions storage building that is east of the proposed HCLA pad. **Figure 2-1** presents the layout of the proposed HCLA pad. The HCLA pad pavement would be 19.5-inch-thick Portland cement concrete underlain by a 4-inch drainage layer and 8-inch cement modified subgrade. Shoulders would consist of 1.5 inches of hot mix asphalt wear course, 2.5 inches of hot mix asphalt base underlain by 6 inches of graded crushed aggregate. Additionally, mitigation for the permanent loss of existing 0.3 acres of wetland will be required. A mitigation plan would be developed during the final design of the proposed HCLA pad subsequent to the evaluation of proposed wetland impacts within the EA. The proposed mitigation will require approval from the New Jersey Department of Environmental Protection (NJDEP) during the permit review process.

Construction of the proposed HCLA pad would overlap with an area designated as an Installation Restoration Program (IRP) site (Operable Unit 8, McGuire Site FT008), which is west/southwest of HCLA pad 1 and the proposed HCLA pad site. Site FT008 (Fire Training Area No. 1) is a 3-acre site that was used to burn waste oils, aviation gasoline, jet fuel, hydraulic fluid, spent solvent, and alcohols during fire department training exercises from the late 1940s to 1958. It consists of overlapping groundwater plumes of trichloroethylene and benzene, as well as surface and subsurface soil contaminated with dioxin/furan compounds, semi-volatile organic compounds, including nine polyaromatic hydrocarbon compounds, and pesticides (JB MDL,

2018a). A feasibility study is currently being completed for the site. Under the Proposed Action, the proposed HCLA pad would overlap with the eastern portion of this site.

Construction of the HCLA pad is anticipated to take 18 months to complete and would conclude in Fiscal Year 2023. All runways, taxiways, and aprons would remain open during construction of the proposed HCLA pad. Construction of the proposed HCLA pad would temporarily disturb up to 15.5 acres of ground surface and result in a permanent increase of 1.8 acres of impervious surface.

The proposed HCLA pad would be used for loading and unloading weapons, ammunition, explosives, and other hazardous cargo of class 1.1 and 1.2 from various aircraft, including 747, KC-46, C-17, C-130, KC-10, C-5, and KC-135. The type and quantity of hazardous cargo operations at the proposed HCLA pad would not change from current conditions and there would be no increase in the quantity of aircraft utilizing the proposed HCLA pad. Activities that would occur at the proposed HCLA pad include pre- and post-flight procedures, cargo loading and unloading, and aircraft refueling (for aircraft with hazardous cargo).

HCLA pads are required at facilities where the existing aprons cannot be used for handling hazardous cargo for safety reasons due to insufficient quantity-distance (QD) clear zones, which are protection requirements from potential explosion sites to various types of exposed sites. Exposed sites include structures, other than ammunition and explosives-related buildings, occupied by personnel or the general public within and outside DoD establishments. Under the Proposed Action, the proposed HCLA pad would be the potential explosion sites and inhabited buildings and public traffic routes (e.g., public highways) would be exposed sites. Defense Explosives Safety Regulation 6055.09 Air Force Manual (AFMAN) 91-201, *Explosives Safety Standards*, describes the inhabited building distance (IBD) and the public traffic route distance (PTRD), which are the minimum distances required to be maintained between a potential explosion site and an inhabited building and public traffic route, respectively, to protect nonexplosive-related facilities and personnel. The proposed HCLA pad QD arcs would consist of an IBD of 1,250 feet from non-related aircraft and facilities, and a PTRD of 750 feet (see **Figure 2-2**). The proposed HCLA pad is considered a related facility to the transient munitions storage building located east of HCLA pad 2.

Prior to construction of the proposed HCLA pad, a new jet fuel hydrant system (fuel pit and associated piping) would be installed under the site of the proposed HCLA pad at HCLA pad 1. This project is not part of USAF's Proposed Action, but is relevant because the proposed HCLA pad design incorporates the jet fuel hydrant system which will supply fuel to aircraft using the proposed HCLA pad.

MSA. Construction of the proposed MSA facilities would require demolition of approximately 6,534 ft^2 of existing buildings, including Buildings 1913 (administration facility), 1918 (multi-cube magazine with 30 bays), and 1939 (vacant shed) (see **Figure 2-3** and **Table 2-1**). Additionally, 29,802 ft^2 of pavement (concrete pads, roadways, sidewalks, etc.), 1,164 ft^2 of gravel, and 3,809 linear feet of security fencing would be removed. Building 1913 and associated sidewalks and existing security fence would remain in place until the proposed munitions maintenance administration facility and fencing are constructed, at which time these structures would be removed. Portions of some existing infrastructure, such as a water line, sanitary sewer line, and an out-of-service monitoring well, would be abandoned in place and capped. Two earthen berms would be removed from their existing locations north of the existing munitions maintenance shop and south of Building 1918, with the material reused during construction. Sustainable principles would be integrated into the design and construction of the MSA in accordance with UFC 1-200-02, *High Performance and Sustainable Building Requirements*.

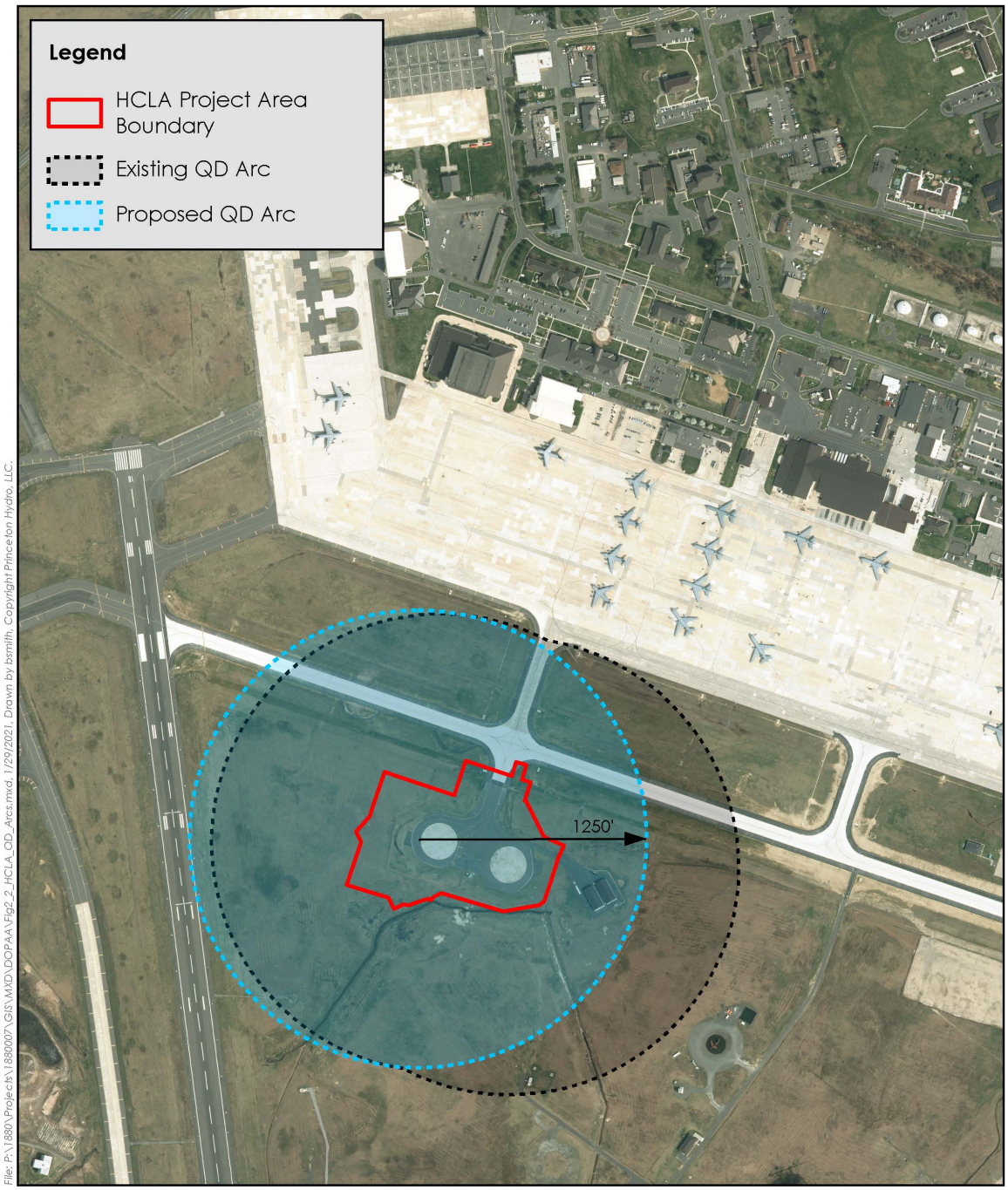
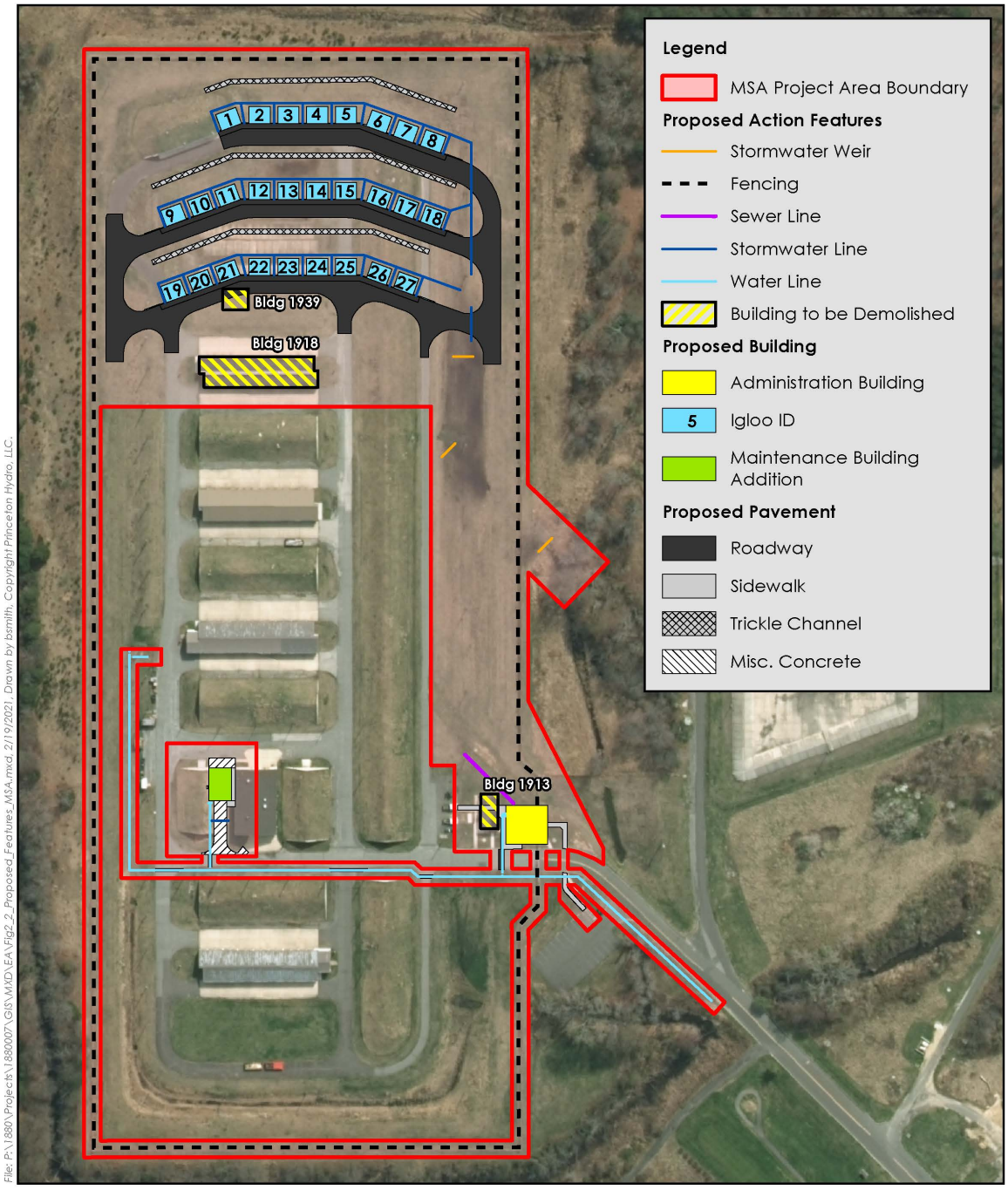


Figure 2-2. HCLA QD Arcs



PROPOSED MSA COMPONENTS

HOT CARGO LOADING AREA (HCLA) & MUNITIONS STORAGE AREA (MSA)
ENVIRONMENTAL ASSESSMENT
JOINT BASE MCGUIRE-DIX-LAKEHURST
BURLINGTON COUNTY, NEW JERSEY

NOTES:
1. Project area boundary and proposed features provided by JBMDL, 787th Civil Engineer Squadron.
2. 2015 orthoimagery obtained from NJ Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGIS).

0 80 160 Feet

Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet

Figure 2-3. Proposed MSA Components

Proposed MSA Components The proposed MSA facilities would include construction of 15,517 ft^2 of munitions storage consisting of 27 single-bay concrete earth-covered igloos in a multi-cubicle configuration, a 2,745 ft^2 munitions maintenance administration facility, a 1,157 ft^2 addition to an existing munitions maintenance shop, 54,030 ft^2 of new concrete and asphalt pavement, site improvements, utilities (electrical, water, sewer), 3,752 linear feet of security fencing, fiber optic communications duct bank, environmental remediation, and all necessary site support. Stormwater drainage infrastructure, including trickle channels and three concrete spreader weirs with downstream vegetative filters and associated piping, would be constructed within the proposed MSA project area to supplement existing stormwater drainage infrastructure.

The proposed igloos would include 2-foot-high earthen berms over the igloos; blast-resistant concrete foundations, floors, walls, and ceilings; blast doors; ventilation; electrical power and lighting; fire detection; intrusion detection system; grounding; and lightning protection systems. The proposed munitions maintenance administration facility, which would house administrative and control functions, would include a concrete foundation, slab, and metal stud wall with brick veneer exterior. The proposed addition to the munitions maintenance shop would consist of one bay with concrete foundation and slab; blast-proof concrete exterior and partition walls with brick veneer and a concrete ceiling overhead monorail hoist system; communications and security systems, standing seam metal roof, oil fired boiler and reciprocating chiller heating and cooling system, plumbing system, fire detection and suppression systems, electrical power and lighting systems, communications and security systems, and a compressed air system as required. The addition would accommodate weapon assembly and disassembly, corrosion control, maintenance and repair of single practice bombs, 30-millimeter ammunition, flare dispensers, countermeasures, and containers.

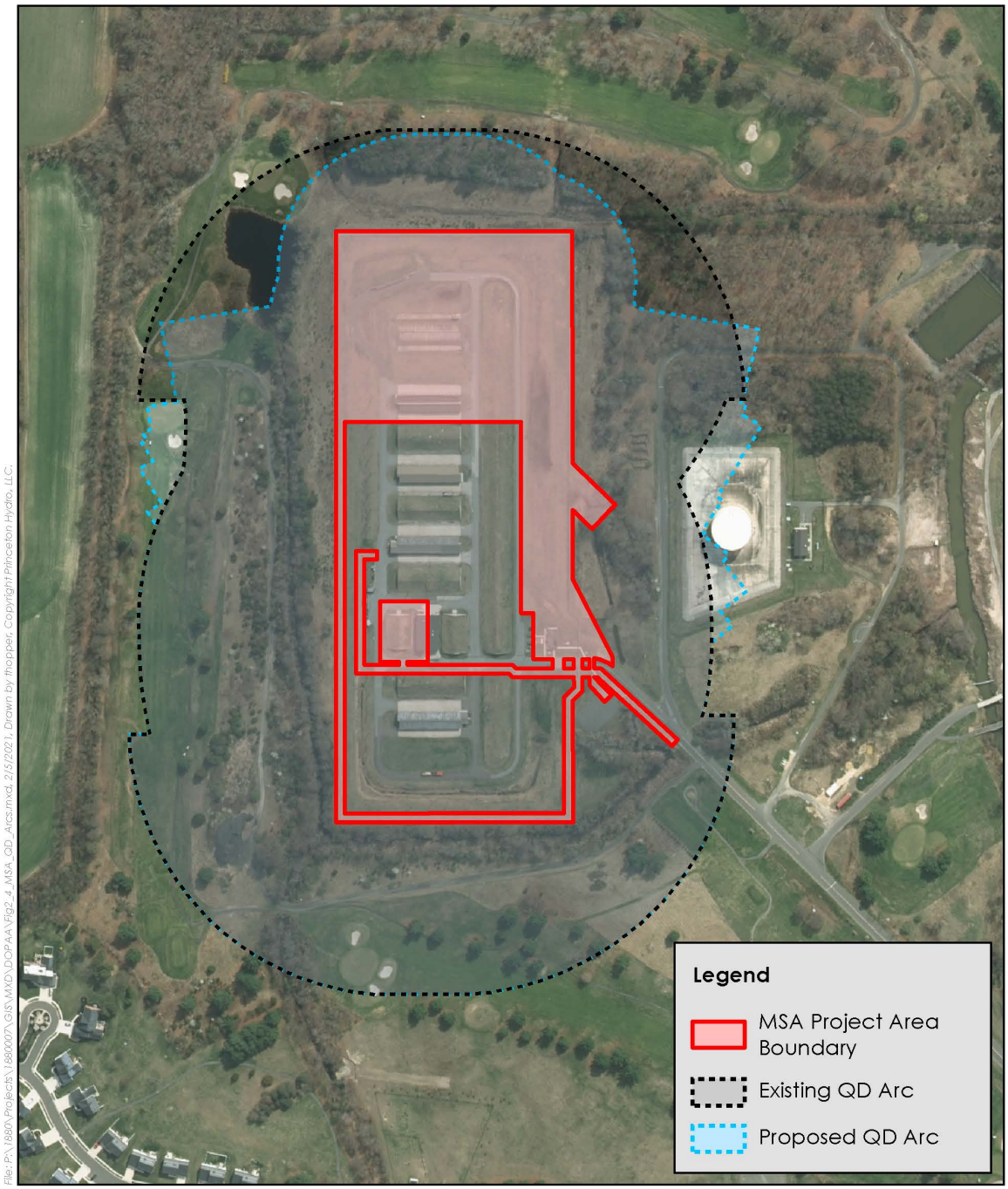
Construction of the proposed MSA facilities is anticipated to begin in October 2021 and conclude in October 2023. Construction of the proposed MSA facilities would temporarily disturb up to 9.5 acres of ground surface and result in a permanent increase of 1-acre of impervious surface. Approximately 0.04 acres of transition areas within the MSA project area would be impacted by grading activities.

The proposed MSA facilities are sited in accordance with applicable USAF guidance to ensure a safe working environment for MSA and other installation personnel. The igloo configurations are sited as close together as safety setback distances allow based on the amount of munitions to be stored and the facility type.

This helps maintain appropriate QD arcs within the MSA and prevents unnecessary exposure to inhabited structures outside the MSA. The QD arc radii for each igloo at the proposed MSA would be an IBD ranging from 654 feet to 806 feet and a PTRD of 420 feet for front exposure (to the west), and an IBD of 250 feet and a PTRD of 150 feet for side/rear exposure (to the north, east, and south) (see **Figure 2-4**).

Proposed Action Measures. The Proposed Action would incorporate the following measures to comply with requirements that apply specifically to JB MDL:

- A site-specific Soil Erosion and Sediment Control (SESC) Plan would be submitted to the Burlington County Soil Conservation District for certification, with no construction occurring until certification has been received. Additionally, a NJDEP Construction Activity Stormwater General Permit (5G3) would also be obtained prior to initiating construction.



MSA QD ARCS

HOT CARGO LOADING AREA (HCLA) & MUNITIONS STORAGE AREA (MSA)
DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES
JOINT BASE MCGUIRE-DIX-LAKEHURST
BURLINGTON COUNTY, NEW JERSEY

NOTES:
1. Project area boundary and proposed QD arcs provided by JBMDL, 787th Civil Engineer Squadron.
2. Existing QD arcs are approximate, digitized based on IBD Clear Zone distances as reported on the Explosives Site Plan AMC-JB M-D-L09.
3. 2015 orthoimagery obtained from NJ Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGIS).

0 150 300 Feet

Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet

Figure 2-4. MSA QD Arcs

- Stormwater would be managed in accordance with New Jersey Administrative Code (N.J.A.C.) 7:8 and Section 438 of the Energy Independence and Security Act of 2007. The Proposed Action would be considered a 'major development', and as such, a stormwater management review consistent with N.J.A.C. 7:8 will be required.
- The Proposed Action would require permit approvals from the NJDEP Division of Land Use Regulation Program to authorize regulated activities within areas governed by the Freshwater Wetlands Protection Act (New Jersey Statutes Annotated [N.J.S.A.] 13:9B-1 et seq.) and the Flood Hazard Area Control Act (N.J.S.A. 58:16A-50 et seq.) rules.
- Grassland habitat within the project areas known to support state-listed grassland bird species would be mowed prior to the breeding season and subsequently maintained at a low height throughout construction to prevent utilization by grassland birds. Subsequent to construction activities these areas would revert to suitable grassland habitat. Additionally, the construction start date would occur outside the regional grassland bird breeding season of April 15 through July 31.
- The JB MDL Natural Resources Manager would periodically monitor the project areas during land clearing operations for the presence of special status species. If any special status species are encountered, construction personnel would be required to contact the JB MDL Natural Resources Manager immediately.
- NJ HPO concurrence with a finding of no effect on cultural resources would be obtained prior to construction occurring. In the case of inadvertent discovery of prehistoric or historic artifacts during project construction, all construction would cease, the site would be secured, and the JB MDL Cultural Resource Manager would contact the NJ HPO and federally recognized tribes, as applicable, within 24-hours.
- Prior to any activities involving digging, drilling, grading, or any other subsurface disturbance activity, the construction team would initiate and procure a Dig Permit at JB MDL (i.e., a Base Civil Engineering Work Clearance Request [Form AF IMT 103]). This process includes contacting New Jersey One-Call.
- While the project areas are not in a "sweep required" area, the construction specification would provide clear instructions to construction personnel on the steps to follow if unexploded ordnance (UXO) is discovered. A pre-construction safety brief would be provided by the JB MDL Safety Office to the construction team outlining how to recognize UXO and the steps to follow. If UXO is discovered, all work would cease, workers would muster at an off-site location, and the discovery would be reported immediately to the JB MDL Dispatch Office at (732) 323-4000.
- In the event of a hazardous material or petroleum spill at the project areas, the JB MDL Dispatch Office would be contacted immediately at (732) 323-4000 in accordance with the installation's spill response policy.
- During construction, heavy equipment would be required to park overnight on paved surfaces. Prior to use each day, all equipment would be inspected for hydraulic and fuel leaks. If leaks are detected, clean-up and repair would be performed immediately.
- All construction equipment would comply with the 3-minute idling limit pursuant to N.J.A.C. 7:27-14 and N.J.A.C. 7:27-15. All non-road diesel equipment would comply with the federal Clean Air Nonroad Diesel Rule, which regulates emissions from nonroad diesel engines and sulfur content in nonroad diesel fuel.

- Dust suppression techniques would be used during construction to reduce air pollution. Methods would include application of water, soil stabilizers, or vegetation; use of wind break enclosures; use of covers on soil stockpiles and dump truck loads; use of silt fences; and suspension of earth-movement activities during high-wind conditions (gusts exceeding 25 miles per hour).
- During construction and operation, use of electricity from the installation would be used preferentially over the use of generators. All generator use would be pre-approved by the JB MDL Air Quality Manager and adhere to applicable NJDEP permit conditions.
- After construction, disturbed areas would be restored and planted with desirable, native grasses in accordance with existing New Jersey SESC standards and as approved by the Burlington County Soil Conservation District to minimize potential erosion and restore grassland habitat. JB MDL would coordinate with the Burlington County Soil Conservation District to ensure the appropriate grassland seed mix is included within their certification approval.
- All stockpiles of excavated materials located within construction areas would be completely covered with tarping and sufficiently weighted down to prevent dust and material from entering other airfield pavement areas outside of the barricaded area.

2.2 Selection Standard for Project Alternatives

In accordance with 32 CFR § 989.8(c), the development of selection standards is an effective mechanism for the identification, comparison, and evaluation of reasonable alternatives. The selection standards were developed to be consistent with the purpose of and need for the Proposed Action and to address pertinent mission, environmental, safety, and health factors. The following selection standards were utilized to identify reasonable alternatives for analysis in the EA:

- Provide a greater degree of safety for JB MDL personnel who airlift, transport, and store munitions;
- Comply with applicable UFC, including antiterrorism/force protection requirements;
- Is adequately sized to contain the necessary infrastructure;
- Provide sufficient QD separation distance of 1,250 feet for the proposed HCLA pad and up to 806 feet for the proposed munitions storage facilities;
- Have minimal impact on QD separation distances and other critical facilities;
- Be located adjacent to existing runway and taxiway (HCLA pad) and non-public roads (HCLA pad and munitions storage and supporting facilities);
- Not impede aircraft operations on the McGuire Airfield (HCLA pad);
- Be compatible with the mission and training at the installation;
- Be compatible with future development needs;
- Be compatible with the 2015 Installation Development Plan;
- Minimize adverse impacts on adjacent communities and properties; and
- Avoid environmental resources such as cultural resources, biological resources, wetlands, floodplains, and contaminated soil or groundwater to the maximum extent practicable.

The Proposed Action is compliant and consistent with the Selection Standards described above (see **Section 2.1** for a detailed description of the Proposed Action). Although construction of the new HCLA pad would impact wetlands and overlap with one IRP site (Site FT008), the planned configuration is required to accommodate new regulations for airplane turning radii, line up with the new jet fuel hydrant system, and avoid the QD arc of the transient munitions storage building. As described in **Section 3.6.2**, mitigation would be conducted to provide an equitable replacement of the functions and values associated with wetlands impacted. Additionally, as described in **Section 3.9.2.3**, the USAF would coordinate with the JB MDL Environmental Restoration Program, Weapons Safety, and Explosives Ordnance Disposal offices to ensure that ground disturbance would not conflict with ongoing remediation and investigation activities at Site FT008.

2.3 No Action Alternative

Under the No Action Alternative, the USAF would not construct a new UFC-compliant HCLA pad and munitions storage and supporting facilities within the McGuire area of JB MDL. The HCLA pads and portions of the MSA would continue to be nonoperational and out of compliance with UFC requirements requiring inefficient workarounds. The HCLA pads are improperly sized and have permanent obstructions which prevent maximum efficiency of airfield operations. The MSA facilities would continue to deteriorate until buildings can no longer support the munitions storage mission requirement and munitions in excess of 66 pounds NEW would have to be stored at different locations. Additionally, logistical difficulties due to security, transport, and documentation of munitions on public roads would continue to require additional explosive ordnance demolition, security forces, and maintenance man-hours. The deficient HCLA pads and MSA would continue to adversely impact the installation's ability to safely and efficiently airlift, transport, and store munitions at the McGuire area of JB MDL.

The No Action Alternative would not satisfy the purpose of and need for the Proposed Action as described in **Section 1.3**; however, the USAF Environmental Impact Analysis Process requires consideration of the No Action Alternative, and CEQ guidance recommends inclusion of the No Action Alternative in an EA to assess environmental consequences that may occur if the Proposed Action is not implemented. Therefore, the No Action Alternative will be carried forward for detailed analysis and also serves as a baseline against which the Proposed Action can be compared.

2.4 Alternatives Considered but Eliminated from Detailed Analysis

As part of the alternative development process, the USAF considered other alternatives for the Proposed Action. The proposed HCLA pad site is the only location able to comply with selection standards, including a location adjacent to existing runways, taxiways, and roads; 1,250-foot QD separation distance from other aircraft, permanent structures, and normal operating stations for flight line personnel; and minimal impact on other QD separation distances and critical infrastructure, including the transient munitions storage facility and air traffic control tower which are east and southeast of the proposed HCLA site, respectively.

USAF considered the use of the Dix area Army ammunition supply point and the Lakehurst MSA to accommodate the munitions to be stored at the proposed MSA facilities; however, both sites were not considered viable alternatives. Siting the proposed MSA at these locations would require munitions to be transported long distances (more than 6 miles) on installation and unsecured public roadways from the McGuire airfield to either the Dix or Lakehurst areas. Other locations for the proposed MSA facilities at the existing McGuire MSA are constrained by the

MSA QD arcs that must avoid a fuel tank to the south and the installation boundary to the north. Because these alternatives would not fully satisfy all of the selection standards, they were eliminated from detailed analysis in the EA.

2.5 Identification of the Preferred Alternatives

The preferred alternative is to implement the Proposed Action, as described in **Section 2.1**.

3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 General Overview

Section 3 examines the potential impacts to the affected environment associated with implementing both the Proposed Action and the No Action Alternative. This EA is limited in scope to a detailed analysis of resources that could be affected by the Proposed Action. Land use, socioeconomics, and environmental justice were considered for potential impacts, determined to not be affected by the Proposed Action, and therefore were eliminated from detailed analysis in the EA.

3.1.1 Reasonably Foreseeable Environmental Trends and Planned Actions

Reasonably foreseeable environmental trends and planned actions were identified within 1 mile of the HCLA and MSA project areas within the next three years (2021-2024). Reasonably foreseeable environmental trends and planned actions reviewed include on- and off-base planned actions that have the potential to affect the resource areas analyzed in this EA**.**

A desktop review did not identify any off-base planned actions within 1 mile of the HCLA and MSA project areas within the next three years; however, three on-base planned actions were identified: 1) the replacement of a leaking fuel hydrant system at the HCLA (ongoing and to be completed prior to the construction of the proposed HCLA pad); 2) the repair of sanitary sewer lines (planned for Fiscal Year 2021); and 3) the restriping of the Air Mobility Command (AMC) aircraft parking ramp (planned for Fiscal Year 2021). **Section 3** analyzes whether the identified planned actions may have the potential to impact the affected environment in combination with the Proposed Action**.**

3.1.2 Resource Areas Eliminated from Detailed Analysis

3.1.2.1 Land Use

Land within the HCLA project area consists of airfield surface area. Current and future land use within and surrounding the HCLA project area is classified as airfield per the Installation Development Plan (JB MDL, 2015a). Current and future land use within the MSA project area is classified as industrial with proximal areas classified as outdoor recreation, per the Installation Development Plan. The land identified as recreational proximal to the MSA consists of the Falcon Creek Golf Course, which is out-of-use.

The HCLA and MSA project areas are geographically located within the McGuire area of JB MDL within the boundaries of New Hanover Township, New Jersey. New Hanover Township zoning identifies JB MDL as “Military Installation;” however, municipal zoning regulations do not apply to federal property. The HCLA and MSA project areas are also located within the Pinelands National Reserve, which is protected by Section 502 of the National Parks and Recreation Act of 1978 and the New Jersey Pinelands Protection Act of 1979. The Pinelands

Comprehensive Management Plan identifies JB MDL as a "Military and Federal Installation Area," which is defined as federal enclaves within the Pinelands. Permitted uses are those associated with the function of the installation or other public purpose uses undertaken by or on behalf of another level of government (New Jersey Pinelands Commission, 2018). New Jersey Pinelands Commission review of this project is waived as a mission essential project for JB MDL in accordance with N.J.A.C. 7:50-4.52(d).

No impacts to land use would result from the implementation of Alternative 1 (i.e., the Proposed Action). The HCLA project area would remain an airfield land use, which is consistent with existing and future land uses. Similarly, the MSA project area's land use would remain as industrial, which is consistent with existing and future land uses. The proposed HCLA pad and MSA facilities would allow for the continued use of the HCLA and MSA, respectively, would be compatible with adjacent land use, and would meet the planning criteria (JB MDL, 2015a). Therefore, land use is not discussed further in this EA.

3.1.2.2 Environmental Justice

EO 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*, and EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, require that all federal agencies address the potential effects of policies on minorities, low-income populations, and children. The project areas and surrounding areas (i.e., New Hanover Township, North Hanover Township, and Wrightstown Borough) do not have a meaningfully higher proportion of environmental justice populations (i.e., minority and low-income) or sensitive populations (i.e., children and the elderly) compared to the reference populations of Burlington County and New Jersey (USCB, 2019a; USCB, 2019b; USCB, 2019c). However, New Hanover Township and Wrightstown Borough are considered potential environmental justice communities because their minority and low-income populations are greater than those in Burlington County and New Jersey. Because of the distance of the project areas from off-installation populated areas, no off-installation minority, low income, or youth populations would be adversely impacted by the Proposed Action. Under Alternative 1, it is unlikely off-installation residences would experience any short-term construction-related noise, air emissions, or increased vehicle traffic. As described within this EA, best management practices (BMP) and other measures would be implemented to reduce or eliminate air emissions and noise from construction. Because there would be a low potential for impacts to on- and off-installation populations, disproportionately high and adverse health or environmental impacts on minority, low-income, and youth populations are not anticipated. Therefore, environmental justice and sensitive populations are not discussed further in this EA.

3.1.2.3 Socioeconomics

Minor, beneficial impacts on socioeconomics (local economy) may occur during construction associated with the Proposed Action from increased construction labor force employment and building material expenditures. However, the socioeconomic impacts would be highly localized to the project areas and it is unlikely there would be an economic impact perceptible within the greater areas of Hanover Township or Burlington County. As of 2019, it was estimated the construction labor force within Burlington County included 12,152 workers (USCB, 2019b), which would provide sufficient capacity to support construction of the new HCLA pad and munitions storage and supporting facilities. Construction workers would commute daily to JB MDL; therefore, no construction workers would be required to relocate to the area. Hence, no impacts on local population and employment distribution would occur. Long-term socioeconomic impacts would not be anticipated from the Proposed Action. Operation of the new HCLA pad and munitions storage and supporting facilities would not require additional personnel to relocate to the area and no jobs would be created or lost by operation of the new HCLA pad and

munitions storage and supporting facilities. Therefore, socioeconomics is not discussed further in this EA.

3.2 Air Quality

3.2.1 Affected Environment

3.2.1.1 Ambient Air Quality

Air quality is defined by the concentration of various pollutants in the atmosphere at a given location. Under the Clean Air Act, the six pollutants defining air quality, called "criteria pollutants" are carbon monoxide, sulfur dioxide, nitrogen dioxide, ozone (O_3), suspended particulate matter (measured less than or equal to 10 microns in diameter [PM_{10}] and less than or equal to 2.5 microns in diameter [$PM_{2.5}$]), and lead. CO, sulfur oxides (SO_X), and some particulates are emitted directly into the atmosphere from emissions sources. Nitrogen dioxide, O_3, and some particulates are formed through atmospheric and chemical reactions that are influenced by weather, ultraviolet light, and other atmospheric processes. Volatile organic compounds (VOC) and nitrogen oxide (NO_X) emissions are precursors of O_3 and are used to represent O_3 generation. Lead emissions from common air emissions sources that would be used under the Proposed Action have been negligible since leaded fuels were phased out in the 1970s and 1980s. Therefore, lead is not included in the air quality analysis.

The U.S. Environmental Protection Agency (USEPA) has established National Ambient Air Quality Standards (NAAQS) (40 CFR § 50) for criteria pollutants. NAAQS are classified as either primary, which protects against adverse health impacts, or secondary, which protects against adverse welfare impacts. Areas that are and have historically been in compliance with the NAAQS or have not been evaluated for NAAQS compliance are designated as attainment areas. Areas that violate a federal air quality standard are designated as nonattainment areas. Areas that have transitioned from nonattainment to attainment are designated as maintenance areas and are required to adhere to maintenance plans to ensure continued attainment. The Clean Air Act requires states to develop a State Implementation Plan to attain the standards for each area designated nonattainment for a NAAQS.

The USEPA General Conformity Rule applies to federal actions occurring in nonattainment or maintenance areas. When the total direct and indirect emissions of nonattainment and maintenance pollutants (or their precursors) exceed specified thresholds, a general conformity determination is required. The emissions thresholds that trigger requirements for a general conformity determination are called de minimis levels. De minimis levels (in tons per year [tpy]) vary by pollutant and depend on the severity of the nonattainment status for the air quality management area in question.

A conformity applicability analysis is the first step of a general conformity evaluation and assesses whether a federal action must be supported by a general conformity determination. This is typically done by quantifying applicable direct and indirect emissions that are projected to result from implementation of the federal action. If the results of the applicability analysis indicate that the total emissions would not exceed the de minimis emissions thresholds, then the conformity evaluation process is completed and a general conformity determination is not required. Compliance with General Conformity requirements can also be achieved by demonstrating the total net direct and indirect emissions increase from a proposed action are already accounted for in the State Implementation Plan emissions budget. The October 29, 2007, New Jersey State Implementation Plan revision for attainment and maintenance of O_3 established general conformity budgets for the McGuire and Lakehurst areas of JB MDL for VOCs and NO_X. These budgets were established by USEPA under 40 CFR 52.1582(m)(5) to

provide the installations with operational flexibility to meet their current and future missions. The general conformity budget for the McGuire area of JB MDL is 730 tpy of VOCs and 1,534 tpy of NO_X (NJDEP, 2007).

The McGuire area of JB MDL is in Burlington County, New Jersey, which is within the Metropolitan Philadelphia Interstate Air Quality Control Region (40 CFR § 81.15). The USEPA has designated Burlington County as marginal nonattainment for the 2008 and 2015 8-hour O_3 NAAQS. Burlington County is also designated as maintenance for $PM_{2.5}$. Therefore, the General Conformity Rule is potentially applicable to emissions of VOCs and NO_X (because they are precursors for O_3 and $PM_{2.5}$), $PM_{2.5}$, and SO_X and ammonia (because they are precursors for $PM_{2.5}$). As outlined in 40 CFR § 93.153(b), the applicable de minimis level threshold for these pollutants is 50 tpy for VOCs and 100 tpy for NO_X, SO_X, $PM_{2.5}$, and ammonia. The air emissions sources for this Proposed Action would produce negligible emissions of ammonia; therefore, ammonia is not included in the air quality analysis. Burlington County is designated as attainment or unclassified for all other criteria pollutants (USEPA, 2021).

3.2.1.2 Existing Air Emissions Sources

NJDEP administers air emissions permits for stationary air pollution sources in the state. NJDEP considers equipment or operations that may emit one or more air pollutants, such as high-capacity emergency generators, to be a significant emissions source, while other equipment, such as small fuel oil tanks, are considered an insignificant emissions source. The McGuire area of JB MDL maintains a Title V operating permit (#BOP200001) that expires October 31, 2021. Significant emissions sources covered by the permit include boilers, diesel-fired emergency generators, fuel storage tanks, remediation activities, solvent cleaners, and emergency fire pumps. Insignificant emissions sources covered by the permit include natural gas and fuel oil boilers/heaters, emergency generators, degreasing units, paint spraying booths, small (less than 10,000 gallons) fuel storage tanks, non-fuel oil, or diesel storage tanks. **Table 3-1** lists potential emissions from all significant and insignificant emissions sources at the McGuire area of JB MDL (JB MDL, 2021). Air emissions from aircraft operations are also covered under the Title V operating permit. There is a 15-kW emergency generator with a 126-gallon diesel tank in a small shed (Building 1147) within the HCLA project, but there are no stationary emissions sources within the MSA project area.

Table 3-1. Potential Emissions from Significant and Insignificant Air Emissions Sources

Source Category	VOC (tpy)	NO_X (tpy)	CO (tpy)	SO_X (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	CO_2e (tpy)
Significant	9.81	40.03	70.23	9.04	1.13	1.13	122,022
Insignificant	19.44	28.7	25.2	3.75	3.52	N/A	N/A

Source: JB MDL, 2021
Note: N/A indicates the pollutant is not emitted or emissions are below reporting threshold.
Key: CO_2e= carbon dioxide equivalent.

3.2.1.3 Climate Change and Greenhouse Gases

Global climate change refers to long-term fluctuations in temperature, precipitation, wind, sea level, and other elements of Earth's climate system. Ways in which the Earth's climate system may be influenced by changes in the concentration of various gases in the atmosphere have been discussed worldwide. Of particular interest, greenhouse gases (GHG) are gas emissions that trap heat in the atmosphere. These emissions occur from natural processes and anthropogenic activities. Scientific evidence indicates a trend of increasing global temperatures over the past century because of an increase in GHG emissions related to anthropogenic

activities. Climate change associated with global warming is predicted to produce negative economic and social consequences across the globe.

Ongoing global climate change in the northeast region of the United States, including Burlington County, New Jersey, has the potential to increase average temperatures, change precipitation patterns, alter the frequency and severity of flood and drought events, and disrupt natural ecosystems. These regional climate changes could lead to impairments of public health, damaged infrastructure, and loss of agricultural productivity (Dupigny-Giroux et al., 2018).

3.2.2 Environmental Consequences of Alternative 1 (Proposed Action)

3.2.2.1 Construction Phase (Short-term)

Short-term, minor, adverse impacts on air quality would result from the construction of the proposed HCLA pad and MSA facilities. Construction activities would produce emissions of criteria pollutants and GHGs from the operation of heavy equipment, construction personnel commuting daily to and from the project areas in their personal vehicles, heavy-duty diesel vehicles hauling materials and debris to and from the project areas, and ground disturbance. However, such emissions would be temporary and would only occur when such activities are occurring, from October 2021 through October 2023.

The air pollutant of greatest concern is particulate matter, such as fugitive dust. The quantity of uncontrolled fugitive dust emissions from a site is proportional to the area of land being worked and the level of activity. Fugitive dust air emissions would be greatest during the initial site grading preparation activities and would vary from day to day depending on the work phase, level of activity, and prevailing weather conditions. Particulate matter air emissions would also occur during combustion of fuels in vehicles and equipment during construction. Construction contractors would employ BMPs and environmental control measures, such as those listed in **Section 2.1**, to suppress fugitive dust and reduce emissions of criteria pollutants.

The USAF Air Conformity Applicability Model was used to estimate the air emissions from construction of the new HCLA pad and MSA facilities. **Table 3-2** provides a summary of estimated air emissions and **Appendix D** contains the Air Conformity Applicability Model summary and detailed reports.

Table 3-2. Estimated Air Emissions from Construction of the Proposed Action (tpy)

Year	VOC	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$	CO_2e
HCLA Pad Construction							
2022	0.387	2.357	2.402	0.006	27.778	0.095	623.6
2023	0.210	1.215	1.553	0.003	0.411	0.051	320.6
MSA Facilities Construction							
2021	0.039	0.254	0.297	0.001	0.092	0.011	57.7
2022	0.384	2.260	2.630	0.007	25.618	0.093	634.9
2023	0.371	0.821	1.067	0.02	0.037	0.036	227.8
Total							
2021	0.039	0.254	0.297	0.001	0.092	0.011	57.7
2022	0.771	4.617	5.032	0.013	53.396	0.188	1,258.5
2023	0.581	2.036	2.62	0.023	0.448	0.087	548.4

3.2.2.2 Operational Phase (Long-term)

The new HCLA pad would not include operational components that would produce air emissions. Therefore, no long-term impacts on air quality would occur from operation of the new HCLA pad.

Long-term, negligible, adverse impacts would occur from operation of the new MSA facilities. Air emissions would be produced from the oil-fueled heating systems for the proposed 2,745 ft^2 munitions administration facility and the 1,157 ft^2 addition to the munitions maintenance shop. Annual air emissions from operation of the proposed MSA facilities were estimated using the USAF Air Conformity Applicability Model and are summarized in **Table 3-3**. Heating systems are assumed to be commercial grade and operate for 900 hours per year. Emissions from the heating systems employed during operation of the MSA facilities would not increase the installation's potential to emit above major source thresholds and the capacity of the systems is likely to be low enough that they would not need to be added to the existing Title V operating permit.

Table 3-3. Estimated Air Emissions from Operation of the New MSA Facilities (tpy)

Year	VOC	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$	CO_2e
2024 and Later	0.001	0.032	0.008	0.069	0.002	0.001	36.2

No additional personnel would be assigned to the installation to operate the proposed HCLA pad or MSA facilities, so no change in the volume of vehicle traffic accessing the installation would occur. In addition, the Proposed Action would not change the frequency of flight or hazardous cargo loading operations at the McGuire airfield. Therefore, Alternative 1 would not increase long-term air emissions from motorized vehicles.

As stated in **Section 3.2.1.1**, the General Conformity Rule is potentially applicable to emissions of VOCs, NO_X, $PM_{2.5}$, and SO_X from federal actions occurring in Burlington County. The de minimis thresholds for new emissions to trigger a general conformity determination is 50 tpy for VOCs and 100 tpy for NO_X, $PM_{2.5}$, and SO_X. As demonstrated in and, the annual emissions of each of these pollutants would be less than the de minimis threshold. Therefore, a general conformity determination is not required. **Appendix D** contains the Record of Conformity Analysis.

Burlington County is designated by USEPA as unclassified/attainment for emissions of carbon monoxide and PM_{10}, and these emissions would not be subject to the General Conformity Rule. However, annual air emissions for these criteria pollutants would be less than the surrogate de minimis threshold of 100 tpy (**see Table 3-2**). Therefore, Alternative 1 would not result in significant, adverse impacts on air quality.

Construction of the proposed HCLA pad and MSA facilities would emit 1,806.6 tons of CO_2e during the construction period (October 2022 through October 2023) and operation of the new MSA facilities would emit 36.2 tons of CO_2e in 2024 and later years. By comparison, 1,806.6 tons of CO_2e is approximately the GHG footprint of 354 passenger vehicles driven for 1 year or 189 homes' energy use for 1 year. 36.2 tons of CO_2e is approximately the GHG footprint of approximately seven passenger vehicles driven per year (USEPA, 2020). Therefore, Alternative 1 would not meaningfully contribute to global climate change.

Ongoing changes to climate patterns in the northeast region of the United States are described in **Section 3.2.1.3**. These changes are unlikely to adversely impact construction and operation of the proposed HCLA pad and MSA facilities. There are no delineated 100-year floodplains mapped within the HCLA and MSA project areas.

3.2.2.3 Reasonably Foreseeable Planned Actions

Emissions of criteria pollutants would be directly produced from construction of reasonably foreseeable planned actions. Due to the relatively small size of the reasonably foreseeable planned actions, construction emissions would not be appreciable. Therefore, reasonably

foreseeable planned actions, when combined with Alternative 1, would not result in significant impacts on air quality.

3.2.3 Environmental Consequences of Alternative 2 (No Action Alternative)

Under Alternative 2, air quality conditions would remain the same as described in **Section 3.2,** and no effects on air quality would occur. Air emissions from construction and operation of the HCLA pad and MSA facilities would not occur.

3.3 Noise

3.3.1 Affected Environment

The Federal Interagency Committee on Urban Noise developed guidelines for considering noise in land use planning and control in June 1980 (FICUN, 1980). These guidelines have been adopted more-or-less unchanged by the DoD (as part of the Air Installation Compatible Use Zone program), the U.S. Department of Housing and Urban Development, and the Federal Aviation Administration.

The Day-Night Average Sound Level (DNL) is the primary metric for measuring the cumulative exposure of individuals to noise energy. DNL is expressed in decibels (dB) or dBA (decibel A-weighted) where noise measurements are adapted to the human ear's response to sound. DNL is the measure of the total noise environment. The threshold of human hearing is approximately 0 dB, and the threshold of pain is approximately 140 dB. Unlike single event noise metrics, DNL averages the sum of all noise-producing events over a 24-hour period with a 10 dBA upward adjustment added to the nighttime events (between 10 p.m. and 7 a.m.). This adjustment is an effort to account for the increased human sensitivity to night-time noise events.

Federal agencies generally agree that DNL below 65 dBA is compatible with residences, nursing homes, schools, and similar land use types. A DNL above 75 dBA is generally considered unacceptable for these land uses. Between 65 dBA and 75 dBA, noise attenuation measures are recommended in the design and construction of public and quasi-public service buildings.

A list of land use categories compatible with different noise zones is provided in **Table 3-4**. Thresholds have been established for three noise zones (Noise Zone I, II, and III) and a land use planning zone. Guidance for the USAF Air Installation Compatible Use Zone program is contained in Air Force Instruction 32-1015, *Integrated Installation Planning*, which implements DoD Instruction 4165.57, *Air Installations Compatible Use Zones*.

Table 3-4. Land Use Compatibility with Noise Zones

Category	Land Use Planning Zone	Noise Zone I	Noise Zone II		Noise Zone III	
	60-65 dB	<65 dB	65-69 dB	70-74 dB	75-79 dB	>80 dB
Households/ Government/ Education/ Parks/ Hospitals	Y	Y	C	C	N	N
Manufacturing/ Agriculture	Y	Y	Y	C	C	C
Retail-General/ Restaurants/ Personal Services	Y	Y	Y	C	C	N
Public Assembly	Y	Y	Y	N	N	N

Source: JB MDL, 2014

Y = Compatible Use C = Conditionally Compatible Use N = Non-Conditionally Compatible Use

3.3.1.1 Current Noise Environment

The McGuire area of JB MDL is home to the 305th Air Mobility Wing, 514th Air Mobility Wing, and 108th Air Refueling Wing. Aircraft flown by these units include the C-17, KC-10, and KC-135 aircraft. Operations for these aircraft occur on Runway 06/24 and Runway 18/36. The primary sources of high noise levels within the McGuire area of JB MDL are military training operations, and military aircraft operations, of which C-17s and KC-10s are the most prevalent source of noise given their frequency of operations per average annual day (JB MDL, 2013a). The C-17 conducts an average of 10 transient operations per day and is typically the largest, by length, aircraft operation at McGuire Airfield. The KC-10 conducts an average of five transient operations per day and is typically the largest, by wingspan, aircraft operation at McGuire Airfield (JB MDL, 2013a).

Noise associated with military training remains an important issue in the public relations effort of JB MDL with towns near the installation. Although natural resources management initiatives are not directly implicated, forest management has the potential to affect noise levels. Reducing timber cover in areas between firing ranges and residential areas can contribute to noise transmission; likewise, increased vegetative cover can disrupt sound waves and mitigate noise.

The HCLA project area falls within Noise Zone III, an area where the DNL is greater than 75 dBA (JB MDL, 2013a). The nearest noise analysis points to the proposed HCLA experienced a DNL of 80 dBA. The MSA project area predominantly falls within a land use planning zone, an area around a noise source where DNL is between 60-65 dBA and accounts for higher-than-average operations. The nearest analysis points to the proposed MSA project area experienced a DNL of 65 dBA.

3.3.1.2 Noise Sensitive Receptors

Noise sensitive receptors include, but are not limited to, residences, health care facilities, daycares, places of worship, and schools. The closest on-base noise sensitive receptors to the HCLA project area are the residences along Grissom Road, approximately 0.43 miles to the north. The nearest off-base residential noise receptor is Spartan Village, approximately 1.45 miles northwest of the proposed HCLA project area. Other on-base noise sensitive receptors within 1 mile of the proposed HCLA include the Child Development Center #2, approximately 1 mile to the north, and on-base barracks, approximately 0.9 miles to the west. These noise sensitive receptors are separated from the HCLA project area by forest, runways, roads, and various buildings.

The closest on-base noise sensitive receptors to the proposed MSA project area are the residences along South Lindbergh Street, approximately 0.3 miles to the northwest and McGuire Chapel, approximately 0.5 miles to the west. The nearest off-base sensitive noise receptors to the MSA project area are the civilian residences approximately 0.4 miles to the north, along Nash Drive. Additional sensitive noise receptors within 1 mile of the MSA project area include the Cookstown United Methodist Church, approximately 1 mile to the northeast; Endeavor Elementary School, approximately 1 mile northwest; and neighboring residential properties, approximately 0.8 miles northwest. These noise sensitive receptors are all separated from the MSA project area by forest, roads, and various buildings.

3.3.2 Environmental Consequences of Alternative 1 (Proposed Action)

3.3.2.1 Construction Phase (Short-Term)

Short-term, negligible, adverse impacts to noise would occur as a result of the construction phase of Alternative 1. Within the HCLA project area, noise levels would temporarily increase during the demolition and construction phases as a result of the use of heavy equipment.

Typical construction equipment noise levels are presented in **Table 3-5** and reflect noise levels (dBA) at a distance of 50 feet from the equipment source. With multiple items of equipment operating concurrently, noise levels may be relatively high during daytime periods; however, the closest on-installation residence is approximately 0.43 miles to the north of the HCLA project area, and the closest off-installation residence is approximately 1.45 miles to the northwest. These noise sensitive receptors are all separated from the HCLA project area by airfield operations, roads, and buildings. Thus, it is anticipated that, due to the substantial distances between the closest sensitive noise receptors and construction equipment (i.e., greater than 1,000 feet), the intermittent, temporary nature of construction activities, and the sound attenuation from existing structures, noise impacts during demolition and construction within the HCLA project area would be temporary and negligible (i.e., less than 65 dBA).

Table 3-5. Noise Levels of Typical Construction Equipment at 50 Feet from Source Levels

Source	Noise, dBA (Samples Averaged)
Pile Driver (Impact)	101
Grader	85
Compactor	83
Dozer	82
Excavator	81
Roller	80
Front End Loader	79
Concrete Mixer	79
Backhoes	78
Air Compressor	78
Pickup Truck	75

Source: FHWA, 2006

Within the MSA project area, noise levels would temporarily increase during the demolition and construction phases as a result of the use of heavy equipment. With multiple items of equipment operating concurrently, noise levels may be relatively high during daytime periods; however, the closest on-installation residence is approximately 0.3 miles to the northwest of the MSA project area, and the closest off-installation residence is approximately 0.4 miles north of the MSA project area. These noise sensitive receptors are all separated from the MSA project area by forest, roads, and various buildings. Thus, it is anticipated that, due to the substantial distances between the closest sensitive noise receptors and construction equipment (i.e., greater than 500 feet), the intermittent, temporary nature of construction activities, and the additional sound attenuation provided by existing vegetated areas, including forest, and existing structures, noise impacts during demolition and construction within the MSA project area would be temporary and negligible (i.e., less than 65 dBA).

At the HCLA and MSA project areas, construction noise levels would mostly be limited to the immediate vicinity of the project area where the primary receptors would be construction workers. Adherence to appropriate Occupational Safety and Health Administration standards and the use of hearing protection would protect the workforce from excessive noise.

3.3.2.2 Operational Phase (Long-Term)

No long-term noise impacts are anticipated from the implementation of Alternative 1 as noise levels at the HCLA and MSA project areas would remain unchanged after construction is complete.

3.3.2.3 Reasonably Foreseeable Planned Actions

Replacement of the fuel hydrant system at the HCLA and the repair of sanitary sewer lines across the installation may result in a temporary increase in localized noise; however, it is not expected that noise levels would adversely impact noise sensitive receptors as there would be substantial distances and noise attenuating features between the closest sensitive noise receptors and construction equipment that would reduce noise levels to less than significant levels. The restriping of the AMC ramp would not have any adverse impacts on noise levels due to the nature of the project. Therefore, reasonably foreseeable planned actions, when combined with Alternative 1, would not result in significant impacts on noise.

3.3.3 Environmental Consequences of Alternative 2 (No Action Alternative)

No impacts to noise would result from the implementation of Alternative 2 as the construction and operation of the new HCLA and MSA would not occur.

3.4 Geology, Topography, and Soils

3.4.1 Affected Environment

3.4.1.1 Geology

The McGuire area of JB MDL is located within the Outer Coastal Plain. The Outer Coastal Plain is New Jersey's largest physiographic province, consisting of about 2.25 million acres, and includes all of Cape May, Cumberland, Atlantic, and Ocean Counties, and parts of Salem, Gloucester, Camden, Burlington, and Monmouth Counties.

The HCLA and MSA project areas lie entirely within the Cohansey Sand Formation, a formation comprised of unconsolidated, yellow quartz sand with gravel, silt, and clay. The Cohansey Formation, which overlies the Kirkwood Formation, is the most extensive surficial deposit in the New Jersey Coastal Plain (USGS, 1993). The Cohansey Sand Formation is primarily 50 to 100 feet thick within the JB MDL area (JB MDL, 2015a). Its sandy nature exerts a major influence on the region as soils that have developed are generally droughty, acidic, and low in nutrients.

Burlington County, New Jersey has a low earthquake risk. The largest potentially active fault in New Jersey is the Ramapo Fault, situated within northern New Jersey where numerous minor earthquakes have been recorded within approximately 20 miles of the fault (USGS, 2008).

3.4.1.2 Topography

Elevations range between 99 to 116 feet above sea level within the HCLA project area, and range between 95 to 104 feet within the MSA project area, as referenced to the North American Vertical Datum of 1988 (NAVD88).

3.4.1.3 Soil Types and Characteristics

The Natural Resources Conservation Service's (NRCS) Soil Survey Geographic (SSURGO) database identifies the majority of soils present within the HCLA project area as members of the Galloway and Woodstown series (NRCS, 2020). **Table 3-6** lists the soil series mapped within the HCLA project area, their drainage class and farmland designation.

Table 3-6. Soil Series within the HCLA Project Area

Series ID	Series Name	Drainage Class	Farmland Designation
GahB	Galloway sand, 0 to 5 percent slopes	Moderately well drained	Farmland of Statewide or Local Importance
ShsA	Shrewsbury fine sandy loam, 0 to 2 percent slopes	Poorly drained	Farmland of Statewide or Local Importance
WolfA	Woodstown fine sandy loam, 0 to 2 percent slopes	Moderately well drained	Prime farmland

The NRCS' SSURGO database identifies the majority of soils present within the MSA project area as members of the Galloway and Shrewsbury series (NRCS, 2020). **Table 3-7** lists the soil series mapped within the MSA project area, their drainage class and farmland designation.

Table 3-7. Soil Series within the MSA Project Area

Series ID	Series Name	Drainage Class	Farmland Designation
GahB	Galloway sand, 0 to 5 percent slopes	Moderately well drained	Farmland of Statewide Importance
PHG	Pits, sand, and gravel	Well drained	None
ShsA	Shrewsbury fine sandy loam, 0 to 2 percent slopes	Poorly drained	Farmland of Statewide Importance
UdwB	Udorthents, wet substratum, 0 to 8 percent slopes	Moderately well drained	None

Descriptions of the soils mapped within the project areas are provided below:

- The soils of the Galloway series are Mesic, coated Aquic Quartzipsamments (United States Department of Agriculture [USDA], 2015a). These deep, moderately well drained soils formed in sandy, unconsolidated marine sediments. Slopes range from 0 to 5 percent. A typical pedon of Galloway loamy sand consists of 0 to 9 inches dark grayish brown (10YR 4/2) loamy sand; 9 to 28 inches light yellowish brown (10YR 6/4) loamy sand; 28 to 58 inches white (2.5Y 8/2) gravelly sand; and 58 to 72 inches white (2.5Y 8/1) sand. These soils are predominately non-hydric.
- The soils of the Shrewsbury series are fine-loamy, mixed, active, mesic Typic Endoaquults (USDA, 2002). These deep, poorly drained soils formed in loamy marine sediments that contain moderate amounts of glauconite that have been influenced by eolian or alluvial action in places. Slope ranges from 0 to 2 percent. A typical pedon of Shrewsbury fine sandy loam consists of 0 to 10 inches dark gray (10Y 6/1) fine sandy loam; 10 to 14 inches gray (5Y 6/1) fine sandy loam; 14 to 24 inches mixed gray (5Y 5/1), light olive gray (5Y 6/2), greenish gray (5GY 5/1), light gray 5Y 7/1) and dark gray (10YR 4/1) gray sandy clay loam; 24 to 32 inches greenish gray (5GY 5/1) sandy clay loam; and 32 to 60 inches alternating strata of olive gray (5Y 5/2) loamy sand and fine sandy loam, and white (10YR 8/1) sand. These soils are predominately hydric.
- The soils of the Woodstown Series are fine-loamy, mixed, active, mesic Aquic Hapludults (USDA, 2015b). These deep moderately well drained soils formed in sandy marine and old alluvial sediments. Slopes range from 0 to 30 percent. A typical pedon of Woodstown sandy loam consists of 0 to 7 inches dark grayish brown (2.5Y 4/2) sandy loam; 7 to 11 inches light yellowish brown (2.5Y 6/4) sandy loam; 11 to 19 inches light olive brown (2.5Y 5/6) sandy clay loam;19 to 29 inches light olive brown (2.5Y 5/6) sandy clay loam; 29 to 45 inches light brownish gray (2.5Y 6/2) sandy loam; and 45 to 70 inches light gray (5Y 7/2) loamy sand. These soils are predominately non-hydric.

- The Udorthents series consists of moderately well-drained, loamy lateral spread deposits. Udorthents is a non-hydric soil that can be found in flats with 0 to 8 percent slopes. The depth to water table is typically 18 to 42 inches. A typical pedon consists of 0 to 36 inches of sand which is underlain by a 24-inch layer of muck. These soils are predominately non-hydric.
- The Pits, Sand, and Gravel series is composed of sandy material disturbed by human activity. The hydric soil rating is non-hydric.

According to the NRCS, Shrewsbury soils within the southern extent of the HCLA project area are identified as predominately hydric (see **Figure 3-1**). Soil borings taken by Princeton Hydro, LLC (Princeton Hydro) in 2020 confirmed that hydric soils were present in this area (see **Appendix C – Wetland Delineation Report**). However, Princeton Hydro also identified hydric soils within a crescent-shaped wetland located to the west of HCLA pad 1. Hydric soils within this wetland were consistent with the Shrewsbury series, which are predominately hydric, despite being mapped by NRCS as the Galloway series, which are predominately non-hydric.

According to the NRCS, Shrewsbury soils identified within the southeastern extent of the MSA project area are identified as predominately hydric (see **Figure 3-2**). Soil borings taken by Princeton Hydro in 2020 confirmed that hydric soils were present at the MSA project area; however, the location of identified hydric soils was inconsistent with NRCS mapping (see **Appendix C – Wetland Delineation Report**). Princeton Hydro observed hydric soils within forested and scrub/shrub wetlands located to the east, north, west, and south of the MSA project area. Hydric soils within these wetlands were consistent with the Shrewsbury series, which are predominately hydric, despite being mapped by NRCS as the Galloway series; pits, sand and gravel series; and Udorthents series, all of which are predominately non-hydric.

All soils within the HCLA and MSA project areas are classified as either Farmland of Statewide or Local Importance or Prime Farmland, except for the Udorthents series and pits, sand, and gravel, both found within the MSA project area (NRCS, 2020). Soils classified as Farmland of Statewide Importance produce high yields of crops when treated and managed according to acceptable farming methods. Some may produce yields as high as Prime Farmland if conditions are favorable. Prime Farmland, as defined by the USDA, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses (NRCS, 2020). Projects are subject to the Farmland Protection Policy Act if they may irreversibly convert farmland (directly or indirectly) to nonagricultural use and are completed by a federal agency or with assistance from a federal agency (NRCS, 2021). However, activities exempt from the Farmland Protection Policy Act include, but are not limited to, projects on land already in urban development as defined by the U.S. Census Bureau.

3.4.1.4 Soil Erosion and Sediment Control Requirements

Approval and certification of a SESC Plan is required when a proposed project will result in the disturbance of 5,000 ft^2 or more of land in New Jersey. Site-specific SESC Plans must be submitted to the Burlington County Soil Conservation District for review and approval and receive certification from the Burlington County Soil Conservation District prior to initiating construction. Additionally, the NJDEP regulates stormwater runoff from construction activities under its New Jersey Pollutant Discharge Elimination System (NJPDES) General Permit for Construction Activities (5G3) (NJPDES Permit No. NJ0088323). This general permit is issued subsequent to receipt of SESC certification and ensures that stormwater discharges to surface waters from general construction activities that disturb 1-acre or more of land are compliant with NJPDES. See **Section 3.5.1.5** for information on stormwater management requirements.

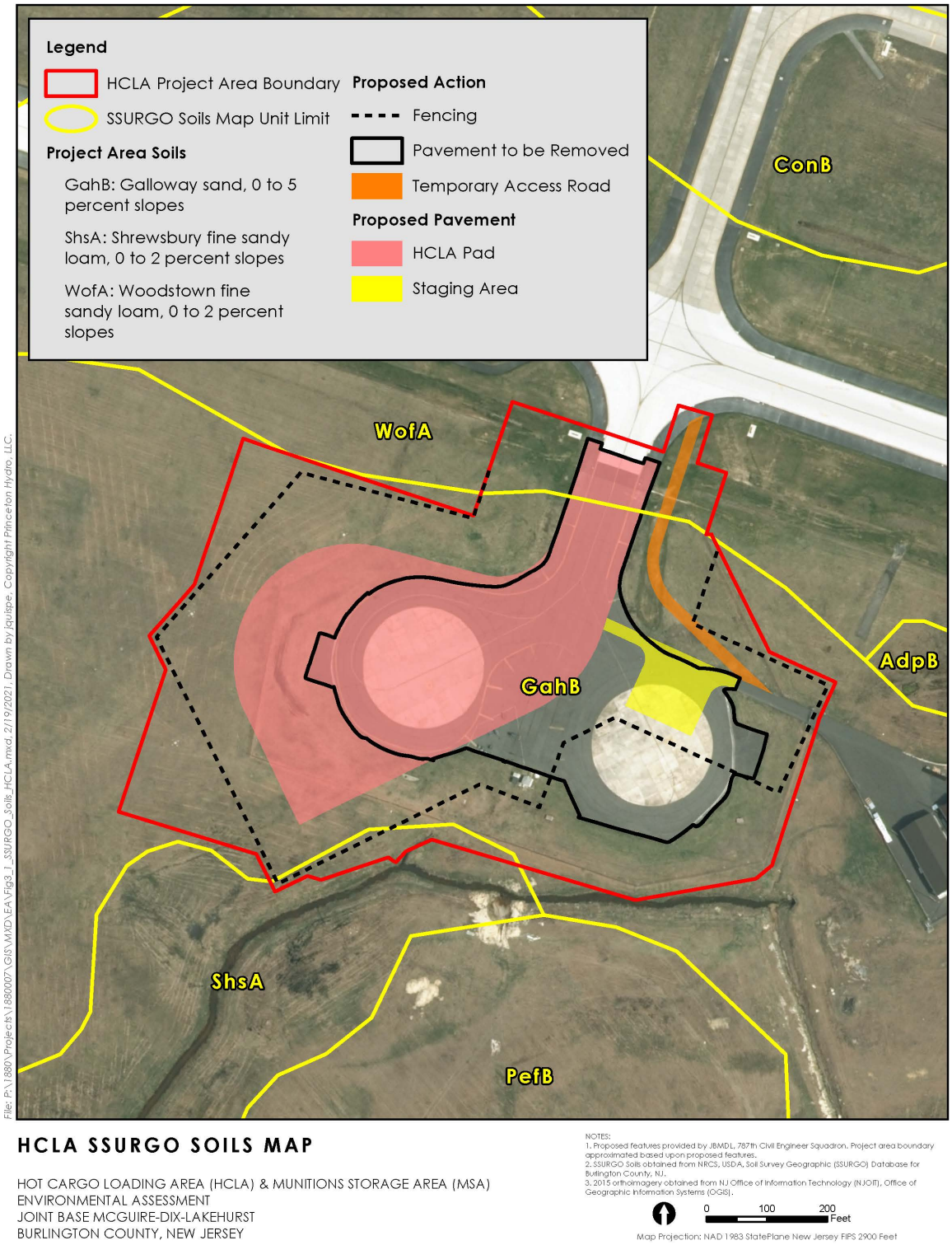


Figure 3-1. HCLA SSURGO Soils Map

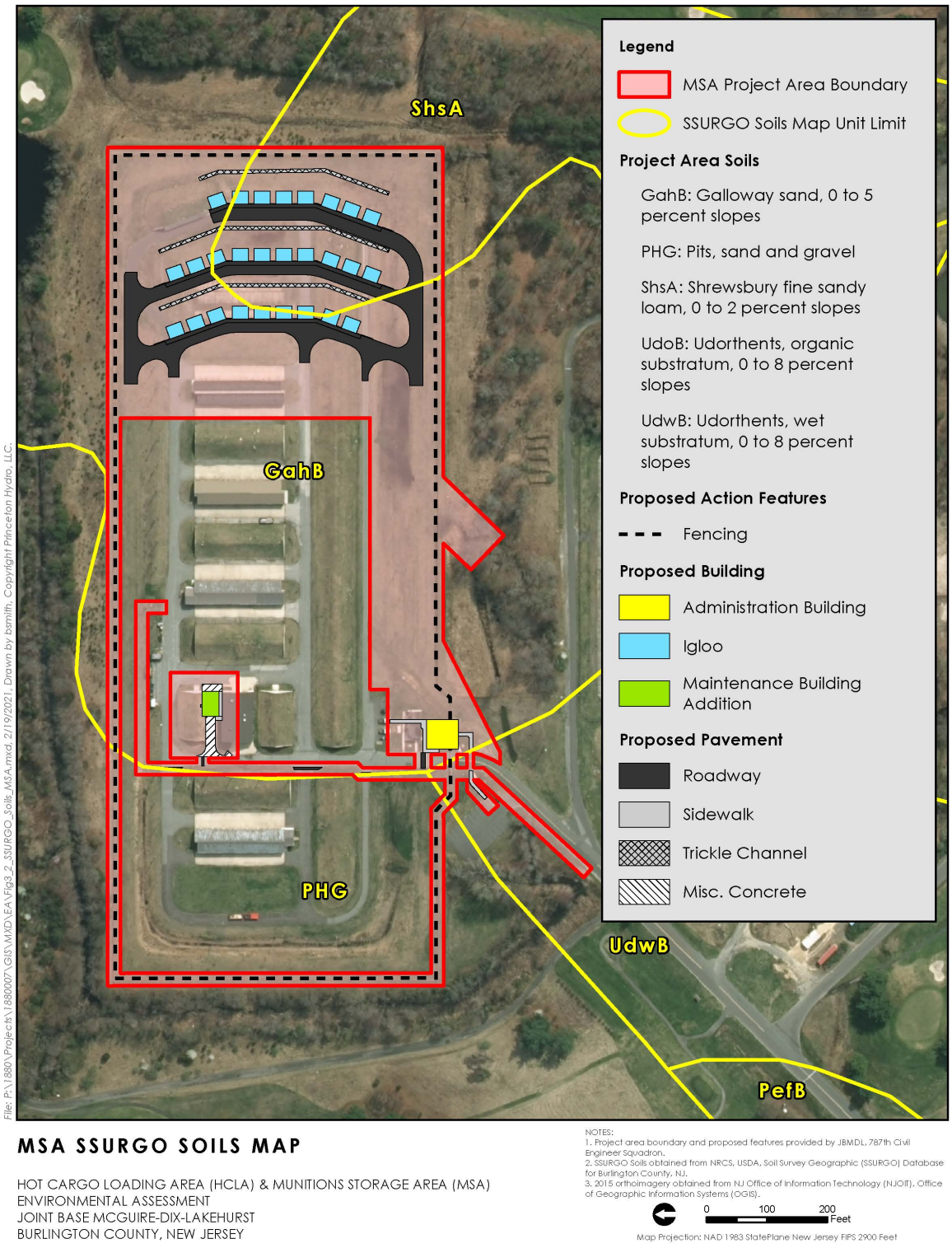


Figure 3-2. MSA SSURGO Soils Map

3.4.2 Environmental Consequences of Alternative 1 (Proposed Action)

Short-term, minor, adverse impacts to geology, topography, and soils would result from implementation of Alternative 1. The geology of the McGuire area of JB MDL does not require special building engineering or design elements. Implementation of Alternative 1 would include concrete and asphalt demolition, cut and fill, and soil grading during the initial construction phase. As a result, there would be a high potential for soil erosion by wind and rain if adequate soil conservation practices are not followed. However, a certified SESC Plan would be obtained from the Burlington County Soil Conservation District prior to commencement of construction activities. Pollution prevention would be accomplished by controlling soil erosion, waterway sedimentation, and airborne dust generation using SESC BMPs. Additionally, a NJPDES Permit for Construction Activities (5G3) would be obtained before the start of construction in accordance with the requirements of the NJDEP Division of Water Quality Management.

Grading and the addition of cement-modified subgrade material and pavement would compact underlying soils within the HCLA and MSA project areas. Soil productivity and capability of soils to produce vegetative biomass would be eliminated within the footprint of proposed impervious surfaces, including roadways and buildings. Approximately 92.7 percent of soils disturbed at the HCLA and 90.7 percent of soils disturbed at the MSA project areas would consist of Farmland of Statewide or Local Importance and Prime Farmland soils. However, since the McGuire area of JB MDL is defined by the U.S. Census Bureau as an urbanized area (USCB, 2010), activities within the HCLA and MSA project areas are not subject to the Farmland Policy Protection Act. Therefore, no impact to Farmland of Statewide Importance and/or Prime Farmland soils would occur as a result of the Proposed Action.

Additionally, the Proposed Action would incorporate the environmental requirements and sustainable design and construction BMPs described in **Section 2.1**. As a result, long-term, minor, adverse impacts to geology, topography, and soils are anticipated as a result of implementing Alternative 1.

3.4.2.1 Reasonably Foreseeable Planned Actions

The replacement of the fuel hydrant system is not expected to impact geology or topography as it is a surficial project. Similarly, the repair of sanitary sewer lines is not anticipated to adversely impact geology and topography as the sub-grade infrastructure already exists and would be backfilled to pre-construction conditions upon completion. Excavation and construction of the fuel hydrant system and sanitary sewer line repairs may have temporary short-term, minor, adverse effects to soils, but it is expected that the projects will adhere to SESC requirements and BMPs to minimize impacts. The restriping of the AMC ramp will not adversely impact geology, topography, and soils as restriping will only superficially impact pavement. Thus, none of the aforementioned projects when combined with Alternative 1, would result in significant impacts on geology, topography, and soils.

3.4.3 Environmental Consequences of Alternative 2 (No Action Alternative)

No impacts to geology, topography, and/or soils would result from the implementation of Alternative 2 as the construction of the new HCLA and MSA would not occur. There would be no ground disturbance associated with the implementation of this alternative.

3.5 Water Resources

3.5.1 Affected Environment

3.5.1.1 Regulatory Framework

"Waters of the United States" are regulated under Sections 401 (33 United States Code [USC] 1341) and 404 (33 USC 1344) of the Federal Clean Water Act. The primary federal regulations and guidance that govern water resources development, usage, and discharge at federal sites, or sites affected by federal activities, include the following:

- Federal Water Pollution Control Act of 1972, as amended by the Clean Water Act of 1977 and 1987 (33 USC 1251 et seq.)
- Land and Water Conservation Act of 1976 (16 USC 460)
- National Pollutant Discharge Elimination System Wastewater Permits (33 USC 1342)
- Pollution Prevention Act of 1990 (42 USC 13101-13109)
- Safe Drinking Water Act of 1974 (42 USC 300f et seq.)
- Soil and Water Resources Conservation Act of 1977 (16 USC 2001)
- Superfund Amendments and Reauthorization Act of 1986 (Public Law 99-499; 40 CFR § 300)
- Emergency Planning and Community Right-to-Know Act of 1986 (42 USC 11011)
- Water quality programs in general (33 USC 1160 et seq. and 1251 et seq., 42 USC 300f et seq., and 6901 et seq.)
- Water Resources Development Act of 1990 (33 USC 2309a, 2316, and 2320)
- Wild and Scenic Rivers Act of 1968 (16 USC 1271 et seq.)
- Energy Independence and Security Act of 2007, Section 438 Stormwater Management
- AFMAN 32-1067, Water and Fuel Systems
- AFMAN 32-7003, Environmental Conservation, April 20, 2020
- EO 11988, Floodplain Management, May 24, 1977
- EO 11990, Protection of Wetlands, May 24, 1977
- EO 11991, Protection and Enhancement of Environmental Quality, May 24, 1977
- EO 12856, Federal Facilities Compliance with the Toxic Release Inventory requirements of Title III, Section 313 of Superfund Amendments and Reauthorization Act, August 3, 1993.

Water resources at JB MDL are also regulated under the jurisdiction of the NJDEP. The NJDEP has the primary responsibility for protecting New Jersey's surface and ground waters from pollution caused by improperly treated wastewater and its residuals, as well as the destruction of watersheds from development. The relevant New Jersey regulations and guidance for water resources within JB MDL include the following:

- NJ Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.)
- Stormwater Management (N.J.A.C. 7:8)
- Water Quality Planning Act (N.J.S.A. 58:11A-1 et seq.)
- Spill Compensation and Control Act (N.J.S.A. 58:10-23.11 et seq.)

- Safe Drinking Water Act (N.J.S.A. 58:4A-4.1 et seq.)
- NJ Ground Water Quality Standards (N.J.S.A. 58:12A-1 et seq.)
- Water Pollution Control Act (N.J.A.C. 7:14)
- Freshwater Wetlands Protection Act (N.J.S.A. 13:9B-1 et seq.)
- Flood Hazard Area Control Act (N.J.S.A. 58:16A-50 et seq.)
- Pinelands Comprehensive Management Plan (N.J.S.A. 13:18A-1 et seq., N.J.A.C. 7:50 et seq.)

Water resources at JB MDL, as applicable, are managed according to these and other applicable environmental laws and regulations.

3.5.1.2 Groundwater Resources

Underlying the McGuire area of JB MDL is the Cohansey Sand Aquifer Formation. This aquifer is primarily comprised of sand, with minor lenses of silt and clay interspersed with gravel. The Cohansey Sand Aquifer Formation is relatively shallow in depth and is highly permeable, making potential contamination a high concern. Immediately below the Cohansey Sand Aquifer Formation is the Kirkwood Formation. Together, these two aquifers are estimated to contain up to 17 trillion gallons of water (Pinelands Preservation Alliance, 2020). The depth to water table within the HCLA project area ranges from 0.66 to 2.6 feet (NRCS SSURGO, n.d.). The depth to water table within the MSA project area ranges from 0.66 to over 6.6 feet.

Delineation of Well Head Protection Areas (WHPA) is a component of the Well Head Protection Program, a federal directive from the 1986 Federal Safe Drinking Water Act. A WHPA is a surface and subsurface land area regulated to prevent contamination of a well or well-field supplying a public water system under the Safe Drinking Water Act (42 USC 330f-300j). Once delineated, these areas become a priority for efforts to prevent contamination of a public water system. A WHPA consists of three tiers, each based on the amount of time for groundwater to travel to the well. The outer boundaries of these tiers are Tier 1 – two years; Tier 2 – five years; and Tier 3 – twelve years. The proposed HCLA and MSA project areas are not located within a Community Water or a Non-Community Water WHPAs.

Classification Exception Areas (CEA) are established by NJDEP to provide notice that the constituent standards for a given aquifer classification are not or will not be met in a localized area due to natural water quality or anthropogenic influences, and that designated aquifer uses are suspended in the affected area for the term of the CEA. When contaminant concentrations in a CEA exceed maximum contaminant levels, and designated aquifer use based on classification includes potable use, the CEA will additionally be identified as a Well Restricted Area (WRA). The WRA functions as the institutional control by which potable use restriction can be affected. As long as the CEA is in place, the NJDEP may prohibit the installation, and require additional construction specifications and/or pumping of wells, within this area.

Several CEAs have been established within JB MDL, including the McGuire CEA that covers the McGuire area of JB MDL where the HCLA and MSA project areas are situated (see **Figure 3-3**). The McGuire CEA is an installation-wide CEA site that is also a WRA. Contaminants of concern for this CEA include benzene, methyl tertiary butyl ether, trichloroethene, tetrachloroethene, vinyl chloride, lead, chlorobenzene, dichloroethane (1,2-), dichloroethene (trans-1,2-), dichloroethylene (cis-1,2), ethylbenzene, toluene, xylenes (total), cumene, methylnaphthalene (2-), and pyrene (JB MDL, 2020b). The general direction of groundwater flow within this CEA is to the southeast. The plume is expected to remain within the CEA.

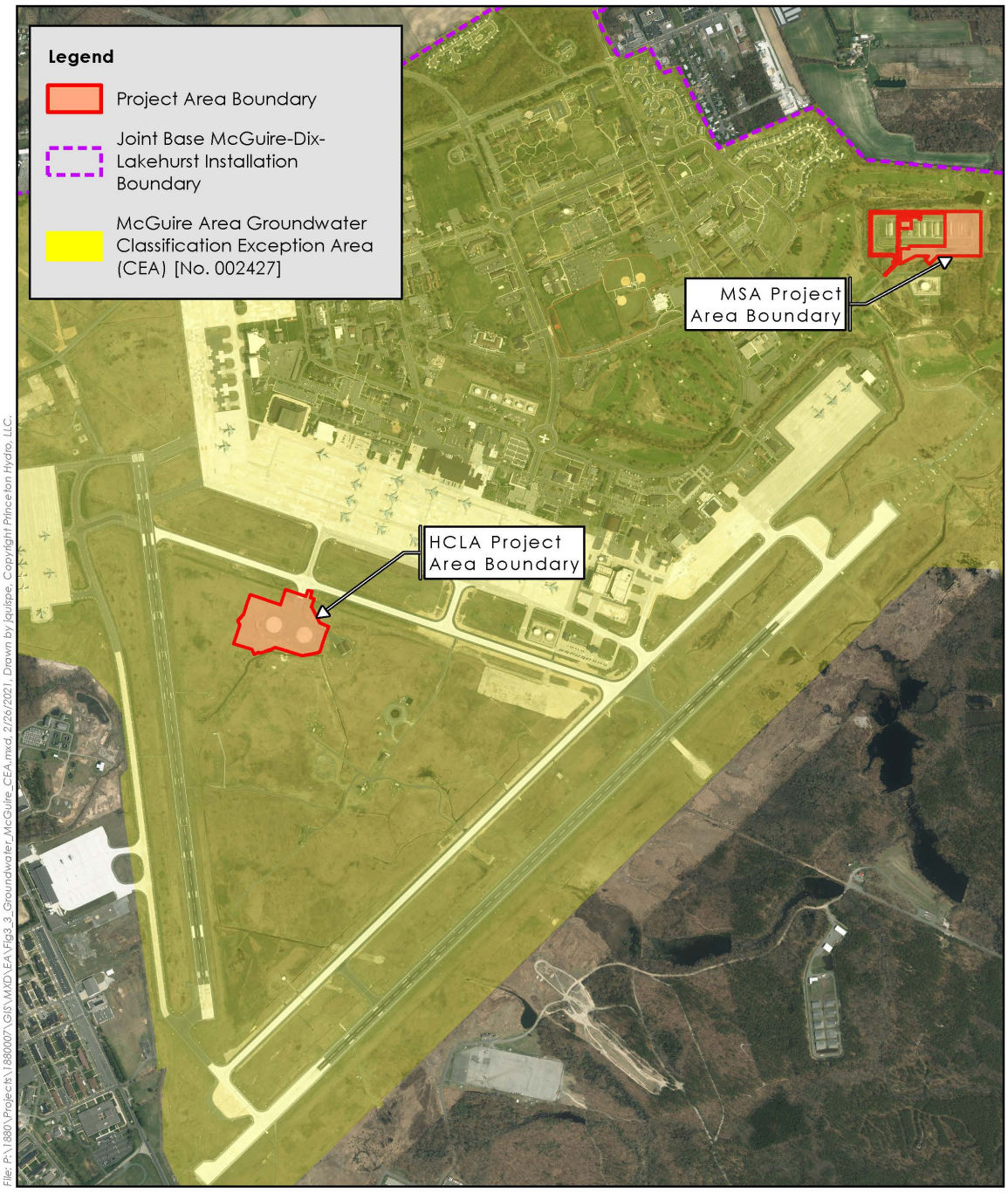


Figure 3-3. Groundwater CEAs at McGuire area of JB MDL

The CEA/WRA is required and will be removed once remedial goals are achieved and groundwater no longer poses an unacceptable risk to human health, respectively. Land use controls within the McGuire CEA include prohibition of groundwater use and construction of groundwater production wells (JB MDL, 2019a).

3.5.1.3 Surface Water Resources

The HCLA and MSA project areas lie within the Crosswicks Creek (above New Egypt) Watershed (Hydrologic Unit Code-11:02040201040). The majority of McGuire airfield's surface water flows through pipes/conduits, concrete-lined channels, and streams that have been straightened to facilitate rapid discharge of stormwater. The primary surface water features on the McGuire area of JB MDL include South Run and North Run (JB MDL, 2012). South Run enters the McGuire area on the west side from the Dix area and exits the McGuire area on the southeast side at the former wastewater treatment plant. Approximately 85 percent of the McGuire area drains to South Run. North Run, also called Jones Mill Stream, flows west then northeast within the northern section of the McGuire area. Approximately 3 percent of the McGuire area drains to North Run. After exiting the McGuire area, South Run drains into North Run (MAFB, 2005). North Run eventually drains to Crosswicks Creek before joining the Delaware River at the City of Bordentown (MAFB, 2006). The remaining 12 percent of the McGuire area of JB MDL drains to Jacks Run and Larkins Run.

An investigation for waters of the United States, including wetlands, was performed by Princeton Hydro in December 2020, in accordance with the methods and procedures outlined in the *Federal Manual for Identifying and Delineating Jurisdictional Wetlands (Federal Manual)* (Federal Interagency Committee for Wetland Delineation [FICWD], 1989) and the U.S. Army Corps of Engineers *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0) (AGCP Regional Supplement)* (Environmental Laboratory, 2010). All wetlands delineated possessed hydrophytic vegetation, hydric soils, and wetland hydrology, satisfying the *Federal Manual* (FICWD, 1989) and *AGCP Regional Supplement* (Environmental Laboratory, 2010) for identifying wetlands and were delineated as such. A Wetland Delineation Report detailing survey methodology and results is provided as **Appendix C**.

Princeton Hydro conducted a desktop review of mapped waterbodies and wetlands prior to conducting the onsite delineation. NJDEP's GeoWeb indicated the presence of herbaceous wetlands to the west, east, and south, and one channel to the south of the HCLA project area (see **Figure 3-4**). No wetlands were mapped by NJDEP's GeoWeb in or within the vicinity of the MSA project area; however, several unnamed tributaries (UNT) to South Run were mapped around the perimeter of the MSA project area (see **Figure 3-5**).

Overall, one unnamed perennial stream was delineated to the south of the HCLA project area and was observed flowing predominately from southeast to northeast before discharging off-site via a culvert (see **Appendix C**). This stream appeared to have been hydrologically modified via channelization and/or straightening. Three modified palustrine emergent (PEM) wetlands were delineated within the stream's floodplain, and one crescent-shaped modified PEM wetland was delineated to the west of HCLA pad 1. To minimize aircraft ground and aircraft obstruction incidents, these wetlands are currently managed by a prescribed mowing regime consistent with the Integrated Natural Resources Management Plan (INRMP) and natural resources management practices as detailed in JB MDL's Vegetation Management Plan (MAFB, 2003). Furthermore, the hydrology of the crescent-shaped wetland is managed by the presence of a 14-inch culvert, which drains water from the wetland to a stormwater drain which subsequently outlets at an unnamed perennial stream.

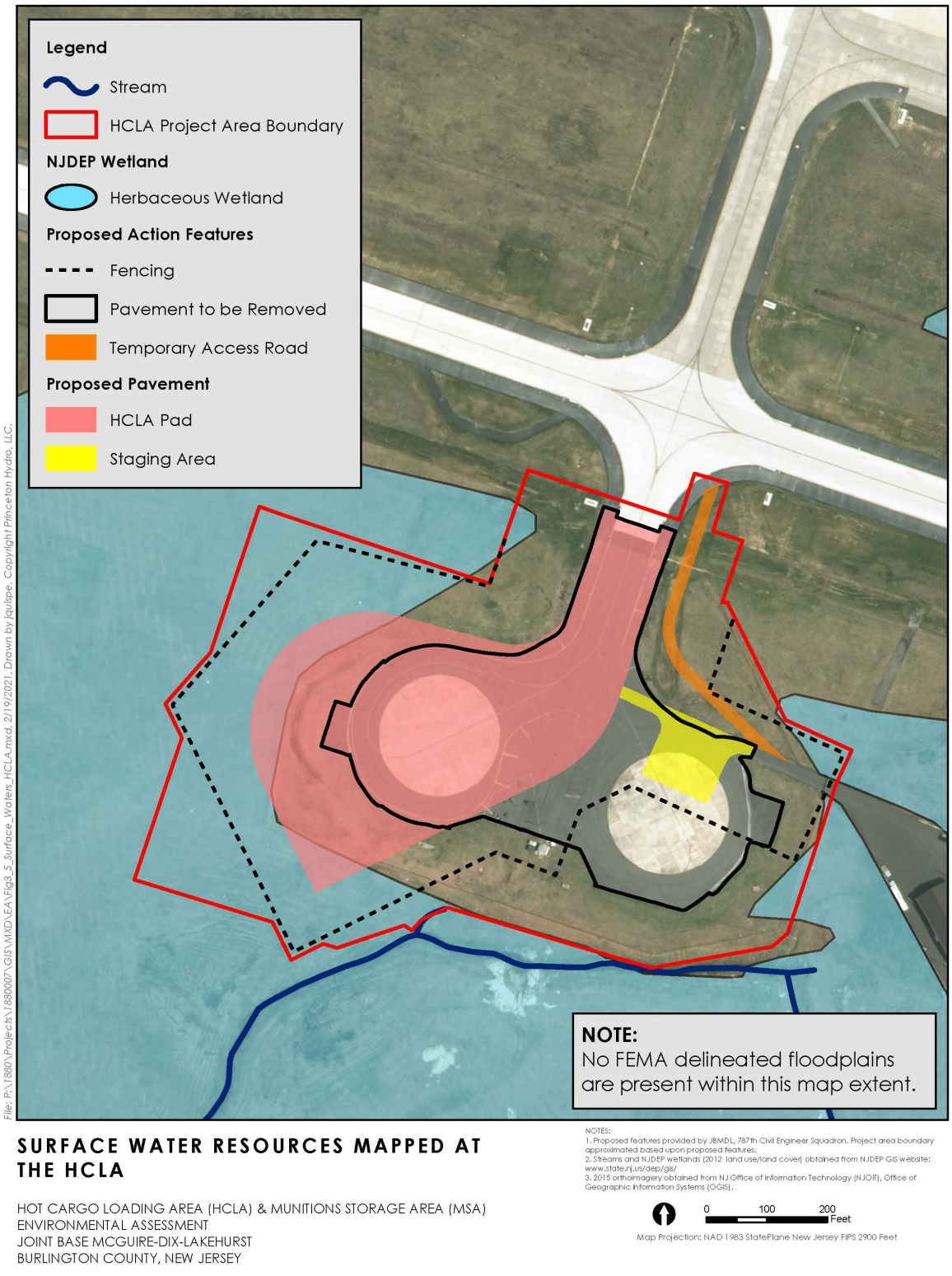


Figure 3-4. Surface Water Resources Mapped at the HCLA

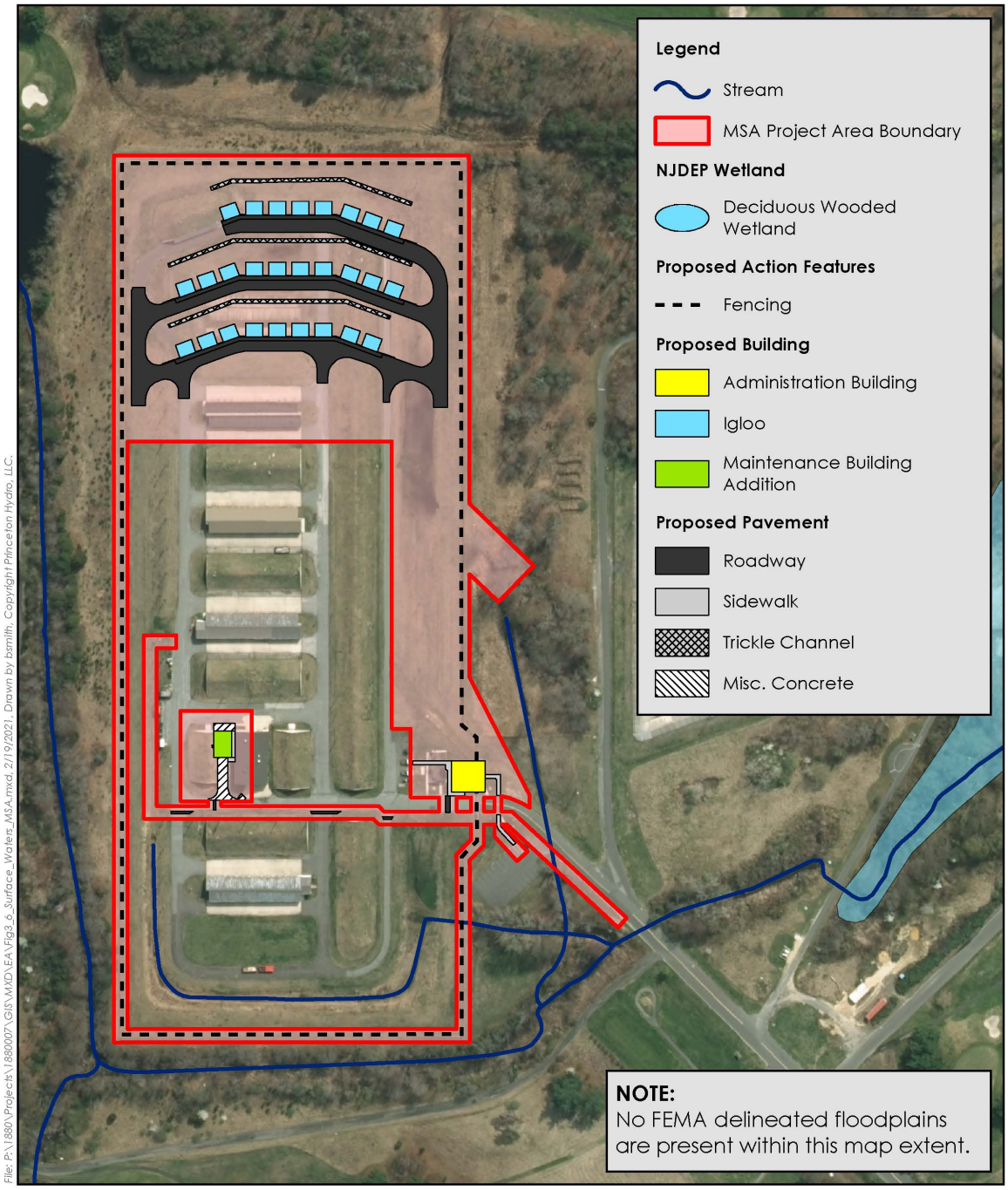


Figure 3-5. Surface Water Resources Mapped at the MSA

Additionally, several perennial UNTs to South Run and one pond were delineated around the perimeter of the MSA project area (see **Appendix C**). These waterbodies were all hydrologically connected to the surface water tributary system via culverts. Three palustrine scrub-shrub wetlands and six palustrine forested wetlands were delineated within the floodplains of the UNTs to South Run. All State open waters present at the HCLA and MSA are classified as Pineland Waters according to NJDEP's Surface Water Quality Standards (N.J.A.C. 7:9B).

3.5.1.4 Floodplains

Floodplains are any land areas susceptible to being inundated by floodwaters from any source (FEMA, 2018). Risk of flooding typically hinges on local topography, the frequency of precipitation events, and the size of the watershed above the floodplain. The Federal Emergency Management Agency does not map floodplains or hold any regulatory authority over potential floodplain development on military installations; floodplains are delineated and mapped on military installations on a project-by-project basis, as necessary (JB MDL, 2014). A formal floodplain study has never been completed for the McGuire area of JB MDL, and there are no delineated 100-year floodplains mapped within the HCLA and MSA project areas.

3.5.1.5 Stormwater Management

The McGuire area of JB MDL currently operates under an Individual NJPDES Industrial Stormwater Discharge Permit (No. NJ0106747) from the NJDEP which authorizes the discharge of stormwater associated with industrial activities to surface water. JB MDL maintains a Storm Water Pollution Prevention Plan (SWPPP) that was developed in accordance with the USEPA administered National Pollutant Discharge Elimination System (40 CFR § 122), the NJDEP Stormwater Management Rules (N.J.A.C. 7:11); the NJPDES Program; and other applicable federal, state, and county water pollution control regulations (JB MDL, 2010). The purpose of the SWPPP is to compensate for the added stormwater runoff and the possible runoff of pollution caused by development and industrial activities.

All construction projects at the installation must have site-specific soil erosion and stormwater management plans considering runoff control during and after construction. Proposed projects that disturb more than 1 acre of land must obtain authorization under NJPDES Construction Activities (5G3) General Permit No. NJ0088323 or under an individual permit.

The procedures and practices included in these plans shall be in accordance with the Standards for SESC under Chapter 251, Public Law 1975, the Soil Erosion and Sediment Control Act, and the Federal Water Pollution Control Act, 33 USC 1323. Contractors shall submit such plans as part of their environmental plan submittal.

Design criteria and calculations shall include, but not be limited by, the objectives and principles in N.J.A.C. 7:8 "Stormwater Management" and "A Guide to Stormwater Management Practices in New Jersey Manual". Under N.J.A.C. 7:8, project designs shall, to the maximum extent practicable, meet the standards for stormwater management by incorporating nonstructural strategies into the design. Minimum design and performance standards for groundwater recharge must be met using the methods required in the regulation. Stormwater management measures shall also be designed to reduce total suspended solids run-off as required by the regulation.

JB MDL and its projects must comply with the stormwater requirements of the Energy Independence and Security Act of 2007 (Section 438, Stormwater Runoff). All newly constructed drainage systems shall have a maintenance and inspection schedule as part of their design.

3.5.2 Environmental Consequences of Alternative 1 (Proposed Action)

3.5.2.1 Groundwater

The implementation of Alternative 1 would result in short and long-term, minor, adverse impacts on groundwater quality and recharge. Construction of a new HCLA pad to replace the existing dual non-functioning HCLA pads would increase impervious surfaces within the HCLA project area by 1.8 acres. Additionally, construction of the proposed MSA facilities would result in a permanent increase of 1 acre of impervious surfaces within the MSA project area. Stormwater management infrastructure would be designed and constructed to ensure that adequate infiltration and groundwater recharge occur in the immediate area in accordance with the NJDEP Stormwater Management Rules (N.J.A.C. 7:8). Thus, it is anticipated that the overall increase in impervious surfaces would negligibly decrease recharge of the New Jersey Coastal Plain Aquifer System. Additionally, implementation of stormwater and spill prevention BMPs developed consistent with the installation's SWPPP and other applicable plans and regulations would minimize potential runoff or spill-related effects on groundwater quality and reduce potential adverse effects of increased impervious surfaces on groundwater recharge.

In the event that groundwater is encountered within contaminated areas, the groundwater would be sampled, and if contaminants were present, the JB MDL Restoration Program Manager would be contacted, who would then notify NJDEP, and the contaminated water would be disposed of appropriately.

3.5.2.2 Surface Waters

Short-term, minor, adverse impacts to State open waters would occur as a result of earth disturbances during construction activities within the HCLA project area. Specifically, installation of a subgrade stormwater pipe would require excavation within potential riparian zones and flood hazard areas regulated by the Flood Hazard Area Control Act (N.J.S.A. 58:16A-50 et seq.). Once the stormwater pipe is installed, excavated soils and grades would be restored to pre-construction conditions. It is anticipated that a NJDEP Flood Hazard Area Individual Permit would be required to authorize regulated activities proposed at the HCLA project area. Additionally, SESC measures required by the Burlington County Soil Conservation District would be implemented and maintained in accordance with a certified SESC Plan to protect proximate surface waters.

Long-term, moderate, adverse impacts to freshwater wetlands would occur due to project activities proposed at the HCLA project area. The implementation of Alternative 1 would result in the filling of 0.3 acres of wetlands to accommodate the proposed HCLA pad. The USAF would mitigate for wetland losses in accordance with the Freshwater Wetlands Protection Act (N.J.S.A. 13:9B-1 et seq.) and its implementing Rules (N.J.A.C. 7:7A). Mitigation would be required to provide equitable replacement of the functions and values associated with the wetland proposed to be filled. The installation of the proposed fence line and stormwater pipe along the southern border of the HCLA project area would also impact approximately 0.1 acres of wetlands. Approximately 200 feet of fencing is proposed within a transition area, and an additional 110 feet of fencing is proposed within freshwater wetlands. Additionally, grading activities are anticipated to permanently impact approximately 0.04 acres of transition area within the HCLA project area.

No significant impacts to surface waters are anticipated as a result of the implementation of Alternative 1 at the MSA project area. The UNT to South Run may experience short-term, minor, adverse impacts from construction within the MSA project area, specifically during the installation of fencing along the southwestern portion of the project area. Approximately 1,355 feet of fencing is proposed within the transition area; however, proposed fencing is within the

footprint of the existing fencing. No fencing is proposed within freshwater wetlands. Grading activities are anticipated to permanently impact approximately 0.04 acres of transition areas at the MSA project area.

Before any construction activities may occur, it is anticipated that a NJDEP Freshwater Wetlands Individual Permit would be required to authorize activities regulated by the Freshwater Wetlands Protection Act (N.J.S.A. 13:9B-1 et seq.) and its implementing Rules (N.J.A.C. 7:7A). Impacts to both freshwater wetlands and transition areas would necessitate implementation of compensatory mitigation to offset these impacts. The USAF would submit an application for a Freshwater Wetlands Individual Permit to the NJDEP for review and approval. The public would be notified of the application in accordance with the requirements at N.J.A.C. 7:7A-17 and through publication in the NJDEP Bulletin. Additionally, a mitigation proposal would either be submitted to NJDEP for review and approval concurrent with the Freshwater Wetlands Individual Permit application or no later than 90 calendar days prior to the initiation of regulated activities authorized by the Freshwater Wetlands Individual Permit. The mitigation proposal would meet the substantive and procedural requirements of N.J.A.C. 7:7A-11. JB MDL would comply with the conditions that apply to every authorization pursuant to an individual permit at N.J.A.C. 7:7A-9.3 and any additional conditions NJDEP establishes, in accordance with N.J.A.C. 7:7A-20.3, as required, to ensure the project meets all applicable requirements of the Freshwater Wetlands Protection Act Rules and its enabling statutes.

3.5.2.3 Floodplains

Because floodplains are delineated and mapped on military installations on a project-by-project basis, as necessary, and no floodplain mapping currently exists for the HCLA and MSA project areas, it is anticipated that a NJDEP Flood Hazard Area Verification would be required to comply with the Flood Hazard Area Control Act (N.J.S.A. 58:16A-50 et seq.) and implementing Rules (N.J.A.C. 7:13). The Flood Hazard Area Verification would establish the flood hazard area design flood elevations, flood hazard area limits, and floodway limits within the HCLA and MSA project areas. The Flood Hazard Area Verification would be used to determine if any proposed work is situated within a flood hazard area, which would determine whether or not regulatory approval under the Flood Hazard Area Control Act Rules (N.J.A.C. 7:13) is required. Based upon the findings of the Flood Hazard Area Verification, a NJDEP Flood Hazard Area Individual Permit may be required to authorize regulated activities proposed within the flood hazard area. The Proposed Action would be designed to avoid and minimize adverse impacts to floodplains to the extent feasible.

3.5.2.4 Stormwater Management

During construction, there may be short-term, minor, adverse impacts to stormwater management as a result of soil erosion and sedimentation from earth disturbing activities. However, SESC measures required by the Burlington County Soil Conservation District would be implemented and maintained in accordance with a certified SESC Plan to protect proximate surface waters during construction activities to the maximum extent practicable. During operational activities, there may be minor, long-term benefits from the use of vegetative filters as part of the MSA stormwater management plan.

Alternative 1 would result in a permanent increase of approximately 1.8 acres of impervious surface within the HCLA project area and 1 acre of impervious surface within the MSA project area. Any development that ultimately disturbs 1 or more acres of land or increases impervious surfaces by 0.25 acres or more is considered a “major development”, as defined in NJDEP’s Stormwater Management Rules (N.J.A.C. 7:8). While the McGuire area of JB MDL currently holds an Individual NJPDES Industrial Stormwater Discharge Permit (No. NJ0106747) from the

NJDEP, it is anticipated that the Proposed Action would require additional permitting for stormwater management. Stormwater management during construction would comply with all federal, state, and local regulations. Operation of the proposed HCLA pad and MSA facilities would adhere to stormwater management objectives and requirements within the McGuire SWPPP.

Any net increase in stormwater runoff from Alternative 1 would be retained onsite in accordance with federal and state regulations as they apply to stormwater management. Stormwater management infrastructure would be designed and constructed to ensure that adequate infiltration and groundwater recharge occur in the immediate area. Any stormwater discharges would meet the requirements of the NJDEP's Stormwater Management Rules (N.J.A.C. 7:8), Leadership in Energy and Environmental Design Stormwater Management criteria, and the Energy Independence and Security Act of 2007, Section 438 "Stormwater Run-off Requirements for Federal Development Projects".

3.5.2.5 Reasonably Foreseeable Planned Actions

As the current fuel hydrant system leaks, replacement would resolve current concerns over potential impacts to water quality from discharges. Repairing the sanitary sewer lines across the installation may result in a temporary short-term, minor, adverse effects to runoff during excavation and construction; however, SESC requirements and BMPs would be implemented to minimize potential impacts to water resources. The restriping of the AMC ramp would not impact water resources. Therefore, none of the aforementioned projects would have a significant adverse impact on water resources in combination with the Proposed Action.

3.5.3 Environmental Consequences of Alternative 2 (No Action Alternative)

No impacts to water resources would result from the implementation of Alternative 2 as the construction of the new HCLA and MSA would not occur. There would be no impacts to groundwater, surface waters, floodplains, or stormwater associated with the implementation of this alternative.

3.6 Biological Resources

3.6.1 Affected Environment

3.6.1.1 Regulatory Framework

Protection and management of biological resources at JB MDL is mandated by several laws, regulations, and guidance documents. The primary statutes, regulations, EOs, and guidance that direct, and apply to, the management of biological resources at the installation include the following:

- Endangered Species Act of 1973 (16 USC 1531 et seq.)
- Endangered Species Preservation Act of 1966 (16 USC 1531)
- Engle Act of 1958 (10 USC 2671)
- Federal Insecticide, Fungicide, and Rodenticide Act of 1947 (7 USC 136)
- Federal Noxious Weed Act of 1975 (7 USC 2801)
- Fresh Water Pollution Control Act, as amended by the Clean Water Act (33 USC 1251 et seq.)
- Fish and Wildlife Conservation Act of 1980 (16 USC 2901 et seq.)

- Fish and Wildlife Coordination Act of 1934 (16 USC 661 et seq.)
- Migratory Bird Conservation Act of 1966 (16 USC 715)
- Migratory Bird Treaty Act of 1918 (16 USC 703-711)
- Sikes Act of 1960 (16 USC 670 et seq.), as amended
- Air Force Manual 32-7003, Environmental Conservation
- EO 11987, Exotic Organisms, May 24, 1977
- EO 11988, Floodplain Management, May 24, 1977
- EO 11990, Protection of Wetlands, May 24, 1977
- EO 11991, Protection and Enhancement of Environmental Quality, May 24, 1977
- Pinelands Comprehensive Management Plan (N.J.S.A. 13:18A-1 et seq., N.J.A.C. 7:50 et seq.).

3.6.1.2 Integrated Natural Resource Management Plan

Natural resources within JB MDL are managed in accordance with its INRMP. The INRMP provides detailed descriptions of the natural resources present at JB MDL, identifies management goals, and establishes specific natural resources management activities. The INRMP was developed in cooperation with the USFWS and the New Jersey Division of Fish and Wildlife (JB MDL, 2012).

3.6.1.3 Vegetation

The McGuire area of JB MDL is located within the Eastern Broadleaf Forest (Oceanic) Province, which is characterized by a temperate deciduous forest. Forest vegetation is divided into three major associations: mixed mesophytic, Appalachian oak, and pine-oak (JD MDL, 2008). The majority of land within the McGuire area is improved (developed) or highly disturbed. Vegetation communities within the McGuire area of JB MDL consist of grasslands in the airfield region, an out-of-use golf course, and lawns or landscaped areas adjacent to buildings and other structures. Early successional meadow and grassland communities exist along the southeastern portion of the McGuire area as a consequence of periodic mowing. Plant diversity is quite variable, though the dominant species typically include brome grass (*Bromus* sp.), panic grass (*Panicum* sp.), broomsedge (*Andropogon virginicus*), little bluestem (*Schizachyrium scoparium*), and the invasive spotted knapweed (*Centaurea maculosa*) (JB MDL, 2012).

Vegetation in and within the vicinity of the HCLA project area is dominated by modified PEM wetland, upland meadow, and maintained lawn. The herbaceous layer of the PEM wetland is dominated by soft rush (*Juncus effusus*) and white avens (*Geum canadense*). Non-wetland portions of the HCLA project area consist of upland meadow and maintained lawn. The herbaceous layer of the upland meadow vegetative community is dominated by wild garlic (*Allium vineale*), tall blue lettuce (*Lactuca biennis*), and common mullein (*Verbascum thapsus*). The maintained lawn vegetative community is comprised of an unidentified cool season grass species. Both upland vegetative communities are disturbed due to a prescribed mowing regime.

Vegetation in and within the vicinity of the MSA project area is dominated by palustrine scrub-shrub wetlands, palustrine forested wetlands, upland forest and maintained lawn. The shrub layer of the palustrine scrub-shrub wetland is dominated by sweet gum (*Liquidambar styraciflua*) saplings, southern arrowwood (*Viburnum dentatum*), and inkberry (*Ilex glabra*). The herbaceous layer is dominated by royal fern (*Osmunda regalis*), common reed (*Phragmites australis*), and roundleaf greenbriar (*Smilax rotundifolia*). Non-wetland portions of the MSA project area consist of upland forest and maintained lawn. The canopy layer of the upland forest is dominated by

pitch pine (*Pinus rigada*). The shrub and sapling layer is dominated by pitch pine saplings, eastern red cedar (*Juniperus virginiana*) saplings, and northern bayberry (*Morella pensylvanica*). The herbaceous layer of the upland forest is dominated by little bluestem (*Schizachyrium scoparium*) and broomsedge bluestem (*Andropogon virginicus*). Reindeer moss (*Cladina (Nyl.) Nyl.*) and American holly (*Ilex opaca*) are present but are not dominant. The maintained lawn vegetative community is comprised of an unidentified cool season grass species.

3.6.1.4 Mammals

There have been no mammal surveys conducted within the McGuire area of JB MDL other than rare species surveys; however, the mammalian communities are representative of the New Jersey Pine Barrens. Common medium to large mammals that may occur include white-tailed deer (*Odocoileus virginianus*), gray fox (*Urocyon cinereoargenteus*), opossum (*Didelphidae* spp.), and raccoon (*Procyonidae* spp.). Less common species may include red fox (*Vulpes vulpes*), and eastern coyote (*Canis latrans*). Groundhogs (*Sciuridae* spp.) are reportedly rare in the Pine Barrens, but they can occur along grass taxiway zones and lawn areas at the base. Common small to medium mammals that may occupy upland forests include eastern gray squirrel (*Sciurus carolinensis*), red squirrel (*Sciurus vulgaris*), and southern flying squirrel (*Glaucomys volans*). Small mammals that may occur in dry upland areas include the white-footed mouse (*Peromyscus leucopus*) and pine vole (*Microtus spp.*).

3.6.1.5 Special Status Species

JB MDL submitted a request for USFWS consultation pursuant to Section 7 of the Endangered Species Act on February 17, 2021 (see **Appendix A**). According to an Official Species List, dated February 17, 2021 (see **Appendix A**), provided by the USFWS – New Jersey Ecological Service Field Office during scoping efforts, known occurrences or potential habitat for the following federally and/or state-listed species are located on or near the HCLA and MSA project areas:

- Federally and State endangered American chaffseed (*Schwalbea americana*);
- Federally threatened and State endangered Knieskern's beaked-rush (*Rhynchospora knieskiernii*);
- Federally threatened and State endangered swamp pink (*Helonias bullata*);
- Federally threatened and State endangered bog turtle (*Glyptemys muhlenbergii*); and
- Federally threatened and State candidate for listing northern long-eared bat (NLEB) (*Myotis septentrionalis*).

According to the McGuire Air Force Base Grassland Bird Surveys, no federally and/or state-listed avian species have been observed within the HCLA or MSA project areas (USFWS, 2019a). However, the HCLA project area is adjacent to grasslands that provide habitat to early successional grassland-dependent birds during the breeding season. The six state-listed threatened or endangered species identified in **Table 3-8** have been documented within 1 mile of the HCLA and MSA project areas (see **Figure 3-6**). Descriptions of these species and findings from the McGuire Air Force Base Grassland Bird Surveys can be found below.

According to JB MDL Natural Resources Staff, during the INRMP revision process, the USFWS recommended a seasonal restriction from April 1 to September 30 to avoid potential impacts to migratory birds protected under the Migratory Bird Treaty Act and roosting bats (Mahon, 2020). JB MDL avoids shrub and tree trimming and removal between April 1 and September 30 in accordance with this federal direction.



Figure 3-6. Special Status Species Observations within 1-Mile of the HCLA and MSA

The habitat requirements for species identified during agency correspondence, species documented by JB MDL within 1 mile of the HCLA and MSA project areas, and the likelihood for each identified species to utilize the project area are described in greater detail in the following sections.

Table 3-8. Special Status Species Known to Occur Within 1-Mile of the HCLA and MSA

Common Name	Scientific Name	Federal Status	State Status[1]
Bobolink	*Dolichonyx oryzivorus*	NL	Tbr, SCnb
Grasshopper sparrow	*Ammodramus savannarum*	MNB	Tbr
Horned lark	*Erimophila alpestrias*	NL	Tbr
Savannah sparrow	*Passerculus sandwichensis*	NL	Tbr
Upland sandpiper	*Bartramia longicauda*	MNB	E
Pied-billed grebe	*Podilymbus podiceps*	NL	Ebr, SCnb

Sources: NJDEP, 2010; USACE, 2006; Geo-Marine Inc., 2006; JB MDL, 2012; USFWS, 2019a; JB MDL, 2020a

Key: NA=Not Applicable, E=Endangered, T=Threatened, SC=Special Concern, br=breeding population, nb=non-breeding population, NL= Not Listed, MNB=migratory nongame bird of management concern

[1] New Jersey animals and plants designated Special Concern and plants designated Endangered are not afforded legal protections but are noted as rare species.

State-Listed Species

Bobolink. Bobolink prefers to build their nests in areas of greatest vegetative height and density and could potentially nest in parcels as small as five to ten acres (NJDFW, 2018). During McGuire's 2019 grassland bird survey, A total of 128 bobolink observations were made, with an average of 32 observations per survey. The highest concentrations of bobolinks were observed along Runway 06/24 and Runway 18/36 (see **Figure 3-6**).

Grasshopper Sparrow. Grasshopper sparrow favors parcels over 100 acres containing short to medium-height bunch grasses interspersed with patches of bare ground, a shallow litter layer, and scattered forbs (NJDFW, 2018). During McGuire's 2019 grassland bird survey, at least two individual grasshopper sparrows were observed at every survey point. A total of 221 observations were made, with an average of 55 observations per survey. This is similar to 2018 which averaged 58 observations per survey. Grasshopper sparrows were present in the greatest numbers at points along the edge of the McGuire Airfield Triangle and across the Runway 06/24 where the grass was mowed (see **Figure 3-6**).

Horned Lark. Horned lark nests within areas of barren ground with short and sparse cover and are quick to abandon sites as vegetation grows thicker (Hall, 2011). During McGuire's 2019 grassland bird survey, a total of 11 observations were made, with an average of 2.75 observations per survey. Horned larks were observed at seven of the survey points (see **Figure 3-6**). All of those points were either along the edge of the McGuire Airfield Triangle along Taxiway Lima or to the east of Runway 06/24 in mowed areas.

Savannah Sparrow. Savannah sparrow requires a mix of short and tall grasses, a thick litter layer, dense ground vegetation, and scattered forbs (NJDFW, 2018). During McGuire's 2019 grassland bird survey, savannah sparrows were the least abundant of the target grassland species with a total of three observations made, an average of 0.75 observations per survey. The observations were made at three different survey points and these points were along the edge of the McGuire Airfield Triangle along Taxiway Lima or to the east of Runway 06/24 in mowed areas (see **Figure 3-6**).

Upland Sandpiper. Upland sandpiper requires a mosaic of vegetation heights within their home range: shorter grasses for foraging and courtship displays, medium grasses for the rearing of precocial chicks, and taller grasses for camouflage of the nest (Houston et al., 2011). They also require a relatively large home range of at least 150 acres that provides extensive communal feeding and loafing areas in close proximity to nesting areas (NatureServe, 2007). In many northeastern states, including New Jersey, airfields provide the majority of the suitable habitat for upland sandpipers (NatureServe, 2007). During McGuire's 2019 grassland bird survey, a total of 62 upland sandpipers were observed, with an average of 15.5 observations per survey. This average is slightly higher than 2017 and 2018 survey observations. The majority of upland sandpiper activity is centered within the McGuire Airfield Triangle, south of the HCLA project area and west of the Runway 06/24 (see **Figure 3-6**). JB MDL is home to one of five known breeding sites within New Jersey.

Pied-billed Grebe. Pied-billed grebe typically utilizes emergent or aquatic vegetation which provides good nest site locations (Muller, 1999). The pied-billed grebe was not observed on the McGuire area during grassland surveys between 2017-2019, however, there is a historical sighting east of Runway 06/24 (see **Figure 3-6**). This sighting was considered a migratory individual that stopped to rest and feed (Fort Dix, 1996).

Federally Threatened Species

American Chaffseed. American chaffseed occurs in sandy (sandy peat, sandy loam), acidic, seasonally-moist to dry soils (USFWS, 2014). It is generally found in early successional habitats described as open, moist pine flatwoods, fire-maintained savannas, ecotonal areas between peaty wetlands and xeric (dry) sandy soils, bog borders, and other open grass-sedge systems. American chaffseed is dependent on factors such as fire, mowing, or fluctuating water tables to maintain the crucial open to partly-open conditions that it requires. The species appears to be shade intolerant.

Although American chaffseed has not been historically observed at JB MDL, the remaining natural occurrence of chaffseed in New Jersey is within the vicinity of JB MDL's boundary (USFWS, 2014). American chaffseed has not been identified within JB MDL (USAF, 2020).

Knieskern's Beaked-Rush. Knieskern's beaked-rush is endemic to New Jersey (USFWS, 2015). An obligate wetland species, Knieskern's beaked-rush occurs in early successional wetland habitats, often on bog-iron substrates adjacent to slow-moving streams in the Pinelands region. Knieskern's beaked-rush has not been identified within the McGuire area. During Section 7 review, the USFWS indicated that they were was unable to determine if Knieskern's beaked-rush would be affected by the Proposed Action at the HCLA project area. The USFWS recommends that a qualified botanist conduct a habitat suitability survey for Knieskern's beaked-rush as soon as possible within the grasslands in and within the vicinity of the proposed limits of disturbance at the HCLA project area (see **Appendix A**).

Swamp Pink. An obligate wetland species, swamp pink occurs in a variety of palustrine forested wetlands including swampy forested wetlands bordering meandering streamlets, headwater wetlands, sphagnous Atlantic white-cedar swamps, and spring seepage areas (USFWS, 2016). Specific hydrologic requirements of swamp pink limit its occurrence within these wetlands to perennially saturated areas, but not inundated by floodwater. The water table must be at or near the surface, fluctuating only slightly during the spring and summer months. Groundwater seepage with lateral groundwater movement is a common hydrologic characteristic of swamp pink habitat. Swamp pink has not been identified within the McGuire area (USAF, 2020).

Bog Turtle. Bog turtles inhabit open, wet meadows and bogs with standing or slow-moving water over mucky substrates (USFWS, 2020). An assessment by Herpetological Associates, Inc. conducted in 2018 determined no suitable habitat for bog turtle was present at JB MDL (Brunson and Bjorhus, 2021).

Northern Long-Eared Bat. Suitable hibernacula areas for NLEB consist of large caves and abandoned mines, while suitable foraging habitat is described in more general terms as consisting of forested areas. Summer nesting habitat includes cavities, crevices, and beneath the bark of dead and live trees (USFWS, 2019b). Roosting NLEB have also been observed in man-made structures such as buildings, barns, sheds, cabins, under eaves of buildings, and in bat houses. In southern New Jersey, the NLEB is known to roost in pitch pine forests and Atlantic white cedar (*Chamaecyparis thyoides*) swamps. There have been no surveys or sightings of NLEB within the McGuire area of JB MDL; however, neither project area is within 0.25 miles of documented NLEB hibernaculum or 150 feet of a documented NLEB maternity roost (USFWS, 2021).

3.6.2 Environmental Consequences of Alternative 1 (Proposed Action)

On April 15, 2021, JB MDL received correspondence from USFWS indicating that they were unable to determine if Knieskern's beaked-rush would be affected by the Proposed Action at the HCLA project area. The USFWS recommended that a qualified botanist conduct a habitat suitability survey for Knieskern's beaked-rush as soon as possible within the grasslands in and within the vicinity of the proposed limits of disturbance (see **Appendix A**). If the habitat suitability survey identifies the presence of Knieskern's beaked-rush, JB MDL would coordinate with the USFWS to ensure the Proposed Action would not result in significant adverse impacts. Consultation with the USFWS is ongoing.

Implementation of Alternative 1 would result in long-term, minor, adverse impacts to biological resources at the HCLA project area due to the loss of wetland and grassland habitats. Construction of Alternative 1 would result in the filling of 0.3 acres of a modified PEM wetland. This wetland is currently disturbed as it is subject to a prescribed mowing regime and has modified hydrology due to an existing culvert that drains the wetland. Several protected species occur or have the potential to occur within the McGuire Airfield, including numerous state-listed grassland birds (see **Section 3.6**). The modified PEM wetland does not possess functions and values typically associated with a wetland due to its modified vegetation and hydrology, and its small size. As a result, this wetland does not currently provide critical wildlife habitat for any of the state-listed grassland birds listed in **Section 3.6**. The USAF is required to mitigate for wetland losses in accordance with the Freshwater Wetlands Protection Act (N.J.S.A. 13:9B-1 et seq.) and its implementing Rules (N.J.A.C. 7:7A). Mitigation would be required to provide equitable replacement of the habitat functions and values associated with the wetland proposed to be filled.

Implementation of Alternative 1 would result in short-term, minor, adverse impacts to biological resources at the MSA project area due to disturbance of potential transition areas. Additionally, noise from demolition and construction activities would result in fauna temporarily leaving the project area and relocating to alternative locations, both on and off base. The frequent presence of people, heavy equipment (and associated construction noise), and the removal of vegetation would likely preclude most fauna from returning to the project area during construction. It is anticipated that fauna would return to the project area and surrounding habitats after construction is complete.

During land clearing at the HCLA project area, there is the potential to disrupt and harm grassland birds during the nesting season; however, these impacts would be reduced to short-

term, minor, adverse impacts by avoiding construction during the grassland bird breeding period of April 15 through July 31. After construction is complete, any temporarily disturbed grassland habitat would be restored with warm-season native bunchgrasses in accordance with the INRMP (USAF, 2020). Approximately 0.42 acres of grassland habitat would be permanently lost or permanently impacted as a result of Alternative 1; however, the larger grassland habitat contiguous with the HCLA project area would continue to provide wildlife habitat to grassland bird species within JB MDL.

The JB MDL Natural Resources Manager would periodically monitor the project area during land clearing operations for the presence of special status species. If any special status species are encountered, construction personnel would be required to contact JB MDL Natural Resources Staff immediately.

[[Preparer's Note: Sections 3.6.1 and 3.6.2 and Appendix A will be updated with the results of and correspondence relating to USFWS' Section 7 review.]]

3.6.2.1 Reasonably Foreseeable Planned Actions

The replacement of the fuel hydrant system, repair of the sanitary sewer lines, and restriping of the AMC ramp would have negligible impacts to biological resources. Noise levels during excavation and construction of the fuel hydrant system and sanitary sewer lines may result in the temporary preclusion of fauna to their project areas and surrounding areas during repairs; however, it is anticipated that fauna would return to the project areas and surrounding habitats after repairs are completed. Therefore, none of the aforementioned projects, when combined with Alternative 1, would have a disproportionally high or significant adverse impact on biological resources.

3.6.3 Environmental Consequences of Alternative 2 (No Action Alternative)

No impacts to biological resources would result from the implementation of Alternative 2 as the construction of the new HCLA and MSA would not occur.

3.7 Cultural Resources

3.7.1 Affected Environment

Under Section 106 of the NHPA, an Area of Potential Effects (APE) is delineated to encompass the area (or areas) where an undertaking or proposed action has the potential to affect historic properties, if they exist. The elements of the Proposed Action with the potential to impact cultural resources include replacing the two existing HCLA pads with a larger HCLA pad, and adding 27 concrete earth-covered igloos and other support facilities at the existing MSA within the McGuire area of JB MDL. In accordance with 36 CFR 800.16(d), JB MDL defined two APEs for the Proposed Action including the HCLA APE, approximately 15 acres, and the MSA APE, approximately 18 acres (see **Figure 3-7** and **Figure 3-8**). On March 24, 2021, in response to the USAF's request for initiation of the Section 106 process for the Proposed Action and review of the APEs, the New Jersey State Historic Preservation Office concurred with the APEs (see **Appendix A**).

Portions of the HCLA APE are located within Cultural Resources Sensitivity Area 3, as identified within the JB MDL Integrated Cultural Resources Management Plan. Cultural Resources Sensitivity Areas at the McGuire area of JB MDL were identified in surveys undertaken in 1993–1996 as areas with potential for archaeological or historic sites, due to their "relative lack of disturbance or their proximity to areas of documented historic or prehistoric occupation or use"

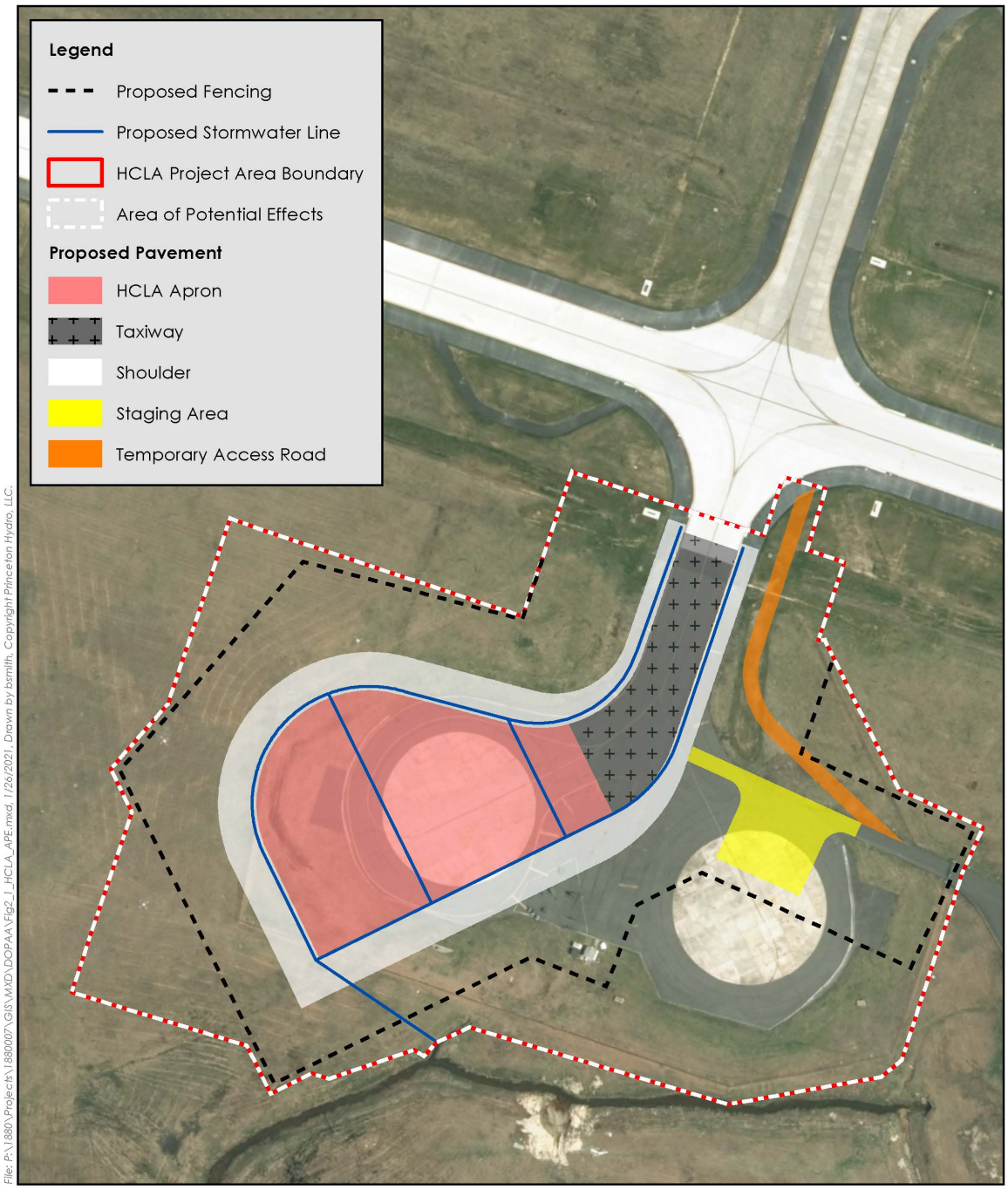
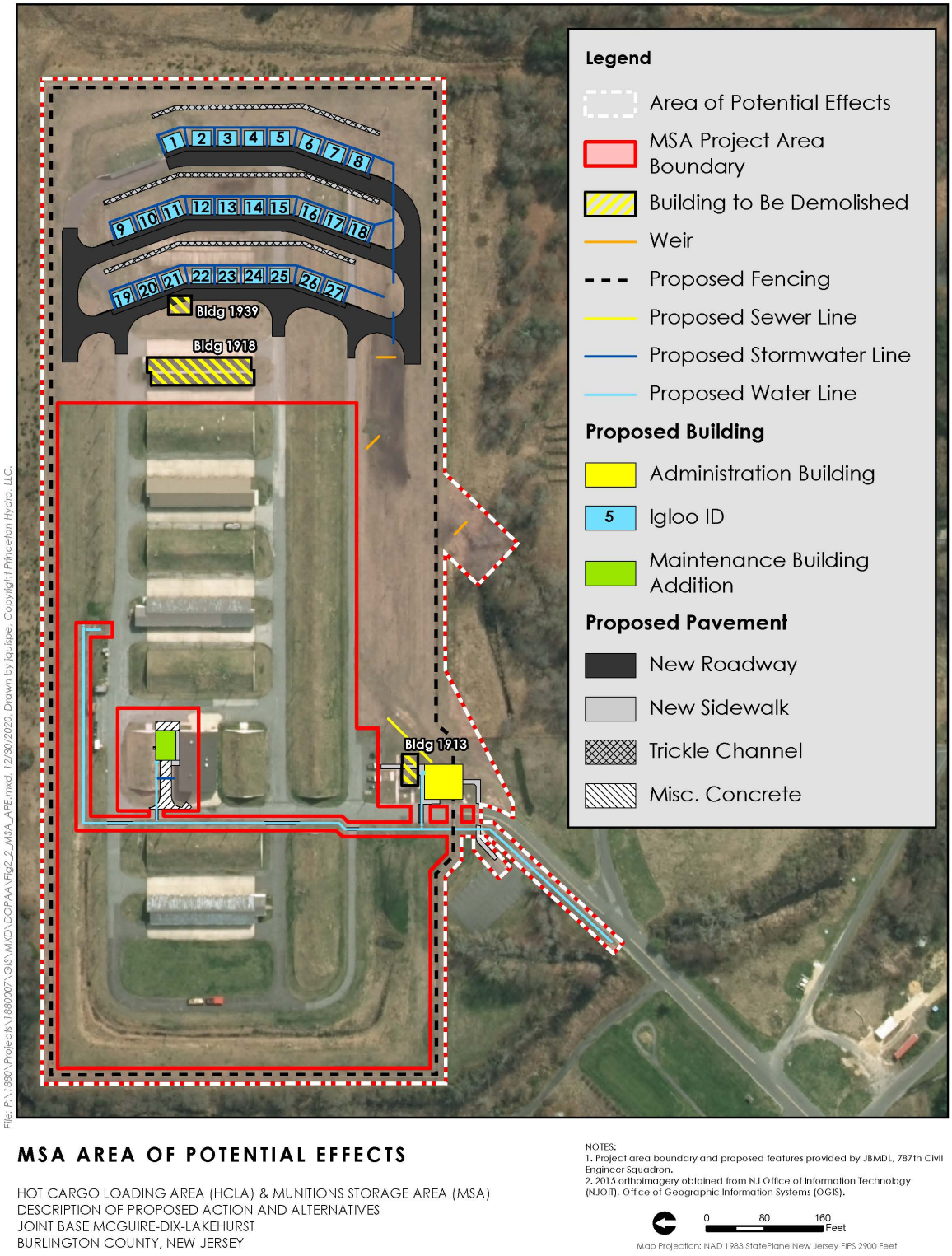


Figure 3-7. HCLA Pad Area of Potential Effects



File: P:\1880\Projects\1880007\GIS\MXD\DOPAA\Fig2-2_MSA_APE.mxd, 12/30/2020, Drawn by jquispe, Copyright Princeton Hydro, LLC.

MSA AREA OF POTENTIAL EFFECTS

HOT CARGO LOADING AREA (HCLA) & MUNITIONS STORAGE AREA (MSA)
DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES
JOINT BASE MCGUIRE-DIX-LAKEHURST
BURLINGTON COUNTY, NEW JERSEY

NOTES:
1. Project area boundary and proposed features provided by JBMDL, 787th Civil Engineer Squadron.
2. 2015 orthoimagery obtained from NJ Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGIS).

0 80 160 Feet

Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet

Figure 3-8. MSA Area of Potential Effects

(JB MDL, 2018b). Because portions of the HCLA APE are within Sensitivity Area 3, JB MDL conducted an archaeological survey in previously undisturbed areas within the HCLA APE that would be subject to ground-disturbing activities. Built resources that comprise the existing HCLA were installed beginning in the 1960s and required National Register of Historic Places (NRHP) evaluation under Section 106. JB MDL conducted an architectural resources survey in the HCLA APE in March 2021 (see **Sections 3.7.1.1** and **3.7.1.2**, and **Appendix E**).

The MSA APE is outside of cultural resources sensitivity areas identified in the JB MDL Integrated Cultural Resources Management Plan, and all proposed activities at the MSA would take place within previously disturbed areas. Thus, no additional archaeological work was recommended at this location. Within the existing MSA, built resources fall into two groups: 1) those that have been previously determined not eligible for NRHP listing (Building 1913), and 2) those subject to the Program Comment for World War II and Cold War Era (1939–1974) Ammunition Storage Facilities (Buildings 1914–1919) (ACHP, 2006). Buildings that fall under the Program Comment are not subject to further Section 106 review. As such, no additional built resources surveys were recommended at this location.

3.7.1.1 Archaeology

Prehistoric sites are rare in the Outer Coastal Plain of New Jersey, and no prehistoric archaeological sites have been identified on the McGuire area of JB MDL since the 1930s, likely due to the level of disturbance required to construct the base (JB MDL, 2018b). As noted in archaeological surveys conducted at JB MDL between 1993 and 1996, streams that crossed the McGuire area may have been occupied by Native American tribes in prehistory; however, much of the McGuire area has been disturbed and is not likely to contain intact sites. However, undisturbed areas have the potential to contain prehistoric archaeological sites, albeit at a moderate to low probability (JB MDL, 2018b).

There are no previously identified historic archaeological sites at the HCLA or MSA project areas. The documented patterns of historic land use in Burlington County indicate that the predominant historic activities were related to forest and water products, including extraction of bog iron, timber, charcoal, cranberries, and water power (JB MDL, 2018b). An evaluation of historical archaeological sites in 1995 resulted in the identification of two NRHP-eligible sites at the McGuire area of JB MDL under Criterion D: 28BU458 and 28BU459, both of which are mid-nineteenth-to-early twentieth-century rural households (JB MDL, 2018b). These sites are not within either the HCLA APE or MSA APE.

Five areas were identified as high sensitivity for cultural resources at the McGuire area of JB MDL as a result of previous surveys. Of these five areas, it was determined that a portion of the HCLA APE is within Sensitivity Area 3, which was surveyed in 1993–1994 (JB MDL, 2018b). NJ HPO archaeology survey standards have been updated since that time, and a 2021 investigation was undertaken to verify the finding of no historically significant archaeological sites present within the HCLA APE. A March 2021 survey confirmed the absence of historically significant archaeological sites within the HCLA APE (see **Appendix E**).

3.7.1.2 Historic Architectural Resources

Nearly all buildings and structures at JB MDL that were constructed prior to 1966 have been inventoried, as well as the majority of Cold War-era resources (JB MDL, 2018b). Several architectural resources at the McGuire area were initially identified as exceptionally significant under Criterion Consideration G (properties less than 50 years old), and then reevaluated upon reaching 50 years of age and recommended eligible as one discontiguous historic district: the BOMARC-SAGE Historic District (JB MDL, 2018b). This historic district is not within either the

HCLA APE or MSA APE. A March 2021 survey confirmed the absence of historic properties within the HCLA APE (see **Appendix E**).

[[Preparer's Note: Sections 3.7.1.1 and 3.7.1.2 and Appendix A will be updated with results of and correspondence relating to NJ HPO's Section 106 review.]]

3.7.1.3 Native American Consultation

There are no Tribal Historic Preservation Officers with jurisdiction within the State of New Jersey; however, there are federally-recognized tribes, now located outside the state, that have a cultural ancestral affiliation with the lands comprising JB MDL (JB MDL, 2018b). JB MDL is in the process of establishing a formal government-to-government relationship with the Delaware Nation and Delaware Tribe of Indians. The JB MDL Commanding Officer sent letters to these tribes in July 2011 and both tribes expressed interest in reviewing ongoing actions at the installation. For specific projects, the tribes requested that information be sent to their Tribal Historic Preservation Officers. No Native American Traditional Cultural Properties, protected tribal resources, treaty rights, sacred sites, or Indian lands are known to be present within the project area (JB MDL, 2018b). However, JB MDL is inviting these tribes to participate as consulting parties for this EA under Section 106 of the NHPA.

[[Preparer's Note: Section 3.7.1.3 and Appendix A will be updated with outcomes of and correspondence relating to tribal participation in the Section 106 consultation process.]]

3.7.2 Environmental Consequences of Alternative 1 (Proposed Action)

No impacts to cultural resources are anticipated due to the implementation of Alternative 1. Based on existing conditions, the HCLA project area has medium-to-low potential to contain prehistoric or historic archaeological resources, and the MSA project area has low potential to contain prehistoric or historic archaeological resources (JB MDL, 2018b). No archaeological sites have been previously identified within the HCLA and MSA project areas. No historically significant archaeological sites were identified as a result of a March 2021 intensive survey of the HCLA. If prehistoric or historic artifacts are inadvertently discovered during project construction and demolition, these activities would be suspended, the site would be secured, and the NJ HPO and federally recognized tribes would be contacted, as applicable. Further, JB MDL would ensure compliance with all applicable statutory, regulatory, and policy requirements in accordance with the Integrated Cultural Resources Management Plan (JB MDL, 2018b) (see **Section 2.1**). No historically significant architectural resources have been previously identified in the HCLA project area nor were any identified as a result of an architectural resources investigation conducted in March 2021. Historic architectural resources in the MSA project area have either been determined not eligible for NRHP listing or are subject to the Program Comment World War II and Cold War Era (1939–1974) Ammunition Storage Facilities and require no further consultation.

3.7.2.1 Reasonably Foreseeable Planned Actions

The fuel hydrant system and sewer line replacement projects would be constructed underground within existing disturbed areas and duct banks. Restriping of the AMC ramp would not include subsurface disturbance, introduce new structures, or affect any culturally significant viewsheds. Therefore, reasonably foreseeable planned actions, when combined with Alternative 1, would not result in significant impacts on cultural resources.

3.7.3 Environmental Consequences of Alternative 2 (No Action Alternative)

No impacts to cultural resources would result from the implementation of Alternative 2 as the construction of the new HCLA pad and MSA facilities would not occur. Environmental Consequences of Alternative 1 (Proposed Action)

3.8 Infrastructure

3.8.1 Affected Environment

Infrastructure includes public works systems such as utilities and transportation networks that enable a population in a specified area to function. Infrastructure is wholly man-made with a high correlation between the type and extent of infrastructure and the degree of which an area is characterized as urban or developed. The availability of infrastructure and its capacity to support growth are generally regarded as essential to the economic growth of an area. The infrastructure components addressed in this section include utilities and public works systems (i.e., electrical system, water supply, wastewater system, natural gas supply, communications system, stormwater system, and liquid fuel system), solid waste management, and transportation.

3.8.1.1 Utilities and Public Works Systems

Electrical System. Electricity at JB MDL is supplied by Jersey Central Power and Light Company. Electricity is transmitted via six 34.5 kilovolt lines to on-installation substations that feed into transformers and step-down facilities and is distributed throughout the installation through service connections and power distribution systems. The current electricity demand is 530,460 kilowatt-hours per day. Portions of the electricity distribution system consist of overhead lines that are prone to power outages due to ice buildup, lightning strikes, falling trees, and aging equipment. Electricity at the existing HCLA pads and MSA is provided via underground and overhead electrical lines (JB MDL, 2015a).

Water Supply System. The JB MDL water supply system consists of 31 wells and surface water supply. Average water demand at JB MDL is 3.439 million gallons per day (mgd), while the peak demand is 4.161 mgd. The system has a supply capacity of 7.26 mgd, which is sufficient to support demand. The installation water distribution system is comprised of three separate systems that allow for supply redundancies. Potable water at the McGuire area of JB MDL is supplied by three 1,000-foot-deep wells that draw water from the Potomac-Raritan-Magothy aquifer that is treated on the installation and distributed via underground water mains. The closest water main connection to the HCLA project area is at the McGuire airfield air traffic control tower, approximately 0.4 miles to the southeast. The closest water main connection to the MSA project area is at the existing munitions administration building (Building 1913) at the entrance of the MSA. As of December 31, 2019, the installation was in full compliance with USEPA and NJDEP drinking water health standards (JB MDL, 2015a; JB MDL, 2019b).

Wastewater System. The wastewater collection system at JB MDL is comprised of 571,818 linear feet of sewer mains and 37 lift stations. Wastewater from the McGuire area of JB MDL flows to an on-installation wastewater treatment plant, which was constructed in the 1990s and is considered to be in very good condition. The maximum capacity of the wastewater treatment plant is 4.925 mgd, while the average demand is 0.94 mgd and the peak demand is 2.775 mgd. The wastewater treatment plant is within the Dix area of JB MDL. The closest wastewater line to the HCLA project area is approximately 0.25 miles to the east. The closest wastewater line to the MSA project area is at the existing munitions administration building (Building 1913) (JB MDL, 2015a).

Natural Gas Supply. Natural gas within the McGuire area of JB MDL is managed by JB MDL and two private utility companies. The natural gas distribution system consists of polyethylene piping. There are no natural gas lines within the HCLA or MSA project areas nor within 1-mile of project areas on JB MDL property (JB MDL, 2015a).

Communications System. The communications system at JB MDL consists of approximately 250 miles of copper cabling that includes several looped distribution systems; however, a majority of the lines are considered old and need replacement. There are 250 miles of fiber optic communications lines that serve 948 buildings at JB MDL. While the communications system is considered degraded, modernization of the infrastructure continues to ensure consistent operations to support mission needs. The communication network extends throughout the McGuire area, including within the airfield where a telephone line terminates at the existing HCLA pads, and within the MSA that contains fiber optic lines (JB MDL, 2015a).

Stormwater System. Stormwater within the McGuire area of JB MDL is managed via runoff. Stormwater on the installation flows north from the Dix area to the McGuire area of JB MDL. Approximately 88 percent of surface drainage flows to the North and South Runs of Crosswicks Creek, which are north of the installation, while the remaining 12 percent of surface drainage flows to Jacks Run and Larkins Run, which are tributaries to Rancocas Creek southwest of the installation. The McGuire and Dix stormwater system uses detention ponds to manage drainage in areas of new development. The nearest stormwater features to the project areas are stormwater culverts, which underlie airfield pavements near the HCLA pads and road networks within and adjacent to the MSA (JB MDL, 2015a). The installation maintains a SWPPP to mitigate potential pollution sources.

Liquid Fuel System. Fuels stored and distributed within the McGuire area of JB MDL include JP-8 (jet fuel), fuel oil, gasoline, and diesel. Most fuels are delivered to the installation by truck; however, JP-8 is delivered through a commercial 6-inch fuel line from an off-installation fuel hub. The closest bulk fuel storage facilities to the project areas include a jet fuel hydrant system underlying the existing HCLA pads and an aboveground fuel tank less than 0.1 miles south of the MSA (JB MDL, 2015a). The jet fuel hydrant piping loop underlying the existing HCLA pads is not in service; aircraft parked on the existing HCLA pads are refueled using tanker trucks (JB MDL, 2019b). A new jet fuel hydrant system (fuel pit and associated piping) would be installed under the site of the proposed HCLA pad prior to the start of construction of the Proposed Action. The construction of the new jet fuel hydrant system is not part of the Proposed Action.

3.8.1.2 Solid Waste Management

JB MDL maintains an Integrated Solid Waste Management Plan. The plan covers general solid waste and includes construction and demolition debris, compost material, and industrial solid waste (USAF, 2020). In Fiscal Year 2011, the McGuire area of JB MDL produced 8,514 tons of construction waste with a diversion rate of approximately 86 percent and 3,376 tons of other non-hazardous waste with a diversion rate of approximately 36 percent (JB MDL, 2015a). There are no active landfills within the McGuire area of JB MDL. Waste contractors collect and transport materials that cannot be reused or recycled from the McGuire area of JB MDL to the Burlington County Resource Recovery Center, which is expected to meet the disposal needs of Burlington County until 2027 (USAF, 2020; Burlington County, 2021).

3.8.1.3 Transportation

The McGuire area of JB MDL is bound by County Routes 616 to the north, County Route 667 to the east, Range Road to the south, and Texas Avenue to the west. Major highways in the area include Interstate 295, Interstate 95, and the New Jersey Turnpike. Several arterial roadways, including County Routes 537, 670, and 680, connect the installation to regional roadways, including State Route 68 and U.S. Route 206. County Route 680 is the primary access road to the McGuire Main Gate.

The McGuire area of JB MDL can be accessed via the McGuire Main Gate, which is less than 1 mile north of the McGuire airfield at the intersection of McGuire Boulevard and County Route

616. Commercial vehicles accessing the McGuire and Dix areas of JB MDL are directed to the McGuire/Dix Commercial Gate along County Route 670 approximately 0.7 miles west of the Wrightstown Gate. The McGuire Main Gate operates 24 hours daily, while the McGuire/Dix Commercial Gate operates weekdays from 6:00 a.m. to 8:00 p.m. A transportation mobility study was completed by Burlington and Ocean Counties in 2011. The study included vehicle processing capacity and peak demand for each installation gate. Data for the McGuire Main Gate and McGuire/Dix Commercial Gate is provided in **Table 3-9**. For both gates, the peak hour of demand was between 7:00 a.m. to 8:00 p.m. during weekdays (JB MDL, 2015a; Burlington County and Ocean County, 2011).

Table 3-9. Vehicle Processing Capacity for Gates in the Vicinity of the Project Areas

Gate	Hourly Processing Capacity	Hourly Demand	Average Inbound AM Peak Hour Demand	Maximum Queued Vehicles in Peak Hour
McGuire Main Gate	1,236	1,031	983	48
McGuire/Dix Commercial Gate	N/A	45	45	0

Sources: JB MDL, 2015a, Burlington County and Ocean County, 2011
Note: N/A = data not available

The primary north/south roadways within the McGuire area of JB MDL include McGuire Boulevard, Vandenberg Avenue, and Arnold Avenue. The primary east/west roadways include West Tuskegee Avenue, East 3rd Street, and West Arnold Avenue. Traffic and level of service data for key intersections on the installation were collected during the 2011 traffic study, and data for four McGuire area intersections are provided in **Table 3-10** (JB MDL, 2015a). Operation of roadway segments and intersections are expressed in terms of level of service, which range from A (best) to F (worst).

Table 3-10. Traffic Counts and Level of Service for Key McGuire Area Intersections

Intersection	Daily Vehicle Count	AM	Midday	PM
McGuire Boulevard and East 3rd Street	1,910	A	A	A
Vandenberg Avenue and West Tuskegee Avenue	3,051	A	A	B
Vandenberg Avenue and West Arnold Avenue	1,456	A	A	A
West Tuskegee Avenue and Arnold Avenue	4,004	B	C	C

Source: JB MDL, 2015a

3.8.2 Environmental Consequences of Alternative 1 (Proposed Action)

3.8.2.1 Utilities and Public Works

Short-term, negligible adverse impacts on the electrical system, water supply system, wastewater system, natural gas supply, and communications infrastructure would be expected during construction and demolition activities associated with the proposed HCLA pad and MSA facilities. Utility disruptions could be experienced when service lines are disconnected from or connected to existing JB MDL utility infrastructure. Any utility disruptions would be temporary and coordinated with area users prior to disconnection. Prior to digging, drilling, grading, or other subsurface disturbances, the construction contractor would initiate a Dig Permit at JB MDL (i.e., a Base Civil Engineering Work Clearance Request [Form AF IMT 103]), as well as contact New Jersey One-Call, as necessary. Construction would require minimal amounts of water, primarily for dust suppression. Although water demand would increase slightly during

construction, this increase would be temporary and would not exceed the existing capacity of the water supply system.

Short and long-term, negligible to minor, adverse impacts on stormwater management would occur from the Proposed Action. Construction of the proposed HCLA pad could temporarily disturb up to 15.5 acres of ground surface and would result in a permanent increase of 1.8 acres of impervious surface. Construction of the proposed MSA facilities could temporarily disturb up to 9.5 acres of ground surface and would result in a permanent increase of 1 acre of impervious surface. Stormwater management during construction would comply with all federal, state, and local regulations. Operation of the proposed HCLA pad and MSA facilities would adhere to stormwater management objectives and requirements within the McGuire Area SWPPP. Additionally, Alternative 1 would be required to be compliant with N.J.A.C. 7:8 as it is considered a major development. In addition, BMPs and management measures listed in **Section 2.1** would also be followed.

Short-term, negligible, adverse impacts on the liquid fuel system would occur from consumption of fuels during construction activities associated with the proposed HCLA pad and MSA facilities and removal of the out-of-service jet fuel hydrant system underlying existing HCLA pad 2. Consumption of fuel by construction vehicles and equipment would be minimal. Aircraft fueling at the existing HCLA pads via tanker truck would cease during construction activities, but this would not affect fueling operations at the airfield. No long-term impacts on the liquid fuels system would occur because there would be no change in aircraft operations at the proposed HCLA and no change in fuel use at the MSA.

3.8.2.2 Solid Waste Management

Short-term, negligible, adverse impacts on solid waste management would occur from the generation of construction and demolition debris associated with the proposed HCLA pad and MSA facilities. Solid waste generated at the sites during construction and demolition would include building materials such as solid pieces of concrete, metals (e.g., conduit, piping, and wiring), lumber, cement, and asphalt. Management of construction and demolition debris would comply with the JB MDL Integrated Solid Waste Management Plan, including waste diversion goals through implementation of reduce, reuse, and recycle guidelines. To maximize landfill diversion rates, contractors would be required to recycle construction and demolition debris, such as scrap metals, clean fill material, asphalt, and cement, in accordance with applicable federal and installation policies. The weights of all materials diverted for recycling or reuse would be reported to the JB MDL Qualified Recycling program to be credited toward the DoD-mandated construction and demolition waste diversion rate of 60 percent. Contractors would be responsible for disposing non-recyclable debris at appropriate waste facilities such as the Burlington County Resource Recovery Center. No additional personnel would be required to operate the proposed HCLA pad and MSA facilities and no change in operations at these facilities are anticipated. Therefore, no long-term impacts on solid waste management are expected from implementation of Alternative 1.

3.8.2.3 Transportation

Short-term, minor, adverse impacts on gate access and installation roadways could occur from construction vehicles and workers commuting daily to the project areas, and delivery and hauling of construction supplies and materials under the Proposed Action. The greatest congestion at installation gates would occur during peak hour demand (i.e., between 7:00 a.m. and 8:00 p.m.). Workers would access the installation via the McGuire Main Gate and use primary installation roadways to access the HCLA and MSA project areas. Commercial vehicles would be required to use the McGuire/Dix Commercial Gate within the Dix area of JB MDL and traverse JB MDL roadways, including those with intersections that may experience short delays

during some periods of the day, to reach the project areas. However, heavy construction vehicles would remain either at the project areas or appropriate staging areas for the duration of the construction period, which would minimize impacts on installation roadways. Construction traffic would compose a small percentage of the total traffic volume accessing the installation and traveling on installation roadways when compared with existing conditions. Any increase in traffic from the implementation of Alternative 1 would be temporary and would cease following the completion of construction. Therefore, no long-term impacts on transportation would occur.

3.8.2.4 Reasonably Foreseeable Planned Actions

Short-term, negligible, adverse impacts on the utilities could result from construction of the reasonably foreseeable planned actions when combined with the construction activities under Alternative 1 due to temporary interruptions. Long-term, negligible, adverse impacts would occur from the generation of construction debris that cannot be recycled or reused and would be disposed of in the Burlington County Resource Recovery Center landfill, which would result in a permanent decrease in landfill capacity.

Construction traffic for the reasonably foreseeable planned actions, when combined with the anticipated construction traffic under Alternative 1, would result in increased vehicle traffic at installation gates and on installation and regional roadways. Therefore, short-term, intermittent, minor, adverse impacts on traffic and long-term, negligible, adverse roadway impacts due to roadway degradation could occur. Replacement of the leaking fuel hydrant system and repair of the sanitary sewer lines would result in long-term, minor, beneficial impacts on these systems via improved efficiency.

3.8.3 Environmental Consequences of Alternative 2 (No Action Alternative)

No impacts to infrastructure would result from the implementation of Alternative 2 as the construction of the new HCLA and MSA would not occur.

3.9 Hazardous Materials and Wastes

3.9.1 Affected Environment

3.9.1.1 Hazardous Materials, Petroleum Products, and Hazardous Wastes

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

Petroleum products include crude oil or any derivative thereof, such as gasoline, diesel, or propane. They are considered hazardous materials because they present health hazards to users in the event of incidental releases or extended exposure to their vapors.

USAF installations manage hazardous materials and hazardous wastes through AFMAN 32-7002, *Environmental Compliance and Pollution Prevention*. USAF has implemented hazardous materials management; spill prevention, control and countermeasures; stormwater pollution

prevention; and hazardous waste management plans for JB MDL. These plans define roles and responsibilities, address record keeping requirements, and provide spill contingency and response requirements. Some of these plans are applicable to all of JB MDL while others are applicable only to the McGuire area (JB MDL, 2013b; JB MDL, 2015b; USAFSAM, 2010; USAF, 2019).

USAF uses hazardous materials and petroleum products, such as liquid fuels, pesticides, oils, lubricants, coolants, batteries, cleaners, hydraulic fluids, adhesives, paints, and solvents, for everyday operations within the McGuire area of JB MDL. The McGuire area of JB MDL operates two Type III jet fuel hydrant systems on the aircraft parking ramp and uses multiple aboveground storage tanks for the bulk storage of jet fuel. The total jet fuel storage capacity within the McGuire area of JB MDL is approximately 7.1 million gallons. The installation also operates several deicing fluid underground storage tanks with a total storage capacity of more than 200,000 gallons (HQ AMC, 2018). The use of these hazardous materials and petroleum products results in the generation and storage of hazardous wastes and used petroleum products. The McGuire area of JB MDL is a Resource Conservation and Recovery Act Large Quantity Generator (USEPA ID# NJ2571824018) (USAF, 2019). Resource Conservation and Recovery Act Large Quantity Generators produce more than 1,000 kilograms of hazardous waste in any one month of a calendar year.

The existing fuel hydrant piping loop to HCLA pads 1 and 2 was installed in 1987 but is not currently in service. As such, aircraft parked on the HCLA pads are refueled using tanker trucks (JB MDL, 2019c). As noted in **Section 2.1**, a new jet fuel hydrant system would be installed under the site of the proposed HCLA pad. This project would be completed prior to the start of construction of the proposed HCLA pad and is not part of the Proposed Action. Aircraft deicing occasionally occurs at HCLA pads 1 and 2. Vacuum trucks remove deicing liquid after runoff from the aircraft. Building 1147, which is located south of HCLA pads 1 and 2 within the HCLA project area, houses an emergency generator that provides backup power for lighting at the HCLA pads and a 126-gallon diesel tank. No hazardous wastes are currently generated or stored within the HCLA project area.

Only Building 1914 (munitions maintenance shop) within the MSA project area stores and uses hazardous materials (JB MDL, 2013b), and minimal quantities of hazardous wastes are generated there from maintenance activities.

3.9.1.2 Toxic Substances

Toxic substances are substances that may pose a risk to human health and are addressed separately from hazardous materials and hazardous wastes. A toxic substance is a chemical or mixture of chemicals that may present an unreasonable risk of injury to health or the environment. These substances include asbestos-containing materials (ACM), lead-based paint (LBP), and polychlorinated biphenyls (PCB), all of which are typically found in older buildings and utility infrastructure. USEPA is given authority to regulate these substances by the Toxic Substances Control Act (15 USC § 53).

USEPA has implemented several bans on various ACM between 1973 and 1990, so ACM are most likely to occur in older buildings (i.e., constructed before 1990). LBP was commonly used prior to its ban in 1978; therefore, any building constructed prior to 1978 may contain LBP. Structures constructed prior to 1979 potentially include PCB containing building materials. The HCLA project area does not contain any structures. As such, no ACM, LBP, or PCB are within the footprint of construction. Buildings 1913, 1918, and 1939, which are proposed for demolition at the MSA, were constructed in 1958, 1976, and 1966, respectively, and Building 1914, to which an addition would be constructed, was constructed in 1958. Buildings 1913, 1918, and 1939 were surveyed for ACM, LBP, and PCB (in transformers and fluorescent light ballasts) in

2012. Buildings 1913 and 1918 were found to contain ACM and LBP. All fluorescent fixtures were labeled as “non-PCB” ballasts (Matrix New World Engineering, Inc., 2012). No surveys were conducted on Building 1914 because Building 1914 was constructed before implementation of modern environmental regulations that phased out ACM, LBP, and PCB, and therefore, it has the potential to contain these toxic substances.

3.9.1.3 Environmental Contamination

The Comprehensive Environmental Response, Compensation, and Liability Act governs the response or cleanup actions to address releases of hazardous substances, pollutants, and contaminants into the environment. The Defense Environmental Restoration Program was formally established by Congress in 1986 to provide for the cleanup of DoD property at active installations, Base Realignment and Closure installations, and formerly used defense sites throughout the United States and its territories. The two restoration programs under the Defense Environmental Restoration Program are the IRP and the Military Munitions Response Program (MMRP). The IRP addresses contaminated sites while the MMRP addresses nonoperational military ranges and other sites suspected or known to contain UXO, discarded military munitions, or munitions constituents. Each site is investigated, and appropriate remedial actions are taken under the supervision of applicable federal and state regulatory programs. When no further remedial action is necessary for a given site, the site is closed, and it no longer represents a threat to human health.

There are no IRP or MMRP sites within the MSA project area (JB MDL, 2019a). One IRP site (FT008) and one MMRP site (XU874/XU874a) are within the HCLA project area. These sites are shown in **Figure 3-9** and are described as follows:

IRP site FT008 (part of Operable Unit 8) is former Fire Protection Training Area No. 1. This site is a 3-acre IRP site in the western portion of the HCLA project area that was used to burn waste oils, aviation gasoline, jet fuel, hydraulic fluid, spent solvent, and alcohols during fire department training exercises from the late 1940s to 1958. An extinguishing agent, which included carbon dioxide, protein foam, and water, was used to control the burn events. This extinguishing agent did not contain per- and polyfluoroalkyl substances (PFAS) because the DoD didn’t start using aqueous film forming foam containing PFAS until the 1970s, which is after the use of this area for fire training exercises (DoD, 2018). Additionally, heavy use of pesticides and herbicides occurred at Site FT008, including pesticides containing dieldrin that were used extensively throughout the McGuire airfield from 1960 to 1982. The contamination at Site FT008 consists of overlapping groundwater plumes of trichloroethylene and benzene, as well as surface and subsurface soil contaminated with dioxin/furan compounds, semi-volatile organic compounds including nine polyaromatic hydrocarbon compounds, and pesticides. Surface water chemicals of concern include VOCs and inorganics. A remedial investigation report recommended completing a feasibility study to evaluate potential remedial alternatives (JB MDL, 2018c). A field-scale pilot study was conducted at Site FT008 in 2018 when injection wells were installed to deliver amendments into the groundwater (JB MDL, 2019c). A feasibility study was conducted to develop and analyze various remedial alternatives for soil, surface water, and groundwater contamination associated with Site FT008 and five other IRP sites that together contribute to Operable Unit 8. The feasibility study identified four alternatives for Site FT008, two of which were the most favorable. The two favorable alternatives included combinations of land use controls for the soil and groundwater, monitoring for surface water, and monitoring and various treatments for groundwater. The feasibility study will be used to support subsequent decision documents and implementation of remedial actions at Operable Unit 8 (JB MDL, 2020b).

Site XU874/XU874a is the former McGuire Ordnance Storage Area of which a portion was formerly used as a practice stokes mortar range. The site was subdivided into two munitions

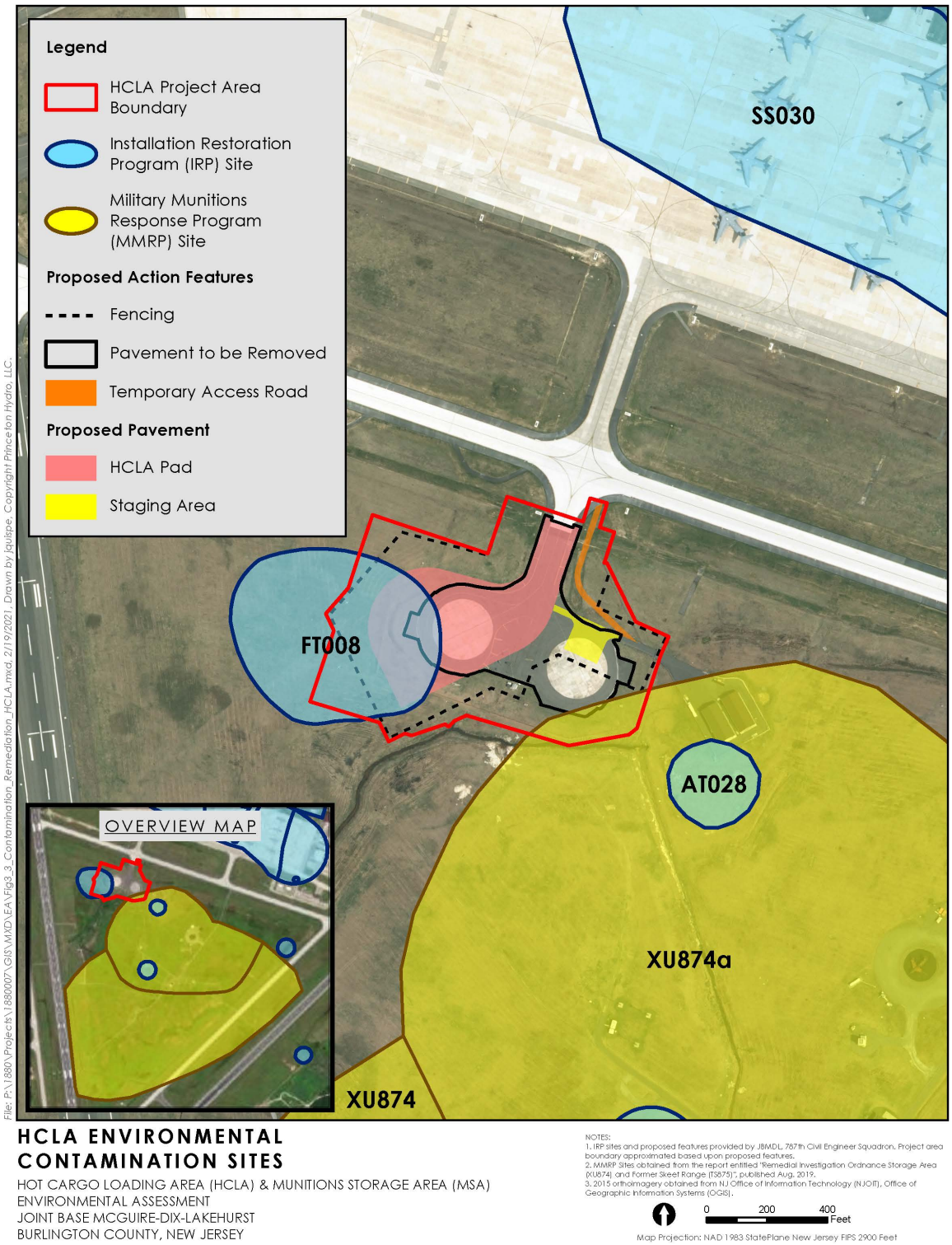


Figure 3-9. HCLA Environmental Contamination Sites

response sites consisting of the 176.8-acre Site XU874 (Former Ordnance Storage Area) and 106.1-acre Site XU874a (Ordnance Storage Area Stokes Mortar Range) (JB MDL, 2019a; USACE and Bay West, 2019). Site XU874 is a potential munitions and explosives of concern (MEC) area that is designated as a "Use Caution" area, but for which no further action has been recommended. Site XU874a is a known UXO/MEC area that is designated as an "Action Required" area. A Comprehensive Site Evaluation Phase II was completed, a remedial investigation was completed to determine the nature and extent of MEC and munitions constituents at this site, and a feasibility study is on-going (JB MDL, 2020b). The far southeastern corner of the HCLA project area overlaps with Site XU874a.

The NJDEP designates CEAs where groundwater quality has been impacted by past releases. As discussed in **Section 3.5.1.2**, several CEAs have been established on JB MDL, including the McGuire CEA that covers a majority of the McGuire area of JB MDL, including the HCLA and MSA project areas. The McGuire CEA is an installation-wide CEA site that is also a WRA. The contaminants of concern are benzene, methyl tertiary butyl ether, trichloroethylene, tetrachloroethene, vinyl chloride, lead, volatile organics, and base/neutrals (NJDEP, 2021). Land use controls within the McGuire CEA include prohibition of groundwater use and construction of groundwater production wells (JB MDL, 2019a).

3.9.1.4 Radon

Radon is a naturally occurring odorless and colorless radioactive gas found in soils and rocks that can lead to the development of lung cancer. Radon tends to accumulate in enclosed spaces, usually those that are below ground and poorly ventilated (e.g., basements). The USEPA established a guidance radon level of 4 picocuries per liter (pCi/L) in indoor air for residences, and radon levels above this amount are considered a health risk to occupants.

USEPA rates Burlington County, New Jersey, as radon zone 2. Counties in zone 2 have a predicted average indoor radon screening levels from 2 to 4 pCi/L (USEPA, 1993).

3.9.2 Environmental Consequences of Alternative 1 (Proposed Action)

3.9.2.1 Hazardous Materials, Petroleum Products, and Hazardous Wastes

Short-term, negligible, adverse impacts would occur during construction and demolition from the use of hazardous materials and petroleum products, including those used in the construction vehicles and equipment, and the generation of hazardous wastes. Construction and demolition would generate negligible to minor quantities of hazardous wastes. Contractors would be responsible for the appropriate disposal of hazardous wastes and used petroleum products in accordance with federal and state laws. All hazardous materials and petroleum products used and hazardous wastes generated during construction and demolition would be contained, stored, and managed appropriately (e.g., secondary containment, inspections, spill kits) in accordance with the installation's hazardous materials management and hazardous waste management plans and applicable regulations to minimize the potential for releases. All construction equipment would be maintained according to the manufacturer's specifications and drip mats would be placed under parked equipment as needed. Any hazardous materials, petroleum products, or hazardous wastes currently within the footprint of construction or demolition areas, including within the buildings proposed for demolition, would be removed and properly disposed prior to construction.

Long-term, negligible, adverse impacts would occur from operation of the new HCLA pad and munitions storage and associated facilities. Aircraft fueling and deicing would occur on the proposed HCLA pad in accordance with installation processes and procedures. However, fueling would occur via the new fuel hydrant system rather than via tanker trucks. The new hydrant system would be constructed prior to the proposed HCLA pad and is not part of the

Proposed Action. There would not be an increase in the amount of fuel or deicing fluid used because the quantity of aircraft using the proposed HCLA pad would not change from current conditions. Waste deicing fluid would be recaptured via vacuum trucks and recycled. Aircraft deicing is anticipated to occur occasionally. The use and storage of additional quantities of hazardous materials and petroleum products and the generation of additional quantities of hazardous wastes would occur within the addition to Building 1914. Building 1914 would receive appropriate provisions to handle the minimal increase in the amounts of hazardous materials and petroleum products needed and hazardous wastes generated. The Proposed Action would not alter current hazardous material and petroleum product storage locations or procedures, nor would it change hazardous waste disposal streams at JB MDL. All hazardous materials, petroleum products, and hazardous wastes associated with the Proposed Action would be managed in accordance with applicable federal, state, and local regulations; USAF policies and procedures; and JB MDL plans. In the event of a leak or spill, all procedures outlined in the JB MDL Integrated Contingency Plan Oil and Hazardous Substance Spill Prevention and Response Plan would be followed.

3.9.2.2 Toxic Substances

Short-term, minor, adverse impacts from toxic substances would occur during demolition of Buildings 1913, 1918, and 1939 and construction of the addition to Building 1914 at the MSA. These demolition and construction activities would disturb known ACM and LBP in Buildings 1913 and 1918, could disturb potential ACM, LBP, and PCB in Building 1914. Building 1914 would be surveyed for ACM, LBP, and PCB, as necessary, by a certified contractor prior to work activities. All appropriate measures would be taken during demolition and construction to reduce potential exposure to, and release of, these toxic substances. Contractors would wear appropriate personal protective equipment (PPE) and would be required to adhere to all federal, state, and local regulations and the JB MDL management plans. All asbestos, LBP, and PCB-containing debris would be handled and disposed of at a landfill approved for that material. New building construction is not anticipated to include the use of these substances because federal policies and laws limit their use in building construction applications. Long-term, beneficial impacts would occur from reducing the potential for future human exposure to these toxic substances and reducing the amounts of ACM, LBP, and PCB at JB MDL.

3.9.2.3 Environmental Contamination

Short-term, minor to moderate, adverse impacts on environmental contamination would occur during construction of the proposed HCLA pad. The HCLA project area overlaps with one IRP site (Site FT008) and one MMRP site (Site XU874a). Construction of the proposed HCLA pad would occur within the footprint of Site FT008, and demolition of existing HCLA pad 2 would be within the far northern footprint of Site XU874a. Therefore, prior to the start of any construction or demolition, the USAF would coordinate with the JB MDL Environmental Restoration Program, Weapons Safety, and Explosives Ordnance Disposal offices to ensure that ground disturbance would not conflict with ongoing remediation and investigation activities at Site FT008 and Site XU874a, respectively. Prior to construction at the HCLA project area, a Request for Waiver to Construct would be initiated for construction within contaminated sites and a UXO/MEC sweep would be conducted.

Site FT008 includes soil and groundwater contamination, and chemicals of concern were identified for surface water; however, Site FT008 does not contain PFAS contamination. The land use controls imposed on Site FT008 permit construction of the proposed HCLA pad because it is an industrial land use; however, the JB MDL Environmental Restoration Program office would need to determine if groundwater remediation is necessary should construction reach the depth of groundwater (JB MDL, 2019a; JB MDL, 2020b).

Site XU874a is designated as an “Action Required” area. Ground disturbance and construction projects in “Action Required” areas require certified explosive ordnance disposal contractors to complete a UXO/MEC sweep prior to construction. A UXO/MEC sweep includes surface clearance, sub-surface magnetometer survey, and removal/disposal of discovered UXO/MEC. Therefore, a UXO/MEC sweep would occur in the area where the HCLA project overlaps with Site XU874a. The McGuire CEA prohibits the groundwater use and construction of groundwater production wells. No groundwater wells are proposed for construction under the Proposed Action, and water needed at the proposed HCLA and MSA facilities would be sourced from the installation’s potable water distribution system.

Construction and demolition could encounter undocumented soil or groundwater contamination or underground storage tanks. If soil or groundwater that is believed to be contaminated was discovered, the contractor would be required to immediately stop work, report the discovery to the installation, and implement appropriate safety measures. Commencement of field activities would not continue in this area until the issue was investigated and resolved. The removal of any undocumented underground storage tank would be coordinated with the NJDEP.

3.9.2.4 Radon

No impacts from radon are anticipated. Based on the USEPA rating of radon zone 2 for Burlington County, it is unlikely indoor radon screening levels greater than 4 pCi/L would be identified in new building construction at the MSA. New construction would incorporate appropriate design features as determined to be needed. Post-construction radon management measures would be installed should buildings test higher than 4 pCi/L. No buildings would be constructed at the HCLA project area.

3.9.2.5 Reasonably Foreseeable Planned Actions

Alternative 1 and reasonably foreseeable planned actions would result in temporary increases in the use of hazardous materials and petroleum products and generation of hazardous wastes during construction. Environmental control measures, including proper equipment maintenance, management of hazardous materials, and disposal of hazardous wastes, would be implemented to minimize impacts. Therefore, reasonably foreseeable planned actions, when combined with Alternative 1, would not result in significant impacts on hazardous materials and wastes.

3.9.3 Environmental Consequences of Alternative 2 (No Action Alternative)

No impacts to hazardous materials, petroleum products, and no hazardous wastes would result from the implementation of Alternative 2 as the construction of the new HCLA and MSA would not occur.

3.10 Safety

3.10.1 Affected Environment

A safe environment is one in which there is no, or an optimally reduced, potential for death, serious bodily injury or illness, or property damage. Potentially unsafe situations or environments exist when a hazard is exposed to a potentially susceptible population. The degree of exposure depends on the proximity of the hazard to the population and the severity of the hazard. Safety addresses the well-being, safety, and health of members of the public, contractors, and DoD personnel.

3.10.1.1 Demolition and Construction Safety

All contractors performing demolition and construction activities at JB MDL are responsible for following ground safety and federal Occupational Safety and Health Administration regulations

and are required to conduct these activities in a manner that does not increase risk to workers or the public. Occupational Safety and Health Administration regulations address the health and safety of people at work and cover potential exposure to a wide range of chemical, physical, and biological hazards, and ergonomic stressors. The regulations are designed to control these hazards by eliminating exposure to the hazards via administrative or engineering controls, substitution, use of PPE, and availability of Safety Data Sheets.

For each demolition and construction project at JB MDL, a site-specific health and safety plan is required. The plan would include, at a minimum, emergency response and evacuation procedures; operational manuals; PPE recommendations; protocols and procedures for handling, storing, or disposing of hazardous materials and wastes; information on the effects and symptoms of potential exposures; and guidance with respect to hazard identification.

3.10.1.2 Natural Hazards

Naturally occurring potential safety hazards in southern and eastern New Jersey include forest fires, flooding, and severe weather such as tropical storms, hurricanes, and winter storms. The project areas are approximately 28 miles west of the Atlantic Ocean, which is susceptible to hurricanes and severe flooding events. The project is not within a storm surge or hurricane hazard area of any category (NJOEM, 2009a). The New Jersey Office of Emergency Management identifies state roads that can be used for potential evacuation routes during coastal emergencies. Roads immediately adjacent to the project area are not identified as a potential evacuation route; however, they do link with major roads that are identified as potential evacuation routes, including State Route 68 and County Route 537 (NJOEM, 2009b).

3.10.1.3 Installation Hazards

As stated in **Section 1.3**, the existing HCLA pads and MSA are not fully operational due to non-compliance with UFC, including safety issues. The existing HCLA pads are closed due to improper sizing and permanent obstructions within the pad footprints. Additionally, the pavement and lighting at the pads are in poor condition. UFC 3-260-01 provides planning and design criteria for hazardous cargo pads. The existing MSA cannot be used at full capacity because allowable NEW and munitions incompatibilities require minimum distances between stored items, rendering many bays unusable as munitions storage and multiple bays are deteriorated, rendering them nonoperational. Additionally, the current configuration limits storage of hazard class 1.1 and 1.2 munitions to 66 pounds NEW. Storage of munitions in excess of this amount must be accommodated at the Dix area Army ammunition supply point, which requires the munitions to be transported approximately 6 miles on unsecured public roads.

Approximately 60 percent of all aircraft operations at JB MDL are conducted at the McGuire airfield. The primary safety concerns associated with the airfield are aircraft mishaps. Clear zones and accident potential zones, which are determined based on historical aircraft mishap and operations data, are areas with restrictions or land use controls that extend beyond each end of a runway to ensure the safety of military personnel and civilians. The HCLA pad is approximately 0.5 miles southeast and 1 mile northwest of the Clear zones associated with Runway 18/36. The MSA is approximately 0.25 miles north of the northern Clear zones associated with Runway 06/24. The nearest accident potential zone is approximately 0.2 miles east of the MSA project area (JB MDL, 2015a).

QD arcs, or explosive safety zones, are imaginary areas established around facilities used for the storage, handling, and maintenance of munitions to provide a safety buffer in case of a detonation. QD arcs restrict the use of areas and personnel density within the QD arc and differ in size based on the type and amount of material being stored (JB MDL 2015). Areas that

require QD arcs include munitions facilities, firing ranges, and restricted areas. Existing HCLA pads 1 and 2 each have a QD arc of 1,250 feet (see **Figure 2-2**). The QD arcs at the existing MSA vary from 500 feet to 806 feet (see **Figure 2-4**).

UXO are any munitions, weapon delivery systems, or ordnance items that contain explosives, propellants, or chemical agents. The primary safety concern associated with UXO is the potential for detonation or chemical exposure. JB MDL has mapped areas known to contain UXO with two designations: "Action Required" and "Use Caution." Prior to ground disturbance in areas mapped as Action Required, a UXO/MEC sweep must be performed to ensure no safety hazards are present. Areas mapped as "Use Caution" are less likely to contain UXO, but caution is still advised when disturbing soils and personnel onsite must be able to recognize any UXO potentially encountered (JB MDL, 2019c). Site XU874a, a former ordnance storage area, is an MMRP site and an "Action Required" area that overlaps into the southeast corner of the HCLA project area (USACE and Bay West, 2019; JB MDL, 2019c). See **Section 3.9.1.3** for more information on Site XU874a.

One IRP site is within the HCLA project area. See **Section 3.9.1.3** for a description of this site. There are no known environmental contamination sites within or adjacent to the MSA project area.

3.10.1.4 Police, Fire, and Medical Facilities

The JB MDL Security Forces provide primary response to emergencies on the installation. Fire Station 1 is approximately 0.75 miles northeast of the HCLA project area and 1 mile southwest of the MSA project area. The closest off-installation fire station is the Wrightstown Volunteer Fire Department, which is approximately 1.75 miles northwest of the HCLA project area and 3 miles west of the MSA project area.

An outpatient medical treatment facility is within the Medical District of the McGuire area near the Wrightstown Gate (JB MDL, 2015a). The closest civilian medical facility to the project areas is the St. Francis Medical Center in Trenton, New Jersey, which is approximately 15 miles northwest of the project areas. Emergency medical services are available via multiple local ambulances and first aid providers, including Virtua EMS, which is approximately 4 miles south/southeast of the project areas and provides emergency ambulance service to Burlington County.

3.10.2 Environmental Consequences of Alternative 1 (Proposed Action)

Short-term, negligible to minor, adverse impacts on safety would occur during demolition and construction. Impacts would result from the exposure of construction personnel to the inherent safety hazards associated with demolition and construction projects. To minimize safety risks, construction personnel would use appropriate PPE and adhere to safety standards outlined in a site-specific health and safety plan. Construction personnel would be educated through daily briefings to review daily activities and potential hazards to include site and weather hazards. Demolition and construction areas would be fenced and appropriately marked with signs and placards to further reduce risks to installation personnel. Trucks transporting heavy equipment and materials to and from the project areas would be directed to roads that can safely accommodate these vehicles. Flagmen would be stationed at locations where construction access/haul routes to the HCLA project area cross active taxiways and aprons. Adherence to applicable safety procedures and implementation of precautionary measures would minimize safety risks to construction workers and other installation personnel in the vicinity.

Demolition and construction would occur within established QD arcs. Construction personnel working in a QD arc would be exposed to an increased risk of potential explosions. However, no handling or transporting of munitions would occur while construction personnel are within the

QD arcs, which would minimize potential explosive safety risks. Any ground disturbance at the HCLA project area within Site XU874a would require a UXO/MEC sweep conducted by certified explosive ordnance disposal contractors prior to the start of work. However, all demolition and construction occurring within the project areas would be monitored for potential UXO. Should UXO be discovered, all work would cease, workers would muster at an off-site location, and the discovery would be immediately reported to the JB MDL Dispatch Office. See **Section 3.9.2.3** for a discussion regarding potential impacts on environmental contamination.

Increased construction traffic and potential slowdowns could affect emergency services by increasing emergency vehicle response times resulting in negligible, adverse impacts. However, most construction equipment would be kept either onsite or at appropriate staging areas during the construction period reducing potential impacts on emergency services. Additionally, JB MDL emergency services would be notified of any potential road closures prior to the start of construction.

All construction activities would be sited within the boundaries of the McGuire area of JB MDL, a military installation. As stated previously, areas undergoing construction would be fenced and appropriately marked with signs and placards. Additionally, BMPs would be implemented to further reduce construction-related impacts associated with demolition and construction that may affect nearby areas.

Long-term, minor to moderate, beneficial impacts to safety would result under Alternative 1. The proposed HCLA pad and MSA facilities would be designed and constructed in compliance with UFC requirements allowing the USAF to safely and efficiently airlift, transport, and store munitions at the McGuire area of JB MDL. The proposed MSA facilities would be sited in accordance with regulatory guidance to ensure a safe working environment for MSA and installation personnel. Proposed QD arcs associated with the HCLA pad and MSA facilities would maintain appropriate IBD and PTRD setback distances ensuring a safe environment for installation personnel and infrastructure.

3.10.2.1 Reasonably Foreseeable Planned Actions

Alternative 1 and reasonably foreseeable planned actions would result in short-term, negligible to minor adverse impacts on safety during construction. Construction traffic may cause traffic delays, which could increase response times for emergency services. Construction projects sited near each other could cause additive noise levels that are unsafe for DoD personnel or civilians. Restriping of the AMC ramp could result in long-term, minor, beneficial impacts on safety via increasing visibility of the stripes by aircraft and ground crew. Therefore, reasonably foreseeable planned actions, when combined with Alternative 1, would not result in significant impacts on safety.

3.10.3 Environmental Consequences of Alternative 2 (No Action Alternative)

Under Alternative 2, USAF would not construct a new UFC-compliant HCLA pad or new MSA facilities at the McGuire area of JB MDL. The HCLA pads and portions of the MSA would continue to be nonoperational and out of compliance with UFC requirements requiring inefficient workarounds. JB MDL would continue to require waivers for use of the existing HCLA pads and would continue to transport munitions along unsecured public roads, as necessary. The deficient HCLA pads and MSA would continue to adversely impact the installation's ability to safely and efficiently airlift, transport, and store munitions at the McGuire area of JB MDL.

4. COMPARISON OF ALTERNATIVES AND CONCLUSIONS

Based on the analysis presented in this EA, Alternative 1 is the Preferred Alternative. The evaluation performed within this EA concludes that, with adherence to sustainable operations and BMPs outlined in **Section 2.1** and impact minimization measures, including mitigation, outlined in **Section 3**, no significant impacts would occur as a result of the implementation of the Preferred Alternative. This analysis determines that an EIS is not necessary for the implementation of Alternative 1 and that a FONSI/FONPA is appropriate. A summary of impacts for both alternatives is provided in **Table 4-1**.

Table 4-1. Summary of Impacts

Resource Area	Alternative 1 – Proposed Action	Alternative 2 – No Action Alternative
Air Quality	Short-term, minor, adverse impacts due to construction (vehicles, equipment, ground disturbance). Long-term, negligible, adverse impacts from operations (heating systems).	No Impact
Noise	Short-term, negligible, adverse noise impacts to sensitive noise receptors may occur due to construction and demolition related activities within the project areas. No long-term impacts to noise are anticipated from the implementation of Alternative 1 as noise levels at the HCLA and MSA project areas would remain unchanged after construction is complete.	No Impact
Geology, Topography, Soils	Site preparation and construction would have short-term, minor, adverse effects on soil erosion from land clearing. Long-term, minor, adverse impacts would result where impervious surfaces are proposed.	No Impact
Water Resources	Short- and long-term, minor, adverse effects on groundwater quality and recharge would occur due to an increase in impervious surfaces. Minor, short-term impacts to surface waters and stormwater management may occur during construction due to soil erosion and sedimentation. Construction would occur in accordance with the Burlington County Soil Conservation District-Certified SESC Plan. Moderate, long-term adverse impacts to wetlands would occur as a result of the filling of 0.3 acres of wetland and the installation of a stormwater pipe and fences in both wetland and transition areas, impacting an additional 0.18 acres of wetlands. Mitigation would be required to provide an equitable replacement of the habitat functions and values associated with the wetlands proposed to be filled. A NJDEP Flood Hazard Area Verification would be obtained to identify the extent, if any, of the flood hazard area within the project areas. The Proposed Action would be designed to avoid and minimize adverse impacts to floodplains to the extent feasible.	No Impact
Biological Resources	Long-term, minor, adverse effects on biological resources at the HCLA project area are anticipated due to the loss of wetland and grassland habitats. Temporarily disturbed grassland habitat would be restored post-construction. Short-term, minor, adverse effects on biological resources at the MSA project area are related to	No Impact

Resource Area	Alternative 1 – Proposed Action	Alternative 2 – No Action Alternative
	potential impacts to transition areas and an increase in noise levels.	
Cultural Resources	No Impact	No Impact
Infrastructure	Short-term, negligible to minor, adverse impacts on utilities and public works from potential disruption during construction. Short- and long-term, negligible, adverse impacts on stormwater management from temporary ground disturbance and the increase in impervious surfaces. Short-term, negligible, adverse impacts on the liquid fuel system due to fuel consumption during construction and demolition. Short-term, negligible, adverse impacts on solid waste management due to generation of wastes during construction and demolition. Short-term, minor, adverse impacts on transportation due to construction traffic.	No Impact
Hazardous Materials and Waste	Short-term, negligible, adverse impacts from the use of hazardous materials and petroleum products and generation of hazardous wastes during construction. Long-term, negligible, adverse impacts from hazardous material use and hazardous waste generation during operation. Short-term, minor, adverse impacts from toxic substances during demolition. Short-term, minor to moderate, adverse impacts on environmental contamination due to construction in contaminated sites. No impacts on radon.	No Impact
Safety	Short-term, negligible to minor, adverse impacts due to safety hazards associated with demolition and construction, activities within established QD arcs, and construction-related traffic. Long-term, minor to moderate, beneficial impacts due to design of HCLA and MSA facilities compliance with UFC requirements	No Impact

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6. LIST OF CONTRIBUTORS

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Dr. Sharon White, Archaeologist, Cultural Resources Manager

Mr. Robert Gullo, GISP, GIS Manager

Mr. Darono Harris, DAFC, JB MDL Weapons Safety Manager

Mr. Paul Mahon, Biologist

Mr. Mark Stevenson, Biologist

7. INTERGOVERNMENTAL COORDINATION FOR ENVIRONMENTAL PLANNING LETTERS MAILING LIST

Federal and Regional Agencies

United States Fish and Wildlife Service
New Jersey Field Office, Ecological Services
4 East Jimmie Leeds Road, Unit 4
Galloway, NJ 08205
Attn: Endangered Species Act Consultation

United States Environmental Protection Agency
Region 2 Office
Environmental Review Section
290 Broadway
New York, NY 10007-1866
Attn: Chief of Environmental Review

State and Local Agencies

New Jersey Department of Environmental Protection
Office of Permit Coordination and Environmental Review
401 East State Street
Mail Code 401-07J
PO Box 420
Trenton, NJ 08625
Attn: Megan Brunatti

New Jersey Department of Environmental Protection
Historic Preservation Office
PO Box 420
Trenton, NJ 08625-0420
Attn: Katherine Marcopul, Administrator

New Jersey Historical Commission
225 West State Street
PO Box 305
Trenton, NJ 08625
Attn: Sara Cureton, Executive Director

New Jersey Division of Fish and Wildlife
Endangered and Nongame Species Office
Mail Code 501-03
PO Box 420
Trenton, NJ 08625-0420
Attn: Endangered and Nongame Species Program Consultation

New Jersey Pinelands Commission
PO Box 359
15 Springfield Road
New Lisbon, NJ 08064
Attn: Nancy Wittenberg, Executive Director

Burlington County Soil Conservation District
1971 Jacksonville-Jobstown Road
Columbus, NJ 08022
Attn: Robert Reitmeyer, District Manager

Burlington County Planning Board
49 Rancocas Road
P.O. Box 6000
Mount Holly, NJ 08060
Attn: James Williams, Chairman

Burlington County Agricultural Development Board
P.O. Box 6000
Mount Holly, NJ 08060
Attn: Phillip Prickett, Chairman

Federally Recognized Tribes

Ms. Erin Paden
Director of Cultural Resources and Section 106
Delaware Nation
PO Box 825
Anadarko, OK 73005

Dr. Brice Obermeyer
Tribal Historic Preservation Officer
Delaware Tribe of Indians
Roosevelt Hall, Room 212
1200 Commercial Street
Emporia, KS 66801

8. PUBLIC DRAFT DISTRIBUTION LIST

United States Fish and Wildlife Service
New Jersey Field Office, Ecological Services
4 East Jimmie Leeds Road, Unit 4
Galloway, NJ 08205
Attn: Endangered Species Act Consultation

United States Environmental Protection Agency
Region 2 Office
Environmental Review Section
290 Broadway
New York, NY 10007-1866
Attn: Chief of Environmental Review

USDA - Natural Resources Conservation Service
220 Davidson Avenue, 4th Floor
Somerset, NJ 08873-4115
Attn: Edwin Muniz, State Soil Scientist

New Jersey Department of Environmental Protection
Office of Permit Coordination and Environmental Review
401 East State Street
Mail Code 401-07J
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Attn: Megan Brunatti

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Anadarko, OK 73005
Attn: Ms. Erin Paden, Director of Cultural Resources and Section 106

Delaware Nation
PO Box 825
Anadarko, OK 73005
Attn: Deborah Dotson, President

Dr. Brice Obermeyer
Tribal Historic Preservation Officer
Delaware Tribe of Indians
Roosevelt Hall, Room 212
1200 Commercial Street
Emporia, KS 66801

Delaware Tribe of Indians
5100 Tuxedo Blvd
Bartlesville, OK 74006
Attn: Chester Brooks, Chief

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APPENDIX A
INTERGOVERNMENTAL COORDINATION FOR ENVIRONMENTAL PLANNING LETTERS MAILING LIST

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR MOBILITY COMMAND
JOINT BASE MCGUIRE-DIX-LAKEHURST

Ms. Catherine Brunson
NEPA/EIAP Project Manager
787 CES/CEIEA
2404 Vandenberg Avenue
Joint Base McGuire-Dix-Lakehurst, NJ 08641

United States Fish and Wildlife Service
New Jersey Field Office, Ecological Services
4 East Jimmie Leeds Road, Unit 4
Galloway, NJ 08205

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If you have information regarding potential impacts of the Proposed Action on the human environment, which includes the natural and physical environment or other environmental aspects of which we are unaware, we would appreciate receiving such information for inclusion and consideration during the NEPA compliance process. We look forward to and welcome your participation in this process. Please respond within 30 days of receipt of this letter to ensure your concerns are adequately addressed in the EA.

Please send your written responses to the JB MDL NEPA/Environmental Impact Analysis Process (EIAP) Project Manager, Ms. Catherine Brunson, 787 CES/CEIEA, via email at catherine.brunson@us.af.mil. Thank you in advance for your participation.

Sincerely

BRUNSON.CATHERINE.E.1091059890
Digitally signed by BRUNSON.CATHERINE.E.1091059890
Date: 2021.01.29 13:01:25 -05'00'

CATHERINE BRUNSON, USAF
JB MDL, NEPA/EIAP Project Manager

Attachment:
Description of the Proposed Action and Alternatives

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR MOBILITY COMMAND
JOINT BASE MCGUIRE-DIX-LAKEHURST

Ms. Catherine Brunson
NEPA/EIAP Project Manager
787 CES/CEIEA
2404 Vandenberg Avenue
Joint Base McGuire-Dix-Lakehurst, NJ 08641

United States Environmental Protection Agency
Region 2 Office
Environmental Review Section
290 Broadway
New York, NY 10007-1866

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BRUNSON.CATHERINE.E.1091059890
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CATHERINE BRUNSON, USAF
JB MDL, NEPA/EIAP Project Manager

Attachment:
Description of the Proposed Action and Alternatives

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR MOBILITY COMMAND
JOINT BASE MCGUIRE-DIX-LAKEHURST

Ms. Catherine Brunson
NEPA/EIAP Project Manager
787 CES/CEIEA
2404 Vandenberg Avenue
Joint Base McGuire-Dix-Lakehurst, NJ 08641

Megan Brunatti
New Jersey Department of Environmental Protection
Office of Permit Coordination and Environmental Review
401 East State Street, Mail Code: 401-07J
PO Box 420, Trenton, NJ 08625

Dear Ms. Brunatti,

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Sincerely

BRUNSON.CATHERINE.E.1091059890

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CATHERINE BRUNSON, USAF
JB MDL, NEPA/EIAP Project Manager

Attachment:
Description of the Proposed Action and Alternatives

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR MOBILITY COMMAND
JOINT BASE MCGUIRE-DIX-LAKEHURST

Dr. Sharon D. White
JB MDL Cultural Resources Manager
787 CES/CEIEA
2404 Vandenberg Avenue
Joint Base McGuire-Dix-Lakehurst, NJ 08641

Katherine Marcopul
New Jersey Department of Environmental Protection
Historic Preservation Office
PO Box 420
Trenton, NJ 08625-0420

Dear Dr. Marcopul,

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Pursuant to Section 106 of the National Historic Preservation Act and in accordance with 36 Code of Federal Regulations Part 800 (Protection of Historic Properties), USAF would like to initiate consultation concerning the Proposed Action and the proposed archaeological and architectural Areas of Potential Effect (Attachment 2) to allow you the opportunity to provide comments, concerns, and/or suggestions you might have. That information will be used to determine whether there are any cultural resources present that are eligible for listing on the National Register of Historic Places, and if so, whether the Proposed Action would cause adverse effects that must be addressed. Your feedback is important and a response within 30 days of receipt of this letter would enable us to ensure that your concerns are fully considered in our evaluation. Thank you in advance for your participation.

Sincerely

WHITE.SHARON.D.1567708388

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SHARON D. WHITE, USAF
JB MDL, Cultural Resources Manager

Two (2) Attachments:
1. Description of the Proposed Action and Alternatives
2. Proposed Areas of Potential Effect

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR MOBILITY COMMAND
JOINT BASE MCGUIRE-DIX-LAKEHURST

Dr. Sharon D. White
JB MDL Cultural Resources Manager
787 CES/CEIEA
2404 Vandenberg Avenue
Joint Base McGuire-Dix-Lakehurst, NJ 08641

Sara Cureton, Executive Director
New Jersey Historical Commission
225 West State Street
PO Box 305
Trenton, NJ 08625

Dear Ms. Cureton,

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SHARON D. WHITE, USAF
JB MDL, Cultural Resources Manager

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1. Description of the Proposed Action and Alternatives
2. Proposed Areas of Potential Effect

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HEADQUARTERS AIR MOBILITY COMMAND
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NEPA/EIAP Project Manager
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Mail Code 501-03
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Trenton, NJ 08625-0420

Attn: Endangered and Nongame Species Program Consultation,

In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality regulations, and the U.S. Air Force (USAF) NEPA regulations, USAF is preparing an Environmental Assessment (EA) to evaluate the potential environmental impacts associated with construction and operation of a new hot cargo loading area (HCLA) pad to replace the existing dual non-functioning HCLA pads and new munitions storage and supporting facilities at the existing munitions storage area (MSA) at the McGuire area of Joint Base McGuire-Dix-Lakehurst (JB MDL). The HCLA pad would include demolition of two existing HCLA pads and construction of a 162,195-square foot (ft^2) HCLA apron of rigid pavement with 50-foot asphalt shoulders; a 50,399-ft^2 taxiway apron with 25-foot shoulders connecting to Taxiway "Lima"; 17,091-ft^2 of pavement for a vehicular access road and staging area; shoulder, taxiway edge, and high mast exterior area lighting; pavement markings; stormwater drainage system; security fencing; and utilities. The MSA would include demolition of three buildings at the existing MSA, including a 5,479-ft^2 multi-cube magazine with 30 bays, and construction of 15,517 ft^2 of munitions storage consisting of 27 single-bay concrete earth-covered igloos in a multi-cubicle configuration, a 2,745-ft^2 munitions maintenance administration facility, a 1,157-ft^2 addition to existing munitions maintenance shop, 54,030 ft^2 of new pavement, site improvements, utilities, security fencing, fiber optic communications duct bank, and all necessary site support.

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Please send your written responses to the JB MDL NEPA/Environmental Impact Analysis Process (EIAP) Project Manager, Ms. Catherine Brunson, 787 CES/CEIEA, via email at catherine.brunson@us.af.mil. Thank you in advance for your participation.

Sincerely

BRUNSON.CATHERINE.E.1091059890
Digitally signed by BRUNSON.CATHERINE.E.1091059890
Date: 2021.01.29 12:58:06 -05'00'

CATHERINE BRUNSON, USAF
JB MDL, NEPA/EIAP Project Manager

Attachment:
Description of the Proposed Action and Alternatives

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR MOBILITY COMMAND
JOINT BASE MCGUIRE-DIX-LAKEHURST

Ms. Catherine Brunson
NEPA/EIAP Project Manager
787 CES/CEIEA
2404 Vandenberg Avenue
Joint Base McGuire-Dix-Lakehurst, NJ 08641

Nancy Wittenberg, Executive Director
New Jersey Pinelands Commission
PO Box 359
15 Springfield Road
New Lisbon, NJ 08064

Dear Ms. Wittenberg,

In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality regulations, and the U.S. Air Force (USAF) NEPA regulations, USAF is preparing an Environmental Assessment (EA) to evaluate the potential environmental impacts associated with construction and operation of a new hot cargo loading area (HCLA) pad to replace the existing dual non-functioning HCLA pads and new munitions storage and supporting facilities at the existing munitions storage area (MSA) at the McGuire area of Joint Base McGuire-Dix-Lakehurst (JB MDL). The HCLA pad would include demolition of two existing HCLA pads and construction of a 162,195-square foot (ft^2) HCLA apron of rigid pavement with 50-foot asphalt shoulders; a 50,399-ft^2 taxiway apron with 25-foot shoulders connecting to Taxiway "Lima"; 17,091-ft^2 of pavement for a vehicular access road and staging area; shoulder, taxiway edge, and high mast exterior area lighting; pavement markings; stormwater drainage system; security fencing; and utilities. The MSA would include demolition of three buildings at the existing MSA, including a 5,479-ft^2 multi-cube magazine with 30 bays, and construction of 15,517 ft^2 of munitions storage consisting of 27 single-bay concrete earth-covered igloos in a multi-cubicle configuration, a 2,745-ft^2 munitions maintenance administration facility, a 1,157-ft^2 addition to existing munitions maintenance shop, 54,030 ft^2 of new pavement, site improvements, utilities, security fencing, fiber optic communications duct bank, and all necessary site support.

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Sincerely

BRUNSON.CATHERINE.E.1091059890
Digitally signed by BRUNSON.CATHERINE.E.1091059890
Date: 2021.01.29 13:06:55 -05'00'

CATHERINE BRUNSON, USAF
JB MDL, NEPA/EIAP Project Manager

Attachment:
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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR MOBILITY COMMAND
JOINT BASE MCGUIRE-DIX-LAKEHURST

Ms. Catherine Brunson
NEPA/EIAP Project Manager
787 CES/CEIEA
2404 Vandenberg Avenue
Joint Base McGuire-Dix-Lakehurst, NJ 08641

Robert Reitmeyer, District Manager
Burlington County Soil Conservation District
1971 Jacksonville-Jobstown Road
Columbus, NJ 08022

Dear Mr. Reitmeyer,

In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality regulations, and the U.S. Air Force (USAF) NEPA regulations, USAF is preparing an Environmental Assessment (EA) to evaluate the potential environmental impacts associated with construction and operation of a new hot cargo loading area (HCLA) pad to replace the existing dual non-functioning HCLA pads and new munitions storage and supporting facilities at the existing munitions storage area (MSA) at the McGuire area of Joint Base McGuire-Dix-Lakehurst (JB MDL). The HCLA pad would include demolition of two existing HCLA pads and construction of a 162,195-square foot (ft^2) HCLA apron of rigid pavement with 50-foot asphalt shoulders; a 50,399-ft^2 taxiway apron with 25-foot shoulders connecting to Taxiway "Lima"; 17,091-ft^2 of pavement for a vehicular access road and staging area; shoulder, taxiway edge, and high mast exterior area lighting; pavement markings; stormwater drainage system; security fencing; and utilities. The MSA would include demolition of three buildings at the existing MSA, including a 5,479-ft^2 multi-cube magazine with 30 bays, and construction of 15,517 ft^2 of munitions storage consisting of 27 single-bay concrete earth-covered igloos in a multi-cubicle configuration, a 2,745-ft^2 munitions maintenance administration facility, a 1,157-ft^2 addition to existing munitions maintenance shop, 54,030 ft^2 of new pavement, site improvements, utilities, security fencing, fiber optic communications duct bank, and all necessary site support.

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Sincerely

BRUNSON.CATHERINE.E.1091059890
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Date: 2021.02.10 12:35:05 -05'00'

CATHERINE BRUNSON, USAF
JB MDL, NEPA/EIAP Project Manager

Attachment:
Description of the Proposed Action and Alternatives

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR MOBILITY COMMAND
JOINT BASE MCGUIRE-DIX-LAKEHURST

Ms. Catherine Brunson
NEPA/EIAP Project Manager
787 CES/CEIEA
2404 Vandenberg Avenue
Joint Base McGuire-Dix-Lakehurst, NJ 08641

James Williams, Chairman
Burlington County Planning Board
49 Rancocas Road
P.O. Box 6000
Mount Holly, NJ 08060

Dear Mr. Williams,

In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality regulations, and the U.S. Air Force (USAF) NEPA regulations, USAF is preparing an Environmental Assessment (EA) to evaluate the potential environmental impacts associated with construction and operation of a new hot cargo loading area (HCLA) pad to replace the existing dual non-functioning HCLA pads and new munitions storage and supporting facilities at the existing munitions storage area (MSA) at the McGuire area of Joint Base McGuire-Dix-Lakehurst (JB MDL). The HCLA pad would include demolition of two existing HCLA pads and construction of a 162,195-square foot (ft^2) HCLA apron of rigid pavement with 50-foot asphalt shoulders; a 50,399-ft^2 taxiway apron with 25-foot shoulders connecting to Taxiway "Lima"; 17,091-ft^2 of pavement for a vehicular access road and staging area; shoulder, taxiway edge, and high mast exterior area lighting; pavement markings; stormwater drainage system; security fencing; and utilities. The MSA would include demolition of three buildings at the existing MSA, including a 5,479-ft^2 multi-cube magazine with 30 bays, and construction of 15,517 ft^2 of munitions storage consisting of 27 single-bay concrete earth-covered igloos in a multi-cubicle configuration, a 2,745-ft^2 munitions maintenance administration facility, a 1,157-ft^2 addition to existing munitions maintenance shop, 54,030 ft^2 of new pavement, site improvements, utilities, security fencing, fiber optic communications duct bank, and all necessary site support.

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Sincerely

BRUNSON.CATHERINE.E.1091059890

Digitally signed by BRUNSON.CATHERINE.E.1091059890
Date: 2021.02.10 12:40:33 -05'00'

CATHERINE BRUNSON, USAF
JB MDL, NEPA/EIAP Project Manager

Attachment:
Description of the Proposed Action and Alternatives

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR MOBILITY COMMAND
JOINT BASE MCGUIRE-DIX-LAKEHURST

Ms. Catherine Brunson
NEPA/EIAP Project Manager
787 CES/CEIEA
2404 Vandenberg Avenue
Joint Base McGuire-Dix-Lakehurst, NJ 08641

Phillip Prickett, Chairman
Burlington County Agricultural Development Board
P.O. Box 6000
Mount Holly, NJ 08060

Dear Mr. Prickett,

In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality regulations, and the U.S. Air Force (USAF) NEPA regulations, USAF is preparing an Environmental Assessment (EA) to evaluate the potential environmental impacts associated with construction and operation of a new hot cargo loading area (HCLA) pad to replace the existing dual non-functioning HCLA pads and new munitions storage and supporting facilities at the existing munitions storage area (MSA) at the McGuire area of Joint Base McGuire-Dix-Lakehurst (JB MDL). The HCLA pad would include demolition of two existing HCLA pads and construction of a 162,195-square foot (ft^2) HCLA apron of rigid pavement with 50-foot asphalt shoulders; a 50,399-ft^2 taxiway apron with 25-foot shoulders connecting to Taxiway "Lima"; 17,091-ft^2 of pavement for a vehicular access road and staging area; shoulder, taxiway edge, and high mast exterior area lighting; pavement markings; stormwater drainage system; security fencing; and utilities. The MSA would include demolition of three buildings at the existing MSA, including a 5,479-ft^2 multi-cube magazine with 30 bays, and construction of 15,517 ft^2 of munitions storage consisting of 27 single-bay concrete earth-covered igloos in a multi-cubicle configuration, a 2,745-ft^2 munitions maintenance administration facility, a 1,157-ft^2 addition to existing munitions maintenance shop, 54,030 ft^2 of new pavement, site improvements, utilities, security fencing, fiber optic communications duct bank, and all necessary site support.

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Sincerely

BRUNSON.CATHERINE.E.1091059890
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Date: 2021.02.10 12:41:16 -05'00'

CATHERINE BRUNSON, USAF
JB MDL, NEPA/EIAP Project Manager

Attachment:
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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR MOBILITY COMMAND
JOINT BASE MCGUIRE-DIX-LAKEHURST

Carl Champion
Installation Tribal Liaison Officer
Environmental Supervisor, 787th CES/CEIE
Civil Engineering Squadron, Environmental Office
2404 Vandenberg Ave
Joint Base McGuire-Dix-Lakehurst, NJ 08641

Delaware Nation
P.O. Box 825
Anadarko, OK 73005
Attn: Erin Paden, Director of Cultural Resources & Section 106

Dear Erin,

The purpose of this letter is to provide you with an opportunity to review and comment on a proposed action in which the Delaware Nation may have an interest and to invite the tribe to participate in government-to-government consultation with Joint Base McGuire-Dix-Lakehurst (JB MDL).

In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality regulations, and the U.S. Air Force (USAF) NEPA regulations, USAF is preparing an Environmental Assessment (EA) to evaluate the potential environmental impacts associated with construction and operation of a new hot cargo loading area (HCLA) pad to replace the existing dual non-functioning HCLA pads and new munitions storage and supporting facilities at the existing munitions storage area (MSA) at the McGuire area of JB MDL. The HCLA pad would include demolition of two existing HCLA pads and construction of a 162,195-square foot (ft^2) HCLA apron of rigid pavement with 50-foot asphalt shoulders; a 50,399-ft^2 taxiway apron with 25-foot shoulders connecting to Taxiway "Lima"; 17,091-ft^2 of pavement for a vehicular access road and staging area; shoulder, taxiway edge, and high mast exterior area lighting; pavement markings; stormwater drainage system; security fencing; and utilities. The MSA would include demolition of three buildings at the existing MSA, including a 5,479-ft^2 multi-cube magazine with 30 bays, and construction of 15,517 ft^2 of munitions storage consisting of 27 single-bay concrete earth-covered igloos in a multi-cubicle configuration, a 2,745-ft^2 munitions maintenance administration facility, a 1,157-ft^2 addition to existing munitions maintenance shop, 54,030 ft^2 of new pavement, site improvements, utilities, security fencing, fiber optic communications duct bank, and all necessary site support.

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Pursuant to Section 106 of the National Historic Preservation Act and in accordance with 36 Code of Federal Regulations Part 800 (Protection of Historic Properties), USAF would like to initiate government-to-government consultation to allow you or your designee the opportunity to identify any properties of religious and/or cultural significance that may be present in the area affected by this proposal. This information will be used to determine whether there are any cultural resources present that are eligible for listing on the National Register of Historic Places, and if so, whether the Proposed Action would cause adverse effects that must be addressed. Your feedback is important and a response within 30 days would enable us to ensure that your concerns are fully considered in our evaluation.

Please send your written responses to me at carl.champion.1@us.af.mil and I will coordinate responses with our environmental compliance program staff. Thank you in advance for your participation.

Sincerely,

CHAMPION.CARL.E.JR.1186038602 Digitally signed by CHAMPION.CARL.E.JR.1186038602 Date: 2021.01.15 10:11:10 -05'00'

Carl Champion
Installation Tribal Liaison Officer

Attachments:
1) Description of the Proposed Action and Alternatives
2) Proposed Areas of Potential Effects

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR MOBILITY COMMAND
JOINT BASE MCGUIRE-DIX-LAKEHURST

Carl Champion
Installation Tribal Liaison Officer
Environmental Supervisor, 787th CES/CEIE
Civil Engineering Squadron, Environmental Office
2404 Vandenberg Ave
Joint Base McGuire-Dix-Lakehurst, NJ 08641

Delaware Tribe of Indians
Director, Delaware Tribe Historic Preservation Office
Roosevelt Hall, Room 212
1200 Commercial Street
Emporia, KS 66801
Attn: Dr. Brice Obermeyer, Tribal Historic Preservation Officer

Dear Dr. Obermeyer,

The purpose of this letter is to provide you with an opportunity to review and comment on a proposed action in which the Delaware Tribe of Indians may have an interest and to invite the tribe to participate in government-to-government consultation with Joint Base McGuire-Dix-Lakehurst (JB MDL).

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Sincerely,

CHAMPION.CARL.E.JR.1186038602 Digitally signed by CHAMPION.CARL.E.JR.1186038602 Date: 2021.01.15 10:12:51 -05'00'

Carl Champion
Installation Tribal Liaison Officer

Attachments:
1) Description of the Proposed Action and Alternatives
2) Proposed Areas of Potential Effects

Emily Bjorhus <ebjorhus@princetonhydro.com>

Request for ESA Consultation

1 message

Johnny Quispe <jquispe@princetonhydro.com> Wed, Feb 17, 2021 at 4:23 PM
To: NJFO_ProjectReview@fws.gov
Cc: "BRUNSON, CATHERINE E GS-12 USAF AMC 787 CES/CEIEA" <catherine.brunson@us.af.mil>, "Michael Rehman, CERP, PWS" <mrehman@princetonhydro.com>, Emily Bjorhus <ebjorhus@princetonhydro.com>

To Whom It May Concern,

The U.S. Air Force is preparing an Environmental Assessment to evaluate the potential environmental impacts associated with construction and operation of a new hot cargo loading area (HCLA) and munitions storage area (MSA) at the McGuire area of Joint Base McGuire-Dix-Lakehurst (JB MDL), New Jersey. A Description of the Proposed Action and Alternatives (DOPAA) was mailed to the USFWS on February 12, 2021. Following IPaC consultation, guidance, and screening it was determined that the project needed to be submitted to the USFWS for ESA consultation.

The U.S. Air Force requests that the USFWS review the project for ESA consultation in accordance with this guidance. Please find enclosed the following information in support of this request:

1. USFWS IPaC Official Species List
2. Completed Submission Form Checklist
3. Northern Long-Eared Bat PBO on Final 4(d) Rule Verification Letter
4. USGS Site Location Maps (HCLA and MSA)
5. Proposed Features Maps (HCLA and MSA)
6. Photographic Log of Project Area
7. Photo Location Maps (HCLA and MSA)
8. USFWS Scoping Request Letter
9. DOPAA

Please send your written responses to catherine.brunson@us.af.mil. Thank you in advance for your consultation.

Regards,

Johnny Quispe

- 1_Official Species List_ New Jersey Ecological ...
- 2_SubmissionForm_Checklist.pdf
- 3_MA Verification Letter_ Northern Long-Eared B...
- 4_USGS Maps.pdf
- 5_Proposed Features Figures.pdf
- 6_Photographic Log.pdf
- 7_Photo Location Maps.pdf
- 8_USFWS NJ Field Office Ecological Services Sco...
- 9_Final_DOPAA_HCLA-MSA.pdf

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Johnny Quispe
Environmental Scientist

201-723-3702
1108 Old York Road, PO Box 720, Ringoes, NJ 08551

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New Jersey Ecological Services Field Office
4 E. Jimmie Leeds Road, Suite 4
Galloway, NJ 08205
Phone: (609) 646-9310 Fax: (609) 646-0352
http://www.fws.gov/northeast/njfieldoffice/Endangered/consultation.html

In Reply Refer To: February 17, 2021
Consultation code: 05E2NJ00-2021-TA-0674
Event Code: 05E2NJ00-2021-E-01597
Project Name: New Hot Cargo Loading Area and Munitions Storage Area

Subject: Verification letter for the 'New Hot Cargo Loading Area and Munitions Storage Area' project under the January 5, 2016, Programmatic Biological Opinion on Final 4(d) Rule for the Northern Long-eared Bat and Activities Excepted from Take Prohibitions.

Dear Johnny Quispe:

The U.S. Fish and Wildlife Service (Service) received on February 17, 2021 your effects determination for the 'New Hot Cargo Loading Area and Munitions Storage Area' (the Action) using the northern long-eared bat (*Myotis septentrionalis*) key within the Information for Planning and Consultation (IPaC) system. This IPaC key assists users in determining whether a Federal action is consistent with the activities analyzed in the Service's January 5, 2016, Programmatic Biological Opinion (PBO). The PBO addresses activities excepted from "take"[1] prohibitions applicable to the northern long-eared bat under the Endangered Species Act of 1973 (ESA) (87 Stat.884, as amended; 16 U.S.C. 1531 et seq.).

Based upon your IPaC submission, the Action is consistent with activities analyzed in the PBO. The Action may affect the northern long-eared bat; however, any take that may occur as a result of the Action is not prohibited under the ESA Section 4(d) rule adopted for this species at 50 CFR §17.40(o). Unless the Service advises you within 30 days of the date of this letter that your IPaC-assisted determination was incorrect, this letter verifies that the PBO satisfies and concludes your responsibilities for this Action under ESA Section 7(a)(2) with respect to the northern long-eared bat.

Please report to our office any changes to the information about the Action that you submitted in IPaC, the results of any bat surveys conducted in the Action area, and any dead, injured, or sick northern long-eared bats that are found during Action implementation. If the Action is not completed within one year of the date of this letter, you must update and resubmit the information required in the IPaC key.

This IPaC-assisted determination allows you to rely on the PBO for compliance with ESA Section 7(a)(2) only for the northern long-eared bat. It **does not** apply to the following ESA-protected species that also may occur in the Action area:

- American Chaffseed Schwalbea americana Endangered
- Bog Turtle Clemmys muhlenbergii Threatened
- Knieskern's Beaked-rush Rhynchospora knieskernii Threatened
- Swamp Pink Helonias bullata Threatened

If the Action may affect other federally listed species besides the northern long-eared bat, a proposed species, and/or designated critical habitat, additional consultation between you and this Service office is required. If the Action may disturb bald or golden eagles, additional coordination with the Service under the Bald and Golden Eagle Protection Act is recommended.

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[1]Take means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct [ESA Section 3(19)].

Action Description
You provided to IPaC the following name and description for the subject Action.

1. Name

New Hot Cargo Loading Area and Munitions Storage Area

2. Description

The following description was provided for the project 'New Hot Cargo Loading Area and Munitions Storage Area':

> The U.S. Air Force proposes to construct a new hot cargo loading area (HCLA) pad and munitions storage area (MSA) facilities in the McGuire area of Joint Base McGuire-Dix-Lakehurst (JB MDL). The proposed HCLA pad is sited at the current location of HCLA pad 1 at the existing dual HCLA pads within the McGuire Airfield in the center of the McGuire area. The proposed MSA facilities are sited at the existing MSA in the northeastern corner of the McGuire area.
>
> The proposed HCLA and MSA includes construction and operation of a HCLA pad and MSA facilities with associated utilities and site improvements. The proposed HCLA pad would replace the existing dual non-functioning HCLA pads with a properly sited, larger HCLA pad. The proposed MSA facilities would add 27 concrete earth covered igloos and other support facilities at the existing MSA. The new HCLA pad and MSA facilities would be designed and constructed in compliance with applicable UFC requirements.
>
> The proposed HCLA pad would include construction of a 162,195 ft2 HCLA apron of rigid pavement with 50-foot asphalt shoulders sized for parking aircraft; a 50,399 ft2 taxiway apron with 25-foot shoulders connecting to Taxiway "Lima"; 17,091 ft2 of pavement for a vehicular access road and staging area; shoulder, taxiway edge, and high mast exterior area lighting; pavement markings; stormwater drainage system; and security fencing. Other components that would be constructed at the proposed HCLA pad include aircraft tie-down and grounding points, and utilities (telephone service, electricity for apron and airfield lighting, water/fire hydrant). A temporary asphalt access road would be constructed for use during the construction phase to connect the HCLA pad taxiway to the transient munitions storage building that is east of the proposed HCLA pad. Additionally, approximately 0.3-acres of wetlands west of the existing HCLA pad 1 would be permanently filled. Construction of the HCLA pad would be completed in Fiscal Year 2022. Construction of the proposed HCLA pad would temporarily disturb up to 15.5 acres of ground surface and result in a permanent increase of 1.8 acres of impervious surface.
>
> Construction of the proposed MSA facilities would require demolition of approximately 6,534 ft2 of existing buildings. Additionally, 29,802 ft2 of pavement (concrete pads, roadways, sidewalks, etc.), 1,164 ft2 of gravel, and

3,809 linear feet of security fencing would be removed. Portions of some existing infrastructure, such as a water line, sanitary sewer line, and an out-of-service monitoring well, would be abandoned in place and capped. Two earthen berms would be removed from their existing locations and reused during construction. The proposed MSA facilities would include construction of 15,517 ft2 of munitions storage consisting of 27 single-bay concrete earth-covered igloos in a multi-cubicle configuration, a 2,745-ft2 munitions maintenance administration facility, a 1,157-ft2 addition to existing munitions maintenance shop, 54,030 ft2 of new concrete and asphalt pavement, site improvements, utilities (electrical, water, sewer), 3,752 linear feet of security fencing, fiber optic communications duct bank, environmental remediation, and all necessary site support. Stormwater drainage infrastructure, including trickle channels and three concrete spreader weirs with downstream vegetative filters and associated piping, would be constructed within the proposed MSA project area to supplement existing stormwater drainage infrastructure. Construction of the proposed MSA facilities is scheduled to begin in October 2021 and conclude in June 2023. Construction of the proposed MSA facilities would temporarily disturb up to 9.5 acres of ground surface and result in a permanent increase of 1-acre of impervious surface.

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@40.02134025000004,-74.59660487530113,14z



Determination Key Result

This Federal Action may affect the northern long-eared bat in a manner consistent with the description of activities addressed by the Service's PBO dated January 5, 2016. Any taking that may occur incidental to this Action is not prohibited under the final 4(d) rule at 50 CFR §17.40(o). Therefore, the PBO satisfies your responsibilities for this Action under ESA Section 7(a)(2) relative to the northern long-eared bat.

Determination Key Description: Northern Long-eared Bat 4(d) Rule

This key was last updated in IPaC on May 15, 2017. Keys are subject to periodic revision.

This key is intended for actions that may affect the threatened northern long-eared bat.

The purpose of the key for Federal actions is to assist determinations as to whether proposed actions are consistent with those analyzed in the Service's PBO dated January 5, 2016.

Federal actions that may cause prohibited take of northern long-eared bats, affect ESA-listed species other than the northern long-eared bat, or affect any designated critical habitat, require ESA Section 7(a)(2) consultation in addition to the use of this key. Federal actions that may affect species proposed for listing or critical habitat proposed for designation may require a conference under ESA Section 7(a)(4).

Determination Key Result

This project may affect the threatened Northern long-eared bat; therefore, consultation with the Service pursuant to Section 7(a)(2) of the Endangered Species Act of 1973 (87 Stat.884, as amended; 16 U.S.C. 1531 et seq.) is required. However, based on the information you provided, this project may rely on the Service's January 5, 2016, *Programmatic Biological Opinion on Final 4(d) Rule for the Northern Long-Eared Bat and Activities Excepted from Take Prohibitions* to fulfill its Section 7(a)(2) consultation obligation.

Qualification Interview

1. Is the action authorized, funded, or being carried out by a Federal agency?

   Yes

2. Have you determined that the proposed action will have "no effect" on the northern long-eared bat? (If you are unsure select "No")

   No

3. Will your activity purposefully **Take** northern long-eared bats?

   No

4. [Semantic] Is the project action area located wholly outside the White-nose Syndrome Zone?

   Automatically answered
   No

5. [Semantic] Is the project action area located within 0.25 miles of a known northern long-eared bat hibernaculum?

   Note: The map queried for this question contains proprietary information and cannot be displayed. If you need additional information, please contact your State wildlife agency

   Automatically answered
   No

6. [Semantic] Is the project action area located within 150 feet of a known occupied northern long-eared bat maternity roost tree?

   Note: The map queried for this question contains proprietary information and cannot be displayed. If you need additional information, please contact your State wildlife agency

   Automatically answered
   No

Project Questionnaire

If the project includes forest conversion, report the appropriate acreages below. Otherwise, type '0' in questions 1-3.

1. Estimated total acres of forest conversion:

0

2. If known, estimated acres of forest conversion from April 1 to October 31

0

3. If known, estimated acres of forest conversion from June 1 to July 31

0

If the project includes timber harvest, report the appropriate acreages below. Otherwise, type '0' in questions 4-6.

4. Estimated total acres of timber harvest

0

5. If known, estimated acres of timber harvest from April 1 to October 31

0

6. If known, estimated acres of timber harvest from June 1 to July 31

0

If the project includes prescribed fire, report the appropriate acreages below. Otherwise, type '0' in questions 7-9.

7. Estimated total acres of prescribed fire

0

8. If known, estimated acres of prescribed fire from April 1 to October 31

0

9. If known, estimated acres of prescribed fire from June 1 to July 31

0

If the project includes new wind turbines, report the megawatts of wind capacity below. Otherwise, type '0' in question 10.

10. What is the estimated wind capacity (in megawatts) of the new turbine(s)?

0

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New Jersey Ecological Services Field Office
4 E. Jimmie Leeds Road, Suite 4
Galloway, NJ 08205
Phone: (609) 646-9310 Fax: (609) 646-0352
http://www.fws.gov/northeast/njfieldoffice/Endangered/consultation.html

In Reply Refer To: February 17, 2021
Consultation Code: 05E2NJ00-2021-SLI-0674
Event Code: 05E2NJ00-2021-E-01596
Project Name: New Hot Cargo Loading Area and Munitions Storage Area

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 that may occur in your proposed action area and/or may be affected by your proposed project. This species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under Section 7(c) of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq.*)

If the enclosed list indicates that any listed species may be present in your action area, please visit the New Jersey Field Office consultation web page as the next step in evaluating potential project impacts: http://www.fws.gov/northeast/njfieldoffice/Endangered/consultation.html

On the New Jersey Field Office consultation web page you will find:

- habitat descriptions, survey protocols, and recommended best management practices for listed species;
- recommended procedures for submitting information to this office; and
- links to other Federal and State agencies, the Section 7 Consultation Handbook, the Service's wind energy guidelines, communication tower recommendations, the National Bald Eagle Management Guidelines, and other resources and recommendations for protecting wildlife resources.

The enclosed list may change as new information about listed species becomes available. As per Federal regulations at 50 CFR 402.12(e), the enclosed list is only valid for 90 days. Please return to the ECOS-IPaC website at regular intervals during project planning and implementation to obtain an updated species list. When using ECOS-IPaC, be careful about drawing the boundary of your Project Location. Remember that your action area under the ESA is not limited to just the footprint of the project. The action area also includes all areas that may be indirectly affected

through impacts such as noise, visual disturbance, erosion, sedimentation, hydrologic change, chemical exposure, reduced availability or access to food resources, barriers to movement, increased human intrusions or access, and all areas affected by reasonably forseeable future that would not occur without ("but for") the project that is currently being proposed.

We appreciate your concern for threatened and endangered species. The Service encourages Federal and non-Federal project proponents to consider listed, proposed, and candidate species early in the planning process. Feel free to contact this office if you would like more information or assistance evaluating potential project impacts to federally listed species or other wildlife resources. Please include the Consultation Tracking Number in the header of this letter with any correspondence about your project.

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Migratory Birds
- 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:

New Jersey Ecological Services Field Office
4 E. Jimmie Leeds Road, Suite 4
Galloway, NJ 08205
(609) 646-9310

Project Summary

Consultation Code: 05E2NJ00-2021-SLI-0674
Event Code: 05E2NJ00-2021-E-01596
Project Name: New Hot Cargo Loading Area and Munitions Storage Area
Project Type: ** OTHER **
Project Description: The U.S. Air Force proposes to construct a new hot cargo loading area (HCLA) pad and munitions storage area (MSA) facilities in the McGuire area of Joint Base McGuire-Dix-Lakehurst (JB MDL). The proposed HCLA pad is sited at the current location of HCLA pad 1 at the existing dual HCLA pads within the McGuire Airfield in the center of the McGuire area. The proposed MSA facilities are sited at the existing MSA in the northeastern corner of the McGuire area.

The proposed HCLA and MSA includes construction and operation of a HCLA pad and MSA facilities with associated utilities and site improvements. The proposed HCLA pad would replace the existing dual non-functioning HCLA pads with a properly sited, larger HCLA pad. The proposed MSA facilities would add 27 concrete earth covered igloos and other support facilities at the existing MSA. The new HCLA pad and MSA facilities would be designed and constructed in compliance with applicable UFC requirements.

The proposed HCLA pad would include construction of a 162,195 ft2 HCLA apron of rigid pavement with 50-foot asphalt shoulders sized for parking aircraft; a 50,399 ft2 taxiway apron with 25-foot shoulders connecting to Taxiway "Lima"; 17,091 ft2 of pavement for a vehicular access road and staging area; shoulder, taxiway edge, and high mast exterior area lighting; pavement markings; stormwater drainage system; and security fencing. Other components that would be constructed at the proposed HCLA pad include aircraft tie-down and grounding points, and utilities (telephone service, electricity for apron and airfield lighting, water/fire hydrant). A temporary asphalt access road would be constructed for use during the construction phase to connect the HCLA pad taxiway to the transient munitions storage building that is east of the proposed HCLA pad. Additionally, approximately 0.3-acres of wetlands west of the existing HCLA pad 1 would be permanently filled. Construction of the HCLA pad would be completed in Fiscal Year 2022. Construction of the proposed HCLA pad would temporarily disturb up to 15.5 acres of ground surface and result in a permanent increase of 1.8 acres of impervious surface.

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and 3,809 linear feet of security fencing would be removed. Portions of some existing infrastructure, such as a water line, sanitary sewer line, and an out-of-service monitoring well, would be abandoned in place and capped. Two earthen berms would be removed from their existing locations and reused during construction. The proposed MSA facilities would include construction of 15,517 ft2 of munitions storage consisting of 27 single-bay concrete earth-covered igloos in a multi-cubicle configuration, a 2,745-ft2 munitions maintenance administration facility, a 1,157-ft2 addition to existing munitions maintenance shop, 54,030 ft2 of new concrete and asphalt pavement, site improvements, utilities (electrical, water, sewer), 3,752 linear feet of security fencing, fiber optic communications duct bank, environmental remediation, and all necessary site support. Stormwater drainage infrastructure, including trickle channels and three concrete spreader weirs with downstream vegetative filters and associated piping, would be constructed within the proposed MSA project area to supplement existing stormwater drainage infrastructure. Construction of the proposed MSA facilities is scheduled to begin in October 2021 and conclude in June 2023. Construction of the proposed MSA facilities would temporarily disturb up to 9.5 acres of ground surface and result in a permanent increase of 1-acre of impervious surface.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@40.02134025000004,-74.59660487530113,14z



Counties: Burlington County, New Jersey

Endangered Species Act Species

There is a total of 5 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	Threatened

Reptiles

NAME	STATUS
Bog Turtle *Clemmys muhlenbergii* Population: Wherever found, except GA, NC, SC, TN, VA No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6962	Threatened

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
Knieskern's Beaked-rush *Rhynchospora knieskernii* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/3280	Threatened
Swamp Pink *Helonias bullata* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4333	Threatened

Critical habitats

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

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
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. https://ecos.fws.gov/ecp/species/1626	Breeds Oct 15 to Aug 31
Bobolink *Dolichonyx oryzivorus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Jul 31

NAME	BREEDING SEASON
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 (■)

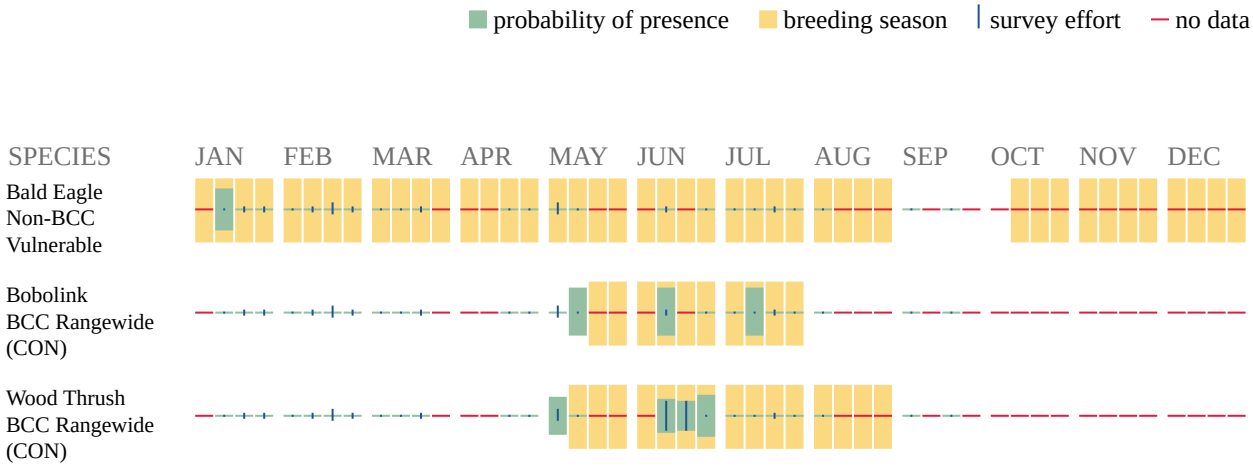
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

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.



Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.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 migratory birds potentially occurring 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 AKN Phenology 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, migrating or present year-round in my project 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 refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. 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.

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.

FRESHWATER EMERGENT WETLAND

- PEM1Dd

FRESHWATER FORESTED/SHRUB WETLAND

- PFO1D
- PSS1E

RIVERINE

- R4SBC
- R4SBCx
- R5UBFx
- R5UBH
- R2UBHx
- R2UBH

Johnny Quispe <jquispe@princetonhydro.com>

Re: [EXTERNAL] Re: Project Review:

1 message

Poirier, Ariel B <ariel_poirier@fws.gov> Thu, Apr 15, 2021 at 3:49 PM
To: Johnny Quispe <jquispe@princetonhydro.com>
Cc: "catherine.brunson@us.af.mil" <catherine.brunson@us.af.mil>, "mrehman@princetonhydro.com" <mrehman@princetonhydro.com>, "ebjorhus@princetonhydro.com" <ebjorhus@princetonhydro.com>, "LUNA, MICHAEL R GS-12 USAF AMC 787 CES/CEIEA" <michael.luna.17@us.af.mil>

Good afternoon Johnny,

I have recently learned about the Grassland Bird Restoration project also occurring adjacent to the HCLA on JBMDL. In order to attempt to reduce conflict with the Grassland Bird project the Service is amending its previous recommendation of a survey for Knieskern's beaked-rush.
The Service recommends:

1. A habitat suitability survey *as soon as possible* in the northern area of parcel D (see attached map) for Knieskern's beaked-rush. It is not necessary to conduct the habitat suitability survey for the entire area of parcel D, just the portion closest to HCLA within the limit of disturbance. This should be conducted as soon as possible to avoid conflict with the application of Plateau (herbicide) for the Grassland Bird project, should there be no suitable habitat for Knieskern's beaked-rush found. If you are unable to find a qualified botanist, our office may be able to assist with a field visit to determine the suitability of the habitat for Knieskern's beaked-rush in the northern part of parcel D.

Please let me know if you have any questions or concerns.

Thank you,
Ariel

Ariel Poirier (She/Her)
Fish and Wildlife Biologist
U.S. Fish & Wildlife Service
New Jersey Field Office
U.S. Fish and Wildlife Service
4 E. Jimmie Leeds Road, Suite 4
Galloway, New Jersey 08205
Phone: 609.382.5271

From: Poirier, Ariel B <ariel_poirier@fws.gov>
Sent: Thursday, April 15, 2021 8:40 AM
To: Johnny Quispe <jquispe@princetonhydro.com>
Cc: catherine.brunson@us.af.mil <catherine.brunson@us.af.mil>; mrehman@princetonhydro.com <mrehman@princetonhydro.com>; ebjorhus@princetonhydro.com <ebjorhus@princetonhydro.com>
Subject: Re: [EXTERNAL] Re: Project Review:

Good morning Johnny,

The Service has reviewed project titled: New Hot Cargo Loading Area and Munitions Storage Area.
Below is the recommendation from the Service:

1. For the area pertaining to Hot Cargo Loading Area (HCLA)- from the information provided; the Service is unable to determine if Knieskern's beaked-rush will be affected by the proposed project. Therefore, to assist in determining the potential impacts of the proposed project on Knieskern's beaked-rush, the Service requests a Knieskern's beaked-rush survey be conducted by a qualified botanist with experience in sedge identification. The survey area should include any suitable wetland habitat within 500 feet of the project's limit of disturbance at the HCLA location. Surveys should be conducted from July to September. Random transect surveys are inappropriate since the species may be present in small wet pockets, which may be overlooked by this survey method. is Please forward the survey results to this office for review. Please include the survey method used and the qualifications of the surveyor along with an assessment of any potential impacts to Knieskern's beaked-rush.

Please reach out with any questions or concerns.

Thank you,
Ariel

Ariel Poirier (She/Her)
Fish and Wildlife Biologist
U.S. Fish & Wildlife Service
New Jersey Field Office
U.S. Fish and Wildlife Service
4 E. Jimmie Leeds Road, Suite 4
Galloway, New Jersey 08205
Phone: 609.382.5271


McGuire Triangle
Areas of restoration
Legend
Feature 1
Feature 2
Feature 3
Feature 4
New Hanover Township
Parcel D - 2021
Parcel C - 2020
Parcel A - 2018
Parcel B - 2019
Vandenberg Ave
E Arnold Ave
Hangar Rd
Manor Rd
Nassau St
Baltimore St
Buffalo
Doughboy
Texas Ave
545
New Hanover Township
1
2
3
4
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Google Earth
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3000 ft

State of New Jersey
THE PINELANDS COMMISSION
PO BOX 359
NEW LISBON, NJ 08064
(609) 894-7300
www.nj.gov/pinelands

PHILIP D. MURPHY
Governor
SHEILA Y. OLIVER
Lt. Governor

General Information: Info@pinelands.nj.gov
Application Specific Information: AppInfo@pinelands.nj.gov

RICHARD PRICKETT
Chairman
NANCY WITTENBERG
Executive Director

February 19, 2021

Catherine Brunson (via email)
NEPA/EIAP Project Manager
2404 Vanderberg Ave.
Joint Base McGuire-Dix-Lakehurst, NJ 08641

Re: Application # 1991-1149.070
Joint Base McGuire-Dix-Lakehurst

Dear Ms. Brunson:

Thank you for your letter asking that we provide comments on a Draft Environmental Assessment for projects associated with the construction and operation of a new hot cargo loading area at Joint Base McGuire-Dix-Lakehurst.

The Pinelands Comprehensive Management Plan (CMP) contains many land use and environmental standards. For example, the land use standards of the CMP require that, where feasible, development at military installations be located in that portion of the installation located within the Pinelands Protection Area and avoid the Pinelands Preservation Area District and Forest Area. Examples of CMP environmental standards include a prohibition on most development in wetlands and a required buffer to wetlands, the protection of threatened and endangered plants and animals, and stormwater management.

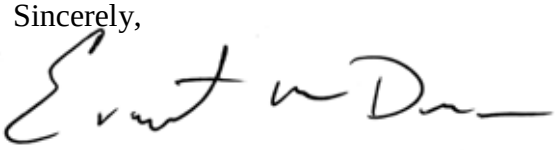
To discuss these standards, you may wish schedule a pre-application conference with our staff. During this conference, we can discuss the proposed development and advise of the specific standards of the CMP that appear to be of concern. There is no fee required for a pre-application conference.

Please note that the proposed development requires the completion of an application with the Commission, including a required application fee.

Due to the Coronavirus, the Commission has closed its offices and staff is working from home. All application fees (checks) must be mailed via the United States Postal Service to the Pinelands Commission, PO Box 359, New Lisbon NJ 08064. All other application-related materials, including application forms, reports and plans, should be submitted in digital format to appinfo@pinelands.nj.gov. All plans must be in .pdf format.

Please feel free to contact me if you have any questions.

Sincerely,



Ernest M. Deman, CPM
Supervising Environmental Specialist

DEPARTMENT OF THE AIR FORCE
87TH AIRBASE WING (AMC)

April 16, 2021

Alice Good, Esq.
87 ABW/JA
Room 217
2901 Falcon Lane
Joint Base McGuire-Dix-Lakehurst NJ 08641

Mr. Ernest Deman
NJ Pinelands Commission
PO Box 359
15 Springfield Road
New Lisbon NJ 08064

Re: Application # 1991-1149.070, Joint Base McGuire-Dix-Lakehurst (JB MDL)

Dear Mr. Deman

We are in receipt of your letter dated February 19, 2021, requesting that JB MDL submit a formal application and fees for review of the above matter, which is JB MDL's proposed project for a Hot Cargo Loading Area (HCLA). As you may be aware, there is no waiver of sovereign immunity set forth in 16 USC §471i for the establishment and administration of the Pine Barrens Area and JB MDL may waive the Pinelands Commission review. The central issue is payment of a set fee which is not based on the actual administrative time used for the project review by your office. Over the years we have not been able to establish a work-around for this issue. However, we would sincerely appreciate and utilize your comments and direction for the planning and construction of this project, but we cannot submit fees under the current legal structure.

Please let JB MDL know if you intend to provide comment and direction for this project without the attendant fee. If not, we respect that position and the Pinelands Commission review of this project is accordingly waived as a mission essential project for JB MDL. See NJAC 7:50-4.52(d) Even if a formal application is not submitted to the Pinelands Commission for this project, proper coordination will be conducted with all regulators where a waiver of sovereign immunity is set forth in the applicable and relevant federal law.

If you need any other information, please contact Ms. Catherine Brunson, NEPA/EIAP Project Manager, 787 CES/CEIEA, at (609) 754-1729 or via email to catherine.brunson@us.af.mil

ALICE GOOD, Chief
Environmental and Real Property Law

c: Catherine Brunson, 787 CES/CEIEA

From: Marcopul, Kate <Kate.Marcopul@dep.nj.gov>
Sent: Wednesday, March 24, 2021 11:10 AM
To: WHITE, SHARON D GS-12 USAF AMC 787 CES/CEIEA <sharon.white.7@us.af.mil>
Cc: Baratta, Meghan <Meghan.Baratta@dep.nj.gov>; West-Rosenthal, Jesse <Jesse.West-Rosenthal@dep.nj.gov>; Thivierge, Lindsay <Lindsay.Thivierge@dep.nj.gov>
Subject: [Non-DoD Source] New Hot Cargo Loading Area - Joint Base McGuire-Dix-Lakehurst (HPO Project # 21-0683)

****This e-mail serves as the official correspondence of the New Jersey Historic Preservation Office as we switch to a temporary remote work environment in response to the ongoing novel coronavirus (COVID-19) outbreak****

HPO Project # 21-0683-1

HPO-C2021-146

Dear Dr. White:

As Deputy State Historic Preservation Officer for New Jersey, in accordance with 36 CFR Part 800: Protection of Historic Properties, as published with amendments in the Federal Register on 6 July 2004 (69 FR 40544-40555), I am providing Consultation Comments for the following proposed undertaking:

Burlington County, North Hanover Township

New Hot Cargo Loading Area

Joint Base McGuire-Dix-Lakehurst

United States Department of the Air Force

800.3 Initiation of the section 106 process

Thank you for providing the Historic Preservation Office (HPO) the opportunity to review and comment on the potential for the proposed Hot Cargo Loading Area to affect historic properties. The HPO has reviewed the documentation submitted. I concur with your area of potential effects, as defined in the documentation submitted. We look forward to further consultation regarding the identification, evaluation, and treatment of historic properties in accordance with Section 106 of the National Historic Preservation Act, as amended.

Additional Comments

Thank you for providing the opportunity to review and comment on the potential for the above-referenced project to affect historic properties. Please do not hesitate to contact Jesse West-Rosenthal, Ph.D. of my staff at Jesse.West-Rosenthal@dep.nj.gov with any questions regarding archaeology or Lindsay Thivierge of my staff at Lindsay.Thivierge@dep.nj.gov with questions regarding historic architecture. Please reference the HPO project number 21-0683, in any future calls, emails, or written correspondence to help expedite your review and response.

Sincerely,

Katherine J. Marcopul, Ph.D., CPM
Administrator and
Deputy State Historic Preservation Officer
Historic Preservation Office
NJ Department of Environmental Protection
501 East State Street, Trenton, NJ 08625
kate.marcopul@dep.nj.gov
T (609) 984-0176 | F (609) 984-0578



Connect with us:

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APPENDIX B
NOTICE OF EARLY PUBLIC REVIEW AFFIDAVITS AND SUMMARY OF PUBLIC COMMENTS RECEIVED

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Summary of Public Comments Received

Date	Name	Comment
None	None	None

AFFIDAVIT OF PUBLICATION

STATE OF WISCONSIN
Brown County

Personally appeared Jesterney

Of the **Asbury Park Press,** a newspaper printed in Freehold, New Jersey and published in Neptune, in the State of New Jersey and Monmouth/Ocean Couties, and of general circulation in Monmounth/Ocean Counties, who being duly sworn, deposeth and saith that the advertisement of which the annexed is a true copy, has been published in the said newspaper 1 time(s), once in each issue as follows:

2/17/2021 A.D 2021

Nancy Heyrman
Notary Public, State of Wisconsin, County of Brown

5.15.23
My commission expires

NANCY HEYRMAN
Notary Public
State of Wisconsin

Notice for Early Public Review of a Proposed Action in Wetlands

To: All Interested Agencies, Groups, and Individuals

The U.S. Air Force (USAF) proposes to construct and operate a new hot cargo loading area (HCLA) pad to replace the existing dual non-functioning HCLA pads, and new munitions storage and supporting facilities at the existing munitions storage area (MSA) at the McGuire area of Joint Base McGuire-Dix-Lakehurst (JB MDL). The purpose of this Proposed Action is to provide a fully operational and efficient HCLA pad and MSA in the McGuire area of JB MDL that are compliant with applicable Unified Facilities Criteria requirements.

The Proposed Action is subject to the requirements and objectives of Executive Order (EO) 11990, *Protection of Wetlands*, because it has the potential to be located in wetlands. This notice is required by EO 11990 and has been prepared and made available to the public by the USAF in accordance with 32 Code of Federal Regulations Part 989.24(c) and Air Force Manual 32-7003, *Environmental Conservation*, for actions proposed in wetlands. The USAF is preparing an Environmental Assessment in accordance with the National Environmental Policy Act (NEPA) and the USAF's Environmental Impact Analysis Process. The USAF will contact the U.S. Fish & Wildlife Service and the State Historic Preservation Officer, amongst other agencies, for their input on the Proposed Action during the preparation of the Environmental Assessment as a part of the NEPA review process.

The Proposed Action could disturb or be located within wetlands. Under proposed conditions the construction of the HCLA pad would result in the permanent loss of 0.3-acres of wetlands. The proposed construction would be designed to avoid and minimize wetlands impacts to the extent possible and is not expected to have an effect on flooding potential.

The USAF requests public comments to determine if there are any public concerns regarding the Proposed Action's potential to impact wetland areas. The 30-day public comment period is from February 17 to March 18, 2021. Submit written comments to the 87th Air Base Wing Public Affairs Office, 2901 Falcon Lane, Suite 235, Joint Base McGuire-Dix-Lakehurst, New Jersey 08641, or by email to *87.abw.pa@us.af.mil*.

AP-GCI0592374-01

State of New Jersey
County of Burlington

HDR
3025 CHEMICAL RD STE 110
PLYMOUTH MEETING, PA 19462

4846121127
0007380160

I, N Heyrman, being duly affirmed according to law, deposes and says that I am the Legal Clerk of BURLINGTON TIME, INC. Publisher of the "Burlington County Times" and that a copy of a notice published in such paper on

February 17, 2021

appears hereto, exactly as published in said newspaper

N Heyrman
Legal Clerk

Vicky Felty
Notary Public, State of Wisconsin, County of Brown

9-19-21
My commission expires

VICKY FELTY
Notary Public
State of Wisconsin

Notice for Early Public Review of a Proposed Action in Wetlands

To: All Interested Agencies, Groups, and Individuals

The U.S. Air Force (USAF) proposes to construct and operate a new hot cargo loading area (HCLA) pad to replace the existing dual non-functioning HCLA pads, and new munitions storage and supporting facilities at the existing munitions storage area (MSA) at the McGuire area of Joint Base McGuire-Dix-Lakehurst (JB MDL). The purpose of this Proposed Action is to provide a fully operational and efficient HCLA pad and MSA in the McGuire area of JB MDL that are compliant with applicable Unified Facilities Criteria requirements.

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Adv. Fee: $71.76
BCT: February 17, 2021
Aff. Chg.: $20.00

BC-0007380164-01

APPENDIX C
WETLAND DELINEATION REPORT

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HOT CARGO LOADING AREA AND MUNITIONS STORAGE AREA WETLAND DELINEATION REPORT

JOINT BASE MCGUIRE-DIX-LAKEHURST
NEW HANOVER TOWNSHIP, BURLINGTON COUNTY, NEW JERSEY

FEBRUARY 2021

PREPARED FOR:
U.S. AIR FORCE
2402 VANDENBURG AVE
JOINT BASE MCGUIRE-DIX-LAKEHURST
NEW JERSEY, 08641

PREPARED BY:
PRINCETON HYDRO, LLC
1108 OLD YORK RD, SUITE 1
P.O. BOX 720
RINGOES, NEW JERSEY 08551
PH: (908) 237.5660
PRINCETONHYDRO.COM

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Appendix III Photographs and Photo Location Map
Appendix IV Official Soil Descriptions
Appendix V Resumes of Principal Preparers

PRIMARY AUTHOR
Ivy Babson

CONTRIBUTING AUTHORS
Emily Bjorhus, PWS
Michael Rehman, CERP, PWS

1.0 INTRODUCTION

1.1 PURPOSE OF STUDY

The objective of this effort was to delineate and describe freshwater wetlands and State open waters, if present, located in and around the perimeter of two specific locations within the McGuire area of Joint Base McGuire-Dix-Lakehurst (JBMDL) in New Hanover Township, Burlington County, New Jersey. The first location consisted of the Hot Cargo Loading Area (HCLA) (**Figures 1** and **2**). The second location consisted of the Munitions Storage Area (MSA) (**Figure 3** and **4**). The HCLA and MSA are collectively referred to as "the Site" hereinafter. Princeton Hydro, LLC (Princeton Hydro) performed the wetland delineation at the HCLA and MSA in accordance with the New Jersey State Freshwater Wetlands Protection Act (N.J.S.A. 13:9B-1 et seq.). The Freshwater Wetlands Protection Act Rules (N.J.A.C. 7:7A) define wetlands as:

"An area that is inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions, commonly known as hydrophytic vegetation; provided however, that the Department, in designating a wetland, shall use the three-parameter approach (that is, hydrology, soils, and vegetation) enumerated in the *Federal Manual for Identifying and Delineating Jurisdictional Wetlands*."

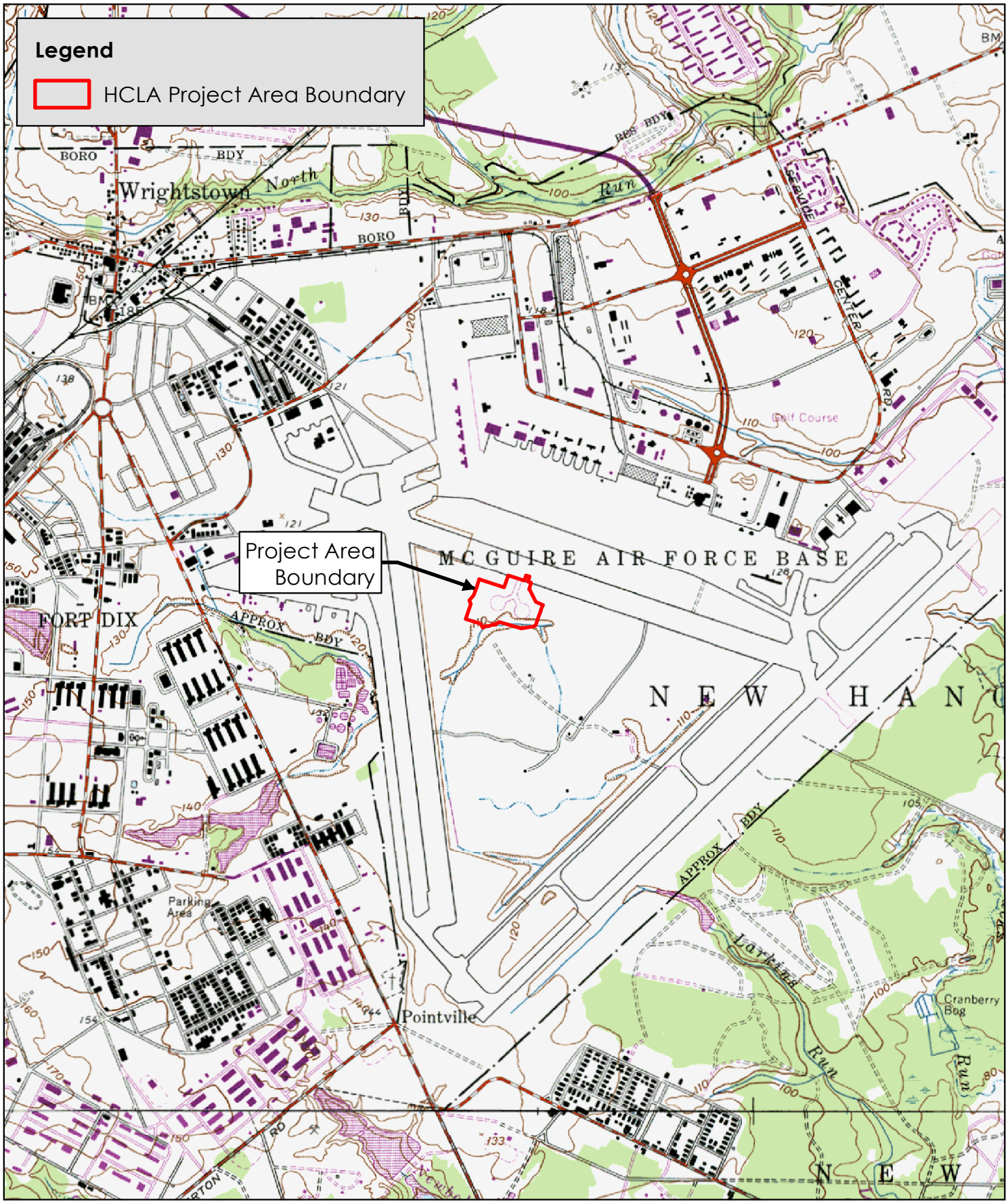
The *Federal Manual for Identifying and Delineating Jurisdictional Wetlands* (*Federal Manual*) (Federal Interagency Committee for Wetland Delineation [FICWD] 1989) cited in this definition presents technical guidelines to identify wetlands and distinguish them from aquatic habitats and non-wetlands. In order to apply these guidelines, the *Federal Manual* provides a set of scientific methods and supporting information including a "Jurisdictional Decision Flow Chart" to aid in determining if an area is a wetland or upland. Princeton Hydro delineated wetlands at the Site in accordance with the *Federal Manual* (FICWD 1989) and the U.S. Army Corps of Engineers' (USACE) *Regional Supplement to the Corps of Engineers Wetland Delineation Manual Atlantic and Gulf Coastal Plain Region (Version 2.0)* (*AGCP Regional Supplement*) (Environmental Laboratory 2010).

1.2 SITE DESCRIPTION

The Site is located within the McGuire area of JBMDL in New Hanover Township, Burlington County, New Jersey. Freshwater wetlands and State open waters were delineated in and within 300-feet of the Site to account for transition areas and riparian zones, and to identify potential opportunities for wetland mitigation implementation (**Figures 5 and 6**).

Hot Cargo Loading Area

The HCLA is located within the central portion of the McGuire area of JBMDL and is bordered to the north by the "Lima" taxiway, to the west by maintained grasslands and Runway 18/36; and to the east and south by grasslands and a series of maintenance roads and buildings. The majority of the HCLA consisted of impervious pavement, including two HCLA pads and a taxiway enclosed by an existing fence line. Remaining portions of the HCLA area were comprised of actively maintained lawn. The HCLA area possessed three distinct plant communities: modified palustrine emergent (PEM) wetlands; upland meadow; and maintained lawn.



File: P:\1880\Projects\1880007\GIS\MXD\Wetland_Report\Fig1_HCLA_USGS.mxd, 2/10/2021, Drawn by thopper, Copyright Princeton Hydro, LLC.

NOTES:
1. Project area boundary approximated based upon proposed features provided by JBMDL, 787th Civil Engineer Squadron.
2. USGS topographic digital raster graphic obtained from Terrain Navigator Pro, New Egypt, NJ quadrangle.

0 1,000 2,000 Feet

Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet

FIGURE 1 HCLA
USGS SITE LOCATION MAP

JOINT BASE MCGUIRE-DIX-LAKEHURST
BURLINGTON COUNTY
NEW JERSEY

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SCIENCE DESIGN ENGINEERING
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File: P:\1880\Projects\1880007\GIS\MXD\Wetland_Report\Fig2_HCLA_Aerial.mxd, 2/10/2021, Drawn by thopper. Copyright Princeton Hydro, LLC.

NOTES:
1. Project area boundary approximated based upon proposed features provided by JBMDL, 787th Civil Engineer Squadron.
2. 2015 orthoimagery obtained from NJ Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGIS).

0 600 1,200 Feet

Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet

FIGURE 2 HCLA AERIAL OVERVIEW MAP

JOINT BASE MCGUIRE-DIX-LAKEHURST
BURLINGTON COUNTY
NEW JERSEY

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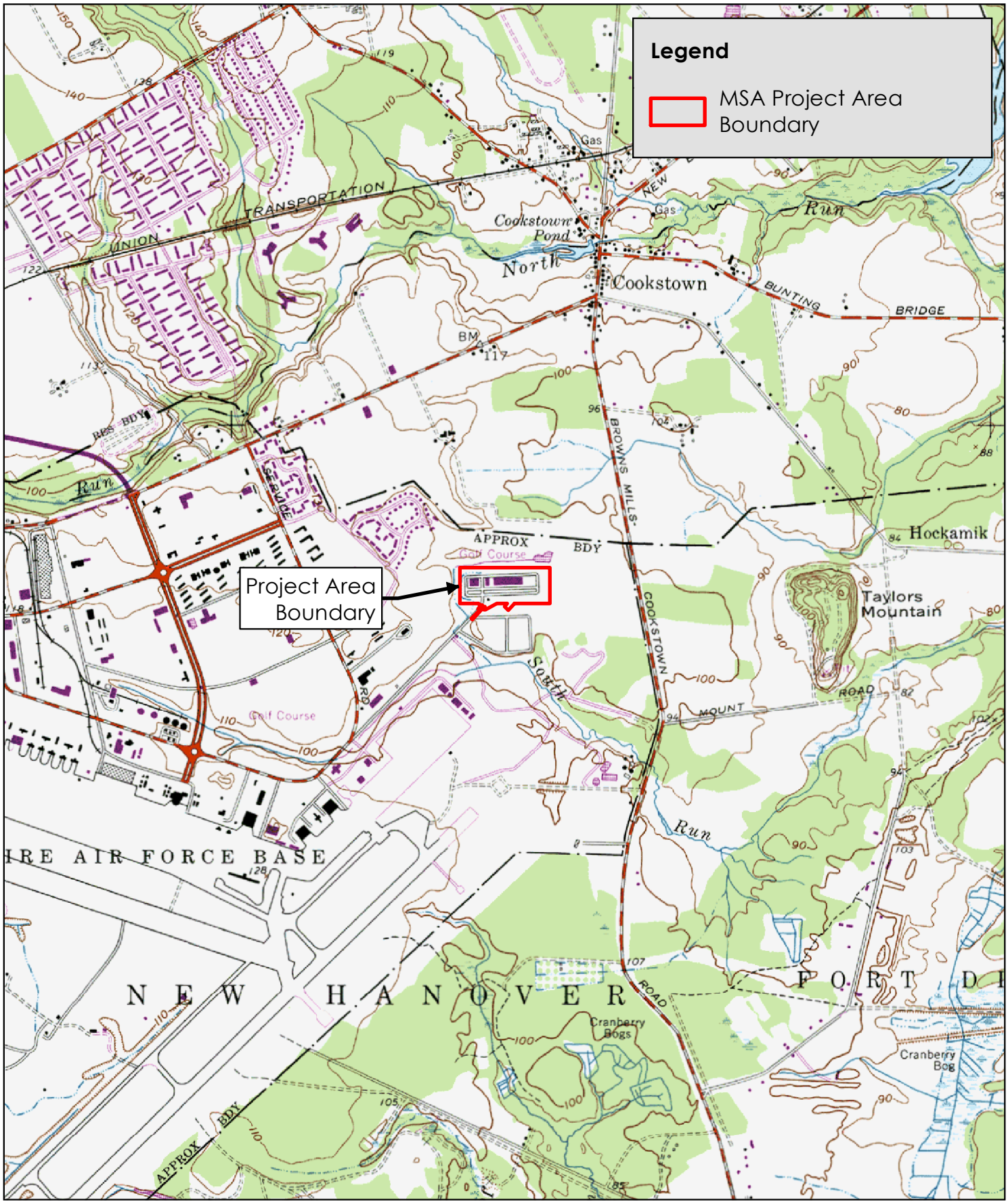

File: P:\1880\Projects\1880007\GIS\MXD\Wetland_Report\Fig3_MSA_USGS.mxd, 2/10/2021, Drawn by thopper, Copyright Princeton Hydro, LLC.

NOTES:
1. Project area boundary provided by JBMDL, 787th Civil Engineer Squadron.
2. USGS topographic digital raster graphic obtained from Terrain Navigator Pro, New Egypt, NJ quadrangle.

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Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet

FIGURE 3 MSA
USGS SITE LOCATION MAP

JOINT BASE MCGUIRE-DIX-LAKEHURST
BURLINGTON COUNTY
NEW JERSEY

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File: P:\1880\Projects\1880007\GIS\MXD\Wetland_Report\Fig4_MSA_Aerial.mxd, 2/12/2021, Drawn by jquispe, Copyright Princeton Hydro, LLC.

NOTES:
1. Project area boundary provided by JBMDL, 787th Civil Engineer Squadron.
2. 2015 orthoimagery obtained from NJ Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGIS).

0 600 1,200 Feet

Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet

FIGURE 4 MSA AERIAL OVERVIEW MAP

JOINT BASE MCGUIRE-DIX-LAKEHURST
BURLINGTON COUNTY
NEW JERSEY

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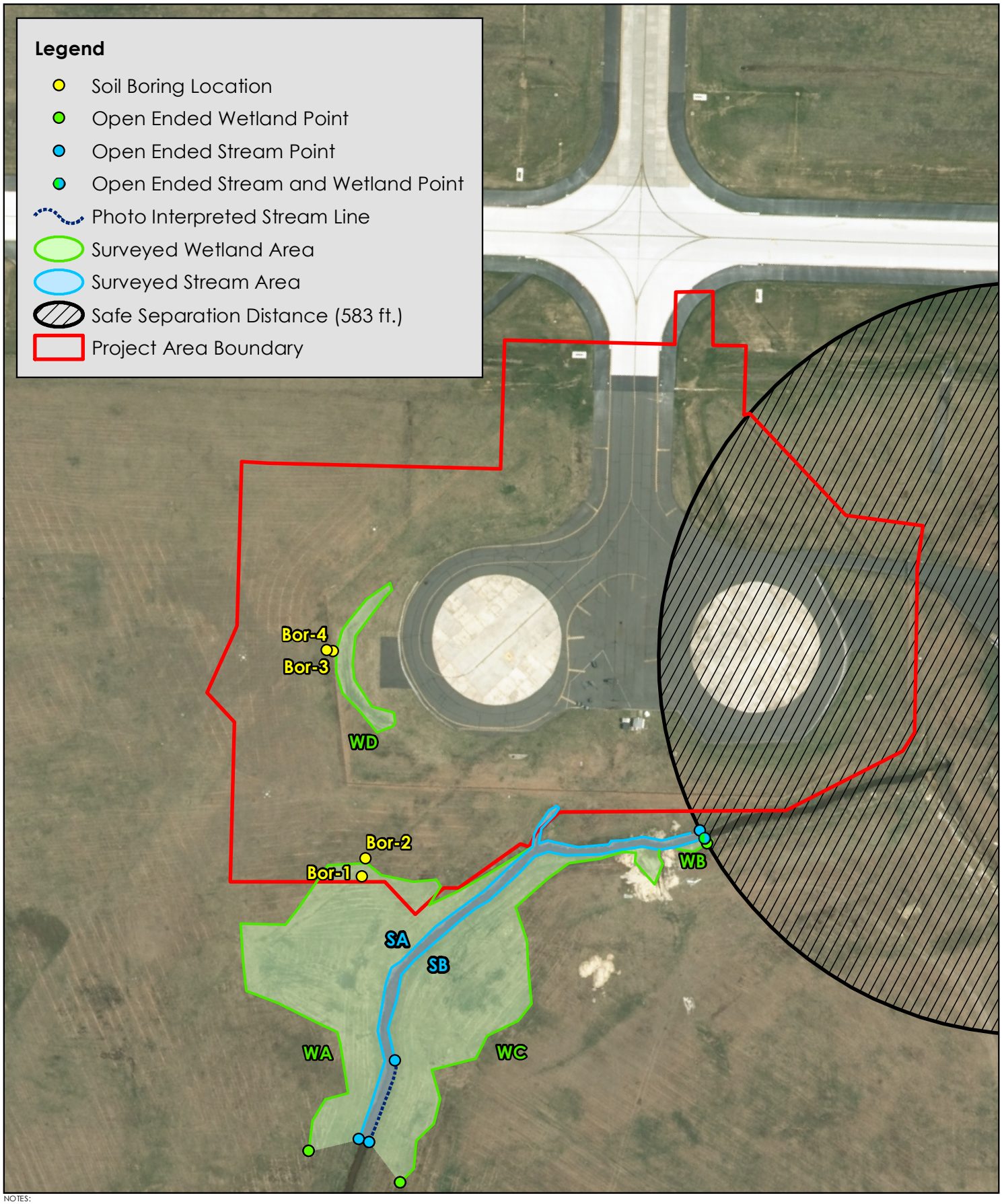


File: P:\1880\Projects\1880007\GIS\MXD\Wetland_Report\Fig5_HCLA_Surveyed_Wetlands.mxd, 2/11/2021, Drawn by thopper, Copyright Princeton Hydro, LLC.

NOTES:
1. Borings and wetlands/stream delineation performed by Princeton Hydro LLC and surveyed by Rogers Surveying LLC.
2. Approximate stream boundary interpreted using 2015 orthoimagery.
3. Project area boundary and Safe Separation Distance provided by JBMDL, 787th Civil Engineer Squadron.
4. 2015 orthoimagery obtained from NJ Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGIS).

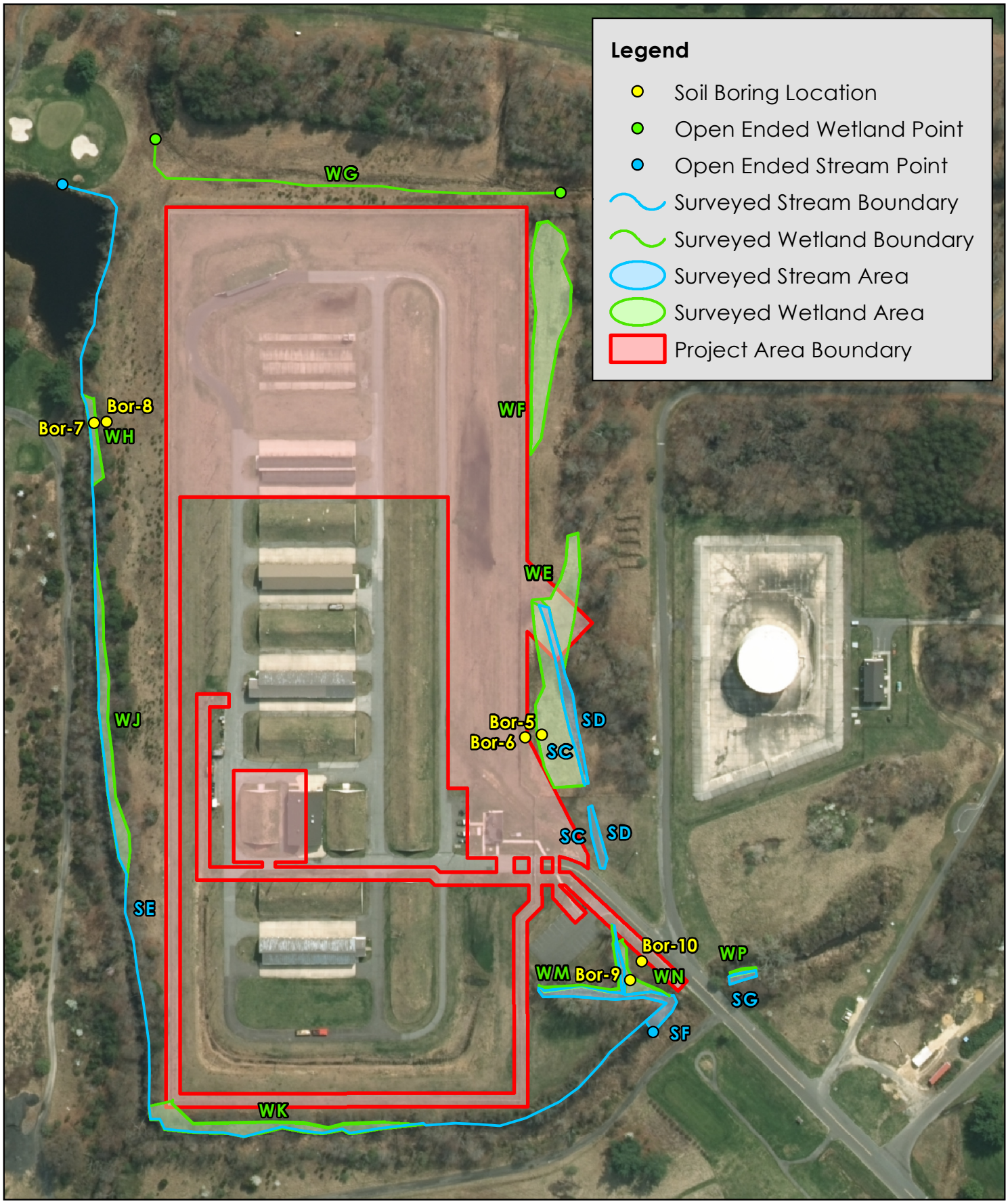
0 100 200 Feet

Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet

FIGURE 5 HCLA SURVEYED WETLANDS

JOINT BASE MCGUIRE-DIX-LAKEHURST
BURLINGTON COUNTY
NEW JERSEY

PRINCETON HYDRO
SCIENCE DESIGN ENGINEERING
www.PrincetonHydro.com



File: P:\1880\Projects\1880007\GIS\MXD\Wetland_Report\Fig6_MSA_Surveyed_Wetlands.mxd, 2/14/2021, Drawn by thopper, Copyright Princeton Hydro, LLC.

NOTES:
1. Borings and wetlands/stream delineation performed by Princeton Hydro LLC and surveyed by Rogers Surveying LLC.
2. Project area boundary provided by JBMDL, 787th Civil Engineer Squadron.
3. 2015 orthoimagery obtained from NJ Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGIS).

0 100 200 Feet

Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet

FIGURE 6 MSA
SURVEYED WETLANDS

JOINT BASE MCGUIRE-DIX-LAKEHURST
BURLINGTON COUNTY
NEW JERSEY

PRINCETON HYDRO
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Princeton Hydro delineated four wetlands and one State open water in and within 300-feet of the HCLA project area boundary. State open waters consisted of a perennial stream, identified as an un-coded tributary according to the New Jersey Department of Environmental Protection (NJDEP) GeoWeb (NJDEP, 2021), that appeared to have been hydrologically modified via channelization. The stream flowed predominately from southeast to northeast and drained off-Site via a culvert. State open waters were delineated by the SA and SB-Lines. The modified PEM wetlands were delineated by the WA, WB, WC, and WD-Lines. The modified PEM wetland vegetative community was located to the south of the existing HCLA pads proximal to the stream, and to the west of the HCLA pads. The modified PEM wetland plant community was subject to a scheduled mowing regime due to its locations proximal to active runways. The upland meadow plant community was located upslope of the modified PEM wetlands and were also maintained by mowing. The maintained lawn plant community was situated adjacent to the impervious surfaces of the existing HCLA pads within the existing fence line. This plant community was comprised of maintained turf grasses.

Munitions Storage Area

The MSA is within the northeast portion of the McGuire area of JBMDL and is bordered to the north and east by State open waters, freshwater wetlands, and a golf course; to the west by State open waters, freshwater wetlands and housing complexes; and to the south by Service Road, a maintenance road, State open waters and freshwater wetlands. The majority of the MSA consisted of a developed landscape that included impervious parking lots, roadways, and buildings contained by an existing fence line. Within the fence line, the MSA consisted of a rectangular area that was bound by maintained lawn and an earthen berm. Areas inside the existing fence line at the MSA were outside the scope of this delineation effort due to security access concerns. The area subject to the delineation possessed four distinct plant communities: palustrine scrub shrub (PSS) wetland; palustrine forested (PFO) wetland; upland forest; and maintained lawn.

Princeton Hydro delineated nine wetlands and a series of State open waters around the perimeter of the MSA project area boundary. State open waters consisted of a series of perennial streams and a pond that were all hydrologically connected via culverts. State open waters were delineated by the SC, SD, SE, SF, and SG-Lines. The PSS wetland plant community was present within wetlands delineated by the WE, WF, WG, and WM-Lines. The PFO wetland plant community was present within wetlands delineated by the WH, WJ, WK, WN, and WP-Lines. Upland forest was present upslope of the PFO wetland plant communities. Maintained lawn was identified along the fence line and earthen berm that surrounded the MSA facilities.

The Site is located within the Crosswicks Creek (above New Egypt) Watershed (Hydrologic Unit Code [HUC]-11: 02040201040). One channelized State open water was observed to the south of the HCLA area and flowed predominately from southeast to northeast, discharging to the east at a culvert. In addition, several tributaries to South Run were observed around the perimeter of the MSA. All State open waters present at the Site are classified as Pineland Waters (PL) according to NJDEP's Surface Water Quality Standards (N.J.A.C. 7:9B).

2.0 FIELD INVESTIGATIONS

2.1 WETLAND DELINEATION METHODOLOGY

The delineation of wetlands and State open waters, if present, at the Site was based on the Routine Onsite Determination Method set forth in the *Federal Manual* (FICWD 1989) with supplemental information provided by the *AGCP Regional Supplement* (Environmental Laboratory 2010). The *Federal Manual* was applied for both the collection and review of existing available background information on vegetation, soils and hydrology, and the on-Site wetland delineation. The delineation was performed by Princeton Hydro in December 2020.

Based on the "three parameter" approach, an area is defined as a wetland if it exhibits, under normal circumstances, all of the following characteristics:

1. The land supports a dominance of hydrophytic vegetation.
2. The substrate is hydric soil.
3. The soil/substrate is at least periodically saturated or inundated during a portion of the growing season.

Princeton Hydro's wetland investigation involved the establishment of representative sampling points along wetland lines and at representative locations within each plant assemblage. At each sampling point, data regarding the vegetation, soil and hydrology of the area was collected. The data collected provided the information required to determine whether the area met the definition of a wetland.

A list of plants identified on-Site are provided in Appendix I. Data collected at each sampling point pertaining to vegetation, soils and hydrology are presented in Appendix II. Representative photographs of the Site are provided in Appendix III. Official United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) descriptions of soils are provided in Appendix IV. Resumes of personnel involved in the delineation are provided in Appendix V.

2.2 VEGETATION

A hydrophyte is any plant that has the ability to grow in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content and depleted soil oxygen levels. The U.S. Fish and Wildlife Service (USFWS) prepared a list of wetland plant species for the Northeast (Region 1) (USFWS 1988 & 1996). On June 1, 2012, the 2012 National Wetland Plant List replaced the 1988 USFWS' National list of plant species that occur in wetlands (USFWS Biological Report 88 (24)). This list was developed by the U.S. Army Corps of Engineers (USACE), the USFWS, the United States Environmental Protection Agency (USEPA), and the NRCS. The 2012 list included changes in the names of species, the recognition of new species, changes in wetland regions, and changes in the wetland indicator statuses of species. The most recently updated 2018 National Wetland Plant List has been released on May 18, 2020. The plant species listed in this publication are classified based on the 2018 National Wetland Plant List and their affinity for wetlands. The wetland indicator classification assigned to each species listed is provided in **Table 1** below.

Table 1. Plant Affinity for Wetland Condition

INDICATOR CLASSIFICATION	PERCENT OCCURRENCE IN WETLANDS
Obligate (OBL)	>99
Facultative Wetland (FACW)	67-99
Facultative (FAC)	34-66
Facultative Upland (FACU)	1-33
Non-wetland (UPL)	<1

Species for which insufficient information is available for classification are listed in the USFWS list with a designation of NI (No Indicator) for regional status. This wetland indicator classification was used for plant species found at the Site. Princeton Hydro assigned a designation of NL (Not Listed) if a species was not present in the list.

To accurately describe the vegetation at each sampling point, data on each horizontal strata or layer were collected. Vegetative strata for which dominants were determined included (1) tree (≥ 5.0 inches diameter at breast height (DBH) and 20 feet or taller); (2) sapling (0.4 to < 5.0 inches DBH and 20 feet or taller); (3) shrub (usually 3 to 20 feet tall including multi-stemmed, bushy shrubs and small trees and saplings); (4) woody vine; and (5) herb (herbaceous plants including graminoids, forbs, ferns, fern allies, herbaceous vines and tree seedlings).

The dominant species was determined by making visual estimates of the herb, shrub, sapling, woody vine, and tree strata and assigned one of the following cover classes, with the midpoints of each cover class in parentheses: T < 1% (none); 1 = 1-5% (3.0); 2 = 6-15% (10.5); 3 = 16-25% (20.5); 4 = 26-50% (38.0); 5 = 51-75% (63.0); 6 = 76-95% (85.5); 7 = 96- 100% (98.0). The midpoints of each species were averaged at each sample point and ranked. The dominance threshold number was calculated and used to determine dominant species. Those species comprising 50 percent of the total cover were considered to be the dominants plus any additional species representing 20 percent or more of the total cover class midpoint values for each stratum. A USFWS wetland indicator was assigned to each species recorded. The affinity of the dominant species to wetlands was used in the determination of the wetland status of each sample point.

2.3 SOILS

Hydric soils are defined as soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part (FICWD 1989). Typically, these soils are predominately gray and mottled immediately below the "A" horizon and have thick, dark colored surface layers. At each sampling point, a detailed soil description was obtained from an auger boring. A Munsell soil color book was used to determine soil color. Each boring was taken to a depth of at least 18 inches or until refusal was met. Areas that were not wetlands, but under State jurisdiction, i.e. streams, lakes, impoundments and intermittent drainage ways, were also delineated if present.

2.4 HYDROLOGY

The identification of positive indicators of wetland hydrology included direct observation of inundation, soil saturation, or secondary characteristics indicating that the area is subject to inundation or saturation for long duration such as stained leaf litter and buttressed tree trunks. For an area to be designated as a wetland, the area must have the presence of water for a week or more during the growing season (FICWD 1989). Areas with wetland hydrology characteristics are those where the

presence of water has an overriding influence on characteristics of vegetation and soils due to anaerobic and reducing conditions, respectively.

At each sampling point positive indicators of wetland hydrology were noted whenever encountered. These indicators also include drainage patterns, drift lines, sediment deposition, watermarks, saturated soils, or inundation. Any features that could influence the hydrology of the area, such as ditches or drainage systems, were also noted.

3.0 RESULTS AND DISCUSSION

3.1 VEGETATION

3.1.1 DESKTOP REVIEW OF VEGETATION

Princeton Hydro conducted a desktop review of previous wetland delineation reporting and mapping efforts outlined within the *Final Environmental Assessment of Installation Development at Joint Base McGuire-Dix-Lakehurst, New Jersey* (Department of the Air Force, 2014). Princeton Hydro also conducted a desktop review of mapped wetlands on-Site prior to conducting the delineation using NJDEP's GeoWeb (NJDEP, 2021). NJDEP Freshwater Wetlands mapping indicated the presence of herbaceous wetlands within 300-feet of the HCLA (**Figure 7**). No wetlands were mapped around the perimeter of the MSA (**Figure 8**).

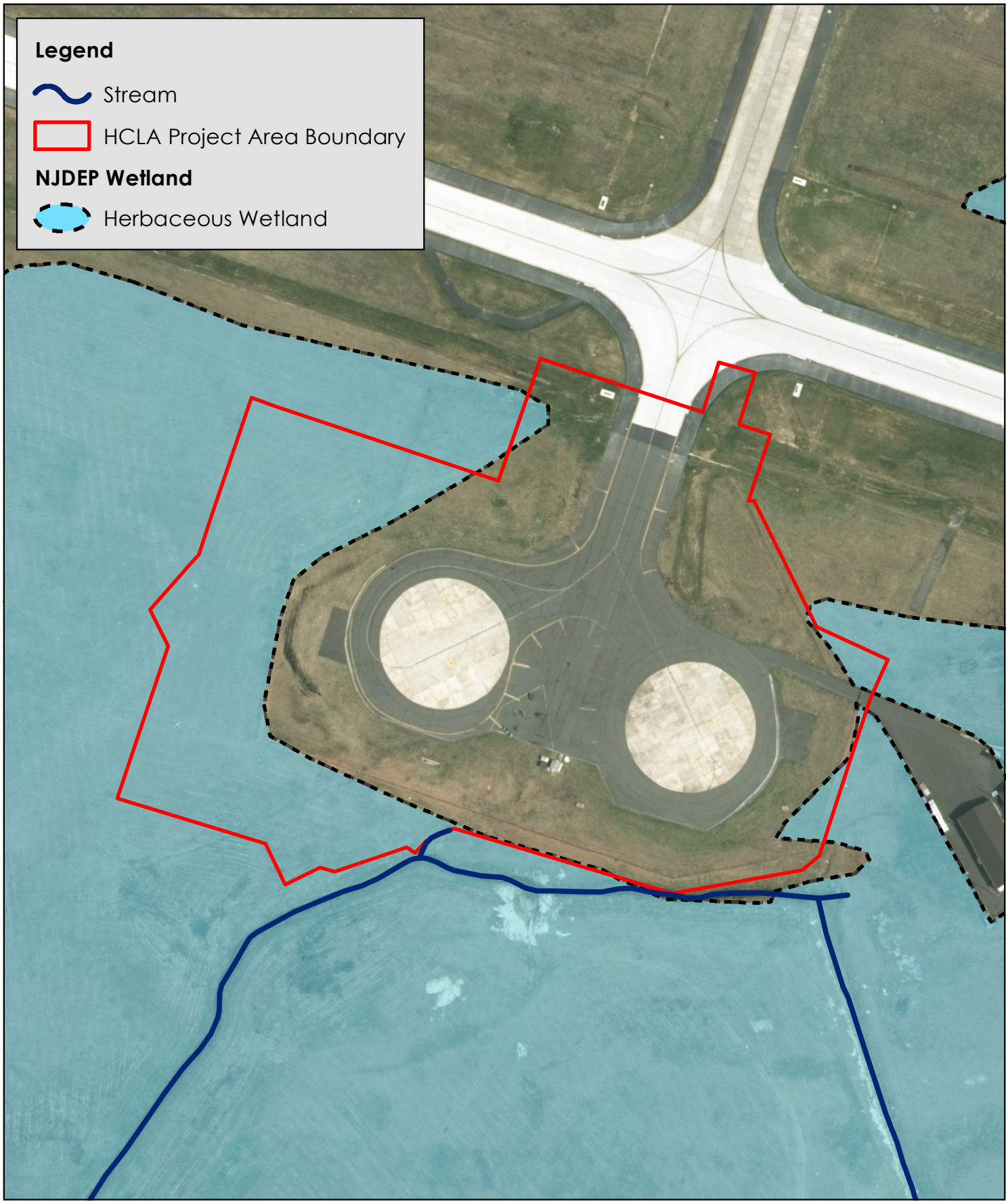
3.1.2 RESULTS OF FIELD INVESTIGATIONS OF VEGETATION

Three distinct plant communities were observed in and within 300-feet of the HCLA portion of the Site during the wetland delineation: modified PEM wetland; upland meadow; and maintained lawn. Four distinct plant communities were observed on the MSA portion of the Site: PSS wetland; PFO wetland; upland forest; and maintained lawn.

Hot Cargo Loading Area

The primary wetland plant community within the HCLA portion of the Site consisted of modified PEM wetland (see Appendix II, Bor-1). The vegetation within the modified PEM wetlands was significantly disturbed due to a mowing regime. The herbaceous layer of the PEM wetland was dominated by common rush (*Juncus effusus*, OBL) and white avens (*Geum canadense*, FAC) (Appendix III, Photo 7). Nepalese browntop (*Microstegium vimineum*, FAC), southern arrowwood (*Viburnum dentatum*, FAC), shallow sedge (*Carex lurida*, OBL), deertongue (*Dichanthelium clandestinum*, FACW), yellow foxtail (*Setaria pumila*, FAC), and reed canary grass (*Phalaris arundinacea*, OBL) were also observed, but not dominant. No other vegetative stratum was observed.

The upland meadow plant community herbaceous layer was dominated by wild garlic (*Allium vineale*, FACU), tall blue lettuce (*Lactuca biennis*, FACU), and common mullein (*Verbascum thapsus*, FACU). Allegheny blackberry (Rubus *allegheniensis*, UPL), yellow foxtail, and slender goldentop (*Euthamia caroliniana*, FAC) were also observed but not dominant. The herbaceous layer was the only stratum observed. The maintained lawn plant community was comprised of an unidentified cool season grass species within the herbaceous layer (See Appendix III, Bor-4). Both of these communities were significantly disturbed as a result of frequent mowing.



File: P:\1880\Projects\1880007\GIS\MXD\Wetland_Report\Fig7_HCLA_NJDEP_Wetland.mxd, 2/11/2021, Drawn by thopper, Copyright Princeton Hydro, LLC.

NOTES:
1. Project area boundary approximated based upon proposed features provided by JBMDL, 787th Civil Engineer Squadron.
2. Wetlands (2012 land use/land cover) and streams obtained from NJDEP GIS website: www.state.nj.us/dep/gis/
3. 2015 orthoimagery obtained from NJ Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGIS).

0 100 200 Feet

Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet

FIGURE 7 HCLA NJDEP WETLANDS MAP

JOINT BASE MCGUIRE-DIX-LAKEHURST
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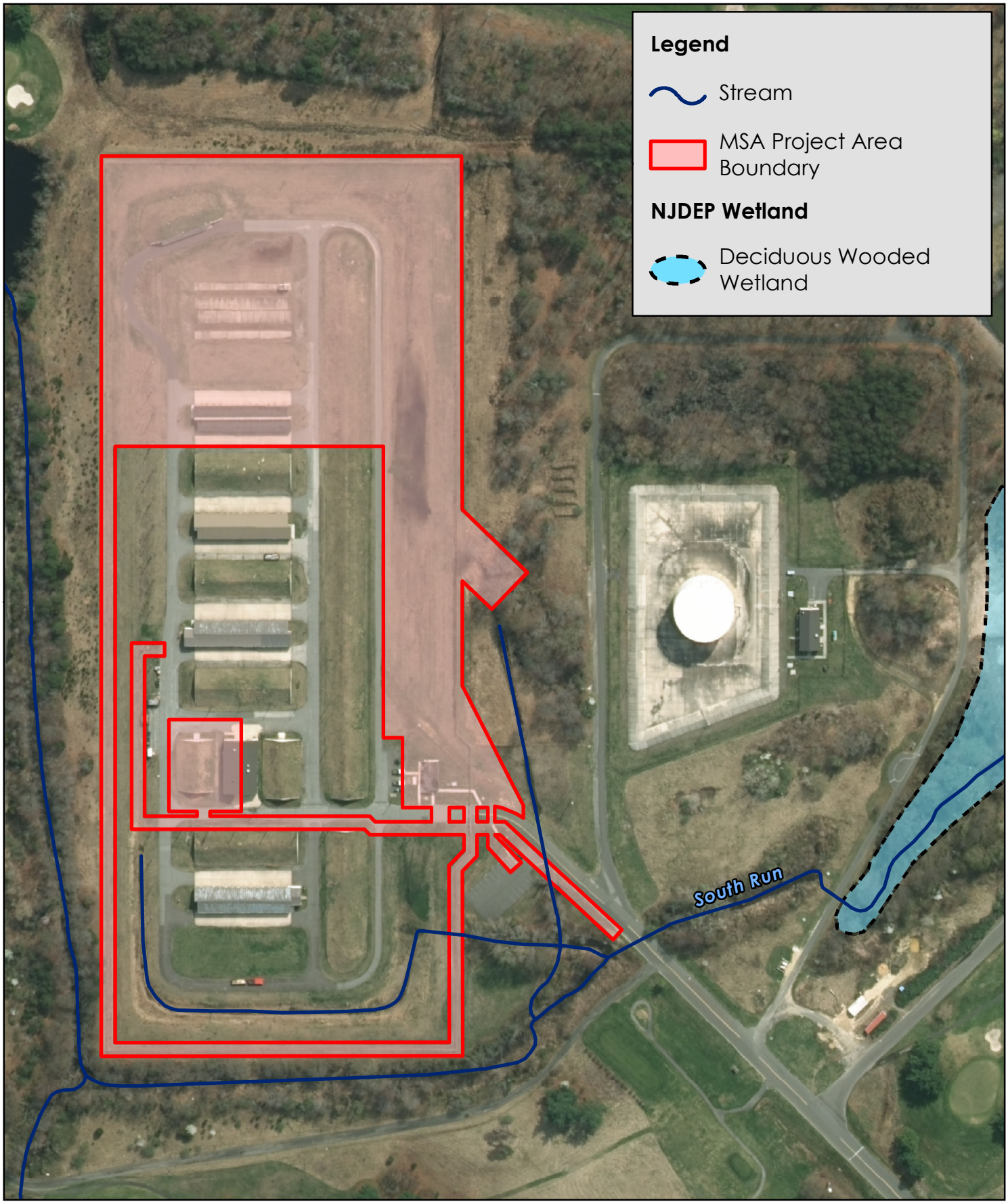

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NOTES:
1. Project area boundary provided by JBMDL, 787th Civil Engineer Squadron.
2. Wetlands (2012 land use/land cover) and streams obtained from NJDEP GIS website: www.state.nj.us/dep/gis/
3. 2015 orthoimagery obtained from NJ Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGIS).

0 100 200 Feet

Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet

FIGURE 8 MSA NJDEP WETLANDS MAP

JOINT BASE MCGUIRE-DIX-LAKEHURST
BURLINGTON COUNTY
NEW JERSEY

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Munitions Storage Area

The primary wetland plant community within the MSA portion of the Site consisted of PSS wetland (see Appendix II, Bor-5 and Bor-9). The shrub layer of the PSS wetland was dominated by sweet gum (*Liquidambar styraciflua*, FAC) saplings, southern arrowwood, and inkberry (*Ilex glabra*, FACW). The herbaceous layer was dominated by roundleaf greenbriar (*Smilax rotundifolia*, FAC), royal fern (*Osmunda regalis*, OBL), and common reed (*Phragmites australis*, FACW) (see Appendix III, Photos 15 and 21). Willow oak (*Quercus phellos*, FACW), woolgrass (*Scirpus cyperinus*, OBL), sensitive fern (*Onoclea sensibilis*, FACW), common rush, and deertongue were also observed, but not dominant.

PFO wetlands were also observed (see Appendix III, Bor-7 and Bor-9). The canopy layer of the PFO wetlands was dominated by red maple (*Acer rubrum*, FAC), sweet gum, and black willow (*Salix nigra*, OBL). The shrub layer was dominated by highbush blueberry (*Vaccinium corymbosum*, FACW), inkberry, southern arrowwood, hazel alder (*Alnus serrulata*, FACW) and sweet gum saplings. The herbaceous layer was dominated by royal fern, common reed, sensitive fern, and cinnamon fern (*Osmunda cinnamomea*, FACW). Black gum (*Nyssa sylvatica*, FAC), pin oak (*Quercus palustris*, FACW), northern bayberry (*Morella pensylvanica*, FAC), marsh seedbox (*Ludwigia palustris*, OBL), and roundleaf greenbriar were also observed, but not dominant.

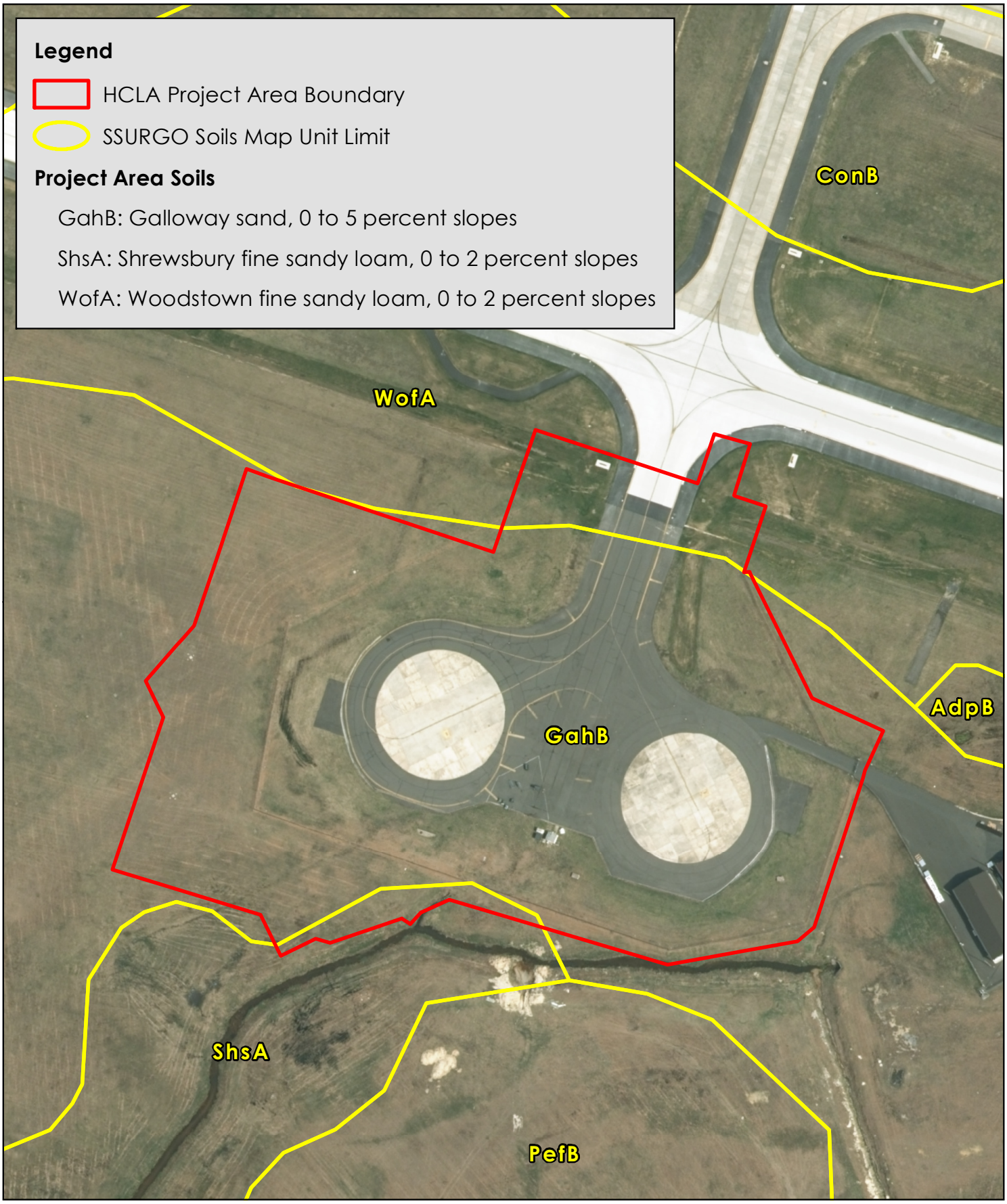
The upland forest plant community was dominated by pitch pine (*Pinus rigada*, FACU). The shrub layer was dominated by pitch pine saplings and eastern red cedar (*Juniperus virginiana,* FACU) saplings and the shrub layer was dominated by northern bayberry. The herbaceous layer was dominated by little bluestem (*Schizachyrium scoparium*, FACU), and broomsedge bluestem (*Andropogon virginicus*, FAC) (see Appendix III, Photo 20). Reindeer moss (*Cladina (Nyl.) Nyl.*, NL) and American holly (*Ilex opaca*, FAC) were observed, but not dominant. The maintained lawn plant community was comprised of an unidentified cool season grass species (see Appendix III, Photo 13).

At each wetland determination data point, vegetation was initially evaluated using the Rapid Test for Hydrophytic Vegetation. If all dominant species across all strata were OBL or FACW based on a visual assessment, vegetation was determined to be hydrophytic. If the area sampled was not dominated solely by OBL and FACW species, the standard Dominance Test was used. Using the Dominance Test, if greater than 50 percent of the dominant plant species were OBL, FACW or FAC then hydrophytic vegetation was determined to be present. The "50/20 rule" outlined in the *AGCP Regional Supplement* (Environmental Laboratory 2010) was used to select dominant species from each stratum of the community. All wetlands on-Site met these hydrophytic vegetation indicators.

3.2 SOILS

3.2.1 DESKTOP REVIEW OF SOILS

The NRCS' Web Soil Survey is the official source for current soil survey information for Burlington County, New Jersey. The NRCS' Web Soil Survey was utilized to conduct a desktop review of the soils on-Site prior to conducting the wetland delineation (NRCS, 2020). The NRCS' Web Soil Survey indicated the presence of three soil-mapping units at the HCLA portion of the Site (**Figure 9**) and five soil-mapping units at the MSA portion of the Site (**Figure 10**). A summary of these soils is provided in **Tables 2** and **3** below. Official NRCS soil descriptions are provided in the sections below and within Appendix IV.



File: P:\1880\Projects\1880007\GIS\MXD\Wetland_Report\Fig9_HCLA_SSURGO_Soils.mxd, 2/10/2021, Drawn by thopper. Copyright Princeton Hydro, LLC.

NOTES:
1. Project area boundary approximated based upon proposed features provided by JBMDL, 787th Civil Engineer Squadron.
2. SSURGO Soils obtained from NRCS, USDA, Soil Survey Geographic (SSURGO) Database for Burlington County, NJ.
3. 2015 orthoimagery obtained from NJ Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGIS).

0 100 200 Feet

Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet

FIGURE 9 HCLA SSURGO SOILS MAP

JOINT BASE MCGUIRE-DIX-LAKEHURST
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NOTES:
1. Project area boundary provided by JBMDL, 787th Civil Engineer Squadron.
2. SSURGO Soils obtained from NRCS, USDA, Soil Survey Geographic (SSURGO) Database for Burlington County, NJ.
3. 2015 orthoimagery obtained from NJ Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGIS).

0 100 200 Feet

Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet

FIGURE 10 MSA SSURGO SOILS MAP

JOINT BASE MCGUIRE-DIX-LAKEHURST
BURLINGTON COUNTY
NEW JERSEY

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Table 2. NRCS Mapped Soils at the HCLA

MAP UNIT SYMBOL	MAP UNIT NAME
GahB	Galloway sand, 0 to 5 percent slopes
ShsA	Shrewsbury fine sandy loam, 0 to 2 percent slopes
WofA	Woodstown fine sandy loam, 0 to 2 percent slopes

Table 3. NRCS Mapped Soils at the MSA

MAP UNIT SYMBOL	MAP UNIT NAME
GahB	Galloway sand, 0 to 5 percent slopes
PHG	Pits, sand, and gravel
ShsA	Shrewsbury fine sandy loam, 0 to 2 percent slopes
UdoB	Udorthents, organic substratum, 0 to 8 percent slopes
UdwB	Udorthents, wet substratum, 0 to 8 percent slopes

GALLOWAY SERIES

The Galloway series consists of very deep, moderately well-drained sand on 0 to 5 percent slopes. The surface runoff is very slow, and permeability is rapid to very rapid. The soil is formed from sandy, unconsolidated marine sediments. The Galloway series is found on nearly level to undulating marine terraces, upland flats, or shallow depressions in Coastal Plain uplands. The depth to bedrock is greater than 60 inches and depth to water table is about 18 to 42 inches. This series is predominantly non-hydric.

PITS, SAND, AND GRAVEL SERIES

The Pits, Sand, and Gravel series is composed of sandy material disturbed by human activity. This series is predominantly non-hydric.

SHREWSBURY SERIES

The Shrewsbury series consists of very deep, poorly drained fine sandy loam formed from fine-loamy marine deposits containing moderate amounts of glauconite. The surface runoff is slow or ponded with moderately slow permeability in the solum and moderately rapid or rapid in the substratum. The depth to water table is typically 0 to 12 inches. The Shrewsbury series is predominantly a hydric soil found in flats and depressions in the Atlantic Coastal Plain

UDORTHENTS, ORGANIC SUBSTRATUM SERIES

The Udorthents series consists of well-drained, loamy lateral spread deposits over organic material. Udorthents can be found in flats with 0 to 8 percent slopes. The depth to water table is typically more

than 80 inches. A typical profile is 0 to 36 inches of sand which is underlain by a 24-inch layer of muck. This series is predominantly non-hydric.

UDORTHENTS, WET SUBSTRATUM SERIES

The Udorthents series consists of moderately well-drained, loamy lateral spread deposits. Udorthents are found in flats with 0 to 8 percent slopes. The depth to water table is typically 18 to 42 inches. A typical profile is 0 to 36 inches of sand which is underlain by a 24-inch layer of muck. This series is predominantly non-hydric.

WOODSTOWN SERIES

The Woodstown series consists of very deep, moderately well-drained fine sandy loam formed from old alluvium and/or sandy marine deposits. Surface runoff is slow to medium with moderate permeability. Woodstown series can be found on upland marine terraces and old stream terraces with 0 to 2 percent slopes in the Coastal Plain region. The depth to water table can range from 18 to 42 inches. This series is predominantly non-hydric.

3.2.2 RESULTS OF FIELD INVESTIGATIONS OF SOILS

The majority of soils observed at the HCLA portion of the Site were part of the Galloway and Shrewsbury series, as reflected in the borings taken in which sandy clay and sandy loam were observed. The majority of soils observed at the MSA portion of the Site were part of the Galloway series, although portions of the MSA were consistent with the Shrewsbury; Pits, Sand, and Gravel; and Udorthents series. The depth, matrix color, redoximorphic features and texture of a subset of soil samples taken at the Site are provided in the Wetland Determination Data Forms provided in Appendix II.

Hot Cargo Loading Area

Soils that possessed indicators of anaerobic soil conditions at HCLA were observed within the modified PEM wetlands. The soils within the modified PEM wetland delineated by the WA-Line met the criteria for soil indicator F3: Depleted Matrix (*AGCP Regional Supplement*) (Environmental Laboratory 2010). A typical F3 soil profile observed consisted of a 3-inch surface layer of 80 percent black (10YR 2/1) sandy loam and 20 percent dark brown (7.5YR 3/3) redoximorphic concentrations occurring as soft masses. The subsurface layer was comprised of 13-inches of 90 percent dark gray (2.5Y 4/1) sandy loam with 10 percent dark brown (7.5YR 3/4) redoximorphic concentrations occurring as soft masses (see Appendix II, Bor-3).The soils within the modified PEM wetland delineated by the WD-Line met the criteria for hydric soil indicator F6: Redox Dark Surface (*AGCP Regional Supplement*) (Environmental Laboratory 2010). A typical F6 soil profile observed consisted of a 6-inch surface layer of 95 percent very dark grayish brown (10YR 3/2) sandy clay with 5 percent reddish brown (5YR 4/4) redoximorphic concentrations occurring as soft masses. The subsurface layer was comprised of a 4-inch layer of 60 percent dark grayish brown (10YR 4/2) sandy clay with 40 percent light yellowish brown (10YR 6/4) reduced matrix occurring as soft mosses. This layer was underlain by a 14-inch layer of 85 percent light yellowish brown (10YR 6/4) with 15 percent reddish brown (5YR 4/4) redoximorphic concentrations occurring as soft masses (see Appendix II, Bor-1).

Indicators of anaerobic soil conditions were absent in soils within the upland meadow and maintained lawn vegetative communities observed at the HCLA. Typically, soils within upland areas were characterized by a surface layer of 2-inch very dark grayish brown (10YR 3/2) silty loam underlain by an 8-inch layer of yellowish brown (10YR 5/6) sandy loam. The subsurface layer was underlain by a 4-

inch layer of yellowish brown (10YR 5/6) sandy loam that contained about 40 percent pebbles. This layer was then underlain by refusal. These soils did not possess redoximorphic features or any other indicators of anaerobic conditions and did not meet the definition of a hydric soil.

Munitions Storage Area

Soils that possessed indicators of anaerobic soil conditions at MSA were observed within the PSS and PFO wetlands. The majority of these soils met the criteria for the hydric soil indicator F6: Redox Dark Surface (*AGCP Regional Supplement*) (Environmental Laboratory 2010). The hydric soil indicator F6 was observed in the PSS wetland delineated by the WE-Line and in the PFO wetland delineated by the WN-Line. A typical F6 soil profile observed consisted of a surface layer of 4-inches of 95 percent black (10YR 2/1) clayey loam with 5 percent gray (10YR 6/1) redoximorphic features occurring as a reduced matrix. The subsurface layer was 8-inches of 80 percent gray (10YR 6/1) clayey loam with 20 percent brownish yellow (10YR 6/6) redoximorphic concentrations occurring as soft masses (see Appendix II, Bor-9).The soils within the PFO wetland delineated by the WH-Line met the criteria for the hydric soil indicator S5: Sandy Redox (*AGCP Regional Supplement*) (Environmental Laboratory 2010). A typical S5 soil profile observed consisted of a surface layer of 2-inches of 100 percent black (10YR 2/1) sandy loam underlain by a 2-inch layer of 100 percent dark grayish brown (10YR 4/2) sand. The subsurface was underlain by a 7-inch layer of 90 percent grayish brown (2.5Y 5/2) sand with 10 percent dark yellowish brown (10YR 4/6) redoximorphic concentrations occurring as pore linings. This layer was underlain by a 13-inch layer of 60 percent dark grayish brown (2.5Y 5/2) sand with 40 percent yellowish brown (10YR 5/8) redoximorphic concentrations occurring as pore linings.

Indicators of anaerobic soil conditions were absent in soils within the upland forest and maintained lawn portions. Typically, soils within these upland areas were characterized by a 6-inch surface layer of very dark grayish brown (10YR 3/2) sand underlain by 6-inches of yellowish brown (10YR 5/4) sand. The subsurface layer was underlain by a 12-inch layer of light olive brown (2Y 5/3) sand. These soils did not possess redoximorphic features or any indicators of anaerobic conditions and did not meet the definition of a hydric soil.

3.3 HYDROLOGY

3.3.1 DESKTOP REVIEW OF HYDROLOGY

Princeton Hydro conducted a desktop review of mapped waterbodies prior to conducting the wetland delineation. The Site is located within the Crosswicks Creek (above New Egypt) Watershed (HUC-11: 02040201040). According to NJDEP's GeoWeb, one channel / ditch is mapped to the south of the HCLA portion of the Site. In addition, several tributaries to South Run are mapped around the perimeter of the MSA portion of the Site. All waterbodies mapped at the Site are classified as Pineland Waters (PL) according to NJDEP's Surface Water Quality Standards (N.J.A.C. 7:9B).

3.3.2 RESULTS OF FIELD INVESTIGATIONS OF HYDROLOGY

Hot Cargo Loading Area

The channel / ditch mapped by NJDEP's GeoWeb to the south of the HCLA portion of the Site was delineated by the SA and SB-Lines and was observed flowing predominately from southeast to northeast prior to discharging off-site via a culvert. The hydrology of the maintained PEM wetland located west of the HCLA's westernmost existing pad had been significantly modified by the presence of a 14-inch culvert. The culvert drained water from the wetland to a stormwater drain that

subsequently discharges at the culvert associated with the SB-Line (see Appendix III, Photo 2). This State open water appeared to have been hydrologically modified via channelization and/or straightening.

Primary and secondary indicators of wetland hydrology were observed within wetlands at the HCLA. Specifically, the modified PEM wetland possessed four primary wetland hydrology indicators: surface water (A1), high water table (A2), saturation (A3), and algal mat or crust (B4) (see Appendix III, Photos 4 and 9). Four secondary wetland hydrology indicators were also observed: drainage patterns (B10), saturation visible on aerial imagery (C9), geomorphic position (D2), and FAC-neutral test (D5). Primary and secondary indicators of wetland hydrology were absent within the upland meadow and maintained lawn portions of the HCLA.

Munitions Storage Area

The UNTs to South Run were delineated around the perimeter of the MSA portion of the Site by the SA, SB, SC, SD, SE, SF, and SG-Lines. These tributaries were all hydrologically connected via culverts. Additionally, a portion of a pond was delineated by the SE-Line to the northeast of the MSA. The pond was hydrologically connected to the South Run tributary system (see Appendix III, Photos 11, 21, 24, 26, and 28).

Primary and secondary indicators of wetland hydrology were observed within wetlands at the MSA. Specifically, the PSS and PFO wetlands possessed four primary wetland hydrology indicators: surface water (A1), saturation (A3), water-stained leaves (B9), and the presence of reduced iron (C4). Three secondary wetland hydrology indicators were also observed: drainage patterns (B10), geomorphic position (D2) and FAC-neutral test (D5) (see Appendix III, Photo 12). Primary and secondary indicators of wetland hydrology were absent within the upland forest and maintained lawn portions of the MSA.

4.0 CONCLUSIONS

The following summarizes the results of the wetland delineation at the time of the Site visit, December 2020. All wetlands on-Site possessed hydrophytic vegetation, hydric soils, and wetland hydrology, satisfying the *Federal Manual* (FICWD 1989) and *AGCP Regional Supplement* (Environmental Laboratory 2010) for identifying wetlands and were delineated as such. All delineated State open waters are designated as Pineland Waters (PL) according to the NJDEP Surface Water Quality Standards (N.J.A.C. 7:9B).

Hot Cargo Loading Area

At the time of the Site visit (December 2020), the HCLA portion of the Site possessed three distinct plant communities: modified PEM wetland, upland meadow, and maintained lawn. Four wetlands were delineated on and within 300-feet of the HCLA portion of the Site and are identified by the WA, WB, WC, and WD-Lines (see Appendix III, Photos 4, 6, and 10). The WA, WB, and WC-Lines delineated modified PEM wetlands located proximal to State open waters delineated by the SA and SB-Lines. The WD-Line delineated a modified PEM wetland to the west of the HCLA pads that appeared to receive stormwater runoff from the adjacent impervious surfaces and drained to a culvert at the southeast corner which discharges into a State open water delineated by the SB-Line. Upland meadow and maintained lawn dominated the surrounding landscape upgradient of wetland areas. These portions of the Site did not possess any of the required three parameters to be considered a wetland. One State

open water was present and delineated by the SA and SB-Lines. This feature was flowing from northeast to southeast (see Appendix III, Photos 1, 2, and 3).

Munitions Storage Area

The MSA portion of the Site possessed four distinct plant communities: PSS wetland, PFO wetland, upland forest, and maintained lawn. Nine wetlands were delineated around the perimeter of the MSA portion of the Site and are identified by the WE, WF, WG, WH, WJ, WK, WM, WN, and WP-Lines (see Appendix III, Photos 12, 16, 19, 25, and 28). The WE, WF, and WG-Lines delineated PSS wetlands. The wetland associated with the WE -Line appeared to be hydrologically influenced by the UNT to South Run delineated by the SC and SD-Line. The WH, WJ, WK, WM, WN, and WP-Lines delineated PFO wetlands that were functioning as floodplain wetlands upgradient to the UNT to South Run delineated by the SE, SF, and SG-Lines. Upland forest and maintained lawn dominated the surrounding landscape upgradient of wetland areas. These portions of the Site did not possess any of the required three parameters to be considered a wetland. The series of UNTs to South Run were delineated by the SC, SD, SE, SF, and SG-Lines; these tributaries were all hydrologically connected via culverts.

A list of plant species identified on-Site is provided in Appendix I. Data collected at each sampling point pertaining to vegetation, soils and hydrology are presented in the Wetland Determination Data Forms in Appendix II. Representative photographs of the Site and a photo location map illustrating the location and direction of each photo taken are provided in Appendix III. Official NRCS descriptions of soils are provided in Appendix IV. Resumes of personnel involved in the delineation are provided in Appendix V. The results outlined within this report are preliminary in nature and are subject to review by the NJDEP. As a consequence, this determination should not be considered final until the NJDEP has issued a letter of interpretation for the Site.

5.0 REFERENCES

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APPENDIX I

PLANT SPECIES LIST

PLANT SPECIES LIST

The following is a list of plant species observed within the Hot Cargo Loading Area located within the McGuire area of Joint Base McGuire-Dix-Lakehurst situated in Burlington County, New Jersey. Nomenclature follows the National Wetland Plant List: 2018 wetland ratings (USACE 2018) for the Atlantic and Gulf Coast Plain.

Scientific Name	Common Name	Indicator Status
Apiaceae/Umbelliferae	**Carrot Family**	
Daucus carota	Queen Anne's lace	UPL
Asteraceae/Compositae	**Aster Family**	
Cirsium vulgare	Bull thistle	FACU
Euthamia caroliniana	Slender goldentop	FAC
Lactuca biennis	Tall blue lettuce	FACU
Solidago altissima	Canada goldenrod	FACU
Symphyotrichum lanceolatum	White panicle aster	FACW
Brassicaceae/Cruciferae	**Mustard Family**	
Alliaria petiolata	Garlic mustard	FACU
Caprifoliaceae	**Honeysuckle Family**	
Lonicera japonica	Japanese honeysuckle	FACU
Virburnum dentatum	Southern arrowwood	FAC
Clusiaceae	**Mangosteen Family**	
Hypericum gentianoides	Orangegrass	FACU
Cyperaceae	**Sedge Family**	
Carex lurida	Shallow sedge	OBL
Fabaceae/Leguminosae	**Pea Family**	
Trifolium repense	White clover	FACU
Juncaceae	**Rush Family**	
Juncus effusus	Common rush	OBL
Liliaceae	**Lily Family**	
Allium vineale	Wild garlic	FACU
Onagraceae	**Evening Primrose Family**	
Oenothera biennis	Common evening primrose	FACU

Scientific Name	Common Name	Indicator Status
Poaceae / Gramineae	**Grass Family**	
Dichanthelium clandestinum	Deertongue	FACW
Microstegium vimineum	Nepalese browntop	FAC
Phalaris arundinacea	Reed canary grass	OBL
Phragmites australis	Common reed	FACW
Setaria pumila	Yellow foxtail	FAC
Rosaceae	**Rose Family**	
Geum canadense	White avens	FAC
Rubus allegheniensis	Allegheny blackberry	UPL
Rosa multiflora	Multiflora rose	FACU
Scrophulariaceae	**Figwort Family**	
Verbascum thapsus	Common mullein	FACU
Vitaceae	**Grape Family**	
Parthenocissus quinquefolia	Virginia creeper	FACU

PLANT SPECIES LIST

The following is a list of plant species observed within the Munitions Storage Area located within the McGuire area of Joint Base McGuire-Dix-Lakehurst situated in Burlington County, New Jersey. Nomenclature follows the National Wetland Plant List: 2018 wetland ratings (USACE 2018) for the Atlantic and Gulf Coastal Plain Region.
NL = Not Listed; NA = Not Available

Scientific Name	Common Name	Indicator Status
Aceraceae	**Maple Family**	
Acer rubrum	Red maple	FAC
Apocynaceae	**Dogbane Family**	
Apocynum cannabinum	Indianhemp	FACU
Aquifoliaceae	**Holly Family**	
Ilex glabra	Inkberry	FACW
Ilex opaca	American holly	FAC
Asclepiadaceae	**Milkweed Family**	
Asclepias syriaca	Common milkweed	UPL
Asteraceae	**Aster Family**	
Solidago altissima	Canada goldenrod	FACU
Betulaceae	**Birch Family**	
Alnus serrulata	Hazel alder	FACW
Betula nigra	River birch	FACW
Caprifoliaceae	**Honeysuckle Family**	
Lonicera japonica	Japanese honeysuckle	FACU
Viburnum dentatum	Southern arrowwood	FAC
Cladoniaceae	**Lichen Family**	
Cladina (Nyl.) Nyl.	Reindeer lichen	NL
Cornaceae	**Dogwood Family**	
Nyssa sylvatica	Black gum	FAC
Cupressaceae	**Cypress Family**	
Juniperus virginiana	Eastern red cedar	FACU
Cyperaceae	**Sedge Family**	
Scirpus cyperinus	Woolgrass	OBL

Scientific Name	Common Name	Indicator Status
Dryopteridaceae	**Wood Fern Family**	
Onoclea sensiblis	Sensitive fern	FACW
Elaeagnaceae	**Oleaster Family**	
Elaeagnus umbellata	Autumn olive	NL
Ericaceae	**Heath Family**	
Vaccinium angustifolium	Lowbush blueberry	FACU
Vaccinium corymbosum	Highbush blueberry	FACW
Fagaceae	**Beech Family**	
Quercus falcata	Southern red oak	FACU
Quercus palustris	Pin oak	FACW
Quercus phellos	Willow oak	FACW
Quercus stellata	Post oak	UPL
Hamamelidaceae	**With-hazel Family**	
Liquidambar styraciflua	Sweet gum	FAC
Juncaceae	**Rush Family**	
Juncus effusus	Common rush	OBL
Juncus tenuis	Poverty rush	FAC
Myricaceae	**Bayberry Family**	
Morella pensylvanica	Northern bayberry	FAC
Oleaceae	**Olive Family**	
Ligustrum sp.	Privet	NA
Onagraceae	**Evening Primrose Family**	
Ludwigia palustris	Marsh seedbox	OBL
Osmundaceae	**Royal Fern Family**	
Osmunda cinnamomea	Cinnamon fern	FACW
Osmunda regalis	Royal fern	OBL
Pinaceae	**Pine Family**	
Pinus rigida	Pitch pine	FACU
Poaceae / Gramineae	**Grass Family**	
Andropogon virginicus	Broomsedge bluestem	FAC
Dichanthelium clandestinum	Deertongue	FACW
Panicum virgatum	Switchgrass	FAC
Phragmites australis	Common reed	FACW
Schizachyrium scoparium	Little bluestem	FACU
Setaria pumila	Yellow foxtail	FAC

Scientific Name	Common Name	Indicator Status
Rosaceae	**Rose Family**	
Geum canadense	White avens	FAC
Rosa multiflora	Multiflora rose	FACU
Rubus allegheniensis	Allegheny blackberry	UPL
Salicaceae	**Willow Family**	
Salix nigra	Black willow	OBL
Smilacaceae	**Catbrier Family**	
Smilax rotundifolia	Roundleaf greenbrier	FAC

APPENDIX II

WETLAND DETERMINATION DATA FORMS

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Joint Base McGuire-Dix-Lakehurst City/County: New Hanover/Burlington County Sampling Date: 2020 Dec 1

Applicant/Owner: U.S. Air Force State: NJ Sampling Point: Bor-1

Investigator(s): EB, RG, IB Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR or MLRA): LRR T (Outer Coastal Plain) Lat: 40.020779° Long: -74.598058° Datum: WGS 84

Soil Map Unit Name: ShsA: Shrewsbury fine sandy loam, 0 to 2 percent slopes NWI classification: Modified PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation X, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No X

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X	No _____	
Wetland Hydrology Present?	Yes X	No _____	

Remarks:

Bor-1 was taken downslope of wetland flag WA-15. Vegetation within this wetland is subjected to a prescribed mowing regime.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☑ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☑ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes _____	No X	Depth (inches): _____
Water Table Present?	Yes X	No _____	Depth (inches): 8
Saturation Present? (includes capillary fringe)	Yes X	No _____	Depth (inches): 0

Wetland Hydrology Present? Yes X No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: Bor-1

Tree Stratum (Plot size: 30-foot radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0 = Total Cover		

50% of total cover: 0 20% of total cover: 0

Sapling/Shrub Stratum (Plot size: 30-foot radius)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0 = Total Cover		

50% of total cover: 0 20% of total cover: 0

Herb Stratum (Plot size: 30-foot radius)			
1. Juncus effusus	60	Yes	OBL
2. Geum canadense	30	Yes	FAC
3. Microstegium vimineum	10	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		

50% of total cover: 50 20% of total cover: 20

Woody Vine Stratum (Plot size: 30-foot radius)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		

50% of total cover: 0 20% of total cover: 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	60	x 1 =	60
FACW species	0	x 2 =	0
FAC species	40	x 3 =	120
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		180 (B)

Prevalence Index = B/A = 1.8

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

✓ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: Bor-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/2	95	5YR 4/4	5	C	M	sandy clay	
6-10	10YR 4/2	60	10YR 6/4	40	RM	M	sandy clay	
10-24	10YR 6/4	85	5YR 4/4	15	C	M	sandy clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Joint Base McGuire-Dix-Lakehurst City/County: New Hanover/Burlington County Sampling Date: 2020 Dec 1

Applicant/Owner: U.S. Air Force State: NJ Sampling Point: Bor-2

Investigator(s): EB, RG, IB Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR or MLRA): LRR T (Outer Coastal Plain) Lat: 40.020847° Long: -74.598011° Datum: WGS 84

Soil Map Unit Name: ShsA: Shrewsbury fine sandy loam, 0 to 2 percent slopes NWI classification: upland meadow

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation X, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No X

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No X	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____	No X	
Wetland Hydrology Present?	Yes _____	No X	

Remarks:

Bor-2 was taken upslope of wetland flag WA-15. Vegetation within this area is subjected to a prescribed mowing regime.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes _____	No X	Depth (inches): _____
Water Table Present?	Yes _____	No X	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No X	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: Bor-2

Tree Stratum (Plot size: 30-foot radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Sapling/Shrub Stratum (Plot size: 30-foot radius)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Herb Stratum (Plot size: 30-foot radius)			
1. Allium vineale	40	Yes	FACU
2. Lactuca biennis	30	Yes	FACU
3. Verbascum thapsus	30	Yes	FACU
4. Rubus allegheniensis	20	No	UPL
5. Pumila setaria	15	No	FAC
6. Euthamia caroliniana	10	No	FAC
7. Dichanthelium clandestinum	5	No	FACW
8.			
9.			
10.			
11.			
12.			
	150 = Total Cover		
50% of total cover: 75	20% of total cover: 30		
Woody Vine Stratum (Plot size: 30-foot radius)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	5	x 2 =	10
FAC species	25	x 3 =	75
FACU species	100	x 4 =	400
UPL species	20	x 5 =	100
Column Totals:	150 (A)		585 (B)

Prevalence Index = B/A = 3.9

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: Bor-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 3/2	100					sandy loam	
4-12	10YR 4/3	60					sandy clay	
4-12	10YR 5/6	40					sandy clay	
12-24	10YR 4/4	100					sandy clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** X

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Joint Base McGuire-Dix-Lakehurst City/County: New Hanover/Burlington County Sampling Date: 2020 Dec 1

Applicant/Owner: U.S. Air Force State: NJ Sampling Point: Bor-3

Investigator(s): EB, RG, IB Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR or MLRA): LRR T (Outer Coastal Plain) Lat: 40.021716° Long: -74.597811° Datum: WGS 84

Soil Map Unit Name: GahB: Galloway sand, 0 to 5 percent slopes NWI classification: modified PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation X, Soil _____, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes _____ No X

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes x	No _____	
Wetland Hydrology Present?	Yes X	No _____	

Remarks:

Bor-3 was taken downslope of wetland flag WD-5. Vegetation within this wetland is subjected to a prescribed mowing regime. The hydrology of wetland WD was significantly modified due to the presence of a 14-inch culvert.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☑ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☑ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☑ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☑ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes X	No _____	Depth (inches): 1
Water Table Present?	Yes X	No _____	Depth (inches): 0
Saturation Present? (includes capillary fringe)	Yes X	No _____	Depth (inches): 0

Wetland Hydrology Present? Yes X No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

The hydrology of WD had been significantly modified by the presence of an existing 14-inch culvert. The culvert discharged water from the wetland to a stormwater drain that outlets at a culvert of a portion of the SB-Line.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: Bor-3

Tree Stratum (Plot size: 30-foot radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0 = Total Cover		

50% of total cover: 0 20% of total cover: 0

Sapling/Shrub Stratum (Plot size: 30-foot radius)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0 = Total Cover		

50% of total cover: 0 20% of total cover: 0

Herb Stratum (Plot size: 30-foot radius)			
1. Tripholium repense	50	Yes	FACU
2. Carex lurida	40	Yes	OBL
3. Phalaris arundinaceae	10	No	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		

50% of total cover: 50 20% of total cover: 20

Woody Vine Stratum (Plot size: 30-foot radius)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		

50% of total cover: 0 20% of total cover: 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species	50	x 1 =	50
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	50	x 4 =	200
UPL species	0	x 5 =	0
Column Totals:	100 (A)		250 (B)

Prevalence Index = B/A = 2.5

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

✓ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: Bor-3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 2/1	80	7.5YR 3/3	20	C	M	sandy loam	
3-16	2.5Y 4/1	90	7.5YR 3/4	10	C	M	sandy loam	
16-24	2.5Y 5/2	95	2.5Y 6/4	5	C	M	sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Joint Base McGuire-Dix-Lakehurst City/County: New Hanover/Burlington County Sampling Date: 2020 Dec 1

Applicant/Owner: U.S. Air Force State: NJ Sampling Point: Bor-4

Investigator(s): EB, RG, IB Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR or MLRA): LRR T (Outer Coastal PLain) Lat: 40.021732° Long: -74.597848° Datum: WGS 84

Soil Map Unit Name: GahB: Galloway sand, 0 to 5 percent slopes NWI classification: maintained lawn

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation X, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No X

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No X	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____	No X	
Wetland Hydrology Present?	Yes _____	No X	

Remarks:

Bor-4 was taken upslope of wetland flag WD-5. Vegetation within this area is subjected to a prescribed mowing regime.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes _____	No X	Depth (inches): _____
Water Table Present?	Yes _____	No X	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No X	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: Bor-4

Tree Stratum (Plot size: 30-foot radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0 = Total Cover		

50% of total cover: 0 20% of total cover: 0

Sapling/Shrub Stratum (Plot size: 30-foot radius)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0 = Total Cover		

50% of total cover: 0 20% of total cover: 0

Herb Stratum (Plot size: 30-foot radius)			
1. Lawn grass sp. (unidentified)	100	Yes	NI
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		

50% of total cover: 50 20% of total cover: 20

Woody Vine Stratum (Plot size: 30-foot radius)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		

50% of total cover: 0 20% of total cover: 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	0 (A)		0 (B)

Prevalence Index = B/A = 0

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

✓ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (If observed, list morphological adaptations below).

Vegetation at Bor-4 was comprised solely of an unidentified cool season grass species that was subjected to a prescribed mowing regime. All unidentified species (NI) were omitted from hydrophytic vegetation indicator tests.

SOIL

Sampling Point: Bor-4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	10 YR 3/2	100					silty loam	
2-10	10 YR 5/6	100					sandy loam	
12-16	10 YR 5/6	100					sandy loam	40% pebbles present within layer

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Rock

Depth (inches): 16

Hydric Soil Present? **Yes** _____ **No** X

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Joint Base McGuire-Dix-Lakehurst City/County: New Hanover/Burlington County Sampling Date: 2020 Dec 1

Applicant/Owner: U.S. Air Force State: NJ Sampling Point: Bor-5

Investigator(s): EB, RG, IB Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): concave Slope (%): none

Subregion (LRR or MLRA): LRR T (Outer Coastal Plain) Lat: 40.034162° Long: -74.568366° Datum: WGS 84

Soil Map Unit Name: GahB: Galloway sand, 0 to 5 percent slopes NWI classification: PSS

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X	No _____	
Wetland Hydrology Present?	Yes X	No _____	

Remarks:

Bor-5 was taken downslope of wetland flag WE-4.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☑ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☑ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☑ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes X	No _____	Depth (inches): 1
Water Table Present?	Yes X	No _____	Depth (inches): 0
Saturation Present? (includes capillary fringe)	Yes X	No _____	Depth (inches): 0

Wetland Hydrology Present? Yes X No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: Bor-5

Tree Stratum (Plot size: 30-foot radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Sapling/Shrub Stratum (Plot size: 30-foot radius)			
1. Liquidambar styraciflua	40	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	40 = Total Cover		
50% of total cover: 20	20% of total cover: 8		
Herb Stratum (Plot size: 30-foot radius)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Woody Vine Stratum (Plot size: 30-foot radius)			
1. Smilax rotundifolia	10	Yes	FAC
2.			
3.			
4.			
5.			
	10 = Total Cover		
50% of total cover: 5	20% of total cover: 2		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	50	x 3 =	150
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	50 (A)		150 (B)

Prevalence Index = B/A = 3

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

✓ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: Bor-5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-8	10 YR 3/1	95	5 YR 5/8	5	C	M	sandy loam	
8-24	10 YR 5/1	95	5 YR 6/8	5	C	M	sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Joint Base McGuire-Dix-Lakehurst City/County: New Hanover/Burlington County Sampling Date: 2020 Dec 1

Applicant/Owner: U.S. Air Force State: NJ Sampling Point: Bor-6

Investigator(s): EB, RG, IB Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR or MLRA): LRR T (Outer Coastal Plain) Lat: 40.034232° Long: -74.568381° Datum: WGS 84

Soil Map Unit Name: GahB: Galloway sand, 0 to 5 percent slopes NWI classification: maintained lawn

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation X, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No X

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No X	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____	No X	
Wetland Hydrology Present?	Yes _____	No X	

Remarks:

Bor-6 was taken upslope of wetland flag WE-4. Vegetation within this area is subjected to a prescribed mowing regime.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes _____	No X	Depth (inches): _____
Water Table Present?	Yes _____	No X	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No X	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: Bor-6

Tree Stratum (Plot size: 30-foot radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		

Sapling/Shrub Stratum (Plot size: 30-foot radius)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		

Herb Stratum (Plot size: 30-foot radius)			
1. Grass sp. (unknown)	100	Yes	NI
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
50% of total cover: 50	20% of total cover: 20		

Woody Vine Stratum (Plot size: 30-foot radius)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	0 (A)		0 (B)

Prevalence Index = B/A = 0

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

✓ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (If observed, list morphological adaptations below).

Dominant vegetation at Bor-6 was an unidentified cool season grass species that was subjected to a prescribed mowing regime. All unidentified (NI) species are omitted from hydrophytic vegetation indicator tests.

SOIL

Sampling Point: Bor-6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	10 YR 4/3	100					sandy loam	
6-14	10 YR 3/2	100					sandy loam	
14-20	10 YR 3/1	100					sandy loam	
20-24	10 YR 3/1	80	2.5 YR 4/9	20	C	M	sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** X

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Joint Base McGuire-Dix-Lakehurst City/County: New Hanover/Burlington County Sampling Date: 2020 Dec 7

Applicant/Owner: U.S. Air Force State: NJ Sampling Point: Bor-7

Investigator(s): EB, IB Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR or MLRA): LRR T (Outer Coastal Plain) Lat: 40.036055° Long: -74.566654° Datum: WGS 84

Soil Map Unit Name: GahB: Galloway sand, 0 to 5 percent slopes NWI classification: PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X	No _____	
Wetland Hydrology Present?	Yes X	No _____	

Remarks:

Bor-7 was taken downslope of wetland flag WH-2.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☑ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☑ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes X No _____ Depth (inches): 11

Wetland Hydrology Present? Yes X No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: Bor-7

Tree Stratum (Plot size: 30-foot radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer rubrum	60	Yes	FAC
2. Liquidambar styraciflua	30	Yes	FAC
3. Salix nigra	10	No	OBL
4.			
5.			
6.			
7.			
8.			
	100	= Total Cover	
50% of total cover: 50	20% of total cover: 20		
Sapling/Shrub Stratum (Plot size: 30-foot radius)			
1. Vaccinium corymbosum	50	Yes	FACW
2. Liquidambar styraciflua	20	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	70	= Total Cover	
50% of total cover: 35	20% of total cover: 14		
Herb Stratum (Plot size: 30-foot radius)			
1. Onoclea sensiblis	30	Yes	FACW
2. Osmunda cinnamomea	20	Yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	50	= Total Cover	
50% of total cover: 25	20% of total cover: 10		
Woody Vine Stratum (Plot size: 30-foot radius)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
50% of total cover: 0	20% of total cover: 0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	10	x 1 =	10
FACW species	100	x 2 =	200
FAC species	110	x 3 =	330
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	220 (A)		540 (B)

Prevalence Index = B/A = 2.5

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

✓ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: Bor-7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 2/1	100					sandy loam	
2-4	10YR 4/2	100					sand	
4-11	2.5Y 5/2	90	10YR 4/6	10	C	PL	sand	
11-24	2.5Y 5/2	60	10YR 5/8	40	C	PL	sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☑ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Joint Base McGuire-Dix-Lakehurst City/County: New Hanover/Burlington County Sampling Date: 2020 Dec 7

Applicant/Owner: U.S. Air Force State: NJ Sampling Point: Bor-8

Investigator(s): EB, IB Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): 3.0

Subregion (LRR or MLRA): LRR T (Outer Coastal Plain) Lat: 40.036002° Long: -74.566647° Datum: WGS 84

Soil Map Unit Name: GahB: Galloway sand, 0 to 5 percent slopes NWI classification: upland forest

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No X	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____	No X	
Wetland Hydrology Present?	Yes _____	No X	

Remarks:

Bor-8 was taken upslope of wetland flag WH-2.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes _____	No X	Depth (inches): _____
Water Table Present?	Yes _____	No X	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No X	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: Bor-8

Tree Stratum (Plot size: 30-foot radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Pinus rigada	30	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	30 = Total Cover		
50% of total cover: 15	20% of total cover: 6		
Sapling/Shrub Stratum (Plot size: 30-foot radius)			
1. Pinus rigada	20	Yes	FACU
2. Juniperus virginiana	20	Yes	FACU
3. Morella pensylvanica	10	Yes	FAC
4.			
5.			
6.			
7.			
8.			
	50 = Total Cover		
50% of total cover: 25	20% of total cover: 10		
Herb Stratum (Plot size: 30-foot radius)			
1. Schizachyrium scoparium	50	Yes	FACU
2. Andropogon virginicus	30	Yes	FAC
3. Cladina (Nyl.) Nyl.	5	No	NL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	85 = Total Cover		
50% of total cover: 42.5	20% of total cover: 17		
Woody Vine Stratum (Plot size: 30-foot radius)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33.3 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	40	x 3 =	120
FACU species	120	x 4 =	480
UPL species	0	x 5 =	0
Column Totals:	160 (A)		600 (B)

Prevalence Index = B/A = 3.8

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (If observed, list morphological adaptations below).

Species that are not listed (NL) in the National Wetland Plant List were omitted from hydrophytic vegetation indicator tests.

SOIL

Sampling Point: Bor-8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/2	100					sand	
6-12	10YR 5/4	100					sand	
12-24	2.5Y 5/3	100					sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** X

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Joint Base McGuire-Dix-Lakehurst City/County: New Hanover/Burlington County Sampling Date: 2020 Dec 7

Applicant/Owner: U.S. Air Force State: NJ Sampling Point: Bor-9

Investigator(s): EB, IB Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Toe of slope Local relief (concave, convex, none): none Slope (%): 3

Subregion (LRR or MLRA): LRR T (Outer Coastal Plain) Lat: 40.033831° Long: -74.569640° Datum: WGS 84

Soil Map Unit Name: UdwB: Udorthents, wet substratum, 0 to 8 percent slopes NWI classification: PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X	No _____	
Wetland Hydrology Present?	Yes X	No _____	

Remarks:

Bor-9 was taken downslope of wetland flag WN-3.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☑ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☑ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☑ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes _____	No X	Depth (inches): _____
Water Table Present?	Yes _____	No X	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes X	No _____	Depth (inches): 2

Wetland Hydrology Present? Yes X No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: Bor-9

Tree Stratum (Plot size: 30-foot radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Liquidambar styraciflua	10	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	10 = Total Cover		
50% of total cover: 5	20% of total cover: 2		
Sapling/Shrub Stratum (Plot size: 30-foot radius)			
1. Alnus serrulata	30	Yes	FACW
2. Viburnum dentatum	10	Yes	FAC
3. Ilex glabra	10	Yes	FACW
4.			
5.			
6.			
7.			
8.			
	50 = Total Cover		
50% of total cover: 25	20% of total cover: 10		
Herb Stratum (Plot size: 30-foot radius)			
1. Osmunda regalis	20	Yes	OBL
2. Phragmites australis	25	Yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	45 = Total Cover		
50% of total cover: 22.5	20% of total cover: 9		
Woody Vine Stratum (Plot size: 30-foot radius)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	20	x 1 =	20
FACW species	65	x 2 =	130
FAC species	20	x 3 =	60
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	105 (A)		210 (B)

Prevalence Index = B/A = 2.0

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

✓ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: Bor-9

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 2/1	95	10YR 6/1	5	RM	M	clayey loam	
4-12	10YR 6/1	80	10YR 6/6	20	C	M	clayey loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Rock

Depth (inches): 12

Hydric Soil Present? **Yes** X **No** ____

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Joint Base McGuire-Dix-Lakehurst City/County: New Hanover/Burlington County Sampling Date: 2020 Dec 7

Applicant/Owner: U.S. Air Force State: NJ Sampling Point: Bor-10

Investigator(s): EB, IB Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): 1

Subregion (LRR or MLRA): LRR T (Outer Coastal Plain) Lat: 40.033787° Long: -74.569624° Datum: WGS 84

Soil Map Unit Name: UdwB: Udorthents, wet substratum, 0 to 8 percent slopes NWI classification: upland forest

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No X	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____	No X	
Wetland Hydrology Present?	Yes _____	No X	

Remarks:

Bor-10 was taken upslope of wetland flag WN-3.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes _____	No X	Depth (inches): _____
Water Table Present?	Yes _____	No X	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No X	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: Bor-10

Tree Stratum (Plot size: 30-foot radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Liquidambar styraciflua	10	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	10 = Total Cover		
50% of total cover: 5	20% of total cover: 2		
Sapling/Shrub Stratum (Plot size: 30-foot radius)			
1. Elaeagnus umbellata	15	Yes	NL
2. Juniperus virginiana	10	Yes	FACU
3.			
4.			
5.			
6.			
7.			
8.			
	25 = Total Cover		
50% of total cover: 12.5	20% of total cover: 5		
Herb Stratum (Plot size: 30-foot radius)			
1. Schizachyrium scoparium	30	Yes	FACU
2. Solidago altissima	5	No	FACU
3. Panicum virgatum	5	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	40 = Total Cover		
50% of total cover: 20	20% of total cover: 8		
Woody Vine Stratum (Plot size: 30-foot radius)			
1. Rubus allegheniensis	15	Yes	UPL
2. Rosa multiflora	5	Yes	FACU
3. Lonicera japonica	5	Yes	FACU
4.			
5.			
	25 = Total Cover		
50% of total cover: 12.5	20% of total cover: 5		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 14.3 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	15	x 3 =	45
FACU species	55	x 4 =	220
UPL species	15	x 5 =	75
Column Totals:	85 (A)		340 (B)

Prevalence Index = B/A = 4.0

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (If observed, list morphological adaptations below).

Species that are not listed (NL) in the National Wetland Plant List were omitted from hydrophytic vegetation indicator tests.

SOIL

Sampling Point: Bor-10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 3/2	100					sandy loam	10% roots & organic matter
10-24	10YR 3/3	100					sandy loam	30% pebbles

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** X

Remarks:

APPENDIX III

PHOTOGRAPHIC LOG AND PHOTO LOCATION MAP

Photographic Log

Client: U.S. Air Force
Site Name: Hot Cargo Loading Area
Project Number: 1880.007
Site Location: JB MDL, Burlington County, NJ

Photograph ID: 1

Date: 1 Dec 2020

Location: 40.020701, -74.597083

Direction: Southwest

Comments: View of the unnamed tributary (UNT) delineated by the SA and SB-Lines located to the south of the Hot Cargo Loading Area (HCLA).



Photograph ID: 2

Date: 1 Dec 2020

Location: 40.020756, -74.597024

Direction: Northeast

Comments: View of the UNT delineated by the SA-Line featuring an existing culvert which drains the modified palustrine emergent (PEM) wetland delineated by the WD-Line.



Photographic Log

Client: U.S. Air Force
Site Name: Hot Cargo Loading Area
Project Number: 1880.007
Site Location: JB MDL, Burlington County NJ

Photograph ID: 3

Date: 1 Dec 2020

Location: 40.020539, -74.597458

Direction: West

Comments: Typical view of the SA and SB-Lines which delineated the UNT in the foreground, and the modified PEM wetland delineated by the WA-Line in the background.



Photograph ID: 4

Date: 1 Dec 2020

Location: 40.020564, -74.597898

Direction: South

Comments: View of the modified PEM wetland delineated by the WA-Line. The vegetation within this wetland was disturbed by mowing.



Photographic Log

Client: U.S. Air Force
Site Name: Hot Cargo Loading Area
Project Number: 1880.007
Site Location: JB MDL, Burlington County NJ

Photograph ID: 5

Date: 1 Dec 2020

Location: 40.020551, -74.596538

Direction: East

Comments: View of the modified PEM wetland delineated by the WC-Line featuring common rush (*Juncus effusus*) and reed canary grass (*Phalaris arundinacea*).



Photograph ID: 6

Date: 1 Dec 2020

Location: 40.020528, -74.596489

Direction: South

Comments: Typical view of the concave landform associated with the wetland delineated by the WC-Line.



Photographic Log

Client: U.S. Air Force
Site Name: Hot Cargo Loading Area
Project Number: 1880.007
Site Location: JB MDL, Burlington County NJ

Photograph ID: 7

Date: 1 Dec 2020

Location: 40.0199131, -74.5977257

Direction: Southeast

Comments: View looking downslope at the modified PEM wetland delineated by the WA-Line in the background.



Photograph ID: 8

Date: 7 Oct 2019

Location: 40.0199131, -74.5977257

Direction: Southwest

Comments: View of bull thistle (*Cirsium vulgare*) and saturated soils within the modified PEM wetland delineated by the WC-Line.



Photographic Log

Client: U.S. Air Force
Site Name: Hot Cargo Loading Area
Project Number: 1880.007
Site Location: JB MDL, Burlington County NJ

Photograph ID: 9

Date: 1 Dec 2020

Location: 40.021877, -74.597705

Direction: Southwest

Comments: Typical view of standing water within the modified PEM wetland delineated by the WD-Line located to the west of the HCLA pads.



Photograph ID: 10

Date: 1 Dec 2020

Location: 40.021823, -74.597824

Direction: South

Comments: Typical view of the modified PEM wetland delineated by the WD-Line.



Client: U.S. Air Force
Site Name: Munitions Storage Area
Project Number: 1880.007
Site Location: JB MDL, Burlington County NJ

Photograph ID: 11 **Date:** 1 Dec 2020 **Location:** 40.033926, -74.568804 **Direction:** West **Comments:** View of the UNT to South Run delineated by the SC and SD-Lines within the Munitions Storage Area (MSA) that drains into the palustrine scrub shrub (PSS) wetland delineated by the WE-Line to the west of Service Street.	
Photograph ID: 12 **Date:** 1 Dec 2020 **Location:** 40.034089, -74.567780 **Direction:** West **Comments:** View of the SC and SD-Lines associated with the UNT to South Run that flows through the PSS wetland delineated by the WE-Line.	

Photographic Log

Client: U.S. Air Force
Site Name: Munitions Storage Area
Project Number: 1880.007
Site Location: JB MDL, Burlington County NJ

Photograph ID: 13 **Date:** 1 Dec 2020 **Location:** 40.034244, -74.567231 **Direction:** East **Comments:** View of the earthen berm comprised of maintained lawn situated between the southern border of the MSA fence line and the PSS wetland delineated by the WE-Line.	
Photograph ID: 14 **Date:** 1 Dec 2020 **Location:** 40.0342367, -74.5674166 **Direction:** Southeast **Comments:** Typical view of the PSS wetland delineated by the WE-Line located downgradient of the maintained lawn berm along the southern border of the MSA.	

Photographic Log

Client: U.S. Air Force
Site Name: Munitions Storage Area
Project Number: 1880.007
Site Location: JB MDL, Burlington County NJ

Photograph ID: 15 **Date:** 7 Dec 2020 **Location:** 40.0341147, -74.5658116 **Direction:** North **Comments:** View of sweet gum (*Liquidambar styraciflua*) saplings within the PSS wetland delineated by the WF-Line.	
Photograph ID: 16 **Date:** 7 Dec 2020 **Location:** 40.0343819, -74.5652761 **Direction:** Northeast **Comments:** Typical view of the PSS wetland delineated by the WG-Line dominated by sweet gum saplings. The pitch pine (*Pinus rigada*) in the background is upgradient of the wetland.	

Photographic Log

Client: U.S. Air Force
Site Name: Munitions Storage Area
Project Number: 1880.007
Site Location: JB MDL, Burlington County NJ

Photograph ID: 17 **Date:** 7 Dec 2020 **Location:** 40.0355862, -74.5651504 **Direction:** Southwest **Comments:** View of standing water at the northernmost portion of the PSS wetland delineated by the WG-Line.	
Photograph ID: 18 **Date:** 7 Dec 2020 **Location:** 40.0361017, -74.5658694 **Direction:** Northeast **Comments:** View of the pond delineated by the SE-Line located adjacent to the golf course that is off-Site.	

Photographic Log

Client: U.S. Air Force
Site Name: Munitions Storage Area (MSA)
Project Number: 1880.007
Site Location: JB MDL, Burlington County NJ

Photograph ID: 19 **Date:** 7 Dec 2020 **Location:** 40.0359756, -74.5674087 **Direction:** West **Comments:** View of the palustrine forested (PFO) wetland delineated by the WH-Line dominated by red maple (*Acer rubrum*) trees and sweet gum saplings.	
Photograph ID: 20 **Date:** 7 Dec 2020 **Location:** 40.0359756, -74.5674087 **Direction:** West **Comments:** View of the upland forest upslope of the WH wetland dominated by little bluestem (*Schizachyrium scoparium*) and pitch pine.	

Photographic Log

Client: U.S. Air Force
Site Name: Munitions Storage Area
Project Number: 1880.007
Site Location: JB MDL, Burlington County NJ

Photograph ID: 21

Date: 7 Dec 2020

Location: 40.036047, -74.567740

Direction: East

Comments: View of the UNT to South Run delineated by the SE-Line to the north of the MSA. The banks of the UNT were dominated by northern bayberry (*Morella pensylvanica*) and river birch (*Betula nigra*).



Photograph ID: 22

Date: 7 Dec 2020

Location: 40.0358636

Direction: West

Comments: View of the PFO wetland delineated by the WH-Line located adjacent to the UNT to South Run delineated by the SE-Line.



Photographic Log

Client: U.S. Air Force
Site Name: Munitions Storage Area
Project Number: 1880.007
Site Location: JB MDL, Burlington County NJ

Photograph ID: 23 **Date:** 7 Dec 2020 **Location:** 40.0349248, -74.5703397 **Direction:** South **Comments:** View of the PSS wetland delineated by the WK-Line that was dominated by inkberry (*Ilex glabra*) and hazel alder (*Alnus serrulata*) saplings.	
Photograph ID: 24 **Date:** 7 Dec 2020 **Location:** 40.0347897, -74.5702721 **Direction:** South **Comments:** View of the UNT to South Run delineated by the SE-Line along the western border of the MSA.	

Photographic Log

Client: U.S. Air Force
Site Name: Munitions Storage Area
Project Number: 1880.007
Site Location: JB MDL, Burlington County NJ

Photograph ID: 25 **Date:** 7 Dec 2020 **Location:** 40.033924, -74.569774 **Direction:** North **Comments:** View of the PSS wetland delineated by the WM-Line and the UNT to South Run delineated by the SF-Line in the southwestern portion of the MSA.	
Photograph ID: 26 **Date:** 7 Dec 2020 **Location:** 40.0336968, -74.56977 **Direction:** Southeast **Comments:** View of the culvert that connects the UNT to South Run delineated by the SF-Line to the UNT to South Run delineated by the SG-Line across Service Road.	

Photographic Log

Client: U.S. Air Force
Site Name: Munitions Storage Area
Project Number: 1880.007
Site Location: JB MDL, Burlington County NJ

Photograph ID: 27 **Date:** 7 Dec 2020 **Location:** 40.033815, -74.569632 **Direction:** East **Comments:** View of maintained lawn and upland forest dominated by sweet gum and little bluestem to the south of the MSA.	
Photograph ID: 28 **Date:** 7 Dec 2020 **Location:** 40.0333811 -74.5696056 **Direction:** Northwest **Comments:** View of the UNT to South Run delineated by the SG-Line and its fringe PEM/PSS wetland located to the east of Service Road. This UNT segment is hydrologically connected to another UNT identified by the SF-Line via the culvert.	



File: P:\1880\Projects\1880007\GIS\MXD\Wetland_Report\Fig11_HCLA_Photo_Location.mxd, 2/10/2021, Drawn by thopper. Copyright Princeton Hydro, LLC.

NOTES:
1. Project area boundary approximated based upon proposed features provided by JBMDL, 787th Civil Engineer Squadron.
2. Photo locations are approximate.
3. Streams obtained from NJDEP GIS website: www.state.nj.us/dep/gis/
4. 2015 orthoimagery obtained from NJ Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGIS).

0 80 160 Feet

Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet

FIGURE 11 HCLA PHOTO LOCATIONS

JOINT BASE MCGUIRE-DIX-LAKEHURST
BURLINGTON COUNTY
NEW JERSEY

PRINCETON HYDRO
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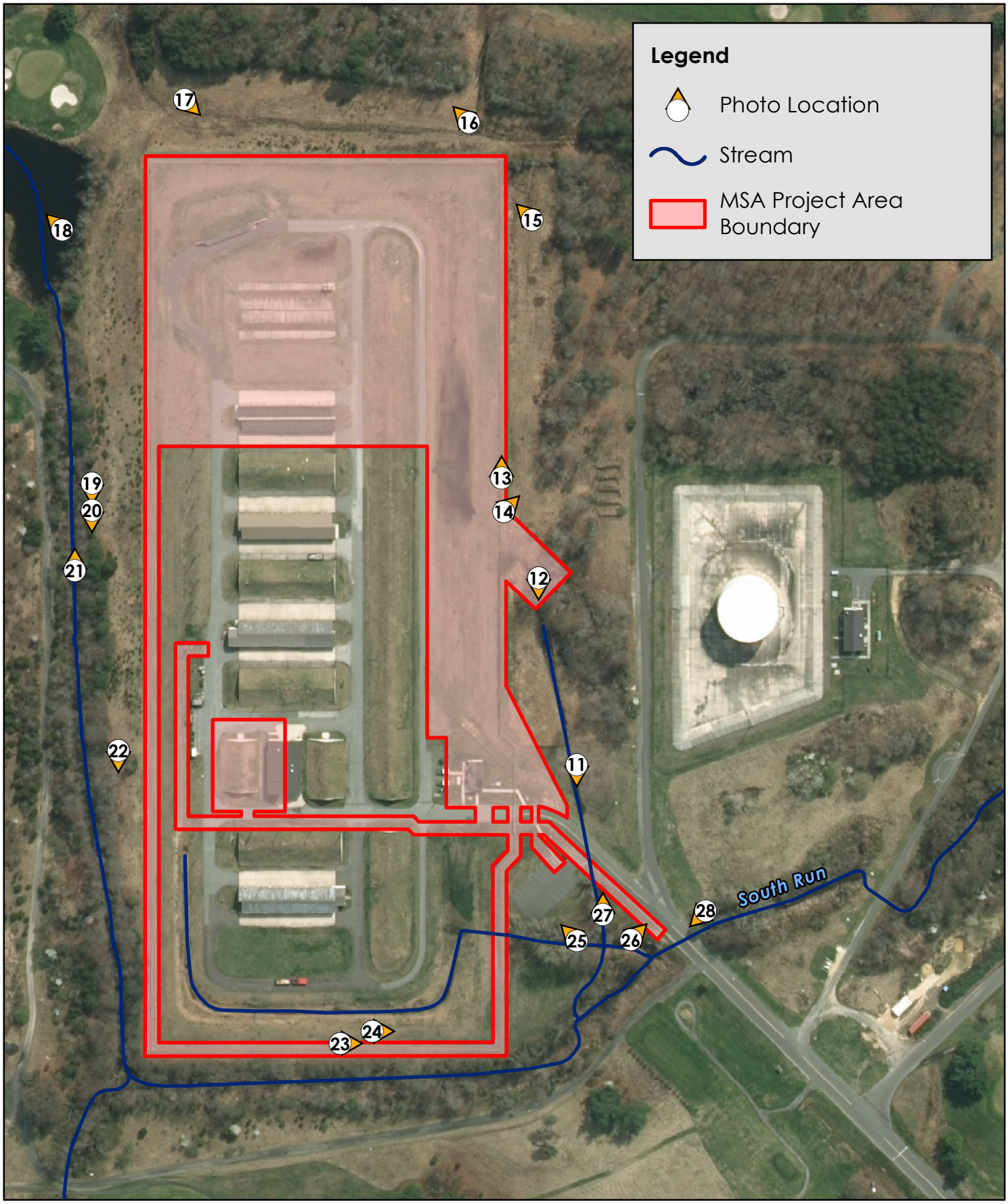

File: P:\1880\Projects\1880007\GIS\MXD\Wetland_Report\Fig12_MSA_Photo_Location.mxd, 2/19/2021, Drawn by jquispe. Copyright Princeton Hydro, LLC.

NOTES:
1. Project area boundary provided by JBMDL, 787th Civil Engineer Squadron.
2. Photo locations are approximate.
3. Streams obtained from NJDEP GIS website: www.state.nj.us/dep/gis/
4. 2015 orthoimagery obtained from NJ Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGIS).

0 100 200 Feet

Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet

FIGURE 12 MSA PHOTO LOCATIONS

JOINT BASE MCGUIRE-DIX-LAKEHURST
BURLINGTON COUNTY
NEW JERSEY

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APPENDIX IV

OFFICIAL SOIL DESCRIPTIONS

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Burlington County, New Jersey



December 21, 2020

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

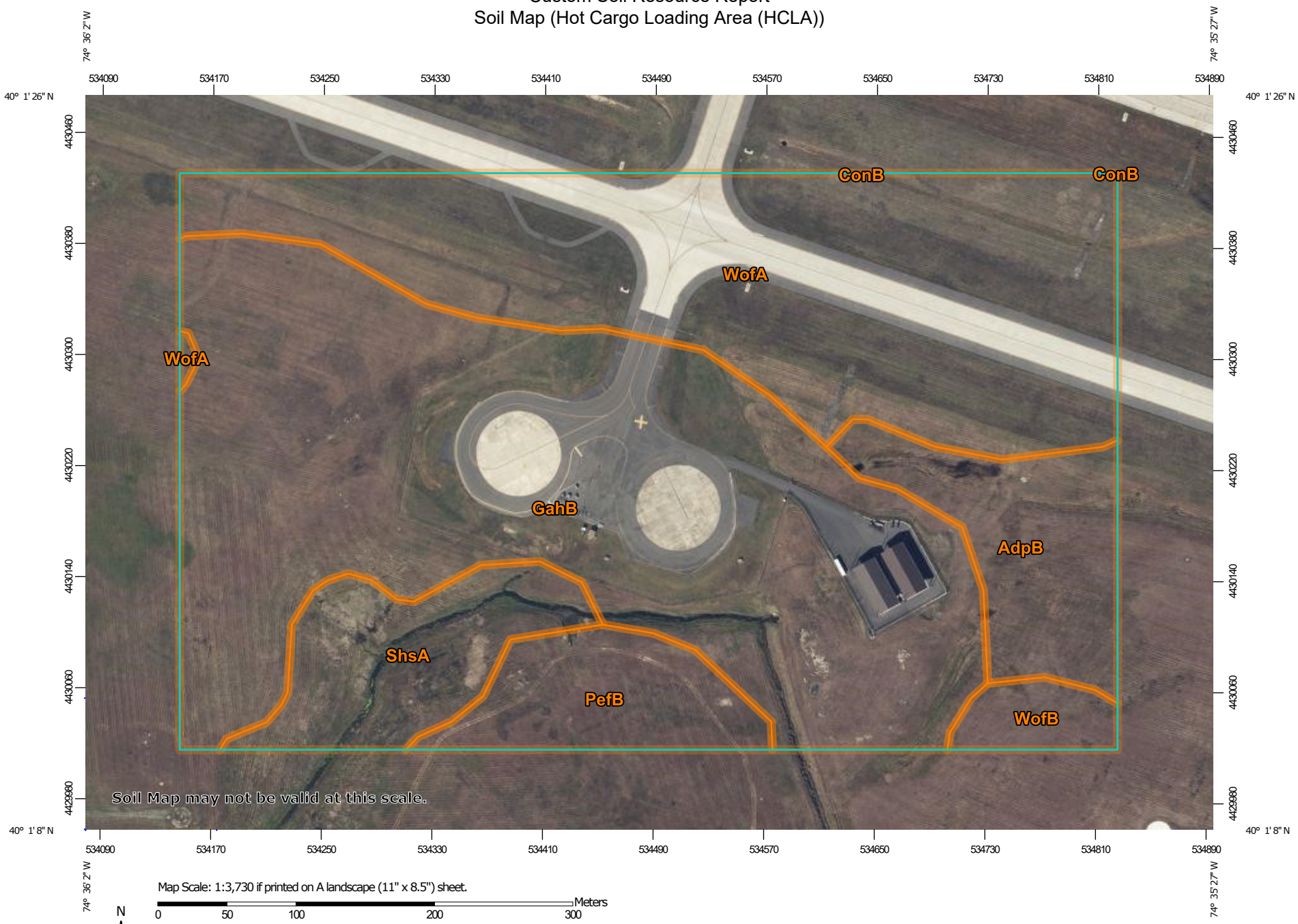
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map (Hot Cargo Loading Area (HCLA))



Map Scale: 1:3,730 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 50 100 200 300

Feet
0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Burlington County, New Jersey
Survey Area Data: Version 16, Jun 1, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Data not available.

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend (Hot Cargo Loading Area (HCLA))

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AdpB	Adelphia-Urban land complex, 0 to 5 percent slopes	5.3	7.5%
ConB	Collington loam, 2 to 5 percent slopes	0.0	0.0%
GahB	Galloway sand, 0 to 5 percent slopes	32.4	46.3%
PefB	Pemberton sand, 0 to 5 percent slopes	4.0	5.7%
ShsA	Shrewsbury fine sandy loam, 0 to 2 percent slopes	5.1	7.2%
WofA	Woodstown fine sandy loam, 0 to 2 percent slopes	21.9	31.4%
WofB	Woodstown fine sandy loam, 2 to 5 percent slopes	1.3	1.9%
Totals for Area of Interest		**69.9**	**100.0%**

Map Unit Descriptions (Hot Cargo Loading Area (HCLA))

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the

scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Burlington County, New Jersey

AdpB—Adelphia-Urban land complex, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: rdyg
Elevation: 0 to 180 feet
Mean annual precipitation: 28 to 59 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 161 to 231 days
Farmland classification: Not prime farmland

Map Unit Composition

Adelphia and similar soils: 55 percent
Urban land: 30 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Adelphia

Setting

Landform: Low hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Glauconite bearing eolian deposits and/or glauconite bearing fluviomarine deposits

Typical profile

A - 0 to 8 inches: loam
Bt1 - 8 to 22 inches: sandy clay loam
Bt2 - 22 to 31 inches: sandy clay loam
BC - 31 to 38 inches: sandy loam
C - 38 to 60 inches: stratified loamy sand to sandy loam

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: About 18 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 8.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C
Hydric soil rating: No

Description of Urban Land

Setting

Landform: Low hills
Down-slope shape: Linear
Across-slope shape: Linear, convex
Parent material: Surface covered by pavement, concrete, buildings, and other structures underlain by disturbed and natural soil material

Typical profile

C - 0 to 60 inches: variable

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: Unranked

Minor Components

Shrewsbury

Percent of map unit: 5 percent
Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Udorthents, stratified substratum

Percent of map unit: 5 percent
Landform: Low hills
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Collington

Percent of map unit: 5 percent
Landform: Low hills
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

ConB—Collington loam, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2thvn
Elevation: 50 to 70 feet
Mean annual precipitation: 42 to 50 inches
Mean annual air temperature: 50 to 57 degrees F
Frost-free period: 190 to 250 days

Farmland classification: All areas are prime farmland

Map Unit Composition

Collington and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Collington

Setting

Landform: Flats, fluviomarine terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Rise
Down-slope shape: Linear, convex
Across-slope shape: Linear
Parent material: Glauconite bearing loamy fluviomarine deposits

Typical profile

Ap - 0 to 9 inches: loam
Bt1 - 9 to 19 inches: loam
Bt2 - 19 to 31 inches: loam
BC - 31 to 38 inches: sandy loam
C - 38 to 80 inches: sandy loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water capacity: Moderate (about 7.6 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Shrewsbury, undrained

Percent of map unit: 4 percent
Landform: Flats
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Reybold

Percent of map unit: 4 percent
Landform: Flats, fluviomarine terraces

Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Rise
Down-slope shape: Linear, convex
Across-slope shape: Linear
Hydric soil rating: No

Tinton

Percent of map unit: 4 percent
Landform: Flats, fluviomarine terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread, rise
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Adelphia

Percent of map unit: 4 percent
Landform: Flats
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Freehold

Percent of map unit: 4 percent
Landform: Fluviomarine terraces, flats
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

GahB—Galloway sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: rf1t
Elevation: 0 to 160 feet
Mean annual precipitation: 28 to 59 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 161 to 231 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Galloway and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Galloway

Setting

Landform: Dunes
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Unconsolidated sandy marine deposits

Typical profile

Ap - 0 to 10 inches: sand
AC - 10 to 20 inches: sand
C1 - 20 to 32 inches: sand
C2 - 32 to 60 inches: sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: About 18 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 4.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Atsion

Percent of map unit: 5 percent
Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Lakehurst

Percent of map unit: 5 percent
Landform: Flats, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Hydric soil rating: No

Lakewood

Percent of map unit: 5 percent
Landform: Flats, knolls
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear, convex

Across-slope shape: Linear
Hydric soil rating: No

PefB—Pemberton sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: rf54
Elevation: 0 to 200 feet
Mean annual precipitation: 28 to 59 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 161 to 231 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Pemberton and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pemberton

Setting

Landform: Low hills, flats
Down-slope shape: Convex, linear
Across-slope shape: Linear
Parent material: Eolian sands over old alluvium and/or glauconitic bearing marine deposits

Typical profile

Ap - 0 to 10 inches: sand
E - 10 to 24 inches: sand
Bt - 24 to 34 inches: fine sandy loam
C - 34 to 60 inches: stratified sand to sandy loam

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: About 12 to 48 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 6.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Holmdel

Percent of map unit: 5 percent
Landform: Flats
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Freehold

Percent of map unit: 5 percent
Landform: Low hills, knolls
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Tinton

Percent of map unit: 5 percent
Landform: Knolls
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

ShsA—Shrewsbury fine sandy loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: rf60
Elevation: 0 to 200 feet
Mean annual precipitation: 28 to 59 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 161 to 231 days
Farmland classification: Farmland of statewide importance, if drained

Map Unit Composition

Shrewsbury and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Shrewsbury

Setting

Landform: Flats
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Fine-loamy marine deposits containing moderate amounts of glauconite

Typical profile

Ap - 0 to 10 inches: fine sandy loam

E - 10 to 14 inches: fine sandy loam
Btg1 - 14 to 24 inches: sandy clay loam
Btg2 - 24 to 32 inches: sandy clay loam
C - 32 to 60 inches: stratified loamy sand to sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 8.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B/D
Hydric soil rating: Yes

Minor Components

Holmdel

Percent of map unit: 5 percent
Landform: Flats
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Keansburg

Percent of map unit: 5 percent
Landform: Flats, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Hydric soil rating: Yes

Adelphia

Percent of map unit: 5 percent
Landform: Interfluves
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

WofA—Woodstown fine sandy loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: rf81
Elevation: 10 to 330 feet
Mean annual precipitation: 28 to 59 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 161 to 231 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Woodstown and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Woodstown

Setting

Landform: Flats
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Old alluvium and/or sandy marine deposits

Typical profile

Ap - 0 to 10 inches: fine sandy loam
E - 10 to 14 inches: fine sandy loam
BA - 14 to 24 inches: sandy clay loam
Bt - 24 to 34 inches: sandy clay loam
C - 34 to 60 inches: loamy sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 6.00 in/hr)
Depth to water table: About 18 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 6.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Sassafras

Percent of map unit: 5 percent
Landform: Knolls, hills
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Fallsington

Percent of map unit: 5 percent
Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

WofB—Woodstown fine sandy loam, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: rf82
Elevation: 10 to 330 feet
Mean annual precipitation: 28 to 59 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 161 to 231 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Woodstown and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Woodstown

Setting

Landform: Flats
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Old alluvium and/or sandy marine deposits

Typical profile

Ap - 0 to 10 inches: fine sandy loam
E - 10 to 14 inches: fine sandy loam
BA - 14 to 24 inches: fine sandy loam
Bt - 24 to 34 inches: fine sandy loam
C - 34 to 60 inches: stratified sand to loamy sand

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 6.00 in/hr)
Depth to water table: About 18 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 6.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Freehold

Percent of map unit: 5 percent
Landform: Flats, low hills
Landform position (two-dimensional): Summit
Down-slope shape: Linear, convex
Across-slope shape: Linear
Hydric soil rating: No

Sassafras

Percent of map unit: 5 percent
Landform: Knolls, hills
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

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United States Department of Agriculture

NRCS

Natural Resources Conservation Service

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Custom Soil Resource Report for Burlington County, New Jersey



December 21, 2020

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map (Munitions Storage Area (MSA))



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Burlington County, New Jersey
Survey Area Data: Version 16, Jun 1, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 14, 2015—Apr 2, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend (Munitions Storage Area (MSA))

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
GahB	Galloway sand, 0 to 5 percent slopes	27.2	43.1%
PefB	Pemberton sand, 0 to 5 percent slopes	0.5	0.7%
PHG	Pits, sand and gravel	18.5	29.3%
ShsA	Shrewsbury fine sandy loam, 0 to 2 percent slopes	8.4	13.3%
UdoB	Udorthents, organic substratum, 0 to 8 percent slopes	1.8	2.9%
UdwB	Udorthents, wet substratum, 0 to 8 percent slopes	6.8	10.8%
Totals for Area of Interest		**63.1**	**100.0%**

Map Unit Descriptions (Munitions Storage Area (MSA))

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit

descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Burlington County, New Jersey

GahB—Galloway sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: rf1t
Elevation: 0 to 160 feet
Mean annual precipitation: 28 to 59 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 161 to 231 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Galloway and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Galloway

Setting

Landform: Dunes
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Unconsolidated sandy marine deposits

Typical profile

Ap - 0 to 10 inches: sand
AC - 10 to 20 inches: sand
C1 - 20 to 32 inches: sand
C2 - 32 to 60 inches: sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: About 18 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 4.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Atsion

Percent of map unit: 5 percent
Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope

Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Lakehurst

Percent of map unit: 5 percent
Landform: Flats, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Hydric soil rating: No

Lakewood

Percent of map unit: 5 percent
Landform: Flats, knolls
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear, convex
Across-slope shape: Linear
Hydric soil rating: No

PefB—Pemberton sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: rf54
Elevation: 0 to 200 feet
Mean annual precipitation: 28 to 59 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 161 to 231 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Pemberton and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pemberton

Setting

Landform: Low hills, flats
Down-slope shape: Convex, linear
Across-slope shape: Linear
Parent material: Eolian sands over old alluvium and/or glauconitic bearing marine deposits

Typical profile

Ap - 0 to 10 inches: sand
E - 10 to 24 inches: sand
Bt - 24 to 34 inches: fine sandy loam
C - 34 to 60 inches: stratified sand to sandy loam

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: About 12 to 48 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 6.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Holmdel

Percent of map unit: 5 percent
Landform: Flats
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Freehold

Percent of map unit: 5 percent
Landform: Low hills, knolls
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Tinton

Percent of map unit: 5 percent
Landform: Knolls
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

PHG—Pits, sand and gravel

Map Unit Setting

National map unit symbol: rf57
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 131 to 178 days
Farmland classification: Not prime farmland

Map Unit Composition

Pits, sand and gravel: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pits, Sand And Gravel

Setting

Parent material: Sandy material disturbed by human activity

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

ShsA—Shrewsbury fine sandy loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: rf60
Elevation: 0 to 200 feet
Mean annual precipitation: 28 to 59 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 161 to 231 days
Farmland classification: Farmland of statewide importance, if drained

Map Unit Composition

Shrewsbury and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Shrewsbury

Setting

Landform: Flats
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Fine-loamy marine deposits containing moderate amounts of glauconite

Typical profile

Ap - 0 to 10 inches: fine sandy loam
E - 10 to 14 inches: fine sandy loam
Btg1 - 14 to 24 inches: sandy clay loam
Btg2 - 24 to 32 inches: sandy clay loam
C - 32 to 60 inches: stratified loamy sand to sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)

Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 8.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B/D
Hydric soil rating: Yes

Minor Components

Holmdel

Percent of map unit: 5 percent
Landform: Flats
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Keansburg

Percent of map unit: 5 percent
Landform: Flats, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Hydric soil rating: Yes

Adelphia

Percent of map unit: 5 percent
Landform: Interfluves
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

UdoB—Udorthents, organic substratum, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: v3tf
Elevation: 0 to 130 feet
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 131 to 178 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents, organic substratum, and similar soils: 90 percent
Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents, Organic Substratum

Setting

Landform: Flats
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy lateral spread deposits over organic material

Typical profile

A - 0 to 36 inches: sand
2O - 36 to 60 inches: muck

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Urban land

Percent of map unit: 5 percent
Landform: Tidal marshes
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Unranked

Pawcatuck, very frequently flooded

Percent of map unit: 5 percent
Landform: Tidal marshes
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

UdwB—Udorthents, wet substratum, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: v3t8
Elevation: 0 to 790 feet

Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 131 to 178 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents, wet substratum, and similar soils: 98 percent
Minor components: 2 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents, Wet Substratum

Setting

Landform: Flats
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy lateral spread deposits

Typical profile

A - 0 to 36 inches: sand
2O - 36 to 60 inches: muck

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 18 to 42 inches
Frequency of flooding: None
Frequency of ponding: None

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Pawcatuck, very frequently flooded

Percent of map unit: 1 percent
Landform: Tidal marshes
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Transquaking, very frequently flooded

Percent of map unit: 1 percent
Landform: Tidal marshes
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

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APPENDIX V

RESUMES OF PRINCIPAL PREPARERS

Emily Bjorhus, PWS

Project Manager, Natural Resources; Environmental Scientist

Princeton Hydro

Education:

- M.S. Sustainable Engineering, Villanova University, 2017
- B.S. Environmental Science, University of Colorado, Boulder, 2011

Professional Certifications:

- Professional Wetland Scientist
- OSHA 40-Hour HAZWOPER

Professional Trainings:

- 2016: Restoration Ecology: Using Mitigation and Sustainable Design Techniques to Reduce Stormwater Impacts and Increase Storm Resiliency, Rutgers University
- 2015: Methodology for Delineating Wetlands, Rutgers University
- 2015: Vegetation Identification for Wetland Delineations, Rutgers University
- 2015: New Jersey Freshwater Wetlands Protection Act Rules, Rutgers University
- 2015: FERC Section 106 and Tribal Consultation Workshop
- 2015: FERC Environmental Review and Compliance for Natural Gas Facilities Seminar

Areas of Expertise

Regulatory Compliance

- NEPA
- USACE
- PADEP
- NJDEP
- NYDEC
- FERC
- County/Municipal

Ecological Surveys

- Wetland Delineations
- Stream Assessments
- Threatened/Endangered Species
- Avian Surveys
- Flora/Fauna Inventories

Wetland and Stream Mitigation

- Design and Implementation
- Monitoring
- Adaptive Management Plans

Summary of Qualifications:

Mrs. Bjorhus has over six years of experience in regulatory compliance and ecological services. She has supported business development efforts and management of several large-scale projects across various industries. In these roles she leads federal, state, and local environmental permitting processes; National Environmental Policy Act (NEPA) compliance and documentation, Endangered Species Act Section 7 consultations, and Clean Water Act Section 404(b)1 analyses. She regularly conducts biological and ecological investigations and inspections involving complex land and water resource development actions. She serves as the lead ecologist for the evaluation, planning, implementation, and monitoring of wetland mitigation projects; habitat assessments; threatened and endangered species investigations; and flora and fauna inventories. She is responsible for authoring intricate environmental resource inventories, including environmental impact statements and environmental assessments.

Select Project Experience:

New Entry Control Point for Commercial Vehicle Security, Joint Base McGuire-Dix-Lakehurst, NJ (present) – The U.S. Air Force has identified a need to construct and operate a new entry control point for commercial vehicles at the Lakehurst area of Joint Base McGuire-Dix-Lakehurst. Mrs. Bjorhus is responsible for NEPA compliance, Section 106 of the National Historic Preservation Act and Section 7 of Endangered Species Act consultations, stakeholder engagement, subconsultant coordination, and client management.

Green Brook Flood Risk Management Project, Segments C-3 and C-4, Middlesex County, NJ (present) – The NJDEP and USACE are constructing the Green Brook Flood Risk Management project to reduce flood hazards and associated urban flood damages along Bound Brook and Green Brook. Ms. Bjorhus is the lead regulatory specialist for Segments C-3 and C-4 of this project. She is responsible for navigating and attaining federal, state and county permit approvals, coordinating with regulatory agencies to achieve consistency with other segment designs, and threatened and endangered species consultations.

Carversville Farm Foundation Stream and Floodplain Restoration, Bucks County, PA (present) – This project aims to reduce sediment inputs and associated nonpoint source pollutants that facilitate eutrophication within Paunnacussing Creek in support of the stream's High-Quality, Cold water Fishery water use designation. Mrs. Bjorhus is the lead wetland scientist and regulatory specialist responsible for attaining federal and state permit waivers, and county and local permits. In these roles, she authored an environmental assessment, wetland determination report, and stream mitigation and monitoring plan, and navigated Section 106 cultural resource consultations to reach a

no potential affect determination.

Crestron Compensatory Wetland and Riparian Zone Mitigation Project, Bergen County, NJ (present) – Mrs. Bjorhus' management of this wetland and riparian zone mitigation project resulted in the site successfully satisfying NJDEP's mitigation requirements within the required five-year timeframe. Mrs. Bjorhus monitored the site annually to assess overall health and vigor, recommended adaptive management measures such as invasive species control, oversaw implementation of such actions, and prepared annual reports documenting the site's progress. After five years, she successfully coordinated with NJDEP to certify the mitigation project was deemed complete, and subsequently prepared a Grant of Conservation Restriction to protect the restored wetland and riparian zone areas in perpetuity.

Spring Creek North Ecological Restoration, Brooklyn and Queens, NY (present) – The USACE is in the planning stages of restoring degraded low marsh, high marsh, maritime uplands and upland habitats within 47-acres of Spring Creek Park. Mrs. Bjorhus is responsible for the delineation and characterization of estuarine wetland, tidal creek, and upland ecological communities within this site and associated reporting.

Aquetong Creek Stream Restoration, Bucks County, PA (2019) - Bucks County, PA (2019) - This project involved restoring a former dam impoundment to a stable stream system that supports cold water aquatic species and provides an ecological uplift to wetland, floodplain and upland areas within a sustainable park setting. Mrs. Bjorhus served as the lead regulatory specialist for this project and successfully attained applicable federal and state permit waivers, and county permits. In this role, she prepared wetland and stream mitigation and monitoring plans in compliance with federal and state guidelines. The plan was approved by regulators without comment.

Linden Blue Acres Green Infrastructure and Floodplain Restoration, Union County, NJ (2019) – This is one of the first projects in New Jersey to increase storm resiliency and reduce flood risk through ecological and floodplain restoration on former residential properties acquired by the NJDEP Blues Acres Floodplain Program. Mrs. Bjorhus served as the lead regulatory specialist and wetland scientist on this restoration project. Her effective communication with state and county regulatory agencies resulted in quick permit approvals to accommodate a tight construction window.

Mercer County Dam 21 Master Plan, Mercer County, NJ (2019) **–** Mercer County proposes to update their Master Plan to include a unique passive recreational park at the Dam 21 site. In support of planning and permitting efforts, Mrs. Bjorhus delineated freshwater wetlands and State open waters within this 279-acre property. Additionally, Mrs. Bjorhus authored an ecological communities report which characterized and mapped the mosaic of vegetative communities that exist on site. Information from these efforts will be incorporated into the vision of the Master Plan and will guide the placement of proposed amenities and trails.

Dunes at Shoal Harbor Shoreline Protection Project, Monmouth County, NJ (2018) – This project involved the restoration of a highly eroded shoreline by installing structural and non-structural shoreline protection measures within a coastal high hazard area. In support of this project, Ms. Bjorhus developed a NJDEP Individual CAFRA and Waterfront Development Permit application; an Individual USACE Permit application; a Freehold Soil Conservation District application for a Soil Erosion and Sediment Control Certification; and Middletown Township Grading, Development and Floodplain Permit applications. She coordinated with adjacent landowners to resolve site access issues and engaged with local stakeholders to address viewshed concerns.

Professional Affiliations:

- Society of Wetland Scientists

Professional Presentations:

- Bjorhus, Emily, Hartshorne, Michael and Cory Speroff. "Carversville Farm: Stream, Floodplain and Multi-Functional Riparian Buffer Restoration". September 23, 2020. Presentation at the 2020 Watershed Congress along the Schuylkill River. Delaware Riverkeeper Network, Bristol, Pennsylvania.

Robert J. George, PWS
Project Manager, Natural Resources

Education:
- MES Population Biology, University of Pennsylvania, Philadelphia, Pennsylvania, 2013
- B.S. Wildlife Biology, Delaware Valley University, Doylestown, Pennsylvania, 2009

Professional Certification:
- Professional Wetland Scientist #3211

Professional Affiliations:
- Ecological Society of America (ESA)
- Society of Environmental Toxicology and Chemistry (SETAC)
- Society of Wetland Scientists (SWS)

Professional Training:
- State of New Jersey- Boating Safety Certificate
- Introduction to Wetland Identification- Rutgers University
- Methodology for Delineating Wetlands- Rutgers University
- Ecological Risk Assessment: Practice & Protocols - Rutgers University
- Ecological Evaluation: Practical Guide to Implementing the Ecological Evaluation Guidance Document – Rutgers University
- Information for Wetland Construction: Principles, Planning and Design– Rutgers University
- Wetland Delineation & Management Training Certification Program- Army Corps of Engineers

Summary of Qualifications:

Robert provides project management and ecological restoration technical support which includes environmental toxicology, wildlife surveys, wetland investigation, permitting and compliance for federal, state, and municipal projects. In addition to his role as an ecologist, he serves as a project manager in the natural resources' division for various restoration projects throughout the Mid-Atlantic. Responsibilities include client and regulatory consultations, staff management, proposal creation, budget generation and tracking, and timely production of deliverables.

Areas of Expertise:

Project Management

Environmental Toxicology
- Phase I environmental assessments
- Ecological evaluations
- Ecological risk assessments
- Remediation

Wetland Ecology
- Presence/absence
- Assessments
- Delineations
- Flora/fauna inventories
- Mitigation monitoring
- Adaptive management plans

Wildlife Surveys
- Federal and State Threatened and Endangered Species Assessments
- NOAA Essential Fish Habitat Assessments
- Nekton
- Benthic Invertebrates

Regulatory Compliance
- USACE
- NJDEP
- PADEP
- NYDEC
- NYSDEC
- NPDES
- FWS- Endangered Species Act: Section 7 Consultations
- Environmental Assessments
- Environmental Impact Statements

Select Project Experience:

Liberty State Park Habitat Restoration, Jersey City, NJ (2019-2020)
Mr. George directed a wetland and stream delineation, characterization, and natural resource inventory on 240 acres of Liberty State Park, which will be the subject of an enhancement project which aims to restore this area to a diverse array of natural habitats, including salt marshes, forested wetlands and uplands, and meadow.

Spring Creek South Flood Risk Management, New York, NY (2015-2018)
This FEMA-funded project includes the restoration of 243 acres of maritime habitat at Spring Creek South, a component

of the Gateway National Recreational Area. In addition to providing ecological uplift, this project aims to increase the coastal resiliency of the Howard Beach neighborhood of Queens. Mr. George was responsible for the wetland delineation, surveying, and habitat assessment of the project site. He was also a key author of the Environmental Assessment and the Army Corps of Engineers Joint Permit Application.

Beneficial Use of Dredged Material to Enhance Salt Marsh Pilot Projects, Avalon & Fortescue, NJ (2015-2018)
Mr. George completed ecological risk assessments, essential fish habitat assessments, fisheries, avian, hydrology, and sediment analyses, and acquired the necessary permits required for these large ecological restoration projects, which were the first application of this novel restoration technique on tidal marshes in New Jersey.

Staten Island Marine Development, New York, NY (2015-2016)
This project included the perpetual preservation of 242 acres of wetlands in the Bloomfield section of Staten Island. Mr. George was responsible for water quality monitoring, macroinvertebrate assessments, faunal surveys, and he was a key author of the Generic Environmental Impact Statement.

Columbia Lake Dam Removal, Columbia, NJ (2016)
Mr. George evaluated the in-situ sediments above and below the dam for COPECs to predict the adverse impacts to downstream benthos and water quality through elevated TSS levels in response to the dam removal.

Middlesex County Parks Wetland Restoration Project, Middlesex County, NJ (2014)
Completed substrate sampling at four sites within the project. Complied a final report where ecological risk was evaluated by comparing the concentrations of contaminants of potential concern against applicable ecological screening criteria for polychlorinated biphenyls (PCBs), volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, and metals. ∑SEM-AVS/foc analysis was performed to determine the bioavailability of metals in the samples.

Relevant Publication:

George R. (2013). *DNA Barcode Examination of North American Mayflies Across Their Natural Distribution Reveals Cryptic Species Complexes*. University of Pennsylvania Scholarly Commons.

Presentations:

Kwityn E., George R., Szczepanski J. (2018). *Nekton Monitoring to Assess Beneficial Reuse of Dredged Material in Salt Marsh Restoration.* 148th Annual Meeting of the American Fisheries Society.

Yepsen M., Woolard J., Jahn J., Moritzen L., Buckner J., Zito-Livingston A., Taghon G., George R., Ferencz A. (2018). Early *Ecosystem Responses: New Jersey Beneficial Use of Dredged Material to Enhance Salt Marsh Pilot Projects.* 2018 Delaware Wetlands Conference.

Ivy Babson
Staff Scientist

Princeton Hydro

Education:

- B.S. Environmental Science (Ecological Design Concentration) and Geospatial Technologies Minor. Rubenstein School of Environment and Natural Resources, University of Vermont, 2019

Areas of Experience:

- Aquatic macrophyte and wetland vegetation identification
- Ecological design and sustainability
- Electrofishing and fish surveys
- Geographic Information Systems:
  - ArcGIS Pro
  - Collector for ArcGIS
  - OpenStreetMap
  - Spatial Analyst
  - 3D Analyst
- Lake and stream sampling and monitoring
- Phytoplankton and zooplankton identification
- Submerged aquatic plant surveys (SAV)
- Wetland delineating and monitoring

Summary of Qualifications:

Ms. Babson joined Princeton Hydro during the Summer of 2018 as an Environmental Science Intern within the Aquatics Department, where she provided assistance on water quality monitoring in lakes, biological sampling and surveys, and cyanobacteria monitoring. She became a full-time employee in the Spring of 2019, where she was able to integrate her skills with both the Aquatics and Natural Resources Departments. Ms. Babson's responsibilities with the firm include water quality monitoring, physical, chemical, and biological sampling of lakes and streams, delineating and monitoring wetlands, technical report writing and permit preparation.

As a recent graduate, Ms. Babson possesses a diverse skill set emanating from extra-curricular activities and educational experience. While at the University of Vermont, she worked on numerous academic projects including the preparation of a prescribed burn plan for a rare forest community in Burlington, VT, the utilization of remote sensing to assess the increase of climate change-driven mortality in the NJ Pine Barren's Atlantic white cedar forests, the utilization of ArcGIS and LiDAR to identify vegetative communities in herbaceous and forested wetlands, and assisting a PhD candidate in the assessment of greenhouse gas emissions in agricultural fields using gas sensors on unmanned aerial vehicles (UAVs).

Select Project Experience:

NJ Pulverizing Tract Ecological Conservation, Berkeley Township, New Jersey (2019 -)
Ms. Babson conducted water quality monitoring events, submerged aquatic plant surveys (SAVs), and fish and macroinvertebrate surveys at the NJ Pulverizing Site, a previously utilized sand extraction site. She assisted in conducting a wetland and State Open Waters delineation, as well as constructing and installing groundwater monitoring wells to assess the Site's hydrology.

Rubenstein School of Environment and Natural Resources, Burlington, Vermont (2019)
Ms. Babson worked as an undergraduate research assistant to analyze agricultural strategies, practices, and outcomes for both adapting to and mitigating climate change while reducing other negative impacts, particularly focusing on the role of technology such as drones and UAVs. She utilized NVivo to assess peer-reviewed studies and literature for agricultural practices implemented for climate change adaptation and mitigation. She also helped organize and monitor frozen soil samples for nitrogen analysis.

Manasquan Reservoir, Howell Township, New Jersey (2018 -)
Ms. Babson assisted in conducting water quality monitoring events and submerged aquatic vegetation (SAV) surveys. She was responsible for performing cyanotoxin-detection tests using the Abraxis strip-test method, where microcystin can be detected from the lysing of the freshwater cyanobacteria, *Microcystis*.

Mill Pond, Southampton, New York (2018 -)
Ms. Babson assisted in assessing Mill Pond's water quality issues by conducting water quality sampling, collecting and processing cyanobacteria samples, and performing submerged aquatic vegetation surveys. She assisted in the

2019 carp removal project to address turbidity and harmful algal bloom (HAB) issues by helping construct a baited carp removal net, collect, transport, and count trapped carp.

Musconetcong River Fishery Survey, Holland Township, New Jersey (2018-)
Ms. Babson participated in the Musconetcong River multi-season fishery survey to evaluate the ecological benefits to the resident and anadromous fishery resulting from the removal of the Hughesville Dam. She has operated back pack electrofishing units, seine nets, and other fishery survey equipment within the Musconetcong River. She also held responsibilities in collecting, identifying, weighing, and measuring the specimens, documenting the species in photos and videos, and completing inventories of each reach.

LaPlatte Headwaters Town Forest Restoration, Hinesburg, Vermont (2018)
Through the University of Vermont, Ms. Babson worked with the Vermont Chapter of The Nature Conservancy to develop a wetland restoration plan for a restoration priority wetland that transitioned into a Class I wetland which ultimately drained into Lake Champlain. She helped conduct research about the invasive reed canarygrass (*Phalaris arundinaceae*), classified herbaceous and woody species communities using handheld GPS, and created vegetative community maps on ArcGIS for the plan.

Other Wetland Delineations performed:

- **Carteret Freshwater Wetland Re-Delineation,** Borough of Carteret, Middlesex County, New Jersey
- **Crestron Wetland Mitigation and Planting Plan,** Borough of Rockleigh, Bergen County, New Jersey
- **Key Environmental - LNG Site,** Staten Island, New York
- **Liberty State Park**, Jersey City, New Jersey
- **Paulins Kill Dam Removal Project,** Warren and Sussex Counties, New Jersey
- **Pernini Wetland Re-Delineation,** Delaware Township, Hunterdon County, New Jersey
- **Spring Creek North Ecosystem Restoration Project,** Brooklyn and Queens, New York

Michael C. Rehman, CERP, PWS

Senior Project Manager, Natural Resources; Senior Ecologist

Princeton Hydro

Education:

- B.S. Ecology & Evolutionary Biology
  Cornell University, Ithaca, NY 2000

Professional Certifications:

- Certified Ecological Restoration Practitioner #0441
- Professional Wetland Scientist #2968
- Army Corps of Engineers Wetland Delineation/Regional Supplement/Waters of United States Training 2018
- Rutgers University Wetland Delineator Program, 2006

Professional Training:

- Mid-Atlantic Association of Professional Soil Scientists: Field Indicators of Hydric Soils in the Coastal Plain Workshop. Various locations in Southern New Jersey, 2009
- Vegetation Identification for Wetland Delineation – South, 2008.
- Endangered and Threatened Species of Northern New Jersey, Rutgers University, 2007.
- Wetland Construction and Design, Rutgers University, 2006.

Professional Affiliations:

- Society of Wetland Scientists (SWS)
- Society of Ecological Restoration (SER)
- Association of State Wetland Managers (ASWM)

Areas of Expertise:

Regulatory Compliance

- USACE
- NJDEP
- PADEP
- NYDEC
- NYSDEC
- Municipal EIS/Reviews

Ecological Surveys

- Avian Surveys
- Vernal Pool Identification
- Threatened/Endangered Species
- Flora/Fauna Inventories

Wetland Investigation

- Delineations
- Assessments
- Presence/absence

Wetland Mitigation

- Monitoring
- Adaptive Management Plans
- Planting/Planting Oversight
- Design/Implementation

Summary of Qualifications:

Mr. Rehman has over nineteen years' experience in a variety of environmental disciplines. He has served as an ecologist and senior project manager on projects involving the evaluation of wetland ecosystems; compliance with NEPA, USACE, NJDEP, PADEP, and NYSDEC regulations; evaluation, planning, implementation, and monitoring of estuarine/freshwater wetland mitigation projects; four-seasons wildlife surveys; avian surveys; habitat assessments; threatened and endangered species investigations; and water quality/land use issues. Mr. Rehman was also a biologist with New Jersey's Division of Fish and Wildlife's Endangered Species Program where he worked extensively with bog turtles, wood turtles, and vernal pools and their associated fauna. He has taught vernal pool certification classes to volunteers and investigated and certified vernal pools throughout New Jersey and has presented at numerous conferences on topics including floodplain restoration, urban restoration, and estuarine restoration.

Select Project Experience:

Liberty State Park Ecosystem Restoration Project. Hudson County, NJ (Current). Lead Ecologist on freshwater wetland/upland restoration design. The Liberty State Park Saltwater and Freshwater Wetland and Upland Restoration Project, once implemented, will be one of the largest habitat restoration projects in New Jersey. The project will result in a resilient coastal ecosystem within a highly urbanized setting, providing both ecological and social benefits.

Pulverizing Site – Ecological Community Mapping. Ocean County (Current). Lead Ecologist on ecological community mapping of the 741-acre property. This effort is related to the development of a conservation management plan outlining the potential short and long-term utilization of the property for both preservation and passive/active recreation opportunities that will include a portion of the Barnegat Rail Trail upon completion.

Dam 21 – Ecological Community Mapping. Mercer County, NJ (2019). Lead Ecologist on ecological community mapping effort of the 279-acre property. This effort is related to the creation of a park master plan for Mercer County. This element will be incorporated into the vision of the master plan and will guide the placement of proposed trails and associated amenities in this highly urbanized landscape.

Hudson River Ecosystem Restoration Feasibility Study. Various Sites, New York State (2018). Lead Ecologist on implementing Evaluation of Planned Wetlands (EPW) analysis of existing resources to determine potential ecological uplift for proposed restoration efforts at the following four sites: Schodack Island, Rensselaer County; Henry Hudson State Park and Binnen Kill, Albany County; and Charles Rider State Park, Ulster County.

Miller Field Forested Wetlands Enhancement Project. South Shore of Staten Island, New York (2018-Current). Lead Ecologist on Ecological Function Baseline Condition Monitoring of the urban Site. This effort included avian surveys; analysis of existing plant community, including species richness, %vegetative cover and stand structure; and wetland delineation efforts of the 15.3-acre Site. Subsequent to field efforts an Ecological Report summarizing the collected data is being prepared in support of proposed enhancement efforts which include enhancement of an existing swamp white oak wetland; creation of a viable trail network and associated signage to foster both recreational and educational usage of the Site.

Brownfield to Greenfield Urban Redevelopment Project. Elizabeth, New Jersey (2006-2013). Obtained multiple NJDEP permits in support of the development of a warehouse park on a contaminated property that incorporated a stream relocation to both provide stormwater management for the Site and facilitate remediation. To compensate for impacts an associated ~18-acre wetland mitigation site was constructed within a highly disturbed low wildlife value ecological setting resulting in a contiguous greenspace that possesses both freshwater and estuarine wetlands as a result of the adjoining Jersey Gardens Mall Wetland Mitigation Site.

Adaptive Management Implementation – Urban Wetland Mitigation Sites. Northern New Jersey (2006-Current). Ecologist responsible for monitoring efforts; identifying adaptive management strategies; oversight of implementation of adaptive management strategies; and coordination with NJDEP – Mitigation Unit to procure approval of proposed management measures on five urban mitigation sites in northern New Jersey: ProLogis Elizabeth Business Park; Jersey Gardens Mall; F.D.P. Enterprises Site; Bayonne Golf Club; and ProLogis Port Reading Business Park.

Publications:
Altomari C., Mark Gallagher and Michael Rehman. Dismal Swamp Watershed Management Plan. Edison Wetlands Association, February 2009.

Select Presentations:
Rehman, Michael. **Elizabeth, New Jersey Wetland Restoration: Ecological Uplift in an Urban Setting.** January 30, 2020. Presentation at the 2020 Delaware Wetlands Conference, Wilmington, Delaware.

Cooper, Paul, Michael Rehman and Mark Gallagher. **Increasing Fish Utilization by Enhancing Ecosystem Complexity Via Integration of Subtidal and Intertidal Components in an Urban Estuary.** March 13, 2009. Presentation at the Society for Ecological Restoration and The Ecological Society of America Mid-Atlantic Chapters Joint Conference 2009; Bridging the Gap: Connecting Ecological Research and Restoration Practice. The College Of New Jersey, Ewing, New Jersey.

Gallagher, Mark, Michael Rehman and Geoffrey Goll. **The Establishment of a Flood Prone Wetland System on the South Branch of the Raritan River.** March 13, 2009. Presentation at the Society for Ecological Restoration and The Ecological Society of America Mid-Atlantic Chapters Joint Conference 2009; Bridging the Gap: Connecting Ecological Research and Restoration Practice. The College Of New Jersey, Ewing, New Jersey.

APPENDIX D
AIR CONFORMITY APPLICABILITY MODEL REPORT
RECORD OF CONFORMITY ANALYSIS

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

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

a. Action Location:

Base: MCGUIRE AFB
State: New Jersey
County(s): Burlington
Regulatory Area(s): Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE; Philadelphia-Wilmington, PA-NJ-DE

b. Action Title: New Hot Cargo Loading Area Pad at McGuire Area of JB MDL, NJ

c. Project Number/s (if applicable):

d. Projected Action Start Date: 4 / 2022

e. Action Description:

See Section 2 of EA.

f. Point of Contact:

Name: Carolyn Hein
Title: Contractor
Organization: HDR
Email: carolyn.hein@hdrinc.com
Phone Number: (484) 612-1060

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

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

Conformity Analysis Summary:

2022

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE			
VOC	0.387	50	No
NOx	2.357	100	No
CO	2.402		
SOx	0.006		
PM 10	27.778		
PM 2.5	0.095		
Pb	0.000		
NH3	0.001		
CO2e	623.6		

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

Philadelphia-Wilmington, PA-NJ-DE			
VOC	0.387	100	No
NOx	2.357	100	No
CO	2.402		
SOx	0.006	100	No
PM 10	27.778		
PM 2.5	0.095	100	No
Pb	0.000		
NH3	0.001	100	No
CO2e	623.6		

2023

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE			
VOC	0.210	50	No
NOx	1.215	100	No
CO	1.553		
SOx	0.003		
PM 10	0.411		
PM 2.5	0.051		
Pb	0.000		
NH3	0.001		
CO2e	320.6		
Philadelphia-Wilmington, PA-NJ-DE			
VOC	0.210	100	No
NOx	1.215	100	No
CO	1.553		
SOx	0.003	100	No
PM 10	0.411		
PM 2.5	0.051	100	No
Pb	0.000		
NH3	0.001	100	No
CO2e	320.6		

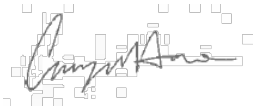
2024 - (Steady State)

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE			
VOC	0.000	50	No
NOx	0.000	100	No
CO	0.000		
SOx	0.000		
PM 10	0.000		
PM 2.5	0.000		
Pb	0.000		
NH3	0.000		
CO2e	0.0		
Philadelphia-Wilmington, PA-NJ-DE			
VOC	0.000	100	No
NOx	0.000	100	No
CO	0.000		
SOx	0.000	100	No

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

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
PM 10	0.000		
PM 2.5	0.000	100	No
Pb	0.000		
NH3	0.000	100	No
CO2e	0.0		

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



Carolyn Hein, Contractor

2/24/2021
DATE

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location

Base: MCGUIRE AFB
State: New Jersey
County(s): Burlington
Regulatory Area(s): Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE; Philadelphia-Wilmington, PA-NJ-DE

- Action Title: New Hot Cargo Loading Area Pad at McGuire Area of JB MDL, NJ

- Project Number/s (if applicable):

- Projected Action Start Date: 4 / 2022

- Action Purpose and Need:

See Section 1.3 of EA.

- Action Description:

See Section 2 of EA.

- Point of Contact

Name: Carolyn Hein
Title: Contractor
Organization: HDR
Email: carolyn.hein@hdrinc.com
Phone Number: (484) 612-1060

- Activity List:

Activity Type		Activity Title
2.	Construction / Demolition	Construct HCLA Pad

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: Burlington
Regulatory Area(s): Philadelphia-Wilmington, PA-NJ-DE; Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE

- Activity Title: Construct HCLA Pad

- Activity Description:

Construction of the HCLA pads is anticipated to take 18 months to complete and would conclude in Fiscal Year 2023. For the purposes of this analysis, it was assumed the construction period would be from April 2022 through September 2023.

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

Demolition:
Demolish 229,489 ft^2 of pavement, including two HCLA pads (aprons and shoulders), HCLA taxiway and shoulders, portions of the munitions storage building access road, and other support pavement. Demolition will begin in April 2022 and last approximately 3 months.

Site Grading:
Grade entire 15.5-acre site (675,180 ft^2). Site grading will begin in July 2022 and last approximately 4 months.

Trenching:
23,375 ft^2 of 5-foot-wide trenching for removal of existing conduit duct banks
8,250 ft^2 of 5-foot-wide joint trenching for installation of area lighting utilities
1,805 ft^2 of 1-foot-wide trenching for existing fencing removal
2,750 ft^2 of 1-foot-wide trenching for installation of new fencing
36,180 ft^2 total
Trenching will begin in November 2022 and last approximately 3 months.

Construction:
Construct 162,195 ft^2 HCLA pad and shoulders. The HCLA pad pavement includes 19.5-inch-thick concrete, 4-inch drainage layer, and 8-inch cement subgrade (31.5-inch total thickness). The 50-foot asphalt shoulders have a thickness of 10 inches. A pavement thickness of 31.5 inches (2.6 feet) for the entire contruction area was used for the analysis. Construction will begin in February 2023 and last approximately 6 months.

Paving:
50,399 ft^2 taxiway pavement with shoulder
17,091 ft^2 permanent pavement (roads, sidewalks, pads, etc.)
10,474 ft^2 temporary pavement for construction access road
77,964 ft^2 total
Paving will begin in August 2023 and last approximately 2 months.

- Activity Start Date
Start Month: 4
Start Month: 2022

- Activity End Date
Indefinite: False
End Month: 9
End Month: 2023

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.597141
SO_x	0.009655
NO_x	3.572332
CO	3.954720
PM 10	28.189460

Pollutant	Total Emissions (TONs)
PM 2.5	0.146399
Pb	0.000000
NH_3	0.002169
CO_2e	944.2

2.1 Demolition Phase

2.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2022
- Phase Duration

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

Number of Month: 3
Number of Days: 0

2.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 229489
Height of Building to be demolished (ft): 2

- Default Settings Used: Yes

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	3	8

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

2.1.3 Demolition Phase Emission Factor(s)

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

Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.266	000.002	000.209	003.068	000.008	000.007		000.023	00313.914
LDGT	000.309	000.003	000.353	004.101	000.010	000.009		000.024	00406.448
HDGV	000.630	000.005	001.017	014.444	000.024	000.021		000.044	00756.575
LDDV	000.120	000.003	000.138	002.513	000.004	000.004		000.008	00303.783
LDDT	000.254	000.004	000.390	004.285	000.007	000.006		000.008	00432.722
HDDV	000.671	000.013	006.097	002.135	000.173	000.159		000.031	01528.646
MC	002.146	000.003	000.796	012.783	000.027	000.024		000.056	00399.526

2.1.4 Demolition Phase Formula(s)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Fugitive Dust Emissions per Phase
$PM10_{FD} = (0.00042 * BA * BH) / 2000$

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

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

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

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

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

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

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

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

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

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

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

2.2 Site Grading Phase

2.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 4
Number of Days: 0

2.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 675180
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	1	8
Graders Composite	1	8
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	8
Scrapers Composite	2	8
Tractors/Loaders/Backhoes Composite	3	8

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

2.2.3 Site Grading Phase Emission Factor(s)

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

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

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

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.266	000.002	000.209	003.068	000.008	000.007		000.023	00313.914
LDGT	000.309	000.003	000.353	004.101	000.010	000.009		000.024	00406.448
HDGV	000.630	000.005	001.017	014.444	000.024	000.021		000.044	00756.575
LDDV	000.120	000.003	000.138	002.513	000.004	000.004		000.008	00303.783
LDDT	000.254	000.004	000.390	004.285	000.007	000.006		000.008	00432.722
HDDV	000.671	000.013	006.097	002.135	000.173	000.159		000.031	01528.646
MC	002.146	000.003	000.796	012.783	000.027	000.024		000.056	00399.526

2.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

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

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

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

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

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

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

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

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

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

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

2.3 Trenching/Excavating Phase

2.3.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 11
Start Quarter: 1
Start Year: 2022

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

2.3.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 36180
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Trenching Default Settings

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

- Construction Exhaust (default)

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

- Vehicle Exhaust

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

2.3.3 Trenching / Excavating Phase Emission Factor(s)

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

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

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.266	000.002	000.209	003.068	000.008	000.007		000.023	00313.914
LDGT	000.309	000.003	000.353	004.101	000.010	000.009		000.024	00406.448
HDGV	000.630	000.005	001.017	014.444	000.024	000.021		000.044	00756.575

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDDV	000.120	000.003	000.138	002.513	000.004	000.004		000.008	00303.783
LDDT	000.254	000.004	000.390	004.285	000.007	000.006		000.008	00432.722
HDDV	000.671	000.013	006.097	002.135	000.173	000.159		000.031	01528.646
MC	002.146	000.003	000.796	012.783	000.027	000.024		000.056	00399.526

2.3.4 Trenching / Excavating Phase Formula(s)

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

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

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

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

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

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

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

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

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

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

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

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

2.4 Building Construction Phase

2.4.1 Building Construction Phase Timeline Assumptions

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

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

2.4.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 162195
Height of Building (ft): 2.6
Number of Units: N/A

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

- Vendor Trips

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

- Vendor Trips Vehicle Mixture (%)

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

2.4.3 Building Construction Phase Emission Factor(s)

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

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

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.266	000.002	000.209	003.068	000.008	000.007		000.023	00313.914
LDGT	000.309	000.003	000.353	004.101	000.010	000.009		000.024	00406.448
HDGV	000.630	000.005	001.017	014.444	000.024	000.021		000.044	00756.575
LDDV	000.120	000.003	000.138	002.513	000.004	000.004		000.008	00303.783
LDDT	000.254	000.004	000.390	004.285	000.007	000.006		000.008	00432.722
HDDV	000.671	000.013	006.097	002.135	000.173	000.159		000.031	01528.646
MC	002.146	000.003	000.796	012.783	000.027	000.024		000.056	00399.526

2.4.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

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

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

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

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

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

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

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

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

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

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

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

2.5 Paving Phase

2.5.1 Paving Phase Timeline Assumptions

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

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

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

2.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 77964

- 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
Tractors/Loaders/Backhoes Composite	1	7

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

2.5.3 Paving Phase Emission Factor(s)

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

Excavators Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0648	0.0013	0.3170	0.5103	0.0136	0.0136	0.0058	119.72
Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61

Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Scrapers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1723	0.0026	1.1176	0.7579	0.0447	0.0447	0.0155	262.87
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.266	000.002	000.209	003.068	000.008	000.007		000.023	00313.914
LDGT	000.309	000.003	000.353	004.101	000.010	000.009		000.024	00406.448
HDGV	000.630	000.005	001.017	014.444	000.024	000.021		000.044	00756.575
LDDV	000.120	000.003	000.138	002.513	000.004	000.004		000.008	00303.783
LDDT	000.254	000.004	000.390	004.285	000.007	000.006		000.008	00432.722
HDDV	000.671	000.013	006.097	002.135	000.173	000.159		000.031	01528.646
MC	002.146	000.003	000.796	012.783	000.027	000.024		000.056	00399.526

2.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

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 ft^2 / $acre)^2$ / acre)

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

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

a. Action Location:

Base: MCGUIRE AFB
State: New Jersey
County(s): Burlington
Regulatory Area(s): Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE; Philadelphia-Wilmington, PA-NJ-DE

b. Action Title: New Munitions Storage Area at McGuire Area of JB MDL, NJ

c. Project Number/s (if applicable):

d. Projected Action Start Date: 10 / 2021

e. Action Description:

See Section 2 of EA.

f. Point of Contact:

Name: Carolyn Hein
Title: Contractor
Organization: HDR
Email: carolyn.hein@hdrinc.com
Phone Number: (484) 612-1060

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

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

Conformity Analysis Summary:

2021

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE			
VOC	0.039	50	No
NOx	0.254	100	No
CO	0.297		
SOx	0.001		
PM 10	0.092		
PM 2.5	0.011		
Pb	0.000		
NH3	0.000		
CO2e	57.7		

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

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Philadelphia-Wilmington, PA-NJ-DE			
VOC	0.039	100	No
NOx	0.254	100	No
CO	0.297		
SOx	0.001	100	No
PM 10	0.092		
PM 2.5	0.011	100	No
Pb	0.000		
NH3	0.000	100	No
CO2e	57.7		

2022

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE			
VOC	0.384	50	No
NOx	2.260	100	No
CO	2.630		
SOx	0.007		
PM 10	25.618		
PM 2.5	0.093		
Pb	0.000		
NH3	0.001		
CO2e	634.9		
Philadelphia-Wilmington, PA-NJ-DE			
VOC	0.384	100	No
NOx	2.260	100	No
CO	2.630		
SOx	0.007	100	No
PM 10	25.618		
PM 2.5	0.093	100	No
Pb	0.000		
NH3	0.001	100	No
CO2e	634.9		

2023

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE			
VOC	0.371	50	No
NOx	0.821	100	No
CO	1.067		
SOx	0.020		
PM 10	0.037		
PM 2.5	0.036		
Pb	0.000		
NH3	0.001		
CO2e	227.8		
Philadelphia-Wilmington, PA-NJ-DE			
VOC	0.371	100	No
NOx	0.821	100	No

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

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
CO	1.067		
SOx	0.020	100	No
PM 10	0.037		
PM 2.5	0.036	100	No
Pb	0.000		
NH3	0.001	100	No
CO2e	227.8		

2024 - (Steady State)

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE			
VOC	0.001	50	No
NOx	0.032	100	No
CO	0.008		
SOx	0.069		
PM 10	0.002		
PM 2.5	0.001		
Pb	0.000		
NH3	0.000		
CO2e	36.2		
Philadelphia-Wilmington, PA-NJ-DE			
VOC	0.001	100	No
NOx	0.032	100	No
CO	0.008		
SOx	0.069	100	No
PM 10	0.002		
PM 2.5	0.001	100	No
Pb	0.000		
NH3	0.000	100	No
CO2e	36.2		

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



Carolyn Hein, Contractor

2/24/2021
DATE

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location

Base: MCGUIRE AFB
State: New Jersey
County(s): Burlington
Regulatory Area(s): Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE; Philadelphia-Wilmington, PA-NJ-DE

- Action Title: New Munitions Storage Area at McGuire Area of JB MDL, NJ

- Project Number/s (if applicable):

- Projected Action Start Date: 10 / 2021

- Action Purpose and Need:

See Section 1.3 of EA.

- Action Description:

See Section 2 of EA.

- Point of Contact

Name: Carolyn Hein
Title: Contractor
Organization: HDR
Email: carolyn.hein@hdrinc.com
Phone Number: (484) 612-1060

- Activity List:

Activity Type		Activity Title
2.	Construction / Demolition	Construct MSA
3.	Heating	Heat Addition to Munitions Maintenance Shop
4.	Heating	Heat Munitions Maintenance Administration Facility

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: Burlington
Regulatory Area(s): Philadelphia-Wilmington, PA-NJ-DE; Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE

- Activity Title: Construct MSA

- Activity Description:

Construction of the proposed MSA facilities is anticipated to begin in October 2021 and conclude in October 2023. For the purposes of this analysis, a contruction period of 25 months was used.

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

Demolition:
Demolish Building 1913 (administration facility) - 958 ft^2
Demolish Building 1918 (multi-cube magazine with 30 bays) - 5,479 ft^2
Demolish Building 1939 (vacant shed) - 97 ft^2
Demolish earth berms - 5,052 ft^2
Remove pavement - 29,802 ft^2
Total - 51,388 ft^2
Demolition will begin in October 2021 and last approximately 4 months.

Site Grading:
Grade entire 9.5-acre site (413,820 ft^2). Site grading will begin in February 2022 and last approximately 6 months.

Trenching:
Approximately 12,500 ft^2 of 5-foot-wide trenches for site sewer, stormwater, and water lines
3,809 ft^2 of 1-foot-wide trenching for existing fence removal
3,752 ft^2 of 1-foot-wide trenching for installation of new fencing
Total - 20,061 ft^2
Trenching will begin in August 2022 and last approximately 4 months.

Construction:
15,517 ft^2 of munitions storage igloos
2,745 ft^2 munitions administration facility
1,157 ft^2 addition to maintenance shop
Total - 19,419 ft^2
Construction will begin in December 2022 and last approximately 8 months.

Architectural Coatings:
Total - 19,419 ft^2
Coatings will begin in July 2023 and last approximately 2 months.

Paving:
54,030 ft^2 permanent pavement
Paving will begin in August 2023 and last approximately 3 months.

- Activity Start Date
Start Month: 10
Start Month: 2021

- Activity End Date
Indefinite: False
End Month: 10
End Month: 2023

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.793874
SO_x	0.009387
NO_x	3.327378
CO	3.992733
PM 10	25.746286

Pollutant	Total Emissions (TONs)
PM 2.5	0.139890
Pb	0.000000
NH_3	0.002141
CO_2e	911.3

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

2.1 Demolition Phase

2.1.1 Demolition Phase Timeline Assumptions

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

- Phase Duration
Number of Month: 4
Number of Days: 0

2.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 51388
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

2.1.3 Demolition Phase Emission Factor(s)

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

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0443	0.0006	0.3176	0.3761	0.0170	0.0170	0.0040	58.563
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2015	0.0024	1.4660	0.7661	0.0581	0.0581	0.0181	239.53

Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0407	0.0007	0.2505	0.3606	0.0112	0.0112	0.0036	66.890

- 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	000.266	000.002	000.209	003.068	000.008	000.007		000.023	00313.914
LDGT	000.309	000.003	000.353	004.101	000.010	000.009		000.024	00406.448
HDGV	000.630	000.005	001.017	014.444	000.024	000.021		000.044	00756.575
LDDV	000.120	000.003	000.138	002.513	000.004	000.004		000.008	00303.783
LDDT	000.254	000.004	000.390	004.285	000.007	000.006		000.008	00432.722
HDDV	000.671	000.013	006.097	002.135	000.173	000.159		000.031	01528.646
MC	002.146	000.003	000.796	012.783	000.027	000.024		000.056	00399.526

2.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

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

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

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

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

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

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

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

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

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

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

2.2 Site Grading Phase

2.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 2
Start Quarter: 1
Start Year: 2022

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

2.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 413820
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	1	8
Graders Composite	1	8
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	8
Tractors/Loaders/Backhoes Composite	3	8

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

2.2.3 Site Grading Phase Emission Factor(s)

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

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

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.266	000.002	000.209	003.068	000.008	000.007		000.023	00313.914
LDGT	000.309	000.003	000.353	004.101	000.010	000.009		000.024	00406.448
HDGV	000.630	000.005	001.017	014.444	000.024	000.021		000.044	00756.575
LDDV	000.120	000.003	000.138	002.513	000.004	000.004		000.008	00303.783
LDDT	000.254	000.004	000.390	004.285	000.007	000.006		000.008	00432.722
HDDV	000.671	000.013	006.097	002.135	000.173	000.159		000.031	01528.646
MC	002.146	000.003	000.796	012.783	000.027	000.024		000.056	00399.526

2.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

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

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

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

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

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

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

- Worker Trips Emissions per Phase

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

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

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

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

2.3 Trenching/Excavating Phase

2.3.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date

Start Month: 8
Start Quarter: 1
Start Year: 2022

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- Phase Duration
Number of Month: 4
Number of Days: 0

2.3.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 20061
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

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

- Construction Exhaust (default)

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

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

2.3.3 Trenching / Excavating Phase Emission Factor(s)

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

Excavators Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0648	0.0013	0.3170	0.5103	0.0136	0.0136	0.0058	119.72
Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51

Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.266	000.002	000.209	003.068	000.008	000.007		000.023	00313.914
LDGT	000.309	000.003	000.353	004.101	000.010	000.009		000.024	00406.448
HDGV	000.630	000.005	001.017	014.444	000.024	000.021		000.044	00756.575
LDDV	000.120	000.003	000.138	002.513	000.004	000.004		000.008	00303.783
LDDT	000.254	000.004	000.390	004.285	000.007	000.006		000.008	00432.722
HDDV	000.671	000.013	006.097	002.135	000.173	000.159		000.031	01528.646
MC	002.146	000.003	000.796	012.783	000.027	000.024		000.056	00399.526

2.3.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

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

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

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

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

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

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

- Worker Trips Emissions per Phase

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

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

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

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

2.4 Building Construction Phase

2.4.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 12
Start Quarter: 1
Start Year: 2022

- Phase Duration

Number of Month: 8
Number of Days: 0

2.4.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial
Area of Building (ft^2): 19419
Height of Building (ft): 12
Number of Units: N/A

- Building Construction Default Settings

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
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

2.4.3 Building Construction Phase Emission Factor(s)

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

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

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.266	000.002	000.209	003.068	000.008	000.007		000.023	00313.914
LDGT	000.309	000.003	000.353	004.101	000.010	000.009		000.024	00406.448
HDGV	000.630	000.005	001.017	014.444	000.024	000.021		000.044	00756.575
LDDV	000.120	000.003	000.138	002.513	000.004	000.004		000.008	00303.783
LDDT	000.254	000.004	000.390	004.285	000.007	000.006		000.008	00432.722
HDDV	000.671	000.013	006.097	002.135	000.173	000.159		000.031	01528.646
MC	002.146	000.003	000.796	012.783	000.027	000.024		000.056	00399.526

2.4.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

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

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

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- Vehicle Exhaust Emissions per Phase

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

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

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

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

- Worker Trips Emissions per Phase

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

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

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

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

- Vender Trips Emissions per Phase

$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

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

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

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

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2.5 Architectural Coatings Phase

2.5.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2023

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

2.5.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 19419
Number of Units: N/A

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

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

- Worker Trips Vehicle Mixture (%)

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

2.5.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.266	000.002	000.209	003.068	000.008	000.007		000.023	00313.914
LDGT	000.309	000.003	000.353	004.101	000.010	000.009		000.024	00406.448
HDGV	000.630	000.005	001.017	014.444	000.024	000.021		000.044	00756.575
LDDV	000.120	000.003	000.138	002.513	000.004	000.004		000.008	00303.783
LDDT	000.254	000.004	000.390	004.285	000.007	000.006		000.008	00432.722
HDDV	000.671	000.013	006.097	002.135	000.173	000.159		000.031	01528.646
MC	002.146	000.003	000.796	012.783	000.027	000.024		000.056	00399.526

2.5.4 Architectural Coatings Phase Formula(s)

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

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

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

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

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

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

2.6 Paving Phase

2.6.1 Paving Phase Timeline Assumptions

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

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

2.6.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 54030

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Paving Equipment Composite	1	8
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

2.6.3 Paving Phase Emission Factor(s)

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

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

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.266	000.002	000.209	003.068	000.008	000.007		000.023	00313.914
LDGT	000.309	000.003	000.353	004.101	000.010	000.009		000.024	00406.448
HDGV	000.630	000.005	001.017	014.444	000.024	000.021		000.044	00756.575
LDDV	000.120	000.003	000.138	002.513	000.004	000.004		000.008	00303.783
LDDT	000.254	000.004	000.390	004.285	000.007	000.006		000.008	00432.722
HDDV	000.671	000.013	006.097	002.135	000.173	000.159		000.031	01528.646
MC	002.146	000.003	000.796	012.783	000.027	000.024		000.056	00399.526

2.6.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)

(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

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

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

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

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

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

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

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

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

3. Heating

3.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Burlington
Regulatory Area(s): Philadelphia-Wilmington, PA-NJ-DE; Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE

- Activity Title: Heat Addition to Munitions Maintenance Shop

- Activity Description:
Heat for 1,157 ft^2 addition to the munitions maintenance shop.

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- Activity Start Date
Start Month: 10
Start Year: 2023

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.000162
SO_x	0.020546
NO_x	0.009512
CO	0.002378
PM 10	0.000590

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.000219
Pb	0.000000
NH_3	0.000000
CO_2e	10.7

3.2 Heating Assumptions

- Heating
Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method
Area of floorspace to be heated (ft^2): 1157
Type of fuel: Fuel Oil No. 2
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value (MMBtu/gal): 0.14
Energy Intensity (MMBtu/ft^2): 0.1151

- Default Settings Used: Yes

- Boiler/Furnace Usage
Operating Time Per Year (hours): 900 (default)

3.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000 gal)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
0.34	43.2	20	5	1.24	0.46			22579

3.4 Heating Formula(s)

- Heating Fuel Consumption gallons per Year
$FC_{HER} = HA * EI / HV / 1000$

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/gal)
1000: 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

4. Heating

4.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Burlington
Regulatory Area(s): Philadelphia-Wilmington, PA-NJ-DE; Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE

- Activity Title: Heat Munitions Maintenance Administration Facility

- Activity Description:
Heat likely is required for the munitions maintenance administration facility (2,745 ft^2).

- Activity Start Date
Start Month: 10
Start Year: 2023

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.000384
SO_x	0.048746
NO_x	0.022568
CO	0.005642
PM 10	0.001399

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.000519
Pb	0.000000
NH_3	0.000000
CO_2e	25.5

4.2 Heating Assumptions

- Heating
Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method
Area of floorspace to be heated (ft^2): 2745
Type of fuel: Fuel Oil No. 2
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value (MMBtu/gal): 0.14
Energy Intensity (MMBtu/ft^2): 0.1151

- Default Settings Used: Yes

- Boiler/Furnace Usage

Operating Time Per Year (hours): 900 (default)

4.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000 gal)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
0.34	43.2	20	5	1.24	0.46			22579

4.4 Heating Formula(s)

- Heating Fuel Consumption gallons per Year

FC_{HER}= HA * EI / HV / 1000

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/gal)
1000: 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 E
CULTURAL RESOURCES SURVEY REPORT

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FINAL

Intensive Cultural Resources Survey for the Hot Cargo Loading Area Project

Joint Base McGuire-Dix-Lakehurst

Burlington County, New Jersey

April 2021

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Intensive Cultural Resources Survey for the Hot Cargo Loading Area Project

Joint Base McGuire-Dix-Lakehurst

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April 2021

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Management Summary

Princeton Hydro, LLC (Princeton Hydro) and HDR, Inc. (HDR) were contracted to conduct a cultural resources survey of the proposed new hot cargo loading area (HCLA) pad in the McGuire area of Joint Base McGuire-Dix-Lakehurst (JB MDL) in Burlington County, New Jersey (Figure 1 and Figure 2). The proposed HCLA pad would replace the existing dual non-functioning HCLA pads (Project). The United States Army Corps of Engineers is the contract agency for the Project.

Portions of the HCLA Project Area are located within Cultural Resources Sensitivity Area 3, as identified in the installation's Integrated Cultural Resources Management Plan (ICRMP). The cultural resources survey of the HCLA Project Area was conducted to support compliance with Section 106 of the National Historic Preservation Act (NHPA), as amended, and its implementing regulations at 36 Code of Federal Regulations (CFR) Part 800. An archaeological survey was conducted in areas that would be subject to ground-disturbing activities. With built resources installed in the HCLA Project Area beginning in the 1960s, the existing HCLA required National Register of Historic Places (NRHP) evaluation under Section 106; thus, a built resources survey was also conducted as part of this investigation.

HDR archaeologist Owen Ford conducted the archaeological survey on March 16–17, 2021. New Jersey Historic Preservation Office (NJ HPO) standards for Phase I archaeological survey were implemented for this investigation. The archaeological survey covered 1.52 acres on the west side of the existing HCLA and excavated a total of 23 shovel tests. One wire nail was identified in a disturbed fill context. No other cultural resources were identified.

HDR architectural historian Diana Garnett conducted the intensive-level architectural survey on March 15–16, 2021. All work conducted for the architectural survey meets the Secretary of the Interior's Standards for Preservation Planning, Standards for Identification of Historic Properties, and Standards for Evaluation of Historic Properties (Standards), and guidelines established by NJ HPO's *Guidelines for Architectural Survey* (Splain n.d.). The architectural survey identified two sets of historic-age facilities (constructed in 1975 or earlier): the HCLA pads (Facility 1147) constructed in 1966; and two identical defense fighting position structures (DFPs; no facility number assigned), built ca. 1975. Additionally, a generator facility (Facility 1146), constructed ca. 1986, was recorded and evaluated for potential eligibility under Criteria Consideration G. HDR recommends that these resources are ***not eligible*** for inclusion in the NRHP.

Due to the absence of any NRHP-eligible or -listed properties in the Project Area of Potential Effects (APE), HDR further recommends that there are ***no historic properties affected*** by the proposed Project.

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Abbreviations and Acronyms

ADB	Air Defense Base
AFB	Air Force Base
AFMAN	Air Force Manual
APE	Area of Potential Effects
BOMARC	Boeing Michigan Aeronautical Research Center
ca.	circa
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
DAFI	Department of the Air Force Instruction
DESR	Defense Explosives Safety Regulation
DoD	Department of Defense
EA	Environmental Assessment
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EO	Executive Order
ES	exposed site
FONPA	Finding of No Practicable Alternative
FONSI	Finding of No Significant Impact
ft^2	square feet
HCLA	Hot Cargo Loading Area
HDR	HDR, Inc.
IBD	inhabited building distance
JB MDL	Joint Base McGuire-Dix-Lakehurst
N.J.A.C.	New Jersey Administrative Code
NEPA	National Environmental Policy Act of 1969
NEW	net explosive weight
NJ HPO	New Jersey Historic Preservation Office
NJDEP	New Jersey Department of Environmental Protection
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
PAH	polyaromatic hydrocarbon
PES	potential explosion site
PTRD	public traffic route distance
QD	quantity distance
SAC	Strategic Air Command
SAGE	Semi-Automatic Ground Environment
SVOC	semi-volatile organic compound
TCE	trichloroethylene
UFC	Unified Facilities Criteria
USAF	United States Air Force
USDA	United States Department of Agriculture
WWI	World War I
WWII	World War II

1 Introduction

1.1 Introduction

Princeton Hydro, LLC (Princeton Hydro) and HDR, Inc. (HDR) were contracted to conduct a cultural resources survey of the proposed new hot cargo loading area (HCLA) pad in the McGuire area of Joint Base McGuire-Dix-Lakehurst (JB MDL) in Burlington County, New Jersey (Figure 1 and Figure 2). The United States Army Corps of Engineers is the contract agency for the Project. The proposed HCLA pad would replace the existing dual non-functioning HCLA pads (Project). The existing HCLA pads at the McGuire area are nonoperational, inefficient, and are not compliant with Department of Defense (DoD) Unified Facilities Criteria (UFC) requirements. The proposed HCLA pad would be compliant with applicable UFC requirements and enable JB MDL to safely and efficiently airlift, transport, and store munitions. The Project includes demolition of two existing HCLA pads and construction of a 162,195-square foot (ft^2) HCLA apron of rigid pavement with 50-foot asphalt shoulders; a 50,399-ft^2 taxiway apron with 25-foot shoulders connecting to Taxiway “Lima”; 17,091 ft^2 of pavement for a vehicular access road and staging area; shoulder, taxiway edge, and high mast exterior area lighting; pavement markings; stormwater drainage system; security fencing; and utilities.

Pursuant to Section 106 of the National Historic Preservation Act (NHPA) and in accordance with 36 Code of Federal Regulations (CFR) Part 800 (Protection of Historic Properties), this Project is an undertaking, and United States Air Force (USAF) and United States Army Corps of Engineers are required to determine whether there are any cultural resources present within the area of potential effects (APE) that are eligible for listing (or already listed) in the National Register of Historic Places (NRHP), and if so, whether the proposed HCLA work would have an effect on identified historic properties.

Portions of the HCLA Project Area are located within Cultural Resources Sensitivity Area 3, as identified in the installation’s Integrated Cultural Resources Management Plan (ICRMP). An archaeological survey was conducted in areas that would be subject to ground-disturbing activities. With built resources installed in the HCLA Project Area beginning in the 1960s, the existing HCLA required NRHP evaluation under Section 106 of the NHPA, as amended; thus, a built resources survey was also conducted as part of this investigation.

HDR archaeologist Owen Ford conducted the archaeological survey on March 16–17, 2021. The archaeological survey covered 1.52 acres on the west side of the existing HCLA and excavated a total of 23 shovel tests. One wire nail was identified in a disturbed fill context. No other cultural resources were identified.

HDR architectural historian Diana Garnett conducted the architectural survey on March 15–16, 2021. The architectural survey identified two sets of historic-age facilities (constructed in 1975 or earlier): the HCLA pads (Facility 1147), constructed in 1966; and two identical defense fighting position structures (DFPs; no facility number assigned), built ca. 1975. Additionally, a generator facility (Facility 1146), constructed ca. 1986, was recorded and evaluated for potential

eligibility under Criteria Consideration G. HDR recommends that these resources are ***not eligible*** for inclusion in the NRHP.

This cultural resources survey report presents background research, research design, methods, survey results and analysis, and recommendations adhering to the guidance provided in *Guidelines for Preparing Cultural Resources Management Archaeological Reports* (2000) and *Guidelines for Architectural Survey*, including maps, photographs, shovel test and artifact logs, and inventory tables. Per Historic Preservation Office (HPO) guidance, archaeological and architectural survey results are presented jointly in this report. Architectural survey forms were prepared and are included in Appendix A.

1.2 Area of Potential Effects

The Project area of potential effects (APE) is the "geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist" (36 CFR 800.16(d)). The archaeological APE was limited to the areas within the Project Area that would be subject to ground-disturbing activities, a total of 1.52 acres (Figure 3).

The architectural APE was limited to the Project Area. The Project would not change the character of the HCLA nor its visual relationship with base buildings and structures in its vicinity; therefore, the architectural APE did not require expansion beyond the Project Area to account for potential visual impacts.

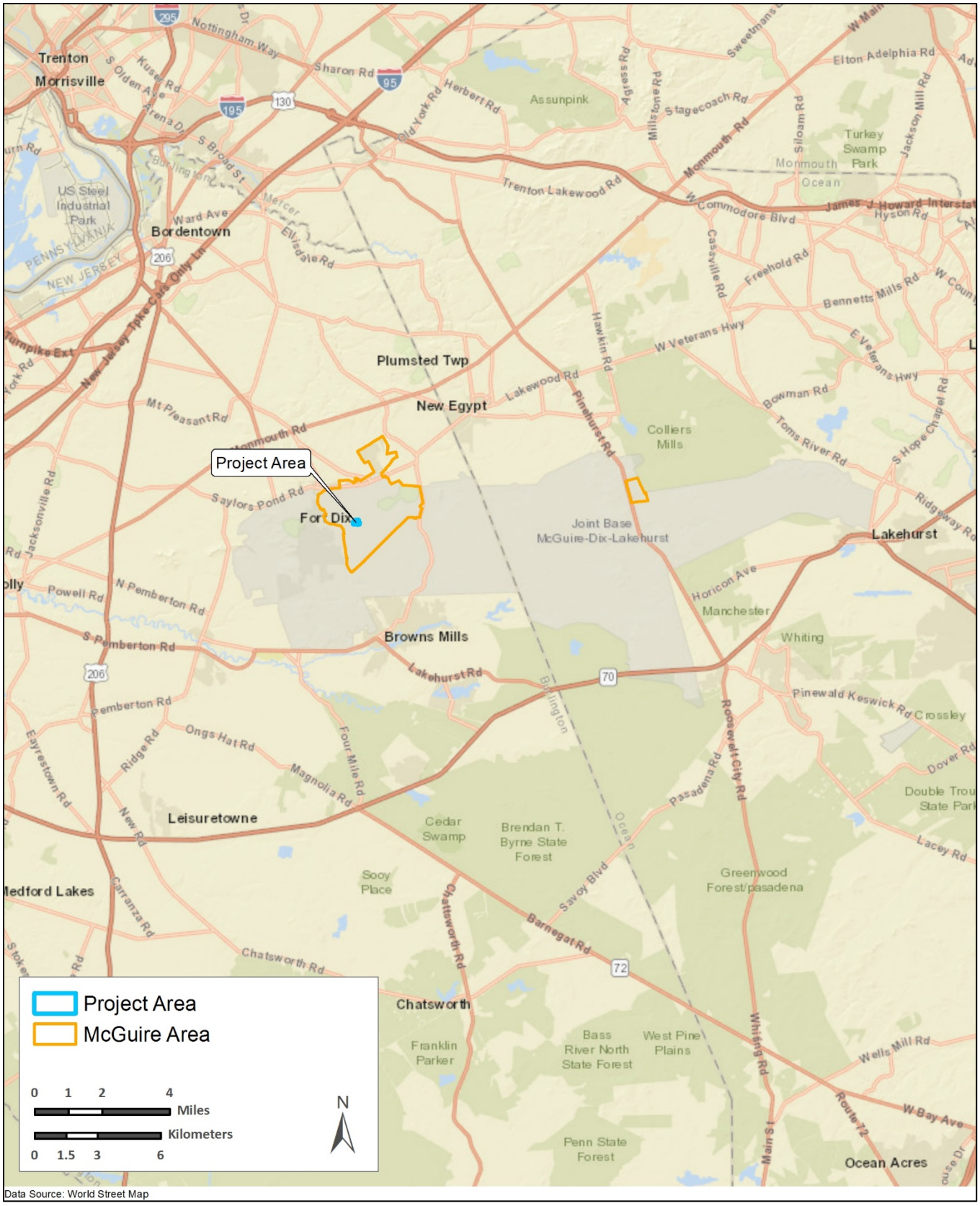

Figure 1. Project vicinity.

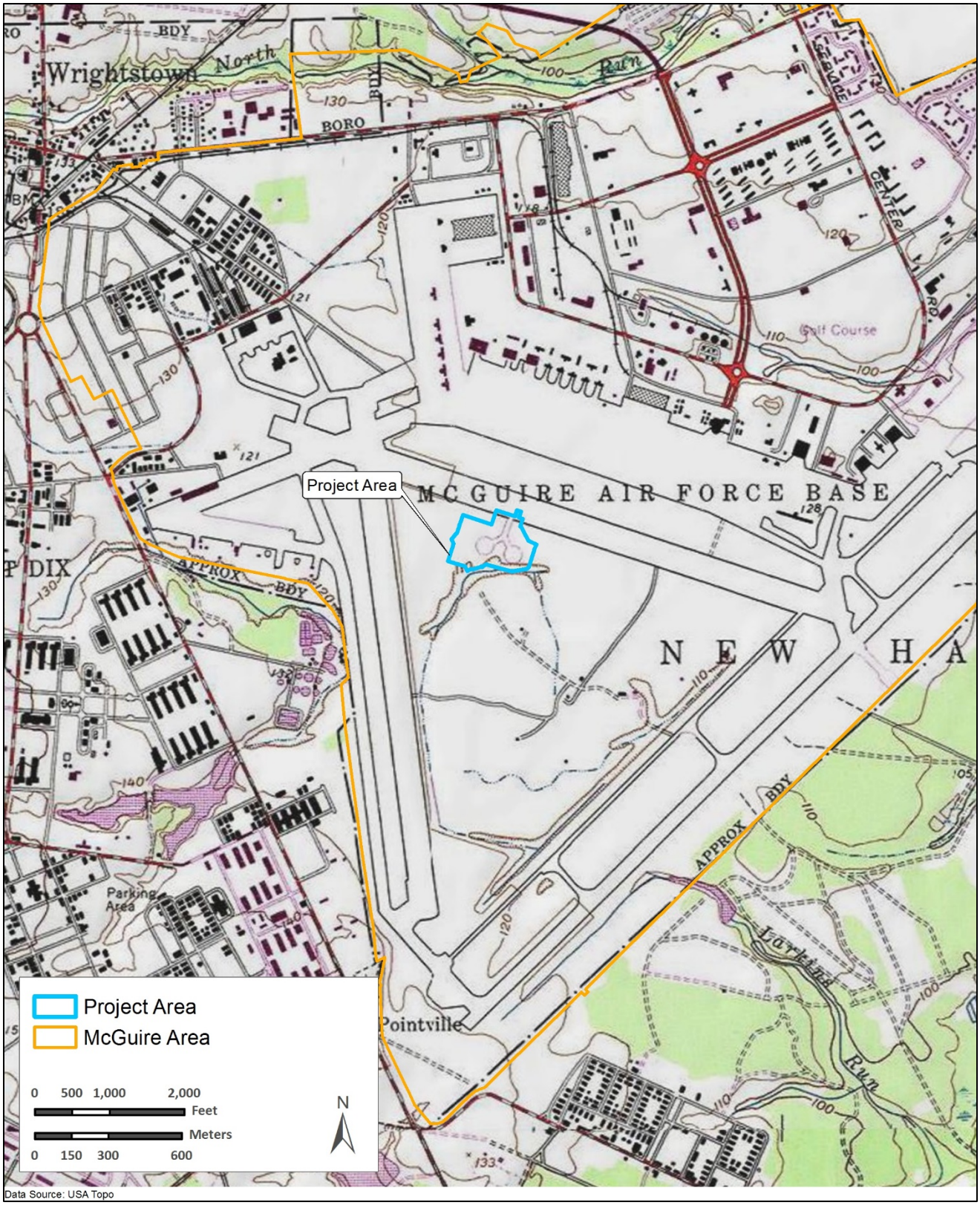

Figure 2. Project location.

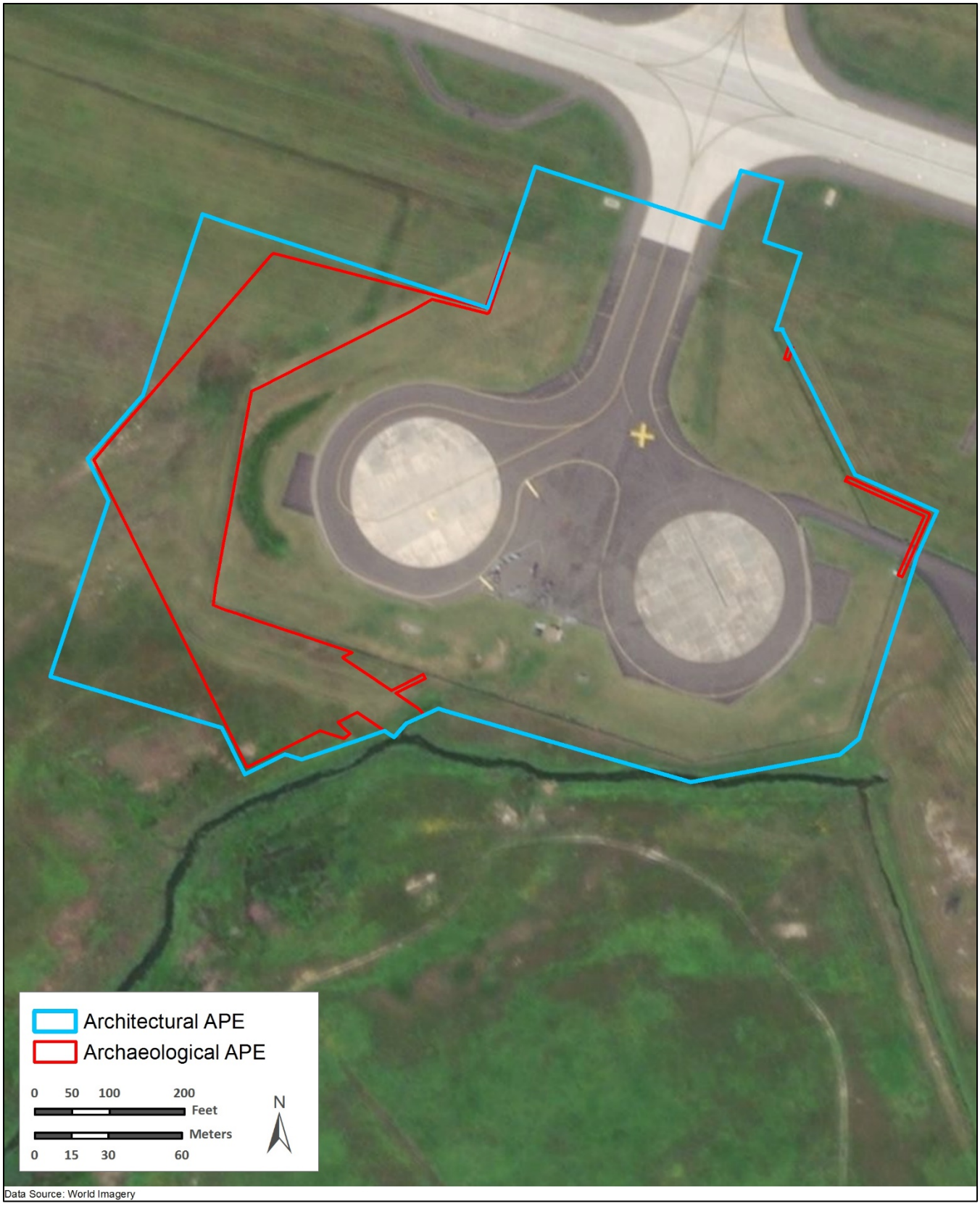

Figure 3. Archaeological and Architectural APEs.

2 Environmental Setting

This section specifically describes the current baseline environmental conditions of the McGuire area at JB MDL.

2.1 Physiography

The HCLA Project Area is located within the McGuire area of JB MDL in New Hanover Township, Burlington County, in central New Jersey. The Project Area is approximately 30 miles east of Philadelphia, 60 miles south of New York City, 55 miles south of Newark, and 28 miles west of the Atlantic Ocean.

JB MDL is located within the Pinelands National Reserve (Reserve), commonly referred to as the Pinelands. The Reserve consists of approximately 1.1 million acres in southern New Jersey and is managed by the New Jersey Pinelands Commission. The Reserve includes portions of Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, and Ocean Counties.

Elevations range between 99 to 116 feet above sea level within the HCLA Project Area, as referenced to the North American Vertical Datum of 1988 (NAVD88).

2.2 Geology and Soils

The McGuire area of JB MDL is located within the Outer Coastal Plain. The Outer Coastal Plain is New Jersey's largest physiographic province, consisting of about 2.25 million acres, and includes all of Cape May, Cumberland, Atlantic, and Ocean Counties, and parts of Salem, Gloucester, Camden, Burlington, and Monmouth Counties.

The HCLA Project Area lies entirely within the Cohansey Sand Formation, a formation composed of unconsolidated, yellow quartz sand with gravel, silt, and clay. The Cohansey Formation, which overlies the Kirkwood Formation, is the most extensive surficial deposit in the New Jersey Coastal Plain (U.S. Geological Survey [USGS] 1993). The Cohansey Sand Formation is primarily 50 to 100 feet thick within the JB MDL area (JB MDL 2015a). Its sandy nature exerts a major influence on the region as soils that have developed are generally droughty, acidic, and low in nutrients.

Burlington County, New Jersey has a low earthquake risk. The largest potentially active fault in New Jersey is the Ramapo Fault, situated within northern New Jersey where numerous minor earthquakes have been recorded within approximately 20 miles of the fault (USGS 2008).

The Natural Resources Conservation Service's (NRCS) Soil Survey Geographic (SSURGO) database identifies the majority of soils present within the HCLA Project Area as members of the Galloway and Woodstown series (NRCS 2020). Table 1 lists the soil series mapped within the HCLA Project Area, their drainage class and farmland designation.

Table 1. Soil Series within the HCLA Project Area

Series ID	Series Name	Drainage Class
GahB	Galloway sand, 0 to 5 percent slopes	Moderately well drained
ShsA	Shrewsbury fine sandy loam, 0 to 2 percent slopes	Poorly drained
WolfA	Woodstown fine sandy loam, 0 to 2 percent slopes	Moderately well drained

The soils of the Galloway series are mesic, coated Aquic Quartzipsamments (United States Department of Agriculture [USDA] 2015a). These deep, moderately well drained soils formed in sandy, unconsolidated marine sediments. Slopes range from 0 to 5 percent. A typical pedon of Galloway loamy sand consists of 0 to 9 inches dark grayish brown (10YR 4/2) loamy sand; 9 to 28 inches light yellowish brown (10YR 6/4) loamy sand; 28 to 58 inches white (2.5Y 8/2) gravelly sand; and 58 to 72 inches white (2.5Y 8/1) sand. These soils are predominately non-hydric.

The soils of the Shrewsbury series are fine-loamy, mixed, active, mesic Typic Endoaquults (USDA, 2002). These deep, poorly drained soils formed in loamy marine sediments that contain moderate amounts of glauconite that have been influenced by eolian or alluvial action in places. Slope ranges from 0 to 2 percent. A typical pedon of Shrewsbury fine sandy loam consists of 0 to 10 inches dark gray (10Y 6/1) fine sandy loam; 10 to 14 inches gray (5Y 6/1) fine sandy loam; 14 to 24 inches mixed gray (5Y 5/1), light olive gray (5Y 6/2), greenish gray (5GY 5/1), light gray 5Y 7/1) and dark gray (10YR 4/1) gray sandy clay loam; 24 to 32 inches greenish gray (5GY 5/1) sandy clay loam; and 32 to 60 inches alternating strata of olive gray (5Y 5/2) loamy sand and fine sandy loam, and white (10YR 8/1) sand. These soils are predominately hydric.

The soils of the Woodstown Series are fine-loamy, mixed, active, mesic Aquic Hapludults (USDA 2015b). These deep moderately well drained soils formed in sandy marine and old alluvial sediments. Slopes range from 0 to 30 percent. A typical pedon of Woodstown sandy loam consists of 0 to 7 inches dark grayish brown (2.5Y 4/2) sandy loam; 7 to 11 inches light yellowish brown (2.5Y 6/4) sandy loam; 11 to 19 inches light olive brown (2.5Y 5/6) sandy clay loam; 19 to 29 inches light olive brown (2.5Y 5/6) sandy clay loam; 29 to 45 inches light brownish gray (2.5Y 6/2) sandy loam; and 45 to 70 inches light gray (5Y 7/2) loamy sand. These soils are predominately non-hydric.

2.3 Hydrology

Underlying the McGuire area of JB MDL is the Cohansey Sand Aquifer Formation. This aquifer is primarily composed of sand, with minor lenses of silt and clay interspersed with gravel. The Cohansey Sand Aquifer Formation is relatively shallow in depth and is highly permeable, making potential contamination a high concern. Immediately below the Cohansey Sand Aquifer Formation is the Kirkwood Formation. Together, these two aquifers are estimated to contain up to 17 trillion gallons of water (Pinelands Preservation Alliance 2020). The depth to water table within the HCLA Project Area ranges, approximately, between 0.66 and 2.6 feet (NRCS SSURGO n.d.).

2.4 Flora and Fauna

The McGuire area of JB MDL is located within the Eastern Broadleaf Forest (Oceanic) Province, which is characterized by a temperate deciduous forest. Forest vegetation is divided into three major associations: mixed mesophytic, Appalachian oak, and pine-oak (JD MDL 2008). The majority of land within the McGuire area is improved (developed) or highly disturbed. Vegetation communities within the McGuire area of JB MDL consist of grasslands in the airfield region, an out-of-use golf course, and lawns or landscaped areas adjacent to buildings and other structures. Early successional meadow and grassland communities exist along the southeastern portion of the McGuire area as a consequence of periodic mowing. Plant diversity is quite variable, though the dominant species typically include brome grass (*Bromus* sp.), panic grass (*Panicum* sp.), broomsedge (*Andropogon virginicus*), little bluestem (*Schizachyrium scoparium*), and the invasive spotted knapweed (*Centaurea maculosa*) (JB MDL 2012).

Vegetation in and within the vicinity of the HCLA Project Area is dominated by modified palustrine emergent wetland, upland meadow and maintained lawn. The herbaceous layer of the palustrine emergent wetland is dominated by soft rush (*Juncus effusus*) and white avens (*Geum canadense*). Non-wetland portions of the HCLA Project Area consist of upland meadow and maintained lawn. The herbaceous layer of the upland meadow vegetative community is dominated by wild garlic (*Allium vineale*), tall blue lettuce (*Lactuca biennis*), and common mullein (*Verbascum thapsus*). The maintained lawn vegetative community is composed of an unidentified cool season grass species. Both upland vegetative communities are disturbed due to a prescribed mowing regime (JB MDL 2012).

There have been no mammal surveys conducted at the McGuire area of JB MDL other than rare species surveys; however, the mammalian communities are representative of the New Jersey Pine Barrens. Common medium to large mammals that may occur include white-tailed deer (*Odocoileus virginianus*), gray fox (*Urocyon cinereoargenteus*), opossum (*Didelphidae* spp.), and raccoon (*Procyonidae* spp.). Species that are less common may include red fox (*Vulpes vulpes*) and eastern coyote (*Canis latrans*). Groundhogs (*Sciuridae* spp.) are reportedly rare in the Pine Barrens, but they can occur along grass taxiway zones and lawn areas at the base. Common small to medium mammals that may occupy upland forests include eastern gray squirrel (*Sciurus carolinensis*), red squirrel (*Sciurus vulgaris*), and southern flying squirrel (*Glaucomys volans*). Small mammals that may occur in dry upland areas include the white-footed mouse (*Peromyscus leucopus*) and pine vole (*Microtus spp.*) (JB MDL 2012).

3 Cultural History

According to the JB MDL ICRMP (2018b), the cultural history for New Jersey is generally divided between prehistory and history, with the appearance of artifacts of European origin in the archaeological record around A.D. 1650. Contact with Europeans is inferred from this point in time and later. Prehistory, which comprises the bulk of time within the cultural history (10,500 B.C.–A.D. 1650) is divided into three main periods: Paleoindian, Archaic and Woodland (Table 2). The distinctions among the periods rest primarily on climate changes as well as changes in lifeways, including technology, settlement and food preferences. Archaeological sites dating from all periods in New Jersey culture history have been found on JB MDL.

Table 2. Cultural Chronology

Cultural Stage	Time Periods
Paleoindian	10,500–8,000 B.C
Archaic	8,000–1,000 B.C.
Woodland	1,000 B.C.–A.D. 1650
Historic	A.D. 1650–1970

3.1 Prehistoric

3.1.1 Paleoindian Period (10,500–8,000 B.C.)

Although glacial sheets did not reach as far south as Burlington County, climatic changes resulting from glaciation had an effect on the landscape of the Pinelands and its ability to sustain human and animal populations. As the glaciers retreated from northern New Jersey between 18,000 and 12,000 years ago, southern New Jersey was cold and wet, with dense forests of mostly spruce, fir, birch, and alder; pine and oak became dominant after post-glacial times (Buell 1970). During the immediately following Holocene period, temperatures rose dramatically, and the glaciation retreated. Rising temperatures led to changes of vegetation in the region. By approximately 10,000 years ago, a pine-oak-hemlock forest cover developed that was soon succeeded by the pine-oak forests that now characterize the Pinelands. Large Pleistocene megafauna (e.g., mammoth and mastodon) became extinct, and white-tailed deer moved into the area as resident caribou and moose migrated north away from the region following more familiar climate.

Humans first occupied portions of the Pinelands by as early as 10,500 B.C. during what is termed the Paleoindian period. The Paleoindian is the first of four major periods, or cultural traditions, that archaeologists have delineated for the prehistory of North America. Paleoindian peoples were hunter-gatherers that traveled in small nomadic bands in search of migratory game such as mastodons, mammoths, fox, fossil bear, seal, great beaver, fossil peccary, white-tailed deer, elk, moose, bison, horse, and caribou (Marshall 1982). Due to the nomadic nature of Paleoindian populations, sites are generally small and ephemeral with few artifacts (Chesler 1982; Pagoulatos 1992).

Paleoindian sites are represented archaeologically by isolated finds of stone tools, including primarily the long, finely crafted, fluted Clovis projectile points that were hafted to the ends of spears. Although rare, Paleoindian sites have been documented in the region, including some with subsurface components (Stewart 1995). Landscape features such as glacial lakes and peri-glacial thermokarsts basins are known to have been preferred sites for Paleoindian habitation (Pagoulatos 1992). Such features known as “vernal pools” can be identified as circular shallow basins on LIDAR imagery and have the potential to be locations for Paleoindian habitation.

3.1.2 Archaic Period (8,000–1,000 B.C.)

The Paleoindian period was followed by the Archaic and Woodland periods, respectively. A gradual warming trend occurred around 8,000 B.C. that immediately preceded the beginning of the Archaic Period. Archaeologists have divided this long era into four subperiods: Early Archaic (ca. 8,000–6,000 B.C.), Middle Archaic (ca. 6,000–4,000 B.C.), Late Archaic (ca. 4,000–2,000 B.C.), and Terminal Archaic (ca. 2,000–1,000 B.C.) (ASNJ 2013). The Archaic generally dates between 8,000 and 1,000 B.C. This period was characterized by a cool, moist climate that supported a closed boreal forest environment dominated by spruce, fir, and birch. The closed forest environment resulted in a significant reduction in the large migratory herds of caribou.

Archaic peoples are known to have been foragers who harvested a wider range of plant, animal, and marine-related resources than those of the preceding Paleoindian period. Ground stone tools were also more commonly used as were stone bowl containers. Archaic settlements included sites occupied for longer periods of time, suggesting that populations may have been more territorial, moved around less, and/or seasonally reoccupied household sites (Kraft 1986). A total of 119 Archaic sites, mainly Late Archaic, have been recorded for the Pinelands. The greater number of sites when compared with the preceding period suggests that populations were growing or at least using the Pinelands area more intensively. Archaic period sites are more numerous than Paleoindian sites on JB MDL and tend to be associated with later Woodland period components as well.

3.1.3 Woodland Period (1,000 B.C.–A.D. 1650)

The Woodland period in New Jersey generally dates between 1,000 B.C. and A.D. 1650. The chronological division is based primarily on the introduction of clay pottery, as a continuation of the cultural and subsistence patterns of the Late Archaic occurred within the Early/Middle Woodland periods. By the Late Woodland period, the introduction of horticulture is correlated with increased residential permanence in specific resource zones for extended periods of time (Kraft 1986).

An oak-hickory-pine forest can be postulated for much of the New Jersey Coastal Plain after ca. 1,000 BC; essentially modern faunal patterns were probably established around this time (Louis Berger 1987). Presently, the only clear criterion for distinguishing Late Archaic cultures from the Early Woodland cultures is the appearance of thick, plain ceramics in the latter period. Changes between the Early and Middle Woodland periods are subtle and reflect a gradual intensification of earlier Archaic subsistence and settlement patterns.

Populations appear to have become more sedentary, and a limited amount of plant cultivation may have begun to take place. Site types included base-camps that were occupied for most of

the year, along with other, more specialized sites, such as fishing stations, shellfish middens, hunting/gathering camps, and mortuary sites (Williams and Thomas 1982). People subsisted on a diet that included shellfish, deer, fowl, fish, and nuts. Early Woodland ceramics are characterized by relatively thick, cord-marked sherds with crushed shell for temper. Middle Woodland pottery assemblages differ from Early Woodland pottery assemblages in the use of net impressions and zone decoration (Stewart 1995). By Middle Woodland times, relict landforms, like the thermokarst basins, are thought to have disappeared from the landscape, replaced in importance by the Delaware River and its tributaries (Pagoulatos 1992).

The domestication and cultivation of maize (as well as squash and beans) is thought to have brought about changes in the subsistence and settlement patterns of Late Woodland people. Food production supported larger populations and permitted the establishment of larger, year-round base camps. Hunting continued, but with the use of the bow and arrow (Stewart 1995). Larger, more sedentary populations are thought to have coincided with food production and an increased need for food storage. The presence of pit features lined with shells (the latter possibly to improve drainage) suggests the advent of foodstuff storage (Custer and Griffith 1986). Artifact assemblages seem to reflect a change only in artistic emphasis from the Middle Woodland period and continue to reflect the functional diversity associated with exploiting a broad resource base. A variety of bone and antler tools were also used during this time and copper was used for ornaments (Cross 1956:118–120).

3.2 Historic Period

3.2.1 Pre-Military History

The Lenape were the earliest inhabitants of the present-day JB MDL territory in the historic period. The Lenape were named the “Delaware” by Europeans. Europeans first arrived in the area in the sixteenth century. By the seventeenth century, Dutch and Swedish traders had established trading posts along the lower Delaware River, and exchanged furs, pelts, copper and brass, muskets, and glass beads with the Native Americans. European colonists during the seventeenth century were mostly transient, and made a living trapping, fishing, and whaling. By the mid-seventeenth century, the Dutch and English had begun to establish colonies along the lower Delaware and Hudson Rivers. Following the 1758 Treaty of Easton, which established the Ohio Valley as Indian territory, many Native Americans left the area and settled in the Ohio Valley, and then later settled in Oklahoma and Ontario. By 1759, approximately 300 Delaware remained in present-day New Jersey (JB MDL 2018b: Appendix M).

The earliest European settlements in the area were established by the Dutch West India Company (1624–1626), followed by Swedish and Finnish (1638) and English (1640s) colonists. Settlement remained unstable and impermanent until the colony of New Jersey was consolidated under British rule in 1701. Settlement spread to the present-day vicinity of JB MDL ca. 1704. The earliest communities in the area included New Hanover Township (1723) and Wrightstown (pre-1775). Closest to the present-day McGuire area was a settlement known as Centerville (later known as Scrabbletown, then Pointville), which grew around the discovery of iron in the area. The iron industry catalyzed further local development as the construction of formal, improved roads required for transportation of goods also facilitated population growth

and the establishment of support services. By the end of the eighteenth century, multiple sawmills and bog iron furnaces were operating in the area. Inns and taverns were established along the Wrightstown-to-Brown's Mill Road and Scrabbletown Road (now Juliustown Road). The timber and sawmill industry remained an economic mainstay even as the iron industry declined during the nineteenth century.

In the nineteenth century, railroads provided a major impetus for growth in economy and population. The Delaware and Atlantic Railroad was built through Lewistown and Juliustown in the 1830s, and the Pemberton Hightstown Railroad was constructed through Wrightstown in 1864. Railroads connected the region to markets in New York City and Philadelphia. Bypassed by both of these railroads, Pointville's significance as a commercial center waned. Following the Civil War, agriculture, and notably cranberry cultivation, assumed an expanding role in the local economy. Lumbering and sawmills also continued to thrive through the nineteenth century (JB MDL 2018b: Appendix M).

Lumbering, sawmills, and agriculture remained the primary economic drivers for the region into the early twentieth century. Despite farmland acreage declining between 1890 and 1910 statewide, the number of farms and cranberry bogs in Burlington County increased. Cranberry bogs in the county reached a peak acreage of 11,000 in the 1920s. However, this acreage declined significantly during the 1930s and 1940s when many cranberry bogs were replaced in favor of acreage dedicated to blueberries and other truck-farm produce, as well as dairy and poultry farms. Although the number of cranberry bogs declined in the mid-twentieth century, improved harvesting and processing techniques allowed for much greater production on remaining bogs (JB MDL 2018b: Appendix M).

A decline in the local population in the early twentieth-century reflected the decline in local, labor-intensive manufacturing industries. An economic and population resurgence occurred notably with the establishment of Camp Dix in 1917. Pointville's sawmills produced building materials and firewood for the new military camp, and the town also provided living quarters for soldiers until construction of the camp was complete. During expansion of the base in the 1940s, buildings in Pointville were demolished, leaving only the community cemetery (JB MDL 2018b: Appendix M).

3.2.2 Military History

The military's presence at present day JB MDL began in 1917 with the establishment of Camp Dix, a staging center for troops deploying during World War I (WWI). After WWI, the camp served as an in-processing center for the Civilian Conservation Corps, and as the Civilian Conservation Corps headquarters for southern New Jersey. In 1938, Fort Dix Airport was established; in 1941, as the United States prepared for entry into World War II (WWII), Fort Dix Airport was redesignated an Army Airfield. Development of the base was rapid and construction was largely designed to be temporary. During the war, Fort Dix was used as a basic training center and a mobilization center, and the airfield was used by observation units, including an anti-submarine patrol squadron. The airfield additionally supported air unit deployments to North Africa and Europe. At the war's end, Fort Dix Army Air Base became a demobilization center for returning troops.

Following a period of deactivation after WWII, the base was reactivated by the newly created USAF in 1948. The base was renamed McGuire Air Force Base (AFB) in honor of WWII ace pilot and Medal of Honor recipient Major Thomas McGuire. The temporary-type construction characterizing the Army air base was upgraded and improved, and a campaign was launched to rehabilitate and construct a new runway, office buildings, and housing. In the late 1940s, McGuire AFB was placed under the command of Strategic Air Command (SAC), and then made an Air Defense Base (ADB). As an ADB, the base's mission was to defend the Mid-Atlantic against potential Soviet attack. The ADB was fitted with surface-to-air missiles and jet interceptors. During the 1950s, McGuire's mission was changed to serve military airlift (McGuire-Lakehurst-Dix Housing 2021).

The following context on the previously evaluated SAGE (Semi-Automatic Ground Environment) and Boeing Michigan Aeronautical Research Center (BOMARC) is excerpted from Chapter 8.0 Cultural Resources Inventory of the Integrated Cultural Resources Management Plan JB MDL *[JB MDL 2018b], pages 54-57).*

> The SAGE (Semi-Automatic Ground Environment) building (Building 1907) was originally constructed in 1956 as a control center for communications and remote missile launching for the NIKE and BOMARC missile systems. The communication system was designed to cover the entire continental United States and SAGE complexes were originally planned for 32 installations. The full complement of SAGE complexes was never constructed, however, due to funding constraints and the shift of defensive focus from bomber attack to Intercontinental Ballistic Missiles.
>
> One of the first SAGE combat and command centers in operation when constructed in 1956, it functioned as a control center for communications and remote missile launching for the NIKE and BOMARC missile systems (John Cullinane Associates 1996, Murphey 1998a). The communications concept represented in SAGE was a significant step in the development of the United States' air defense system and represents an important element in America's Cold War strategy. The windowless SAGE building was an integral part of the air defense center concept and housed emerging computer technology designed to monitor and assist the air defense of the United States; the building was designed around, and built for, the computer system it housed.
>
> Another significant Cold War development at McGuire was the Boeing Michigan Aeronautical Research Center (BOMARC), constructed between 1957 and 1959. The complex of 110 one-story buildings and structures developed as a launch site for the BOMARC missile. It was originally designed to be self- contained and not dependent on outside supplies of electricity or fuel. All of the buildings and structures are utilitarian in design and display no distinct architectural style; they are all built primarily of concrete, concrete block, and corrugated metal. Immediately adjacent to the central part of the site there are 56 type II BOMARC launch structures, laid out in four rows of 14 and centered around Goddard Boulevard, which is the primary north-south access through the site. Adjacent to

> these launch structures are 28 Type IV launch buildings, designed for use with the later BOMARC solid fuel missile. The entire north end of the site is contained within secondary fencing and is devoted to missile launch structures and warhead storage.
>
> As was the case with SAGE, BOMARC was initially planned to be distributed across the United States, primarily along the east and west coasts and along the northern border of the United States and Canada. However, in response to funding constraints in 1956, the programmed number of BOMARC sites was ultimately reduced from the proposed 52 (in 1952) to eight (in 1957). A Cold War study for McGuire (United States Air Force [USAF] AMC 1996) interpreted the BOMARC facility as exceptionally significant and recommended that it be considered eligible for the NR as an outstanding example of America's investment in high technology for defense. The property is the earliest constructed and largest BOMARC facility; and the only remaining intact facility of its kind. The BOMARC facility has been unoccupied since 1972, and has been largely dismantled since that time. [*End excerpt*]

In 1966, McGuire AFB developed the hot cargo loading area south of the main runway. The design of the HCLA was based on standard configurations for aircraft parking used by the SAC in the 1950s. The configurations most commonly consisted of a single, large apron parking with extended "stub parking" for individual planes, and on bases where explosives-laden aircraft landed, hot cargo loading pads that were further set apart from the large-scale parking (Wietze 1999:109). The HCLA at McGuire AFB included eight landing areas, with only pads 1 and 2 laid out in a circular pattern separated from the main runways (Figure 4).

With planes becoming heavier, engines more powerful, and cargo more volatile, the USAF and Army applied extensive experimentation in highway engineering to the planning of airfields and runways. During the late 1940s and the first half of the 1950s, SAC undertook major runway experimentation and studies at its various installations. In 1954, the USAF constructed two of the world's longest runways, at Kirtland AFB in Albuquerque and Edwards AFB in the Mojave Desert of Southern California. The Kirtland AFB runway was composed of a four-inch asphalt layer over 25-33 inches of subgrade compacted earth, gravel, and stone. The ends of this runway extended 1,000 feet in length and were concrete, 15 to 19 inches thick. The Edwards AFB runway served as the USAF's prototype for all future runways, and as a flight test facility. The 15,000-foot long runway, taxiways, parking aprons, and warm-up pads were constructed entirely of concrete, 17 to 19 inches deep. The Edwards AFB runway was engineered for aircraft weighing up to 500,000 pounds (Weitze 1999:94).

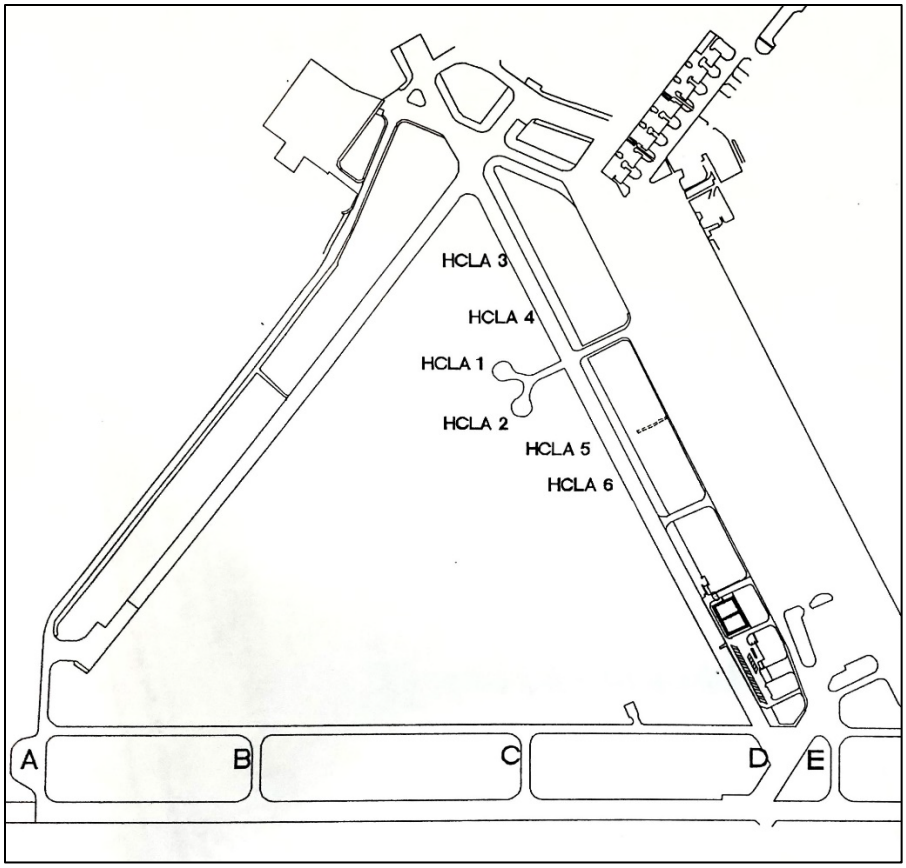

Figure 4. Six of the original HCLA locations (JB MDL Real Property Records).

Some experimentation and construction used asphalt or tar-rubber pavement. These materials were utilized at Dow AFB in Maine in 1952 and at Homestead AFB in Florida. The U.S. Rubber Company manufactured the tar-rubber pavement, called Sulfa-Aero-Sealz, and shipped it in by tanker trucks from New Jersey. Ultimately, testing conducted on the asphalt surfaces proved that the material was inferior to concrete pavement, and the USAF chose to use concrete for runway pavement exclusively at any primary use installation. The USAF continued to test the strength of concrete pavement, including use of prestressed concrete and reinforced concrete at Columbus AFB in Mississippi. By 1960, SAC was typically constructing its runways with a length measuring 13,000 to 13,500 feet (Weitze 1999:93–94).

The SAC also constructed runways and air facilities especially designed to facilitate alert systems of operation. Supporting these missions required construction of a wide range of buildings and structures, and careful design to ensure good observation, rapid movement, and safe takeoff and landing. Stub pads were designed to allow for rapid departure. “Moleholes” were subterranean housing situated adjacent to runways in order for crews to make rapid departure. Bases where munitions were transported to and from, such as McGuire AFB, required additional hot cargo loading areas, which were sometimes repurposed or jointly used as alert-designed areas. At Travis and Campbell AFBs, these rows of hot cargo loading pads extending off of the runway were an especially substantial presence (Figure 5) (Weitze 1999:108–110).

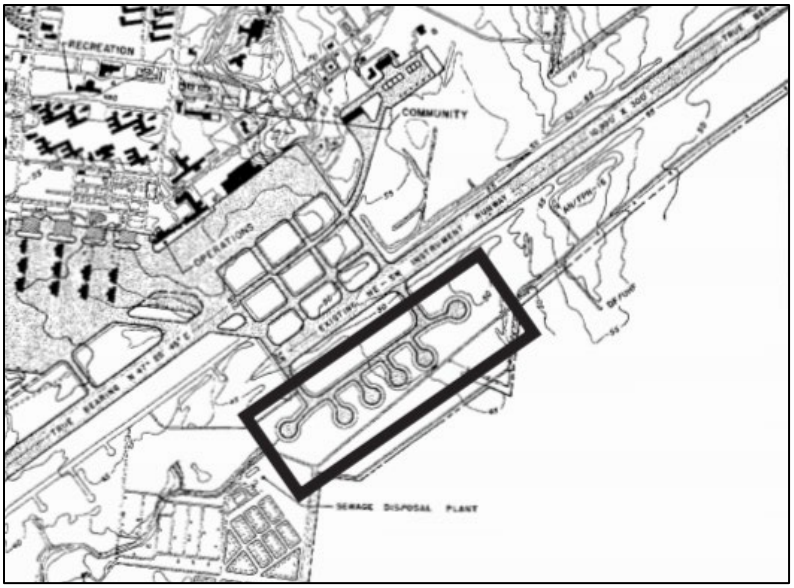

Figure 5. Hot cargo loading area at Travis AFB in California (Weitze 1999: 111).

Two small, concrete defensive fighting positions were installed south and east of the HCLA pads at McGuire AFB to provide additional security for munitions transport operations. The defensive fighting positions were built as semi-subterranean buildings with low, flat roofs and narrow horizontal openings allowing for 360-degree observation. The current fence line was constructed around the HCLA in 1977. In 1986, a new concrete block generator shelter was built at the south end of the HCLA (JB MDL Real Property Records).

According to the JB MDL Cultural Resources Manager, McGuire AFB's HCLA remained in use through the Cold War; records indicate that it may have continued in use through the early 2000s before becoming defunct due to insufficient utilities and capacity to support modern aircraft. Historic aerials show that the asphalt taxi was repaved and repainted with different markings at various times during the 2000s, with some of the most recent markings applied ca. 2015 (HistoricAerials.com). The concrete loading pads have remained substantially unaltered. The airfield at McGuire AFB remains in active use, with ongoing construction of hangars and support buildings north of the HCLA.

4 Methods

4.1 Background Research

4.1.1 Archaeology

Prehistoric sites are rare in the Outer Coastal Plain of New Jersey, and no prehistoric archaeological sites have been identified on the McGuire area of JB MDL since the 1930s, likely due to the level of disturbance required to construct the base (JB MDL 2018b). As noted in archaeological surveys conducted at JB MDL between 1993 and 1996, streams that crossed the McGuire area may have been occupied by Native American tribes in prehistory; however, much of the McGuire area has been disturbed and is not likely to contain intact sites. However, undisturbed areas have the potential to contain prehistoric archaeological sites, albeit at a moderate to low probability (JB MDL 2018b).

There are no previously identified historic archaeological sites at the HCLA Project Area. The documented patterns of historic land use in Burlington County indicate that the predominant historic activities were related to forest and water products, including extraction of bog iron, timber, charcoal, cranberries and water power (JB MDL 2018b). An evaluation of historical archaeological sites in 1995 resulted in identification of two NRHP-eligible sites at the McGuire area of JB MDL under Criterion D: 28BU458 and 28BU459, both of which are mid-nineteenth- to early twentieth-century rural households (JB MDL 2018b). These sites are not within the HCLA APE.

Five areas were identified as high sensitivity for cultural resources at the McGuire area of JB MDL as a result of previous surveys. Of these five areas, it was determined that a portion of the HCLA APE is within Sensitivity Area 3, which was surveyed in 1993–1994 (Herbert and Grumet 1993; Moeller et al. 1995). NJ HPO archaeology survey standards have been updated since that time, and the current investigation was undertaken to verify the previous assessment's finding of no archaeological sites present within the HCLA APE.

4.1.2 Architecture

Nearly all buildings and structures at JB MDL that were constructed prior to 1966 have been inventoried previously, as well as the majority of Cold War-era resources (JB MDL 2018b). Several architectural resources at the McGuire area were initially identified as exceptionally significant under Criteria Consideration G (properties less than 50 years old), and then reevaluated upon reaching 50 years of age and recommended eligible as one discontiguous historic district: the BOMARC-SAGE Historic District (JB MDL 2018b). This historic district is not within the HCLA APE.

4.2 Survey Methods

4.2.1 Archaeological Methods

HDR archaeologist Owen Ford conducted the archaeological survey on March 16–17, 2021. Mr. Ford meets the Secretary of the Interior's Professional Qualification Standards for Archaeology.

All work conducted for the archaeological survey meets the NJ HPO standards and the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation.

NJ HPO standards for Phase I archaeological survey were implemented for this investigation. Pedestrian surface inspection was conducted while plotting the locations of subsurface testing units. Subsurface probing/shovel testing included a strategy of testing every 50 feet (15 meters) within a rectilinear grid. The probes/shovel tests were one foot (30 centimeters [cm]) in diameter and penetrated the full depth of intact Holocene sediment deposits (era of potential human occupation) according to typical area soil horizon descriptions from the USDA (2021). All excavated sediments were screened through ¼-inch mesh. Soil stratigraphy profiles for each subsurface test were recorded and digitally photographed. Each subsurface testing location was placed and recorded utilizing a sub-meter accurate Global Positioning Systems device. Overview photos were limited as care was taken to comply with JB MDL's security protocols as they pertain to photography.

4.2.2 Architectural Methods

HDR architectural historian Diana Garnett conducted fieldwork on March 15–16, 2021. Ms. Garnett meets the Secretary of the Interior's Professional Qualification Standards for Architectural History. All work conducted for the architectural survey meets the Secretary of the Interior's Standards for Preservation Planning, Standards for Identification of Historic Properties, and Standards for Evaluation of Historic Properties (Standards), and guidelines established by NJ HPO's Guidelines for Architectural Survey (Splain n.d.). Care was also taken to comply with JB MDL's security protocols as they pertain to photographs and site access. Digital photographs were taken of the two HCLA pads, surrounding taxi area, and structures located within the APE.

Real property records and associated plans, photographs, and other documentation of the HCLA were accessed at JB MDL's record center in order to locate construction dates and any relevant historical data related to the surveyed resources.

4.3 NRHP Eligibility Evaluation Criteria

As part of the Section 106 review process, cultural resources investigations are undertaken with the purpose of identifying resources that are listed in, or eligible for listing in, the NRHP. The assessment of significance of cultural resources is based on federal guidelines and regulations. Any cultural resource that is listed in or eligible for inclusion in the NRHP is known as a "historic property," and the term "eligible for inclusion in the NRHP" includes both properties formally determined as such by the Secretary of the Interior and all other properties that meet NRHP listing criteria (36 CFR 800.2). The criteria for evaluating properties for inclusion in the NRHP (36 CFR 60.4 [a–d]) are codified under the authority of the NHPA of 1966, as amended, and the Advisory Council on Historic Preservation has set forth guidelines to use in determining site eligibility. Subsequent to the identification of relevant historical themes and related research questions, four criteria for eligibility are applied.

The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, material, workmanship, feeling, and association and:

A. that are *associated with events* that have made a significant contribution to the broad patterns of our history; or
B. that are *associated with the lives of persons* significant in our past; or
C. that *embody the distinctive characteristics* of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
D. that have *yielded, or may be likely to yield, information important in prehistory or history*. Note that the application of Criterion D presupposes that the information imparted by the site is significant in history or prehistory [36 CFR 60.4, emphasis added].

The physical characteristics and historic significance of the overall property are examined when conducting NRHP evaluations. Although a property in its entirety may be considered eligible based on Criteria A, B, C, and/or D, specific data are also required for individual components therein based on date, function, history, physical characteristics, and other information. Resources that do not relate in a significant way to the overall property may contribute if they independently meet the NRHP criteria.

For a historic resource, district, or landscape to be determined eligible for the NRHP, it must retain enough of its historic integrity to convey its significance. For the NRHP, there are seven aspects of integrity:

1. Location
2. Design
3. Setting
4. Materials
5. Workmanship
6. Feeling
7. Association

Occasionally, certain resources fall into categories in which they must be evaluated further using one or more of the following Criterion Considerations. If a resource identified during the reconnaissance-level survey falls into one of these categories, the following Criterion Considerations will be applied in conjunction with one or more of the four NRHP criteria:

A. A religious property deriving primary significance from architectural or artistic distinction or historical importance, or
B. A building or structure removed from its original location but which is significant primarily for architectural value, or which is the surviving structure most importantly associated with a historic person or event, or
C. A birthplace or grave of a historical figure of outstanding importance if there is no other appropriate site or building directly associated with his or her productive life, or
D. A cemetery which derives its primary significance from graves of persons of transcendent importance, from age, from distinctive design features, or from association with historic events, or

E. A reconstructed building when accurately executed in a suitable environment and presented in a dignified manner as part of a restoration master plan, and when no other building or structure with the same association has survived, or
F. A property primarily commemorative in intent if design, age, tradition, or symbolic value has invested it with its own historical significance, or
G. A property achieving significance within the past 50 years if it is of exceptional importance (36 CFR 60.4).

The scientific value of archaeological sites is often assessed under Criterion D. With regard specifically to this criterion, the goal of prehistoric archaeological research and management is to fill gaps in the knowledge about specific research domains. Scientific importance is driven, in part, by the research paradigms of the time and in part by the amount of information available about a particular research topic in a specific geographic area. The most robust forms of scientific importance should honor diverse and occasionally competing schools of research interests and their attendant approaches. In order to fulfill Criterion D, a site must possess certain attributes (e.g., intact buried cultural strata with functionally and temporally diagnostic materials, datable cultural features) such that further intensive research at the site could be expected to add additional information to relevant research questions.

5 Results

One wire nail was identified in a disturbed fill context during subsurface testing. No other cultural materials were identified during the archaeological survey. The architectural survey resulted in the identification of two historic-age facilities within the APE (Facility 1147 and the two DFPs, documented as a single facility) (Figure 6). Neither architectural resource is recommended eligible for the NRHP. The results of each survey are presented separately in this chapter.

5.1 Archaeological Survey Results

Preliminary review of SHPO and JB MDL files pertaining to the approximate two-acre HCLA archaeological APE indicated the presence of no previously identified archaeological resources within the archaeological APE. The archaeological survey conducted March 16-17, 2021 included a pedestrian surface survey and the excavation of 23 shovel tests. In accordance with NJ HPO standards, shovel tests were distributed at approximately 50 ft. (15 meter) intervals in a rectilinear grid pattern within the area designated for subsurface testing (Figures 7 and 8). Upon arrival at the HCLA on March 16, 2021, access to 0.46 acre of the northern portion of the archaeological APE (approximately 23%) was impeded by construction crews (Figures 7, 8 and 9) working under a separate action. This reduced the archaeological area to 1.52 acres. Construction crews had removed topsoil, stockpiled backdirt, and parked heavy machinery atop the northern portion of the archaeological APE. Upon consultation with the JB MDL Cultural Resources Manager (Sharon White personal communication 2021), due to the presence of ongoing construction, ground disturbance, and backdirt piles, along with the negative results from the subsurface investigation, no shovel tests were conducted in the freshly disturbed northern area. All shovel tests except one were excavated to 40 inches (100 cm) below surface, the water table, and/or into culturally sterile subsoil (pre-Holocene deposits). Shovel Test 13 was abandoned in a very compact fill layer that neither shovel nor hand auger could penetrate. Shovel Test 22 had a single round wire nail in a gravel fill layer at 20 to 30 cm below surface. Due to the nail's location in a disturbed fill context, it was photographed and not collected. No cultural materials were identified within the other 22 excavated shovel tests. Several concrete well head access locations were noted to demonstrate areas of previous ground disturbance. A shovel test was not placed in the furthest western portion of the archaeological APE due to well head access disturbance (Figure 7). The pedestrian surface survey and subsurface testing resulted in no cultural resources identified, besides the wire nail in a disturbed fill context, within the archaeological APE.

Typical soil profiles (Figure 10) of the excavated shovel tests consisted of a disturbed fill layer extending from the surface to depths of 8 to 22 inches (20 to 55 cm) below surface. This is consistent with the expected disturbance from original construction and maintanence of the HCLA. The USDA database (2021) maps the current archaeological APE as Galloway sand (GahB). Intact Galloway sand is typically formed on dune landforms and is moderately well drained. Culturally sterile pre-Holocene C horizon soils are typically located at 20 to 32 inches (50 to 81 cm) below surface with water tables encountered 18 to 42 inches (45 to 106 cm) below surface (USDA 2021). Much of the intact holocene sediments had been impacted by the HCLA construction. More than half of the subsurface test encountered the water table within the USDA typical range at 33 to 39 inches (84 to 99 cm) below surface.

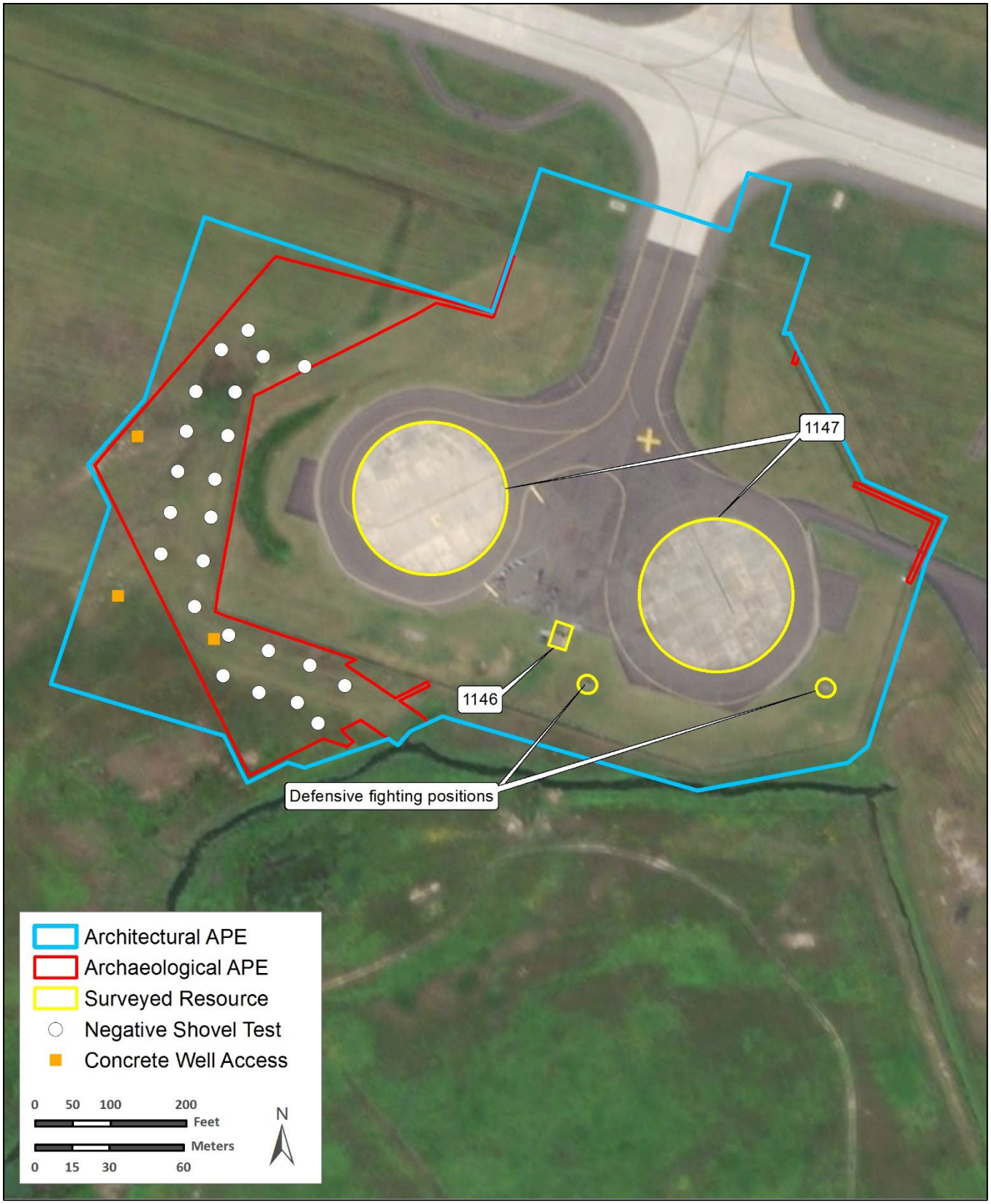

Figure 6. Archaeological and architectural survey results.



Figure 7. HCLA archaeological testing area, shovel test locations, current construction disturbance.



Figure 8. Overview of shovel test locations offset from existing fence line with construction disturbance visible in the background, view north.



Figure 9. Construction impeding access in the northern portion of subsurface testing APE.



Figure 10. Typical shovel test soil profile (ST 7) with darker fill layer atop intact sands to water table visible in the bottom of the unit.

5.2 Architectural Survey Results

Preliminary review of the HCLA architectural APE indicated the presence of three architectural resources associated with the HCLA (Figure 11). These included the two large concrete pads central to the HCLA, which were installed in the mid-1960s (Facility 1147); a concrete generator shelter (Facility 1146); and two defensive fighting position buildings (DFPs) that do not have known facility numbers. The architectural survey confirmed that the only components of the HCLA that are historic in age (50 years of age or older) and have not been previously evaluated for listing in the NRHP are the two concrete pads (Facility 1147) and potentially the two DFPs. Real property records indicate that the concrete pads were constructed originally in 1966. Records did not indicate a date of construction for the DFPs, but historic aerial imagery and the materials and form of the structures indicate that they were built between 1970 and 1990, with an estimated construction year ca. 1975. Facility 1146 was constructed ca. 1986 and documented for evaluation under Criteria Consideration G.

5.2.1 Facility 1147 – HCLA Pads

The two HCLA pads lie approximately 0.25-mile south of the main aircraft parking area at McGuire's Airfield, separated by a taxi lane and open grassy field (Figure 12, Figure 13, and Figure 15). The HCLA consists of two circular poured-concrete pads approximately 200 feet distant from one another, and surrounded by an asphalt-paved taxi area. The concrete pads were poured in square sections and painted with yellow (now much faded) markings. Two fuel spill holes are capped with flush metal lids on the west pad (Figure 14). The metal lids are marked with "Carsite Products Inc., Deer Park NY USA." Lining the east and west perimeters of the HCLA is a concrete drainage trench (Figure 16). Between the two pads, south of the asphalt-paved taxi surround, stands Facility 1146, the concrete generator building constructed in 1986 (Figure 17). Just southeast of Facility 1146 stands the west DFP; an additional 300 feet to the east stands the east DFP. A high metal fence with barbed wire overhang encloses the HCLA.

Little historic data could be found regarding construction of the HCLA at McGuire AFB in 1966. The area was developed during the Cold War era and was designed to support the base's airlift mission. The HCLA at McGuire AFB historically included eight loading areas, with only pads 1 and 2 (the two current pads) laid out in a circular pattern separated from the main runways (Figure 18). In 2000, loading areas 7 and 8 were removed (JB MDL Real Property). Ca. 1975, two small, concrete DFP buildings were installed south and east of the HCLA pads to provide additional security for munitions transport operations. The DFPs were built as semi-subterranean structures with low, flat roofs and narrow horizontal openings allowing for 360-degree observation (see Section 5.2.2). The current fence line was constructed around the HCLA in 1977. In 1986, a new concrete block generator house was built at the south end of the HCLA (JB MDL Real Property Records).

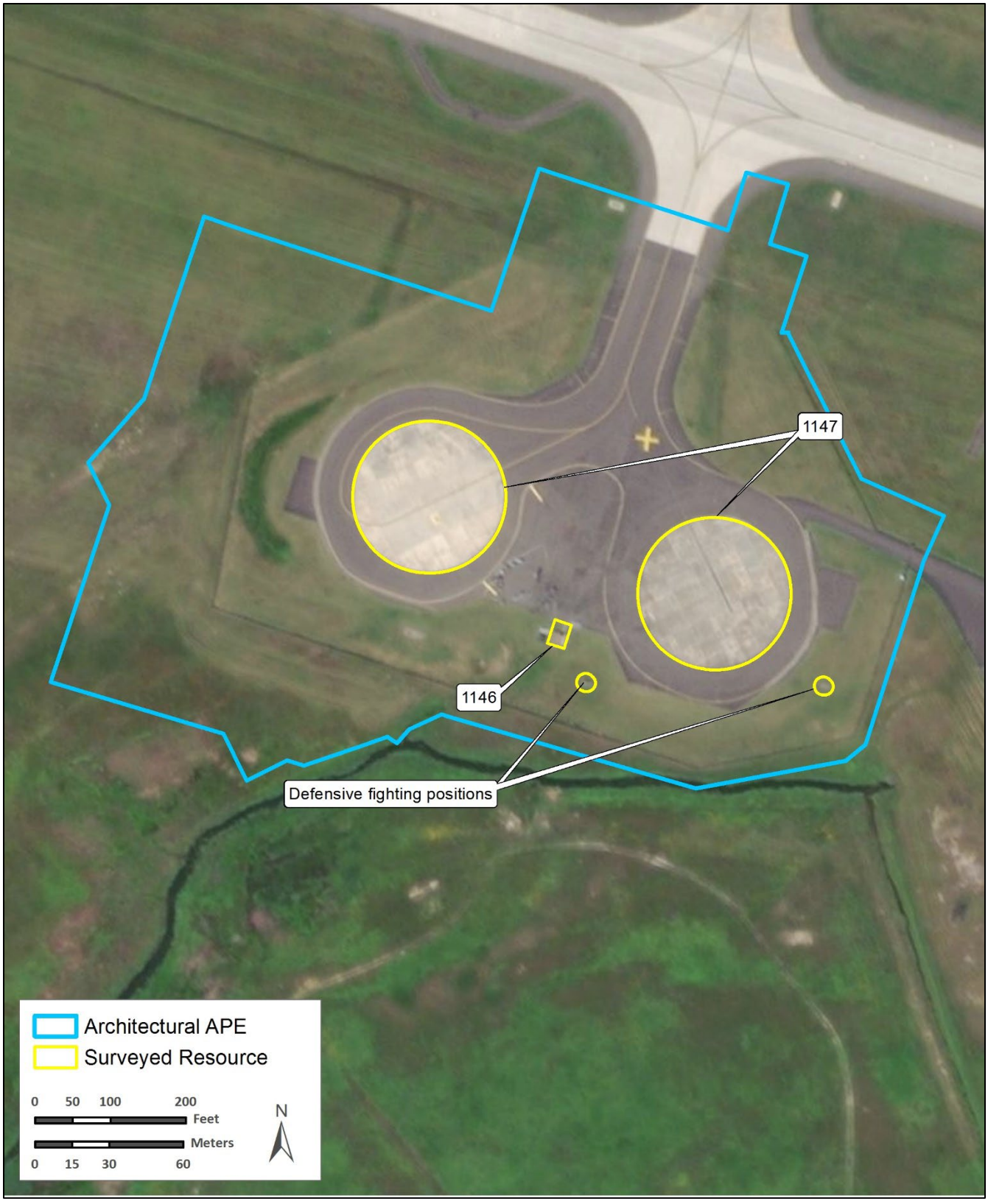

Figure 11. Architectural survey results.



Figure 12. HCLA: view from west edge of HCLA, looking east.



Figure 13. View from west loading area, looking east.



Figure 14. Fuel spill holes on west HCLA pad.



Figure 15. View from east edge of HCLA, looking west.



Figure 16. View of concrete drainage trench at east end of HCLA, looking southwest.



Figure 17. View of non-historic concrete generator house (right) and west DFP (left).

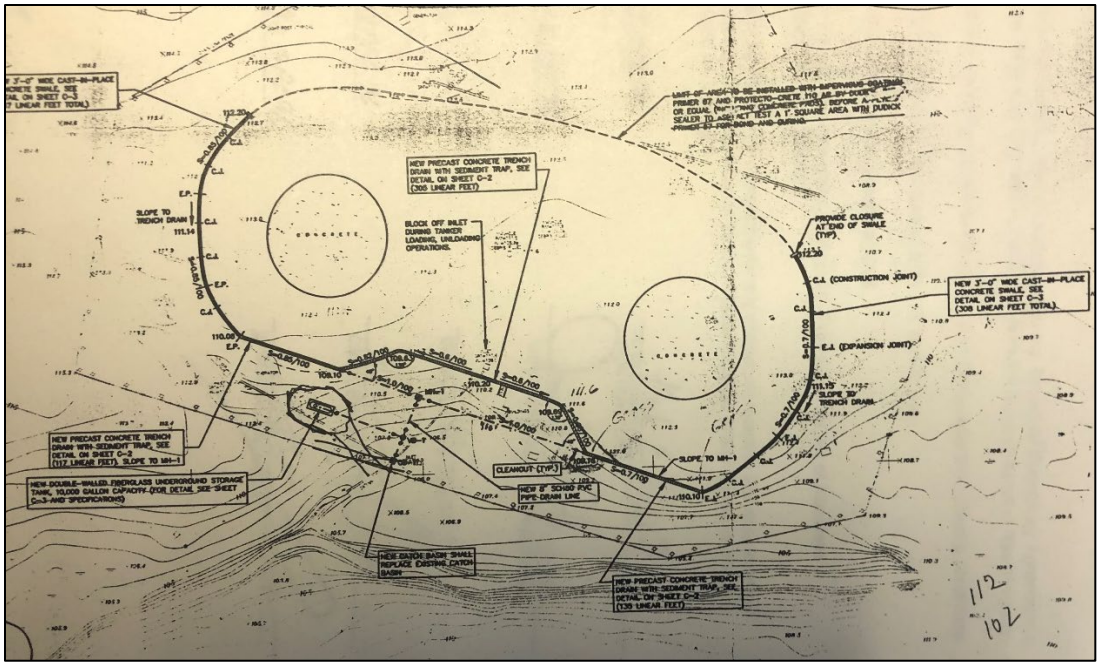

Figure 18. As-built of Facility 1147, modified with updates in a 1996 work order for new underground storage tanks.

According to the JB MDL Cultural Resources Manager, McGuire AFB's HCLA remained in use through the Cold War; records indicate that it may have continued in use through the early 2000s before becoming obsolete due to insufficient utilities and capacity to support modern aircraft. Historic aerial photographs show that the asphalt taxi was repaved and repainted with different markings at various times during the 2000s, with some of the most recent markings applied ca. 2015 (HistoricAerials.com). The concrete loading pads have remained substantially unaltered. The McGuire airfield remains in active use, with ongoing construction of hangars and support buildings north of the HCLA.

The HCLA pads associated with Facility 1147 were constructed during the 1960s at the height of the Cold War. The two structures provided ancillary support to McGuire's munitions airlift mission. The HCLA pads are of standard materials, design, and construction and are undistinguished in any way.

NRHP Criterion A: Facility 1147 is not directly associated with any historical events that have made a significant contribution to the broad patterns of our history under NRHP Criterion A. The pads were constructed in 1966 to support McGuire's munitions airlift program. They served as temporary holding areas while munitions were transferred between the aircraft and the munitions storage area. Some sources indicate that the HCLA fell into disuse following the end of the Cold War in the 1990s. Facility 1147 is not directly associated with any significant historical events that would qualify the resource as individually significant under NRHP Criterion A.

NRHP Criterion B: Facility 1147 does not meet NRHP Criterion B for any known direct associations with the productive lives of important individuals in local, regional, state, or national history.

NRHP Criterion C: Facility 1147 does not meet NRHP Criterion C for "distinctive characteristics of a type, period, and method of construction," and does not appear to have any architectural or engineering distinction. While the USAF and Army put much research and effort into designing concrete and asphalt airfield facilities during WWII and the Cold War, the innovative results were constructed during the 1940s and 1950s at other installations such Kirtland and Edwards AFBs. Constructed in 1966, Facility 1147 at McGuire is not representative of any technologically innovative engineering in design and construction associated with WWII or Cold War-era runways or taxi areas. The pads are utilitarian in appearance and standard in their design and construction, exhibiting design and construction techniques that were commonly employed during the Cold War.

NRHP Criterion D: Facility 1147 does not meet NRHP Criterion D for any potential to provide information important to the study of Cold War history at JB MDL. NRHP Criterion D is typically reserved for archaeological resources, ruins, or rare built environments of which little is already known, and that are considered the sole source of historical data. The two concrete pads would not yield any information important to the study of local, state, or national history. They do not provide any additional information beyond what is documented in maps, aerial photographs, as-builts, photographs, and written description, and therefore, their limited data potential has been exhausted once their location, physical characteristics, and pertinent history have been recorded on survey forms.

Due to an overall lack of significance, the HCLA (Facility 1147) is recommended ***not eligible*** for listing in the NRHP.

5.2.2 Defense Fighting Position Buildings (east and west).

The two DFP buildings are identical in form, scale, materials, and design. They are small, rectangular bunker-type buildings that measure approximately 7x10 feet, as measured at the roofline, which forms a deep front overhang (Figure 19). The buildings are poured concrete boxes sunk 3–5 feet below grade, with only the upper half (approximately) exposed above grade (Figure 20). Each building is capped by a flat roof with deep overhangs, particularly over the front/door, where the overhang shelters a subterranean entrance (Figure 21). The entrance is accessed by concrete steps that descend below grade into a concrete enclosure with waist-high concrete block retaining walls. A single-leaf steel door opens into the DFP interior, which consists of concrete walls, floor, and ceiling. On each of the four building elevations is a narrow horizontal slit opening, framed in a steel panel nailed to the concrete wall. No other fenestration, venting, or ornamentation is present. Walls are painted white, the roofs are painted brown, and steel window surrounds and doors are Army green. Both buildings open to the west.

The DFPs associated with Facility 1147 were constructed at an unverified date after 1970 and before 1995, as indicated by historic aerial photograph imagery. The two DFPs may have replaced earlier structures, but research did not uncover evidence of prior DFPs at the HCLA. The two structures provided security for the HCLA and McGuire's munitions airlift mission. The structures are of standard materials and utilitarian design.



Figure 19. East DFP; view southeast.



Figure 20. East DFP; view southwest.



Figure 21. Detail of west DFP (west elevation); view east.

NRHP Criterion A: The two DFPs are not known to be directly associated with any historical events that have made a significant contribution to the broad patterns of our history under NRHP Criterion A. They were likely constructed ca. 1975 to provide on-site security for McGuire's HCLA. Some sources indicate that the HCLA fell into disuse following the end of the Cold War in the 1990s. The DFPs are currently not in use and appear to have been unoccupied for a period of time, with water collecting in the subterranean interior. The two DFPs are not directly associated with any significant historical events that would qualify the resources as individually significant under NRHP Criterion A.

NRHP Criterion B: The DFPs do not have any known direct associations with the productive lives of important individuals in local, regional, state, or national history.

NRHP Criterion C: The structures do not meet NRHP Criterion C for "distinctive characteristics of a type, period, and method of construction," and do not appear to have any architectural or engineering distinction. They are utilitarian in design and materials, exhibiting design and construction techniques that were commonly employed by the military during the Cold War.

NRHP Criterion D: The DFPs do not meet NRHP Criterion D for any potential to provide information important to the study of Cold War history at JB MDL. NRHP Criterion D is typically reserved for archaeological resources, ruins, or rare built environments of which little is already known, and that are considered the sole source of historical data. The two structures would not yield any information important to the study of local, state, or national history. They do not provide any additional information beyond what is documented in maps, aerial photographs, as-

builds, photographs, and written description, and therefore, their limited data potential has been exhausted once their location, physical characteristics, and pertinent history have been recorded on survey forms.

Due to an overall lack of significance, the two DFPs associated with the HCLA are recommended ***not eligible*** for listing in the NRHP.

5.2.3 Facility 1146 – Generator Shelter

The concrete block generator shelter that stands between the HCLA pads was built ca. 1986, according to JB MDL real property records. Though not historic in age, the structure is recorded here in order to evaluate it under the requirements for outstanding significance under Criteria Consideration G. The building is a small, rectangular-plan structure with concrete block walls and a front gable roof covered in asphalt shingles (Figure 22 and Figure 23). Gables are clad in plywood. Double-leaf steel doors are centered in the front (north) gable end, and open onto a concrete walkway. A metal louvered vent is present in the lower wall of each side (east and west) side elevation. No other fenestration or ornamentation is present. A light is affixed to the rear (south) gable, and a camera is affixed to the front gable.



Figure 22. Facility 1146; view southeast.



Figure 23. View to the northwest.

Constructed ca. 1986 to house a generator, Facility 1146 is utilitarian in character and function. Though built during the Cold War era, the structure serves an ancillary purpose for the HCLA, and does not meet the requirements for demonstrating exceptional significance under Criteria Consideration G for properties that have not reached the 50-year-old threshold. Facility 1146 is recommended ***not eligible*** for listing in the NRHP under Criteria Consideration G.

6 Summary and Recommendations

6.1 Archaeological Survey

During the course of the archaeological survey of the APE, 1.52 acres were surveyed (excludes 0.46 acres of construction) with a total of 23 shovel tests excavated. One wire nail was identified in a disturbed fill context. No other cultural materials were identified. HDR recommends **no further work** is required within the HCLA archaeological APE.

6.2 Architectural Survey

Within the APE for the architectural resources survey, HDR recorded two historic-age facilities (50 years of age or older), as well as one facility built ca. 1986, recorded due to its Cold War-era construction date. No previously recorded architectural resources were present within the APE. The resources were constructed between 1966 and 1990. The historic-age architectural resources recorded during this investigation are recommended ***not eligible*** for listing in the NRHP due to lack of significance under Criteria A–D. Facility 1146 is recommended ***not eligible*** for NRHP listing under Criterion Consideration G.

Based on these NRHP recommendations, there are ***no historic properties*** affected by the proposed Project as defined.

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A

Appendix A – Scope of Work

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Scope and Assumptions: Cultural Resources Surveys for Hot Cargo Loading Area at Joint Base McGuire-Dix-Lakehurst, NJ

The following scope and assumptions are an integral part of HDR's cost proposal for the above referenced cost modification, which is based on the USACE Request for Proposal (09 September 2020) and Scope of Work (08 September 2020) for the hot cargo loading area (HCLA) pad and munitions storage area Environmental Assessment (EA) and supplemented by the Princeton Hydro (PH)/ Joint Base McGuire-Dix-Lakehurst (JB MDL) teleconference with HDR on 06 January 2021 and feedback provided by Ms. Sharon White, JB MDL Cultural Resources Manager, on 13 January 2021.

1. Project Description for Hot Cargo Loading Area

USAF is preparing an EA to evaluate the potential environmental impacts associated with construction and operation of a new HCLA pad to replace the existing dual non-functioning HCLA pads at the McGuire area of JB MDL. The HCLA pad would include demolition of two existing HCLA pads and construction of a 162,195-square foot (ft^2) HCLA apron of rigid pavement with 50-foot asphalt shoulders; a 50,399-ft^2 taxiway apron with 25-foot shoulders connecting to Taxiway "Lima"; 17,091-ft^2 of pavement for a vehicular access road and staging area; shoulder, taxiway edge, and high mast exterior area lighting; pavement markings; stormwater drainage system; security fencing; and utilities.

2. Section 106 Compliance

Pursuant to Section 106 of the National Historic Preservation Act and in accordance with 36 Code of Federal Regulations Part 800 (Protection of Historic Properties), this project is an undertaking, and USAF is required to determine whether there are any cultural resources present within the area of potential effects (APE) that are eligible for listing (or already listed) in the National Register of Historic Places (NRHP), and if so, whether the proposed HCLA work would have an effect on identified historic properties.

3. Scope

3.1 Archaeological Survey

Proposed construction for the HCLA project is situated within a portion of Sensitivity Area 3 as defined in JB MDL's Integrated Cultural Resources Management Plan (ICRMP) and within sensitive areas as depicted on the 2020 Cultural Resources Sensitivity Map provided by JB MDL (see Attachment A). While parts of Sensitivity Area 3 were previously surveyed in 1993–1994, land within the project's APE (see Attachment B) has not been surveyed to meet current New Jersey State Historic Preservation Office (HPO) standards, as presented in *Guidelines for Phase I Archaeological Investigations: Identification of Archaeological Resources*. Based on previous surveys and current project drawings that indicate existing disturbance (underground utilities, concrete pads), no additional archaeological survey within the existing fencing is recommended. Also, because the proposed temporary access road, which consists of the placement of temporary road mats with no excavation required, does not require any ground disturbance, no additional archaeological survey is recommended in that location.

Therefore, locations of proposed ground-disturbing activities within the project boundary that are recommended for shovel testing associated with an archaeological Phase 1 survey include:

- Graded area (includes pavement area), 1.65 acres
- Stormwater pipe trench, 50-foot buffer centered on pipeline, 0.11 acres

- Fencing, 6-foot buffer centered on fence line, 0.22 acres

This approximately 2-acre area would require up to 34 shovel tests, based on the HPO requirement of an average of 17 one-foot diameter subsurface probes per acre (see Attachment C). One archaeologist would complete the survey within 2–3 days.

3.2 Architectural Survey

Several components of the HCLA are historic in age (50 years of age or older) and have not been previously evaluated for listing in the NRHP, including the two large concrete pads central to the HCLA, which were installed in the mid-1960s. The APE as depicted in Attachment B would be limited to the project boundary; no additional viewshed analysis is recommended, as the project would not change the character of the HCLA nor its visual relationship with base buildings and structures in its vicinity. The reconnaissance survey would require photography of all components of the HCLA for which recent JB MDL photography and photography from HDR's December 1, 2020 site visit should suffice. In order to establish historical context for the HCLA, as well as its integrity, one architectural historian would conduct research on the HCLA using available JB MDL drawings, maintenance records, and associated archival materials gathered from a visit to the JB MDL and, if needed, supplement existing photography with a brief reconnaissance survey. The reconnaissance survey would document HCLA resources within the APE to an extent sufficient for NRHP evaluation. Resources less than 50 years of age within the APE will also be assessed under NRHP Criteria Consideration G: Properties that Have Achieved Significance Within the Past 50 Years.

3.3 Deliverables

Survey documentation would be presented in a report addressing background research, research design, methods, survey results and analysis, and recommendations, adhering to the guidance provided in *Guidelines for Preparing Cultural Resources Management Archaeological Reports* (2000) and *Guidelines for Architectural Survey*, including maps, photographs, shovel test and artifact logs, and inventory tables. As the same consulting firm would complete both the archaeological and architectural surveys, results will be presented in a single report, per HPO guidance. Appropriate archaeological site forms and architectural survey forms would be prepared and included with the report.

HDR will forward a draft report to Princeton Hydro for distribution and review, and address reviewer comments in a final report.

3.4 Task 1 – HCLA Cultural Resources Survey (Assumptions)

1. Field team will include one architectural historian (one day plus travel) and one archaeologist (up to three days plus travel).
2. Architectural historian will gather available archival information from JB MDL during survey, in coordination with the JB MDL Cultural Resources Manager.
3. Archaeologist will complete up to 34 shovel tests in the APE, following HPO standards of 17 shovel tests per acre.
4. JB MDL will provide appropriate access to the airfield (HCLA project area) and clearance of ordnance for archaeology survey.
5. The cultural resources report will conform to HPO standards for archaeology and architecture.
6. Only one iteration of each deliverable (draft and final) will be necessary.
7. HDR will submit an invoice to PH monthly based on progress completed.

8. HDR will submit the draft report to PH electronically for PH and regulatory review. Upon USACE acceptance of the report as final, HDR will submit electronic and/or up to five hard copies for distribution as directed by PH/USACE.
9. The period of performance is 6 months.
10. Scope and fee are based on a determination of no effects to historic properties. No additional services relating to Section 106 compliance are included in this scope, including mitigation measures, agreement documents, or consulting party coordination.

B

Appendix B – Professional Qualifications

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Owen Ford

Archaeologist

Mr. Ford has 30 years of experience in archaeological investigations, including extensive experience and technical knowledge in Cultural Resource Management (CRM). This includes all phases of field investigations from construction monitoring to data recovery, artifact analysis and curation, background research, and report writing from multiple regions in the United States and in Central America. Mr. Ford has provided extensive consulting and task management support for HDR Inc., Aspen Environmental, SWCA Inc., Anthony & Brown Consulting, The Center for Archaeological Research at the University of Texas at San Antonio (UTSA), TRC Inc., and Epsilon Systems Solutions, Inc.

Mr. Ford has extensive experience working with and running field crews on federally managed properties including: Bureau of Land Management, U.S. Forest Service, and bases for United States Navy, Air Force, and Army. He has experience running crews under Section 106, Section 110 and NEPA guidelines. During his 30 years of experience he has conducted prehistoric and historic field investigations in Alaska, California, Illinois, Iowa, Kentucky, Lousiana, Missouri, Nevada, New Jersey, New Mexico, Oklahoma, Oregon, South Carolina, Tennessee, Texas, Virginia, and West Virginia.

EDUCATION
M.A., Cultural Resources Management – 2020, Adams State University

B.A., Anthropology – 1993, Texas State University

INDUSTRY TENURE
30 years

HDR PROJECT EXPERIENCE

Intensive Cultural Resources Survey for the Hot Cargo Landing Area Project
Joint Base McGuire-Dix-Lakehurst, Burlington County, New Jersey (2021). Survey, subsurface testing and report write up for airfield improvements. *Client: JBMDL.*

Phase I Cultural Resources Background Investigations for Oak Point Admin and Repeater Towers, Bronx County, New York (2021). Background research and report write up for previously identified resources near proposed railroad tower locations. *Client: CSX.*

Architectural Survey for DSC Richmond, Chesterfield County, Virginia (2021). Documentation of multiple resources at the US Defense Center Richmond. *Client: DSC Richmond.*

Phase I Archaeological Survey for Rocky Creek, Chester and Fairfield Counties, South Carolina (2021). Survey, subsurface testing and report write up for transmission line improvements. *Client: Duke Energy.*

Sub-surface Testing for MODoT improvements along Interstate 70, St. Charles County, Missouri (2020, 2021). Survey, subsurface testing and report write up for roadway improvements. *Client: MODot.*

Phase I Archaeological Survey for Rice Creek Trails Expansion, Anoka County, Minnesota (2020). Data processing and report write up for Phase I cultural survey. *Client: Anoka County Parks and Recreation.*

Phase I Phase I Archaeological Survey for Geophysical Lines in White Pine County, Nevada (2020). Report write up for field investigations in White Pine County, Nevada. *Client: BLM.*

BNSF Proposed Tower Location, Walshville, Montgomery County, Illinois (2020). Survey, subsurface testing and report write up for a proposed railroad tower location. *Client: BNSF.*

CSX RR Tower Survey, Kenton County, Kentucky (2020). Survey, subsurface testing and report write up for a proposed railroad tower location. *Client: CSX.*

Phase I Cultural Resources Assessment Council Bluffs Riverfront Project, City of Council Bluffs, Pottawattamie County, Iowa (2020). Principal Investigator for background research and Phase I field investigation for cultural resources on the left bank of the Missouri River. *Client: USACE.*

Oregon DOT Region 4 Community Highway Improvement Projects, Central Oregon (2020). Historical context research for eleven communities in central Oregon. *Client: ODOT*

Sterling Highway MP45-60, Kenai Peninsula, Alaska (2020). Crew Chief for Phase I survey and site delineation. *Client: AKDOT*

BNSF Proposed Tower Location Project, South Dakota, (2020). Background research for previously identified resources near proposed tower locations. *Client: BNSF*

Hampton Roads SD Proposed Forced Main Survey, Suffolk, Virginia (2019). Survey, site recording, subsurface testing and artifact analysis for proposed water lines. *Client: HRSD.*

CSX RR Tower Survey, Laurel County, Kentucky (2019). Survey, subsurface testing and report write up for a proposed railroad tower location. *Client: CSX.*

Beardsley Reservoir Data Recovery, Tuolumne County, California (2019). Crew Chief for Phase III mitigation of a site in the Stanislaus National Forest. *Client*: *Tri-Dam.*

Ameren Transmission Survey, Mclean County, Illinois (2019). Pedestrian survey and subsurface sampling for transmission lines. *Client: Ameren*

Invenergy Yum Yum Cultural Resource Survey, Fayette County, Tennessee (2019). Crew Chief for large block pedestrian survey for proposed solar farm. *Client: Invenergy*.

Delta Fire Cultural Resource Monitoring and Survey, Shasta County, California (2018, 2019). Monitoring emergency clean up and construction crews and recordation of new resources after wildfires. *Client: Pacific Power and Light.*

Tri-Dam Lake Tulloch Cultural Resource Site Monitoring, Tuolumne County, California (2018). Crew Chief on updating previously recorded cultural resource sites. *Client: Tri-Dam Project*.

West Virginia Route 2 Parkersburg to Saint Mary's Road, Parkersburg, Wood County, West Virginia (2018). Participated in pedestrian survey, subsurface testing, and report development. *Client: WVDOT.*

Defense Supply Center Richmond Artifact Curation, Chesterfield County, Virginia (2018). Curation of artifacts associated with Phase II excavations. *Client: DSCR*

Celestial Valley Sediment Management Plan, Yuba County, California (2018). Pedestrian survey, recordation of historic resources, and report write up. *Client: YCWA.*

Dalton Highway Milepost 109-144 Reconstruction, Yukon-Koyukuk Census Area, Alaska (2018). Crew chief on pedestrian survey and subsurface testing. *Client: AKDOT & PF.*

Richardson Highway Milepost 65-80, 82-115 Project, Unorganized Borough, Alaska (2018). Participated in background research, report development, pedestrian survey and subsurface testing. *Client: AKDOT & PF.*

Pebble Mine Amakdedori Port Cultural Resources Survey, (2018) Pedestrian survey and subsurface testing, daily helicopter transport. *Client: Pebble Limited Partnership.*

JBER (Joint Base Elmendorf-Richardson) Cultural Resources Survey Inventory, Anchorage, Alaska (2017, 2018). Participated in background research, report development, pedestrian survey and subsurface testing. *Client: United States Air Force/United States Army.*

South State Water Project (FERC No.2426), Pyramid Lake, Los Angeles County, California (2018). Pedestrian survey of transmission lines. *Client: PG&E*

Devil Canyon FERC Relicensing Project (FERC No.14797), San Bernardino, California (2017). Participated in pedestrian surveys and recordation of historic and prehistoric resources. *Client: California Department of Water Resources.*

Camp Far West Transmission Line (FERC No.10821), Camp Far West Reservoir, Yuba and Placer Counties, California (2017). Field Lead for pedestrian surveys of prehistoric and historic resources. *Client: PG&E.*

Armstrong Nanushuk North Slope Oil and Gas Development Project, North Slope, Alaska (2017). Participated in background research, pedestrian survey, helicopter survey, and subsurface testing within the Arctic Circle. *Client: Armstrong Energy, LLC.*

Seward Highway 75 – 90 Chugach Electrical Association Pole Replacement Project, Portage, Alaska (2017). Participated in pedestrian survey and subsurface testing for utility pole replacement, as well as report write up. *Client: AKDOT & PF.*

Ketchikan Water Street Trestle #2 Replacement Project, Ketchikan, Alaska (2017, 2018). Monitoring of road construction and trestle replacement including recordation of historic materials. *Client: AKDOT & PF.*

Sterling Highway Milepost 45-60 Project, Kenai Peninsula, Alaska (2016). Assisted in development of monitoring and curation plan, background research for additional pedestrian survey and subsurface testing including lands in Chugach National Forest. *Client: Alaska Department of Transportation and Public Facilities*

Armstrong Nanushuk North Slope Oil and Gas Development Project, Alaska (2016). Participated in background research and report development. *Client: Armstrong Energy, LLC.*

DOT&PF Maintenance and Operations, Denali District Materials Site Project, Alaska (2016). Participated in pedestrian survey and subsurface testing of DOT&PF materials site, site boundary delineation for the Ringling site (GUL-00077). *Client: Alaska Department of Transportation and Public Facilities*

Iliamna River Bridge Historic American Engineering Record Documentation and Consultation, Alaska (2016). Assisted in development of memorandum of agreement, background research. *Client: Alaska Department of Transportation and Public Facilities*

Sam's Valley Transmission Line Project, Jackson County, Oregon (2016, 2017, 2018). Pedestrian survey and testing for historic and prehistoric remains along proposed transmission lines and substation locations. *Client: Pacific Power*

Camp Far West Reservoir Hydro Project (FERC No.2997), Nevada County, California (2016). Directed survey crews for artifact identification and recordation of historic and prehistoric site remains. *Client: South Sutter Water District*

Don Pedro Reservoir Repatriation Project (FERC 2299), Tuolumne County, California (2016). Reinternment of native remains previously excavated in 1970. *Client: Toulumne Irrigation District*

Cultural Monitoring for PG&E Woodleaf-Kanaka Transmission Line (FERC No.2281), Butte County, California (2016). Monitored crews and established boundaries for protection of previously and newly identified cultural remains. *Client: Pacific Gas and Electric*

Don Pedro Shoreline Stabilization Construction Monitoring (FERC No.2299), Tuolumne County, California (2015). Consulted construction crews on impact avoidance to cultural materials and monitored during construction for compliance. *Client: Toulumne Irrigation District*

Site Evaluations for Nevada Irrigation District at Jackson Meadows Reservoir (FERC No.2266), Nevada County, California (2014). Assisted in directing crews on excavation of prehistoric sites. *Client: Nevada Irrigation District*

Woodleaf Cultural Monitoring for Hazardous Tree Removal for PG&E Transmission Lines, Butte County, California (2014). Monitored crews for impact analysis of cultural remains. *Client: PG&E*

Tri-Dam Project Beardsley-Donnells Hydroelectric Project (FERC No. 2005) License Implementation-Site Recordation, Tuolumne County, California (2014). Directed field crews on prehistoric site excavation and recordation *Client: Tri-Dam Project*

Yuba River Development Project (FERC No. 2246) Relicensing, Yuba County, California (2014). Assisted in directing field crews on survey and recordation of historic remains. *Client: Yuba County Water Agency*

SELECT NON-HDR PROJECT EXPERIENCE

Cultural Resources Survey at Beale AFB, Yuba County, California (2015). Directed crews for survey and artifact analysis of historic and prehistoric site remains. *Client: United States Air Force*

G2/B-29 Road Bio Survey, Naval Air Weapons Station, China Lake, Kern County, California (2014). Directed crews for survey and artifact analysis of historic and prehistoric site remains. *Client: United States Navy*

Cultural Resources Survey for the Water Treatment Plant at Rancho Murieta, Sacramento County, California (2014). Directed field crews on survey for prehistoric and historic remains. *Client: Rancho Murieta CSD*

Bullpup East Expansion Cultural Resources Survey, Naval Air Weapons Station, China Lake, Inyo County, California (2014). Directed field crews on prehistoric and historic site recordation. *Client: United States Navy*

JCIF Petroglyph Recordation at CA-INY-130 & CA-INY-6534, Naval Air Weapons Station, China Lake, Inyo County, California (2013). Directed field crews on petroglyph recordation procedures. *Client: United States Navy*

Bodie Hills FY13 Cultural Resource Survey, Bodie Hills, Mono County, California (2013). Directed field crews on prehistoric and historic site recordation. Other duties included laboratory analysis and technical write up. *Client: Bereau of Land Management*

SCE Utility Pole Replacement Survey in the White Mountains, Inyo County, California (2013). Directed field crews on prehistoric and historic site recordation. Duties included technical write up. *Client: Southern California Edison*

Survey for Ewiiaapaayp Tribal Reservation at San Diego County, California (2013). Directed field crews for survey and artifactanalysis of historic and prehistoric site remains. *Client: Paiky*

Survey for La Posta Tribal Reservation at San Diego County, California (2013). Directed field crews for survey and artifact analysis of historic and prehistoric site remains. *Client: Paiky*

Survey for GPO's Investigations at Dixie Valley, Nevada for Fallon Naval Air Station, Churchill County, Nevada (2013). Directed field crews for survey and artifact analysis of historic and prehistoric site remains. Duties included technical write up. *Client: United States Navy*

Mammoth Lakes Cultural Resource Survey, Bodie Hills, Mono County, California (2012). Directed field crews on prehistoric and historic site recordation. Other duties included laboratory analysis and technical write up. *Client: United States Forest Service*

Bodie Hills FY12 Cultural Resource Survey, Bodie Hills, Mono County, California (2012). Directed field crews on prehistoric and historic site recordation. Other duties included laboratory analysis and technical write up. *Client: Bureau of Land Management*

Airport Lake Cultural Site Re-Evaluations, Naval Air Weapons Station, China Lake, Inyo County, California (2012). Directed field crews on prehistoric and historic site recordation and updating of previously recorded sites. *Client: United States Navy*

Sleepy Bear Mine Cultural Resources Survey, Randsburg, California (2012). Directed field crews on prehistoric and historic cultural resources survey. *Client: Bureau of Land Management*

Burro Canyon Cultural Resources Survey, Naval Air Weapons Station, China Lake, Inyo County, California (2012). Directed field crews on prehistoric and historic site recordation. *Client: United States Navy*

SCE Utility Pole Replacement Survey, Mojave, Kern County, California (2012). Directed field crews on prehistoric and historic site recordation and construction monitoring. Duties included technical write up. *Client: Southern California Edison.*

Bishop Creek Cultural Resource Survey, Bishop, Inyo County, California (2011). Directed field crews on prehistoric and historic site recordation. Other duties included laboratory analysis and technical write up. *Client: Bureau of Land Management*

Bodie Hills FY11 Cultural Resource Survey, Bodie Hills, Mono County, California (2011). Directed field crews on prehistoric and historic site recordation. Other duties included laboratory analysis and technical write up. *Client: Bureau of Land Management*

EIS Buffer Zones Cultural Resources Survey, Naval Air Weapons Station, China Lake, Inyo County, California (2011). Directed field crews on prehistoric and historic site recordation. *Client: United States Navy*

WSL Fiber Optic Line Cultural Resources Survey, Naval Air Weapons Station, China Lake, Inyo County, California (2011). Directed field crews on prehistoric and historic site recordation. Duties included technical write up. *Client: United States Navy*

Snowstorm Cultural Resource Inventory of 16,055 Acres, Chimney Reservoir, Humboldt County, Nevada (2011). Directed field crews on prehistoric and historic site recordation. *Client: Enviroscientists, Inc.*

Survey for GPO's Explorations at Fallon Naval Air Station, Fallon, Churchill County, Nevada (2011). Directed crews for survey and artifact analysis of historic and prehistoric site remains. Duties included technical write up. *Client: United States Navy*

North Range Roads (ROTR 2, JX-49, JX-59 & B-29) Cultural Resources Survey, Naval Air Weapons Station, China Lake, Inyo County, California (2011). Directed field crews for survey and prehistoric site recording and updates. *Client: United States Navy*

Survey for Geothermal Investigations at Fallon Naval Air Station, Fallon, Nevada (2010). Directed crews for survey and artifact analysis of historic and prehistoric site remains. Duties included technical write up. *Client: United States Navy*

Bodie Hills FY10 Cultural Resource Survey, Bodie Hills, Mono County, California (2010). Directed field crews on prehistoric and historic site recordation. Other duties included laboratory analysis and technical write up. *Client: Bureau of Land Management*

Final Mitigation Plan for Treatment/Remediation of Sites Adversely Effected by the Installation of Fiber Optic Cable in Support of the Join Counter IED (JCIF) Project, Naval Air Weapons Station, Inyo County, California (2010). Directed crews on subsurface prehistoric site investigations. Other duties included laboratory analysis and technical write up. *Client: United States Navy*

Survey at Devil's Postpile National Monument, Mammoth Lakes, CA (2010). Directed field crews on prehistoric and historic site recordation. *Client: Bureau of Land Management*

Coso North Infill Cultural Resources Survey, Naval Air Weapons Station, China Lake, Inyo County, California (2010). Directed field crews on prehistoric and historic site recordation. *Client: United States Navy*

Cactus Flat Target Range Infill Cultural Resources Survey, Naval Air Weapons Station, China Lake, Inyo County, California (2010). Directed field crews on prehistoric and historic site recordation. *Client: United States Navy*

Project experience dating back to 1991 is available upon request.

SELECT REPORTS AND PUBLICATIONS

2020 Phase I Archaeological Survey for the Proposed Hampton Roads Sanitation District Suffolk Regional Landfill to Bainbridge Boulevard Force Main Project
Suffolk and Chesapeake, Virginia (co-authors James G. Parker and Pamela Hale).

2018 Cultural Resources Desktop Review for the Dalton Highway MP 108-144 Reconstruction, Yukon-Koyukuk Census Area, Alaska (co-authors S. Teeter and D. Ramsey Ford). Prepared for AKDOT & PF, Northern Region. HDR, Inc., Anchorage, Alaska.

2018 Memorandum of Record for PLP-Amakdedori Port Cultural Resources Study (Co-author Sean Teeter). Prepared for the Pebble Limited Partnership.

2018 Traditional Cultural Practices in America's Last Frontier: Conceptualizing Traditional Cultural Properties in Alaska (co-author D. Ramsey Ford). Poster presented at the 83rd Annual Meeting of the Society for American Archaeology, Washington, D.C.

2017 Cultural Resources Investigation for the DOT&PF Seward Highway MP 75–90 CEA Pole Replacement Project, Anchorage Borough, Alaska (co-authors S. Teeter and D. Ramsey Ford). Prepared for Alaska Department of Transportation and Public Facilities, Central Region, DOT&PF Project No. 58105.

2017 Cultural Resources Investigation for the DOT&PF South Tongass Highway Deermount to Saxman Widening, and Saxman to Surf Street Pavement Rehabilitation Project, Ketchikan Gateway Borough, Alaska (co-authors S. Teeter, A. Keen, L. Gratreak, D. Ramsey Ford, and M. Odell). Prepared for AKDOT & PF, Anchorage, AK.

2017 A Tale of Two Mines: The Kennedy and Argonaut Mines of Amador County, CA. Poster presented at the 82nd Annual Meeting of the Society for American Archaeology, Vancouver, B.C., Canada.

2015 Procedural Guide to Cultural Fieldwork, Completed as an Internship Project with Aspen Environmental Group for Adams State University, Alamosa, Colorado.

2012 Coso Ceramics: A Study from the Pinyon-Juniper Zone of the Western Great Basin, a poster presentation for the Great Basin Archaeological Conference (co-authors S. Izzi and R. Cook). Epsilon Systems Solutions, Ridgecrest, CA.

2012 The Sleepy Bear Mine Cultural Resources Survey, Randsburg, CA. Epsilon Systems Solutions, Ridgecrest, CA.

2011 The Bodie Hills FY10 Cultural Resources Survey, Mono County, California (co-authors B. DeBoer, C. Duran and P. Carey). Report No. CA-170-10-61. Epsilon Systems Solutions, Ridgecrest, CA.

2011 Cultural Resources Survey Report for the Geothermal Program Office's Exploration Program within the Fallon Range Training Complex, Churchill County, Nevada. Report No. NIR-254. Epsilon Systems Solutions, Ridgecrest, CA.

2001 The History of the Carvajal Crossing (co-author Wayne Cox). In Archaeological Investigations at a Spanish Colonial Site, (41KA26-B) Karnes County, TX., by Cynthia L. Tennis. Archaeological Survey Report, No. 302. Center for Archaeological Research, University of Texas at San Antonio, San Antonio.

2000 The 1998 Excavations at the Western Groups (co-author with Amy E. Rush). In The 1998 and 1999 Seasons of the Chan Chich Archaeological Project, edited by Brett A. Houk, p. 41-48. Papers of the Chan Chich Archaeological Project, Number 4. Mesoamerican Archaeological Research Laboratory. The University of Texas, Austin.

1998 Excavations at the Ballcourt. In The 1997 Season of the Chan Chich Archaeological Project, edited by Brett A. Houk, p. 53-58. Papers of the Chan Chich Archaeological Project, Number 3. Center for Maya Studies, San Antonio.

1997 Progress Report on the 1997 Season of the Chan Chich Archaeological Project (co-author with Brett A. Houk, Hubert R. Robichaux, and Richard Meadows). Papers of the Chan Chich Archaeological Project, Number 2. Center for Maya Studies, San Antonio.

1997 An Archaeological Survey of the SAWS Watson, Howard, Fischer, and Quintana Roads Project, Bexar County, Texas (co-author with Brett A. Houk). Letter Report, No. 115. Center for Archaeological Research. University of Texas at San Antonio, San Antonio.

1997 Archaeological Investigations at Promontory Pointe at Stone Oak II, Bexar County, Texas. Archaeological Survey Report, No. 261. Center for Archaeological Research. University of Texas at San Antonio, San Antonio.



EDUCATION
Master of Arts Public History, (concentration in Historic Preservation), University of South Carolina, 2015

Bachelor of Arts, Art History, University of Virginia, 2011

INDUSTRY TENURE
6 years

HDR TENURE
5 years

OFFICE LOCATION
Vienna, VA

PUBLICATIONS
Diana Garnett, "Rural Mission: Saint James the Greater in South Carolina," *Sacred Architecture Journal*, Notre Dame, Indiana, Fall 2015.

"A Precarious History: The South Carolina State Hospital on Bull Street," poster presented at National Council for Public History Annual Meeting, Nashville, Tennessee, April 2015.

Virtual Online Walking Tour of Historic Barhamville-Kendalltown Neighborhood, Columbia, South Carolina, produced for Historic Columbia, Fall 2014.

"Digitizing Bull Street," website, co-author (http://www.digitizingbullstreet.com/), Spring 2014.

Diana Garnett

Architectural Historian

Ms. Garnett has a diverse background in cultural resource management and meets the Secretary of the Interior's *Professional Qualification Standards* (36 CFR 61) for History and Architectural History. Her experience includes architectural and historic sites surveys, National Register of Historic Places (NRHP) eligibility evaluations and nominations, Historic American Engineering Record (HAER)— and Historic American Building Survey (HABS) – level documentation, preservation easement inspections, conditions assessments, and archival research. Ms. Garnett has experience on projects in Montana, Colorado, Nebraska, South Dakota, North Dakota, Utah, Virginia, West Virginia, Maryland, Delaware, Massachussetts, New York, Illinois, Indiana, Texas, and South Carolina for departments of transportation, state historic preservation offices, railroads, as well as other governmental and private agencies. She has also conducted research and assisted in writing reports for federal agencies, including the Department of Defense, the United States Air Force, and the Defense Logistics Agency.

RELEVANT EXPERIENCE

Architectural Resource Survey Reports for Jacks Valley and Cadet Area, United States Air Force Academy, El Paso County, Colorado (December 2019-August 2020). USAFA has prepared a District Plan for the Jacks Valley Training Area and Cadet Area, and completion of the District Plan required compliance with Section 106. Ms. Garnett contributed to a team effort documenting a total of 77 architectural resources in two separate reports produced for Jacks Valley and Cadet Area at USAFA. Ms. Garnett conducted research and served as primary author of the historic contexts and NRHP evaluations for the project. Ms. Garnett also led the coordination with GIS staff to produce individual and project maps for surveyed resources.

Historic Bridge Survey and Report for Metropolitan Transit Authority-Long Island Rail Road (MTA-LIRR) Webster Avenue Bridge Replacement, Manhasset, New York (December 2019). MTA-LIRR is replacing the NRHP-eligible Webster Avenue Bridge (1916), resulting in a determination of adverse effect. Ms. Garnett completed mitigation for the project, which consisted of photo-documentation and a HAER-level report per the standards of the New York SHPO. Ms. Garnett conducted the field work, archival and online research, and served as primary author of the report.

Cultural Resources Assessment of Effects for Accessibility Improvements at Worcester Union Station and Associated Track Work, Massachusetts Bay Transportation Authority, Worcester, Massachusetts (November 2019). MBTA is improving platform accessibility, including construction of a new pedestrian overpass, at the historic Union Station, listed in the NRHP and adjacent to several historic properties. Ms. Garnett conducted a site visit to assess and photo-document potential project visual impacts and other effects that the proposed project

may have on Union Station and nearby historic properties. Ms. Garnett was primary author of the assessment of effects report.

Historic Architecture Survey Report Update for NDOT I-15 South Corridor Improvements Environmental Assessment Revaluation, Sloan Road to Tropicana Avenue, Las Vegas, Nevada (August 2019-January 2020). NDOT is continuing improvements to I-15 and Las Vegas Boulevard that began in 2008-2009, and an update to the 2007-2008 EA was necessary to complete the project. Ms. Garnett conducted fieldwork and survey of 12 architectural resources, and produced the survey update report with recommendations regarding the NRHP status of previously recorded resources.

Historic Architecture Survey for NDDOT Memorial Highway Improvements from Main Street to 46th Avenue Project, Mandan, North Dakota (June 2019-February 2020). North Dakota Department of Transportation is improving a 2.5-mile segment of Memorial Highway between Mandan and Bismarck with new turning lanes, drainage infrastructure, and multi-use pathways. Ms. Garnett conducted a survey of 36 architectural properties in the project area, evaluating each property for NRHP eligibility and completing site forms. Ms. Garnett also conducted all related historic research and was primary author of the survey report.

Cultural Resources Investigation for Norfolk Southern Bridge Repairs at Mile Posts 237.96, 243.81, and 247.77 in Liberty and West Chester Townships, Butler County, Ohio (September 2019). Norfolk Southern is rehabilitating three early twentieth century concrete railroad bridges in rural Butler County, Ohio. Ms. Garnett completed three separate cultural resource reports as well as associated site forms, which included a historic context, bridge descriptions, and NRHP evaluations.

State-Level Historic Documentation Report and Historic Marker Text for WVDOH Rehabilitation of Monument Place Bridge, Elm Grove, West Virginia (September 2019). West Virginia Department of Highways and Federal Highway Administration produced a Memorandum of Agreement outline mitigation for the adverse effect caused by WVDOH's rehabilitation of the NRHP-eligible Monument Place Bridge. Ms. Garnett and colleagues conducted archival and online research, photo-documented the bridge, and Ms. Garnett wrote a state-level (HAER-type) documentation report. Ms. Garnett also contributed to the textual and photographic material for a historic marker.

Cultural Resources Survey for SCDOT Repair of Washout on S-14-76 Old River Road Project, Clarendon County, South Carolina (June 2019). South Carolina Department of Transportation is repairing a washed-out road that traverses an historic rural-industrial complex in Clarendon County. Ms. Garnett assisted in conducting research on the historic mill site, and co-authored the survey report, evaluating the complex as an NRHP-eligible historic district composed of nine contributing resources and including an archaeological site.

Linear Resources Documentation and Evaluation, Fort Carson, Colorado (January 2019-January 2020). United States Army Corps of Engineers (USACE) Omaha District issued a fence-to-fence contract for environmental operations and services at Fort Carson Army Garrison and Piñon Canyon Maneuver Site. Tasks identified under this contract include

environmental consulting services and conservation management support activities. Ms. Garnett supported colleagues in completing Task 15, an Irrigation Network Context. Task 15 includes an inventory of Fort Carson's irrigation features, and NRHP evaluation of the newly recorded resources. Ms. Garnett served as co-author of the historic context report and site forms.

NDOT US-275 Scribner to West Point Project, Dodge and Cuming Counties, Nebraska (June 2018). HDR conducted a historic architecture survey for the proposed road widening project in Dodge and Cuming Counties. Ms. Garnett supported the survey of 55 historic-age architectural resources, evaluated resources for NRHP eligibility, and assessed eligible properties for adverse effects. Ms. Garnett was primary author of the historic architecture survey report and site forms.

sPower Prevailing Winds, Yankton, South Dakota (June 2018-January 2019). HDR is conducting a cultural resource survey for sPower's Prevailing Winds wind farm project in Bon Home, Charles Mix, Hutchinson, and Yankton counties. Ms. Garnett and colleagues surveyed over 200 architectural resources in a 45,000-square-foot project area. Co-Author. Ms. Garnett served as primary author of the architectural report. Ms. Garnett also led coordination with GIS staff to produce individual and project maps for surveyed resources.

West Virginia Department of Highways (DOH) Bridge Replacements, Ohio County, West Virginia (2018). HDR provides West Virginia DOH NHPA Section 106 cultural resource services for bridge replacements in Ohio County—Lewis Bridge, Playground Bridge, and Valley Grove. Deliverables include West Virginia SHPO site forms, assessment of effects, consultation letters, and cultural resource reports. Ms. Garnett has served as co-investigator for the bridge surveys and as primary author of the architectural reports.

West Virginia Department of Highways (DOH) WV2 Parkersburg Widening, Wood County, West Virginia (2018-Present). HDR is completing archaeological and architectural surveys in support of DOH plans to widen West Virginia Highway 2 to five lanes from Wood CR 3 to WV 31.

South Carolina Department of Transportation (SCDOT) US 701 Widening, Horry County, South Carolina (September 2018). HDR is completing archaeological and architectural surveys in support of SCDOT plans to widen US Highway 701 in Loris, South Carolina. Ms. Garnett conducted the survey of 25 historic architectural resources, and served as co-author of the cultural resources investigation report.

BNSF Railway, Repair of Culvert 32.5, Line Segment 22, Wayzata Subdivision of Maple Plain, Hennepin County, MN (2018). Ms. Garnett supported the required mitigation for the culvert, including Level 1 documentation of the historic culvert for the Minnesota Historic Property Record for submittal to the Minnesota SHPO and the Hennepin County Historical Society.

BNSF Saco West Subgrade Stabilization Project, Phillips County, Montana (April 2018). HDR supported the U.S. Army Corps of Engineers in completing Historic American Engineering Record (HAER) Level III documentation of a historic BNSF railroad culvert prior to stabilization work.

Ms. Garnett directed large format photography of the culvert, conducted historic research, and authored the HAER report.

Illinois Department of Transportation, Central Avenue at Belt Railway Company (BRC) Railroad, Chicago, Illinois (2018-Present). Architectural History Project Manager. HDR conducted an architectural survey of 325 properties located along Central and Archer Avenue in Chicago's Garfield Ridge Community Area. Ms. Garnett and a colleague conducted the architectural survey and served as primary author of the survey report, NRHP evaluations, and site forms.

South Carolina Department of Transportation (SCDOT), Manning Avenue Corridor Revitalization Project, Sumter, Sumter County, South Carolina (October-December 2017). SCDOT is preparing to carry out improvements to the south section of Manning Avenue in Sumter, South Carolina, a project that includes road widening and sidewalk and median improvements. Ms. Garnett and a colleague conducted a historic architectural survey of approximately 75 resources in along the project corridor. Ms. Garnett served as primary author of the historic architecture report.

Red Lion Historic Context, Delaware DOT (DelDOT), Red Lion, Delaware (2016-2019). Ms. Garnett serves as the primary author and researcher for a historic context of the Red Lion village as part of mitigation for a DelDOT road improvement project. This work follows Phase 1 and II archeological investigations and includes the preparation of a scholarly article to be published in the *Bulletin of the Archaeological Society of Delaware*.

Northwest Indiana Commuter Transportation District, Double Track NWI Core Capacity Project, Lake, Porter, and LaPorte Counties, IN (2016-2017). Ms. Garnett and colleagues supported NICTD and FTA in completion of NEPA and Section 106 for a double-track expansion project for a 22-mile segment from Gary, IN to Michigan City, IN. Conducted architectural survey of 634 resources and Section 106 consultation efforts on behalf of FTA and NICTD, including identification of historic properties, assessment of effects, development of a MOA, and completion of an individual 4(f) evaluation. HDR Project Number 10034929.

Ameren Environmental Services, Spoon River Transmission Line, Galesburg to Peoria, Knox and Peoria Counties, Illinois (2016). Ms. Garnett and a colleague documented standing structures 45-years or older prior to construction of a 46-mile 345 kV transmission line. In total, 59 parcels with architectural resources were surveyed and evaluated for NRHP eligibility, including 259 buildings, 85 agriculture-related structures, and 4 bridges and culverts. Ms. Garnett co-authored the report's architecture-related components, including a geography-based historic context and state historic resource inventory forms for the properties, which were primarily late nineteenth and early twentieth-century rural farmsteads.

Colorado Department of Transportation (CDOT) and Clear Creek County, Colorado, Cultural Resources Investigation for the Proposed Clear Creek Greenway, Clear Creek County, Colorado (2016). Ms. Garnett and colleagues conducted a cultural resources survey of buildings

and structures over 45 years of age with the potential to be affected by the proposed Clear Creek Greenway. In total, 38 architectural resources and 12 segments of 6 linear resources were evaluated for NRHP eligibility and assessed for adverse effect. Ms. Garnett conducted archival research at local repositories and co-authored the report's historic context and sections describing individual resources, as well as architectural and cultural resource site forms for each surveyed property.

Colorado Department of Transportation (CDOT) and U.S. Army Corps of Engineers, Historic American Engineering Record (HAER) Documentation for Proposed Replacement of the Dolores River Bridge, Montrose County, Colorado (2016). In order to provide permanent and updated recordation of the NRHP-listed Dolores Bridged, scheduled for removal or demolition, Ms. Garnett directed a colleague in the execution of a large-format photography shoot of the bridge. Additionally, Ms. Garnett conducted archival research in Montrose County, and co-authored the HAER Form in the Outline Format.

Intermountain Rural Electric Association (IREA), Cultural Resources Survey for the Proposed 7.2kV Rebuild Project, Park County, Colorado (2016). Ms. Garnett surveyed architectural resources 45-years or older prior to the proposed replacement of 9.08 miles of distribution line following the existing right-of-way (ROW). The project area comprised both land owned by the United States Forest Service (USFS) and privately owned parcels. In total, Ms. Garnett documented 32 buildings, including one district listed in the NRHP. In addition to providing updated documentation of the district, Ms. Garnett evaluated all newly surveyed resources for NRHP eligibility and assessed eligible or listed properties for adverse effect. Ms. Garnett conducted local archival research and wrote the report's architecture-related sections, as well as co-authored the report's overall historic context.

Intermountain Rural Electric Association (IREA), Cultural Resources Survey for the Proposed 7.2kV Rebuild Projects, Teller County, Colorado (2016). Ms. Garnett surveyed architectural resources 45-years or older prior to the proposed replacement of a combined 6.6 miles of distribution line following the existing right-of-way (ROW) in three different project locations in Teller County. The project areas comprised both land owned by the United States Forest Service (USFS – Pike National Forest) and privately owned parcels. In total, Ms. Garnett documented 12 architectural resources, including one district listed in the NRHP. In addition to providing updated documentation of the district, Ms. Garnett evaluated all newly surveyed resources for NRHP eligibility and assessed eligible or listed properties for adverse effect. Ms. Garnett conducted local archival research and wrote the architecture-related sections in all three reports, as well as co-authored the historic context for each report.

Utah Department of Transportation (UDOT), Redwood Road Improvements Mitigation, Riverton, Utah (2016). Ms. Garnett and a colleague conducted an intensive level survey of 28 properties previously determined eligible for NRHP listing and subject to adverse effect by a proposed roadway widening. Mitigation included photographing the standing structures and completing in-depth research on property owners, including chain of title. Ms. Keen co-authored the associated Utah SHPO historic resource forms.

UDOT, Historic Buildings Assessment Update for the Proposed West Davis Corridor Project, Davis and Weber Counties, Utah (2016). Ms. Garnett and a colleague conducted a reconnaissance level survey of 33 previously unsurveyed properties associated with two alternatives for a proposed new transportation corridor. The survey included NRHP evaluations for 55 buildings and 10 structures.

Colorado Department of Transportation (CDOT) and Douglas County, CO, US 85 Corridor Improvements, Highlands Ranch Parkway to C-470, Douglas County, CO (2015). HDR conducted survey and analysis for an Environmental Impact Statement (EIS) re-evaluation and Planning and Environmental Linkages (PEL) study on the U.S. Highway 85 corridor for Douglas County. Ms. Garnett conducted intensive-level survey to support the EIS re-evaluation and a reconnaissance-level survey in support of the PEL study. To support both efforts, Ms. Garnett conducted archival research, prepared state (CO) historic architectural site forms, and co-authored the historic resources report. Resources surveyed included historic irrigation systems and a building that housed the first metro Denver radio station catering to an African-American audience.

Colorado Department of Transportation (CDOT), US 550 Cribwalls Replacement Project, San Juan County, CO (2015). HDR performed research, NRHP evaluations, and effects analysis for a proposed road improvement project by Colorado Department of Transportation (CDOT). Two highway cribwalls constructed circa 1965 were surveyed and evaluated for NRHP eligibility. Effects were assessed for U.S. Highway 550, the "Million Dollar Highway, Ms. Garnett was the lead architectural historian and completed SHPO inventory forms for the two cribwalls and drafted an eligibility and effects consultation letter.

Colorado Department of Transportation (CDOT), US 34 Big Thompson Permanent Repair Project, Larimer County, CO (2015). HDR conducted archaeological and architectural surveys in the vicinity of two proposed bridge replacements off of U.S. Highway 34 in the Big Thompson Canyon in Larimer County, Colorado. Work conducted included archival research and documentation and evaluation of six properties older than 48 years of age for National Register eligibility and for adverse effects. Surveyed resources included early and mid-twentieth century Rustic and vernacular residences. Ms. Garnett completed the state (CO) historic architectural site forms and authored a cultural resource evaluation and effects consultation memorandum.

Utah Department of Transportation (UDOT), Redwood Road (SR 68) Widening Project, Salt Lake County, UT (2015). HDR conducted a survey of 90 properties, primarily residential, along Redwood Road in advance of a proposed widening project by Utah Department of Transportation UDOT). She also conducted archival research. Ms. Garnett conducted archival research, completed a reconnaissance-level survey based on Utah State Historic Preservation Office (SHPO) guidelines, and co-authored the project report, encompassing local history, settlement patterns, and agricultural industry.

NON-HDR EXPERIENCE

HistoriCorps Institute, Morrison, Colorado (2020)

Took on a seasonal position with the non-profit HistoriCorps, who partners with the National Forest to manage their historic architectural resources. Duties included leading crews of volunteers and staff in conducting field documentation of historic recreation residences in the National Forests in Wyoming and Idaho, identifying original construction features as well as modifications made to buildings based on historic records, prior documentation, and in-person observation. In consultation with NF staff, Idaho SHPO, and Wyoming SHPO, Ms. Garnett produced baseline and update documentation on recreation residences. Documentation consisted of technical reports providing lot and tract descriptions, survey photographs, and NRHP evaluations.

Surveys were conducted with the framework of 5-day outdoor camps, with volunteer survey crews and supporting staff operating out of tent arrangements. In addition to survey and reporting tasks, Ms. Garnett coordinated on-site visits and logistics with local National Forest and SHPO staff; prepared and coordinated all necessary logistical arrangements including travel to remote and difficult-to-access survey sites; dissemination of survey equipment and field maps among volunteers; and in-field collection, organization, and safe-keeping of data.

National Register Nomination, St. James the Greater Mission, Walterboro, SC (2015). Ms. Garnett authored and prepared a NRHP nomination for St. James the Greater Catholic Church and School Mission in Walterboro, South Carolina. St. James the Greater Mission, a black Catholic parish, comprises a vernacular church (1935) and schoolhouse (1901), and a cemetery dating to 1835. The property was listed on the National Register of Historic Places in September 2015.

National Register Nomination, Camp Fornance-Alta Vista-Newman Park Historic District, Columbia, SC (2015). Ms. Garnett co-authored and prepared a NRHP nomination for a historic streetcar suburb composed of three historic subdivisions that today constitute the Earlewood neighborhood in Columbia, South Carolina. The streetcar suburb comprised over 600 properties and 800 buildings and structures built in the Revival, Craftsman, Minimal Traditional, and Ranch styles between 1910 and 1960. Camp Fornance-Alta Vista-Newman Park Historic District was listed on the National Register in November 2015.

Architectural Inventory for Summerville National Register Historic District, South Carolina State Historic Preservation Office (2013). Ms. Garnett worked with a team of four to conduct a reconnaissance survey of over 800 properties located in the Summerville Historic District in South Carolina. Resources surveyed included mid-nineteenth to early twentieth cenury residential and commercial buildings designed in Greek Revival, Victorian, neoclassical, and vernacular styles. Ms. Garnett completed a survey form with National Register eligibility recommendations for the South Carolina State Historic Preservation Office.

Easement Reports, Virginia Department of Historic Resources, Richmond, VA (2014). Ms. Garnett visited historic architectural and archaeological properties held under easement by the Virginia DHR. She documented historic buildings, structures, and sites and performed conditions assessments, compiling annual stewardship reports for each site. Easement properties included prehistoric archaeological sites, Civil War

battlefields, industrial and agricultural structures, and buildings dating from the early eighteenth to the early twentieth century.

C

Appendix C – Representative Soil Logs

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REPRESENTATIVE SOIL LOG

Table 1. Representative Soil Profiles from Shovel Test Probes

Test Number	Depth (cmbs)	Stratum	Munsell	Soil Type	Comment/Artifacts
ST 01	0 to 25	O Horizon/fill	10 YR 4/3 Brown	Loamy Sand	NCM; 25% gravels
	25 to 60	A Horizon	10 YR 5/4 Yellowish Brown	Loamy Sand	NCM; <2% gravels
	60 to 100	C Horizon	10 YR 5/4 Yellowish Brown m/w 7.5 YR 4/6 Strong Brown	Sandy Clay	NCM; wet w/redox
ST 02	0 to 6	O Horizon	10 YR 3/2 Very Dark Grayish Brown	Sandy Loam	NCM
	6 to 98	A Horizon	10 YR 5/6 Yellowish Brown	Sand	NCM; 50% pea gravels; water table at 86 cmbs
ST 03	0 to 6	O Horizon	10 YR 3/2 Very Dark Grayish Brown	Sandy Loam	NCM
	6 to 24	Fill	10 YR 5/6 Yellowish Brown	Sandy Loam	NCM
	24 to 90	A Horizon	10 YR 6/6 Brownish Yellow m/w 7.5 YR 6/8 Reddish Yellow	Sand	NCM; wet; water table at 84 cmbs
ST 04	0 to 6	O Horizon	10 YR 3/2 Very Dark Grayish Brown	Loamy Sand	NCM
	6 to 46	Fill	10 YR 5/6 Yellowish Brown	Loamy Sand	NCM; 10% pea gravels
	46 to 100		10 YR 5/8 Yellowish Brown	Sandy Loam	NCM; water table at 98 cmbs

ST 05	0 to 6	O Horizon	10 YR 3/2 Very Dark Grayish Brown	Loamy Sand	NCM
	6 to 18	Fill	10 YR 4/6 Dark Yellowish Brown	Compact Loamy Sand	NCM; 20% pebbles
	18 to 91	A Horizon	10 YR 6/6 Brownish Yellow	Sand	NCM; wet; water table at 86 cmbs
ST 06	0 to 7	O Horizon	10 YR 3/2 Very Dark Grayish Brown	Sandy Loam	NCM
	7 to 12	Fill	10 YR 5/4 Yellowish Brown	Compact Loamy Sand	NCM
	12 to 89	A Horizon	10 YR 5/6 Yellowish Brown	Sand	NCM; wet; water table at 86 cmbs
ST 07	0 to 8	O Horizon	10 YR 3/2 Very Dark Grayish Brown	Sandy Loam	NCM
	8 to 25	Fill	10 YR 4/4 Dark Yellowish Brown	Compact Loamy Sand	NCM; 20% pea gravels
	25 to 90	A Horizon	10 YR 6/6 Brownish Yellow	Sand	NCM; wet; water table at 84 cmbs
ST 08	0 to 8	O Horizon	10 YR 3/2 Very Dark Grayish Brown	Loamy Sand	NCM
	8 to 20	Fill	10 YR 5/6 Yellowish Brown	Compact Sand	NCM; 20% pea gravels with asphalt chunks present
	20 to 95	A Horizon	10 YR 5/8 Yellowish Brown	Sand	NCM; wet; water table at 92 cmbs
ST 09	0 to 10	O Horizon	10 YR 3/2 Very Dark Grayish Brown	Loamy Sand	NCM
	10 to 85	Fill	10 YR 4/4 Dark Yellowish Brown	Compact Sand	NCM; 20% pea gravels with asphalt chunks present to 75 cmbs

	85 to 100	A Horizon	2.5 Y 4/2 Dark Grayish Brown	Sand	NCM; wet with wetland odor
ST 10	0 to 6	O Horizon	10 YR 3/2 Very Dark Grayish Brown	Loamy Sand	NCM
	6 to 20	Fill	10 YR 4/6 Dark Yellowish Brown	sand	NCM; 20% gravels
	20 to 93	A Horizon	10 YR 6/6 Brownish Yellow	Sand	NCM; wet; 2% gravels; water table at 88 cmbs
ST 11	0 to 15	O Horizon	10 YR 4/3 Brown	Loamy Sand	NCM
	15 to 60	Fill	10 YR 4/4 Dark Yellowish Brown	Loamy Sand	NCM; 20% gravels with asphalt chunks present
	60 to 103	A Horizon	10 YR 6/4 Light Yellowish Brown	Sand	NCM; wet; water table at 99 cmbs
ST 12	0 to 6	O Horizon	10 YR 4/3 Brown	Sandy Loam	NCM
	6 to 30	Fill	10 YR 4/4 Dark Yellowish Brown	Compact Loamy Sand	NCM
	30 to 103	A Horizon	10 YR 6/4 Light Yellowish Brown	Sand	NCM; wet; water table at 98 cmbs
ST 13	0 to 6	O Horizon	10 YR 4/3 Brown	Sandy Loam	NCM
	6 to 30+	Fill	10 YR 4/6 Dark Yellowish Brown	Compact Sandy Loam	NCM; 50%+ gravels; quit at 30 cmbs
ST 14	0 to 10	O Horizon	10 YR 4/4 Dark Yellowish Brown	Sandy Loam	NCM
	10 to 40	Fill	10 YR 5/6 Yellowish Brown	Loamy Sand	NCM; 2% gravels

	40 to 100	C Horizon	10 YR 6/4 Light Yellowish Brown	Sand	NCM; 40% pebbles
ST 15	0 to 6	O Horizon	10 YR 3/2 Very Dark Grayish Brown	Loamy Sand	NCM
	6 to 30	Fill	10 YR 5/8 Yellowish Brown	Compact Loamy Sand	NCM; 10% gravels
	30 to 100	C Horizon	2.5 Y 5/4 Light Olive Brown	Compact Sand	NCM; 2% gravels
ST 16	0 to 15	O Horizon	10 YR 3/3 Dark Brown	Loamy Sand	NCM
	15 to 25	Fill	10 YR 4/4 Dark Yellowish Brown	Loamy Sand	NCM
	25 to 95	A Horizon	10 YR 7/4 Very Pale Brown m/w 10YR 5/6 Yellowish Brown	Sand	NCM; wet; water table at 90 cmbs
ST 17	0 to 10	O Horizon	10 YR 3/2 Very Dark Grayish Brown	Silty Loam	NCM
	10 to 55	Fill	10 YR 5/4 Yellowish Brown	Loamy Sand	NCM; 2% pea gravels
	55 to 73	C Horizon	10 YR 5/6 Yellowish Brown	Compact Loamy Sand	NCM; 50% pea gravels
ST 18	0 to 10	O Horizon	10 YR 3/2 Very Dark Grayish Brown	Silty Loam	NCM
	10 to 30	Fill	10 YR 5/4 Yellowish Brown	Sandy Loam	NCM; 25% gravels
	30 to 87	A Horizon	10 YR 5/4 Yellowish Brown	Silty Loam	NCM; 2% pea gravels; water table at 87 cmbs
ST 19	0 to 10	O Horizon	10 YR 3/2 Very Dark Grayish Brown	Silty Loam	NCM

	10 to 50	A Horizon	10 YR 4/6 Dark Yellowish Brown	Sandy Loam	NCM; 2% gravels
	50 to 90	C Horizon	10 YR 5/6 Yellowish Brown m/w 10 YR 5/3 Grayish Brown	Loamy Sand	NCM
ST 20	0 to 10	O Horizon	10 YR 3/2 Very Dark Grayish Brown	Silty Loam	NCM
	10 to 50	A Horizon	10 YR 4/4 Dark Yellowish Brown	Loamy Sand	NCM
	50 to 90	C Horizon	10 YR 5/3 Brown m/w 10 YR 5/6 Yellowish Brown	Compact Silty Loam	NCM; wet; 2% gravels
ST 21	0 to 9	O Horizon	10 YR 3/2 Very Dark Grayish Brown	Silty Loam	NCM
	9 to 30	A Horizon	10 YR 5/6 Yellowish Brown	Compact Loamy Sand	NCM
	30 to 90	C Horizon	10 YR 5/3 Brown m/w 10 YR 5/6 Yellowish Brown	Compact Loamy Sand	NCM; moist
ST 22	0 to 10	O Horizon	10 YR 3/2 Very Dark Grayish Brown	Sandy Loam	NCM
	10 to 30	Fill	10 YR 5/4 Yellowish Brown	Loamy Sand	20% gravels; 1 round wire nail not collected from disturbed context
	30 to 75	A Horizon	10 YR 5/6 Yellowish Brown m/w 7.5 YR 4/6 Strong Brown	Loamy Sand	NCM
	75 to 90	C Horizon	2.5 Y 4/2 Dark Grayish Brown	Sandy Silt	NCM; wet; redox, wetland odor

ST 23	0 to 10	O Horizon	10 YR 3/3 Dark Brown	Silty Loam	NCM
	10 to 49	A Horizon	10 YR 5/4 Yellowish Brown	Loamy Sand	NCM
	49 to 72	C Horizon	2.5 Y 4/2 Dark Grayish Brown	Loamy Sand	NCM; wet; wetland odor

Key:
NCM = no cultural material
cmbs = centimeters below surface
m/w = mottled with

D

Appendix D – Historic Resources Survey Forms

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BASE FORM

Historic Sites #:

Property Name: Hot Cargo Loading Area Pads (Facility 1147)

Street Address: *Street #:* _____ (Low) _____ (High) *Apartment #:* _____ (Low) _____ (High)

Prefix: _____ *Street Name:* _____ *Suffix:* _____ *Type:* _____

County(s): Burlington **Zip Code:** 08879

Municipality(s): New Hanover Township **Block(s):** N/A

Local Place Name(s): Wrightstown **Lot(s):** N/A

Ownership:: Public **USGS Quad(s)** New Egypt

Photograph: View west.



Description: The two HCLA pads lie approximately 0.25-mile south of the main aircraft parking area at McGuire's Airfield, separated by a taxi lane and open grassy field. The HCLA consists of two circular poured-concrete pads approximately 200 feet distant from one another, and are surrounded by an asphalt-paved taxi area. The concrete pads were poured in square sections, and painted with yellow (now much faded) markings. Two fuel spill holes are capped with flush metal lids on the west pad. The metal lids are marked with "Carsite Products Inc., Deer Park NY USA." Lining the east and west perimeters of the HCLA is a concrete drainage trench. Between the two pads, south of the asphalt-paved taxi surround, stands Facility 1146, the concrete generator building constructed in 1986. Just southeast of Facility 1146 stands the west DFP; an additional 300 feet to the east stands the east DFP. A high metal fence with barbed wire overhang encloses the HCLA.

Registration and Status Dates:

National Historic Landmark: _____ SHPO Opinion: _____

National Register: _____ Local Designation: _____

New Jersey Register: _____ Other Designation: _____

Determination of Eligibility: Not Eligible Other Designation Date: _____

BASE FORM

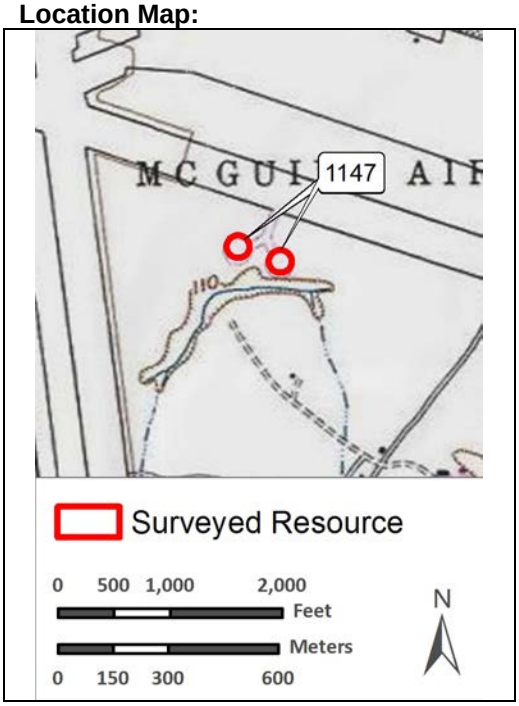
Historic Sites #:

Survey Name: Intensive Cultural Resources Survey of the Proposed Hot Cargo Loading Area, Joint Base McGuire-Dix-Lakehurst, Burlington County, New Jersey Date: April 21, 2021

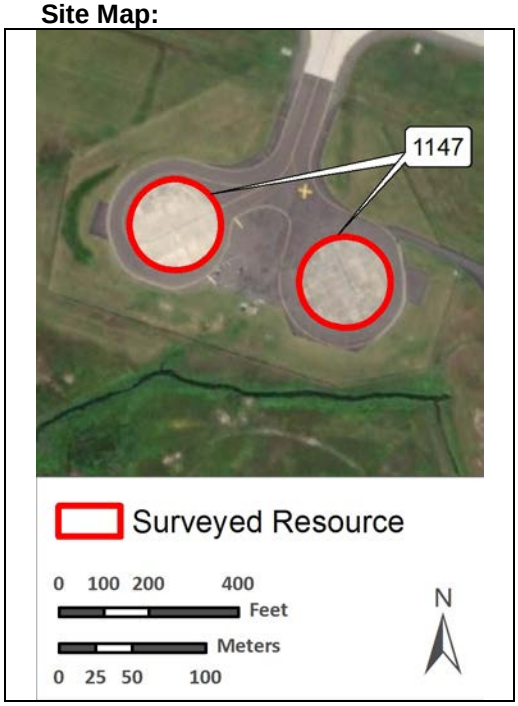
Surveyor: Diana Garnett

Organization: HDR Inc.

Location Map:



Site Map:



Bibliography/Sources:

JB MDL
1966-2000 Real Property Records for Facility 1147. On file with Real Property Office.

Weitze, Karen J.
1999 *Cold War Infrastructure for Strategic Air Command: The Bomber Mission*. Prepared by KEA Environmental, Inc. for Headquarters, Air Combat Command, Langley Air Force Base, Virginia.

Additional Information: N/A

More Research Needed? ☐ Yes ☒ No

INTENSIVE LEVEL USE ONLY

Attachments Included: ☐ Building ☒ Structure ☐ Object ☐ Bridge ☐ Landscape ☐ Industry

Within Historic District? ☐ Yes ☒ No

Status: ☐ Key-Contributing ☐ Contributing ☐ Non-Contributing

Associated Archaeological Site/Deposit? ☐ Yes
(Known or potential Sites – if yes, please describe briefly)

ELIGIBILITY WORKSHEET

Historic Sites #:

History: Little historic data could be found regarding construction of the HCLA at McGuire AFB in 1966. The area was developed during the Cold War era and was designed to support the base's airlift mission. The HCLA at McGuire historically included eight landing areas, with only pads 1 and 2 (the two current pads) laid out in a circular pattern separated from the main runways (Figure 18). In 2000, landing areas 7 and 8 were removed (JB MDL Real Property). Ca. 1975, two small, concrete defensive fighting position structures were installed south and east of the HCLA pads at McGuire to provide additional security for munitions transport operations. The defensive fighting positions were built as semi-subterranean structures with low, flat roofs and narrow horizontal openings allowing for 360-degree observation. The current fence line was constructed around the HCLA in 1977. In 1986, a new concrete block generator house was built at the south end of the HCLA (JB MDL Real Property Records).

According to CRM staff at JB MDL, McGuire's HCLA remained in use through the Cold War; records indicate that it may have continued in use through the early 2000s, before becoming obsolete due to insufficient utilities and capacity to support modern aircraft. Historic aerials show that the asphalt taxi was repaved and repainted with different markings at various times during the 2000s, with some of the most recent markings applied ca. 2015 (HistoricAerials.com). The concrete landing pads have remained substantially unaltered. The airfield at McGuire remains in active use, with ongoing construction of hangars and support buildings north of the HCLA.

Significance: The HCLA pads associated with Facility 1147 were constructed during the 1960s at the height of the Cold War. The two structures provided ancillary support to McGuire's munitions airlift mission. The parking pads are of standard materials, design, and construction and are undistinguished in any way. The facility does not meet any of the criteria of the NRHP. The two hot cargo pads are not directly associated with any historical events that have made a significant contribution to the broad patterns of our history under NRHP Criterion A. They were constructed in 1966 to support McGuire's munitions airlift program. The two pads were temporary holding areas while munitions were transferred from the aircraft to the munitions storage area. Some sources indicate that the HCLA fell into disuse following the close of the Cold War in the 1990s. Facility 1147 is not directly associated with any significant historical events that would qualify the resource as individually significant under NRHP Criterion A. These two hot cargo pads do not meet NRHP Criterion B for any direct associations with the productive lives of persons important in local, regional, state, or national history. The facility does not have any known direct associations with the productive lives of important individuals in local, regional, state, or national history, and it does not appear eligible for the NRHP under Criterion B. The facilities do not meet NRHP Criterion C for "distinctive characteristics of a type, period, and method of construction," and do not appear to have any architectural or engineering merits. While the USAF and Army put much research and effort into designing concrete and asphalt airfield facilities during WWII and the Cold War, the innovative results were constructed during the 1940s and 1950s at other premier Army and Air Force bases, such Kirtland and Edwards AFBs. Constructed in the mid-late 1960s, the two hot cargo pads at McGuire are not representative of any technologically innovative engineering in their design and construction associated with WWII or Cold War-era runways or taxi areas. The structures are utilitarian in appearance and standard in their design and construction, exhibiting mid-to-late twentieth century architectural/engineering design and construction techniques that were commonly employed during the Cold War. These two concrete pads are unable to yield any information important to the study of local, state, or national history. They do not provide any additional information beyond what is documented in maps, aerials, as-builds, photographs, and written description, and therefore, their limited data potential has been exhausted once their location, physical characteristics, and pertinent history have been recorded on survey forms.

Eligibility for New Jersey and National Registers: ☐ Yes ☒ No **National Register Criteria:** ☐ A ☐ B ☐ C ☐ D

Level of Significance ☐ Local ☐ State ☐ National

Justification of Eligibility/Ineligibility: Due to an overall lack of historic significance, Facility 1147 (Hot Cargo Loading Area) is recommended not eligible for listing in the NRHP.

ELIGIBILITY WORKSHEET

Historic Sites #:

For Historic Districts Only:

Property Count: Key Contributing: _____ Contributing: _____ Non Contributing: _____

For Individual Properties Only:

List the completed attachments related to the property's significance:

Structure Attachment Form
Base Form

Narrative Boundary Description: The boundaries of Facility 1147 are constituted by the two separate circular perimeters of the two concrete pads. The diameter of each pad measures approximately 200 feet, and the circumference of each pad measures 628 feet.

Survey Name: Intensive Cultural Resources Survey of the Proposed Hot Cargo Loading Area, Joint Base McGuire-Dix-Lakehurst, Burlington County, New Jersey Date: April 21, 2021

Surveyor: Diana Garnett

Organization: HDR

STRUCTURE ATTACHMENT

Historic Sites #:

Common Name: Facility 1147

Historic Name: Hot Cargo Loading Area

Present Use: No Activity

Historic Use: Transportation and Movement Activity: Vehicular Parking

Construction Date: 1966 **Source:** Joint Base McGuire-Dix-Lakehurst Real Property Records

Alteration Date(s): **Source:**

Designer: unknown **Physical Condition:** Fair

Builder: unknown **Remaining Historic Fabric:** High

Type: Other

Roof Finish Materials: N/A

Exterior Finish Materials Concrete

Exterior Description: The two HCLA pads lie approximately .25-mile south of the main aircraft parking area at McGuire's Air Field, separated by a taxi lane and open grassy field. The HCLA consists of two circular poured concrete pads that lie approximately 200 feet distant from one another, and surrounded by asphalt-paved taxi area. The concrete pads were poured in square sections, and painted with yellow (now much faded) markings. Two fuel spill holes are capped with flush metal lids on the west pad. The metal lids are marked with "Carsite Products Inc., Deer Park NY USA." Lining the east and west perimeters of the HCLA is a concrete drainage trench. Between the two pads, south of the asphalt-paved taxi surround, stands Facility 1146, the concrete generator building constructed in 1986. Just southeast of Facility 1146 stands one of the defensive fighting position structure; an additional 300 feet to the east stands the second defensive fighting position structure. A high metal fence with barbed wire overhang encloses the HCLA.

Interior Description: N/A

Setting: Facility 1147 is located within the McGuire area of Joint Base McGuire-Dix-Lakehurst (JB MDL) in New Hanover Township, Burlington County, in central New Jersey. McGuire Air Force Base is approximately 30 miles east of Philadelphia, 60 miles south of New York City, 55 miles south of Newark, and 28 miles west of the Atlantic Ocean. JB MDL is located within the Pinelands National Reserve (Reserve), commonly referred to as the Pinelands. The Reserve consists of approximately 1.1 million acres in southern New Jersey. The Reserve includes portions of Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, and Ocean Counties. Elevations range between 99 to 116 feet above sea level within the HCLA project area, and range between 95 to 104 feet within the MSA project area, as referenced to the North American Vertical Datum of 1988.

BASE FORM

Historic Sites #:

Property Name: Generator Shelter (Facility 1146)

Street Address: *Street #:* _____ (Low) _____ (High) *Apartment #:* _____ (Low) _____ (High)

Prefix: _____ *Street Name:* _____ *Suffix:* _____ *Type:* _____

County(s): Burlington **Zip Code:** 08879

Municipality(s): New Hanover Township **Block(s):** N/A

Local Place Name(s): Wrightstown **Lot(s):** N/A

Ownership:: Public **USGS Quad(s)** New Egypt

Photograph: View west.



Description: The concrete block generator shelter that stands between the HCLA pads was built c. 1986, according to JB MDL real property records. Though not historic in age, the structure is recorded here in order to evaluate it under the requirements for outstanding significance under Criteria Consideration G. The building is a small, rectangular-plan structure with concrete block walls and a front gable roof covered in asphalt shingles. Gables are clad in plywood. Double-leaf steel doors are centered in the front (north) gable end, and open onto a concrete walkway. A metal louvered vent is present in the lower wall of each side (east and west) side elevation. No other fenestration or ornamentation is present. A light is affixed to the rear (south) gable, and a camera is affixed to the front gable.

Registration and Status Dates:

National Historic Landmark:		SHPO Opinion:	
National Register:		Local Designation:	
New Jersey Register:		Other Designation:	
Determination of Eligibility:	Not Eligible	Other Designation Date:	

BASE FORM

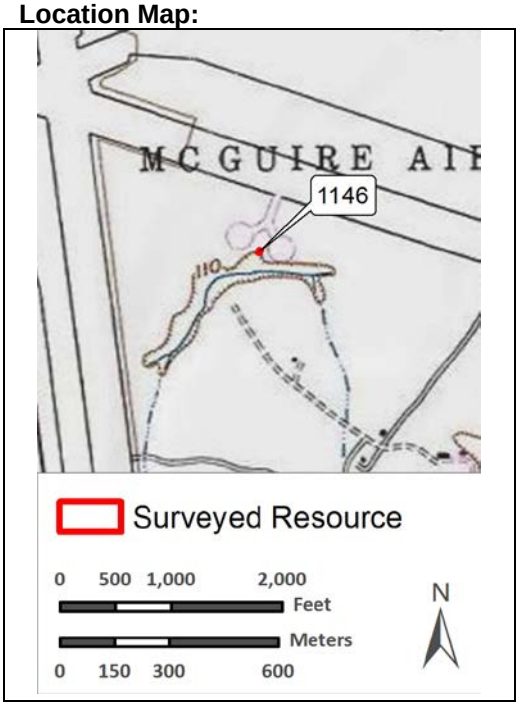
Historic Sites #:

Survey Name: Intensive Cultural Resources Survey of the Proposed Hot Cargo Loading Area, Joint Base McGuire-Dix-Lakehurst, Burlington County, New Jersey Date: April 21, 2021

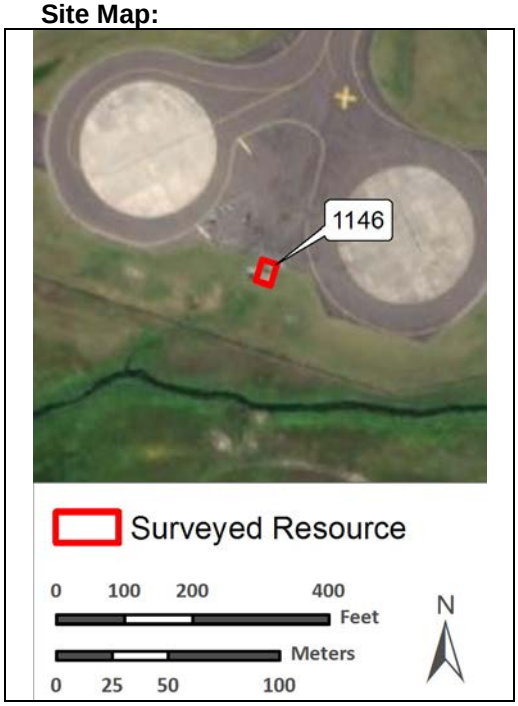
Surveyor: Diana Garnett

Organization: HDR Inc.

Location Map:



Site Map:



Bibliography/Sources:

JB MDL
1973-2000 Real Property Records for Facility 1146. On file with Real Property Office.

Weitze, Karen J.
1999 *Cold War Infrastructure for Strategic Air Command: The Bomber Mission*. Prepared by KEA Environmental, Inc. for Headquarters, Air Combat Command, Langley Air Force Base, Virginia.

Additional Information: N/A

More Research Needed? ☐ Yes ☒ No

INTENSIVE LEVEL USE ONLY

Attachments Included: ☐ Building ☒ Structure ☐ Object ☐ Bridge ☐ Landscape ☐ Industry

Within Historic District? ☐ Yes ☒ No

Status: ☐ Key-Contributing ☐ Contributing ☐ Non-Contributing

Associated Archaeological Site/Deposit? ☐ Yes
(Known or potential Sites – if yes, please describe briefly)

ELIGIBILITY WORKSHEET

Historic Sites #:

History: In 1966, McGuire AFB developed the hot cargo loading area south of the main airfield. The design of the hot cargo loading area was based on standard configurations for aircraft parking used by the SAC in the 1950s. The configurations most commonly consisted of a single, large apron parking area with extended "stub parking" for individual planes, and on bases where explosives-laden aircraft landed, hot cargo loading pads that were set apart farther from the large-scale parking (Wietze 1999: 109). The HCLA at McGuire included eight landing areas, with only the two currents pads laid out in a circular pattern separated from the main runways. Two small, concrete defensive fighting positions were installed south and east of the HCLA pads at McGuire to provide additional security for munitions transport operations. The defensive fighting positions were built as semi-subterranean structures with low, flat roofs and narrow horizontal openings allowing for 360-degree observation. The current fence line was constructed around the HCLA in 1977. In 1986, a new concrete block generator house was built at the south end of the HCLA (JB MDL Real Property Records).

According to CRM staff at JB MDL, McGuire's HCLA remained in use through the Cold War; records indicate that it may have continued in use through the early 2000s, before becoming defunct due to insufficient utilities and capacity to support modern aircraft. Historic aerial imagery shows that the asphalt taxi was repaved and repainted with different markings at various times during the 2000s, with some of the most recent markings applied c. 2015.

Significance: Constructed c. 1986 to house a generator, Facility 1146 is utilitarian in character and function. Though built during the Cold War era, the structure serves an ancillary purpose for the HCLA, and does not meet the requirements for demonstrating exceptional significance under Criteria Consideration G for properties that have not reached the 50-year-old threshold.

Eligibility for New Jersey and National Registers: ☐ Yes ☒ No **National Register Criteria:** ☐ A ☐ B ☐ C ☐ D

Level of Significance ☐ Local ☐ State ☐ National

Justification of Eligibility/Ineligibility: Facility 1146 does not meet the requirements for demonstrating exceptional significance under Criteria Consideration G for properties that have not reached the 50-year-old threshold.

For Historic Districts Only:

Property Count: Key Contributing: _____ Contributing: _____ Non Contributing: _____

For Individual Properties Only:

List the completed attachments related to the property's significance:
Structure Attachment Form
Base Form

Narrative Boundary Description: The boundaries of Facility 1146 comprise the building footprint and the narrow perimeter around it, which includes adjacent and attached concrete pads with utility boxes.

ELIGIBILITY WORKSHEET

Historic Sites #:

Survey Name: Intensive Cultural Resources Survey of the Proposed Hot Cargo Loading Area, Joint Base McGuire-Dix-Lakehurst, Burlington County, New Jersey
Date: April 21, 2021

Surveyor: Diana Garnett

Organization: HDR

STRUCTURE ATTACHMENT

Historic Sites #:

Common Name: Facility 1146
Historic Name: Generator Shelter
Present Use: No Activity
Historic Use: Industrial
Construction Date: 1986 **Source:** Joint Base McGuire-Dix-Lakehurst Real Property Records
Alteration Date(s): **Source:**
Designer: unknown **Physical Condition:** Good
Builder: unknown **Remaining Historic Fabric:** High
Type: Other
Roof Finish Materials: Asphalt Shingle
Exterior Finish Materials Concrete Block, Modern

Exterior Description: The concrete block generator shelter that stands between the two HCLA pads was built c. 1986, according to JB MDL real property records. Though not historic in age, the structure is recorded here in order to evaluate it for outstanding significance under Criteria Consideration G. The building is a small, rectangular-plan structure with concrete block walls and a front gable roof covered in asphalt shingles. Gables are clad in plywood. Double-leaf steel doors are centered in the front (north) gable end, and open onto a concrete walkway. A metal louvered vent is present in the lower wall of each side (east and west) side elevation. No other fenestration or ornamentation is present. A light is affixed to the rear (south) gable, and a camera is affixed to the front gable.

Interior Description: N/A

Setting: Facility 1146 is located within the McGuire area of Joint Base McGuire-Dix-Lakehurst (JB MDL) in New Hanover Township, Burlington County, in central New Jersey. McGuire Air Force Base is approximately 30 miles east of Philadelphia, 60 miles south of New York City, 55 miles south of Newark, and 28 miles west of the Atlantic Ocean. JB MDL is located within the Pinelands National Reserve (Reserve), commonly referred to as the Pinelands. The Reserve consists of approximately 1.1 million acres in southern New Jersey. The Reserve includes portions of Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, and Ocean Counties. Elevations range between 99 to 116 feet above sea level within the HCLA project area, and range between 95 to 104 feet within the MSA project area, as referenced to the North American Vertical Datum of 1988.

BASE FORM

Historic Sites #:

Property Name: Defensive Fighting Position Buildings

Street Address: *Street #:* _____ (Low) _____ (High) *Apartment #:* _____ (Low) _____ (High)

Prefix: _____ *Street Name:* _____ *Suffix:* _____ *Type:* _____

County(s): Burlington **Zip Code:** 08879

Municipality(s): New Hanover Township **Block(s):** N/A

Local Place Name(s): Wrightstown **Lot(s):** N/A

Ownership:: Public **USGS Quad(s)** New Egypt

Photograph: View west.



Description: The two DFP buildings are identical in form, scale, materials, and design. They are small, rectangular bunker-type buildings that measure approximately 7x10 feet, as measured at the roofline, which forms a deep front overhang. The buildings are poured concrete boxes sunk 3–5 feet below grade, with only the upper half (approximately) exposed above grade. Each building is capped by a flat roof with deep overhangs, particularly over the front/door, where the overhang shelters a subterranean entrance. The entrance is accessed by concrete steps that descend below grade into a concrete enclosure with waist-high concrete block retaining walls. A single-leaf steel door opens into the DFP interior, which consists of concrete walls, floor, and ceiling. On each of the four building elevations is a narrow horizontal slit opening, framed in a steel panel nailed to the concrete wall. No other fenestration, venting, or ornamentation is present. Walls are painted white, the roofs are painted brown, and steel window surrounds and doors are Army green. Both buildings open to the west.

Registration and Status Dates:

National Historic Landmark: _____ SHPO Opinion: _____

National Register: _____ Local Designation: _____

New Jersey Register: _____ Other Designation: _____

Determination of Eligibility: Not Eligible Other Designation Date: _____

BASE FORM

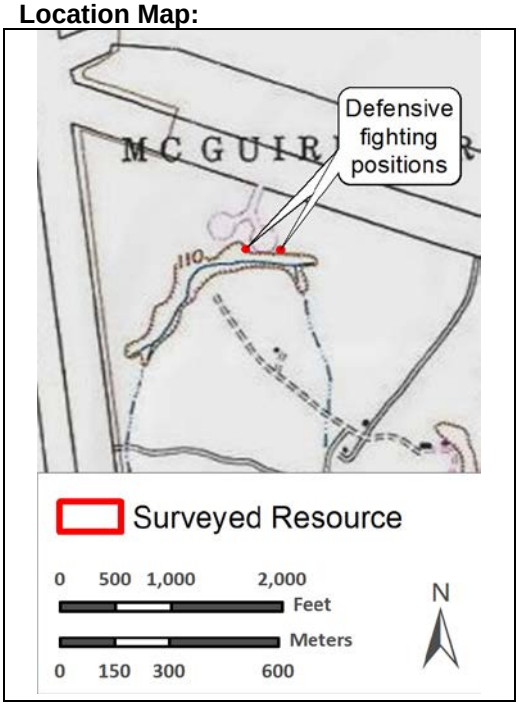
Historic Sites #:

Survey Name: Intensive Cultural Resources Survey of the Proposed Hot Cargo Loading Area, Joint Base McGuire-Dix-Lakehurst, Burlington County, New Jersey
Date: April 21, 2021

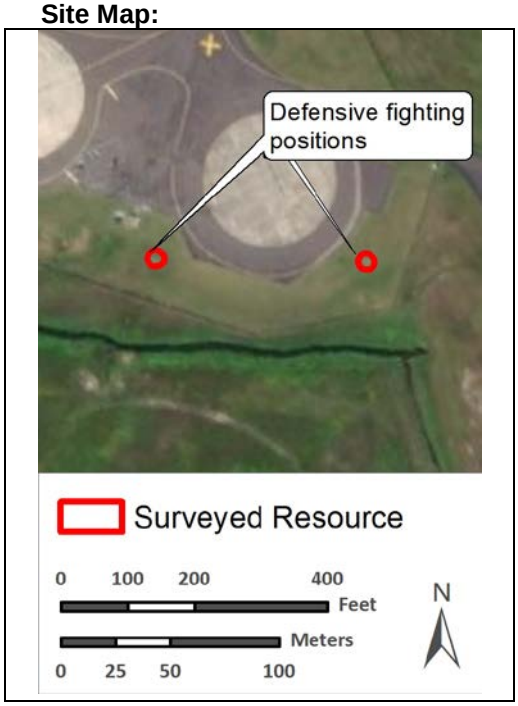
Surveyor: Diana Garnett

Organization: HDR Inc.

Location Map:



Site Map:



Bibliography/Sources:

JB MDL
1966-2000 Real Property Records for Facilities 1146 and 1147. On file with JB MDL Real Property Office.

Weitze, Karen J.
1999 *Cold War Infrastructure for Strategic Air Command: The Bomber Mission*. Prepared by KEA Environmental, Inc. for Headquarters, Air Combat Command, Langley Air Force Base, Virginia.

Additional Information: N/A

More Research Needed? ☐ Yes ☒ No

INTENSIVE LEVEL USE ONLY

Attachments Included: ☒ Building ☐ Structure ☐ Object ☐ Bridge ☐ Landscape ☐ Industry

Within Historic District? ☐ Yes ☒ No

Status: ☐ Key-Contributing ☐ Contributing ☐ Non-Contributing

Associated Archaeological Site/Deposit? ☐ Yes
(Known or potential Sites – if yes, please describe briefly)

BUILDING ATTACHMENT

Historic Sites #:

Common Name: Defensive Fighting Position
Historic Name: Defensive Fighting Position
Present Use: No Activity
Historic Use: Unclassifiable Activities
Construction Date: c. 1975 **Source:** Historic Aerials; JB MDL Real Property Records
Alteration Date(s): **Source:**
Designer: Unknown **Physical Condition:** Fair
Builder: Unknown **Remaining Historic Fabric:** High
Style: None
Form: Other **Stories:** 1
Type: Other **Bays:** 1
Roof Finish Materials: Other
Exterior Finish Materials Concrete

Exterior Description: The two DFP buildings are identical in form, scale, materials, and design. They are small, rectangular bunker-type buildings that measure approximately 7x10 feet, as measured at the roofline, which forms a deep front overhang. The buildings are poured concrete boxes sunk 3–5 feet below grade, with only the upper half (approximately) exposed above grade. Each building is capped by a flat roof with deep overhangs, particularly over the front/door, where the overhang shelters a subterranean entrance. The entrance is accessed by concrete steps that descend below grade into a concrete enclosure with waist-high concrete block retaining walls. A single-leaf steel door opens into the DFP interior, which consists of concrete walls, floor, and ceiling. On each of the four building elevations is a narrow horizontal slit opening, framed in a steel panel nailed to the concrete wall. No other fenestration, venting, or ornamentation is present. Walls are painted white, the roofs are painted brown, and steel window surrounds and doors are Army green. Both buildings open to the west.

Interior Description: N/A

Setting: Facility 1146 is located within the McGuire area of Joint Base McGuire-Dix-Lakehurst (JB MDL) in New Hanover Township, Burlington County, in central New Jersey. McGuire Air Force Base is approximately 30 miles east of Philadelphia, 60 miles south of New York City, 55 miles south of Newark, and 28 miles west of the Atlantic Ocean. JB MDL is located within the Pinelands National Reserve (Reserve), commonly referred to as the Pinelands. The Reserve consists of approximately 1.1 million acres in southern New Jersey. The Reserve includes portions of Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, and Ocean Counties. Elevations range between 99 to 116 feet above sea level within the HCLA project area, and range between 95 to 104 feet within the MSA project area, as referenced to the North American Vertical Datum of 1988.

Survey Name: Intensive Cultural Resources Survey of the Hot Cargo Loading Area, JB MDL Date: April 21, 2021
Surveyor: Diana Garnett
Organization: HDR, Inc.

ELIGIBILITY WORKSHEET

Historic Sites #:

History: In 1966, McGuire AFB developed the hot cargo loading area south of the main airfield. The design of the hot cargo landing area was based on standard configurations for aircraft parking used by the SAC in the 1950s. The configurations most commonly consisted of a single, large apron parking area with extended "stub parking" for individual planes, and on bases where explosives-laden aircraft landed, hot cargo landing pads that were set farther apart from the large-scale parking (Wietze 1999: 109). The HCLA at McGuire included eight landing areas, with only pads 1 and 2 (the two current extant pads) laid out in circular form and separated from the main runways. Two small, concrete defensive fighting position buildings were constructed south and east of the HCLA pads at an unverified date after 1970 and before 1995, as indicated by historic aerial imagery. The two DFPs may have replaced earlier structures, but research did not uncover evidence of prior defense structures at the HCLA. The two bunker-like buildings provided security for the HCLA and McGuire's munitions airlift mission. The defensive fighting positions were built as semi-subterranean buildings with low, flat roofs and narrow horizontal openings allowing for 360-degree observation. The current fence line was constructed around the HCLA in 1977. In 1986, a new concrete block generator house was built at the south end of the HCLA (JB MDL Real Property Records).

According to CRM staff at JB MDL, McGuire's HCLA remained in use through the Cold War; records indicate that it may have continued in use through the early 2000s, before becoming defunct due to insufficient utilities and capacity to support modern aircraft. Historic aerial imagery shows that the asphalt taxi was repaved and repainted with different markings at various times during the 2000s, with some of the most recent markings applied c. 2015. Research did not reveal when or for how long the DFPs were in active use, but they currently appear to have been unoccupied for a period of time, with water collecting in the subterranean interior.

Significance: The two DFPs are not known to be directly associated with any historical events that have made a significant contribution to the broad patterns of our history under NRHP Criterion A. They were likely constructed in the 1970s or 1980s to provide on-site security for McGuire's HCLA. Some sources indicate that the HCLA fell into disuse following the close of the Cold War in the 1990s. The DFPs are currently not in use, and appear to have been unoccupied for a period of time, with water collecting in the subterranean interior. These defensive fighting positions do not meet NRHP Criterion B for any direct associations with the productive lives of persons important in local, regional, state, or national history. The structures do not have any known direct associations with the productive lives of important individuals in local, regional, state, or national history, and they do not appear eligible for the NRHP under Criterion B. The structures do not meet NRHP Criterion C for "distinctive characteristics of a type, period, and method of construction," and do not appear to have any architectural or engineering merits. They are utilitarian in design and materials, exhibiting mid-to-late twentieth century architectural/engineering design and construction techniques that were commonly employed by the military during the Cold War. The DFPs do not meet NRHP Criterion D for any potential to provide information important to the study of Cold War history at McGuire AFB. They do not provide any additional information beyond what is documented in maps, aerials, as-builds, photographs, and written description, and therefore, their limited data potential has been exhausted once their location, physical characteristics, and pertinent history have been recorded on survey forms.

Eligibility for New Jersey and National Registers: ☐ Yes ☒ No **National Register Criteria:** ☐ A ☐ B ☐ C ☐ D

Level of Significance ☐ Local ☐ State ☐ National

Justification of Eligibility/Ineligibility: Due to an overall lack of significance, the two defense fighting positions associated with the HCLA are recommended not eligible for listing in the NRHP.

For Historic Districts Only:

Property Count: Key Contributing: _____ Contributing: _____ Non Contributing: _____

For Individual Properties Only:

ELIGIBILITY WORKSHEET

Historic Sites #:

List the completed attachments related to the property's significance:
Building Attachment Form
Base Form

Narrative Boundary Description: The boundaries of the DFPs comprise each individual building footprint, which measures approximately 10x7 feet.

Survey Name: Intensive Cultural Resources Survey of the Proposed Hot Cargo Loading Area, Joint Base McGuire-Dix-Lakehurst, Burlington County, New Jersey Date: April 21, 2021

Surveyor: Diana Garnett

Organization: HDR



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