Davison Army Airfield Area Development Plan

Final Environmental Impact Statement

Vol. I & Vol. II

June 2021

US ARMY GARRISON FORT BELVOIR, VIRGINIA

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Davison Army Airfield
Area Development Plan
Environmental Impact Statement
FINAL

US Army Garrison Fort Belvoir, Virginia

June 2021

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Final Environmental Impact Statement
Davison Army Airfield Area Development Plan
US Army Garrison Fort Belvoir
Fairfax County, Virginia

Lead Agency: Department of the Army

Title of Proposed Action: Implementation of an Area Development Plan at Davison Army Airfield

Designation: Final Environmental Impact Statement

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Abstract: This Final Environmental Impact Statement (EIS) evaluates the potential environmental impacts from the Army's Proposed Action to implement the Area Development Plan (ADP) at Davison Army Airfield (DAAF) on United States (US) Army Garrison Fort Belvoir (Fort Belvoir), Fairfax County, Virginia. The purpose of the Proposed Action is to provide DAAF with an ADP consistent with the airfield's vision of creating "a safe, secure, sustainable, consolidated aviation complex that allows for mission growth and provides multiple services in a compact campus." This includes upgrading and replacing an aging, undersized, inadequate, and inefficiently laid out physical infrastructure to allow DAAF to fully support its tenants' ongoing missions and eliminating partial obstructions of airfield safety zones and associated requirements for temporary waivers under which the airfield is currently operating. The Proposed Action is needed because DAAF facilities are aging and not sized or located appropriately to safely and effectively support the airfield's current or future mission. In addition to the No Action Alternative of not implementing the ADP, the Final EIS evaluates two alternatives addressing different levels of space and functional needs on the installation: the Full Implementation Alternative and the Partial Implementation Alternative. The Final EIS incorporates comments that were received during the 45-day Draft EIS public review period that was conducted from July 24 to September 8, 2020. The Army has selected the Full Implementation Alternative as its Preferred Alternative for implementation of the Proposed Action.

Executive Summary

ES.1 Introduction

This Final Environmental Impact Statement (EIS) evaluates the potential environmental impacts of the proposed implementation by the United States (US) Army (Army) of an Area Development Plan (ADP) for Davison Army Airfield (DAAF) at US Army Garrison Fort Belvoir (Fort Belvoir) in Fairfax County, Virginia. The proposed ADP would provide DAAF and its tenant organizations with the required facilities and infrastructure to fully support their ongoing missions. Projects in the proposed ADP would be implemented over the next 30 years.

ES.2 Background

DAAF is situated on approximately 673 acres of land on Fort Belvoir's Main Post, approximately 13 miles south of Washington, D.C. The airfield itself covers about 348 acres and its proximity to Washington, D.C. makes it a logistically valuable location for Department of Defense (DoD) units providing aviation support for federal activities in the National Capital Region (NCR). DAAF is also an important aviation support resource for Fort Belvoir tenants and Garrison leadership.

The airfield was built between 1951 and 1954 and has been administered by Military District Washington (MDW) since 1952. DAAF currently hosts five main DoD tenants: the Army Aviation Brigade (TAAB); Night Vision and Electronic Sensors Directorate (NVESD); District of Columbia Army National Guard (DCARNG); Civil Air Patrol (CAP); and Fire and Emergency Services (FES). Approximately 50 helicopters and airplanes are permanently assigned to DAAF to support the missions of the tenants. These aircraft are used for training and testing operations as well as passenger transport for the Army and DoD. The airfield's authorized work force consists of 672 personnel, with the three largest units being the 12th Aviation Battalion (12th AV BN), Operational Support Airlift Activity / Operational Support Airlift Command (OSA-A/OSACOM), and DCARNG.

Many of the buildings on the airfield date to the 1950s, 1960s, and 1970s. More than 40 percent of buildings at the airfield are 50 years or older, and an additional 25 percent are between 30 and 49 years old. Multiple facilities at DAAF are past their intended lifecycle and are obsolete, undersized, and/or inefficient. Their age also results in unnecessarily high maintenance costs.

Several facilities at DAAF are located within safety zones defined by the DoD and Federal Aviation Administration (FAA) associated with the airfield's runway. These zones, the Primary Surface and Transitional Surface, are required to be free of obstructions to ensure the safe operation of aircraft. Facilities within these zones at DAAF are required to operate under temporary waivers that must be periodically reviewed by the US Army Aeronautical Services Agency to ensure that control measures are in use and adequate to minimize the risk posed by the obstructions.

The Army initiated the preparation of an ADP for DAAF in 2017. The DoD's Unified Facilities Criteria (UFC) 2-100-01, Change 1 (November 2018) prescribes the preparation of ADPs for districts within DoD installations that are identifiable and connected based on characteristics such as geographical features, land use patterns, and building types (DoDI 4165.70, 2018). DAAF is identified as such a district in Fort

Belvoir's Real Property Master Plan (RPMP), which was updated in 2014. The DAAF ADP recommends 24 construction, modernization, and demolition projects to provide facilities and infrastructure that would adequately support the ongoing and future missions of the airfield's tenants. The ADP would be fully consistent with the goals and objectives of the Fort Belvoir RPMP and would ensure compliance with UFC 2-100-01, Change 1.

ES.3 Purpose and Need

The purpose of the Proposed Action is to provide DAAF with an ADP consistent with the airfield's vision of creating "a safe, secure, sustainable, consolidated aviation complex that allows for mission growth and provides multiple services in a compact campus." This includes upgrading and replacing aging, undersized, inadequate, and inefficiently laid out physical infrastructure to allow DAAF to fully support its tenants' ongoing missions and remove obstructions from airfield safety surfaces requiring temporary waivers under which the airfield is currently operating.

The Proposed Action is needed because DAAF facilities are aging and not sized or located appropriately to support safe and efficient airfield operations. These deficiencies adversely affect the military mission at DAAF now and in the future.

ES.4 Proposed Action

The Army's Proposed Action is to implement the 24 construction, modernization, demolition, and infrastructure improvement projects identified in the DAAF ADP. The Proposed Action does not include, nor would it require, substantial changes in missions, air operations, or the number of aircraft and personnel at DAAF. All of the proposed projects would occur within Fort Belvoir's existing boundaries and most of them within DAAF's existing fence line. No land acquisition by the Army would be needed.

The proposed projects are organized into short-range (next ten years), mid-range (from 11 to 20 years from now), and long-range (from 21 to 30 years from now) timeframes. This phasing reflects the Army's preferred sequence for implementing the projects based on current priorities and need, and provides an organizational framework for discussion of the projects in the EIS. Of the 24 projects, **Project 6**, which would build an 8-bay aircraft maintenance hangar for the 12th AV BN, is the only project currently programmed; it would be implemented in Fiscal Year 2024.

ES.5 Alternatives

In accordance with the National Environmental Policy Act (NEPA), the Army considered a range of reasonable alternatives to implement the ADP. The range of alternatives had to meet the Proposed Action's purpose and need while constituting a complete, coherent program that adequately accommodates the space and functional needs of all DAAF tenants; allowing for only partial implementation of the ADP projects, while not precluding their potential full implementation; and removing existing facilities in the airfield Primary Surface and Transitional Surface. The No Action Alternative is also analyzed in the EIS consistent with the requirements of NEPA. Alternatives analyzed in the EIS are summarized below.

No Action Alternative

Under the No Action Alternative, the DAAF ADP would not be implemented and existing conditions at the airfield would continue for the foreseeable future. None of the proposed construction, modernization, and demolition projects would occur. The No Action Alternative does not meet the Proposed Action's purpose and need; however, it is analyzed in the EIS to provide a baseline for evaluating the impacts of the Full and Partial Implementation Alternatives.

Full Implementation Alternative (Preferred Alternative)

The Full Implementation Alternative would implement all 24 projects identified in the DAAF ADP. As such, it would include the modernization of seven existing buildings and structures, construction of 13 buildings and structures, and demolition of up to 37 existing buildings and structures. Demolition under this Alternative would remove unneeded or redundant facilities following the implementation of the proposed projects. This would also include the demolition of all of the facilities currently within the Primary Surface and Transitional Surface that require temporary waivers to operate.

The Full Implementation Alternative would meet the Proposed Action's purpose and need by accommodating the space and functional needs of all DAAF tenants consistent with applicable DoD requirements. It would also fulfill DAAF's vision to create a safe, secure, sustainable, and consolidated aviation complex. The Army has selected the Full Implementation Alternative as its **Preferred Alternative** for implementing the Proposed Action.

Partial Implementation Alternative

The Partial Implementation Alternative would implement a modified, reduced program of ADP projects at DAAF. This alternative would amount to implementing 15 of the projects, including all of the short-range and most of the mid-range projects, with adjustments to some of the projects relative to the Full Implementation Alternative. None of the long-range projects would be implemented.

Under this Alternative, seven facilities would be modernized while five new facilities would be constructed. Up to 24 existing buildings and structures at DAAF would be demolished to remove facilities that would be redundant or unnecessary following the implementation of the proposed projects. It would remove all but two of the buildings within the Primary and Transitional Surfaces that require temporary waivers to operate. These facilities would continue to operate under those waivers for the foreseeable future following the implementation of the Partial Implementation Alternative.

The Partial Implementation Alternative would not address DAAF's tenants' requirements as comprehensively as the Full Implementation Alternative. However, it would substantially improve conditions and adequately fulfill DAAF's vision to create a safe, secure, sustainable, and consolidated aviation complex. It would also not preclude later implementation of those mid-range and long-range projects not included in the alternative.

Table ES-1 summarizes the proposed ADP projects in the Full and Partial Implementation Alternatives and the timeframes in which they would occur.

Table ES-1: Summary of Full and Partial Implementation Alternatives

Project No.	Project	Alternative	
		Full Implementation (Preferred Alternative)	Partial Implementation
Short-Range ADP Projects (1 to 10 years)			
1	Modernize Building 3121, DCARNG Airfield Operations Section	X	X
2	Modernize Building 3145, OSA-A/OSACOM Hangar	X	X
3	Modernize Building 3151, 12th AV BN D Company Hangar	X	X
4	Modernize Building 3232, 12th AV BN C Company Hangar	X	X
5	Realign Santjer Road and Gavin Road	X	X
6	Construct 12th AV BN 8-Bay Aircraft Maintenance Hangar	X	X
7	Construct North Taxiway Connection	X	X
8	Remove Earthen Knoll	X	X
9	Construct Runway Safety Overrun	X	X
Mid-Range ADP Projects (11 to 20 years)			
10	Modernize and Expand Building 3146	X	X
11	Construct 12th AV BN 10-Bay Storage Hangar	X	
12	Construct 12th AV BN 4-Bay Storage Hangar and Secondary Parking Lot	X	
13	Construct 12th AV BN Aircraft Paint Shop	X	
14	Modernize and Expand Building 3212, DCARNG Readiness Center	X	X
15	Construct DCARNG Aircraft Wash Rack	X	X
16	Modernize Building 3165, OSA-A/OSACOM Operations Facility	X	X
17	Relocate NVESD	X	X
18	Expand Aircraft Parking Apron	X	X
Long-Range ADP Projects (21 to 30 years)			
19	Replace Farrar Gate Access Control Point and Install Redundant Communications Line	X	
20	Construct NVESD Hangar	X	
21	Construct OSA-A / OSACOM Operational Flight Division Hangar	X	
22	Construct OSA-A/OSACOM Operations Facility	X	
23	Construct Perimeter Road Multi-purpose Trail	X	
24	Construct Alternative Perimeter Road	X	

ES.6 Public Involvement

The Army published a Notice of Intent (NOI) to prepare the EIS in the *Federal Register* on April 19, 2018. Additional notices announcing the Army's intent to prepare the EIS and upcoming scoping meetings were published in the *Washington Post* on April 19, 2018, and in the *Mount Vernon Gazette* and Fort

Belvoir *Eagle* on April 26, 2018. Both the NOI and the newspaper notices solicited public comments. Publication of the NOI initiated a 30-day public scoping period that ended on May 21, 2018.

Scoping letters briefly describing the Proposed Action, announcing the upcoming scoping meetings, and soliciting comments were sent on April 18, 2018, to 91 stakeholders and potentially interested parties, including state and local officials; federal, state, regional, and local agencies; federally recognized Native American tribes; non-profit organizations; and members of the general public with a potential interest in the Proposed Action.

On May 16, 2018, the Army hosted two scoping meetings at the South County Center in Fairfax County. The first meeting was for government agencies and consisted of a presentation on the Proposed Action and EIS process followed by a question and answer session. The second meeting was an open house for the general public. Information on the Proposed Action was presented at both meetings through poster boards, fact sheets, and informal interaction with project team members. Attendees were encouraged to submit written comments.

Ten persons representing seven agencies attended the agency meeting. Five persons attended the public open house. No comments having a substantive bearing on the Proposed Action or the EIS were received during either of the scoping meetings.

A total of 15 persons or agencies provided comments during the 30-day scoping period. Eight of the comments received consisted of factual questions, acknowledgements of receipt, or offers of services with no direct bearing on the scope of the EIS. Substantive comments were received from the US Environmental Protection Agency (USEPA), Virginia Department of Environmental Quality (VDEQ), Virginia Department of Transportation (VDOT), Virginia Department of Historic Resources (VDHR), Virginia Department of Conservation and Recreation (VDCR), National Capital Planning Commission (NCPC), and the Fairfax County Department of Planning and Zoning. These comments are addressed accordingly in the EIS.

The Draft EIS was distributed to agencies, tribes, organizations, and individuals for a 45-day public review period that was conducted from July 24 to September 8, 2020. Two public teleconferences were held during the 45-day public review period to provide additional opportunities for comment on the Draft EIS. No comments requiring substantive revisions to the EIS, Proposed Action, or impact analysis were received during the 45-day public review period. Comments requiring minor revisions are addressed accordingly in the Final EIS.

The Final EIS will be publicly available for at least 30 days before the Army issues a Record of Decision (ROD). The ROD will articulate the decision made, provide a supporting explanation, and identify mitigation and protective measures to address adverse impacts that were identified during the EIS process. The ROD will explain both the pertinent factors upon which the decision is based and the reasons the alternative selected best meets the Proposed Action's purpose and need. The environmentally preferred alternative will also be identified in the ROD. The Notice of Availability (NOA) announcing the availability of the signed ROD will be published in the *Federal Register* no sooner than 30 days after the Final EIS is released for public review. Issuance of the signed ROD will formally conclude the NEPA process for the Proposed Action analyzed in this EIS.

ES.7 Environmental Consequences and Cumulative Impacts

Environmental consequences (or impacts) that could potentially result from the alternatives analyzed in the EIS are summarized below (**Table ES-2**). Overall, the Proposed Action would have significant impacts on wetlands and streams from unavoidable disturbance during construction and operation of multiple proposed ADP projects under both the Partial and Full Implementation Alternatives. Adherence to applicable permitting requirements and associated mitigation measures yet to be determined would mitigate these impacts to the extent possible. Projects would be designed to avoid or minimize wetlands and streams and the boundaries of such features would be field-delineated prior to beginning construction of each project, further minimizing impacts. The Fort Belvoir Directorate of Public Works-Environmental Division (DPW-ED) would review each of the proposed ADP projects prior to implementation to identify environmentally sensitive areas that could potentially be impacted and work with the project proponent to identify alternatives to avoid impacts or measures to minimize or mitigate potential impacts. Most impacts would be confined to resources within DAAF's boundaries.

Short-term and long-term adverse impacts on all other resources analyzed in the EIS would be less than significant. Short-term impacts would primarily result from construction and demolition activities associated with the proposed projects, while long-term impacts would result from operation of the proposed facilities. Impacts from both Alternatives would be similar, although impacts from the Partial Implementation Alternative would be less extensive as fewer projects would be implemented. The incremental implementation of the proposed projects over a 30-year period would ensure that not all impacts occur simultaneously and minimize disruption of airfield and tenant operations. As necessary, impacts would be further minimized through the implementation of best management practices and standard management measures (**Section ES.8**). Project-specific mitigation measures would be identified at a later date, when more detailed site and design data are available to support such determinations.

In accordance with Section 7 of the federal Endangered Species Act (ESA), the Army has determined that the Proposed Action is *not likely to adversely affect* federally listed threatened and endangered species and has consulted with the US Fish and Wildlife service accordingly.

When considered with the incremental effects of other past, present, and reasonably foreseeable future projects occurring on and in the vicinity of DAAF, the environmental consequences of the Full and Partial Implementation Alternatives would not contribute significant adverse cumulative effects on the resources analyzed in the EIS.

The EIS alternatives would have no substantive impacts on socioeconomics, utilities, airspace management, or traffic and transportation. Therefore, these resources were dismissed from analysis in the EIS, consistent with Council on Environmental Quality (CEQ) regulations implementing NEPA to focus the analysis on issues of relevance.

ES.8 Mitigation and Management Measures, and Summary of Impacts

To mitigate significant adverse impacts on wetlands and streams from the Full and Partial Implementation Alternatives, the Army would adhere to applicable requirements of permits issued by

USACE in accordance with the Clean Water Act. Such requirements would likely include the preparation of a compensatory mitigation plan.

The following minimization measures or best management practices (BMPs) would minimize less-than-significant impacts on the current affected environment:

- Standard construction BMPs would be implemented to minimize or eliminate soil erosion and downstream sedimentation.
- Soils would be managed at an individual project level in compliance with applicable laws and regulations.
- Project designs would incorporate low impact development (LID) measures where feasible, further reducing the transport of soils offsite in surface runoff.
- Stormwater runoff would be managed in accordance with Section 438 of the Energy Independence and Security Act (EISA) and Fort Belvoir's Virginia Pollutant Discharge Elimination System (VPDES) permit.
- Site-specific health and safety plans and procedures would sufficiently manage risk unique to each project site.
- All hazardous materials and wastes would be handled, stored, and disposed of in accordance with Fort Belvoir's Resource Conservation and Recovery Act permit.
- Project proponents would conduct surveys on and/or near the project sites prior to implementing construction and demolition activities to determine the presence of Breeding Birds of Management Concern (BBMC); adhere to applicable time of year restrictions for BBMC as warranted; and, coordinate with Fort Belvoir DPW-ED to identify and establish suitable areas of BBMC buffer on DAAF or Fort Belvoir to replace BBMC buffer on DAAF permanently lost from the Proposed Action.
- Projects with potential to permanently impact Chesapeake Bay Resource Protection Areas (RPAs) on DAAF would be planned, conducted, and mitigated as applicable in accordance with the requirements of Fort Belvoir's *Guide for Resource Protection Areas (RPAs) and Stream Buffers* dated 21 September 2016 (Fort Belvoir 2016). Such requirements could include the preparation of a Water Quality Impact Assessment in accordance with 9 Virginia Administrative Code (VAC) 25-830-140 and approval by DPW-ED, and on-site or off-site mitigation plantings at ratios specified in the guidance to replace vegetation removed from the RPA.

Specific measures to minimize potential adverse effects will be identified in the Army's ROD for the Proposed Action (**Section ES.6**).

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Table ES-2: Summary of Impacts from the Proposed Action

Resource	No Action Alternative	Full Implementation Alternative (Preferred Alternative)	Partial Implementation Alternative
Land Use, Plans, Aesthetics and Visual Quality, and Coastal Zone Management (**EIS Sections 3.2** and **4.2**)	Long-term, less-than-significant adverse impacts on plans relevant to Fort Belvoir. No impacts on land use, plans, aesthetics and visual quality at Davison Army Airfield (DAAF) or Fairfax County, or on the county's Comprehensive Plan.	Short-term, less-than-significant adverse impacts on land use and aesthetics at DAAF, during construction activities. Long-term beneficial impacts on DAAF land use and aesthetics from projects that are consistent with the Airfield land use designation in accordance with Fort Belvoir's Installation Planning Standards (IPS) and DAAF regulating plan. Beneficial impacts on the goals and objectives of the Fort Belvoir Real Property Master Plan (RPMP) and DAAF Area Development Plan (ADP). No adverse effects on Fairfax County land use, aesthetics, or Comprehensive Plan. Consistent to the maximum extent practicable with the enforceable policies of Virginia's Coastal Zone Management (CZM) Program.	Short-term impacts would be similar to those under the Full Implementation Alternative. Long- term impacts would be less substantial due to the reduced scope of this alternative.
Historic and Cultural Resources (**EIS Sections 3.3** and **4.3**)	No impacts on historic and cultural resources in the Area of Potential Effect (APE).	Short-term, less-than-significant, indirect adverse effects on architectural resources in the APE due to changes in viewshed or noise environment. No ground disturbance would occur within a 50-foot radius of the known, non-listed, non-eligible archaeological sites on DAAF. Any potential indirect effects would be negligible through adherence to standard construction site BMPs. In the unlikely event that an inadvertent discovery of undocumented archaeological materials or human remains occurs during ground disturbing activities, work would stop immediately and the Army would adhere to the policies and procedures for such discoveries in Fort Belvoir's *Integrated Cultural Resources Management Plan* (ICRMP).	Impacts would be similar to those under the Full Implementation Alternative.
Air Quality (**EIS Sections 3.4** and **4.4**)	No impacts on local or regional ambient air quality.	Short-term, less-than-significant adverse impacts on air quality from the generation of fugitive dust and emissions of exhaust fumes from construction-related equipment and vehicles.	Short-term impacts would be similar to those under the Full Implementation Alternative. Long- term impacts would be less substantial due to the reduced scope of this alternative.

Table ES-2: Summary of Impacts from the Proposed Action (continued [con't.])

Resource	No Action Alternative	Full Implementation Alternative (Preferred Alternative)	Partial Implementation Alternative
Air Quality (con't.) (**EIS Sections 3.4** and **4.4**)	(see above)	No new permanent sources of emissions would be established at DAAF by the proposed facilities nor would they contribute to exceedances of National Ambient Air Quality Standards (NAAQS) or the degradation of regional air quality. Long-term adverse impacts on air quality resulting from additional mobile sources during operation (i.e., increased vehicle use) would be less than significant.	(see above)
Noise (**EIS Sections 3.5** and **4.5**)	No impacts on existing noise conditions at and around DAAF.	Short-term, less-than-significant impacts from construction-related noise (e.g., construction vehicles and equipment). The dominant source of noise at DAAF would continue to be aircraft operations. Short- and long-term, less-than-significant impacts on on- and off-post land uses, including noise-sensitive land uses, from operational activities. No on- or off-post sensitive land uses would be within incompatible noise zones.	Short-term impacts would be similar to those under the Full Implementation Alternative. Long- term impacts would be less substantial due to the reduced scope of this alternative. The highest operational noise levels would be entirely confined to DAAF.
Geology, Topography, and Soils (**EIS Sections 3.6** and **4.6**)	No new or different effects on geology, topography, and soils at DAAF as affected by the ongoing military mission.	Short- and long-term, less-than-significant adverse impacts on geology, soils, and topography from construction-related disturbance/alteration. Short-term, less-than-significant adverse impacts on geology from the construction of foundations for some proposed projects. No effects on geological features of special significance or worth, as none are present under DAAF. No long-term adverse impacts on geology. Short- and long-term, less-than-significant adverse impacts on topography from excavation, grading, filling, and trenching on project sites. No unique or valued topographic features on DAAF would be affected by the proposed projects. Short- and long-term, less-than-significant impacts on soils resulting from disturbance on up to approximately 84 acres of land area. No substantial alterations of soil condition or function would occur. Project-specific disturbances would be temporary and intermittent, ranging from approximately 0.3 to 23 acres.	Short-term and long-term impacts would be similar to those from the Full Implementation Alternative. Impacts would be less substantial due to the reduced scope of this alternative. Approximately 36 acres of land area would be disturbed by construction activities associated with this alternative.

Table ES-2: Summary of Impacts from the Proposed Action (con't.)

Resource	No Action Alternative	Full Implementation Alternative (Preferred Alternative)	Partial Implementation Alternative
Water Resources (**EIS Sections 3.7** and **4.7**)	No impacts on water resources at or in the vicinity of DAAF.	*Significant adverse impacts* on wetlands and streams from unavoidable disturbance of approximately 3.6 acres of wetlands and 2,026 linear feet of streams during construction and operation of multiple ADP projects over the Alternative's approximately 30-year implementation period. Impacts would be confined to resources within DAAF's boundaries. Short- and long-term, less-than-significant adverse impacts on groundwater from accidental releases of hazardous substances (e.g., fuel spills) during construction and a 36-acre increase in impervious surfaces and corresponding localized changes in groundwater recharge area and rates. Short-term, less-than-significant adverse impacts on water quality from increased concentrations of sediments and pollutants in runoff during construction. Long-term, negligible adverse impacts on water quality during operational activities from increased stormwater runoff. Long-term, direct, less-than-significant adverse impacts on Resource Protection Areas (RPAs) from permanent loss of approximately 23 acres of land designated as such. Long-term, less-than-significant adverse impacts on the 100-year floodplain from development of approximately 7.5 acres in the floodplain on DAAF. The maximum increase to the horizontal extent of the floodplain on DAAF would not exceed 2 feet. Potential adverse impacts of increased flooding downstream of DAAF would occur on land within Fort Belvoir in conservation status. Therefore, risks to life and property from flooding downstream of DAAF would be minimal. A Finding of No Practicable Alternative (FONPA) addressing potential impacts on floodplains and wetlands is included in **Appendix F**.	*Significant adverse impact* on wetlands from unavoidable disturbance of approximately 1.4 acres of wetlands during construction and operation of multiple ADP projects over the Alternative's approximately 20-year implementation period. Wetland impacts would be confined to resources within DAAF's boundaries. Short- and long-term, less-than-significant adverse impacts on streams from 517 linear feet of temporary and permanent disturbance. Less-than-significant impacts on other water resources would be similar to those under the Full Implementation Alternative. Impacts would be less substantial due to the reduced scope of this alternative. Impervious surface on DAAF would increase by approximately 21 acres under this alternative. Projects in the alternative would permanently impact an estimated 15 acres of RPAs. Approximately 3.2 acres of the 100- year floodplain on DAAF would be developed under this alternative.
Biological Resources (**EIS Sections 3.8** and **4.8**)	No impacts on biological resources at DAAF.	Long-term, less-than-significant adverse impacts on plant communities from vegetation removal (and associated displacement of common wildlife species) and, indirectly, introduction of invasive species or creation of edge habitats.	Short- and long-term impacts would be similar to those under the Full Implementation Alternative. Impacts would be less substantial due to the reduced scope of this alternative.

Table ES-2: Summary of Impacts from the Proposed Action (con't.)

Resource	No Action Alternative	Full Implementation Alternative (Preferred Alternative)	Partial Implementation Alternative
Biological Resources (con't.) (**EIS Sections 3.8** and **4.8**)	(see above)	Short- and long-term, intermittent, less-than-significant adverse impacts on aquatic macroinvertebrates and fish from degraded water quality resulting from increased concentrations of pollutants and sediments in runoff discharged to receiving water bodies. Long-term, less-than-significant adverse impacts on wildlife from loss of approximately 11.4 acres of vegetation and forested habitat, and encroachment on approximately 21 acres of Breeding Birds of Management Concern (BBMC) habitat. No federally listed threatened or endangered species have been documented at DAAF; as such, adverse impacts would not be anticipated. **ESA Section 7 determination:** *Not likely to adversely affect* federally listed threatened and endangered species.	This alternative would permanently encroach on approximately 18 acres of BBMC habitat. **ESA Section 7 determination:** *Not likely to adversely affect* federally listed threatened and endangered species.
Health and Safety (**EIS Sections 3.9** and **4.9**)	No impacts on health and safety.	Short-term, less-than-significant potential adverse impacts on human and environmental health from accidents during construction activities and potential exposure to asbestos-containing material (ACM), lead-based paint (LBP), contaminated soils, and munitions constituents/munitions of explosive concern (MEC). Negligible risks to public safety outside the airfield.	Short- and long-term impacts would be similar to those under the Full Implementation Alternative. Impacts would be less substantial due to the reduced scope of this alternative.
Hazardous Materials and Wastes (**EIS Sections 3.10** and **4.10**)	No impacts on hazardous materials, hazardous wastes, pesticides, radon, or solid waste management units (SWMUs).	Short- and long-term, less-than-significant adverse impacts from hazardous materials and wastes due to use and handling of such materials during construction activities, as well as from the potential for accidental spills or discovery of contaminated soils. No permanent adverse impacts from hazardous materials and waste since there would be no changes in the quantity of hazardous materials and waste used at DAAF or in the capacity of Fort Belvoir to manage these substances.	Short- and long-term impacts would be similar to those under the Full Implementation Alternative. Impacts would be less substantial due to the reduced scope of this alternative. Beneficial effects from ACM and LBP removal would be limited relative to the Full Implementation Alternative because fewer buildings containing these substances would be removed.

Table ES-2: Summary of Impacts from the Proposed Action (con't.)

Resource	No Action Alternative	Full Implementation Alternative (Preferred Alternative)	Partial Implementation Alternative
Hazardous Materials and Wastes (con't.) (**EIS Sections 3.10** and **4.10**)	Long-term, less- than-significant adverse impact on the management of ACM and LBP as those substances would not be removed from existing facilities proposed for modernization or demolition under the Proposed Action.	Long-term, beneficial impacts on hazardous materials and waste from consolidation and modernization of associated storage areas, the removal of ACM and LBP in up to 27 facilities, and potential decrease in areas requiring pesticide treatment. No short-term or long-term impacts from radon.	(see above)
Cumulative Impacts (**EIS Chapter 5**)	No potential to contribute to significant adverse cumulative effects on the resources analyzed in the EIS.	When considered with the incremental effects of other past, present, and reasonably foreseeable future projects occurring on and in the vicinity of DAAF, the environmental consequences of the Full Implementation Alternative would contribute significant adverse cumulative effects on wetlands and streams under the Full Implementation Alternative from the construction and operation of multiple short-, mid-, and long-range ADP projects. No significant cumulative adverse effects are expected to occur on the other resources analyzed in the EIS.	Short-term contribution to potential adverse cumulative impacts would be similar to that under the Full Implementation Alternative. Long-term contribution to potential adverse cumulative impacts would be overall less substantial due to the reduced scope of this alternative. In addition, significant cumulative impacts would only occur on wetlands from construction and operation of short-range ADP projects.

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TABLES

FIGURES

DAAF ADP Final EIS Vol. II – APPENDICES

(The Appendices to the Final EIS are provided separately as standalone .PDF files.)

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Abbreviations and Acronyms

AAFES	Army and Air Force Exchange Service
AAM	Advanced Acoustic Model
ABWR	Accotink Bay Wildlife Refuge
ACP	Access control point
ACHP	Advisory Council on Historic Preservation
ACM	asbestos-containing materials
ADP	Area Development Plan
AFFF	aqueous film forming foam
AHA	Activity Hazard Analysis
APE	Area of Potential Effect
AR	Army Regulation
ARI	Aviation Restructure Initiative
asl	above sea level
AST	aboveground storage tank
AQCR	air quality control regions
AV BN	Aviation Battalion
BACT	Best Available Control Technology
BBMC	Breeding Birds of Management Concern
BCC	Birds of Conservation Concern
bgs	below ground surface
BMP	best management practice
BRT	bus rapid transit
CAA	Clean Air Act
CAAA	Clean Air Act Amendments
CAP	Civil Air Patrol
CBPA	Chesapeake Bay Preservation Act
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CGP	Construction General Permit
CO	carbon monoxide
CO_2	carbon dioxide
COA	Course of Action
con't.	continued
CWA	Clean Water Act
CZM	Coastal Zone Management
DAAF	Davison Army Airfield

dB	decibel
dBA	A-weighted decibel
DCARNG	District of Columbia Army National Guard
DLA	Defense Logistics Agency
DNL	Day-Night Average Sound Level
DoD	Department of Defense
DoDI	Department of Defense Instruction
DPW	Directorate of Public Works
DPW-ED	Directorate of Public Works-Environmental Division
DPWES	Department of Public Works and Environmental Services
DTRA	Defense Threat Reduction Agency
D.C.	District of Columbia
E&SC	erosion and sediment control
EFD	Executive Flight Detachment
e.g.	for example
EIS	Environmental Impact Statement
EISA	Energy Independence and Security Act
EO	Executive Order
EOD	explosive ordnance disposal
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FBNA	Fort Belvoir North Area
FCDOT	Fairfax County Department of Transportation
FCT	Flight Control Tower
FEMA	Federal Emergency Management Agency
FES	Fire and Emergency Services
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
FPPA	Farmland Protection Policy Act
FWC	Forest and Wildlife Corridor
F-Rating	Mission Rating
GCR	General Conformity Rule
GHG	greenhouse gas
GSF	gross square feet
HAP	hazardous air pollutant
HEC-RAS	Hydrologic Engineering Center-River Analysis System
HQ	headquarters
HOV	high-occupancy vehicle
HUD	US Department of Housing and Urban Development
HVAC	Heating, ventilation, and air conditioning
HWAS	hazardous waste accumulation site
HWMMP	Hazardous Waste Management and Minimization Plan

I-95	Interstate 95
ICRMP	Integrated Cultural Resources Management Plan
i.e.	that is
INRMP	Integrated Natural Resources Management Plan
INSCOM	Intelligence and Security Command
IPS	Installation Planning Standards
IVDP	Installation Vision and Development Plan
JFHQ	Joint Force Headquarters
kg	kilograms
LBP	lead-based paint
LHA	lifetime health advisory
LID	low impact development
LQG	large quantity generator
LOS	level of service
LUCs	land use controls
LUP	Land Use Planning
MACT	Maximum Achievable Control Technology
MC	munitions constituents
MDW	Military District Washington
MEC	munitions of explosive concern
MILSPEC	military standard
MSAT	Mobile Source Air Toxics
MSS	Mission Sensitive Species
MWR	Morale, Welfare, and Recreation
MWCOG	Metropolitan Washington Council of Governments
N/A	not applicable
NAAQS	National Ambient Air Quality Standards
NCPC	National Capital Planning Commission
NCR	National Capital Region
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NFA	No Further Action
NHPA	National Historic Preservation Act
NLW	National Listing Workplan
NMUSA	National Museum of the United States Army
NNSR	Nonattainment New Source Review
NSR	New Source Review
NOA	Notice of Availability
NOAA	National Oceanic Atmospheric Administration
NOI	Notice of Intent
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System

NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSPS	New Source Performance Standards
NTHP	National Trust for Historic Preservation
NVESD	Night Vision and Electronic Sensors Directorate
NWI	National Wetland Inventory
O_3	ozone
O/WS	oil/water separator
OFD	Operational Flight Division
OSA-A/OSACOM	Operational Support Airlift Activity/Operational Support Airlift Command
OSH	occupational safety and health
OSHA	Occupational Safety and Health Act
OTR	ozone transport region
pCi	picocuries
PCB	polychlorinated biphenyls
PEM	palustrine emergent
PFO	palustrine forested
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PIF	Partners in Flight
PM	particulate matter
POL	Petroleum, oil, and lubricants
POV	Privately owned vehicle(s)
ppb	parts per billion
PPE	personal protective equipment
ppm	parts per million
ppt	parts per trillion
PSD	Prevention of Significant Deterioration
PTE	potential to emit
PX	Post Exchange
Q-Rating	Quality Rating
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
ROI	Region of Influence
RPA	Resource Protection Area
RPMP	Real Property Master Plan
SAA	satellite accumulation area
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SO_2	sulfur dioxide
SOC	species of concern
STF	Skills Training Facility

SU	standard unit
SVOC	semi-volatile organic compounds
SWM	stormwater management
SWMU	Solid Waste Management Unit
SWPPP	Stormwater Pollution Prevention Plan
TAAB	The Army Aviation Brigade
TBT	Tributyltin
TIP	transportation improvement plan
TMDL	total maximum daily load
TN	total nitrogen
TP	total phosphorus
TPH	total petroleum hydrocarbons
tpy	tons per year
TSCA	Toxic Substances Control Act
TSS	total suspended solids
UFC	Unified Facilities Criteria
US	United States
USACE	US Army Corps of Engineers
USC	United States Code
USEPA	US Environmental Protection Agency
USFWS	US Fish and Wildlife Service
USGS	US Geological Survey
UST	underground storage tank
UXO	unexploded ordnance
VA	Virginia
VAC	Virginia Administrative Code
VDCR	Virginia Department of Conservation and Recreation
VDCR-DNH	Virginia Department of Conservation and Recreation, Division of Natural Heritage
VDEQ	Virginia Department of Environmental Quality
VDGIF	Virginia Department of Game and Inland Fisheries
VDHR	Virginia Department of Historic Resources
VDOT	Virginia Department of Transportation
VMRC	Virginia Marine Resources Commission
VOC	volatile organic compounds
VPDES	Virginia Pollutant Discharge Elimination System
WMA	Watershed Management Area
WOUS	Waters of the US
WQIA	Water Quality Impact Assessment

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1 Purpose and Need

1.1 Introduction

This Final Environmental Impact Statement (EIS) evaluates the potential environmental impacts of the proposed implementation by the United States (US) Army (Army) of an Area Development Plan (ADP) for Davison Army Airfield (DAAF) at US Army Garrison Fort Belvoir (Fort Belvoir) in Fairfax County, Virginia. The proposed ADP would provide DAAF and its tenant organizations with the required facilities and infrastructure to fully support their ongoing missions. The proposed ADP would be implemented over the next 30 years.

1.2 Background

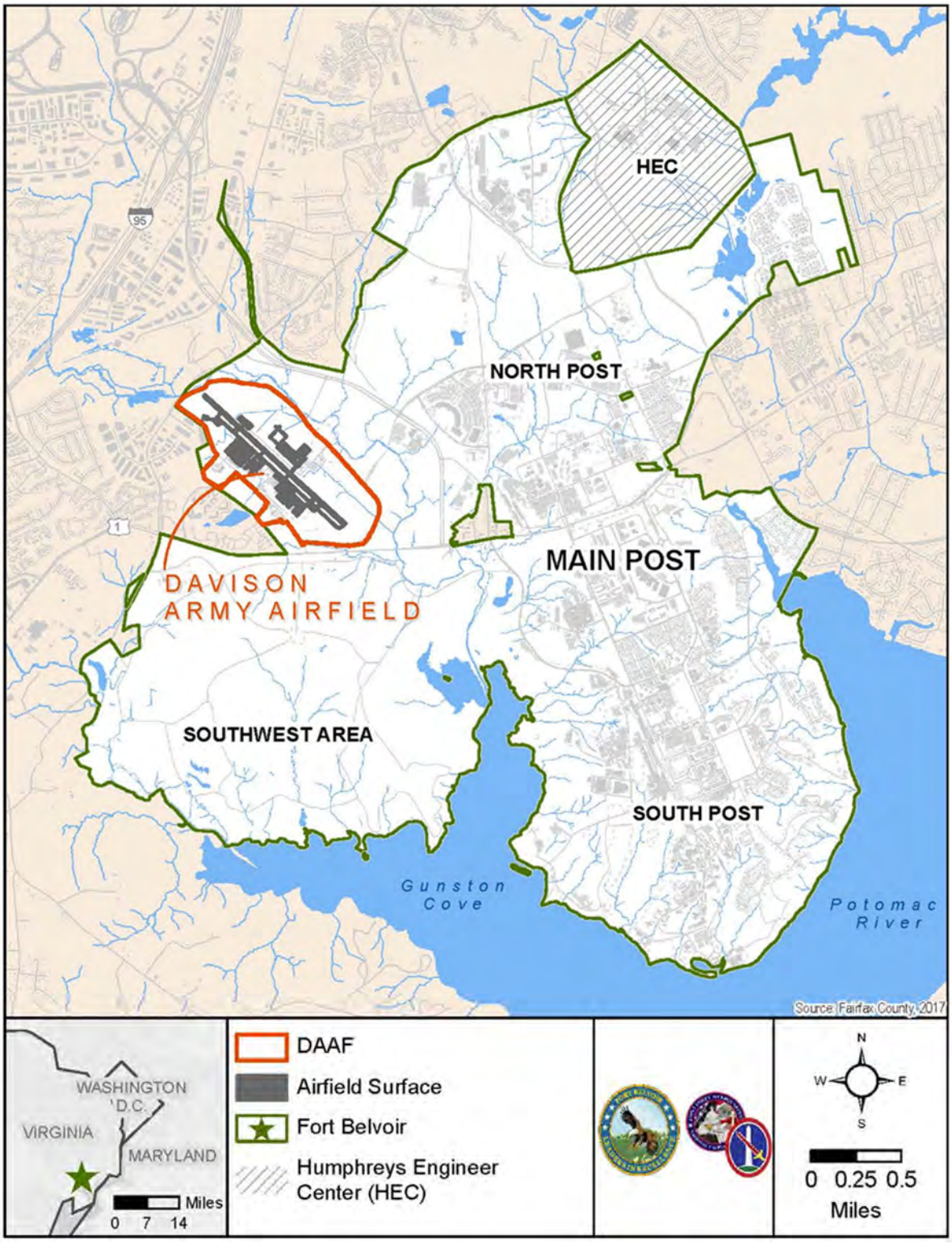
1.2.1 Overview

DAAF covers approximately 348 acres on Fort Belvoir's Main Post, approximately 13 miles south of Washington, D.C. (**Figure 1.2-1**). Fort Belvoir is a strategic sustaining base for America's Army in the National Capital Region (NCR), providing logistical, intelligence, and administrative support to a diverse group of more than 140 Army and Department of Defense (DoD) organizations with over 39,000 personnel. Fort Belvoir's landholdings in Fairfax County consist of the 7,682-acre Main Post and the noncontiguous 807-acre Fort Belvoir North Area (FBNA), located approximately 1.6 miles northwest of Main Post. Main Post is subdivided into four distinct sub-areas: South Post, the area south of Richmond Highway (US Route 1); North Post, the area north of Richmond Highway; the Southwest Area, located south of Richmond Highway and west of South Post; and DAAF.

The airfield's proximity to Washington, D.C. makes it a logistically valuable location for DoD units providing aviation support for federal activities in the NCR. DAAF is also an important aviation support resource for Fort Belvoir tenants and Garrison leadership.

Fort Belvoir owns and maintains DAAF's facilities; however, DAAF's operational component is administered by Military District Washington (MDW). MDW serves as the core element and Army Service Component Command of the Joint Force Headquarters National Capital Region (JFHQ-NCR). In this role, MDW conducts ceremonial duties in support of civilian and military leaders; deters, prevents, and responds to national security emergencies in the NCR; and provides administrative, legal, and support services to MDW personnel. MDW serves as Senior Mission Command for five Army installations in the NCR: Fort Belvoir, Fort A.P. Hill, and Joint Base Myer-Henderson Hall (Virginia); Fort George G. Meade (Maryland); and Fort Hamilton (New York).

Figure 1.2-1: Location of DAAF



DAAF currently hosts five main DoD tenants (**Table 1.2-1**): the Army Aviation Brigade (TAAB) is the largest tenant with its three subordinate units: Airfield Division, 12th Aviation Battalion (12th AV BN), and Operational Support Airlift Activity / Operational Support Airlift Command (OSA-A / OSACOM). The Night Vision and Electronic Sensors Directorate (NVESD) is the airfield's other main tenant. DAAF also hosts the District of Columbia Army National Guard (DCARNG), Civil Air Patrol (CAP), and Fire and Emergency services (FES). Approximately 50 helicopters and airplanes are permanently assigned to DAAF to support the missions of the tenants. These aircraft are used for training and testing operations as well as passenger transport for the Army and DoD.

Table 1.2-1: DAAF Tenants

Tenant		Description	Aircraft Operated (total number)
	TAAB Headquarters (HQ)	TAAB provides fixed- and rotary-wing aviation and engineer technical rescue capability; aviation, airfield, and air traffic control mission command; and multi-component, world-wide executive and non-executive airlift support to Headquarters Department of the Army and JFHQ-NCR/MDW to support JFHQ-NCR's Homeland Defense and Defense Support of Civil Authorities Contingency Plans to defend and secure the NCR.	None
	Airfield Division	TAAB's Airfield Division conducts continuous airfield operations at DAAF to provide a safe, controlled, and efficient airfield environment. The division also provides On Order Support Joint Reception Staging, and Onward Movement and Integration during contingency operations.	None
	12th Aviation Battalion (AV BN)	TAAB's 12th AV BN is the largest unit at DAAF in terms of number of assigned personnel and aircraft. The unit consists of four companies (A, B, C, and D) that provide air transport, aerial mission command support, limited air assault, and technical rescue for Headquarters Department of the Army and JFHQ-NCR/MDW. Consistent with these missions, the 12th AV BN maintains a constant alert posture at DAAF to sustain a rapid response, readiness, and support force capability in support of JFHQ-NCR.	VH-60 (4) and UH-60 (20) Black Hawk helicopters

Table 1.2-1: DAAF Tenants (continued [con't.])

Tenant		Description	Aircraft Operated (total number)
	Operational Support Airlift Activity / Operational Support Airlift Command (OSA-A / OSACOM)	OSA-A/OSACOM is a multi-component activity under TAAB, MDW, and the DCARNG that oversees management and execution of the total Army Non-Executive Operational Support Airlift program. OSA-A/OSACOM Detachment 4 is one of the detachments for the DCARNG Army Aviation Command. The detachment supports MDW by conducting domestic and international transport activities and supports contingency operations in the event of a regional or national emergency, as necessary.	12R Huron (2) and UC-35 Citation (4) airplanes
	Night Vision and Electronic Sensors Directorate (NVESD)	NVESD supports deployed combatants; develops innovative electronic sensor systems for unmanned aircraft systems, rotary, and fixed-wing aircraft; transitions mature technologies to appropriate DoD authorities for acquisition and distribution to end users; and provides technical support to the acquisition and user communities. In addition to its facilities at DAAF, NVESD also occupies administrative and research facilities in the 300 Area of Fort Belvoir's South Post.	DHC-6 Twin Otter (2) and Beechcraft King Air 350 airplanes (1) UH-60 (1) and EH-60 (1) Black Hawk helicopters
	District of Columbia Army National Guard (DCARNG)	The DCARNG provides aviation training and maintenance support for assigned aviation units; contingency medical evacuation support for first responders; counterdrug surveillance; very important person transport; Reserve Officers' Training Corps airlift for Howard, George Mason, and Georgetown Universities; patient transfer for Fort Belvoir Community Hospital; and DCARNG F-16 combat survival training.	C-26 Metroliner airplane (1) UH-72 Lakota (6) and UH-60 Black Hawk (3) helicopters
	Civil Air Patrol (CAP)	CAP is the civilian auxiliary unit of the United States Air Force and fulfills three congressionally assigned missions: emergency services (search and rescue) and disaster relief operations; aerospace education for youth and the general public; and cadet programs for teenage youth.	Cessna 172/182 airplanes (4)

Table 1.2-1: DAAF Tenants (con't.)

Tenant		Description	Aircraft Operated (total number)
	Fire and Emergency Services (FES)	FES is housed in five stations throughout DAAF and serves as first responders to fires, public safety, and medical emergencies, thereby ensuring the safety and welfare of personnel on the airfield through preservation of life, health, property, and the environment.	None

Source: (USACE, 2017)

The airfield's authorized work force consists of 672 personnel, with the three largest units being the 12th AV BN (209 personnel); OSA-A/OSACOM (163 personnel); and DCARNG (144 personnel).

1.2.2 Summary History

DAAF was constructed between 1951 and 1954. In 1952, it was designated a component of Fort Belvoir's Engineering School. It was reassigned to MDW in 1954.

In 1957, the Army Executive Flight Detachment (EFD) was established to support routine presidential transport as well as the evacuation of the President and the cabinet from Washington, D.C. in the event of an emergency situation. DAAF supported the Army branch of EFD while Marine Corps Base Quantico supported the Marine Corps branch. During the Johnson and Nixon administrations, EFD relocated to Texas and New York, respectively, before returning to DAAF in 1970. In 1974, all EFD operations were transitioned to the Marine Corps and the Air Force. The former EFD facilities at DAAF are now occupied by the 12th AV BN and NVESD.

1.2.3 Existing Physical Infrastructure

1.2.3.1 Airfield Pavements

DAAF is a Class A airfield. Class A runways are less than 8,000 feet long and are primarily intended for use by small, light aircraft. DAAF's runway (Runway 14/32) is 5,618 feet long and 74 feet wide. It is oriented in a northwest-to-southeast direction.

At its northwestern end, the runway includes a 200-foot paved overrun, as required by Unified Facilities Criteria (UFC) 3-260-01, *Airfield and Heliport Planning and Design*. However, there is no paved overrun at the southeastern end. Runway overruns are intended to keep the probability of serious damage to an aircraft to a minimum in the event that the aircraft runs off the runway end during a takeoff or landing,

or lands short during a landing. Apart from this, the runway surface is in good condition and adequate to DAAF's needs. However, an airfield pavement evaluation conducted at DAAF in 2015 determined that six taxiway sections and six apron sections are structurally inadequate to withstand day-to-day missions (i.e., peacetime use) for the next 20 years (**Figure 1.2-2**) (USACE, 2015).

1.2.3.2 Buildings

Facilities supporting DAAF tenants and operations are located on either side of the runway, with the majority of facilities concentrated on the southwest side of the airfield (**Figure 1.2-3**).

Unless otherwise cited, the following information is drawn from the DAAF Final ADP (US Army 2020).

Age

Many of DAAF's buildings date to the 1950s, 1960s, and 1970s (**Figure 1.2-4**). Generally, DoD facilities are designed with a 50-year lifespan with the understanding that they will need significant modernization or full replacement after 50 years. In particular, hangars built decades ago were not designed to accommodate newer, modern aircraft and their associated maintenance requirements. As an example, four hangars occupied by the 12th AV BN were built between 1955 and 1961.

More than 40 percent of buildings at the airfield are 50 years or older, and an additional 25 percent are between 30 and 49 years old. These facilities are now past their intended lifecycle and are obsolete, undersized, and inefficient. Their age also results in unnecessarily high maintenance costs.

Size

Collectively, DAAF's existing buildings do not provide the airfield's tenants with the amount and quality of space they need to adequately perform their respective missions. A space requirement analysis was conducted for each of DAAF's tenants as part of the ADP development process (**Section 1.3**). The analysis showed that collectively DAAF's tenants have less than 50 percent of the functional space prescribed by DoD guidance for organizations of their respective type: the total calculated space requirement is 576,351 gross square feet (GSF), while only 263,277 GSF are currently provided. Aircraft Maintenance Hangar space represents the largest deficit in calculated requirements (**Table 1.2-2**).

The 12th AV BN is the tenant with the largest deficit (**Table 1.2-3**), as it currently occupies less than one third of the space its mission requires. Altogether, TAAB and its three subordinate units have about 38 percent of the space they require under DoD standards, as does NVESD. The DCARNG has less of a space deficit, but still falls short of its requirements by about 25 percent.

Figure 1.2-2: DAAF Airfield Pavement Conditions

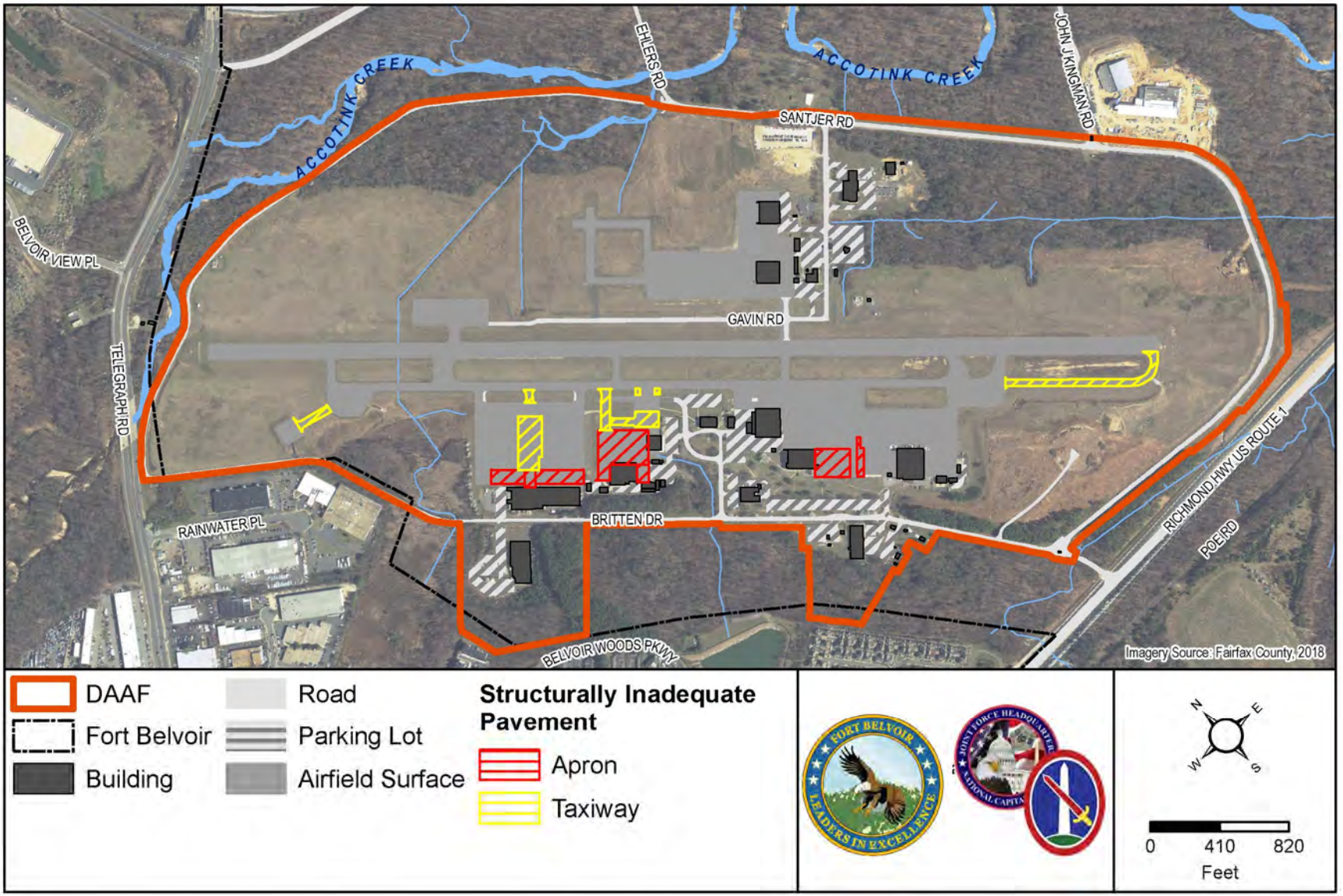


Figure 1.2-3: Main DAAF Tenants

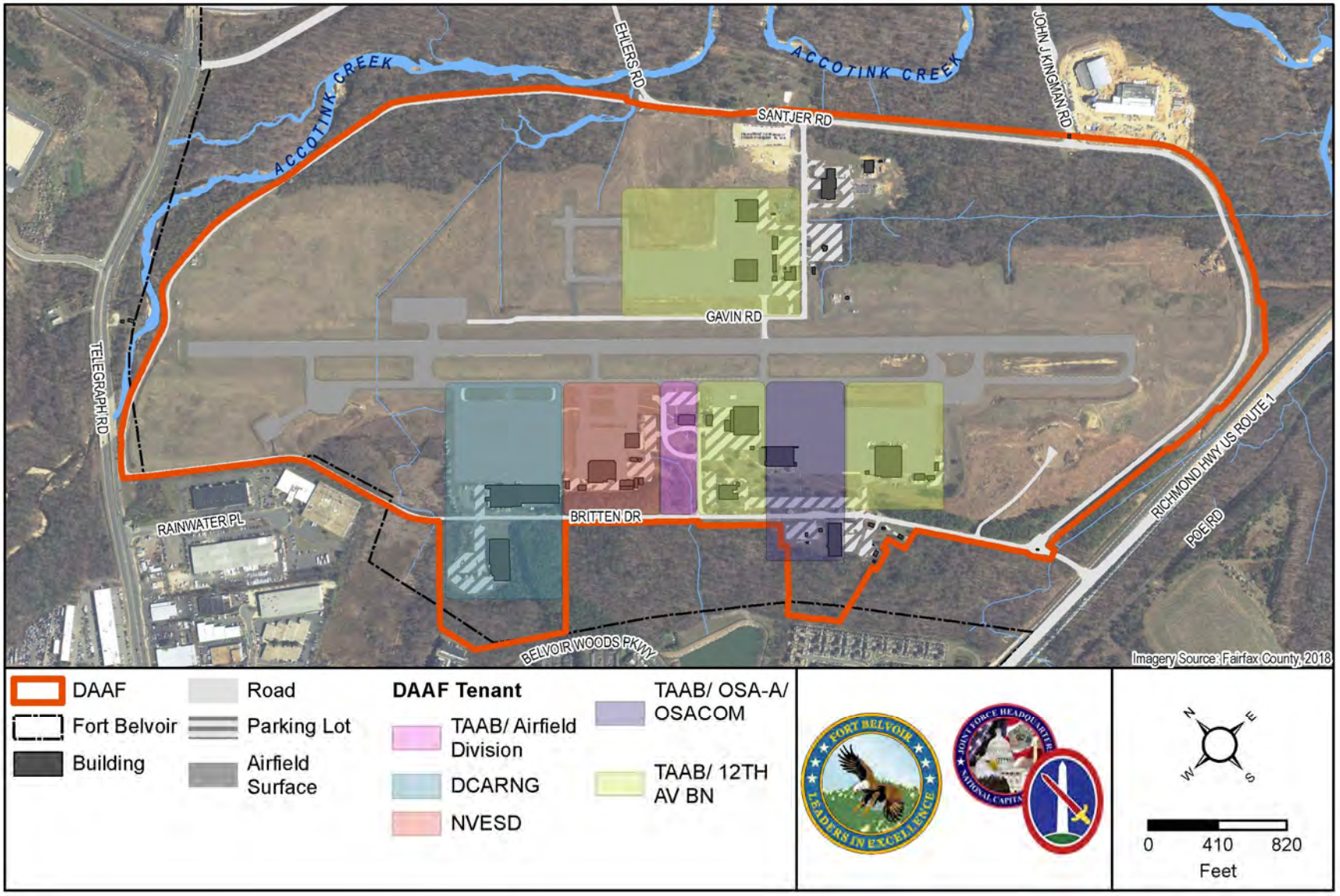


Figure 1.2-4: Age of Existing DAAF Buildings

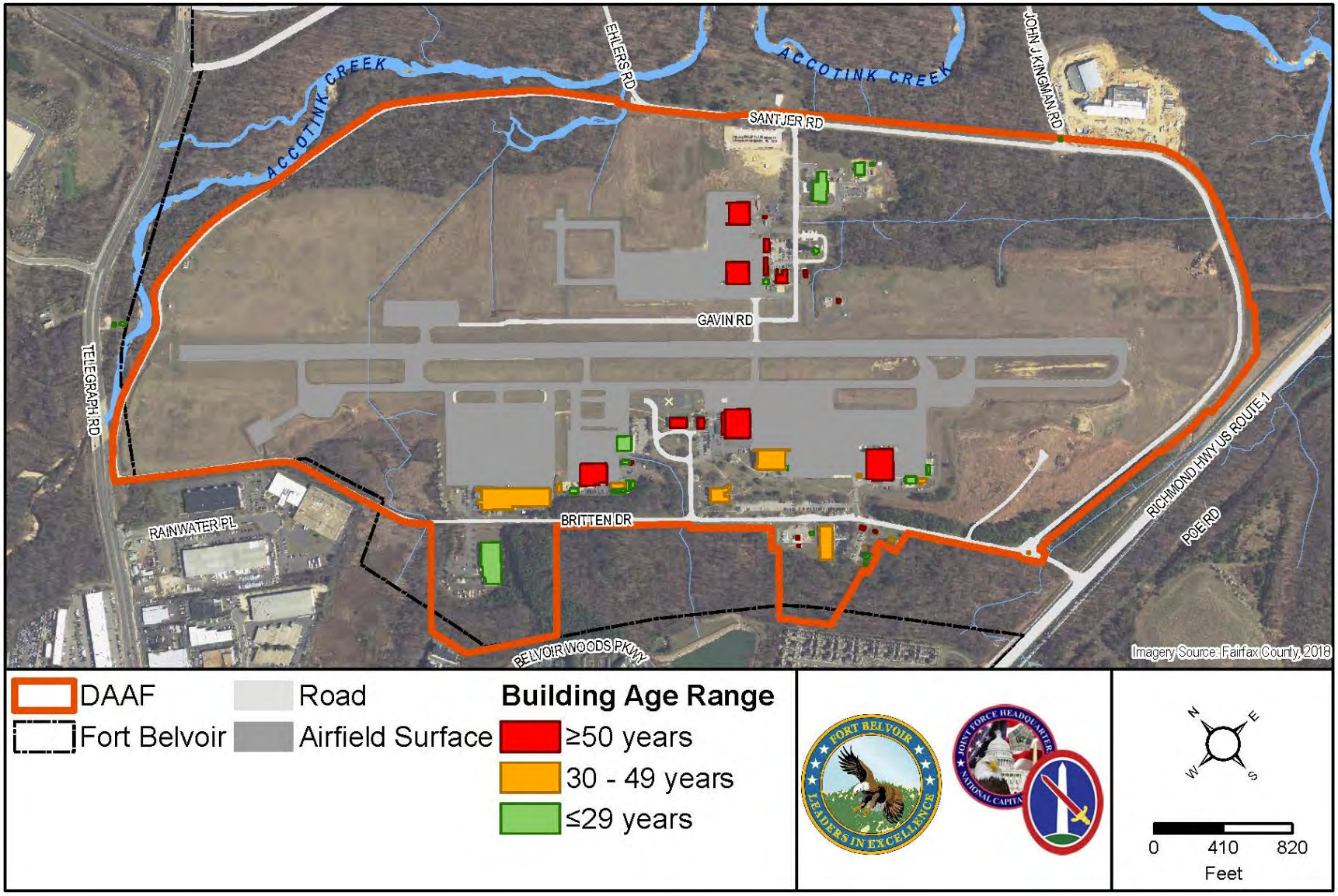


Table 1.2-2: DAAF Space Requirements Analysis by Building Type

Building Type	Existing Assets (GSF)	Calculated Requirement (GSF)	Delta
Flight Control Tower	6,912	6,912	0
Airfield Operations Building	12,832	9,000	3,832
Aviation Unit Operations Building	2,647	2,000	647
Brigade Headquarters Building	0	8,500	(8,500)
National Guard Readiness Center	27,665	35,000	(7,335)
Aircraft Maintenance Hangar	157,164	379,910	(222,746)
Aircraft Parts Storage Building	0	3,700	(3,700)
Aircraft Component Maintenance Shop	19,158	62,500	(43,342)
Aircraft Paint Shop	0	20,000	(20,000)
Vehicle Maintenance Shop	1,894	3,500	(1,606)
Oil Storage Building	0	400	(400)
Storage Shed, General Purpose, Installation	296	3,000	(2,704)
Organizational Storage Building	6.792	6,344	448
Administrative Building, General Purpose	15,332	23,000	(7,668)
Fire Station	12,585	12,585	0
Totals	**263,277**	**576,351**	**(313,074)**

Table 1.2-3: Space Deficit by Tenant

Tenant	Existing Assets (GSF)	Calculated Requirement (GSF)	Delta
TAAB	0	8,500	(8,500)
12th AV BN	88,539	273,510	(184,971)
Airfield Division	20,691	16,912	3,779
OSA-A/OSACOM	38,907	95,500	(56,593)
DCARNG	78,110	102,200	(24,090)
NVESD	24,301	65,000	(40,699)
CAP	0	2,000	(2,000)
FES	12,729	12,729	0
Totals	**263,277**	**576,351**	**(313,074)**

Quality and Configuration

In addition to providing insufficient space, a majority of DAAF's existing buildings are of inadequate or poor quality. As part of the ADP, the quality of the buildings was assessed using metrics called the Quality Rating (Q-Rating) and the Mission-Rating (F-Rating). The Q-Rating is the ratio between the estimated cost of replacing a facility and the cost of correcting all deficiencies. The F-Rating is calculated based on the ability of each facility's configuration to support the mission. Ratings range from Q1/F1 (best) to Q4/F4 (worst) (**Table 1.2-4**).

Table 1.2-4: Q- and F-Ratings

Rating	Definition
Q1/F1 Good	Minor facility condition deficiencies and no significant facility configuration or capacity deficiencies.
Q2/F2 Fair	Some facility condition deficiencies and/or configuration or capacity deficiencies that have limited impacts on the mission.
Q3/F3 Inadequate	Significant facility condition deficiencies and/or configuration or capacity deficiencies that impair the mission.
Q4/F4 Poor	Major facility condition deficiencies and/or configuration or capacity deficiencies that present significant obstacles to the mission.

Of 48 Q-rated facilities, 31 (65 percent) have a Q-Rating of 3 or 4 (**Figure 1.2-5**); in terms of building area, 196,308 GSF (62 percent of the total) are rated Q3 or Q4. Of 31 F-rated facilities, 18 (58 percent) are rated F3 or F4 (**Figure 1.2-6**). By building area, this represents 49 percent of all facilities and 74 percent of all F-rated facilities. In particular, three of the 12th AV BN's four aircraft hangars are rated Q-4/F-3; the fourth hangar is rated Q-3/F-4. Of 15 facilities supporting the 12th AV BN, only two are rated Q-1 (totaling 2,843 GSF) and one is rated F-1 (143 GSF).

In addition to being undersized and of inadequate or poor quality, the facilities supporting the 12th AV BN in particular are inefficiently laid out. The 12th AV BN occupies facilities in three separate areas of the airfield and on opposite sides of the runway (**Figure 1.2-3**). The battalion HQ is north of the runway as are A and C Companies, which occupy two separate hangars. B and D Companies are on the south side of the runway in two hangars and smaller support buildings. This arrangement requires personnel and aircraft to continuously shuttle between those facilities for maintenance, operation, and storage functions, resulting in safety risks, disruptions to work processes, and overall functional inefficiencies. Taken together, these deficiencies increase the potential for an accident to occur or for a military mission to be compromised (e.g., due to a slower response time). By extension, these circumstances increase the probability of injury or loss of life.

Figure 1.2-5: Q-Rated DAAF Buildings

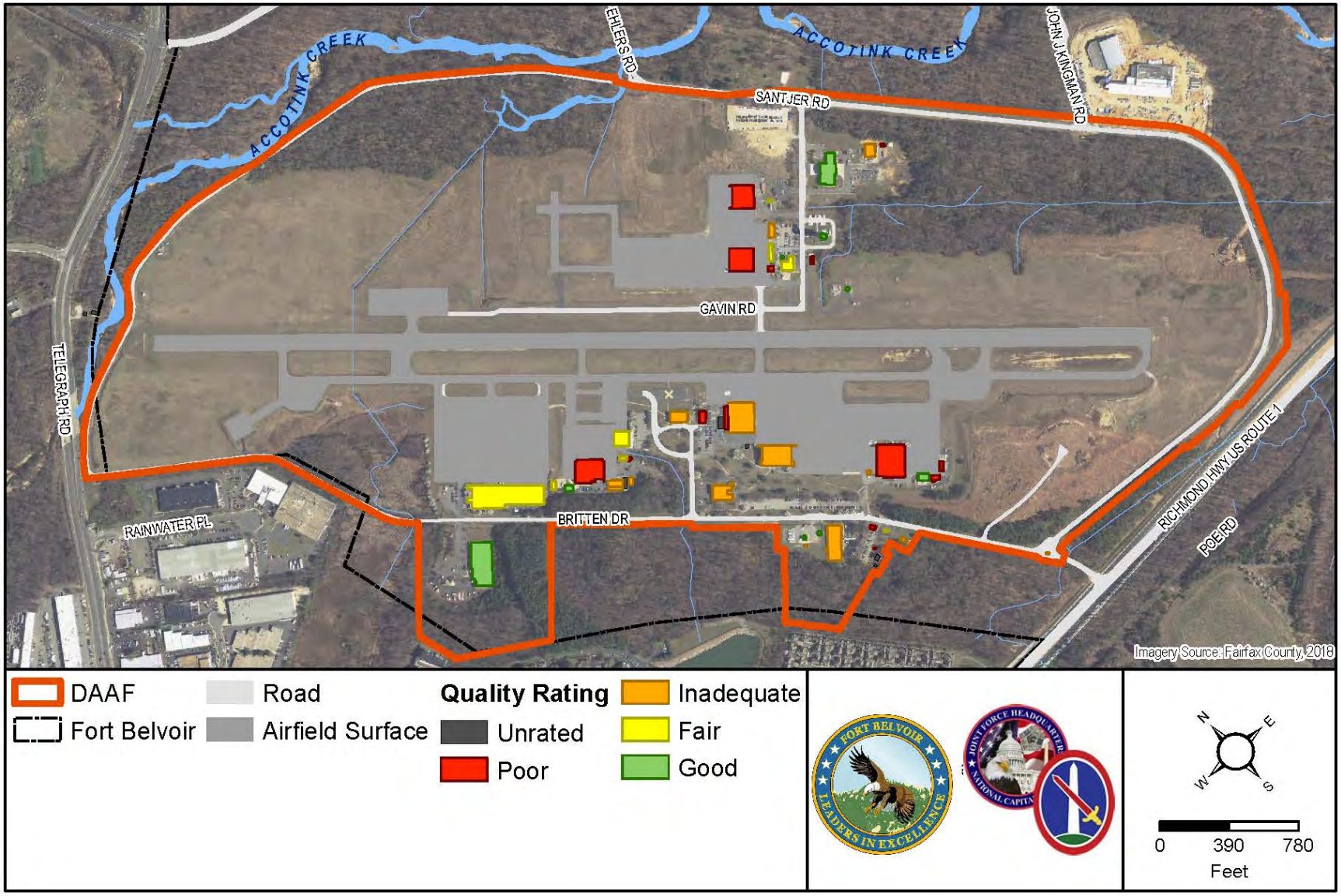
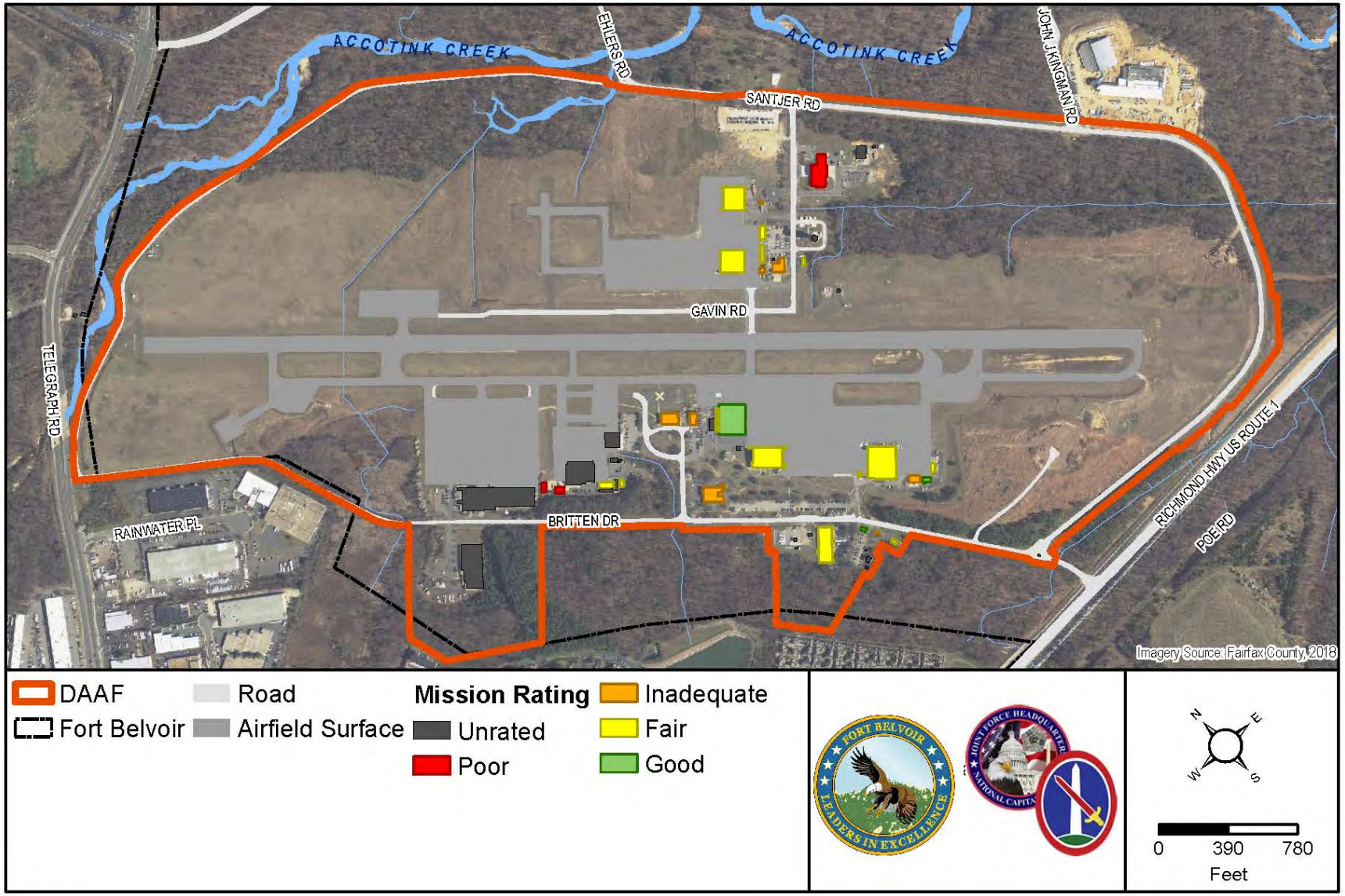


Figure 1.2-6: F-Rated DAAF Buildings



1.2.3.3 Surface Transportation

Although located on Fort Belvoir, DAAF is a discrete entity not connected to the installation's road network. The airfield has one active controlled-access, staffed entry gate (the Farrar Gate) located at the southern end of John J. Kingman Road, about 0.33 mile from the Fairfax County Parkway (VA 286). The Farrar Gate does not currently meet applicable Antiterrorism/Force Protection standards. In addition to the Farrar Gate, the airfield has three other inactive gates. These gates remain operable if needed.

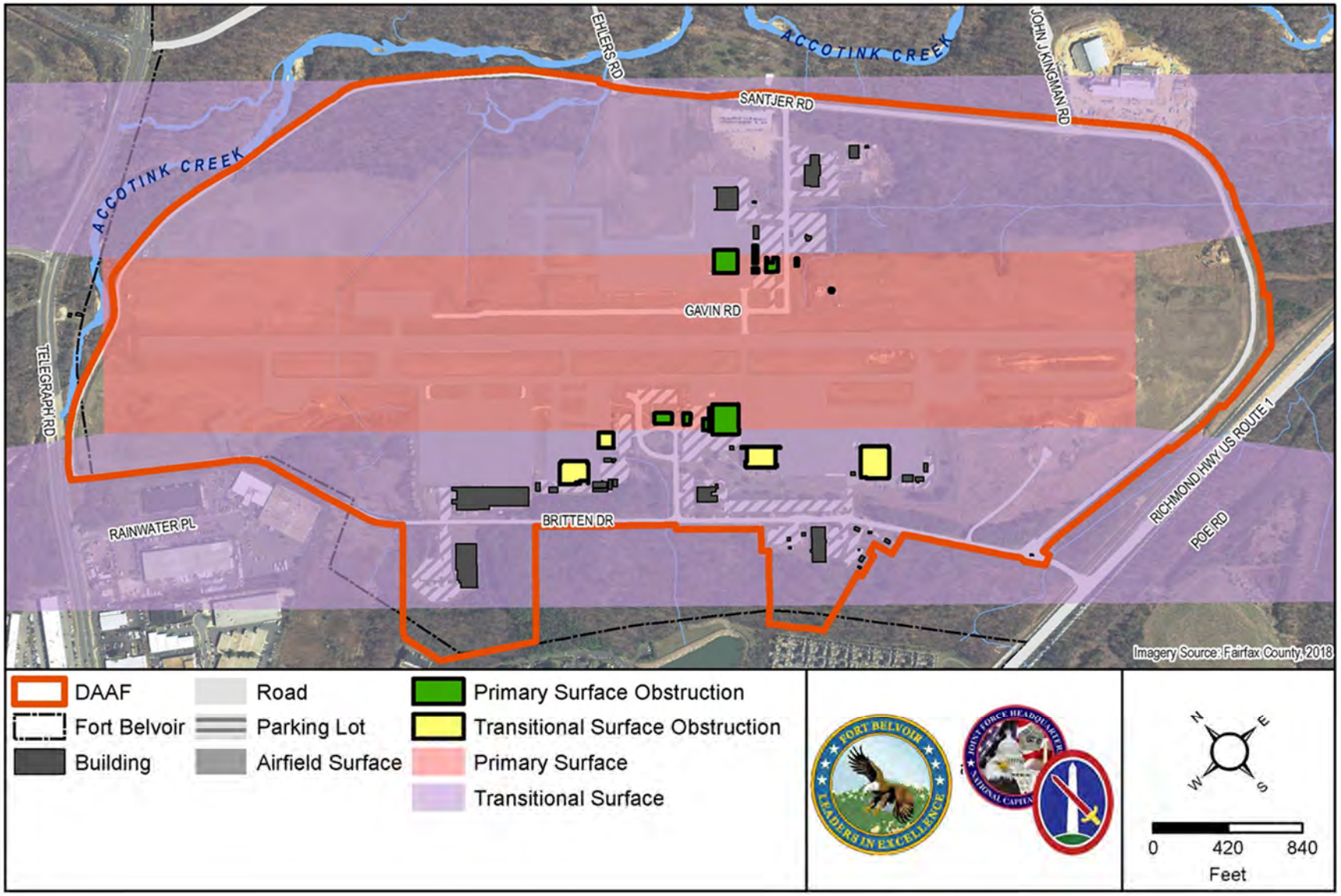
Past the Farrar Gate, access to DAAF facilities is via Santjer Road and Britten Drive which form a ring around the airfield parallel to the perimeter fence. Facilities on the north side of the runway are accessed from Santjer Road via Gavin Road; facilities on the south side of the runway are reached from Britten Drive either directly or via tertiary roads or short driveways. On the north side, Santjer Road connects to Ehlers Road, which in turn connects to the Fairfax County Parkway. However, a currently unused, closed gate prevents vehicles from using this route to enter or exit the airfield. Surface lots of various sizes along Britten Drive and Gavin Road provide vehicular parking for airfield personnel and visitors.

1.2.3.4 Temporary Airfield Waivers

To ensure safe flight operations, the DoD and Federal Aviation Administration (FAA) define safety surfaces that must remain free of obstructions, as specified in UFC 3-260-01, *Airfield and Heliport Planning and Design* and 14 Code of Federal Regulations (CFR) Part 77, respectively. Obstructions may include terrain, vegetation, buildings, and other structures. For a Class A airfield such as DAAF, the Primary Surface extends laterally 500 feet from the runway's centerline. The ground surface within this area must be clear of fixed or mobile objects and no objects are permitted to be above runway elevation, except for frangible navigational aids. The presence of obstructions with these surfaces poses a potential hazard to aircraft navigation.

At DAAF, both the Primary Surface and the Transitional Surface are not currently free of obstructions because of terrain elevation and the location of several existing buildings and pavements. Twelve existing buildings are located within the Primary Surface: Buildings 3136, 3138, 3140, 3141, 3142, 3213, 3231, 3233, 3234, 3237, 3238, and 3239 (**Figure 1.2-7**). Additionally, large portions of the existing aircraft parking aprons are also located within the Primary Surface on either side of the runway.

Figure 1.2-7: Airfield Surface Obstructions



The Transitional Surface extends outward and upward from the edge of the Primary Surface to a height of 150 feet above the runway's elevation at a slope of 7:1 (i.e., 1 foot of vertical distance for each 7 feet of horizontal distance). No vegetation or other fixed or mobile obstacles and/or structures are permitted to penetrate the Transitional Surface; taxiing aircraft are exempt from this requirement. Four existing buildings currently penetrate the Transitional Surface at DAAF: Buildings 3126, 3132, 3145, and 3151 (**Figure 1.2-7**)[1]. Additionally, terrain elevation along the southwestern side of the runway, and trees in several parts of the airfield are at a height that penetrates the Transitional Surface. DAAF has implemented a hazardous tree removal program to clear trees penetrating imaginary surfaces (i.e., surfaces in space that are designed to define the obstacle free airspace around the airfield); this program was evaluated in National Environmental Policy Act (NEPA) documentation prepared in 2016 (Fort Belvoir, 2016a).

Because of this situation, DAAF is currently operating under multiple temporary airfield waivers. Temporary waivers "are for a specified period during which additional actions to mitigate the situation must be initiated to fully comply with the applicable criteria" (UFC 203-260-01, B1-1.2.2.2). DAAF's latest waiver extension was granted in September 2016 for five years. The clearance waivers are periodically reviewed by the US Army Aeronautical Services Agency to ensure that control measures are in use and adequate to minimize the risk posed by the obstructions.

1.3 Real Property Master Planning and DAAF ADP

DoD installations are required to develop and periodically maintain master plans to guide future growth and development, in accordance with DoD Instruction (DoDI) 4165.70, *Real Property Management*. UFC 2-100-01, Change 1 (November 2018) defines DoD's minimum requirements for master planning processes and products in accordance with DoDI 4165.70. The Undersecretary of Defense's *Memorandum on Installation Master Plans*, dated May 28, 2013, requires all DoD installations to develop a master plan in accordance with the UFC guidance by October 2018.

Fort Belvoir completed a Real Property Master Plan (RPMP) update for the Main Post and FBNA in 2014. UFC 2-100-01, Change 1 prescribes that as part of the master planning process, installations should be divided into identifiable and connected districts based on characteristics such as geographical features, land use patterns, and building types. ADPs should be prepared for those districts. DAAF was identified as such a district in the updated Fort Belvoir RPMP.

The Army initiated the preparation of an ADP for DAAF in 2017. The scope of this effort included a requirement analysis to establish each tenant's facility requirements (April 2017); a course of action (COA) workshop to develop planning alternatives to address identified operational requirements, capability gaps, and future functional needs (May-June 2017); and preparation of a draft final ADP. This EIS evaluates the impacts of implementing the preferred COA identified in the draft final ADP and reasonable alternatives. The ADP will be finalized after completion of the NEPA process and incorporation, as applicable, of any management measures identified during this process.

[1] DAAF's air traffic control tower also penetrates the Transitional Surface. However, because DAAF holds a permanent waiver for this facility, it is not included in the facilities listed in this section.

1.4 Purpose and Need

The purpose of the Proposed Action is to provide DAAF with an ADP consistent with the airfield's vision of creating "a safe, secure, sustainable, consolidated aviation complex that allows for mission growth and provides multiple services in a compact campus." This includes upgrading and replacing an aging, undersized, inadequate, and inefficiently laid out physical infrastructure to allow DAAF to fully support its tenants' ongoing missions and remove obstructions from airfield safety surfaces requiring temporary waivers under which the airfield is currently operating.

The Proposed Action is needed because DAAF facilities are aging or obsolete, inadequately sized, inappropriately sited, and do not adequately support ongoing missions (**Section 1.2.3**).

1.5 Public Participation

1.5.1 EIS Scoping

The Army published a Notice of Intent (NOI) to prepare this EIS in the *Federal Register* on April 19, 2018. Additionally, notices announcing the Army's intent to prepare the EIS and upcoming scoping meetings were published in the *Washington Post* on April 19, 2018 and in the *Mount Vernon Gazette* and *Fort Belvoir Eagle* on April 26, 2018. Both the NOI and the newspaper notices solicited comments. Publication of the NOI initiated a 30-day public scoping period that ended on May 21, 2018.

Scoping letters briefly describing the Proposed Action, announcing the upcoming scoping meetings, and soliciting comments were sent on April 18, 2018 to 91 stakeholders and potentially interested parties, including state and local officials; federal, state, regional, and local agencies; federally recognized Native American tribes; non-profit organizations; and members of the general public with a potential interest in the Proposed Action.

On May 16, 2018, the Army hosted two scoping meetings at the South County Center, 8350 Richmond Highway in Alexandria, Virginia. The first meeting was for government agencies and consisted of a presentation on the Proposed Action and EIS process by project team members, followed by questions and answers. The second meeting was an open house intended for the general public. At both meetings, information was presented using poster boards and fact sheets as well as through informal interaction with project team members. Attendees were encouraged to provide written comments.

Ten persons representing seven agencies attended the agency meeting. Five persons attended the public open house. No comments having a substantive bearing on the Proposed Action or the EIS were received during either of the scoping meetings.

1.5.2 Summary of Scoping Comments

A total of 15 persons or agencies provided comments during the 30-day scoping period. Eight of the comments received consisted of factual questions, acknowledgements of receipt, or offers of services with no direct bearing on the scope of the EIS. Substantive comments are summarized below.

1.5.2.1 United States Environmental Protection Agency

The United States Environmental Protection Agency (USEPA) Region III submitted the following recommendations:

- It is important that the purpose and need be clearly identified in the EIS.
- Details of each alternative must be clearly presented in a comparative form for easy analysis by the reader.
- The project area should be described in detail and quantified. Permit requirements should be discussed as well.
- The EIS should examine the potential direct and indirect impacts of the proposed project, paying particular attention to: Air Resources; Water Resources; Physiography; Terrestrial Resources; Threatened and Endangered Species; and Waste Management.
- Impacts to the following resources should be discussed in the EIS: Noise; Socioeconomics; Traffic and Transportation; Environmental Justice (EJ); Human Health; Children's Health; and Cultural Resources.
- The EIS should include how DAAF will reduce energy use and costs, increase efficiency, and build resiliency into project design.
- Where feasible, consider incorporating Leadership in Energy and Environmental Design standards into the project design.
- The EIS should assess secondary and cumulative impacts.
- The EIS should include a Distribution List of agencies, organizations, and persons to whom copies of the document were sent.

1.5.2.2 Virginia Department of Environmental Quality

The Virginia Department of Environmental Quality (VDEQ) provided information on procedures for state review of NEPA documents and compliance with the federal consistency requirements of the Coastal Zone Management Act. The agency requested that if possible, the EIS and the federal consistency determination be submitted together for concurrent review. VDEQ also provided links to various databases that may be helpful in preparing the EIS.

1.5.2.3 Virginia Department of Transportation

The Northern Virginia District of Virginia Department of Transportation (VDOT) provided the following comments:

- The EIS should include an assessment of additional traffic that would be generated with the proposed changes, its impact on the highway network in the vicinity of the ADP, and any mitigation needed as per the Chapter 527 Traffic Impact Analysis regulations.

- Route 1 in the vicinity of the ADP is identified as a Corridor of Statewide Significance by the Commonwealth Transportation Board. The corridor helps move people and goods between regions of Virginia and must be protected to ensure appropriate level of mobility for long distance travel.
- Route 1 in the vicinity of ADP is also part of the Arterial Preservation Network with a goal to enhance capacity and improve operational efficiency.
- The Army should consult with Fairfax County about any County planning requirements and regulations and whether they apply to the Proposed Action.

1.5.2.4 Virginia Department of Historic Resources

The Virginia Department of Historic Resources (VDHR) commented that the Proposed Action has potential to affect historic properties and must undergo review under Section 106 of the National Historic Preservation Act (NHPA). (VDHR is the State Historic Preservation Office [SHPO] for the Commonwealth of Virginia.)

1.5.2.5 Virginia Department of Conservation and Recreation

The Virginia Department of Conservation and Recreation (VDCR) searched its Biotics Data System for occurrences of natural heritage resources in the study area. The database search revealed the potential presence of the following natural heritage resources:

- The Accotink Bay-Gunston Cove Stream Conservation Unit, a site of general significance containing eastern lamp mussel (*Lampsilis radiate*) and the state-listed threatened wood turtle (*Glyptemys insculpta*);
- The Accotink Wetlands Conservation Site, a site of high significance containing marsh pea (*Lathyrus palustris*), river bulrush (*Bolboschoenus fluviatilis*), water-plantain crowfoot (*Ranunculus ambigens*), and velvet sedge (*Carex vestita*);
- Tidal freshwater marsh; coastal plain/outer piedmont acidic seepage swamp; northern coastal plain/piedmont mesic mixed hardwood forest; and
- Parker's piperwort (*Erocaulon parkeri*), historically documented downstream of the project site.

To minimize adverse impacts on aquatic ecosystems, VDCR recommended the implementation of and strict adherence to applicable state and local erosion and sediment control (E&SC) regulations. VDCR also recommended state consultation to ensure compliance with the Virginia Endangered Species Act (ESA).

1.5.2.6 National Capital Planning Commission

The National Capital Planning Commission's (NCPC) Urban Design and Plan Review Division provided the following comments and recommendations:

- Potential future development along the northeast side of the existing airfield development should be minimized to the maximum extent possible as it is an environmentally sensitive area. Future expansion should be positioned contiguously to existing development as much as possible, and trade-offs between environmental impacts and airfield requirements should be highlighted in as much detail as possible in the EIS.
- Parking should be limited in the airfield planning district to the maximum extent possible. However, should employee parking exceed NCPC's 1:1.5 (67 percent) goal, parking elsewhere on the installation should be minimized. The EIS should document impacts to overall installation-wide parking capacity.
- The EIS should capture construction and post-construction impacts to the natural environment using the following metrics: change in total vegetation and tree canopy area; change in total impervious surface area; change in stormwater runoff volumes; change in greenhouse gas (GHG) emissions; change in wetland and floodplain areas; change in wildlife habitat; and changes in the master plan-identified policy areas.
- The ADP should be submitted to NCPC for separate draft and final reviews.
- Future consultation meetings with NCPC are encouraged to ensure ADP compliance.

1.5.2.7 Fairfax County Department of Planning and Zoning

The Fairfax County Department of Planning and Zoning's Planning Division for Heritage Resources submitted the following comments:

- The project is located near three County-designated historic overlay districts: Mount Air; Pohick Church; and Woodlawn.
- The following sites are designated on the Fairfax County Inventory of Historic Sites:
  - La Grange
  - Fort Belvoir Military Railroad Historic Corridor
  - Accotink United Methodist Church
  - Camp Humphreys Pump Station
- The primary concern is how the proposed changes will be viewed from historic districts and how it may impact their historic character.
- Information about the tallest proposed structure should be provided in order to determine impact and possible mitigation.

The Fairfax County Architectural Review Board should be considered as a stakeholder, as two historic districts are directly adjacent to the project site.

1.5.3 Draft EIS Public Review

The 45-day Draft EIS public review and comment period was conducted from July 24 to September 8, 2020. The Draft FONPA was made available for public review and comment concurrently with the Draft EIS. The NOA for the Draft EIS was published in the *Federal Register* and *Washington Post* on July 24, 2020 and in the *Mount Vernon Gazette* on July 30, 2020. Notifications announcing the availability of the Draft EIS for public review and comment were sent to 101 stakeholders and potentially interested parties. Copies of the Draft EIS and associated documents were made available for viewing and download on the Fort Belvoir DPW-ED website. Two publicly accessible teleconferences were held during the 45-day Draft EIS public review period to provide the public and agencies with the opportunity to learn about and comment on the Proposed Action and the Draft EIS.

A total of 194 distinct comments were received during the 45-day Draft EIS public review period. All comments received were considered when preparing the Final EIS. None of the comments required substantive changes to the EIS, Proposed Action, or impact analysis.

Additional information regarding public review of the Draft EIS is provided in **Chapter 9** of this Final EIS. Comments received on the Draft EIS and the Army's responses are provided in **Tables A-2** through **A-7** in **Appendix A**.

1.5.4 Final EIS and Record of Decision

This Final EIS will be made available for public review for at least 30 days before the Army issues a Record of Decision (ROD) for the Proposed Action. The ROD will articulate the decision made, provide a supporting explanation, and identify mitigation and protective measures to address adverse impacts that were identified during the EIS process. The ROD will explain both the pertinent factors upon which the decision is based and the reasons the alternative selected best meets the Proposed Action's purpose and need. The environmentally preferred alternative will also be identified in the ROD. The NOA announcing the availability of the signed ROD will be published in the *Federal Register* no sooner than 30 days after the Final EIS is released for public review. Issuance of the signed ROD will formally conclude the NEPA process for the Proposed Action analyzed in this EIS.

1.6 Scope and Contents of the EIS

This EIS was prepared in accordance with NEPA (42 United States Code [USC] 4321), the implementing regulations issued by the President's Council on Environmental Quality (CEQ) (40 CFR Parts 1500-1508), and the Army's procedures to implement NEPA (32 CFR Part 651, *Environmental Analysis of Army Actions*). The purpose of the EIS process is to inform decision makers and the public of the likely environmental consequences of the Proposed Action and alternatives.

This EIS evaluates the potential impacts from implementing the projects defined in the DAAF ADP over the next 30 years. The scope of the EIS (i.e., the range of topics considered in the impact analysis) was determined based on the aforementioned documents, currently available information on environmental conditions on and near DAAF, and the comments received during the scoping period.

Impacts on the following resources are evaluated: land use, including aesthetics and coastal zone management; historic and cultural resources; air quality; noise; geology, topography, and soils; water resources; biological resources; health and safety; and hazardous materials and waste.

Executive Order (EO) 11988, *Floodplain Management*, requires federal agencies to determine whether a proposed action would occur within a floodplain, and to avoid development in floodplains unless the agency determines that there is no practicable alternative. Projects in the Proposed Action would have the potential to affect the 100-year floodplain associated with Accotink Creek, a perennial tributary of the Potomac River that crosses DAAF. Therefore, impacts on the 100-year floodplain potentially resulting from the Proposed Action are analyzed in this EIS in accordance with EO 11988 (see **Section 3.7.6** and **Section 4.7**).

Army policy calls for the environmental analysis to be proportionate to the nature and scope of the Proposed Action, the complexity and level of anticipated effects on important resources, and the capacity of Army decisions to influence those effects in a productive, meaningful way from the standpoint of environmental quality. The environmental analysis for this EIS is commensurate with the planning horizon and array of projects associated with implementing the proposed ADP. As required by NEPA, an interdisciplinary team of environmental planners and scientists analyzed the Proposed Action and alternatives in light of existing conditions and identified both beneficial and adverse effects associated with the action. Where applicable, management measures are defined.

1.7 Related NEPA Documents

As applicable, this EIS incorporates relevant information from the following NEPA documents that have recently been prepared for projects at DAAF and Fort Belvoir:

- Supplemental Environmental Assessment, Communications Line Extension, Davison Army Airfield, Fort Belvoir, VA, December 2016
- Davison Army Airfield Hazardous Tree Removal Environmental Assessment and Finding of No Significant Impact, October/December 2016
- Final EIS for Short-term Projects and RPMP Update, Fort Belvoir, Virginia, June 2015
- NEPA Environmental Assessment, Construct Skills Training Facility (STF), Davison Army Airfield, Fort Belvoir, VA, Record Document, July 16, 2014
- DAAF Grading Project Record of Environmental Consideration (Project Number/IJO Number AV-0053-1J), May 2012

1.8 Organization of the EIS

This EIS consists of the following sections:

- Chapter 1 (Purpose and Need) presents information about the Proposed Action's purpose and need as well as background information on DAAF and a summary of the EIS process, including opportunities for public involvement.

- Chapter 2 (Proposed Action and Alternatives) provides a description of the Proposed Action and alternatives analyzed in the EIS.
- Chapter 3 (Affected Environment) describes the various aspects of the environment that may be affected by the Proposed Action and alternative.
- Chapter 4 (Environmental Consequences) describes and assesses the impacts of the Proposed Action and alternatives on those aspects of the environment.
- Chapter 5 (Cumulative Effects) addresses the impacts of the Proposed Action and alternatives when added to those of past, present, and reasonably foreseeable future actions.
- Chapter 6 (Management Measures and Impacts) summarizes the measures that would be implemented to prevent, minimize, or compensate for the impacts of the Proposed Action and alternatives. This section also summarizes applicable permitting requirements.
- Chapter 7 (Federal Consistency Determination) assesses the consistency of the Proposed Action with the enforceable policies of the Virginia Coastal Zone Management Program.
- Chapter 8 (References) lists the documents and information sources cited in the EIS.
- Chapter 9 (Distribution and Review of the Draft EIS) summarizes the 45-day Draft EIS public comment period.
- Chapter 10 (Preparers) provides the names and qualifications of the persons who were involved in the preparation of the EIS.

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2 Proposed Action and Alternatives

2.1 Proposed Action

The Army's Proposed Action is to implement the construction, modernization, demolition, and infrastructure improvement projects identified in the DAAF ADP. The Proposed Action does not include, nor would it require, substantial changes in missions, air operations, or the number of aircraft and personnel at DAAF. All of the proposed projects would occur within Fort Belvoir's existing boundaries and most of them within DAAF's existing fence line. No land acquisition by the Army would be needed.

The proposed projects are organized into short-range (next ten years), mid-range (from 11 to 20 years from now), and long-range (from 21 to 30 years from now) timeframes. One project, a new 8-bay aircraft maintenance hangar for the 12th AV BN (**Project 6**), is currently programmed in the short-range phase for Fiscal Year 2024. This phasing reflects the Army's preferred sequence for implementing the projects and provides an organizational framework for discussion of the projects in the EIS. The incremental implementation of the proposed projects would minimize disruption of airfield and tenant operations during the life of the ADP and it prioritizes those projects most critical to meeting the Proposed Action's purpose and need.

The proposed ADP projects are described below (**Sections 2.1.1** through **2.1.3**). Alternatives for implementing the proposed projects are discussed in **Section 2.2**.

2.1.1 Short-Range ADP Projects

Short-range projects would be implemented over the next 10 years. These projects include modernizations of multiple existing facilities, the construction of a modern aircraft maintenance hangar for the 12th AV BN, infrastructure improvements, and building demolitions.

Project 1 – Modernize Building 3121, DCARNG Airfield Operations Section

Project 1 would renovate 13,000 square feet of space in Building 3121 to replace worn finishes, reconfigure interior spaces to optimize functionality, and provide the DCARNG Airfield Operations Group with its full space authorization. The modernizations would include repairing the damage (floor settling and block wall cracking) the building suffered as a result of the earthquake the region experienced in 2011; demolishing and reconfiguring interior partition walls; replacing lighting and plumbing fixtures; and updating mechanical systems (e.g., electrical wiring; plumbing; and heating, ventilation, and air conditioning [HVAC]), as necessary.

Project 2 – Modernize Building 3145, OSA-A/OSACOM Hangar

Project 2 would renovate 23,004 square feet of space in Building 3145 to replace worn finishes; reconfigure interior spaces to optimize functionality; upgrade fire suppression, mechanical, and

electrical systems; and improve the building envelope with new exterior paint, more efficient insulation, new windows and doors, and/or roofing materials.

Project 3 – Modernize Building 3151, 12th AV BN D Company Hangar

Project 3 would renovate 35,208 square feet of space in Building 3151 to replace worn finishes and optimize functionality. Proposed modernizations would include upgrades to fire suppression and mechanical systems and improvements to the building envelope such as new exterior paint, more efficient insulation, new windows and doors, and/or roofing materials. Proposed modernizations would also include replacement of electrical wiring throughout the building.

Project 4 – Modernize Building 3232, 12th AV BN C Company Hangar

Project 4 would renovate 17,698 square feet of space in Building 3232 to replace worn finishes; upgrade fire suppression and mechanical systems; and improve the building envelope with new exterior paint, more efficient insulation, new windows and doors, and/or roofing materials.

Project 5 – Realign Santjer Road and Gavin Road

Project 5 would realign segments of Santjer Road and Gavin Road (totaling 3,168 linear feet) to accommodate construction of a new maintenance hangar facility for the 12th AV BN (**Project 6**). Santjer Road would be realigned approximately 100 feet to the north of its current alignment between its intersection with Ehlers Road and a point approximately 800 feet east of its intersection with Gavin Road. Gavin Road would be extended to the north to maintain its intersection with Santjer Road. The project would include the demolition of the abandoned portions of Santjer Road and restoration of those areas to a vegetated or otherwise permeable condition to the extent practicable, paving and striping the realigned and extended road segments, and installation of applicable directional and traffic control signage. Building 3260 would be demolished as part of this project.

Project 6 – Construct 12th AV BN 8-Bay Aircraft Maintenance Hangar

Project 6 would build an 8-bay, 145,100-square-foot aircraft maintenance hangar for the 12th AV BN on a site to the northeast of Building 3232 that currently consists of maintained lawn and vegetation. The maintenance hangar is the tallest proposed facility at 55 feet above sea level (asl). As noted above, this project has been programmed for Fiscal Year 2024.

The new 8-bay hangar would be a steel-framed structure built on a reinforced concrete slab with exterior masonry walls; interior gypsum board partition walls; and all necessary electrical, mechanical, plumbing, communications, fire suppression, life safety, and HVAC systems. The new facility would include storage for parts; storage for petroleum, oil, and lubricants (POL) and hazardous materials; open storage areas; an aircraft wash rack; and an associated ground support equipment building. Runoff from the new aircraft wash rack would discharge to the airfield's sanitary sewer system, and would include an oil/water separator (O/WS) to manage associated runoff in accordance with applicable regulations. The

existing parking apron in that area of the airfield would be expanded by approximately 300,000 square feet (6.9 acres) to accommodate the new hangar.

As part of this project, a paved, approximately 55,000-square-foot (1.3-acre), 147-space parking lot for privately owned vehicles (POV) would be built on the opposite side of the newly realigned Santjer Road (**Project 5**) from the new hangar. The new parking lot would be built on a site that is currently part of Anderson Park, a Fort Belvoir-owned and -maintained recreational area. To effectively consolidate the 12th AV BN on the northeast side of the airfield and ensure that its facilities are outside the Primary and Transitional Surfaces associated with Runway 14/32, the new hangar, parking lot, and portions of the expanded aircraft parking apron would be built in areas of the 100-year floodplain associated with Accotink Creek.

Upon its completion, the 12th AV BN's B and D Companies would relocate to the new hangar to consolidate all 12th AV BN activities to the northeast side of the airfield's runway. Following their relocation, the following vacated facilities would be demolished: Buildings 3138, 3140, 3141, 3142, 3143, 3149, 3233, 3234, 3235, 3236, 3237, and 3238. The demolition of Buildings 3138, 3140, 3141, 3142, 3233, 3234, and 3237 would remove those facilities from the Primary Surface associated with the airfield's runway and eliminate the requirement for associated temporary operational waivers.

Project 7 – Construct North Taxiway Connection

A new aircraft taxiway would be built under **Project 7** to connect the new 12th AV BN hangar and expanded aircraft parking apron (**Project 6**) to the airfield's runway. Depending on the alternative selected for implementation, the new taxiway would have an area of 12,980 square feet (0.3 acres) (Full Implementation Alternative; **Section 2.2.2.3**) or 12,938 square feet (0.3 acre) (Partial Implementation Alternative; **Section 2.2.2.4**). Under either alternative, the new taxiway would be constructed using reinforced concrete and would have paved shoulders on either side in accordance with DoD requirements. Construction of the new taxiway would also include applicable soil grading, excavation and/or filling, pavement markings, lighting, and drainage.

Project 8 – Remove Earthen Knoll

Project 8 would excavate, grade, and level a knoll to the southwest of Runway 14/32 because it is high enough to penetrate the Transitional Surface. Removal of the knoll would include the clearing and grubbing of existing vegetation, which primarily consists of maintained grass, low-lying shrubs, and tree stumps remaining from a recent clearing action (impacts from that action were analyzed in the *Davison Army Airfield Hazardous Tree Removal Environmental Assessment* and Finding of No Significant Impact [Fort Belvoir 2016]). The project would require the excavation of approximately 337,088 cubic yards of soil. The project area would be graded to match the runway elevation and restored to a permeable condition (i.e., mowed grass or other native, low-lying vegetation).

Project 9 – Construct Runway Safety Overrun

A 200-foot long, 20,000-square-foot paved overrun would be established at the southeastern end of the runway under **Project 9** to meet applicable UFC and airfield safety requirements. Construction of the paved overrun would require relocating the existing aircraft approach lighting system. The new overrun would address safety requirements associated with current airfield operations; however, the new overrun would not support changes to the number and/or types of aircraft that can be accommodated at DAAF.

2.1.2 Mid-Range ADP Projects

Proposed ADP mid-range projects would be implemented over the next 11 to 20 years. These projects primarily consist of facility modernization and construction projects, as well as an infrastructure improvement project. The mid-range projects would complete the build-out of the 12th AV BN complex on the northeast side of the runway and would result in substantial reconfiguration of that portion of the airfield.

Project 10 – Modernize and Expand Building 3146

Project 10 would renovate and expand Building 3146 to 49,487 square feet to accommodate Airfield Division and TAAB Command functions, which would be relocated from Building 3136. Modernizations to Building 3146 would include demolishing and reconfiguring interior partition walls to optimize functionality and meet the space authorizations of these groups; replacing worn finishes and lighting and plumbing fixtures; and updating electrical wiring, plumbing, and HVAC systems as necessary.

The two-story addition to Building 3146 would have a footprint of approximately 4,500 square feet and would consist of a steel-framed structure erected on a reinforced concrete slab with interior gypsum board partition walls. Its exterior design would be complementary to that of the existing building. All necessary utilities, including HVAC, fire suppression and life safety, and electrical would be extended from the existing building to the addition.

The existing fitness center in Building 3146 would remain for the use of DAAF personnel. The modernization of Building 3146 may include a shoppette on the facility's first floor to serve DAAF personnel as well as transient flight crews. POV parking for Building 3146 would be provided in a new paved 150-space lot located immediately south of the facility across Britten Drive.

Following the relocation of the Airfield Division and TAAB Command to the renovated and expanded Building 3146, Building 3136 would be demolished and removed from the airfield's Primary Surface.

Project 11 – Construct 12th AV BN 10-Bay Storage Hangar

Project 11 would build a 76,210-square-foot, 10-bay aircraft storage hangar for the 12th AV BN northwest of the proposed 8-bay hangar (**Project 6**). The new 10-bay hangar would be a steel-framed structure built on a reinforced concrete slab with exterior masonry walls; interior gypsum board partition walls; and all necessary electrical, mechanical, plumbing, communications, fire suppression, life

safety, and HVAC systems. In addition to aircraft storage, interior space would be provided for maintenance shops, general storage, POL and hazardous materials storage, and administrative functions. Overall, the new hangar would meet the 12th AV BN's functional space requirement for such a facility.

Site improvements associated with the new hangar would include all necessary grading, the installation of buried utilities, and an adjacent approximately 380,000-square-foot (8.7-acre) expansion of the aircraft parking apron. A new taxiway 50 feet wide and 500 feet long (37,500 square feet [0.9 acre]) would connect the expanded apron to the runway, and a new helipad approximately 100 feet on each side (10,000 square feet [0.2 acre]) would be built approximately 700 feet to the west.

The helipad would be connected to the expanded apron to the east and Santjer Road to the west by a new road that would provide access for refueling and other support vehicles. The access road would be approximately 12 feet wide and 1,600 feet long for a total area of 19,200 square feet (0.44 acre). A small bridge would be required to span an airfield drainage channel between the proposed helipad and the expanded apron. Prior to the expansion of the apron as described above, the helipad would be connected to an existing portion of the aircraft apron along the north side of the runway by road approximately 700 feet long (0.20 acre); this road would be demolished once east-west road is constructed.

The expanded apron, new taxiway, and helipad would be built of reinforced concrete and would include all necessary lighting, pavement markings, and drainage. As described for **Project 6** and for similar reasons, the new 10-bay hangar, helipad, and the majority of the expanded aircraft apron and new taxiway would be built in the 100-year floodplain associated with Accotink Creek.

Following the completion of the new 10-bay hangar, Building 3231 would be vacated by the 12th AV BN and demolished to remedy the building's intrusion on the airfield's Primary Surface and remove an unneeded facility. Its site would be incorporated into the aircraft parking apron and remain in an impermeable condition.

Project 12 – Construct 12th AV BN 4-Bay Storage Hangar and Secondary Parking Lot

Under **Project 12**, a 52,243-square-foot, 4-bay aircraft storage hangar would be built to the southeast of the proposed 8-bay hangar (**Project 6**). The new hangar would be a steel-framed structure built on a reinforced concrete slab with exterior masonry walls; interior gypsum board partition walls; and all necessary electrical, mechanical, plumbing, communications, fire suppression, life safety, and HVAC systems. Interior space would be provided for aircraft storage, shops, general storage, POL and hazardous materials storage, and administrative functions, meeting the functional space requirements for such a facility.

Site improvements associated with the new hangar would include the demolition of a parking lot adjacent to the northwestern side of Gavin Road as well as all necessary grading and the installation of buried utilities. A new paved 17,500-square-foot (0.4-acre) parking lot would be built on a site near the southeast corner of the realigned Gavin Road-Santjer Road intersection (**Project 5**) to provide POV parking for personnel assigned to the new hangar. To provide sufficient standoff distance from nearby

existing and proposed facilities in accordance with DoD requirements, a small portion of the new parking lot would be located within the 100-year floodplain associated with Accotink Creek.

Following the completion of the new hangar, Building 3232 and an approximately 52,250-square-foot (1.2-acre) portion of the existing aircraft parking apron and aircraft taxiway would be demolished to remove unneeded facilities. The site of Building 3232 would be incorporated into the aircraft parking apron and would remain in an impermeable condition; demolished areas of the aircraft parking apron and taxiway would be revegetated or restored to an otherwise permeable surface using native, low-growing grasses or similar vegetation.

Project 13 – Construct 12th AV BN Aircraft Paint Shop

Project 13 would build a 20,000-square-foot, 3-bay paint shop for the 12th AV BN immediately northwest of the proposed 8-bay hangar (**Project 6**). The new paint shop would be a steel-framed structure built on a reinforced concrete slab with exterior masonry walls; interior gypsum board partition walls; and all necessary electrical, mechanical, plumbing, communications, fire suppression, life safety, and HVAC systems. Interior space would be provided in the new paint shop for aircraft preparation, sandblasting, and painting as well as administrative, general storage, and hazardous materials storage areas. Construction of this facility would require relocation of the existing aircraft wash rack. As described for **Projects 6** and **11** and for similar reasons, the new paint shop would be built within the 100-year floodplain associated with Accotink Creek.

The construction of this facility would complete the build-out of the 12th AV BN complex on the northeast side of the runway and would fulfill that unit's functional space requirements at DAAF.

Project 14 – Modernize and Expand Building 3123, DCARNG Readiness Center

Project 14 would renovate and expand Building 3123, the existing DCARNG Readiness Center, to 35,000 square feet to meet that unit's functional space requirements. Proposed modernizations would include demolishing and reconfiguring interior partition walls to optimize functionality and meet the DCARNG's space authorization; replacing worn finishes and lighting and plumbing fixtures; and updating electrical wiring, plumbing, and HVAC systems as necessary.

The addition to Building 3123 would have a footprint of approximately 2,000 square feet and would consist of a steel-framed structure erected on a reinforced concrete slab with interior gypsum board partition walls. Its exterior design would be complimentary to that of the existing building. All necessary utilities, including HVAC, fire suppression and life safety, and electrical would be extended to the addition from Building 3123.

Project 15 – Construct DCARNG Aircraft Wash Rack

An 8,730-square-foot aircraft wash rack would be built by **Project 15** for the DCARNG on the site of an existing parking lot to the northwest of Building 3121. Runoff from the new aircraft wash rack would discharge to the airfield's sanitary sewer system, and would include an O/WS to manage associated runoff in accordance with applicable regulations. POV parking displaced by the demolition of the existing

parking lot and construction of the new wash rack would be relocated by expanding an existing parking lot northwest of Britten Drive and adjacent to Building 3123. Parking for CAP aircraft, which currently park at the northwestern corner of the aircraft apron adjacent to the proposed wash rack site, would shift on the apron a short distance to the north.

Project 16 – Modernize Building 3165, OSA-A/OSACOM Operations Facility

Project 16 would renovate 15,332 square feet of space in Building 3165 to improve the physical quality of interior spaces and meet OSA-A/OSACOM's space authorization. Modernizations would consist of demolishing and reconfiguring interior partition walls to optimize functionality; replacing worn finishes and lighting and plumbing fixtures; and updating electrical wiring, plumbing, and HVAC systems as necessary.

Project 17 – Relocate NVESD

Project 17 would relocate NVESD to the Building 3151 complex (including Buildings 3153, 3154, and 3155) following the relocation of the 12th AV BN's D Company to the proposed 8-bay hangar (**Project 6**). Up to 69,433 square feet of space in Building 3151 would be renovated as needed to accommodate NVESD's functional requirements. Modernizations would potentially include demolishing and reconfiguring interior partition walls to optimize functionality and meet NVESD's space authorization; replacing finishes and lighting and plumbing fixtures; and updating electrical, communications/data, and HVAC systems as necessary. Building 3151 would continue to operate under a temporary waiver due to its location in the airfield's Transitional Surface.

Following the relocation of NVESD to Building 3151, Buildings 3125, 3126, 3127, 3128, 3129, 3130, 3131, 3132 and 3133 would be demolished to remove redundant facilities. In addition, the demolition of Buildings 3126 and 3132 would eliminate two facilities within the airfield's Transitional Surface.

Project 18 – Expand Aircraft Parking Apron

Project 18 would expand the aircraft parking apron on the southwestern side of the runway. Depending on the alternative selected for implementation, the aircraft parking apron would be expanded by approximately 440,653 square feet (10.1 acres) (Full Implementation Alternative; **Section 2.2.2.3**) or 224,885 square feet (5.2 acres) (Partial Implementation Alternative; **Section 2.2.2.4**). The expanded apron would primarily be built in the area of Building 3132, which would be demolished following the relocation of NVESD to Building 3151 (**Project 17**); Building 3138, which would be demolished following the relocation of the 12th AV BN to the new 8-bay aircraft maintenance hangar (**Project 6**); and Buildings 3140 and 3136, which would be demolished as part of **Projects 6** and **10**, respectively.

The expanded apron would consist of reinforced concrete and would include all required pavement markings, lighting, and drainage. Site preparation would include the demolition of approximately 332,638 square feet (7.6 acres) (Full Implementation Alternative) or 235,224 square feet (5.4 acres) (Partial Implementation Alternative) of existing pavement as well as all necessary grading, filling,

excavation, and installation of buried utilities. The expanded apron would be used for parking DCARNG and transient aircraft.

Expansion of this apron (and demolition of existing airfield pavements associated with this project) would eliminate the majority of structurally inadequate taxiway and apron sections at DAAF (**Section 1.2.3.1**). Exceptions would be Sections T11B and T19A (**Figure 1.2-2**), which are not addressed by the Proposed Action. Future improvements to these sections, should they be programmed, would be evaluated in NEPA documentation separately from this EIS as applicable.

2.1.3 Long-Range ADP Projects

Proposed long-range projects consist of new facility and infrastructure construction and would be implemented in 21 to 30 years. These projects would also include the demolition of 12 existing buildings.

Project 19 – Replace Farrar Gate Access Control Point and Install Redundant Communications Line

Project 19 would build a new access control point (ACP) to replace the existing ACP on John J. Kingman Road. The new ACP would include a security building with reinforced concrete foundation and floor slab, appropriate security features (e.g., pop-up vehicle barriers, fencing, cameras, etc.), vehicle approach and inspection lanes, a canopy structure to shelter vehicles and security personnel from the elements, and a turnaround loop for vehicles that are denied access to DAAF. Existing utilities serving DAAF (e.g., water, sewage, electricity, communications/data) would be extended to the new ACP. A secondary communications line would also be installed during construction of the new ACP to provide DAAF with redundant connectivity to off-post commercial communications and data service providers.

Site preparations for the new ACP would consist of all necessary grading, excavation, stormwater drainage, and landscaping. When complete, the developed area of the new ACP would encompass 100,487 square feet (2.3 acres).

Operation of the existing Farrar Gate ACP would continue throughout the new ACP's construction phase. Once the new ACP is operational, the existing ACP would be demolished, and its site would be incorporated into the John J. Kingman Road right of way (i.e., paved and striped) or restored to a permeable condition using native vegetation, as applicable.

Project 20 – Construct NVESD Hangar

Under **Project 20**, a 66,000-square-foot hangar would be built for NVESD immediately southwest of Building 3121 on the northwestern side of the runway. The new hangar would be built on the northwestern edge of the aircraft apron proposed for expansion (**Project 18**) and would consist of a steel-framed structure with exterior masonry walls; interior gypsum board partition walls; and all necessary electrical, mechanical, plumbing, communications, fire suppression, life safety, and HVAC systems. An aircraft wash rack would be built adjacent to the new hangar. Runoff from the new aircraft wash rack would discharge to the airfield's sanitary sewer system, and would include an O/WS to

manage associated runoff in accordance with applicable regulations. Interior space in the new hangar would include maintenance shops, storage, and administrative areas and would fulfill NVESD's functional space requirements. Britten Drive would be realigned approximately 200 feet to the southwest to accommodate construction of the new hangar. POV parking would be provided in a paved, approximately 22,000-square-foot (0.5-acre), 24-space parking lot along the western side of Britten Drive opposite the new hangar.

Following the completion of the new hangar, Buildings 3150, 3151, 3153, 3154, and 3155 would be demolished to remove unneeded facilities and eliminate the requirement for operational waivers associated with Building 3151's location in the airfield's Transitional Surface.

This project would complete the reorganization, consolidation, and modernization of NVESD facilities at DAAF.

Project 21 – Construct OSA-A / OSACOM Operational Flight Division Hangar

Project 21 would build a 70,000-square-foot Operational Flight Division (OFD) hangar for OSA-A/OSACOM at the southeastern end of the aircraft parking apron along the northwestern side of the runway. The new hangar would consist of a steel-framed structure built on a reinforced concrete slab with exterior masonry walls; interior gypsum board partition walls; and all necessary electrical, mechanical, plumbing, communications/data, fire suppression, life safety, and HVAC systems. Interior space would include maintenance shops, general storage, POL and hazardous materials storage, and administrative areas.

Site preparation would consist of all necessary grading, excavation, filling, stormwater management, landscaping, and installation of buried utilities. An approximately 750-foot segment of Britten Drive would be shifted slightly to the west to accommodate the proposed facility. Buildings 3170 and 3171 would also be demolished to remove them from the right of way of the realigned Britten Drive.

As part of this project, the aircraft parking apron would be expanded by approximately 137,046 square feet (3.1 acres) adjacent to and near the new hangar; approximately 36,000 square feet (0.8 acre) of existing apron near the new hangar would be rebuilt. New and rebuilt areas of the aircraft parking apron would consist of reinforced concrete with all necessary pavement markings, lighting, and drainage.

Following completion of the new hangar, Buildings 3145 and 3144 would be demolished. This would eliminate Building 3145's intrusion on the airfield's Transitional Surface and the requirement for a temporary waiver for its operation.

Project 22 – Construct OSA-A/OSACOM Operations Facility

Under **Project 22**, a three-story, 21,500-square-foot administrative facility for OSA-A/OSACOM would be built along the western side of the realigned Britten Drive approximately 200 feet west of the proposed OSA-A/OSACOM hangar (**Project 21**). The new administrative facility would consist of a steel-framed structure built on a reinforced concrete slab with exterior masonry walls; interior gypsum board partition walls; and all necessary electrical, mechanical, plumbing, communications/data, fire suppression, life safety, and HVAC systems. The developed footprint of the new facility would cover

approximately 7,200 square feet. Interior space would primarily consist of office and administrative areas as well as general storage. Site preparation would include all necessary grading, excavation, filling, installation of buried utilities, landscaping, and stormwater management. Parking for this facility would be provided in an adjacent paved, approximately 8,750-square-foot (0.2-acre), 25-space parking lot. Buildings 3176, 3177, and 3178 would be demolished to accommodate the proposed facility on the site.

OSA-A/OSACOM administrative functions would relocate from Building 3165 to this facility following its completion. Building 3165 would then be repurposed as the DAAF storage and grounds maintenance facility for the Airfield Division and Garrison.

Project 23 – Construct Perimeter Road Multi-Purpose Trail

Project 23 would build an 8-foot wide multi-purpose trail adjacent to Santjer Road on the north and east sides of the airfield and along Britten Drive on the airfield's south side. The trail would provide an off-road facility for physical training, bicycling, troop movements, and general connectivity between facilities for DAAF personnel. The trail would be paved. Collectively, the trail segments would have a length of 9,250 feet and a total area of 74,000 square feet (1.7 acres).

Project 24 – Construct Alternative Perimeter Road

If determined necessary by future operational and/or security requirements, **Project 24** would build a new segment of the airfield perimeter road along the southwestern side of DAAF up to 500 feet southwest of Britten Drive. An access road would also be built as part of this project to facilitate access from the new perimeter road to Britten Drive in the vicinity of Building 3146. Collectively, the new road segments would be paved with asphalt and would have a length of 8,083 feet and an area of 323,320 square feet (7.4 acres), assuming a 24-foot right of way with 8-foot paved shoulders on each side of the new road segments.

2.2 Alternatives Development and Evaluation Process

2.2.1 Courses of Action Considered during the ADP Process

2.2.1.1 Relocating All or Selected Missions

During development of the ADP, the Army considered alternatives that would accommodate the requirements of DAAF's tenants by relocating all or some of them to adequately sized facilities at other DoD installations in the NCR. Because the missions of DAAF's tenants are specific to their location in the NCR, relocating them to installations outside that region would not be practicable. Thus, alternatives that would potentially relocate DAAF tenants to installations outside the NCR were dismissed from consideration by the Army and are not considered in this EIS. Such alternatives would not adequately meet screening criteria developed by the Army to evaluate alternatives considered for analysis in this EIS (**Section 2.2.2.1**), as location within the NCR is essential to the mission of DAAF's tenants.

Within the NCR, at a minimum, any relocation of DAAF tenants would require moving TAAB and its subordinate units (Airfield Division, 12th AV BN, OSA-A/OSACOM) to the same installation, as their missions are closely interrelated. These units constitute the largest tenants at DAAF with respect to the number of assigned personnel and aircraft. Therefore, they collectively represent the largest demand for functional space on the airfield as prescribed by DoD requirements.

The Army reviewed applicable requirements for DAAF tenants as a whole as well as for TAAB, its subordinate units, and DCARNG collectively. The requirements were then compared to available functional space at other installations in the NCR. Based on this review, the Army determined that sufficient space to accommodate DAAF tenants in their entirety or TAAB and its subordinate units collectively is unavailable at a single NCR installation. Therefore, such alternatives were dismissed from consideration early in the planning process and are not considered in the EIS (**Section 2.2.2.1**).

The Army also considered relocating other tenant units to other DoD installations. Although NVESD is a comparatively small tenant at DAAF in terms of number of assigned personnel and aircraft, any relocation of the NVESD activities and personnel currently at DAAF would physically separate them from the organization's main facilities in Fort Belvoir's 300 Area on South Post or require moving all NVESD functions and personnel from Fort Belvoir to a new location. Neither option would be practicable. Relocating NVESD's airfield operations alone would adversely affect NVESD's mission, while moving the entire organization would be a disproportionate effort that would unnecessarily disrupt its work.

CAP has a minimal footprint at DAAF and while relocating it would likely be feasible, the effort involved and resulting benefits would be outweighed by the practicality of keeping it at DAAF. In addition, relocating FES individually is not a practicable alternative either, as it is critical to supporting the operations and safety of all other DAAF tenants.

Thus, the Army dismissed alternatives to relocate the smaller tenants early in the ADP process and such alternatives are not considered in this EIS, as they could not adequately meet screening criteria developed by the Army (**Section 2.2.2.1**).

2.2.1.2 DAAF Courses of Action

The Army considered several COAs to address the needs and requirements of DAAF's tenants during a multi-day planning workshop (**Section 1.3**). Various potential COAs (i.e., future airfield configurations) were outlined and assessed through an iterative process that considered both the intensity of redevelopment ("Traditional," "Moderate," or "Aggressive") and the distribution of facilities on the airfield (north or south of the runway). Throughout, the focus was on balancing modernizations, new construction, and demolitions in a manner that:

- Meets all tenants' requirements;
- Fulfills the Airfield's vision to create "a safe, secure, sustainable, consolidated aviation complex that allows for mission growth and provides multiple services in a compact campus;" and
- Removes obstructions from the Primary and Transitional Surfaces and eliminates the requirement for as many airfield safety waivers as possible.

The list of projects included in the proposed ADP (Preferred COA) emerged from this process as the only COA that adequately accommodates these requirements.

The primary factor in developing the Preferred COA was the need to consolidate the 12th AV BN in one location, while also accommodating the other tenants and removing obstructions from the Primary and Transitional Surfaces, thereby eliminating the need for airfield waivers. Because of existing development patterns at the airfield, only two potential locations for a consolidated 12th AV BN complex appeared potentially feasible: in the southwest corner (vicinity of Building 3151, or South Flightline Option) or in the northeast part of the airfield (vicinity of Building 3232, or North Flightline Option). Both options had substantial limitations. To avoid penetrating the Transitional Surface, any new buildings in the southwest corner of the airfield would have to be built into the wooded hillside that currently separates the airfield from the adjacent residential neighborhood, requiring extensive excavation and bringing airfield operations substantially closer to the nearby residences. Alternatively, much of the northeastern portion of DAAF is within the floodplain associated with Accotink Creek.

Both the South Flightline Option and the North Flightline Option were considered during the ADP workshop. It was determined that in addition to the constraints summarized above, the South Flightline Option could not provide enough space to accommodate the 12th AV BN's aircraft parking needs, eliminating the southwest corner as a potential site for the unit's consolidated complex. Therefore, only the North Flightline Option was retained for further consideration. In turn, locating the 12th AV BN complex in the northeastern part of the airfield limited the range of options to accommodate the needs of the other tenants, leading to the development of the Preferred COA identified in the ADP.

The alternatives considered when preparing this EIS are based on the Preferred COA.

2.2.2 EIS Alternatives and Identification of the Preferred Alternative

2.2.2.1 Screening Criteria

CEQ's regulations for implementing NEPA establish a number of policies for federal agencies, including using the NEPA process "…to identify and assess the reasonable alternatives to proposed actions that will avoid or minimize adverse effects of these actions upon the quality of the human environment" (40 CFR § 1500.2[e]).

The Army developed screening criteria to assess whether an alternative would meet its purpose and need, and therefore could be considered reasonable. These criteria were used to determine the range of reasonable alternatives to be assessed in the EIS:

1. Alternatives must constitute a complete, coherent program that adequately accommodates the space and functional needs of all DAAF tenants consistent with applicable DoD requirements and the airfield's vision to create a safe, secure, sustainable, and consolidated aviation complex.
2. Recognizing that uncertain funding and changing priorities over the 30-year horizon of the ADP may affect the timing and extent of the plan's implementation, reasonable alternatives may allow for only partial implementation of the ADP projects, but must not preclude their potential full implementation.

3. As consistent as possible with the two previous criteria, reasonable alternatives must remove existing facilities in the airfield Primary Surface and Transitional Surface that require waivers for their continued operation.

Based on these criteria, and following consideration of multiple alternatives for meeting the Army's purpose and need, two alternatives were selected for evaluation in the EIS: the Full Implementation Alternative and the Partial Implementation Alternative (**Section 2.2.2.3** and **Section 2.2.2.4**, respectively).

The No Action Alternative (**Section 2.2.2.5**) does not meet the screening criteria presented above. However, it is evaluated in this EIS consistent with CEQ guidance to provide a baseline against which impacts of the Full Implementation and Partial Implementation alternatives can be compared.

Table 2.2-1 summarizes the alternatives analyzed in this EIS. Alternatives that were initially considered by the Army but dismissed from further evaluation in the EIS are discussed in **Section 2.2.3**.

Table 2.2-1: EIS Alternatives

ADP Project Phase	Alternative		
	No Action	Full Implementation	Partial Implementation
Short-Range Projects (next 10 years)	None	All (**Projects 1-9**)	All (**Projects 1-9**)
Mid-Range Projects (11 to 20 years from now)	None	All (**Projects 10-18**)	Partial (**Project 10** and **Projects 14-18**)
Long-Range Projects (21 to 30 years from now)	None	All (**Projects 19-24**)	None

2.2.2.2 Preferred Alternative

Based on consideration of DoD and DAAF tenant mission requirements, the analysis presented in this EIS, and stakeholder comments received during the NEPA process, the Army has selected the Full Implementation Alternative as its **Preferred Alternative** to implement the Proposed Action. The Full Implementation Alternative would implement the complete suite of 24 projects recommended in the DAAF ADP, thereby meeting the Proposed Action's purpose and need by accommodating the space and functional needs of all DAAF tenants consistent with applicable DoD requirements, removing all facilities within the airfield's Primary and Transitional Surfaces that require temporary safety waivers to operate, and fulfilling the airfield's vision to create a safe, secure, sustainable, and consolidated aviation complex. Other alternatives considered by the Army would not address DoD and DAAF tenant mission requirements as comprehensively as the Full Implementation Alternative.

2.2.2.3 Full Implementation Alternative (Preferred Alternative)

The Full Implementation Alternative (**Figures 2.2-1** through **2.2-4**[2]) would implement **Projects 1** through **24** (**Sections 2.1.1** through **2.1.3**). This is the complete list of projects identified in the DAAF ADP. The Full Implementation Alternative is the Army's **Preferred Alternative** for implementing the Proposed Action (**Section 2.2.2.2**).

The following summarizes the Full Implementation Alternative by tenant or type of project:

12th AV BN

All operations and storage, maintenance, and administrative functions of the 12th AV BN would be consolidated to a new complex located on the north side of the airfield. This would involve:

- Modernizing Building 3151, D Company Hangar (**Project 3**) and Building 3232, C Company Hangar (**Project 4**).
- Realigning and extending Santjer Road and Gavin Road, respectively (**Project 5**).
- Building an 8-bay helicopter maintenance hangar (**Project 6**), including 300,000 square feet of new parking apron and POV parking lot.
- Building separate 10-bay and 4-bay aircraft storage hangars (**Projects 11** and **12**, respectively).
- Building an aircraft paint booth (**Project 13**) adjacent to the new 8-bay helicopter maintenance hangar.

NVESD

NVESD would be initially relocated to Building 3151 (**Project 17**) and would ultimately relocate to a new aircraft and flight equipment building that would be built on the southern side of the airfield to support all NVESD operations at DAAF (**Project 20**).

DCARNG

Existing DCARNG facilities would be upgraded by renovating Buildings 3121 and 3123 (**Projects 1** and **14**, respectively).

OSA-A/OSACOM

OSA-A/OSACOM facilities at DAAF would be upgraded by renovating the existing OSA-A/OSACOM facilities (Buildings 3145 and 3165) (**Projects 2** and **16**) in the short and mid-range; and building a new OFD aircraft maintenance hangar (**Project 21**) and a new administrative facility (**Project 22**) in the long-range.

[2] **Figures 2-1** through **2-3** show projects by project type against a base map of existing conditions; **Figure 2-4** shows the final configuration of the airfield under this alternative.

Figure 2.2-1: Full Implementation Alternative (Preferred Alternative) – Facility Demolitions

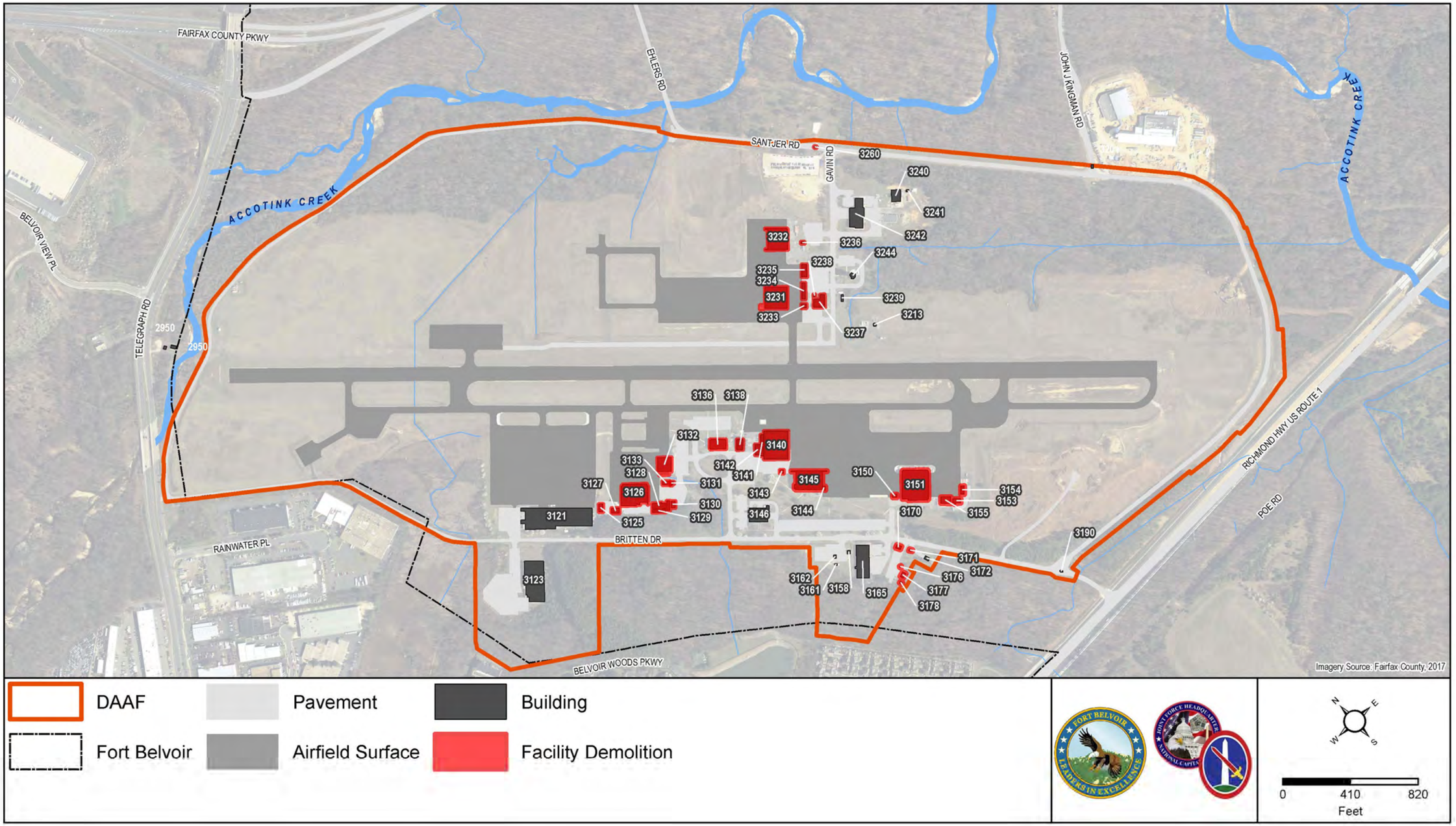

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Figure 2.2-2: Full Implementation Alternative (Preferred Alternative) – Facility Modernization and New Construction

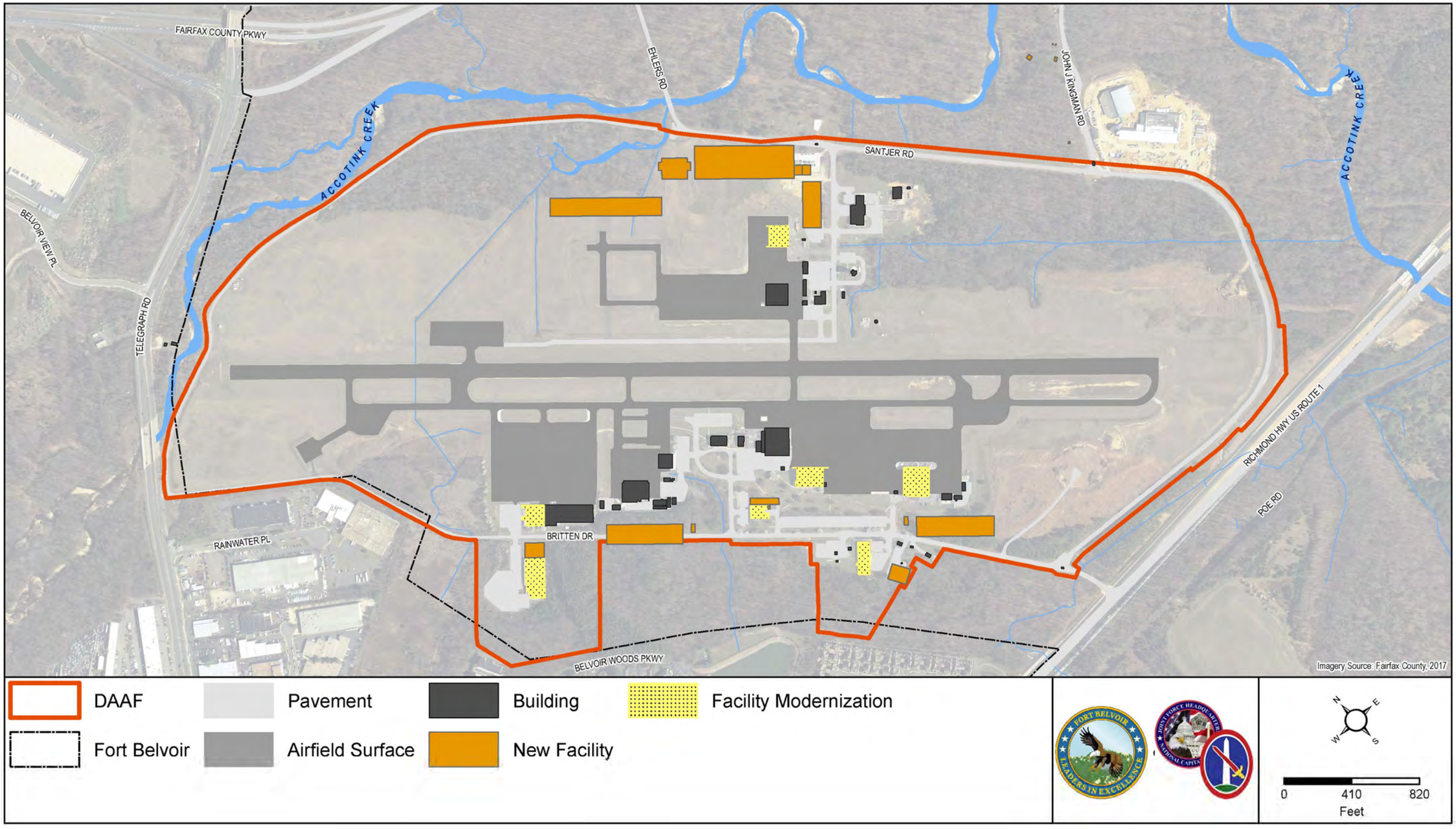

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Figure 2.2-3: Full Implementation Alternative (Preferred Alternative) – New Pavement

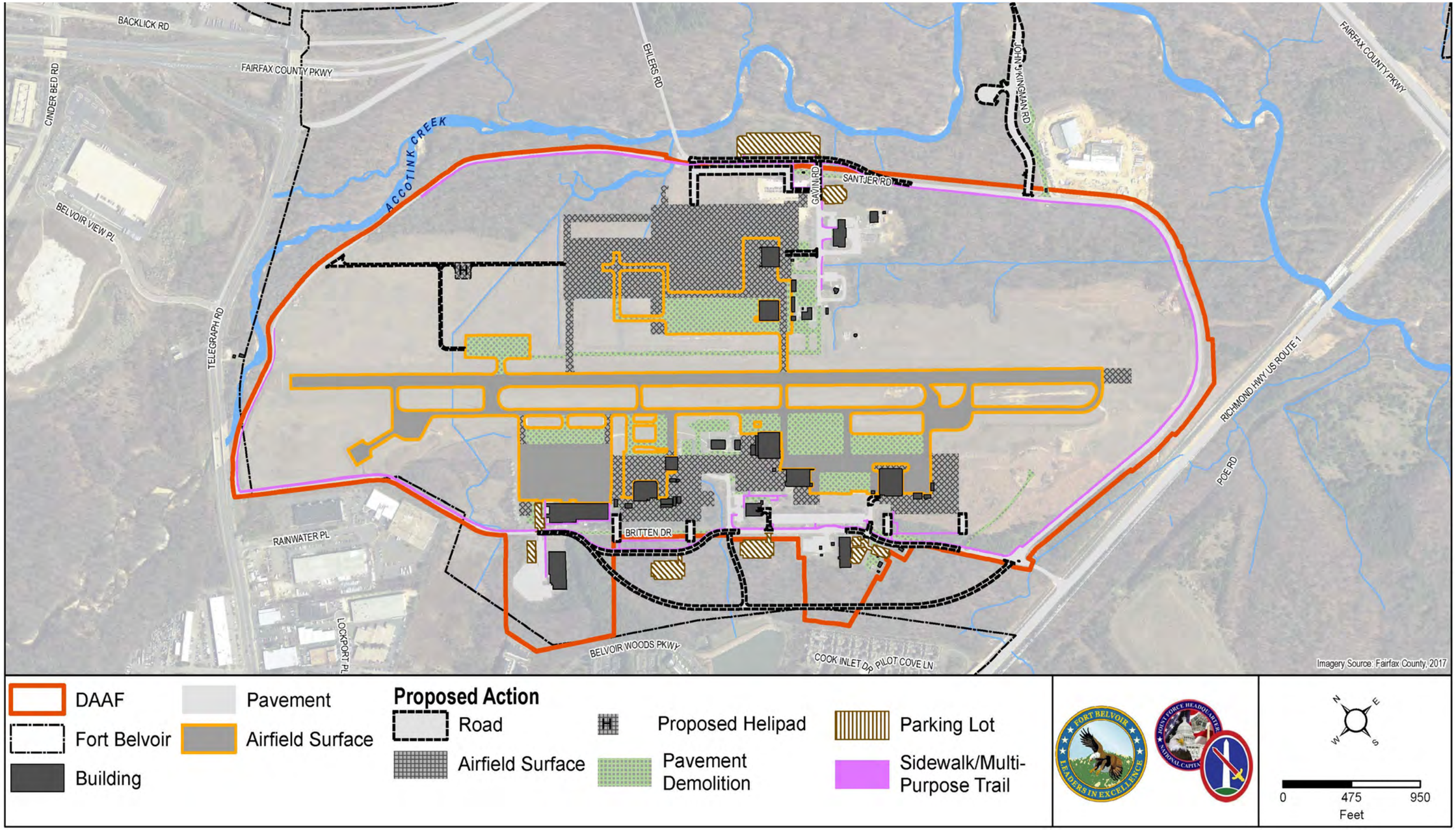

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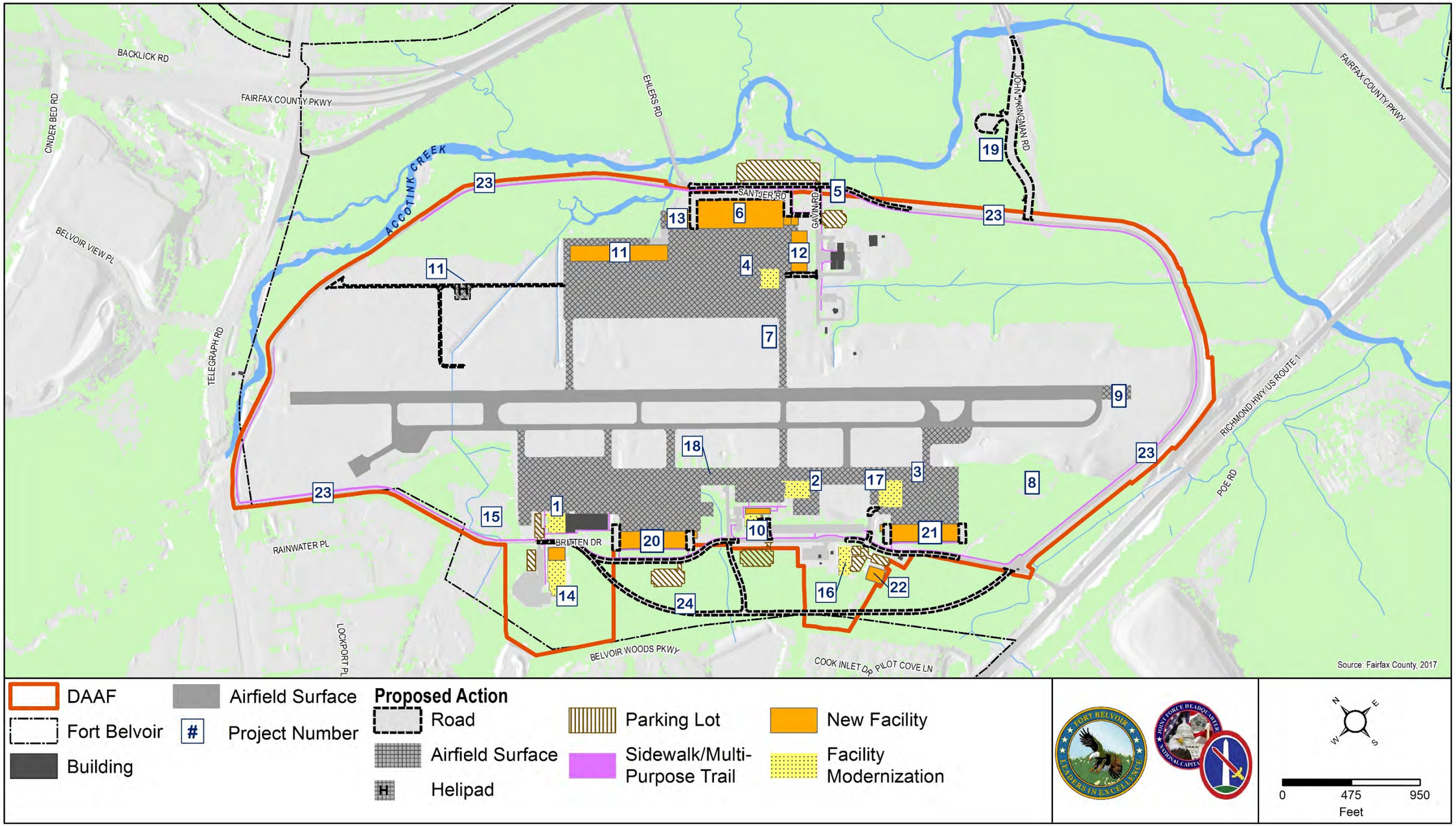
Figure 2.2-4: Full Implementation Alternative (Preferred Alternative) – End State



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Airfield Division

Airfield Division facilities at DAAF would be upgraded by relocating the group into a renovated and expanded Building 3146 (**Project 10**), along with fuel testing and Flight Control Tower (FCT) maintenance functions.

CAP

CAP activities would be relocated to Building 3146 (**Project 10**).

Facility Demolitions

In association with several projects in the Full Implementation Alternative, 37 buildings at DAAF would be demolished to remove facilities that partially obstruct the airfield's Primary and Transitional Surfaces and currently require airfield waivers, and/or would be redundant or no longer needed once new facilities have been built to replace them (**Section 2.2.2.6**). All buildings currently requiring temporary waivers would be removed under this alternative, with the exception of Building 3213 (Instrument Landing System) and Building 3239 (Airfield Landing Equipment Vault), which directly support runway operations and cannot be relocated.

Other Infrastructure Improvements

To improve access, circulation, and safety on the airfield, the following projects would be implemented:

- A 12,980-square-foot (0.3-acre) aircraft taxiway would be built (**Project 7**) to connect the new 12th AV BN hangar and expanded aircraft parking apron (**Project 6**) to the airfield's runway.
- An earthen knoll in the southeastern end of the airfield would be excavated, leveled, and graded to eliminate the knoll's intrusion into the airfield's Transitional Surface (**Project 8**).
- A 200-foot paved safety overrun would be built at the southeastern end of the airfield's runway (**Project 9**).
- An 8,730-square-foot aircraft wash rack would be built for the DCARNG to the northwest of Building 3121 (**Project 15**).
- The aircraft parking apron on the southwestern side of the runway would be expanded by approximately 440,653 square feet (10.1 acres) (**Project 18**).
- The airfield entrance gate on John J. Kingman Road would be upgraded (**Project 19**).
- Britten Drive would be realigned to the southwest (as part of **Project 20**).
- A perimeter road multi-purpose trail would be constructed adjacent to Santjer Road (**Project 23**).
- An alternative perimeter road would be constructed (**Project 24**).

2.2.2.4 Partial Implementation Alternative

The Partial Implementation Alternative would implement a modified, reduced program of ADP projects at DAAF. These projects would consist of **Projects 1** through **10** and **14** through **18** (**Figures 2.2-5** through **2.2-8**[3]). They would include the consolidation of the 12th AV BN to the northeastern side of the airfield; relocation and consolidation of NVESD to existing facilities made available by the 12th AV BN's consolidation; and modernization or expansion of select existing facilities. All tenants other than the 12th AV BN and NVESD would remain at their respective current locations for the foreseeable future. The Partial Implementation Alternative would amount to implementing all the short-range and mid-range projects except the 12th AV BN's 10-bay and 4-bay storage hangars and paint booth (**Projects 11**, **12**, and **13**, respectively), along with some adjustments to the remaining projects. None of the long-range projects would be implemented.

The Partial Implementation Alternative would not address DAAF's tenants' requirements as comprehensively as the Full Implementation Alternative (Preferred Alternative) since it would not provide enough additional space to address OSA-A/OSACOM's deficit. However, it would substantially improve conditions and adequately fulfill the airfield's vision to create a safe, secure, sustainable, and consolidated aviation complex. It would not preclude later implementation of those mid-range and long-range projects not included in the alternative (in which case, further NEPA documentation would be prepared as applicable) and it would remove most buildings requiring waivers because they partially obstruct the airfield's Primary and Transitional Surfaces. Relative to the Full Implementation Alternative (Preferred Alternative), only two additional temporary waivers (for Buildings 3145 and 3151, which pierce the Transitional Surface) would remain in effect under the Partial Implementation Alternative.

The Partial Implementation Alternative is briefly summarized below by tenant or type of project:

12th AV BN

All operations and storage, maintenance, and administrative functions of the 12th AV BN would be consolidated in a new complex located on the northeast side of the airfield. This new complex would be reduced relative to what is proposed in the Full Implementation Alternative (Preferred Alternative) and involves:

- Renovating Building 3151, D Company Hangar (**Project 3**) and Building 3232, C Company Hangar (**Project 4**).
- Realigning and extending Santjer Road and Gavin Road, respectively (**Project 5**).

[3] **Figures 2.2-5** through **2.2-7** show projects by project type against a base map of existing conditions; **Figure 2.2-8** shows the final configuration of the airfield under this alternative.

Figure 2.2-5: Partial Implementation Alternative – Facility Demolitions

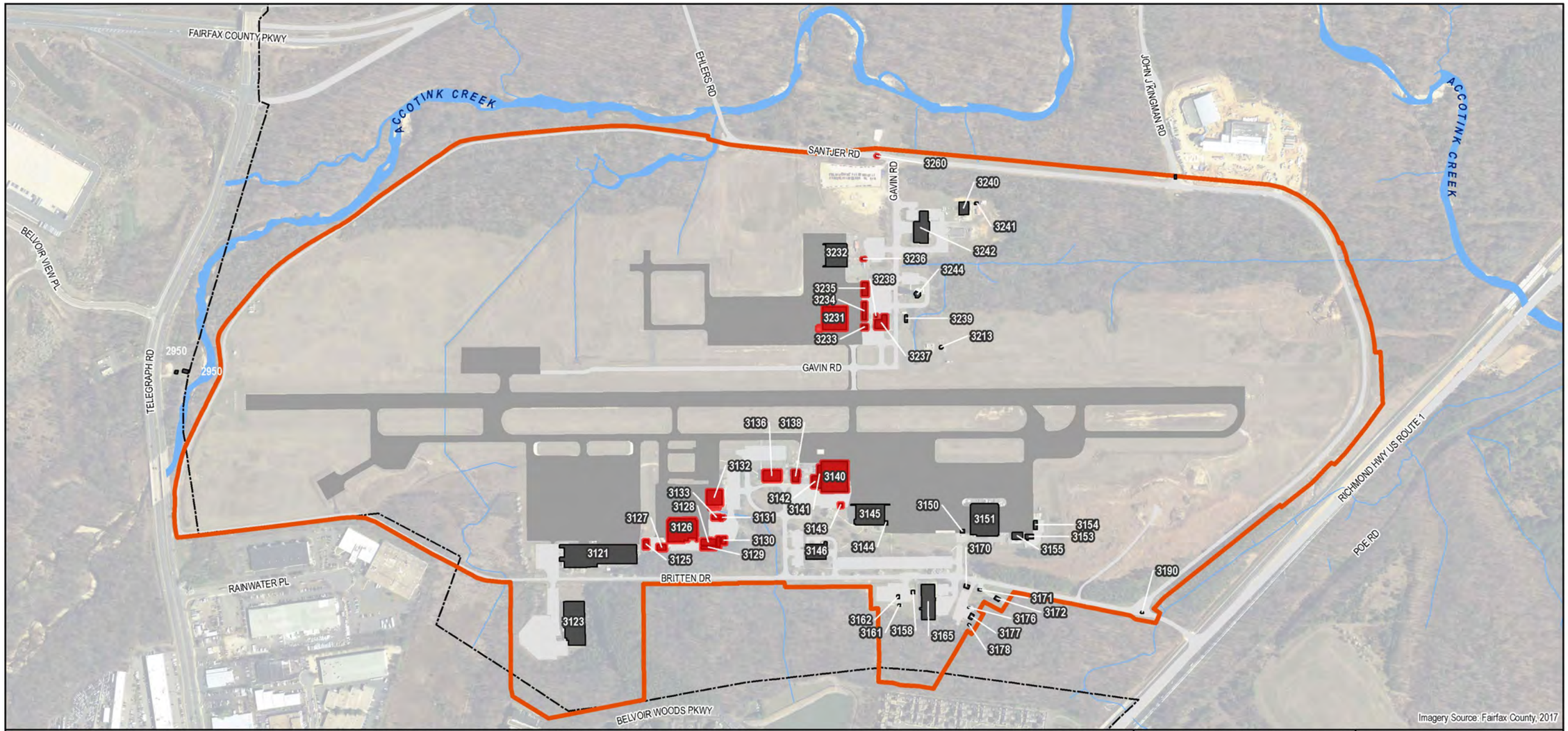

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Figure 2.2-6: Partial Implementation Alternative – Facility Modernization and New Construction

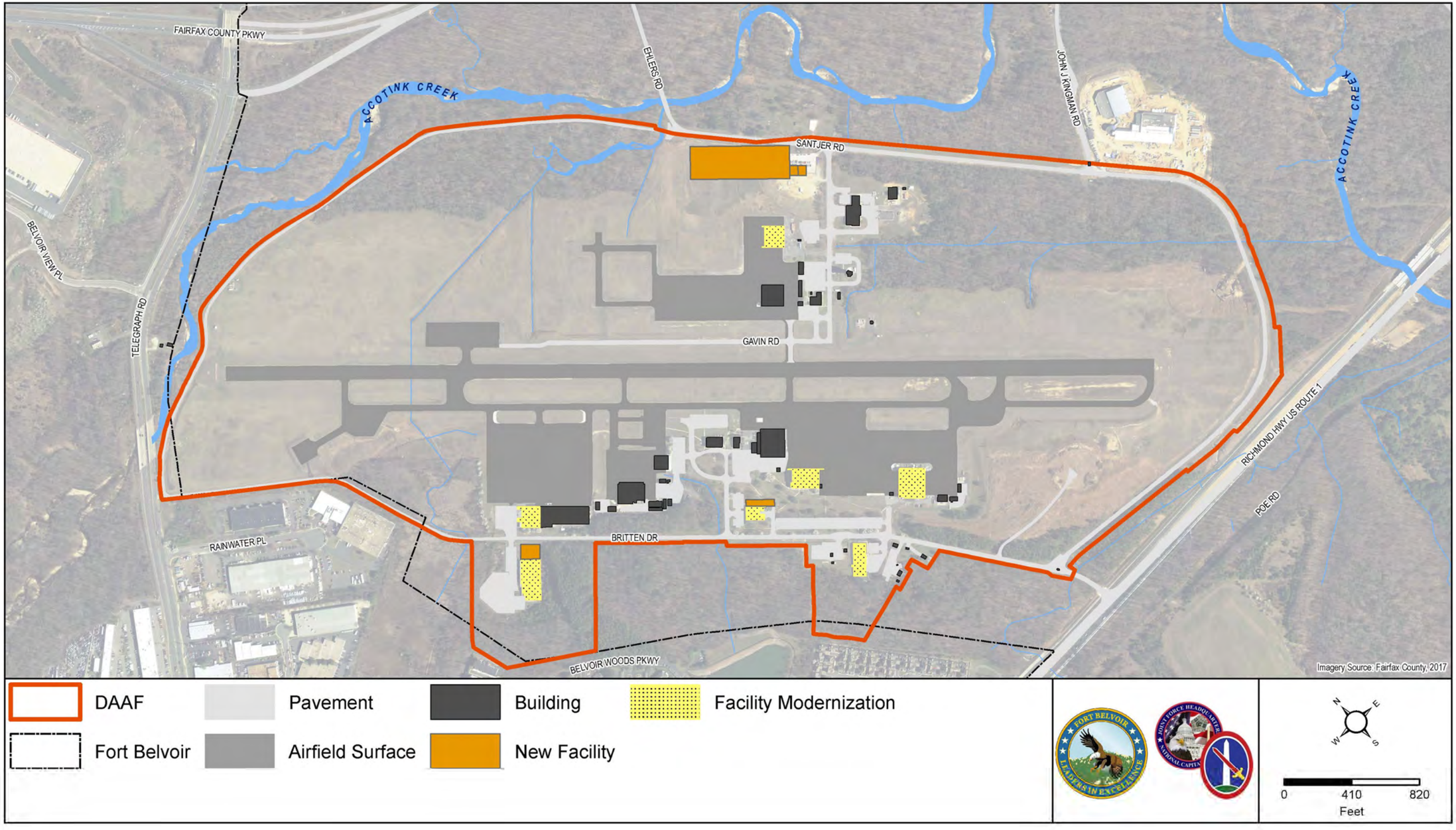

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Figure 2.2-7: Partial Implementation Alternative – New Pavement

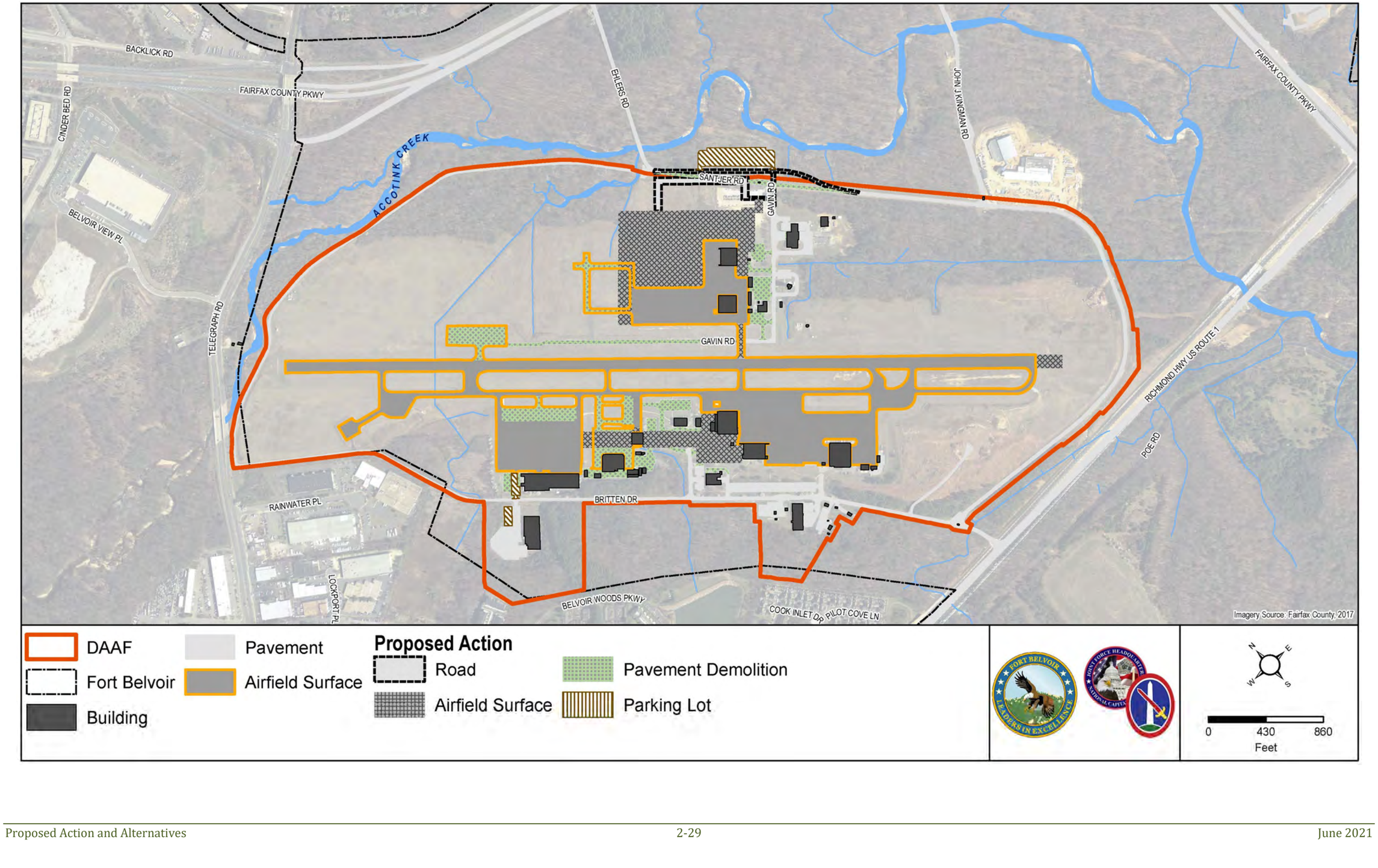

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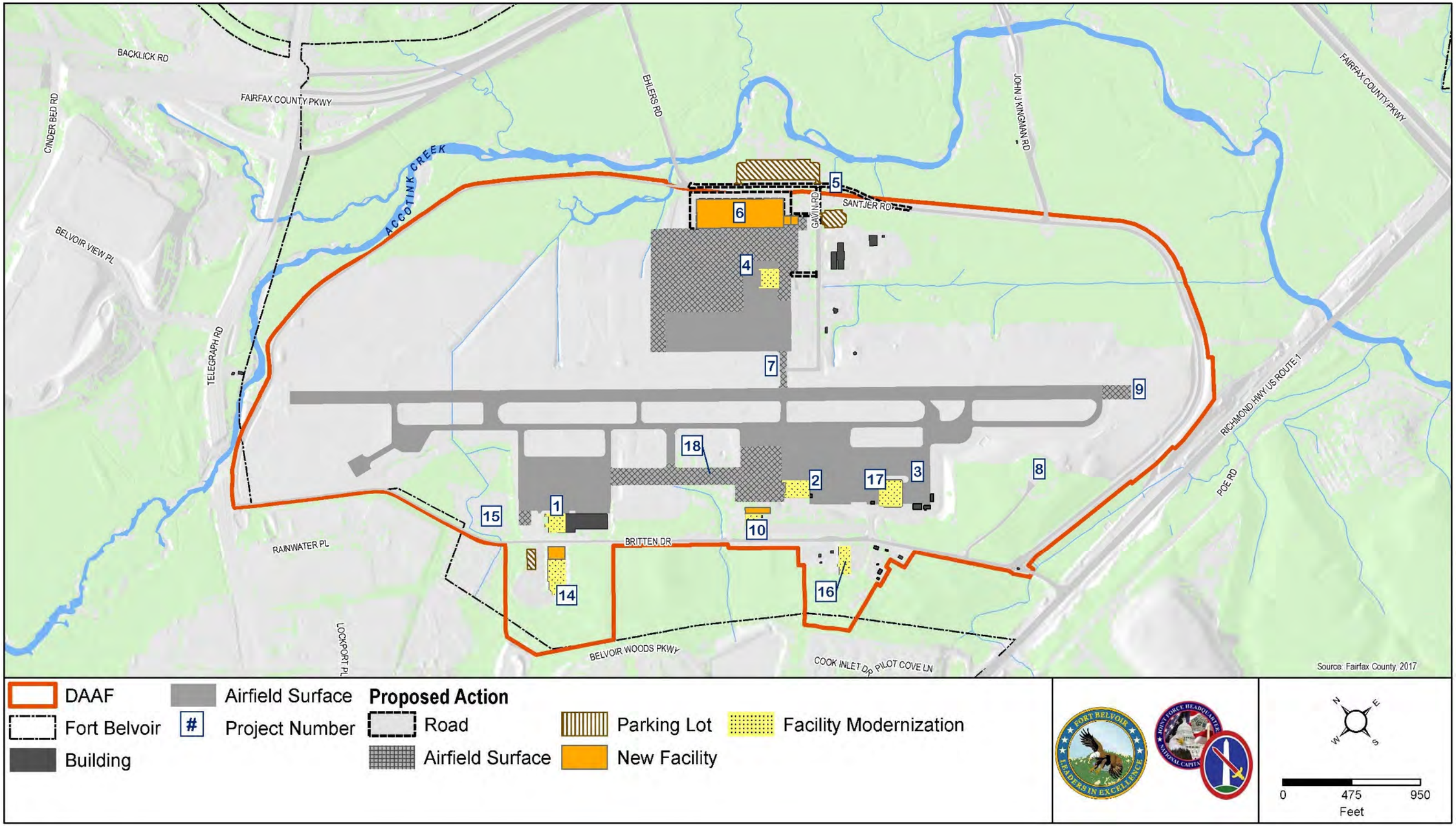
Figure 2.2-8: Partial Implementation Alternative – End State



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- Building an 8-bay, 135,500-square-foot aircraft maintenance hangar for the 12th AV BN on the northeast side of the airfield (**Project 6**). No other new aircraft storage hangars and no paint booth would be built. Building 3232 would be used for the indoor storage of VH-60 Black Hawk helicopters. The aircraft parking apron on the northeast side of the airfield would be extended by approximately 510,959 square feet (11.7 acres) to connect the new 8-bay hangar to the runway and provide space for the storage of aircraft that could not be stored in Building 3232. Approximately 313,632 square feet (7.2 acres) of paved areas on the northeast side of the airfield, including portions of the existing aircraft parking apron and adjacent taxiways, would be demolished. A 100 by 100-foot helipad (similar to that included in **Project 11**) would be constructed.

NVESD

NVESD would relocate to Building 3151 (**Project 17**).

DCARNG

The existing DCARNG facilities would be upgraded by renovating Buildings 3121 and 3123 (**Projects 1** and **14**, respectively).

OSA-A/OSACOM

OSA-A/OSACOM facilities at DAAF would be upgraded by renovating the existing OSA-A/OSACOM facilities (Buildings 3145 and 3165) (**Projects 2** and **16**) and continue to operate from these existing facilities.

Airfield Division

Airfield Division facilities at DAAF would be upgraded by renovating and expanding Building 3146 (**Project 10**) and relocating fuel testing and FTC maintenance functions into the expanded Building 3146.

CAP

CAP activities would relocate to Building 3146 (**Project 10**).

Facility Demolitions

In association with select projects, 24 buildings would be demolished to remove facilities that partially obstruct the airfield's Primary and Transitional Surfaces and currently require airfield waivers, and/or would become redundant or no longer needed once new facilities have been built to replace them (**Section 2.2.2.6**). Under this alternative, with the exception of Building 3213 (Instrument Landing System), Building 3239 (Airfield Landing Equipment Vault), Building 3145, and Building 3151, all buildings requiring airfield waivers would be removed.

Other Infrastructure Improvements

To improve access, circulation, and safety on the airfield, the following projects would be implemented:

- A 12,938-square-foot (0.3-acre) aircraft taxiway would be built (**Project 7**) to connect the new 12th AV BN hangar and expanded aircraft parking apron (**Project 6**) to the airfield's runway.
- An earthen knoll in the southeastern end of the airfield would be excavated, leveled, and graded to eliminate the knoll's intrusion on the airfield's Transitional Surface (**Project 8**).
- A 200-foot paved safety overrun would be built at the southeastern end of the airfield's runway (**Project 9**).
- An 8,730-square-foot aircraft wash rack would be built for the DCARNG to the northwest of Building 3121 (**Project 15**).
- The aircraft parking apron on the southwestern side of the runway would be expanded by approximately 225,089 square feet (5.2 acres) (**Project 18**).

2.2.2.5 No Action Alternative

Under the No Action Alternative, none of the proposed ADP projects would be implemented. Current conditions at DAAF would continue for the foreseeable future. Facilities partially obstructing the airfield's Primary and Transitional Surfaces would continue to operate under multiple temporary waivers.

The No Action Alternative does not meet the screening criteria developed by the Army (**Section 2.2.2.1**). However, it is analyzed in this EIS in accordance with NEPA to provide a baseline against which the impacts of the Full Implementation Alternative (Preferred Alternative) and Partial Implementation Alternative can be measured.

2.2.2.6 Summary of Full Implementation Alternative (Preferred Alternative) and Partial Implementation Alternative Projects

Table 2.2-2 presents a side-by-side summary of the ADP projects included in the Full Implementation Alternative (Preferred Alternative) and Partial Implementation Alternative, respectively. Facility demolitions included in these alternatives are summarized in **Table 2.2-3**. (Under the No Action Alternative, none of the projects would be implemented and no facilities would be demolished.)

Table 2.2-2: Summary of Full Implementation Alternative (Preferred Alternative) and Partial Implementation Alternative

Project No.	Project	Alternative	
		Full Implementation (Preferred Alternative)	Partial Implementation
Short-Range ADP Projects			
1	Modernize Building 3121, DCARNG Airfield Operations Section	X	X
2	Modernize Building 3145, OSA-A/OSACOM Hangar	X	X
3	Modernize Building 3151, 12th AV BN D Company Hangar	X	X
4	Modernize Building 3232, 12th AV BN C Company Hangar	X	X
5	Realign Santjer Road and Gavin Road	X	X
6	Construct 12th AV BN 8-Bay Aircraft Maintenance Hangar	X	X
7	Construct North Taxiway Connection	X	X
8	Remove Earthen Knoll	X	X
9	Construct Runway Safety Overrun	X	X
Mid-Range ADP Projects			
10	Modernize and Expand Building 3146	X	X
11	Construct 12th AV BN 10-Bay Storage Hangar	X	
12	Construct 12th AV BN 4-Bay Storage Hangar and Secondary Parking Lot	X	
13	Construct 12th AV BN Aircraft Paint Shop	X	
14	Modernize and Expand Building 3212, DCARNG Readiness Center	X	X
15	Construct DCARNG Aircraft Wash Rack	X	X
16	Modernize Building 3165, OSA-A/OSACOM Operations Facility	X	X
17	Relocate NVESD	X	X
18	Expand Aircraft Parking Apron	X	X
Long-Range ADP Projects			
19	Replace Farrar Gate Access Control Point and Install Redundant Communications Line	X	
20	Construct NVESD Hangar	X	
21	Construct OSA-A / OSACOM Operational Flight Division Hangar	X	
22	Construct OSA-A/OSACOM Operations Facility	X	
23	Construct Perimeter Road Multi-Purpose Trail	X	
24	Construct Alternative Perimeter Road	X	

Table **2.2-3: Proposed Facility Demolitions**

Project No.	Project	Building No.	Building Area (Square feet)	Alternative	
				Full Implementation (Preferred Alternative)	Partial Implementation
Short-Range ADP Projects					
5	Realign Santjer Road and Gavin Road	3260	171	X	X
6	Construct 12th AV BN 8-Bay Aircraft Maintenance Hangar	3138	2,381	X	X
		3140	25,365	X	X
		3141	2,600	X	X
		3142	2,164	X	X
		3143	Not Applicable (N/A)	X	X
		3149	N/A	X	X
		3233	793	X	X
		3234	2,170	X	X
		3235	4,596	X	X
		3236	200	X	X
		3237	4,152	X	X
		3238	143	X	X
Mid-Range ADP Projects					
10	Modernize and Expand Building 3146	3136	12,832	X	X
11	Construct 12th AV BN 10-Bay Storage Hangar	3231	19,882	X	X
12	Construct 12th AV BN 4-Bay Storage Hangar and Secondary Parking Lot	3232	17,216	X	

Table 2.2-3: Proposed Facility Demolitions (con't.)

Project No.	Project	Building No.	Building Area (Square feet)	Alternative	
				Full Implementation (Preferred Alternative)	Partial Implementation
17	Relocate NVESD	3125	969	X	X
		3126	19,158	X	X
		3127	1,527	X	X
		3128	2,647	X	X
		3129	1,343	X	X
		3130	986	X	X
		3131	345	X	X
		3132	8,581	X	X
		3133	946	X	X
Long-Range ADP Projects					
20	Construct NVESD Hangar	3150	320	X	
		3151	34,648	X	
		3153	1,584	X	
		3154	1,122	X	
		3155	2,700	X	
21	Construct OSA-A / OSACOM Operational Flight Division Hangar	3144	390	X	
		3145	23,004	X	
		3170	609	X	
		3171	232	X	
22	Construct OSA-A/OSACOM Operations Facility	3176	80	X	
		3177[1]	732	X	
		3178[1]	200	X	
Total square footage of **Full Implementation Alternative (Preferred Alternative)** demolitions			**196,788**	--	--
Total square footage of **Partial Implementation Alternative** demolitions			**113,951**	--	--

Note:
1. Buildings 3177 and 3178 are identified as temporary facilities in Fort Belvoir Real Property data.

2.2.3 Alternatives Dismissed from Consideration in the EIS

2.2.3.1 Alternatives Incorporating a Different Subset of Projects

Under Screening Criterion 1, reasonable alternatives must adequately address DAAF tenants' needs and requirements consistent with the Army's purpose and need and the airfield's vision for its development. Because of the multiplicity of tenants, the need to keep their respective facilities collocated, and the requirement to remove facilities from the Primary and Transitional Surfaces and eliminate as many temporary airfield waivers as possible; and because several projects are connected and interdependent, the number of potential combinations of projects that would constitute a reasonable alternative is limited. For this reason, the Partial Implementation Alternative, as described above, is the minimal combination that would adequately meet DAAF tenants' requirements.

While implementing the short-range projects only would improve conditions at DAAF, such an alternative would fall short of Screening Criterion 1, as three tenant units would have their needs and requirements either unmet or minimally addressed. None of NVESD's requirements would be addressed under such an alternative and while some improvements would be made to the existing DCARNG facility (Building 3121) under **Project 1** and to the OSA-A hangar (Building 3145) under **Project 2**, this would be far from adequately addressing these units' needs. A short-range-projects-only alternative would also eliminate none of the buildings currently penetrating the runway's Transitional Surface.

By adding several mid-range projects to the short-range ones, the Partial Implementation Alternative addresses NVESD's requirements by relocating the organization to a renovated facility (**Project 17**), also allowing for the elimination of two more temporary airfield waivers; better addresses OSA-A/OSACOM's needs (**Project 16**); and fully addresses the needs of the DCARNG (**Projects 14** and **15**). As such, it was deemed to adequately meet the screening criteria.

An alternative that would only add **Project 17** to the short-range projects would at least partially address the needs and requirements of all tenants. Such an alternative would amount to the Partial Implementation Alternative minus **Projects 13** through **16** and **Project 18**. However, Projects 13 through **16** and **Project 18** would be constructed in already developed portions of the airfield and, as such, can be anticipated to result in minimal impacts. Therefore, the potential impacts of this alternative would not be substantially less than those of the Partial Implementation Alternative. Since alternatives as defined in 40 CFR 1500.2(e) are those "that will avoid or minimize adverse effects," for NEPA analysis purposes, an alternative that would include only the short-range projects plus **Project 17** would not be substantially different from the Partial Implementation Alternative, while it would leave two tenant units with minimally improved facilities. Therefore, it is not considered a reasonable alternative and is not analyzed in this EIS.

The Partial Implementation Alternative represents the minimum alternative that would adequately meet the Army's purpose and need and the screening criteria, and thus the lower range of potential impacts. Conversely, the Full Implementation Alternative (Preferred Alternative) represents an optimal solution and the upper range of potential impacts. Thus, the alternatives considered in this EIS cover the

full range of potential impacts from the Proposed Action and no further alternatives were retained for detailed analysis.

2.2.3.2 Alternatives Avoiding Construction in the Floodplain

Part of the proposed 12th AV BN consolidated complex (**Projects 6** and **11** through **13**) would be constructed in the 100-year floodplain associated with Accotink Creek (**Section 2.1.1** and **Section 2.1.2**, respectively). During the development of the ADP, the Army sought ways to site the needed facilities entirely outside the floodplain while still adequately addressing the requirements of DAAF's tenants. As explained above, because of the lack of space to the southeast of the runway to accommodate the consolidated complex, it had to be sited to the northwest of the runway. The complex also had to be sited a sufficient distance from the runway to avoid violating the restrictions applying in the Primary and Transitional Surfaces. These two constraints together made it unfeasible to site the proposed complex entirely outside the floodplain. Alternatives that would entirely avoid affecting the floodplain would not adequately address the requirements of the 12th AV BN and would fail to fulfill Screening Criteria 1 and 3. Therefore, any such alternatives would not meet the Army's purpose and need and are not analyzed in this EIS.

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3 Affected Environment

3.1 Introduction

This chapter describes the existing conditions of resources that may be affected by the implementation of the Proposed Action. The following resources are addressed:

- Land use, including aesthetics and coastal zone management
- Historic and cultural resources
- Air quality
- Noise
- Geology, topography, and soils
- Water resources
- Biological resources
- Health and safety
- Hazardous materials and waste

The introduction to each resource section defines the resource(s) under evaluation and establishes the study area. The extent of the study area, hereafter referred to as a region of influence (ROI) in this EIS, varies with the aspect of the resource considered. In general, it consists of the individual project sites and their surroundings; however, a larger or smaller area may be considered when appropriate. As applicable, this chapter also describes the methodology used to evaluate resources.

3.1.1 Resources Eliminated from Further Analysis

In accordance with the CEQ Regulations, Fort Belvoir used the EIS scoping process, a review of applicable environmental documentation, and an analysis of the scope and components of the Proposed Action by qualified technical subject matter experts to "identify and eliminate from detailed study the issues which are not significant, or which have been covered by prior environmental review (40 CFR Part 1506.3)." Through this process, Fort Belvoir determined that the resources discussed below could be dismissed from an in-depth evaluation in this EIS, "narrowing the discussion of these issues in the statement [EIS] to a brief presentation of why they will not have a significant effect on the human environment or providing a reference to their coverage elsewhere" (40 CFR Part 1501.7(a)(3)). The resources eliminated from further analysis and the rationale for their dismissal in accordance with 40 CFR Part 1501.7(a)(3) are described in the following sub-sections.

3.1.1.1 Socioeconomics

The Proposed Action does not include substantial changes in the number of personnel at DAAF. Further, any unanticipated increase in personnel associated with the Proposed Action would not exceed the total numbers previously analyzed in the 2015 *RPMP EIS* (Fort Belvoir, 2015a). As a result, changes to

population, demographics, income, community services and facilities, or housing would not be appreciable.

Construction associated with the Proposed Action would create local jobs and induced effects such as local expenditures from construction workers. These jobs would be temporary, and personnel hired would not be likely to change their place of residence. In the context of the regional economy, the Proposed Action would have short- and long-term, less-than-significant positive effects on local economic conditions. These effects would occur on a temporary basis over the course of an approximately 30-year time period. Potential adverse impacts on socioeconomics from noise, air, or water pollution associated with the Proposed Action would mostly be confined to the airfield. Therefore, socioeconomics is dismissed from detailed analysis in this EIS.

3.1.1.2 Environmental Justice

In accordance with EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, no minority or low-income populations would be disproportionately affected by implementation of the Proposed Action. Environmental Justice communities in the vicinity of DAAF include Block Group 1 in Census Tract 4220; Block Groups 2 and 3 in Census Tract 4219; and Block Groups 1 and 2 in Census Tract 4211.03 for persons below the poverty level or as minority populations. (US Census Bureau, 2016). However, local residents that comprise these communities would not be particularly or disproportionately affected by the Proposed Action. Potential adverse impacts from air or water pollution associated with the Proposed Action would mostly be confined to the airfield where no residential populations are present. Noise generated under the Proposed Action would be commensurate with existing levels within the potentially affected Environmental Justice communities. These noise levels are generally considered to be compatible with residential land use (see **Section 4.5**). Therefore, Environmental Justice is dismissed from detailed analysis in this EIS.

3.1.1.3 Protection of Children

EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks* recognizes that children may suffer disproportionately from environmental health and safety risks. The EO directs federal agencies to identify and assess such risks, and consequently to ensure that its policies, programs, activities, and standards address effects on children. The census tracts adjacent to DAAF do not have unusually high proportions (i.e., at least 20 percent higher) of residents under 18 years old in comparison to the reference populations of Virginia and Fairfax County (US Census Bureau, 2016). The Proposed Action would occur on a secure, fenced military facility with access restricted to authorized personnel only. As noted above, potential adverse impacts from noise, air, or water pollution resulting from the Proposed Action would mostly be confined to the airfield. There are no facilities where children frequently congregate, such as schools, day care centers, and entertainment venues on the airfield. Therefore, the analysis of disproportionate environmental health and safety risks to children in accordance with EO 13045 is dismissed from detailed analysis in this EIS.

3.1.1.4 Utilities

The Proposed Action would not include substantial changes in missions, air operations, or the number of aircraft or personnel at DAAF. Further, any unanticipated increase in military personnel associated with the Proposed Action would not exceed the total numbers previously analyzed in the 2015 *RPMP EIS* (Fort Belvoir, 2015a), which determined there would be no significant impacts. The potential for any corresponding utility demand (i.e., electricity, natural gas, water, wastewater, solid waste, and telecommunications) to adversely affect the capacity of local utility systems and services would not be appreciable. The Proposed Action would improve the condition and operation of local utility system components on and around the airfield, resulting in net beneficial impacts.

Throughout the implementation of the Proposed Action and following completion of the proposed projects, solid waste and universal waste generated on DAAF (including wasted generated by construction and operational activities) would continue to be handled, stored, and recycled or disposed of in accordance with Fort Belvoir's *Integrated Solid Waste Management Plan*. Such waste would be periodically collected by licensed contractors and recycled or disposed of at permitted facilities outside Fort Belvoir. The volume of waste generated on DAAF during and following implementation of the proposed projects would not exceed Fort Belvoir's waste management capabilities nor would it exceed the available capacity of local landfills or recycling facilities.

The Proposed Action would develop new facilities and infrastructure on DAAF over the course of an approximately 30-year time period. Construction activities and operational components of the proposed projects would increase utility demand in the short- and long-term, respectively. However, existing utilities serving Fort Belvoir and DAAF have sufficient capacity to support the Proposed Action (Fort Belvoir, 2018a). The phasing of the Proposed Action over 30 years would preclude any substantial surge in utility demand from occurring as a single event, providing more flexibility to manage any unforeseen capacity deficits. In the long term, the Proposed Action would partially offset increased utility demand by providing modern facilities that are more energy-efficient facilities than the existing structures as well as demolishing multiple outdated, inefficient buildings. Localized utility service disruptions would potentially occur during construction associated with the Proposed Action; however, any such effects would be limited to areas within DAAF's boundaries and further minimized by advanced coordination and communication with the affected parties, thereby ensuring that adverse impacts remain temporary and less than significant. For these reasons, utilities are dismissed from detailed analysis in this EIS.

3.1.1.5 Airspace Management

As described and depicted in **Section 1.2.3.4**, the Proposed Action would remove obstructions that currently penetrate the Primary Surface and Transitional Surface of the airfield. These obstructions include buildings, terrain, and other infrastructure in violation of safety standards, requiring DoD and FAA approval of temporary waivers to operate the airfield. The Proposed Action would eliminate most of these safety hazards in alignment with the phased modernization of DAAF. This would improve the safety of aircraft operations and have a positive effect on airspace management. Additionally, the Proposed Action would not include substantial changes in missions, air operations, or the number of

aircraft or personnel at DAAF. Therefore, airspace management is dismissed from detailed analysis in this EIS.

3.1.1.6 Traffic and Transportation

The Proposed Action would occur in a rapidly growing urban area with a heavily congested regional transportation system. Although construction would increase the number of vehicles using this system to access DAAF, potentially resulting in minor delays on local and regional roadways, these activities would occur intermittently over the course of the Proposed Action's 30-year implementation period. The Proposed Action would not change the level of service (LOS) on any roadways that comprise the regional network (VDOT, 2012). The cumulative impact of the Proposed Action on average annual daily traffic volumes for such roadways would not be discernable (i.e., less than 1 percent) (VDOT, 2017). Impacts would be minimal in this context and construction project management (e.g., travel during off-peak hours, signage, and detours) would further reduce the potential for any substantial traffic delays to result from the Proposed Action. Local and regional transportation improvement projects that are already funded or planned would continue to address the capacity and condition of the region's transportation infrastructure (VDOT, 2017). These improvements would occur concurrently with the Proposed Action.

With respect to Fort Belvoir's road network, the Proposed Action would not include substantial changes in the number of personnel at DAAF. On post, the current workforce comprises approximately 40,000 military and civilian personnel. By 2030, this workforce is projected to increase by approximately 17,000 personnel (INRMP 2018). The 2015 *RPMP EIS* concluded that, based upon an on post working population of 39,000 personnel, significant traffic and transportation impacts would result over time in lieu of current and planned mitigation (Fort Belvoir, 2015a). Although this finding would not change under the Proposed Action, implementing the DAAF ADP would not substantially increase traffic or reduce the capacity or function of Fort Belvoir's road infrastructure. Demolition and construction during implementation of the Proposed Action would generate increased traffic onsite; however, these impacts would be negligible with the phasing of the ADP projects and further reduced by management efforts to avoid and minimize disruption of the military mission.

DAAF personnel would continue to benefit from an easily accessible, airfield-specific ACP. Although parking capacity remains sufficient to support current airfield personnel levels, implementing the Proposed Action would ensure that onsite parking capacity is able to accommodate any long-term increased demand. NCPC parking ratios were considered and incorporated into the ADP at the individual project-level.

Overall, implementation of the Proposed Action would upgrade and expand the airfield's infrastructure without any discernable effects elsewhere on post. The Proposed Action would also result in more efficient and safer airfield operations by improving site and facility access and traffic circulation and flow. For these reasons, traffic and transportation is dismissed from detailed analysis in this EIS.

3.2 Land Use, Aesthetics, and Coastal Zone Management

3.2.1 Introduction

Land use describes the natural or developed condition of a given parcel of land or area, and the type of functions and structures it supports. Examples of land use types include industrial, commercial, and recreational. Assigning land use designations and identifying land use patterns helps land management organizations characterize, manage, understand, and organize the functions and relationships of land within their jurisdictions. Planning documents are developed by land management organizations to guide future development based on the current and historical characteristics of the territory within their boundaries.

The ROI for land use includes Fort Belvoir and DAAF, and areas of Fairfax County that may be affected by development on the installation. This section also describes the baseline environment for aesthetics and coastal zone management, resource areas primarily considered within a land use and development context.

3.2.2 DAAF Land Use

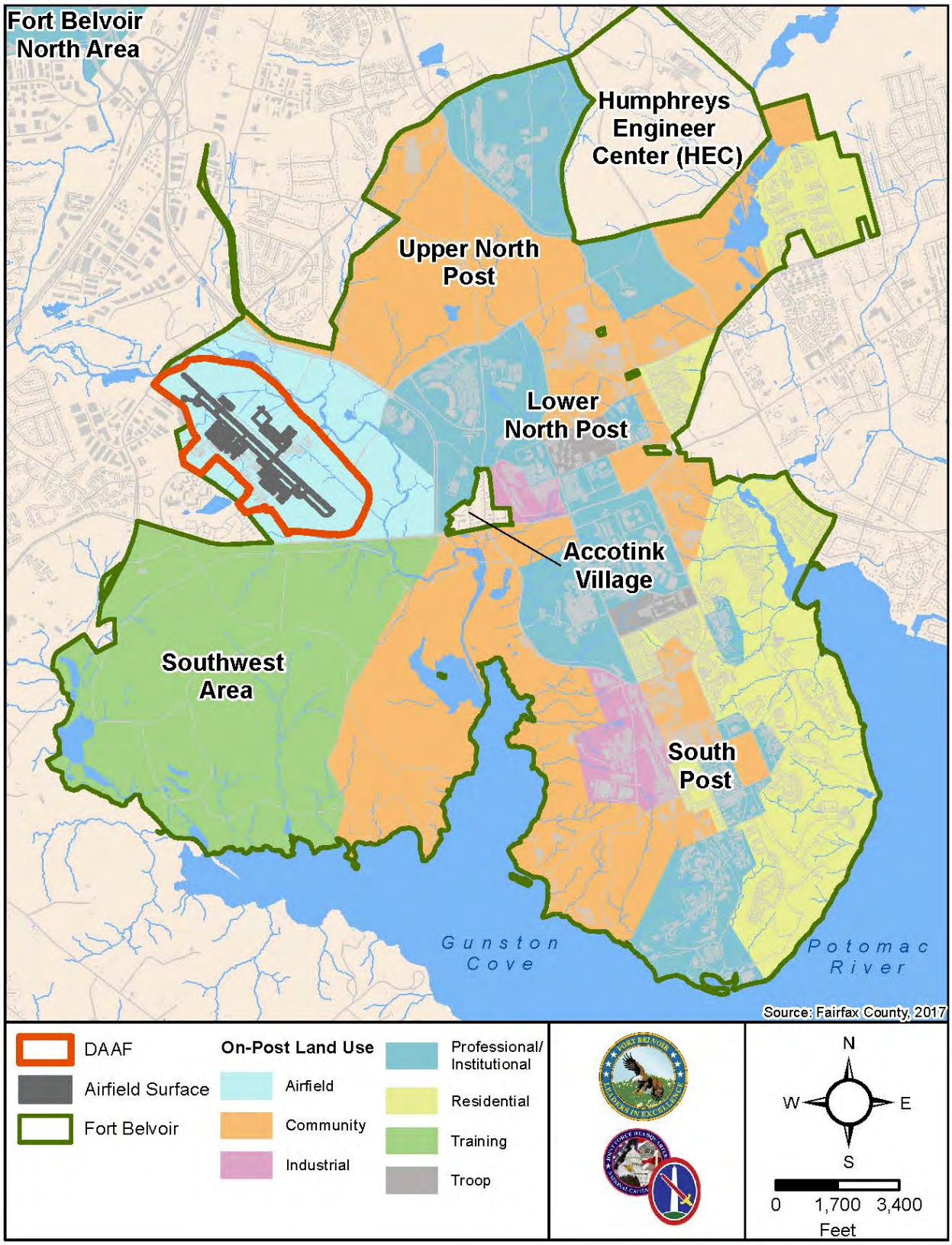
3.2.2.1 General

DAAF covers approximately 348 acres on Fort Belvoir's North Post, north of Richmond Highway and west of Fairfax County Parkway (**Figure 1.2-1**). The intensively developed portion of the airfield, consisting of a single runway flanked by associated taxiways, aircraft parking aprons, hangars, and other facilities supporting airfield operations, occupies much of the western half of the property. The eastern side of DAAF is densely wooded and minimally developed. A segment of Accotink Creek traverses the eastern side of the airfield in a northwest to southeast direction.

Land use at Fort Belvoir is categorized as Professional/Institutional, Community, Residential, Troop, Industrial, Ranges/Training, or Airfield (**Figure 3.2-1**). These categories are intended to reflect the predominant use of an area, provide flexibility in siting facilities, and encourage mixed-use development. The majority of DAAF is categorized as Airfield, which consists of land designated for flight operations such as runways and taxiways, and airfield support facilities, including airfield operations, aviation maintenance and refueling, and related test facilities (Fort Belvoir, 2015a). DAAF is the only part of Fort Belvoir where the Airfield land use designation occurs.

Existing land use in the intensively developed area of DAAF is consistent with this designation with the exception of Anderson Park, an approximately 7-acre parcel between Santjer Road and Accotink Creek. The park is maintained by Fort Belvoir's Morale, Welfare, and Recreation (MWR) office and consists of a picnic shelter, outdoor volleyball court, horseshoe pits, and open areas for passive recreation. As a recreational facility, Anderson Park does not directly support DAAF operations or the missions of the airfield's tenants and therefore, is inconsistent with the Airfield land use designation. However, the park neither creates land use incompatibilities nor inhibits the operation of other Airfield uses or facilities.

Figure 3.2-1: Fort Belvoir Land Use



A smaller area along the eastern side of the airfield is categorized as Professional/Institutional (**Figure 3.2-1**). Uses on Fort Belvoir in this category include non-tactical organizations such as military schools, headquarters, major commands, and non-industrial research, development, test, and evaluation facilities (Fort Belvoir, 2015a). The portion of DAAF categorized as Professional/Institutional is wooded and undeveloped.

3.2.2.2 Fort Belvoir Special Natural Areas

Fort Belvoir has established a number of noteworthy habitat areas on Main Post to provide wildlife habitat and protect sensitive ecological features. These areas include the 980-acre Forest and Wildlife Corridor (FWC) and approximately 3,600 acres of Breeding Birds of Management Concern (BBMC) buffers on Main Post for species that are identified as US Fish and Wildlife Service (USFWS) Birds of Conservation Concern (BCC), Partners in Flight (PIF) Species of Concern (SOC), and DoD Mission Sensitive Species (MSS). Development projects occurring at Fort Belvoir are planned, sited, and designed to avoid immitigable impacts on these areas.

A portion of the FWC covers approximately 131 acres on the eastern side of DAAF between Fairfax County Parkway and the intensively developed area around the runway. Fort Belvoir also maintains three noncontiguous areas of BBMC habitat on the southeastern, northeastern, and northwestern sides of DAAF, collectively totaling approximately 370 acres (Fort Belvoir, 2015a). The FWC and BBMC buffers are further discussed in **Section 3.8.5**.

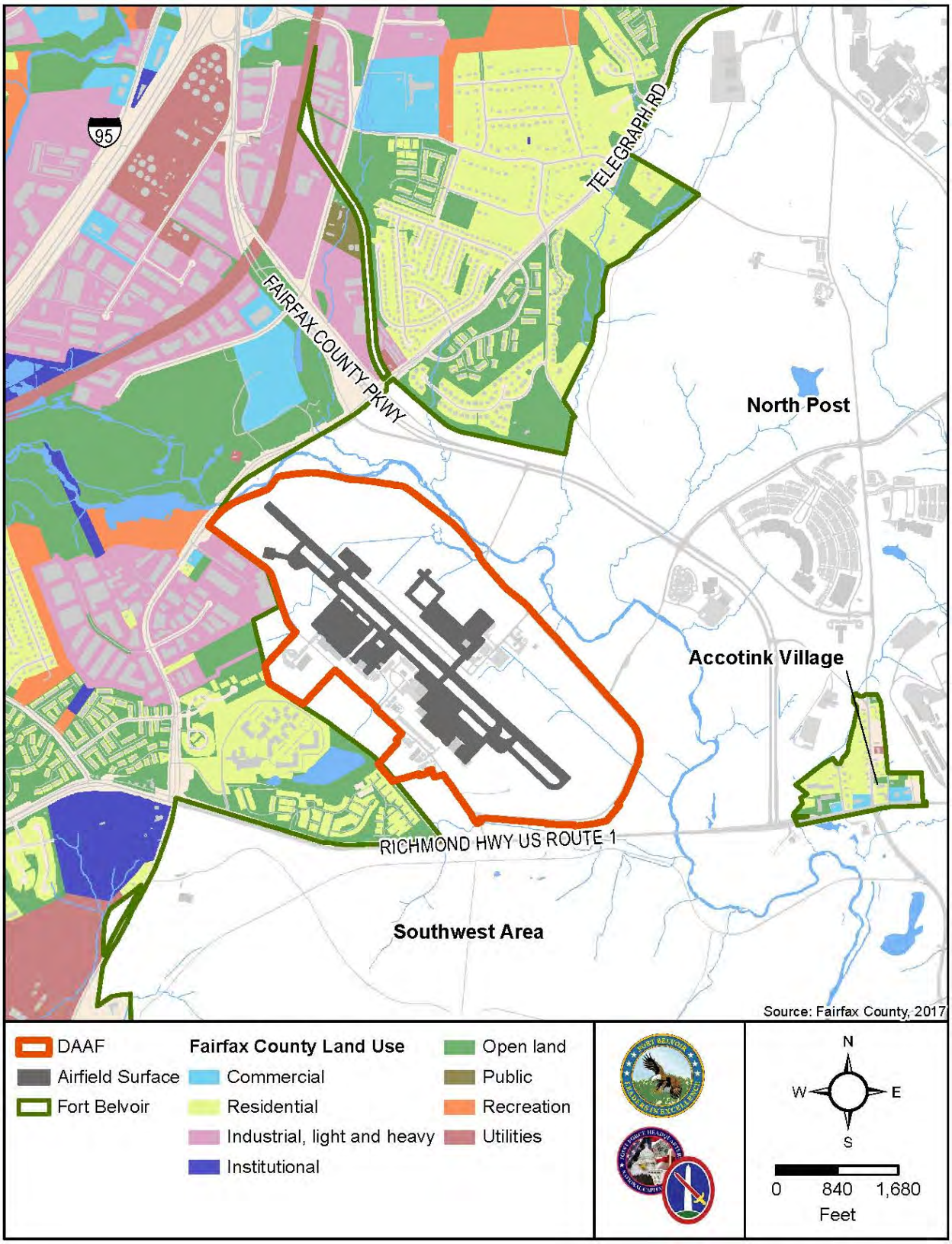
3.2.3 Surrounding Land Use

On-post land uses adjacent to DAAF consist of Community and Professional/Institutional on North Post and Ranges/Training on the Southwest Area (**Figure 3.2-1**). The Community designation encourages a mix of uses and includes religious, family support, personnel and professional services, medical, retail, commercial, and recreational facilities. Uses on North Post within this category near DAAF include the Fort Belvoir Golf Course, the Commissary/Post Exchange complex, and the National Museum of the US Army, currently under construction. Professional/Institutional land uses on North Post near DAAF are characterized by the Defense Logistics Agency (DLA) and Intelligence and Security Command (INSCOM) complexes immediately east of Fairfax County Parkway and south of John J. Kingman Road.

Approximately two-thirds of the Southwest Area is designated as Ranges/Training. It is the only part of Fort Belvoir with this designation. Ranges/Training uses include closed or former live fire ranges, non-live fire ranges, and special training areas such as confidence courses, drivers' training, and land navigation (Fort Belvoir, 2015a).

Land uses designated by Fairfax County adjacent to and near DAAF include a mixture of residential, light and heavy industrial, commercial, recreation, institutional, and open land (**Figure 3.2-2**). Residential uses near DAAF include the Fairfax, a privately maintained military retirement community adjacent to the southwest side of the airfield; a townhome development north of Fairfax County Parkway between Telegraph Road and North Post; and Accotink Village, a 27-acre unincorporated community to the east that is completely surrounded by, but not part of, Fort Belvoir (Fort Belvoir, 2015a).

Figure 3.2-2: Fairfax County Land Use near DAAF



A number of parks, open spaces, and recreational areas are located on Main Post and in Fairfax County near DAAF. These include a running track, tennis and basketball courts, and the historic amphitheater on North Post; the Waterfront Park on South Post; multiple baseball fields on North and South Posts; and Pohick Bay Regional Park, Mason Neck State Park, and Lorton South Park in Fairfax County.

Generally, land in Fairfax County adjacent to DAAF is intensively developed; any current or future development occurring nearby would likely consist of redevelopment projects on individual or groups of parcels. Property near DAAF consisting of open space or otherwise minimally developed land is likely constrained by sensitive environmental features such as wetlands, steep slopes, or wildlife habitat.

3.2.4 Relevant Plans

3.2.4.1 Fort Belvoir Real Property Master Plan

Fort Belvoir completed a RPMP update for Main Post and FBNA in 2014. The updated RPMP guides facility development, infrastructure, and land management decisions on the installation that reflect current needs and conditions while fully supporting the missions of Fort Belvoir and its tenants. Guiding principles articulated in the RPMP to guide future development at Fort Belvoir include the following:

- Create and sustain a world-class installation.
- Achieve environmental sustainability.
- Support the natural habitat.
- Recognize that land is a valuable resource.
- Improve multi-modal connectivity.
- Respect the history of Fort Belvoir to ensure the continuation of its legacy.

Among other goals and objectives, these principles aim for future development that efficiently utilizes land, maximizes the use of previously developed areas and historic structures, minimizes impacts on the environment, improves connectivity, and creates a sustainable, world-class installation.

Components of the updated RPMP include a revised land use plan reflecting current development patterns and spatial relationships; an Installation Vision and Development Plan (IVDP) to guide the type and location of future development; and Installation Planning Standards (IPS) to regulate the design of sites, buildings, landscaping, and vehicular and pedestrian circulation. The Airfield and Professional/Institutional land use designations that were applied to DAAF under the previous land use plan remain under the revised land use plan in the 2014 RPMP update. The primary change with regard to DAAF (and much of the rest of the installation) was the addition of a Development Suitability overlay to the land use map. This overlay indicates areas of the installation that are least suitable, moderately suitable, and most suitable for extensive future development based on the presence of various natural and man-made development constraints.

Much of the intensively developed portion of DAAF around the runway is identified as moderately suitable for future development (**Figure 3.2-1**). Much of the northern and eastern sides of the airfield

are considered least suitable for development, while a smaller area along the west side between Britten Drive and the airfield's western boundary are identified as most suitable for development. Development constraints at DAAF primarily consist of restrictions on building height and site development necessitated by safety clearance zones associated with the runway. Natural features such as Accotink Creek and its tributaries, wetlands associated with those water bodies, and special habitat areas are also incorporated in constrained development areas on DAAF. Many of these natural constraints are on the east and north sides of the airfield.

Regulating plans were developed for 20 planning districts on Fort Belvoir, including DAAF, as part of the IPS to provide specific planning and design guidance based on the character and functions of those districts. Notable development objectives for DAAF include redevelopment of facilities further to the west of existing structures; the removal of existing structures within runway clearance zones; and the development of facilities with specific functions supporting airfield operations. **Table 3.2-1** summarizes RPMP Regulating Plan guidance applicable to DAAF.

Table 3.2-1: RPMP Regulating Plan Guidance Applicable to DAAF

Design Element	Guidance
General	The long-term redevelopment strategy will site new facilities west of existing buildings and demolish most of the original structures. This will ensure that buildings are outside runway clearance zones, thereby adhering to airfield clearance standards and improving mission functionality. The demolition of obsolete buildings will eliminate intrusions into the clearance zones and increase apron space.
Road Configuration	The majority of road infrastructure will be maintained in its current alignment and configuration. Most improvements will be the realignment of access drives to individual buildings and parking lots as new development occurs.
Buildings	Buildings in this area will have a very specific mission function related to airfield operations. Buildings will typically be large with rectilinear forms, and industrial in appearance. The overall architectural character will be utilitarian in appearance.
Parking	Parking is consolidated into one lot at the rear of buildings. Lots may service more than one facility, and therefore can be shared by multiple mission partners.
Open Space	Areas reserved for open space within this district are mainly building setbacks from the road, environmental constraints, existing development, and buffers. The buffer along the western boundary will implement existing topography and vegetation to minimize conflicts with adjacent land uses.

Source: (Fort Belvoir, 2014a; Fort Belvoir, 2014b)

3.2.4.2 Fairfax County Comprehensive Plan

DAAF and the entirety of Fort Belvoir's Main Post are within Fairfax County's Lower Potomac Planning District. Main Post comprises approximately 30 percent of the planning district's land area. The district includes a variety of land uses such as residential, retail/commercial, industrial, and open space. Major planning objectives for the Lower Potomac Planning District include the following (Fairfax County, 2018):

- Create a focal point of development or "Town Center" for the Lorton-South Richmond Highway area;
- Preserve stable residential areas through infill development that is compatible with existing residential uses;
- Limit commercial encroachment into residential neighborhoods and establish a clearly defined "edge" between commercial and residential areas;
- Encourage pedestrian access to retail and mixed-use areas;
- Encourage the creation of additional parks, open space, and recreation areas;
- Identify, preserve, and promote awareness of heritage resources; and
- Provide adequate buffering and screening and appropriate transitional land uses between residential areas and nonresidential uses.

DAAF is adjacent to the southern edge of the county's Springfield Planning District. This district encompasses approximately 10,400 acres, or approximately four percent of the county, and includes FBNA. Outside of the intensively developed Franconia-Springfield Area and FBNA, the district primarily consists of low density, single-family residential uses. Commercial nodes are located at several intersections of major transportation corridors. The Accotink Stream Valley traverses the western half of the district. Major planning objectives for the district include the following (Fairfax County, 2018):

- Encourage revitalization and redevelopment of the Springfield Community Business Center;
- Develop the Franconia-Springfield Transit Station Area given existing access and environmental constraints;
- Ensure that any future development of FBNA does not result in adverse impacts on surrounding neighborhoods and transportation service;
- Improve circulation in and around the community by the management of existing transportation facilities and by promoting alternatives to single-occupant vehicle use;
- Protect stable residential neighborhoods from any adverse impacts associated with adjacent nonresidential development;
- Protect wetlands and Environmental Quality Corridors;
- Provide opportunities for affordable housing near mass transit facilities and transportation corridors for persons with low and moderate incomes; and
- Identify, preserve, and promote awareness of heritage resources.

3.2.5 Aesthetics

DAAF has operated for more than 60 years. For most of that time, the airfield's visual environment has been predominantly characterized by pavements, areas of maintained vegetation, hangars, administrative buildings, and maintenance shops that support DAAF's overall mission, the missions of its

tenants, and ongoing military aircraft operations and maintenance. Buildings and structures at DAAF are utilitarian, institutional, or light-industrial in appearance, reflecting their role as military airfield support facilities. With the exception of the FCT, building heights are low-rise (i.e., not exceeding three to four stories in height), consistent with their intended function as well as height restrictions imposed by safety clearance zones associated with the runway.

No pristine or noteworthy visual elements or viewsheds have been documented at DAAF. Facilities at the airfield have been determined not eligible for listing in the National Register of Historic Places (NRHP) (**Section 3.3**); therefore, facility maintenance activities focus on upkeep and mission-related improvements as needed, rather than maintaining historic character, association, or integrity. Airfield facilities, including the FCT, runways, and aircraft parking aprons and taxiways are largely screened from view outside DAAF by dense vegetation on its northern, eastern, and western sides, and an earthen berm adjacent to Richmond Highway along its southern boundary. The airfield and its facilities, including the FCT, are not visible from the adjacent Mount Air Historic Overlay District to the north or the Pohick Church Historic Overlay District to the southwest (**Section 3.3**).

3.2.6 Coastal Zone Management

The Coastal Zone Management Act, as amended, establishes a national policy for the protection and use of coastal zones. Section 307(c)(1) of the Act requires federal projects with potential to affect land uses, water uses, or coastal resources of a state's coastal zone to be consistent, to the maximum extent practicable, with the enforceable policies of that state's federally approved coastal management plan.

Virginia has developed and implemented a federally approved Coastal Zone Management (CZM) Program. Enforceable policies of the Virginia CZM Program pertain to fisheries management, subaqueous lands management, wetlands management, dunes management, non-point source pollution control, point source pollution control, shoreline sanitation, air pollution control, and coastal lands management. The Virginia CZM Program is administered by VDEQ and consists of a network of state agencies and local governments that manage and regulate resources addressed by the program's enforceable policies.

Virginia's coastal zone includes all of Fairfax County. As a federal installation, Fort Belvoir is statutorily excluded from the state's coastal zone. However, federal actions occurring at Fort Belvoir have the potential to affect Virginia coastal zone resources. Therefore, federal actions at Fort Belvoir are subject to federal consistency requirements. The Army is required to determine the consistency of proposed activities potentially affecting Virginia's coastal resources or coastal uses with the enforceable policies of the Virginia CZM program. **Chapter 7** of this EIS presents the Federal Consistency Determination for the Proposed Action.

3.3 Historic and Cultural Resources

3.3.1 Introduction

Historic and cultural resources include properties as defined by the NHPA, archaeological resources as defined by the Archaeological Resources Protection Act, cultural items as defined by the Native American Graves Protection and Repatriation Act, sacred sites as defined in EO 13007, *Indian Sacred Sites*, to which access is afforded under the American Indian Religious Freedom Act, and collections and associated records as defined in 36 CFR Part 79.

The ROI for historic and cultural resources is defined in accordance with NHPA as the "Area of Potential Effects" (APE). The APE is further defined and depicted in this section, but generally includes DAAF and its adjacent areas within audible distance and line of sight is further defined and depicted in this section to and from the airfield.

3.3.2 Background and Historic Context

Historic and cultural resources on Fort Belvoir relate both to its pre-military and military history (from World War I through the Cold War). These resources include buildings, structures, districts, archaeological sites, and historic landscapes (Fort Belvoir, 2015a). The region comprising present day Fort Belvoir was first settled about 11,500 years ago. English settlers began to colonize the area in the 17th Century, claiming large amounts of land for agrarian use. Large plantations were first established during this time period and their subsequent sale and sub-division eventually led to military ownership of the land on the Belvoir peninsula in 1912. Construction of the temporary cantonment known as Camp A.A. Humphreys began in 1917 and included the purchase of a 3,300-acre parcel that today comprises Fort Belvoir's North Post and DAAF. The historic significance of DAAF primarily derives from its association with the Cold War and its associated proxy wars. For example, DAAF was the home base for the operation of the Army's presidential helicopter program and joint-service EFD up until 1976 (US Army, 2009; Fort Belvoir, 2015a).

3.3.3 Historic and Cultural Resources Management

The NHPA, as amended, is the basic federal law protecting historic and cultural resources. The Act defines such resources as "any prehistoric or historic district, site, building, structure, or object" (36 CFR 800) with known or potential significance with regard to pre- or post-American history, architecture, archaeology, engineering, or culture. Pursuant to the NHPA, federal agency historic preservation programs identify, evaluate, and nominate historic and cultural resources under their jurisdiction for listing in the NRHP. The NHPA also requires federal agencies to consider effects of their undertakings for resources not under their jurisdiction, including those designated and managed by local jurisdictions and interest groups.

DoD Instruction 4715.16, *Cultural Resources Management*, sets forth guidelines and procedures for the management of cultural resources on DoD lands. In turn, Army Regulation (AR) 200-1, *Environmental Protection and Enhancement* establishes Army policy for cultural resources management to meet

applicable legal requirements. Fort Belvoir maintains an Integrated Cultural Resources Management Plan (ICRMP) for this purpose. In accordance with the ICRMP, management responsibilities are assigned to the Cultural Resources Manager, a position within Fort Belvoir's Directorate of Public Works (DPW) (Fort Belvoir, 2014c).

The RPMP contains development regulations to manage and preserve historic and cultural resources on Fort Belvoir. These regulations are enforced through the installation's master planning process and development program in accordance with the IVDP and IPS, which establish building height, auditory, and aesthetic guidelines that apply to proposed development projects on Fort Belvoir (Fort Belvoir, 2014a; Fort Belvoir, 2014b). Additionally, the ICRMP establishes post-wide management policies for archaeological or other culturally sensitive sites on post. These include a buffer zone of 50 feet around documented sites where ground disturbance activities are restricted and procedures to address the inadvertent discovery of artifacts and human remains when disturbing land (Fort Belvoir, 2014c).

3.3.4 NEPA and NHPA Section 106 Consultation

As the Proposed Action considered in this EIS constitutes a federal "undertaking" as defined by the NHPA, Fort Belvoir has initiated consultation under Section 106 of the NHPA. To date, consulting parties who have received correspondence regarding the Proposed Action include the Advisory Council on Historic Preservation (ACHP), Virginia Department of Historic Resources (VDHR) (the SHPO for the Commonwealth of Virginia), Native American tribes with historic or cultural ties to Virginia, and other potentially interested parties such as local preservation trusts, historic societies, and the public at-large.

Letters briefly describing the nature and location of the Proposed Action were distributed to the consulting parties on April 18, 2018 to announce a 30-day scoping period for this EIS. The distribution list for all parties notified of the scoping period is provided in **Chapter 9**, and representative scoping letters and copies of all stakeholder comments received are included in **Appendix A**. Fort Belvoir also hosted a public scoping meeting at a local venue on May 16, 2018 to communicate information with respect to the Proposed Action, including potential impacts on historic and cultural resources. Meeting participants were encouraged to participate in the NEPA process and provide feedback for consideration in the Section 106 consultation and this EIS. No substantive public comments were received during the EIS scoping period. Select comments received from regulatory agencies and tribes regarding historic and cultural resources are summarized as follows:

- **Fairfax County Department of Planning and Zoning, Historic and Heritage Resources Division.** In correspondence dated May 29, 2018 information regarding designated historic overlay districts and sites listed in the Fairfax County Inventory of Historic Sites was provided for consideration in the Section 106 consultation and EIS. The primary concern was noted as the outward-facing viewshed as seen from each historic district and potential adverse effects on their historic character that may result from a visual obstruction. As such, a request was made to obtain information on the maximum building height that would result from the Proposed Action. The correspondence also requested that the Fairfax County Architectural Review Board be included as a consulting party with regard to the Proposed Action and two County-designated historic districts that are adjacent to DAAF.

- **ACHP**. In correspondence dated April 25, 2018 the ACHP requested an invitation to participate in the Section 106 consultation for the Proposed Action should the Army reach a determination of adverse effect on any historic and cultural resources on or around DAAF.
- **VDHR**. In correspondence dated May 2, 2018 VDHR noted the nature of the Proposed Action as having potential to affect historic properties listed, or eligible for listing, in the NRHP, if present on or in the vicinity of DAAF.
- **Catawba Indian Nation.** In correspondence dated May 16, 2018 the Catawba Indian Nation requested copies of any meeting minutes resulting from the 30-day scoping period, including the public scoping meeting. As no meetings were recorded, the Catawba Indian Nation was provided with a link to Fort Belvoir's website[4] where information on the Proposed Action and EIS would be posted and available for review and download.
- **National Trust for Historic Preservation (NTHP).** In correspondence dated May 16, 2018 the NTHP requested an extension of the 30-day EIS scoping period. As it was not possible to extend the scoping period, the NTHP was informed of additional, forthcoming opportunities to provide feedback with respect to the Proposed Action and EIS. The NTHP was also provided with a link to Fort Belvoir's website where information on the Proposed Action and EIS would be posted and available for download.

On October 29, 2019, Fort Belvoir sent letters to VDHR, ACHP, Fairfax County Department of Planning and Zoning, and 11 federally recognized Native American tribes to support continued Section 106 consultation for the Proposed Action. Copies of these letters are provided in **Appendix A**. No responses from these agencies or tribes were received.

During state agency review of the Federal Consistency Determination for the Proposed Action (**Section 3.2.6**, **Section 4.2.6**, and **Chapter 7**) that occurred concurrently with the 45-day Draft EIS public review and comment period (**Section 1.5.3**), VDHR requested the Army to continue consulting under Section 106 with respect to undertakings occurring at DAAF. A copy of these comments is provided in **Appendix A**.

3.3.5 Architectural Resources

3.3.5.1 Fort Belvoir

Architectural resources on Fort Belvoir include numerous buildings and structures more than 50 years old. Most of these resources are associated with the historical military use of the post, particularly World War- and Cold War-era operations. To date, Fort Belvoir has identified six NRHP-eligible historic architectural features, including the Fort Belvoir Historic District. All of the properties containing these NRHP-eligible buildings and structures are located within the Main Post.

In 2009, Fort Belvoir conducted an architectural survey of 83 resources on post to evaluate their eligibility for listing in the NRHP. The survey included resources associated with DAAF, which were

[4] https://home.army.mil/belvoir/index.php/about/Garrison/directorate-public-works/environmental-division

collectively evaluated as a historic district since the airfield consisted of a self-operated campus organized around aviation operations and missions. As a result, Fort Belvoir recommended DAAF "not eligible" for listing in the NRHP due to lack of historical and architectural significance. In correspondence dated June 22, 2009, VDHR disagreed with Fort Belvoir's determination of "not eligible." To resolve this disagreement, in correspondence dated September 22, 2009, Fort Belvoir formally requested the Keeper of the National Register (hereafter, the "Keeper") make a determination on Fort Belvoir's finding of "not eligible." In response, the Keeper requested additional details regarding the airfield's historical role as EFD HQ. As requested, Fort Belvoir prepared a NRHP nomination package to include DAAF's history relative to EFD operations. The more detailed information, received by the Keeper on January 26, 2010, stated that the airfield no longer retained significant EFD features and those that did remain (e.g., Buildings 3150 and 3151) lacked integrity. Fort Belvoir's determination of "not eligible" for DAAF received concurrence from the Keeper on March 12, 2010; and so, the Virginia Cultural Resources Information System (VCRIS) website lists DAAF as "federally determined not eligible" (Abernathy, 2010).

There are no NRHP-listed or -eligible architectural resources associated with DAAF; however, two NRHP-eligible features on Fort Belvoir are located in proximity to DAAF (**Figure 3.3-1**): the Camp A.A. Humphreys Pump Station and Filter Building (VDHR File No. 029-0096), and Fort Belvoir Military Railroad Multiple Property Listing (VDHR File No. 2003-1374). These features are described below.

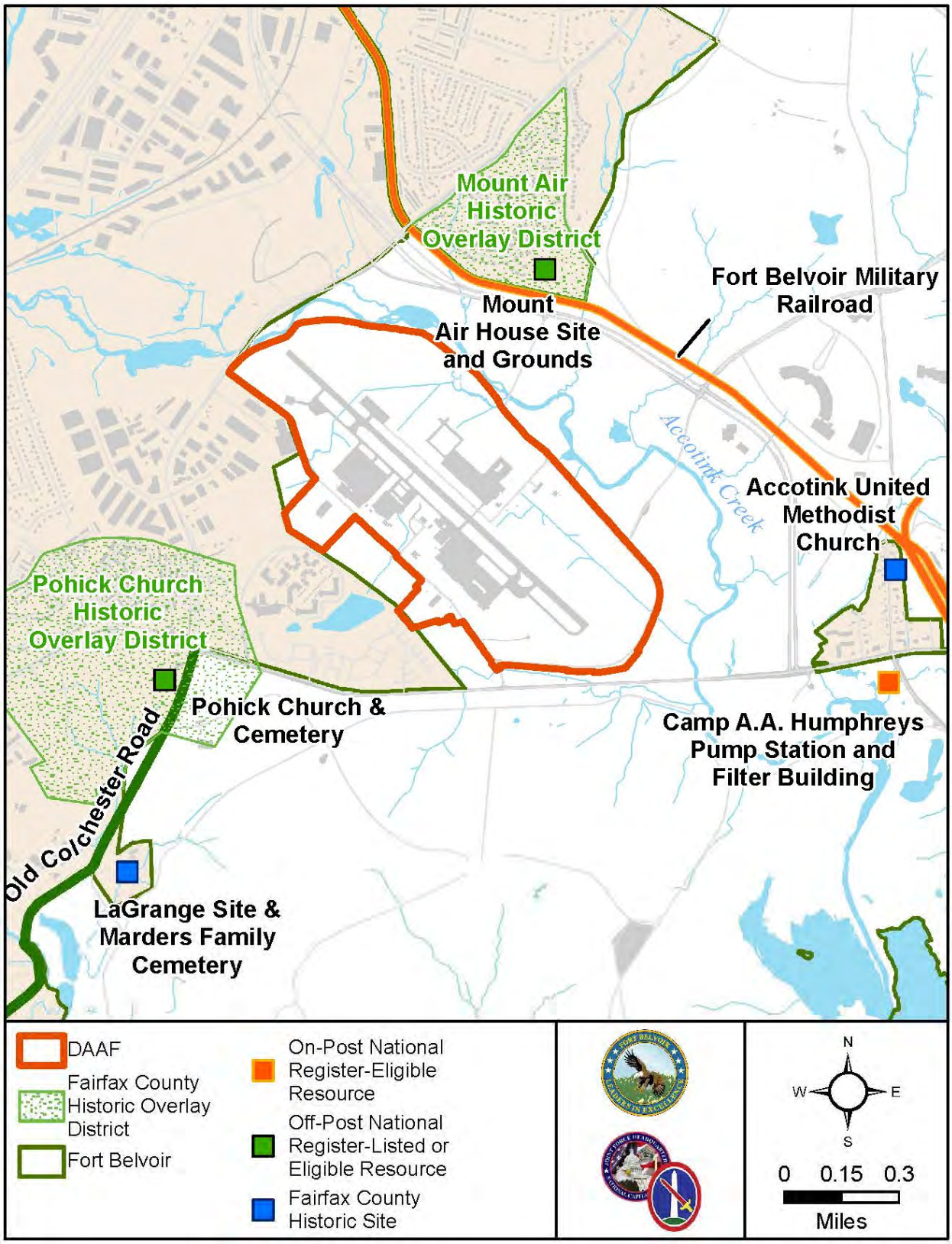
Camp A.A. Humphreys Pump Station and Filter Building

The Pump Station and Filter Building is located approximately 0.5 mile southeast of DAAF. This World War I-era support facility, built in 1918 and renovated in 1936, represents one of the few remaining vestiges of Camp A.A. Humphreys. Drinking water purification operations at the facility ceased in 1970 and all of the large mechanical equipment was removed. The Pump Station and Filter Buildings was determined NRHP-eligible in 1983 and renovated in accordance with *Secretary of the Interior's Standards for Rehabilitation* as the Eleanor U. Kennedy Homeless Shelter in 1986. It is also listed in the Virginia Landmarks Register (1996) and as a Fairfax County Historic Site (Fort Belvoir, 2015a; Fort Belvoir, 2014c).

Fort Belvoir Military Railroad

The Fort Belvoir Military Railroad enters Fort Belvoir near the intersection of Telegraph Road and Fairfax County Parkway and continues south along the length of Gunston Road. An approximately 1.5-mile segment of the railroad is located to the north-northeast of DAAF (**Figure 3.3-1**). The nearest railroad segment is located approximately 0.2 mile from DAAF, directly north of the airfield. Built in 1918 for the purpose of connecting steam and electric rail lines with access to Washington, D.C., the railroad, three bridges, and an associated coal trestle were determined NRHP-eligible in 2006; the track bed was determined NRHP-eligible in 2011 (Fort Belvoir, 2014c).

Figure 3.3-1: Historic Properties or Sites near DAAF



3.3.5.2 Fairfax County Historic Properties

Pursuant to the NHPA, the Army is also required to consider potential effects on historic properties listed in or eligible for listing in the NRHP that are not under their jurisdiction. There are four such resources located in proximity to the airfield (**Figure 3.3-1**): Old Colchester Road; Pohick Church and Cemetery and the Pohick Church Historic Overlay District; Accotink United Methodist Church; and Mount Air House Site and Grounds Historic Overlay District (**Table 3.3-1**). As requested by Fairfax County during the scoping period for this EIS, potential effects on one historic property located outside of the APE, the LaGrange Site and Marders Family Cemetery, are also considered in this EIS.

Table 3.3-1: Fairfax County Architectural Resources in the APE

Resource (VDHR File No.)	Description	Distance and Direction from DAAF (approximate)	Listing or Eligibility Status	Historic District
Old Colchester Road (029-0953)	Historic segment of road that once led to a seaport on the banks of the Occoquan River near its confluence with the Potomac River in Colchester, Virginia; now a minor road incorporated into State Route 611	0.5 mile southwest	NRHP-eligible	No
Pohick Church and Cemetery (029-0046)1	18th-century church where George Mason and George Washington attended services	0.5 mile southwest	NRHP-eligible; Virginia Landmarks Register	Yes
Accotink United Methodist Church (029-5697)	19th-century church that served as an institutional and cultural center for Euro-American residents	0.5 mile east	Fairfax County Historic Site	No
Mount Air House Site (029-0136)1	25-acre historic private property circa-18th and -19th centuries	0.2 mile northwest	Fairfax County Historic Site	Yes
LaGrange Site and Marders Family Cemetery (034-0069)	28-acre historic private property circa-18th and 19th centuries	1 mile southwest	Fairfax County Historic Site	No

Note:

1. Viewsheds of the Pohick Church and Cemetery and Mount Air House Site historic districts are shown on **Figure 3.3-1**.

3.3.6 Archaeological Resources

Archaeological investigations on Fort Belvoir began in the 1920s. Since that time through present day, most areas on Fort Belvoir have been subject to some level of survey and investigation (Fort Belvoir,

2015a). VDHR concurred that Phase I archaeological investigations at Fort Belvoir were complete following the completion of an installation-wide Phase I survey in 1994.

There are five archaeological sites known to occur on DAAF. Information regarding each respective site is summarized in **Table 3.3-2**. With the exception of ineligible Site 44FX1811, the archaeological sites on DAAF are separated from the APE by Accotink Creek and would have no potential to be affected by ground-disturbing activities. As land disturbance associated with the Proposed Action would be limited to the interior portions of DAAF, no other documented archaeological sites known to occur elsewhere in the APE were considered for analysis in this EIS.

Table 3.3-2: DAAF Archaeological Sites

Site Identification No.	Description	Recordation Date	Further Investigation(s)	NRHP-listed or -eligible?
44FX0035	Prehistoric scattered artifacts with Native American affiliations	1976	(Karell Archaeological Associates, 1982) (Fairfax County Archaeology, 2008)	No
44FX1949	Prehistoric domestic site	1992	None	No
44FX1936	Native American camp site and domestic site (circa-18th and -19th centuries)	1992	(Coastal Carolina Research, Inc., 2002) (Coastal Carolina Research, Inc., 2012a)	No
44FX1811	Prehistoric site with Native American affiliations	2002	(Coastal Carolina Research, Inc., 2012a)	No
44FX1937	Historic/prehistoric site with Native American and indeterminate affiliations	2002	(Coastal Carolina Research, Inc., 2012b)	No

Source: (Fort Belvoir, 2014c; Fairfax County, 2015; Fort Belvoir, 2015a)

3.3.6.1 Area of Potential Effects

The APE is the geographic area or areas within which an "undertaking" may directly or indirectly cause changes in the character or use of historic properties or prehistoric sites (36 CFR 800.16[d]). APEs are determined by the scale and nature of an "undertaking" and its potential effects on the resource(s) from ground disturbance, changes in the surrounding landscape or viewshed, and noise. SHPO consultations under NHPA Section 106 validate and confirm that an appropriate APE is defined as a baseline for analysis of the potential effects of an "undertaking."

The APE for the Proposed Action accounts for the full extent and range of potential impacts on historic and cultural resources that could occur on or in the vicinity of DAAF. In addition to the scale and nature of the Proposed Action, other factors that influenced development of the APE included surrounding development, topography, vegetation, and existing noise sources. In field observations and desktop analyses were used in combination to determine an appropriate APE for the Proposed Action. A field

view was conducted on September 20, 2018 to observe and record vistas and noises in the vicinity of DAAF. Subsequently, desktop analyses were conducted using Google Earth imagery to evaluate sites that were not accessible during the field view. As a result, it was concluded that DAAF is not visible from any historic properties or sites potentially affected by the Proposed Action. As depicted in **Photo 1** through **Photo 7**, development, vegetation, and topography surrounding DAAF prevent any discernable view of the airfield from these properties/sites.

During the field view, observations were also made with respect to noise conditions in the vicinity of DAAF. Noise typical of an urban environment such as that generated from automobile traffic and construction activities were audible at each accessible property/site. Noise levels in areas with adjacency to a major roadway (e.g., Route 1 and Telegraph Road) were notably higher by comparison.

As determined by field views and desktop reviews, areas within a 0.25-mile radius of DAAF would encompass the maximum distance from which elements of the Proposed Action could potentially be observed or heard. As such, the APE for the Proposed Action evaluated in this EIS includes DAAF and areas within a 0.25-mile radius of its perimeter (**Figure 3.3-2**). As defined, potential adverse effects on historic and cultural resources are not likely or anticipated to occur beyond the APE.

Photo 1. View from Camp AA Humphreys Pump Station and Filter Building (facing DAAF W)

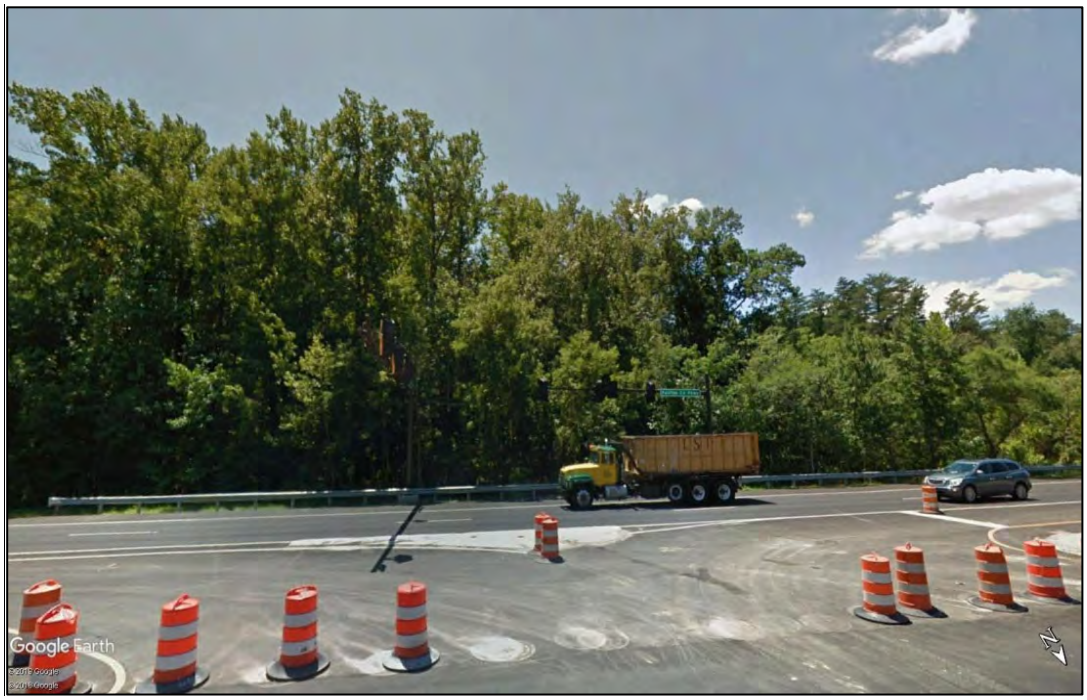


Photo 2. View across Fairfax County Parkway near Fort Belvoir Military Railroad (facing DAAF S-SW)

Photo 3. View from Telegraph Road terminus of Old Colchester Road (facing DAAF N-NE)

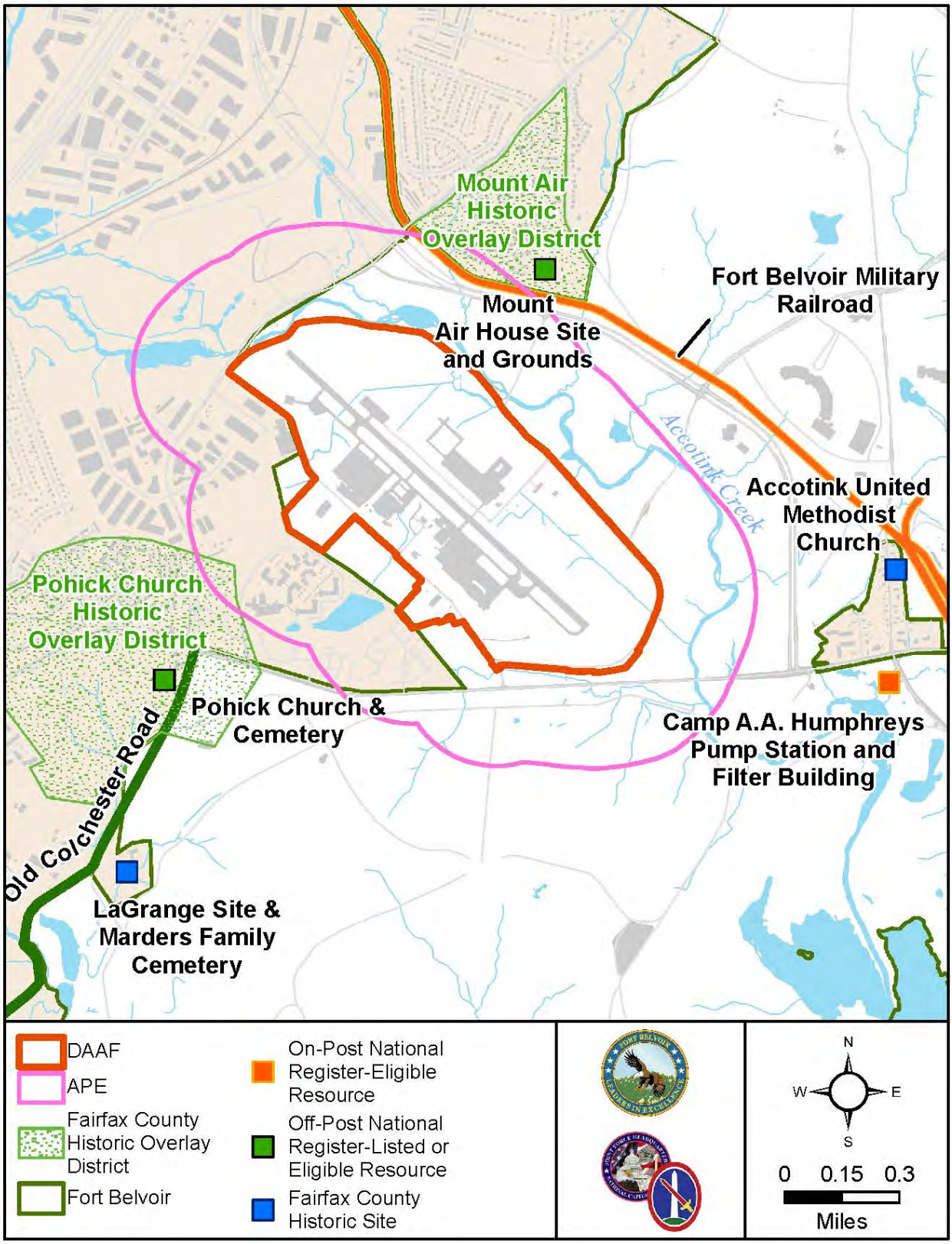
Photo 4. View from Pohick Church and Cemetery (facing DAAF E)

Photo 5. View from Accotink United Methodist Church (facing DAAF W-NW)

Photo 6. View from Mount Air House Site and Grounds (facing DAAF S)

Photo 7. View from LaGrange Site and Marders Family Cemetery (facing DAAF NE)

Figure 3.3-2: Area of Potential Effects (APE)



The portion of the APE that extends beyond the DAAF boundary is characterized by military operations on Fort Belvoir, clockwise from northeast to southwest; and suburban and urban development in areas surrounding the airfield, counterclockwise from north to southwest. Development on and off the post is interspersed with pockets of undeveloped open space and forest lands. The terrain is gently to moderately undulating with areas of lower elevation aligned with surface water features, most prominently Accotink Creek. Land use within the APE is interconnected by wide-ranging roads and other linear routes that support regional pedestrian, bicycle, and rail transit. Military and civilian aircraft operations also occur on a regular basis in the overlying airspace.

3.4 Air Quality

3.4.1 Introduction

This section discusses the National Ambient Air Quality Standards (NAAQS), local ambient air quality, the State Implementation Plan (SIP) for Clean Air Act (CAA), conformity, an overview of GHG, and climate change as they relate to Fort Belvoir.

3.4.2 National Ambient Air Quality and Attainment Status

USEPA Region 3 and the VDEQ regulate air quality in Virginia. The CAA (42 USC 7401-7671q), as amended, gives USEPA the responsibility to establish primary and secondary NAAQS (40 CFR Part 50) that set acceptable concentration levels for six criteria pollutants. The NAAQS are health-based air quality standards. The primary air quality standards are established to protect public health while the secondary standards are established to protect public welfare. The six NAAQS pollutants are: particulate matter (PM_{10} [particles generally less than 10 microns in diameter] and $PM_{2.5}$ [particles generally less than 2.5 microns in diameter]), sulfur dioxide (SO_2), carbon monoxide (CO), oxides of nitrogen (NO_x), ozone (O_3), and lead.

The NAAQS have been established for short- and long- term averaging periods. Short-term standards (i.e., 1-, 8-, and 24-hour periods) have been established for pollutants contributing to acute health effects, while long-term standards (i.e., annual averages) have been established for pollutants contributing to chronic health effects. While each state has the authority to adopt standards stricter than those established under the federal program, the Commonwealth of Virginia accepts the federal standards.

States are required to monitor existing air quality levels and determine if areas in the state (known as air quality control regions [AQCR]) are either above or below the appropriate NAAQS. Federal regulations designate AQCRs that have concentrations of one or more of the criteria pollutants that exceed the NAAQS as nonattainment areas. Federal regulations designate AQCRs with levels below the NAAQS as attainment areas. Maintenance areas are AQCRs that have previously been designated nonattainment and have been re-designated to attainment for a probationary period through implementation of a maintenance plan. According to the severity of the air pollution problem, O_3 and PM_{10} nonattainment areas can be categorized as marginal, moderate, serious, severe, or extreme.

Fairfax County (including Fort Belvoir) is within the National Capital Interstate AQCR (AQCR 47) (40 CFR § 81.12). AQCR 47 is in the ozone transport region (OTR) that includes 12 states and Washington, D.C. USEPA has designated Fairfax County as the following:

- Marginal nonattainment for the 2008 8-hour O_3 NAAQS[5]

Fairfax County is in the Washington, D.C.-MD-VA AQCR for other NAAQS. USEPA has designated Fairfax County as unclassifiable or in attainment for all other criteria pollutants (40 CFR § 81.347) (USEPA, 2018).

3.4.3 State Implementation Plan and Clean Air Act Conformity

The CAA, as amended in 1990, mandates that state agencies adopt SIPs that target the elimination or reduction of the severity and number of violations of the NAAQS. SIPs set forth policies to expeditiously achieve and maintain attainment of the NAAQS. Because Fairfax County is a nonattainment area for the 8-hour O_3 standard, the Commonwealth of Virginia, in coordination with Metropolitan Washington Council of Governments (MWCOG) was required to develop SIPs that outline the actions that would be taken to achieve the NAAQS. An initial plan developed in 2007, *Plan to Improve Air Quality in the Metropolitan Washington, D.C.-MD-VA Region: State Implementation Plan (SIP) for 8-Hour Ozone Standard* was approved by USEPA (MWCOG, 2008). In December 2017, MWCOG submitted a Re-designation Request to USEPA for the Washington D.C.-MD-VA 2008 Ozone NAAQS Marginal Nonattainment Area and a Maintenance Plan for the Washington D.C.-MD-VA 2008 Ozone NAAQS Nonattainment Area (MWCOG, 2017a; MWCOG, 2017b).

The 1990 amendments to the CAA require federal agencies to ensure that their actions conform to the SIP. USEPA has developed two distinctive sets of conformity regulations: one for transportation projects and one for non-transportation projects. Non-transportation projects are governed by general conformity regulations (40 CFR Parts 6, 51, and 93), described in the final rule *Determining Conformity of General Federal Actions to State or Federal Implementation Plans* and published in the *Federal Register* on November 30, 1993. The General Conformity Rule (GCR) became effective January 31, 1994 and was updated in April 2010. Under Section 176(c) of CAA, the GCR became applicable one year after the O_3 designation became effective. Virginia has adopted the federal conformity regulations by reference (Virginia Administrative Code [VAC] § 10.1-1308). A general conformity analysis is required with respect to the 8-hour O_3 NAAQS and is provided for each EIS alternative (**Section 4.4**).

3.4.4 Permitting Overview

Virginia's Air Pollution Control Law provides VDEQ with the legal authority to carry out state air quality programs, including establishing air pollution regulations to ensure maintenance of the attainment of the NAAQS. These regulations require air quality permits for the construction and operation of various sources of air pollution including new or modified sources and establish thresholds for the types of emissions sources and the quantities and types of pollutants that would be emitted.

[5] The 1-hour ozone standard is revoked effective June 15, 2005 for all areas in Virginia except Northern Shenandoah Valley Region (Winchester City and Frederick County) and Roanoke area where it is revoked effective April 15, 2009.

The air permitting process begins with the application for a construction permit, if necessary. There are three types of construction permits available through VDEQ for the construction of new or modified emissions sources:

- Major New or Modified Source Construction Permits in Nonattainment Areas (Nonattainment New Source Review [NNSR]);
- Prevention of Significant Deterioration (PSD) permits in Attainment Areas; and
- Minor New Source Construction Permits (Minor New Source Review [NSR]).

Thresholds that determine the type of construction permit that might be required depend on both the quantity and type of emissions. Operators of a newly constructed emission source will need to apply for a Title V permit within 12 months of commencing operation if the facility has the potential to emit emissions above 100 tons per year (tpy) for criteria pollutants, 10 tpy of a single hazardous pollutant or 25 tpy of combined hazardous pollutants from the source. A facility with emissions below the Title V emission thresholds may elect to apply for a State Only Permit but is not required to do so.

3.4.4.1 Nonattainment New Source Review

Major New or Modified Source Construction Permits in Nonattainment Areas (NNSR Permit) are required for any major new sources or major modifications to existing sources intended to be constructed in an area designated as nonattainment. Currently, when undergoing a physical or operational change, a source determines NNSR applicability through a two-step process. First, it is determined if the increased emissions from a particular proposed project alone are above the thresholds (**Table 3.4-1**). If the emissions increase is found to be below the threshold, a NNSR permit would not be required. Second, if the emissions increase is found to be above the threshold, a procedure called "*netting*" is applied to determine if the project's net emissions plus all contemporaneous increases and decreases in the previous five years at the source would be above the thresholds (9 VAC 5, Chapter 80, Article 9). If this determination results in an increase that is lower than the threshold, a NNSR permit would not be required.

NNSR permits are legal documents that specify what construction is allowed; which emissions thresholds must not be exceeded; reporting, recordkeeping, and monitoring requirements; and often, how the source must be operated. The NNSR permitting process typically takes 18 to 24 months to complete. Specifically, typical requirements for a NNSR permit can include the following:

- Best Available Control Technology (BACT) review for qualifying attainment criteria pollutants;
- Lowest achievable emission rate review for qualifying nonattainment pollutants (i.e., VOC, NO_x and $PM_{2.5}$);
- Maximum Achievable Control Technology (MACT) review for hazardous air pollutants (HAPs);
- Predictive air quality dispersion modeling to demonstrate no significant impact in the nonattainment areas;

- Acquiring emissions offsets for all contemporaneous emissions increases; and
- A public involvement process.

Table 3.4-1: Major Modification Thresholds that Apply to Fort Belvoir

Pollutant	Major Modification Threshold (tons per year)	
	PSD	NNSR
CO	100	--
NO_x	--	40[1]
SO_2	40	--
PM_{10}	15	--
$PM_{2.5}$	--	10
Volatile Organic Compounds (VOCs)	--	40

Note:

1. Although the region is in attainment for NO_x, the 40 tons per year threshold applies because of the region's O_3 non-attainment status.

Source: 9 VAC 5, Chapter 80, Article 9

3.4.4.2 Prevention of Significant Deterioration

The PSD program allows for industrial growth in a region while protecting (or preventing significant deterioration of) the air quality in attainment areas. PSD regulations impose limits on increases in the amount of pollutants that new major sources or major modifications to existing sources may emit (**Table 3.4-1**). The PSD process would apply to all pollutants for which the region is in attainment (i.e., all but VOC as a precursor to O_3 for Fort Belvoir). The PSD permitting process typically takes 18 to 24 months to complete. Sources subject to PSD are typically required to complete the following:

- BACT review for each criteria pollutant and GHG;
- MACT review for HAPs;
- Predictive air quality dispersion modeling to demonstrate compliance with the NAAQS, PSD increments (both Class I and Class II areas), and regional haze requirements;
- Establishing procedures for measuring and recording emissions and/or process rates; and
- A public involvement process.

The PSD regulations also set standards to protect Class I areas. The CAA defines Class I areas as certain national parks, wilderness areas, national memorial parks, and international parks that were in existence as of August 1977. Class I areas include national parks larger than 6,000 acres and national wilderness areas and national memorial parks which exceed 5,000 acres, that were in existence on August 7, 1977. The Clean Air Act Amendments (CAAA) of 1990 provided that subsequent additions to the boundaries of such areas are also Class I areas. Currently, 48 areas in the National Park system, 21 Refuge System units, and 88 areas under the administration of the Forest Service are designated as Class I.

Under the PSD provisions and implementing regulations (40 CFR §51.166(p)), for Class I areas, once baseline concentrations come under review by submission of a PSD preconstruction permit application for a major new or modified emissions source, only the smallest increment of certain pollutants (i.e., SO_2, NO_x, and PM) may be added to the air by the proposed new source, and other "increment consuming" sources.

There are two Class I areas in the Commonwealth of Virginia and two in West Virginia that are within 150 miles of Fort Belvoir: Shenandoah National Park and James River Face, 90 to 150 miles, respectively, to the southwest in Virginia; and Dolly Sods and Otter Creek, 120 to 135 miles, respectively, to the west in West Virginia (USEPA, 2013).

3.4.4.3 Minor New Source Review

A Minor NSR permit is required for construction of minor new sources, minor modifications of existing sources, and major sources that are both not exempt from permitting under 9 VAC 5, Chapters 80-1105 and also not subject to NNSR or PSD permit requirements. The Minor NSR permitting process typically takes 4 to 5 months to complete. Sources subject to Minor NSR could be required to complete the following:

- BACT review for each criteria pollutant;
- MACT review for regulated HAPs;
- Predictive air quality dispersion modeling upon request by VDEQ; and
- Establish procedures for measuring and recording emissions and process rates.

3.4.4.4 Operation Permits

Under VDEQ's Title V Facility Permit regulations (9 VAC 5, Chapter 80, Article 1), a Title V permit is required for facilities whose potential to emit (PTE) is greater than 100 tons per year of any criteria pollutant, 10 tons per year or more of any HAP or 25 tons per year or more of any combination of HAPs. Fort Belvoir holds a Title V operating permit (No. NVRO70550) (VDEQ, 2003). The permit requirements include annual periodic inventory for all significant stationary sources of air emissions and also covers monitoring, recordkeeping, and reporting requirements. Fort Belvoir's 2017 installation-wide air emissions for all significant stationary sources are tabulated below (**Table 3.4-2**).

Table 3.4-2: 2017 Air Emissions from Significant Stationary Sources at Fort Belvoir

Criteria Pollutant	Annual Emissions (tons per year)
VOCs	1.95
NOx	31.85
SO_2	0.12
CO	14.86
PM_{10}	1.37
$PM_{2.5}$	1.35

Source: (VDEQ, 2018)

3.4.4.5 New Source Performance Standards and National Emission Standards for Hazardous Air Pollutants

In addition to the permitting requirements to construct and operate new or modified emissions sources, New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAP) set emissions standards for categories of new stationary emissions sources of both criteria pollutants and HAPs. The NSPS process requires USEPA to list categories of stationary sources that cause or contribute to air pollution that might reasonably be anticipated to endanger public health or welfare. The NSPS program sets uniform emissions limitations for many industrial sources.

The NESHAP promulgated prior to the 1990 CAAA, found in 40 CFR Part 61, apply to *specific compounds* emitted from specific processes. Pursuant to the CAAA of 1990, NESHAP apply to *specific processes* identified as emitters of listed HAPs and are promulgated at 40 CFR Part 63. These "*process-specific*" NESHAP require affected sources to meet emission levels consistent with the MACT and are typically referred to as "MACT standards".

3.4.5 Greenhouse Gases and Climate Change

GHGs are components of the atmosphere that trap heat relatively near the surface of the earth and therefore, contribute to the greenhouse effect and climate change. Most GHGs occur naturally in the atmosphere; increases in GHG concentrations result from human activities, such as the burning of fossil fuels. Global temperatures are expected to continue to rise as human activities continue to add carbon dioxide (CO_2), methane, nitrous oxide, and other GHGs to the atmosphere.

To address the potential effects of climate change, EO 13834, *Efficient Federal Operations* (2018) directs the federal government to enhance the resiliency of its infrastructure and operations. While EO 13834 does not require a formal planning process to evaluate and manage climate change, federal agencies are nonetheless directly involved in climate resilience and adaptation efforts to address its implications across their services, programs, and assets (FedCenter, 2018).

3.4.5.1 Permitting for GHG

Currently, USEPA has promulgated regulations that require:

1. The reporting of GHG emissions annually (which Fort Belvoir implements), and
2. BACT for new or modified sources that occur after January 2, 2011.

The rule does not require control of GHGs; rather, it requires only that sources above certain threshold levels monitor and report emissions. In addition, USEPA also recently promulgated the Tailoring Rule that established a CO_2 equivalent threshold for permitting purposes (i.e., construction and operation) of 5,000 tons per year for modifications and 100,000 tons per year for new sources. This rule "tailors" the major source permitting rules (i.e., PSD and NNSR) to apply to relatively large emitters of GHG.

3.5 Noise

3.5.1 Introduction

Noise is defined as unwanted or undesirable sound that interferes with or disrupts normal human activities. Although continuous and extended exposure to high noise levels (e.g., through occupational exposure) can cause hearing loss, the principal human response to noise is annoyance.

The ROI for noise includes the audible distance on and around DAAF from which noise associated with the Proposed Action could reasonably be heard.

3.5.2 Noise Fundamentals and Regulatory Context

3.5.2.1 Noise Fundamentals

The human ear can only detect certain sounds with a high intensity and many sounds of a lower intensity are not detectable. Human response to noise is highly variable, as influenced by noise type, source, time of day, and individual sensitivities. Individuals also differ with respect to the perceived significance and appropriateness of noise in a particular setting.

Noise is measured by decibel (dB), a logarithmic unit used to represent the intensity of a sound or sound level. All sounds have a spectral content in that their magnitude or level changes with frequency, measured in cycles per second, or Hertz. To mimic the human ear's sensitivity and perception of different sound frequencies, the spectral content is weighted. Environmental noise measurements are usually made on an "A-weighted" scale that filters out very low and very high frequencies in order to better replicate human sensitivity. It is common to add the "A" to the measurement unit to indicate that the measurement has been made using this filtering process (A-weighted decibel [dBA]). For reference, **Table 3.5-1** shows maximum noise levels emitted by common types of construction equipment.

Table 3.5-1: Maximum Noise Levels Emitted by Common Types of Construction Equipment

Equipment Description	dBA Maximum Sound Level Measured at 50 feet
Backhoe	78
Bulldozer	82
Ground Compactor	83
Concrete Mixer Truck	79
Crane	81
Dump Truck	76
Excavator	81
Flat Bed Truck	74
Front End Loader	79
Generator	81
Jackhammer	89
Pickup Truck	75
Roller	80

Source: (FHWA, 2019)

The Day-Night Average Sound Level (DNL) metric is the most commonly used tool for analyzing noise generated by airfield operations and is the metric used in the analysis presented in this EIS. The DNL metric is the energy-averaged sound level measured over a 24-hour period, with a 10-dB penalty assigned to noise events occurring between 10 p.m. and 7 a.m. (acoustic night). DNL values are average quantities, mathematically representing the continuous sound level that would be experienced if all the variations in sound level that occur over a 24-hour period were averaged to have the same total sound energy. The DNL metric quantifies the total sound energy and is a cumulative measure, but it does not provide specific information on the number of noise events or the intensity of the individual sound events that occur during the 24-hour measurement period. Finally, DNL does not represent a single specific 24-hour period but rather an annual average day.

DNL is the standard noise metric used by the US Department of Housing and Urban Development (HUD), FAA, USEPA, and DoD. Studies of community annoyance in response to various types of environmental noise have shown that there is a consistent relationship between DNL and reported levels of annoyance. Research indicates that a large majority of the population (about 87 percent) is not highly annoyed by outdoor sound levels below 65 dB DNL (Federal Interagency Committee on Urban Noise, 1980).

3.5.2.2 Noise Guidelines and Criteria

Federal agencies have adopted guidelines for assessing noise impacts that provide both a characterization of the existing noise environment and a measure of project-induced impacts when applicable. In June 1980, the Federal Interagency Committee on Urban Noise published guidelines relating DNL to compatible land uses. This committee was composed of representatives from the DoD, US Department of Transportation, HUD, USEPA, and US Veterans Administration (VA).

Following the lead of the committee, DoD has adopted the noise zone concept of land use compatibility as the measure of aircraft noise effect. To address the potential impacts of aircraft operations, DoD defined noise zones with associated recommendations regarding compatible land uses as described in *Instruction 4165.57 Incorporating Change 2* (*Air Installations Compatible Use Zones [AICUZ]*), dated November 9, 2017.

According to the instruction, "the Army shall apply Operational Noise Management Program DNL designations of 60-65, 65-75, and greater than 75 at its air installations. Contours below 65 DNL are not required but may be provided if local conditions warrant discussion of lower aircraft noise levels, such as in rural and desert areas, or where significant noise complaints have been received from areas outside DNL 65 contours."

The Army has developed specific guidelines for addressing land use compatibility within specific noise zones (**Table 3.5-2**). Noise-sensitive land uses typically include residential areas, schools, hospitals, and churches.

Table 3.5-2: Noise Zones

Noise Zone	Aviation DNL (dBA)	Land Use Recommendation
Land Use Planning (LUP) Zone	60 – 65	For land use planning purposes.
I	< 65	Generally acceptable with any residential or noise-sensitive uses.
II	65–75	Normally not recommended with residential or noise-sensitive uses.
III	>75	Not recommended with any residential or noise-sensitive uses.

Source: (US Army Center for Health Promotion and Preventive Medicine, 2005)

At a local level, Fairfax County has a noise ordinance in place to regulate activities such as equipment and vehicle operations. The ordinance restricts certain noise-generating activities to specific times of the day in the public interest. A complete list of restricted activities can be found in *Fairfax County Code Chapter 108.1* (*Noise Ordinance*) (Fairfax County, 2019).

3.5.3 Methodology

Contours representing existing (or baseline) DNL noise conditions at DAAF were generated using the NOISEMAP computer model for fixed wing aircraft and the Advanced Acoustic Model (AAM) for rotary wing helicopters, respectively. Input data for both models include the types, frequency, and location of noise-generating operations at the subject airfield. For the noise analysis in this EIS, data sources include interviews with DAAF pilots, maintenance personnel, planners, schedulers, and air traffic controllers. The data from these sources were compiled and integrated into a general description of noise-generating activities at DAAF. The description included the type and frequency of flight operations from the various aircraft operating at DAAF; the airfield layout; runway utilization; flight tracks; and flight profiles. Detailed information regarding noise modeling methodologies and assumptions, operational data used as model inputs, and modeling results is provided in **Appendix B**.

3.5.4 Existing Noise Conditions

Noise associated with DAAF is primarily generated by aircraft operations. An aircraft operation is any takeoff or landing at the airfield. Takeoffs and landings may be part of training maneuvers (or "patterns") in the vicinity of the runway or may simply be departures or arrivals of aircraft. Aircraft operations conducted at DAAF include:

- **Departure:** An aircraft taking off from a runway.
- **Non-break Arrival:** An aircraft straight-in landing on a runway.
- **Overhead Arrival:** A special type of approach where the aircraft splits off to the left or right making a spiral-like descent to the ground using Visual Flight Rules (**Appendix B**) instead of straight-in.
- **Patterns:** An aircraft travels in a loop (once or multiple times). Pattern flights at DAAF only involve helicopter "touch-and-go" exercises (i.e., an aircraft touches down on a runway then immediately goes to full power and takes off again).

For the purpose of noise modeling, operations are defined as a given number of takeoffs and landings; patterns are counted as two operations since each includes a landing and a takeoff. DAAF aircraft operations data were tabulated by flying unit, aircraft, operation type, and sortie type (a sortie is the specific flight mission of one aircraft) (**Table 3.5-3**). The number of annual operations was divided by 365 to determine the average annual-day operations to be used as model input.

Table 3.5-3: Flight Operations at DAAF (2017)

Unit	Aircraft	Departures	Arrivals	Patterns	Total Annual Operations
12th Aviation Battalion	UH-60	5,000	5,000	18,750	28,750
Army National Guard	C-26	280	280	0	560
	UH-60 / UH-72	1,120	1,120	4,200	6,440
CAP	C-172 / C-182	617	617	0	1,234
NVESD	C-12 / DHC-6	104	104	0	208
	UH-60	52	52	0	104
OSA-A	C-12	1,040	1,040	0	2,080
	Cessna Citation	2,080	2,080	0	4,160
Transient	All	6,232	6,232	0	12,464
All Units	**All**	**16,525**	**16,525**	**22,950**	**56,000**

In addition to flight operations, pilots and maintenance personnel regularly conduct static engine run-ups as part of maintenance or standard pre-flight and post-flight procedures. Run-ups are performed in designated locations at DAAF while the aircraft is stationary. Noise from such run-up operations must be accounted for in baseline noise modeling. At DAAF, run-ups are conducted by the 12th AV BN, OSA-A, NVDES, and the Army National Guard at designated locations on the airfield using the respective aircraft assigned to each unit (**Figure 3.5-1; Appendix B)**.

Figure 3.5-2 depicts contours representing baseline DNL noise levels generated by aircraft operations at DAAF. The on- and off-post land area within each contour is summarized in **Table 3.5-4**. The contours align with the runways and the dominant flight tracks for arrivals, departures, and patterns. Departures and the descending portion of pattern operations require a higher engine power setting that generates greater noise and influences the shape of the contours.

Table 3.5-4: Land Area within DAAF 2017 Noise Zones

Noise Zone1	On-Post Acreage	Off-Post Acreage
Zone I (<65 DNL)	100.3	467.0
Zone II (65-75 DNL)	223.7	69.9
Zone III (> 75DNL)	22.2	0.0
Total	346.1	536.9

Note:

1. The area within each DNL contour is the “zone” where a receptor would experience that particular DNL.

Figure 3.5-1: DAAF Engine Run-up Locations

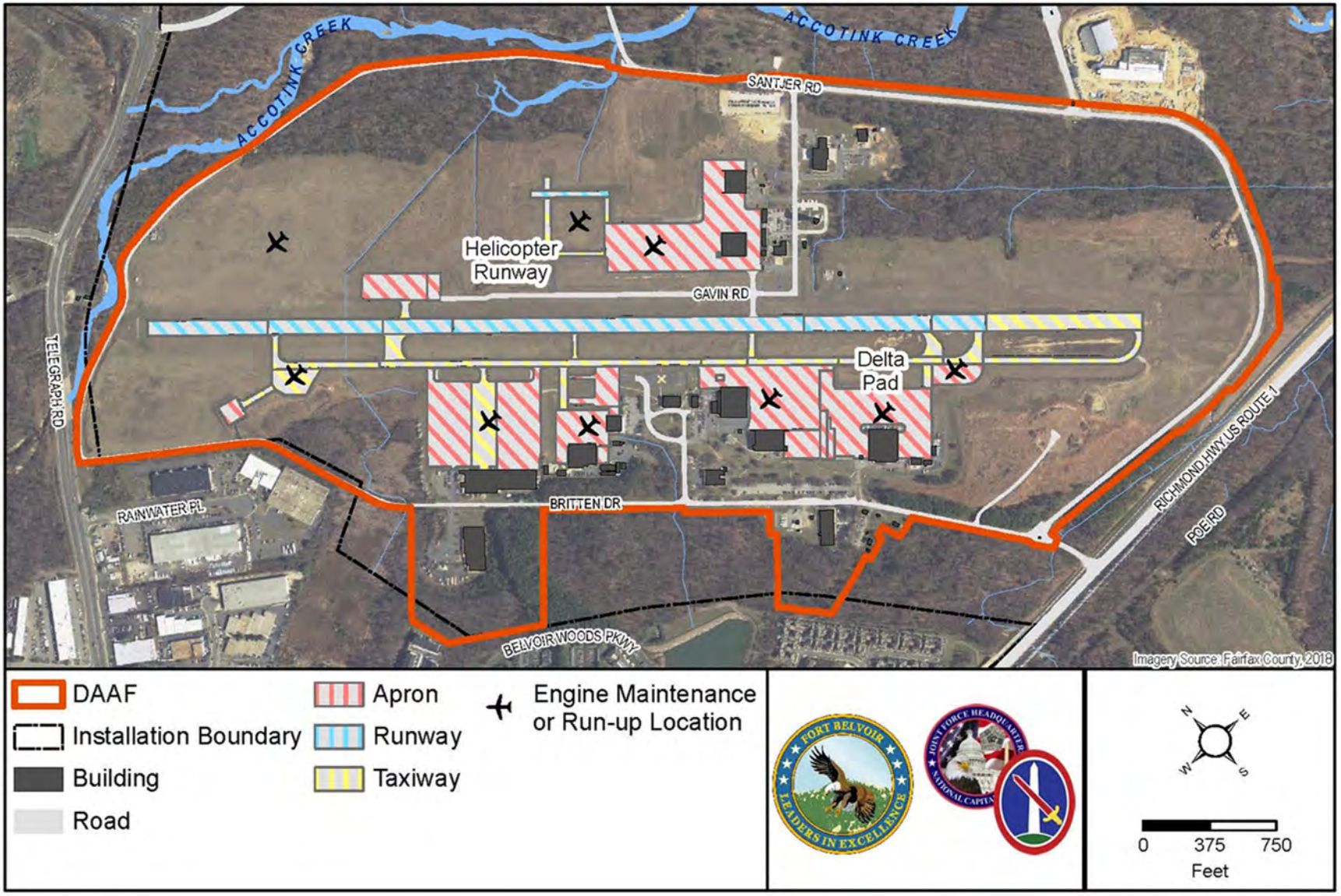
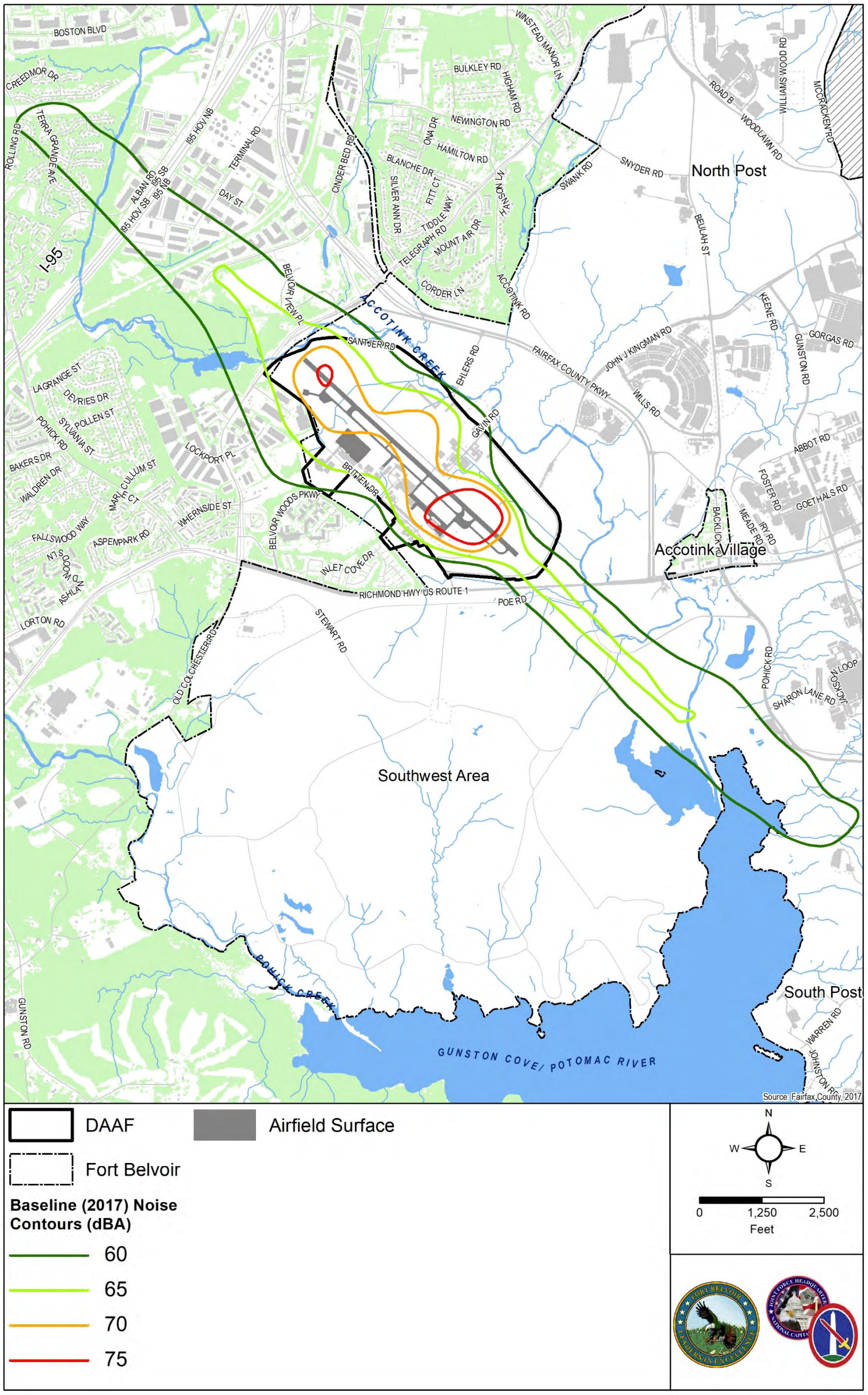


Figure 3.5-2: DAAF Baseline Noise Contours (2017)



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The highest noise levels (Zone III, > 75 dB DNL) are entirely confined to the airfield (**Figure 3.5-2**). The 65 dB DNL contour (representing the lowest noise levels of Zone II) extends about half a mile past the northwestern and southeastern limits of the airfield. To the southeast, the contour extends over the Fort Belvoir Southwest Area; it encompasses no developed land in that direction (**Figure 3.5-2**). To the northwest, the tip of the 65 dB DNL contour overlaps with light industrial and commercial land uses between Interstate-95 (I-95) and Telegraph Road. Publicly available aerial imagery shows that there are no residential land uses within the 65 dB DNL or 70 dB DNL contours (i.e., Zone II). No on- or off-post sensitive land uses are located within an incompatible noise zone (**Table 3.5-2**).

The LUP/Zone I (60-65 dB) contour extends another 1 and 0.5 mile past the northwestern and southeastern tips of the 65 dB DNL contour, respectively. To the southeast, it partially overlaps with Fort Belvoir's South Post but almost exclusively encompasses undeveloped land (**Figure 3.5-2**). To the northwest, Zone I encompasses light industrial and commercial uses along the east side of I-95 and a portion of a residential neighborhood to the west of the interstate. To the west of DAAF, the 60-65-dB DNL contour slightly extends into with a portion of a residential neighborhood between the airfield's boundary and US Route 1 (Richmond Highway).

Residential uses are compatible with Zone I. Other than those noted above, no other residential uses are within the 60-dB DNL and higher contour.

3.6 Geology, Topography, and Soils

3.6.1 Introduction

Geological resources consist of the Earth's surface and subsurface materials. These resources are described as part of a physiographic province in terms of topography and physiography, geology, soils, and, where applicable, geologic hazards and paleontology. Topography and physiography pertain to the general shape and arrangement of the land surface or the height and position of natural and built environment features. Geology is the study of the Earth's composition and provides information on the structure and configuration of surface and subsurface features.

Soils are the unconsolidated materials overlying bedrock or other parent material. Soil types vary in terms of their structure, elasticity, strength, shrink/swell potential, and erosion potential. These unique attributes determine a particular soil's suitability to support certain applications or uses, including development. Prime farmland is protected under the Farmland Protection Policy Act (FPPA) of 1981. The intent of the FPPA is to minimize the extent that federal programs contribute to the unnecessary conversion of high-quality farmland to non-agricultural uses.

The ROI for geology, topography, and soils includes DAAF and its adjacent surface and subsurface features or areas.

3.6.2 Geology

There are two physiographic provinces associated with Fairfax County, Virginia: the Coastal Plain and the Piedmont Plateau. These two provinces are divided by a northeast to southeast trending fall line that

bisects the county in relative proximity to I-95. The fall line is an area of transition between the resistant, metamorphic rocks of the Piedmont and the softer, sedimentary rocks of the Coastal Plain.

DAAF lies below the fall line within the high and low Coastal Plain Terraces of the Coastal Plain province. The underlying geology is most commonly associated with the Potomac Formation, which outcrops along slopes leading down to the Potomac River shoreline. Coastal Plain deposits in this area consist of a sequence of unconsolidated sediments. The lens-shaped deposits of the Potomac Formation are primarily of non-marine origin and occur as interbedded sand, silt, clay, and gravel. The Potomac Formation is approximately 600 feet thick beneath most of Fort Belvoir (Fort Belvoir, 2015a).

Landforms of the Coastal Plain are typified by undulating hills dissected by numerous streams, separated by lowlands and valley bottoms (Fairfax County DPWES & NVSWCD, 2013). Seeps and springs occur along slope faces (Fort Belvoir, 2015a). At higher elevations, marine-deposited clays are the predominant underlying stratum where downhill creep, landslides, slumping, and rock falls can occur. Other upland areas are less susceptible to these land-forming processes as sands, silts, and clays of riverine origin are the predominant substratum. The lowlands and valley bottoms of the Coastal Plain are underlain by deposits of alluvium. Land-forming associated with this substratum primarily occurs as active riverine erosion and deposition during overbank flooding (USGS, 2017).

The geology underlying DAAF is characterized in the north by the lowlands associated with Accotink Creek, and in the south by moderately hilly terrain. Depth to bedrock in the vicinity of DAAF is variable, ranging from approximately 6 feet below ground surface (bgs) along Accotink Creek to more than 20 feet bgs in areas farther south (Fort Belvoir, 2018b).

3.6.3 Topography

Topography on DAAF (**Figure 3.6-1**) is moderate with elevations ranging from approximately 20 feet asl along Accotink Creek to 130 feet asl south of Britten Drive. The higher elevations in the south are characterized by slopes greater than 15 percent. Another steeply sloped topographic feature on DAAF is a knoll to the south-southwest of the airfield runway, near Richmond Highway. This feature is approximately 120 feet asl (USGS, 2011).

Surface water drainage on DAAF aligns with the topography. From the hilly terrain in the south, surface water is collected and conveyed by intermittent streams and gully features. Surface flow moves northeast and east across the airfield along one of two primary drainage features (**Figure 3.6-1**) before discharging into Accotink Creek. A third drainage feature in the southeast portion of DAAF parallels Richmond Highway, discharging in an easterly direction into Accotink Creek (USGS, 2018).

3.6.4 Soils

According to the US Department of Agriculture's Natural Resources Conservation Service (NRCS), there are sixteen soil units associated with DAAF. As shown on **Figure 3.6-2**, the predominant soil units include Codorus and Hatboro soils, 0 to 2 percent slopes, occasionally flooded (153 acres or 23 percent); Grist Mill sandy loam, 0 to 25 percent slopes (146 acres or 22 percent); and Urban land (73 acres or 11 percent) (NRCS, 2018).

Figure 3.6-1: DAAF Topography and Drainage

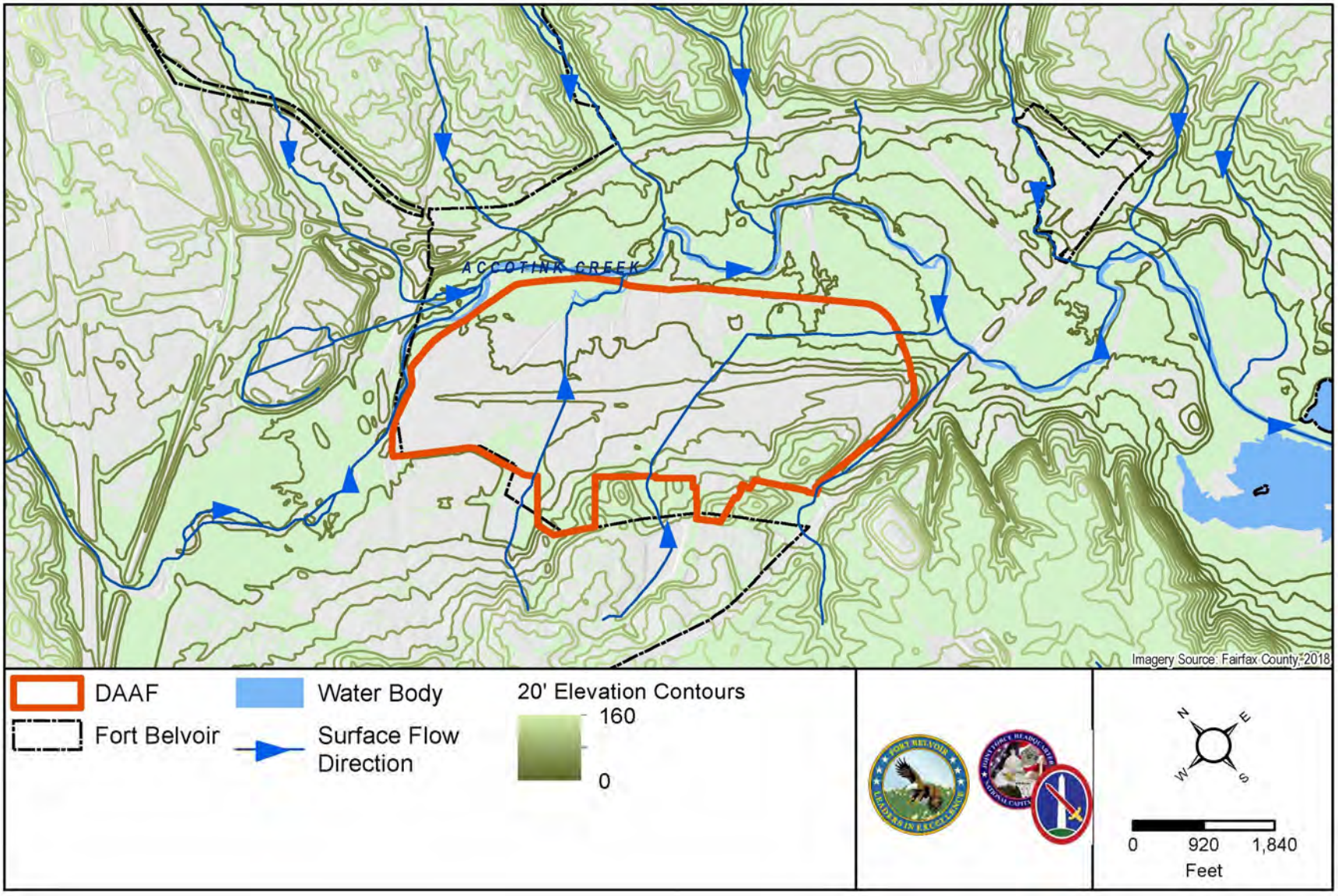
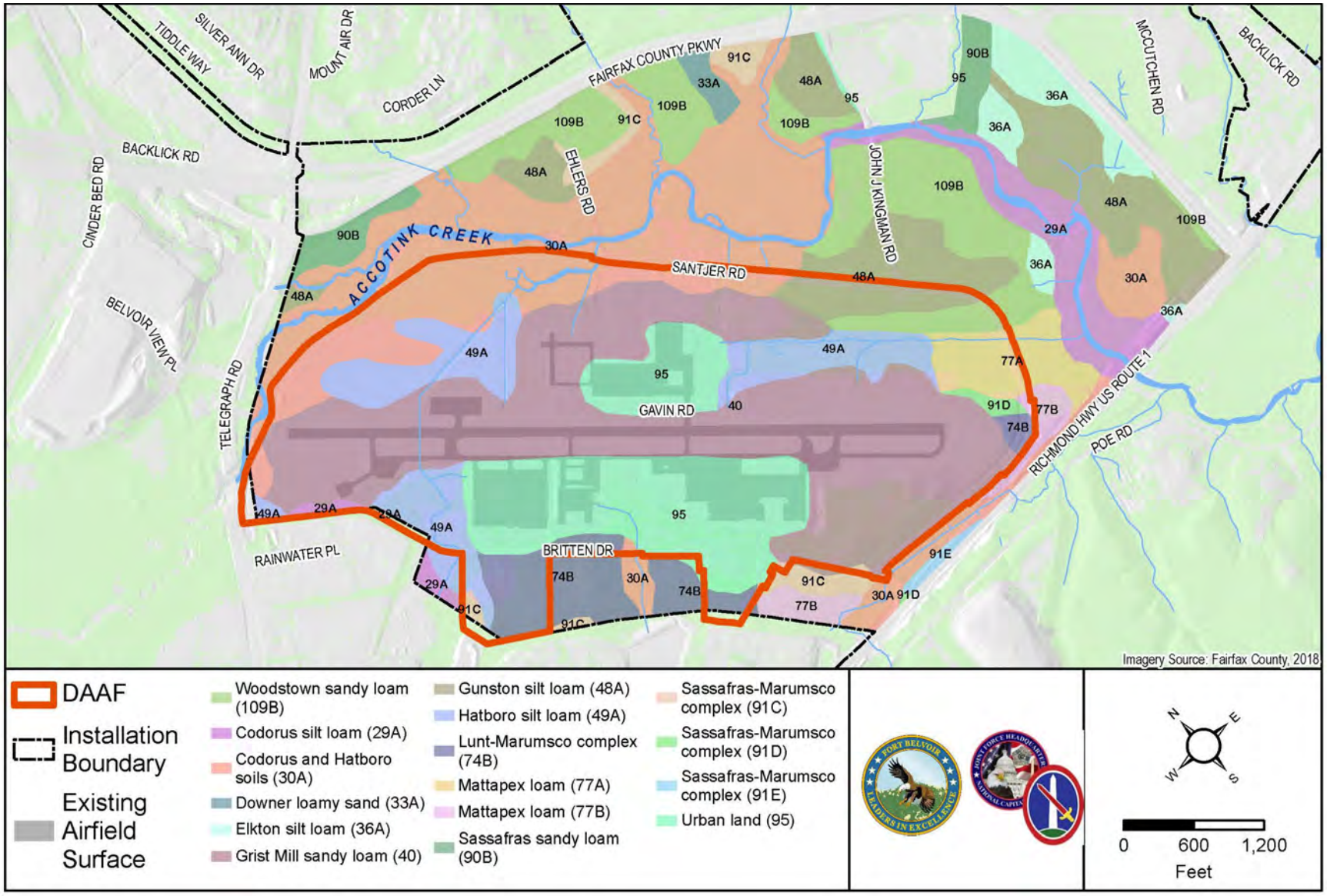


Figure 3.6-2: DAAF Soils



The developed areas that comprise DAAF are primarily underlain by the Grist Mill and Urban Land soil units. Grist Mill soils consist of sand, silt, and clay sediments of the Atlantic Coastal Plain, previously disturbed from development activities. Urban land soils are typified by an extensive amount of past land disturbance such that their traits and characteristics are unique as compared to soils in a more natural state. These soils are often associated with large, contiguous areas of impervious surfaces such as asphalt, concrete, or rooftop. The various soil units on DAAF provide different characteristics and suitability for construction (**Table 3.6-1**).

Soils classified as "hydric" may pose a development concern related to poor drainage, a high water table, or a high shrink/swell potential. Hydric soils are saturated, flooded, or ponded with water during the growing season, long enough to develop anaerobic (oxygen-deprived) conditions in the upper soil. Together with hydrophytic vegetation and other hydrologic characteristics, these soils are a potential indicator of wetland hydrology (NRCS, 2018). Hydric soils that occur on DAAF include Elkton silt loam and Hatboro silt loam (**Figure 3.6-2**), encompassing approximately 61 acres of land area. In other areas, soil units on DAAF contain components of Elkton silt loam and Hatboro silt loam. The hydric component of these soils ranges in content from less than 10 percent up to approximately 35 percent (NRCS, 2018).

Generally, facilities constructed on soils that are not stable or thick enough to support heavy loads require deep foundations. This is achieved by pile driving which forces structural components several feet below grade. Deep foundations include pile foundations that emulate a rock platform to provide structural stability or by drilling into bedrock. Piles may consist of various materials such as concrete, timber, and steel (Coastal Bridge, 2015). At the project level, depth of the foundation is determined by the extent and characteristics of the underlying soil media.

Soils classified as "prime farmland", pursuant to the FPPA, also occur on DAAF. At the state level, these soils are similarly designated as unique or important farmland resources. These lands are designated as such due to a combination of physical and chemical characteristics that support sustainable, high-valued crop production. Such characteristics are present in approximately 141 acres of DAAF soils (NRCS, 2018). However, the historic military use of DAAF constitutes an irreversible commitment to a non-agricultural land use and precludes the formal designation of these land areas as federal- or state-protected farmland.

Table 3.6-1: DAAF Soil Suitability for Construction

Soil Name (Map Symbol)	Soil Problem Class[1]	Soil Drainage[2]	Soil Erosion Potential[3]	Foundation Support[4]	Acres
Codorus silt loam (29A)	III	Poor	Low	Poor	31.0
Codorus and Hatboro soils (30A)	III	Poor	Low	Poor	153.1
Downer loamy sand (33A)	I	Good	Low	Good	3.5

Table 3.6-1: DAAF Soil Suitability for Construction (con't.)

Soil Name (Map Symbol)	Soil Problem Class[1]	Soil Drainage[2]	Soil Erosion Potential[3]	Foundation Support[4]	Acres
Elkton silt loam* (36A)	III	Poor	Low	Poor	15.8
Grist Mill sandy loam (40)	IVB	Fair	Medium	Fair	146.4
Gunston silt loam (48A)	III	Poor	Low	Poor	65.7
Hatboro silt loam* (49A)	III	Poor	Low	Poor	44.8
Lunt-Marumsco complex (74B)	III	Poor	Medium	Poor	27.5
Mattapex loam (77A, 77B)	II	Poor	Medium	Marginal	25.8
Sassafras sandy loam (90B)	I	Good	Medium	Good	11.6
Sassafras-Marumsco complex (91C, 91D, 91E)	III	Poor	High	Poor	15.0
Urban land (95)	IVB	NA	NA	NA	72.9
Woodstown sandy loam (109B)	IVA	Poor	Medium	Marginal	59.6
Total					**672.8**

Notes:
1. Soil Problem Class Ratings:
Soil Problem Class is based on severity of problems associated with these soils and the potential difficulty of analyzing and correcting those problems:

- Class I soils are undisturbed natural soils that typically have few characteristics that would adversely affect building foundations or surrounding land. A geotechnical investigation is advised but not required as a condition of site or grading plan approval.
- Class II soils are undisturbed natural soils that typically have shallow water tables or restrictive soil layers. A geotechnical investigation is strongly advised but not required as a condition of site or grading plan approval.
- Class III soils are undisturbed natural soils that have characteristics such as high shrink/swell potential, landslide susceptibility, high compressibility, low bearing strength, and shallow water tables, which may result in poor drainage, building settlement, unstable slopes, etc. Geotechnical problems must be addressed with adequate engineering evaluations and designs prior to development.
- Class IV soils are soils that have been disturbed or altered as a result of grading or construction resulting in soils with variable characteristics. Class IVA soils are disturbed soils that were originally Class III soils; a detailed geotechnical investigation and report are required. Class IVB soils are disturbed soils that were originally Class I or II soils; a limited geotechnical investigation is required.

Table 3.6-1: DAAF Soil Suitability for Construction (con't.)

Soil Name (Map Symbol)	Soil Problem Class[1]	Soil Drainage[2]	Soil Erosion Potential[3]	Foundation Support[4]	Acres

2. Soil Drainage Ratings:
   - Good = No significant problems expected. A "good" rating refers to permeable soils with a seasonal water table well below the ground surface.
   - Fair = Minor potential problems affecting design or construction
   - Marginal = Significant problems that must be considered in design and construction
   - Poor = Major problems that must be addressed during the design and construction to ensure satisfactory performance of structures. Soils with a "poor" rating have a seasonal high water table at or near the surface, permeable layers with slow infiltration rates, or are subject to frequent flooding.

3. Soil Erosion Potential Ratings:

Soil erosion potential is affected by texture (particle-size distribution), rock content, permeability, structure, and slope (either natural or man-made).
   - "Low" rated soils are not highly erodible except on steep unprotected cuts.
   - "Medium" rated soils are moderately erodible on 2-7 percent slopes and highly erodible on 7-15 percent slopes or greater.
   - "High" rated soils are highly erodible on 2-7 percent slopes or greater.

4. Foundation support ratings are based on empirical evidence concerning unstable slopes, soft or compressible soils with low bearing values, high shrink/swell clays, high seasonal water tables, and flooding potential.

Source: (Fairfax County DPWES & NVSWCD, 2013; NRCS, 2018)

3.7 Water Resources

3.7.1 Introduction

Water resources addressed in this EIS include groundwater, surface water (including water quality), wetlands, and floodplains.

Groundwater is water that collects or flows beneath the Earth's surface. It originates from precipitation and percolates through the ground surface, filling the porous spaces in soil, sediment, and rocks. Groundwater resources are often used for potable water consumption, agricultural irrigation, and industrial applications.

Surface water includes natural, modified, and constructed water confinement and conveyance features above groundwater that may have a defined channel and discernable water flows. Surface water features include streams, wetlands, springs, natural and artificial impoundments (e.g. ponds and lakes), and constructed drainage canals and stormwater ditches. Water quality in surface water bodies is influenced by a number of factors, and particularly by concentrations of terrestrial sediments and pollutants in stormwater flows discharged to receiving water bodies in urbanized areas.

Wetlands are areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal conditions do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (USACE, 1987). Wetlands serve a variety of functions including flood control, groundwater recharge, maintenance of biodiversity, wildlife habitat, recreational opportunities, and maintenance of water quality.

Floodplains are areas of low-lying, relatively flat ground adjacent to rivers, streams, large wetlands, or coastal waters with potential for periodic or infrequent inundation due to rain or melting snow. In their natural vegetated state, floodplains slow the rate at which incoming overland flows reach the adjacent water body. In addition to flood moderation, floodplains also function to recharge groundwater, maintain water quality, provide wildlife habitat, and provide recreational opportunities.

The ROI for water resources includes DAAF and areas downstream that are part of the Accotink Creek Watershed (**Figure 3.7-1**).

3.7.2 Groundwater

Groundwater resources underlying DAAF are characterized by two aquifer systems associated with the Lower (hereafter, the "lower Potomac aquifer") and Middle Potomac (hereafter, the "middle Potomac aquifer") Formations. The lower Potomac aquifer is situated within the bottom portion of the Potomac Formation between approximately 500 and 600 feet bgs. This confined aquifer system occurs between a layer of crystalline bedrock and a thick wedge of clay interbedded with sand. Groundwater in the lower Potomac aquifer flows to the southeast; recharge occurs via precipitation along the western portion of Fort Belvoir and areas farther north and west of the post (Fort Belvoir, 2018b). The lower Potomac aquifer is a drinking water supply for private wells that remain operable in some areas of northern Virginia due to lack of access to a public water supply system.

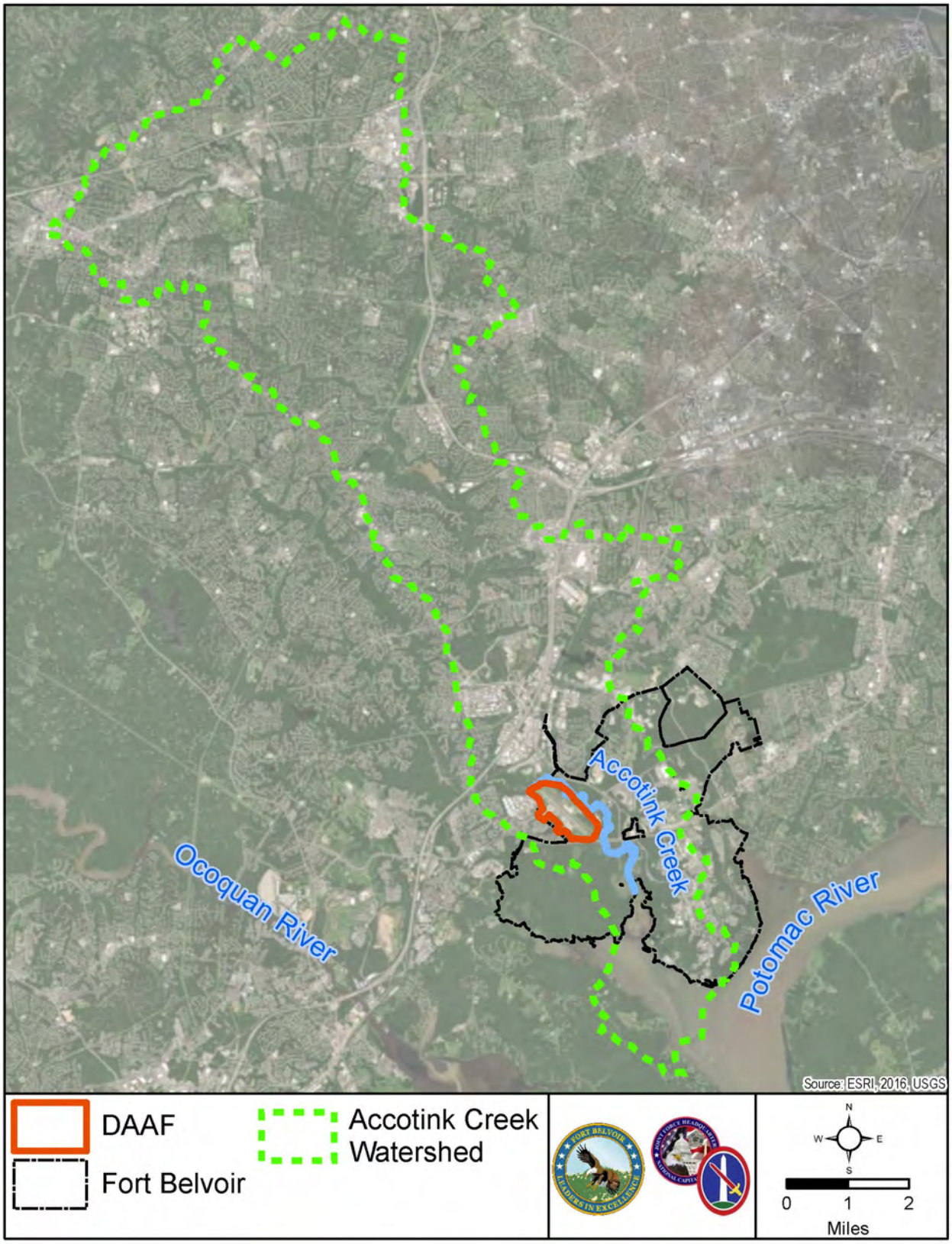
The middle Potomac aquifer, situated above the lower Potomac aquifer, is an unconfined system or perched (water table) aquifer. It consists of interbedded lenses of sand, silt, and clay that vary in thickness. Groundwater in this aquifer system is locally influenced by topography and drains towards nearby surface water features. Aquifer recharge occurs directly and indirectly via precipitation as either surface discharge or percolation through soil media (Fort Belvoir, 2018b).

Depth to the water table across Fort Belvoir is seasonally and geographically variable, ranging from approximately 10 to 35 feet bgs in most areas on post. In proximity to streams and other surface water features, however, the water table may occur at or near the surface as part of the unconfined aquifer system. In such areas, depth to water is typically less than 10 feet bgs. For example, in some areas adjacent to Accotink Creek, water table depth can be as little as 6 feet bgs (Fairfax County DPWES & NVSWCD, 2013; Fort Belvoir, 2018b).

Accidental releases to groundwater of petroleum products and other hazardous substances have previously occurred at DAAF. Sites on the airfield where such releases occurred have received administrative regulatory closure or letters of no further action (NFA) from applicable regulatory agencies. There are currently no active groundwater remediation sites at DAAF. Additional discussion of current and former contaminated sites at DAAF, referred to as Solid Waste Management Units (SWMUs) is presented in **Section 3.10.7**.

Potable water supply and distribution at Fort Belvoir, including DAAF, is provided and maintained by a private contractor. There are no active drinking water wells on DAAF.

Figure 3.7-1: Accotink Creek Watershed



3.7.3 Surface Water

Pursuant to the Clean Water Act (CWA) (33 USC §1251 et. seq., as amended), the National Pollutant Discharge Elimination System (NPDES) establishes thresholds on concentrations of various pollutants that can be discharged to surface waters to maintain and restore their water quality. In Virginia, the NPDES permit program is administered as the Virginia Pollutant Discharge Elimination System (VPDES) by VDEQ. The discharge of dredged or fill materials into surface waters, referred to as Waters of the US (WOUS), is regulated under Sections 404 (wetlands permitting) and 401 (water quality certification) of the CWA (**Section 3.7.5**). Water quality protections are also administered under the Safe Drinking Water Act (42 USC § 201, 300 et seq.) and Section 303(d) of the CWA, which requires states to identify and develop a list of impaired water bodies where technology-based and other required controls have not provided attainment of water quality standards.

Section 438 of the Energy Independence and Security Act (EISA) (42 USC § 17094) directs federal agencies to incorporate, to the maximum extent technically feasible, low impact development (LID)[6] measures to maintain the pre-development hydrology of a site for projects involving 5,000 square feet or more of land disturbance. DoD technical criteria and requirements for compliance with Section 438 of EISA are provided in UFC 3-210-10, Change 1, *Low Impact Development* (WBDG, 2016).

3.7.3.1 Accotink Creek and Accotink Creek Watershed

Accotink Creek

Accotink Creek originates in central Fairfax County approximately 12 miles northwest of DAAF. From its source, the creek flows 23 miles in a southeasterly direction and discharges to Accotink Bay between Fort Belvoir's Southwest Area and South Post. Accotink Bay is an inlet of Gunston Cove, which itself is an embayment of the Potomac River.

Accotink Creek and its tributaries are shallow, warm water streams reflecting ambient temperatures typical of the northern Virginia region. Under typical flow, Accotink Creek is a low gradient, relatively shallow (i.e., less than three feet) perennial stream with an unconsolidated streambed consisting of a mixture of cobble-gravel, sand, muds, and organic material. Tributary streams that feed into Accotink Creek include perennial, intermittent, and ephemeral streams composed of similar substrate.

An approximately 3.8-mile segment of Accotink Creek traverses Fort Belvoir's Main Post: approximately 2.3 miles of the creek is within the boundaries of DAAF between Telegraph Road and US Route 1, while the remaining 1.5-mile segment south of US Route 1 effectively separates the Southwest Area from South Post (an approximately one-mile segment of Accotink Creek also crosses FBNA approximately two miles north of DAAF; this segment is not addressed further in this EIS). Accotink Creek is tidally influenced from its confluence with Accotink Bay to US Route 1.

[6] LID measures include filtration, infiltration, evaporation, plant transpiration, and rainwater reuse to retain and treat stormwater onsite, in contrast to conventional management practices that temporarily store and ultimately discharge stormwater to receiving water bodies.

Within DAAF, Accotink Creek is bordered by steep creek banks ranging from four to over 10 feet in elevation. These steep banks and the common occurrence of rock and cobble accretion bars indicate that stormwater runoff discharged to the creek is sufficient to result in riparian erosion and scour during certain rainfall conditions. Tributaries of Accotink Creek entering DAAF from the east include Long Branch Creek and Kernan Run, which discharge to Accotink Creek approximately a half mile and one mile downstream of Telegraph Road, respectively. Neither of these tributaries receives stormwater runoff generated on the airfield. A number of shallow drainage ditches, some of which may be relict waterways, traverse the airfield and convey stormwater generated on DAAF to Accotink Creek.

Accotink Creek Watershed

The Accotink Creek watershed encompasses approximately 51 square miles (32,682 acres) and extends from Gunston Cove's confluence with the Potomac River to central Fairfax County near the City of Fairfax. Part of the Potomac River Basin, it is Fairfax County's second largest watershed and contains 111 miles of streams.

The majority of the Accotink Creek watershed's land area (approximately 28,969 acres, or 89 percent) is upstream of Main Post and DAAF (**Table 3.7-1**). Existing land use in the watershed is primarily classified as urban and suburban. Eighty-seven (87) percent of the watershed's land area is developed while 13 percent consists of either open space or water. Approximately 27 percent (8,971 acres) of the watershed's land area consists of impervious surface, the majority of which (approximately 8,651 acres, or 96 percent) is upstream of Main Post and DAAF (Fairfax County DPWES, 2011).

Table 3.7-1: Accotink Creek Watershed Impervious Surface

Geographic Area	Area		Impervious Surface	
	Acres	Percent	Acres	Percent
Accotink Creek Watershed	32,682	100	8,971	27
Accotink Creek Watershed Upstream of Main Post/DAAF	28,969	89	8,651	30
Proportion of Watershed Impervious Surface Upstream of DAAF				96

Source: Fairfax County DPWES, 2011; Fort Belvoir, 2018b

Undeveloped and forested areas in the Accotink Creek watershed lie primarily in parkland along stream corridors or within the boundaries of Fort Belvoir. Based on analysis of US Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) data, an estimated 1,043 acres of wetlands are located within the watershed.

Approximately 3,708 acres of the Accotink Creek watershed is within Fort Belvoir's Main Post (**Table 3.7-2; Figure 3.7-1**). This area represents approximately 11 percent of the watershed's total land area and includes portions of North Post, South Post, the Southwest Area, and the entirety of DAAF. The Accotink Creek watershed is the largest on Fort Belvoir and drains approximately 44 percent of Main Post. Watershed studies conducted at Fort Belvoir have subdivided the Accotink Creek watershed into 13 sub-watersheds on Main Post; these sub-watersheds are used in **Table 3.7-2** to organize and summarize characteristics of the Accotink Creek watershed on Fort Belvoir.

Approximately 11 percent (405 acres) of the Accotink Creek watershed on Fort Belvoir consists of impervious surfaces while forested and open areas comprise the remaining 89 percent (3,306 acres). Wetlands account for nearly 16 percent (583 acres) of the watershed's land area within Fort Belvoir and represent more than half of the total wetlands within the entire Accotink Creek watershed as noted above (note that percentages of land cover types exceed 100 percent due to overlap among land cover classifications; e.g., wetlands can occur within areas identified as "Forest" and "Open"). The Accotink Creek watershed within Fort Belvoir contains the third highest percentage of wetlands (13.5 percent) on the installation after the Pohick Creek (20 percent) and Dogue Creek (18 percent) watersheds (Landgraf, 1999, as cited in US Army 2018, 2018).

Table 3.7-2: Accotink Creek Watershed Characteristics on Main Post

Sub-watershed	Size (acres)	Impervious Surface		Forest		Open Area		Wetlands	
		Acres	Percent	Acres	Percent	Acres	Percent	Acres	Percent
1	133.2	19.8	14.9	71.4	53.6	42.0	31.5	8.8	6.6
2	62.4	12.6	20.2	38.4	61.6	11.4	18.2	11.5	18.5
29	147.8	37.9	25.6	53.5	36.2	56.4	38.2	8.9	6.0
30	699.6	121.2	17.3	296.8	42.4	281.7	40.3	23.0	3.3
37	344.1	21.0	6.1	255.7	74.3	65.5	19.0	9.7	2.8
38	205.9	9.8	4.7	85.2	41.3	111.0	53.9	15.9	7.7
39	97.9	45.3	46.2	11.0	11.2	41.7	42.5	1.4	1.5
40[1]	7.7	0.8	10.8	1.9	24.3	5.0	64.8	1.1	14.7
41[1]	21.2	5.6	26.4	7.9	37.1	7.7	36.5	5.9	27.6
42[1]	352.1	55.1	15.6	171.3	48.7	113.7	32.3	33.6	9.5
43[1]	154.9	35.6	23.0	44.9	29.0	92.4	59.6	1.8	1.1
44	329.9	7.9	2.4	266.9	80.9	55.2	16.7	10.7	3.2
52[1]	1,150.9	32.8	2.8	920.6	80.0	197.6	17.2	451.0	39.2
Sub-total – Sub-watersheds Draining DAAF[2]	*1,686.9*	*129.9*	*7.7*	*1,146.6*	*68*	*416.4*	*24.7*	*493.4*	*29.2*
TOTAL	**3,708**	**405.4**	**10.9**	**2,225.3**	**60.0**	**1,081.2**	**29.2**	**583.4**	**15.7**

Notes:

1. Indicates sub-watersheds that drain DAAF.
2. Calculated by totaling rows 40, 41, 42, 43, and 52.

Source: (Fort Belvoir, 2018b)

Accotink Creek sub-watersheds draining DAAF account for almost half (1,686.9 acres, or approximately 45 percent) of the land area of the creek's sub-watersheds on Main Post (**Table 3.7-2**). Impervious surfaces cover slightly less than 8 percent of the DAAF sub-watersheds. Forest and open areas account

for 68 percent and about 25 percent of the land area within the airfield's sub-watersheds, respectively while wetlands are suspected to be present over nearly 30 percent of those sub-watersheds.

3.7.3.2 Water Quality

Virginia Surface Water Classifications

The Commonwealth of Virginia promulgates regulations for evaluating, classifying, and monitoring the quality and uses of surface waters. These regulations include "beneficial use designations" that describe the potential or realized capacity of a waterbody to provide defined ecological and human population benefits. A summary of the beneficial use designations for Accotink Creek is provided below.

To minimize or prevent the degradation of surface water quality, the Commonwealth of Virginia has developed regulations (9 VAC 25 260-30) that establish three levels (or tiers) of antidegradation criteria for all state surface waters:

- **Level I:** waters where existing water quality and uses need to be maintained.
- **Level II:** waters that are exceeding water quality standards.
- **Level III:** exceptional waters where no new discharges of pollution are allowed; these waters are required to be listed in the VAC.

Accotink Creek is designated as Level III water (Nontidal Waters Coastal and Piedmont Zones). VDEQ has established surface water quality standards **(Table 3.7-3**) that protect designated uses for Level III surface waters in Virginia. Water quality standards consist of three components: use designations, general and numeric water quality criteria necessary to protect those uses, and an anti-degradation statement.

Table 3.7-3: Virginia Water Quality Standards and Fish Tissue Screening Levels

Water Quality Parameter	Units	Criteria
Water temperature: Level III nontidal waters [a]	°C	32 (instantaneous maximum)
Dissolved oxygen: Level III nontidal waters	mg/l	4.0 (instantaneous minimum); 5.0 (daily average)
Dissolved oxygen: Level II tidal waters [b]	mg/l	30-day mean > 5.5 mg/l (tidal habitats with 0-0.5 parts per trillion [ppt] salinity) 30-day mean > 5 mg/l (tidal habitats with >0.5 ppt salinity) 7-day mean > 4 mg/l Instantaneous minimum > 3.2 mg/l at temperatures < 29°C
pH	SU	6.0 - 9.0
Fecal coliform bacteria [c]	#/100 ml	200/400
Escherichia coli [d]	#/100 ml	126/235
Enterococci [e]	#/100 ml	35/104

Table 3.7-3: Virginia Water Quality Standards and Fish Tissue Screening Levels (con't.)

Water Quality Parameter	Units	Criteria			
Other Parameters					
Parameter	**Units**	**Aquatic life—freshwater acute**	**Aquatic life—freshwater chronic**	**Human health—public water supplies**	**Human health—all other surface waters**
Total polychlorinated biphenyls (PCB) (water) [f]	µg/l	NA	NA	0.00064	0.000064
Total PCB (fish tissue screening level) [f]	ppb	NA	NA	54	54
Benzo(k)fluoranthene (water) [f]	µg/l	NA	NA	0.038	0.18
Benzo(b)fluoranthene (water) [f]	µg/l	NA	NA	0.038	0.18
Chrysene (water) [f]	µg/l	NA	NA	0.038	0.18

Notes:
°C = degrees Celsius; mg/l = milligrams per liter; µg/l = micrograms per liter; ppb = parts per billion; ppt = parts per trillion; SU = standard unit
a. Temperature criteria are not specified for Class II tidal waters.
b. Open Water criteria shown. For information on seasonal dissolved oxygen criteria for specific designated uses refer to Virginia Water Quality Standards 9 VAC 25-260-185. For information on implementation of dissolved oxygen criteria for naturally low dissolved oxygen waters refer to 9 VAC 25-260-55.
c. The Virginia fecal coliform bacteria standard for primary contact recreational waters is as follows: "Fecal coliform bacteria shall not exceed a geometric mean of 200 fecal coliform bacteria per 100 ml of water for two or more samples over a calendar month nor shall more than 10 percent of the total samples taken during any calendar month exceed 400 fecal coliform bacteria per 100 ml of water." For information on fecal coliform criteria for shellfish waters refer to Virginia Water Quality Standards 9 VAC 25-260-160.
d. The Virginia Escherichia coli standard for primary contact recreational waters (freshwaters) states that Escherichia coli shall not exceed a geometric mean of 126 per 100ml for two or more samples over any calendar month and shall not exceed a single sample maximum of 235 per 100 ml (9 VAC 25-260-170)
e. The Virginia enterococci standard for primary contact recreational waters (saltwater and transition zone) states that enterococci shall not exceed a geometric mean of 35 per 100ml for two or more samples over any calendar month and shall not exceed a single sample maximum of 104 per 100 ml.
f. Virginia Criteria for Surface Water; 9VAC25-260-140, State Water Control Board
Source: 9 VAC 25-260-140

Water quality standards have the dual purposes of establishing water quality goals for specific waterbodies and serving as the regulatory basis for establishing water quality-based treatment controls and strategies. All streams in Virginia, including Accotink Creek, are minimally assigned the uses of recreation (e.g., swimming and boating); propagation and growth of a balanced, indigenous population of aquatic life, including game fish species that might reasonably be expected to inhabit them; wildlife; and the production of edible and marketable natural resources (e.g., fish and shellfish).

In addition to Virginia's water quality standards, AR 200-1 requires installations to conserve, protect, and restore surface water resources (including wetlands, estuaries, streams, and lakes) (US Army, 2007a).

Accotink Creek Water Quality

Under Section 303(d) of the CWA, the Commonwealth of Virginia is required to identify and develop a list of waterbodies that are impaired and for which technology-based and other required controls have not resulted in attainment of water quality standards. VDEQ uses ambient water quality, sediment, fish tissue, and other available data to assess water quality conditions, threats to human health, and the impairment status for each waterbody. Current and historical water quality data for Fort Belvoir watersheds are available from VDEQ, the Fairfax County Health Department, and USEPA.

Accotink Creek is listed as a non-attainment waterbody from the confluence of Calamo Branch to the downstream tidal waters of Accotink Bay, which includes the segment of the stream within DAAF. The impaired use is the consumption of fish by recreational fishermen as well as piscivorous wildlife due to elevated levels of PCB in fish tissue. In addition, water quality in Accotink Creek is a concern due to elevated bacteria levels, as well as observed impacts on the benthic community. These impairments and concerns are primarily related to intensive urbanization within the portion of the watershed upstream of DAAF, which result in large areas of impervious surface (i.e., exceeding 20 percent of the watershed's land area) and correspondingly high concentrations of pollutants in and increased volumes of stormwater runoff discharged to Accotink Creek from those urbanized areas.

Two VDEQ monitoring stations are located on Accotink Creek in the vicinity of DAAF: station 1AACO004.84 is located at the upstream boundary of DAAF and station 1AACO002.50 is located at DAAF's downstream boundary at US Route 1. These stations monitor pollutants in support of the creek's CWA 303(d) listing and to monitor progress in achieving applicable total maximum daily loads (TMDL) (i.e., regulatory thresholds on concentrations of particular pollutants in surface water). Of the parameters monitored by those stations, dissolved oxygen (DO) has shown reduced levels in Accotink Creek at the upstream monitoring station. In addition to chemical and bacteria levels, habitat condition is also a primary factor influencing the biological condition of a waterway. Accotink Creek exhibits typical urban habitat degradation, including low bank stability, increased bank erosion, and the consequent sedimentation of the stream bottom.

In 2001, Fairfax County conducted a *Stream Protection Strategy Baseline Study* in which twelve sampling sites were monitored for a variety of parameters along the length of Accotink Creek. The study showed that throughout most of the watershed, Accotink Creek was characterized by severely incised stream channels and active stream widening in most of the smaller tributaries. Unstable habitat and sediment bars, eroded banks, tree falls, and log jams were widespread throughout. The poor and very poor overall rankings of the monitored stream segments and sites are consistent with the fact that many of those segments flow through intensively urbanized areas with greater than 25 percent imperviousness. The study noted a lack of fish diversity and only a few insects collected were intolerant of degraded conditions (Fairfax County DPWES, 2011).

Fort Belvoir collects samples of runoff discharged from three representative outfalls from DAAF to Accotink Creek biannually in compliance with VPDES permit requirements (**Section 3.7.4**). Water samples are analyzed for regulated pollutants including total suspended solids (TSS), pH, total petroleum

hydrocarbons (TPH), total nitrogen (TN), total phosphorus (TP), and metals, among others. Sampling results are reported to VDEQ and corrective action taken when maximum allowable limits are exceeded.

3.7.4 Stormwater

Stormwater generated on DAAF is conveyed through a network of inlets, pipes, culverts, ditches, and human-made as well as naturally occurring channels, and ultimately discharged to Accotink Creek. The management and discharge of stormwater generated by airfield-related operations and facilities at DAAF is regulated by VPDES Industrial Stormwater Major Permit #VA0092771 administered by VDEQ. Requirements of the permit include biannual sampling and quarterly visual inspections of stormwater discharge outfalls, adherence to requirements of the Chesapeake Bay TMDL and limitations on concentrations of TSS, TP, and TN discharged in stormwater, and monitoring benchmarks for propylene glycol, TPH, dissolved copper, and DO. Discharge limitations for chlorides and sediment specified in TMDLs for Accotink are also included as monitoring benchmarks in the permit.

As a condition of permit coverage, DAAF is required to maintain and adhere to the requirements of a stormwater pollution prevention plan (SWPPP). DAAF's SWPPP identifies all sources of stormwater discharges at the facility, actual and potential sources of stormwater contamination, and requires the implementation of both structural and non-structural best management practices (BMPs) to reduce the impact of stormwater runoff on the receiving water body to the maximum extent practicable and meet water quality standards. The Major Industrial Stormwater Permit and accompanying SWPPP must be revised accordingly to incorporate and address any changes in operations, outdoor material storage areas, de-icing and anti-icing activities, aircraft maintenance activities and wash racks, or similar activities that affect the quantity and quality of stormwater generated on and discharged from the airfield. Runoff from existing aircraft wash racks on DAAF is discharged to the airfield's sanitary sewer system. New aircraft wash racks constructed on DAAF require the installation of an O/WS to manage associated runoff in accordance with applicable regulations.

Stormwater generated by land-disturbing activities of 2,500 square feet or more and the operation and maintenance of the airfield's stormwater management ponds are regulated under Fort Belvoir's VPDES Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems (MS4) (Permit No. VAR040093). Under this permit, contractors for projects disturbing 2,500 square feet or more of land must prepare and adhere to an E&SC plan in accordance with 9VAC25-840-40 and stormwater management (SWM) plan in accordance with 9VAC25-870-55. The MS4 permit also requires projects disturbing one acre or more of land to obtain coverage under Virginia's General Permit for Discharges of Stormwater from Construction Activities (Construction General Permit [CGP]). In addition to the E&SC and stormwater management requirements described above, contractors requesting coverage under the CGP must submit a Registration Statement to VDEQ and prepare and adhere to a site-specific SWPPP. Adherence to the requirements of the CGP and E&SC and SWM plans manages the quantity and quality of stormwater discharged from land-disturbing activities and minimizes adverse effects on water quality in receiving water bodies.

Surface water quality in watersheds with impervious cover of 10 percent or more may exhibit characteristics of degradation or impairment (USEPA, 2019a). Watersheds with 20 percent or more

impervious surface may have surface water quality that can be considered substantially degraded or impacted (Chesapeake Bay Foundation, 2004). As noted above, approximately 11 percent (405 acres) of the Accotink Creek watershed on Fort Belvoir, which includes DAAF, consists of impervious surface. The discharge of stormwater in accordance with the requirements of DAAF's industrial stormwater permit and Fort Belvoir's MS4 permit minimizes the potential for further degradation of water quality in receiving water bodies from runoff generated in developed areas such as DAAF.

3.7.5 Wetlands, Streams, and Chesapeake Bay Resource Protection Areas

3.7.5.1 Wetlands and Streams

Wetlands and streams are protected as WOUS under Section 404 of the CWA, which authorizes the United States Army Corps of Engineers (USACE) to issue permits for the discharge of dredged or fill materials into such waters. Such permits require project proponents to avoid, mitigate, or compensate for impacts on wetlands to ensure "no net loss" of wetlands in accordance with the *Compensatory Mitigation for Losses of Aquatic Resources Final Rule* (40 CFR Part 230) issued jointly by USACE and USEPA in 2008. Permitting requirements generally specify mitigation measures, such as wetland or stream restoration, payment of fees, or purchase of wetland banking credits, for projects temporarily or permanently impacting 0.1 acre or more of wetlands.

Section 401 of the CWA authorizes states and regional boards to issue water quality certifications to regulate any proposed federal activity that could result in a discharge to water bodies, including wetlands. States may issue water quality certifications with or without conditions, or deny certification for activities that might result in a discharge to water bodies.

EO 11990, *Protection of Wetlands*, requires that federal agencies provide leadership and take actions to minimize or avoid the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands. Federal agencies are to avoid new construction in wetlands unless the agency finds there is no practicable alternative to construction in the wetland and the proposed construction incorporates all possible measures to limit harm to the wetland. When making such determinations, the evaluation process follows the same eight-step decision-making process as stipulated for EO 11988, *Floodplain Management* (**Section 3.7.6**).

Wetlands cover an estimated 1,250 acres on Main Post (Fort Belvoir, 2018a). There are an estimated 192 acres of wetlands on DAAF[7] (**Figure 3.7-2**). Most wetlands on the airfield have been identified through planning-level surveys conducted for individual projects (Fort Belvoir, 2018b). To support development of the DAAF ADP and the analysis in this EIS, preliminary wetlands delineations were conducted on the northeast and southwest sides of DAAF in July 2017 and August 2018 (**Appendix C**). The delineations were conducted in accordance with the United States Army Corps of Engineers *Wetlands Delineation Manual* (1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region* (Version 2.0, 2010). A total of 3.3 acres of

[7] Wetlands on DAAF identified as a Coastal Plain/Piedmont Acidic Seepage Swamp are discussed in **Section 3.8.4.2**, ***Rare Ecological Communities***.

wetlands were delineated during these surveys; this area is incorporated into the total area of wetlands on DAAF described above. Evaluations of physical, hydrologic, and biological conditions at the airfield and review of NWI mapping developed by USFWS were performed as part of the delineations (Avatar Environmental, 2018).

Palustrine emergent (PEM) wetland hydrology occurs on the northeast side of the airfield as depressional areas, well-defined drainage patterns, inundation on aerial imagery, and saturation. These wetlands are dominated by erect, rooted, herbaceous, perennial hydrophytic vegetation suited to growing in wet conditions (Cowardin et al., 1979). Palustrine forested (PFO) wetland hydrology occur by depressional areas, stained leaf litter, standing water, darkened soil, muck, buttressed tree trunks and moss trim lines, drift deposits, and detritus. These wetlands are dominated by trees and shrubs at least 20 feet tall with a tolerance to a seasonally high water table (Cowardin et al., 1979). Forested wetlands typically have a mature tree canopy with a diverse range of understory and herbaceous community structure and species (Avatar Environmental, 2018).

3.7.5.2 Chesapeake Bay Resource Protection Areas

The Virginia General Assembly enacted the Chesapeake Bay Preservation Act (CBPA) in 1988 to improve water quality in the Chesapeake Bay and other waters of the state by requiring effective land management and land use planning. The CBPA sets limits on development within Chesapeake Bay Resource Protection Areas (RPAs), and sets requirements for removal of nutrients from stormwater from developments in resource management areas. RPAs are defined in the CBPA as a vegetative buffer no less than 100 feet wide located adjacent to and landward of all tidal shores, tidal wetlands, and non-tidal wetlands connected by surface flow and contiguous to tidal wetlands along water bodies with perennial flow.

The purpose of RPAs is to maintain or restore a vegetated buffer between development and tributaries to the Chesapeake Bay, with the assumption that such a buffer would trap pollutants in runoff before they reach the Bay. Development in RPAs is restricted to water dependent activities, maintenance of public facilities, passive recreation, water wells, and historic preservation; redevelopment of existing uses is also allowed in RPAs. Fairfax County regulates proposed development activities within RPAs by requiring the preparation of a Water Quality Impact Assessment (WQIA).

Figure 3.7-2: Surface Water Features on DAAF

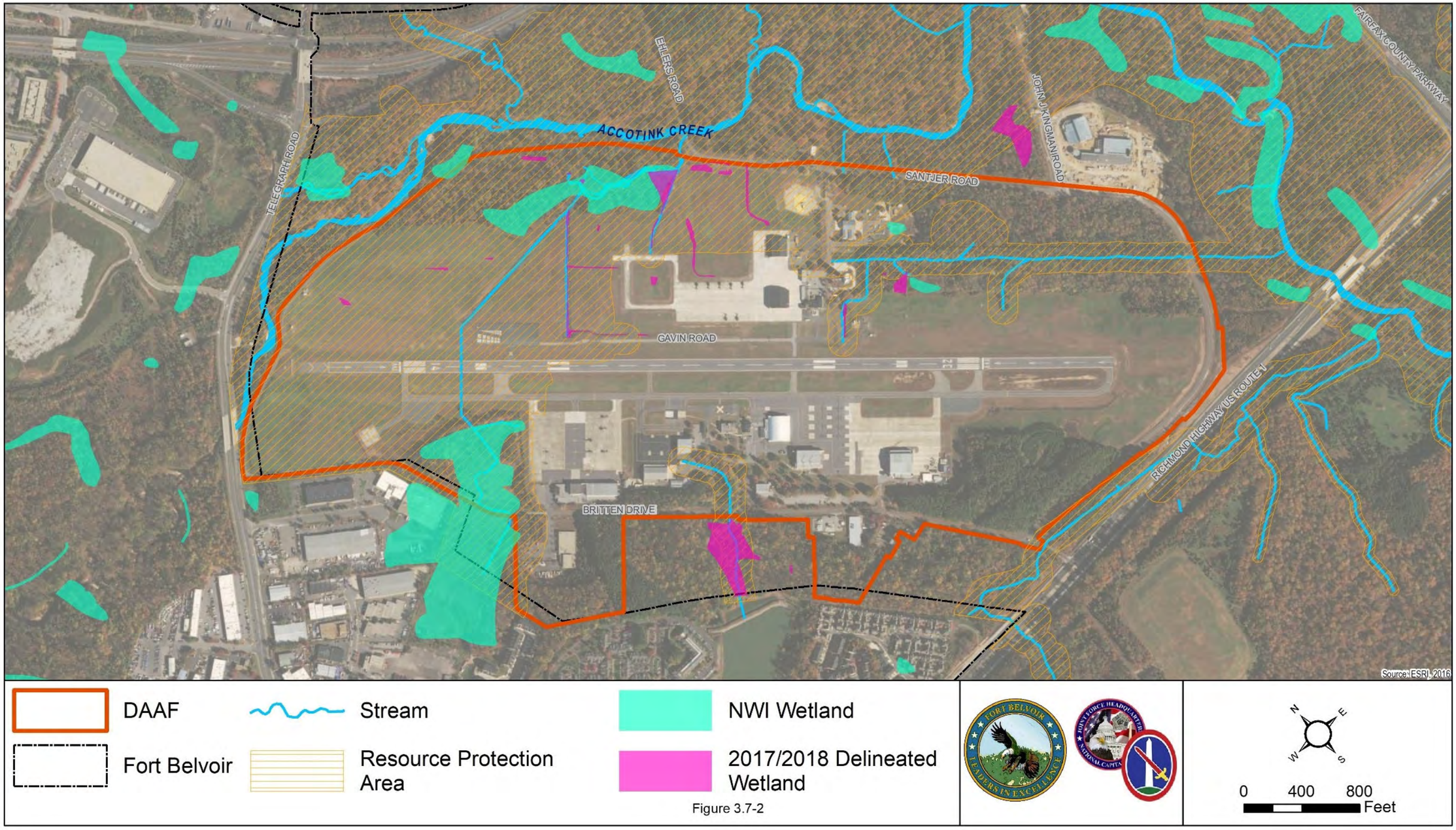


Figure 3.7-2

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Based on planning-level assessments, approximately 2,700 acres of Chesapeake Bay RPAs have been identified on Fort Belvoir[8]. In addition to the 100-foot vegetated buffers described above, RPAs on the installation also include 100-year floodplains and 35-foot buffers adjacent to all intermittent streams (Fort Belvoir, 2018b). On DAAF, RPAs encompass the 100-year floodplain associated with Accotink Creek and cover much of the northern and eastern sides of the airfield including a segment of the northern end of the runway and adjacent taxiway (**Figure 3.7-2**). Other RPAs on the airfield are adjacent to an intermittent drainage that extends from the vicinity of Gavin Road to the southern end of the airfield near US Route 1; along the southwestern side of the airfield adjacent to US Route 1; and on the western side of DAAF between existing facilities and the airfield boundary. RPAs on DAAF cover approximately 420 acres. Some areas designated as RPAs on Fort Belvoir and DAAF may not fully function as buffers due to the presence of existing development and/or a lack of vegetative cover.

3.7.6 Floodplains

EO 11988, *Floodplain Management* requires federal agencies to determine whether a proposed action would occur within a floodplain and to avoid floodplains, to the maximum extent possible, when there is a practicable alternative. For the reasons discussed in **Section 2.2.3.2**, the Army has determined that certain facilities and infrastructure proposed in the ADP necessitate development in the 100-year floodplain on DAAF. In such cases, all alternative siting considerations for those particular facilities and infrastructure would adversely affect the mission and/or the safe operation of the airfield.

When making such determinations, the Federal Emergency Management Agency (FEMA) directs federal agencies to follow an eight-step decision-making process for development in high-hazard areas, such as floodways, unless demonstrably inappropriate. This EIS documents and incorporates the Army's decision-making process in accordance with EO 11988. With respect to the floodplains on DAAF, the planning process began with development of the ADP and tentative decisions on where to site new facilities and infrastructure. The resultant siting decisions considered multiple factors, including the mission, safety, and relevant environmental constraints on and around the airfield. When necessary, these considerations included flood characteristics, such as anticipated design water level, flow velocity and depth, and subsidence, among others.

In support of this EIS, the Army conducted internal and external scoping concerning the Proposed Action to further identify and evaluate alternatives to siting in the 100-year floodplain on DAAF. This EIS will also provide opportunity for interested stakeholders and the public at-large to participate in decisions regarding the Proposed Action and Alternatives under evaluation. Through such efforts, consistent with EO 11988, decisions and findings with respect to floodplains on DAAF will also be subject to public review and explanation. Based upon known and available project-specific data, management and design measures to minimize potential adverse floodplain effects are also identified, considered, and documented in this EIS, as appropriate.

[8] Site-specific Chesapeake Bay RPA delineations (or the perennial flow determinations and wetland delineations that support an RPA delineation) have not been conducted on Fort Belvoir, except for projects in an advanced stage of site planning or permitting.

FEMA defines the 100-year floodplain as an area adjacent to a water body that has a 1 percent or greater chance of inundation in any given year. There are two delineations within the boundary of the 100-year floodplain, the *floodway* and *flood fringe*. The *floodway* comprises the channel of a watercourse and its adjacent land area that must remain free of obstruction in order to discharge the base flood without any increase in water surface elevation. Floodways are designated and mapped through detailed engineering studies. The *flood fringe* is the area between the floodway boundary and outer extent of the floodplain. By comparison, the flood fringe can be completely obstructed without increasing the water surface of the base flood more than 1 foot at any point.

On DAAF, the 100-year floodplain occurs in association with Accotink Creek and its contributing ground and surface waters where portions of FEMA Flood Insurance Rate Maps (FIRMs) 51059C0380E and 51059C0385E extend onto the airfield. These FIRMs depict the 100-year floodplain on DAAF as Zone A, an area for which the base flood elevation has not been determined (FEMA, 2010a; FEMA, 2010b). Floodplains depicted as Zone A on FEMA FIRMs are based on approximate analyses (e.g., interpretation of data shown on maps and aerial imagery).

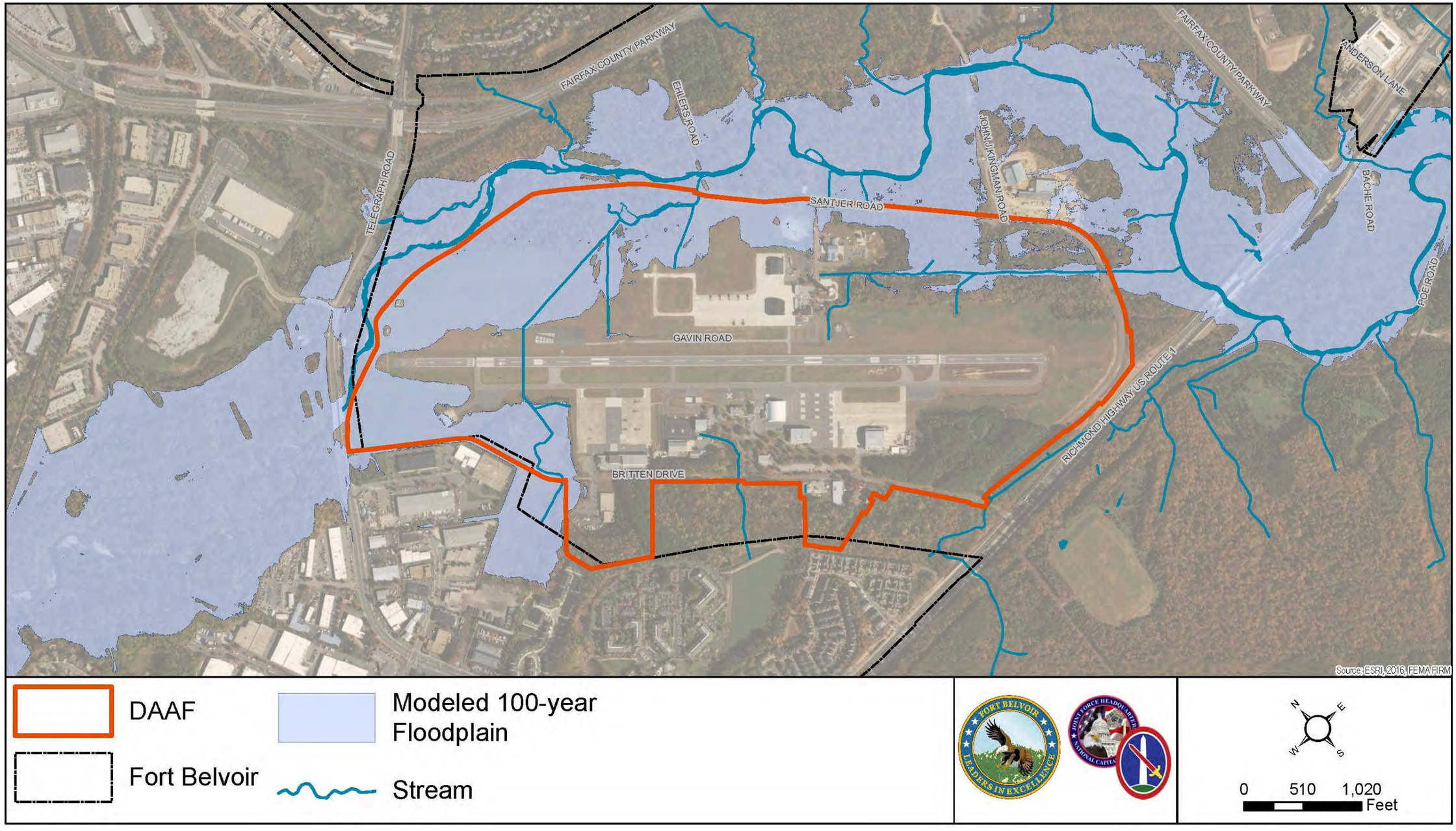
EO 11988 requires federal agencies to determine the effects of a proposed action on floodplains using maps produced by HUD, FEMA, or a more detailed map, if available. If such maps are not available, the agency shall make a determination of the location of the floodplain based on the best available information. The effective FEMA FIRMs covering DAAF were last updated in 2010 and, as noted above, are based on approximate analyses. Based on development that has occurred near DAAF and Fort Belvoir since 2010, floodplain data depicted on the FEMA FIRMs was considered outdated and inaccurate to support a defensible analysis of potential impacts from the Proposed Action. Fort Belvoir-maintained GIS data depicting the 100-year floodplain on DAAF was also determined to be out-of-date.

Therefore, to support the floodplain impact analysis in this EIS, the Army modeled the 100-year floodplain on DAAF (**Figure 3.7-3**) using a FEMA-approved software program, the Hydrologic Engineering Center-River Analysis System (HEC-RAS). HEC-RAS is a USACE-developed data model that can be used to determine the extent of a floodplain based upon various site-specific geometric and hydrologic inputs (Avatar and AECOM, 2019).

FEMA is currently updating floodplain mapping in the vicinity of DAAF and Fort Belvoir. USACE and FEMA have agreed for FEMA to provide hydrologic flow input values for use in the USACE HEC-RAS model to update the Accotink Creek 100-year floodplain on DAAF. Once complete, USACE will provide FEMA with all hydraulic modeling and floodplain mapping for Accotink Creek developed for this EIS. This will ensure that the analysis presented in this EIS will be consistent with the floodplain shown on future FEMA FIRMs covering DAAF.

To determine the current extent of the 100-year floodplain on DAAF, geometric cross sections for the study area on DAAF were established by incorporating 1-meter resolution digital elevation data into the HEC-RAS model. These data were supplemented by field survey data of areas within the immediate stream channel. Geometric inputs to the model also included data for the various road/bridge crossings within the study area.

Figure 3.7-3: 100-Year Floodplain at DAAF



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Hydrologic inputs (i.e., flow rates) to the HEC-RAS model for DAAF included data corresponding to the 10-, 25-, 50-, 100-, and 500-year probability storm events (corresponding to a 10%, 4%, 2%, 1%, and 0.2% annual chance of occurrence, respectively) taken from points downstream of I-95 to Accotink Bay. Since Accotink Creek is not gaged in the section that traverses the airfield, the Army estimated peak flow rates for this segment in accordance with US Geological Survey's (USGS) *Methods and Equations for Estimating Peak Stream Flow per square mile in Virginia's Urban Basins, Scientific Investigations Report 2014-5090.* The equations put forth by this publication are the result of statistical analyses of gaged flow rates and drainage areas for urban watersheds in Virginia that can be used to estimate peak flow rates for similar, ungaged streams.

As delineated by the HEC-RAS model, the extent of the 100-year floodplain on and in the immediate vicinity of DAAF covers approximately 276 acres of land, north and south of Accotink Creek. Its northern extent overlies much of DAAF between Accotink Creek and Fairfax County Parkway; the southern extent of the floodplain covers areas on and adjacent to DAAF. To the south of Accotink Creek, the floodplain extends into the northern portion of the airfield and covers most of the area west of the runway end point. It also abuts a smaller area immediately southwest of the developed airfield (**Figure 3.7-3**). This modeled 100-year floodplain is used as the baseline for the impact analysis in **Section 4.7.3.5**.

The Army has prepared a detailed floodplain impact analysis for the Proposed Action that describes the HEC-RAS methodology and modeling outputs that were produced. A copy of this analysis is included as **Appendix D** of this EIS.

3.8 Biological Resources

3.8.1 Introduction

Fort Belvoir, including DAAF, contains large tracts of forests, wetlands, and other natural habitats that support a diverse assemblage of wildlife. The installation is in an ecologically complex area where three ecological subregions converge: the Outer Piedmont subregion of the Piedmont Plateau to the west; Coastal Plain ecoregion to the east; and Upper Atlantic Coastal Plain subregion of the Eastern Broadleaf Forest (Oceanic) ecoregion to the north. Habitats on Fort Belvoir range from terrestrial upland forests, grasslands, and undeveloped and maintained fields; freshwater wetlands, seepage swamps, and brackish tidal marshes; and piedmont streams, tidal creeks and rivers, and estuarine coastal embayments. Plants and wildlife that use these habitats are typical of floral and faunal assemblages whose distributions are governed largely by the climate of the mid-Atlantic. The installation occupies an important location for many bird species along the Atlantic Flyway, a major North American bird migration route, near the connection of a principal migratory route from the southeastern Great Lakes.

The federal ESA of 1973 and subsequent amendments provide for the conservation of threatened and endangered species of animals and plants, and the habitats in which they occur. The ESA prohibits jeopardizing endangered and threatened species or adversely modifying critical habitats essential to their survival. Section 7(a)(2) of the ESA requires federal agencies to ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of any listed endangered or threatened species or result in the destruction or adverse modification of designated critical habitat.

Federal agencies are required to consult with USFWS or National Marine and Fisheries Service if an action may affect a listed species. Copies of Section 7 consultation correspondence regarding the Proposed Action are provided in **Appendix A**.

The Migratory Bird Treaty Act (16 USC §§703-712) implements four treaties with the US and Canada, Mexico, Japan, and Russia in the conservation and protection of migratory birds. The MBTA makes it illegal to pursue, hunt, take, capture, or sell migratory birds or any of their parts (e.g., feathers, eggs, nests), alive or dead. More than 1,000 species are protected under the MBTA. The regulatory definition of "migratory bird" as applied in this context, and detailed in 50 CFR §§10.12 and 10.13, is broad and includes most native birds found in the United States, including species that do not migrate. The USFWS is responsible for administering the provisions of the Act and maintaining a list of bird species protected under the Act. Projects potentially disturbing migratory birds or their habitat on the installation must adhere to the requirements of Fort Belvoir Policy Memorandum #78, *Conservation of Migratory Birds*.

Biological resources on Fort Belvoir are valued for their intrinsic, aesthetic, economic, and recreational qualities and include fish, wildlife, plants, and their respective habitats. Fort Belvoir maintains an Integrated Natural Resources Management Plan (INRMP) that comprehensively addresses the management of biological resources occurring on the installation (Fort Belvoir, 2018b). Unless otherwise noted, the discussion presented below is drawn from the INRMP. Although the INRMP addresses the management of biological resources throughout the entirety of Fort Belvoir rather than DAAF specifically, resources and habitats on DAAF (e.g., woodlands, wetlands) are similar to those occurring elsewhere on the installation and are reasonably expected to support those species described in the INRMP.

The ROI for biological resources focuses on DAAF and Fort Belvoir. This section addresses the following biological resources occurring on and around Fort Belvoir:

- Terrestrial and aquatic plant and animal species;
- Game and non-game species;
- Special status species (state or Federally listed threatened or endangered species, marine mammals, or SOC, such as species proposed for listing or migratory birds); and
- Environmentally sensitive or critical habitats.

3.8.2 Vegetation

3.8.2.1 Plant Communities

Plant communities on DAAF include upland forests, wetlands (**Section 3.7.5.1**), and grasslands (**Figure 3.8-1**; **Table 3.8-1**). Fort Belvoir classifies plant communities by common characteristics and species within each community, and to facilitate their management. The classifications do not represent individual species or communities that are particularly unique or noteworthy. Plant communities cover a total of approximately 421 acres on DAAF and 8,219 acres on Fort Belvoir.

Figure 3.8-1: DAAF Plant Communities

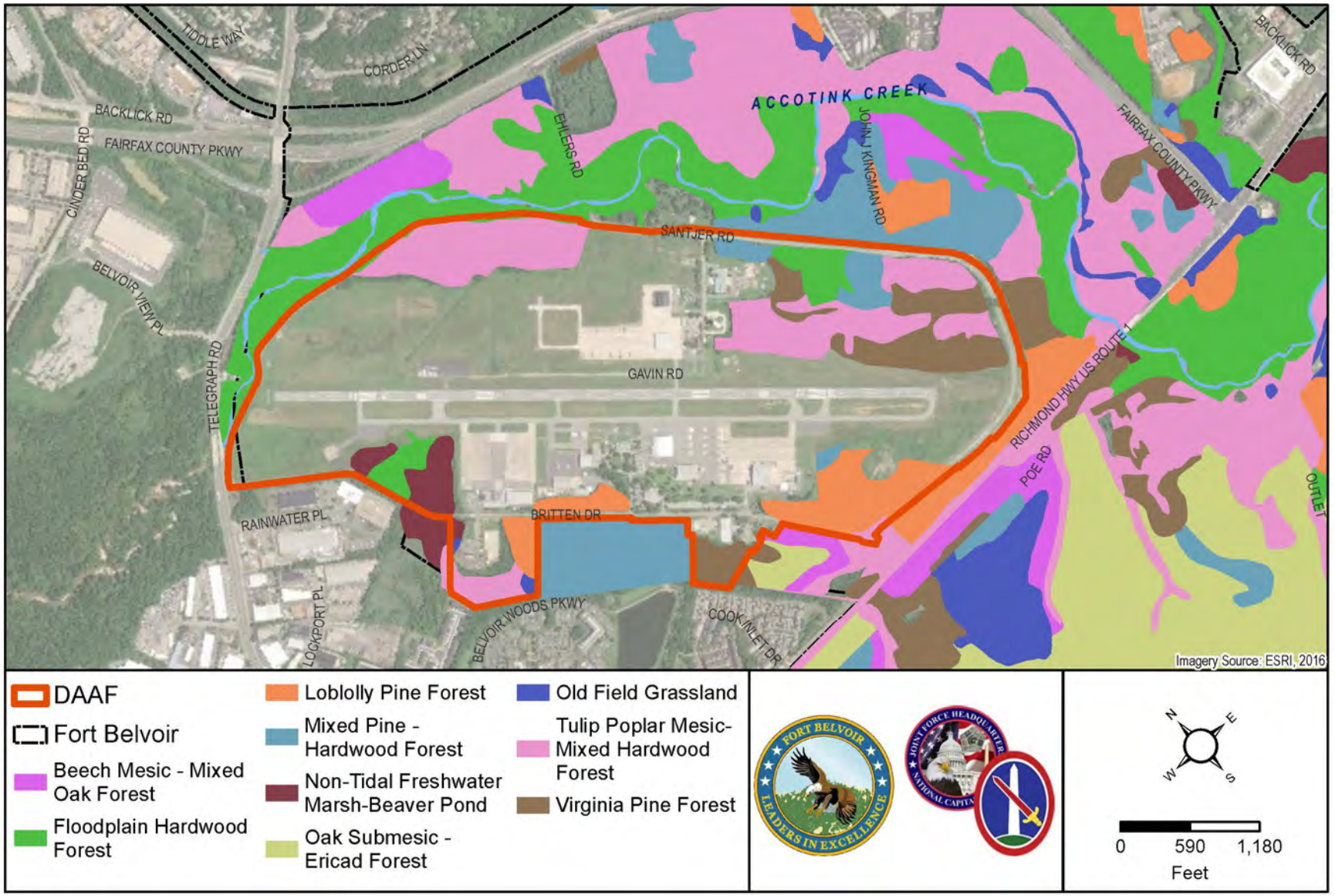


Table 3.8-1: Summary of DAAF Plant Communities

Community Name	Description	Area (acres)	
		DAAF	Fort Belvoir
Beech Mesic-Mixed Oak Forest	These forests at Fort Belvoir are generally located on more gradual slopes, topographically below oak/ericad (heath) forests. Mixed oak species of white oak and northern red oak are dominant trees, while American beech (*Fagus grandifolia*) is the dominant shrub in the understory. Other common shrubs in the understory consist of flowering dogwood (*Cornus florida*), red maple (*Acer rubrum*), and cherryleaf viburnum (*Viburnum prunifolium*). Occasional areas of mature American beech are found in lower, moister elevations or within ravines.	18.3	1,085.1
Floodplain Hardwood Forest	Moderately well-drained floodplain hardwood forests are dominant within major floodplains. These communities are hardwood forests primarily located above streambanks in non-hydric soils. Although flooded regularly, the well-drained soils do not retain hydrology long enough to support wetland vegetation. The dominant species in this floodplain community is the tulip poplar (*Liriodendron tulipifera*) mixed with red maple and sweet gum (*Liquidambar styraciflua*) trees. The understory consists of ironwood (*Vernonia fasciculata*), red maple, and spicebush (*Lindera benzoin*) shrubs. Poorly drained hardwood forests differ from moderately well-drained hardwood forests in that they are located on wetter soils and are dominated by hydrophytic vegetation. These communities are most extensive along Accotink Creek floodplains and consist of a variable mix of pin oak (*Quercus palustris*), willow oak (*Quercus phellos*), green ash (*Fraxinus pennsylvanica*), sycamore (*Platanus occidentalis*), red maple, river birch (*Betula nigra*), and sweet gum. The understory contains highbush blueberry (*Vaccinium corymbosum*).	90.3	603.1
Loblolly Pine Forest	Small portions of DAAF have been planted with loblolly pine (*Pinus taeda*) and often appear in rows. Native stands are not prevalent at Fort Belvoir.	36.2	240.3
Old Field Grassland	These are routinely mowed and maintained areas that for the most part, surround the airfield runway. As these grass fields are maintained and periodically mowed, saplings and shrubs indicative of pioneer succession are absent. In addition to the domestic grasses used initially to vegetate the open areas, herbaceous plants that occur in these fields include asters (*Aster spp*.), goldenrods (*Solidago spp*.), common ragweed (*Ambrosia artemisiifolia*), milkweeds (*Asclepias spp*.), black eyed susan (*Rudbeckia hirta*), thistles (*Cirsium spp*.) and a number of additional herbaceous grassy field species.	9.8	224.6

Table 3.8-1: Summary of DAAF Plant Communities (con't.)

Community Name	Community Description	Area (acres)	
		DAAF	Fort Belvoir
Mixed Pine-Hardwood Forest	Mixed pine-hardwood forests consist of transitional forests between early successional pine and climax hardwood types. Vegetation is a mix of pines and hardwoods. At Fort Belvoir, mixed pine-hardwood forests were identified where hardwoods and pine trees appeared to be evenly distributed or where neither hardwoods nor pines appeared to be more than 70 percent dominant. Virginia pine (*Pinus virginiana*) is the dominant pine in mixed pine hardwood forests, although some stands mixed with loblolly pine exist. Dominant hardwoods in mixed pine-hardwood forests are variable, but can be generalized based on topography and their position bordering mapped hardwoods. For example, mixed pine-hardwood forests mapped at the tops of dry ridges and bordered by oak/ericad (heath) forest are likely to have chestnut oak (*Quercus prinus*) or scarlet oak (*Quercus coccinea*) as the dominant hardwood in the mix. Lowland areas tend to have tulip poplar and red maple mixed with Virginia pine. Upland areas tend to be mixed with white oak (*Quercus alba*) and chestnut oak.	52.9	212.8
Non-tidal Freshwater Marsh-Beaver Pond	These areas are successional herbaceous to scrubby wetlands of variable composition. They consist of emergent wetlands that are above the tidal limits of Accotink Creek. Many of these areas are created or influenced by beaver activity that has caused flooding and created open marshes in areas previously dominated by hardwood forests. Vegetation composition is variable, consisting of emergent including arrow arum (*Peltandra virginica*), rice cutgrass (*Leersia oryzoides*), sedges (*Carex sp*.), rushes (*Juncus sp*.), smartweeds (*Polygonum sp*.), and swamp rose mallow (*Hibiscus moscheutos*). Common shrubs are buttonbush (*Cephalanthus occidentalis*), swamp rose (*Rosa palustris*), and swamp dogwood (*Cornus amomum*).	10.7	127.2
Oak Submesic-Ericad (Heath) Forest	These are upland forests of gravelly ridges and dry slopes, located at the tops of hills and bluffs and along steep, well-drained slopes. The overstory is dominated by chestnut oak,with a mixture of northern red oak (*Quercus rubra*), white oak (*Quercus alba*), and scarlet oak (*Quercus coccinea*). At Fort Belvoir, vegetation in the understory varies between two topographically different types. Arid plateaus are generally composed of chestnut oak and white oak with huckleberry (*Gaylussacia baccata*) and deerberry (*Vaccinium stamineum*) in the understory. Cooler, northerly-facing steep slopes are dominated by chestnut oak, and the understory generally consists of mountain laurel (*Kalmia latifolia*).	3.7	1,223.7

Table 3.8-1: Summary of DAAF Plant Communities (con't.)

Community Name	Community Description	Area (acres)	
		DAAF	Fort Belvoir
Tulip Poplar Mesic-Mixed Hardwood Forest	Tulip poplar mixed hardwood forests are upland forests of moist fertile ravine slopes and ravine bottoms. At Fort Belvoir, they are found in habitats similar to beech mixed oak forest, but are more common on more gradual slopes and ravine bottoms. Tulip poplar (*Liriodendron tulipiferu*) trees are dominant within this vegetation community type, but American beech, white oak, and northern red oak are also mixed. Understory species are similar to that of beech mixed oak forests and consist of flowering dogwood, American beech, and red maple shrubs.	170.0	1,038.5
Virginia Pine Forest	Virginia pine forests consist of early successional forest of old fields or other land clearings dominated by Virginia pine (*Pinus virginiana*) (greater than 70% dominance). Virginia pines are most abundant and occur naturally compared to forests of loblolly pine and white pine, which most likely have been introduced by plantings in former clearings	29.0	513.0

Source: Fort Belvoir 2018b

3.8.2.2 Non-native Vegetation

Fort Belvoir has conducted surveys for non-native plant species and maintains a map of known areas of invasive vegetation. The installation has prioritized areas for eradication and executes projects as funds become available. Species arrive and spread mostly by natural means (e.g., wind- or water-borne, carried by animals). Fort Belvoir has a management plan to control invasive species and is actively treating select installation areas each year. Fort Belvoir works to prevent direct introduction of invasive species by publishing a list of recommended plant species and by sharing the state's list of prohibited plant species. Fort Belvoir DPW-ED reviews landscaping plans for proposed projects on the installation to reduce the potential for invasive species introduction.

Six invasive species on or in the vicinity of DAAF are being managed by Fort Belvoir (**Table 3.8-2**).

Table 3.8-2: Invasive/Exotic Vegetation on Fort Belvoir and DAAF

Common Name	Scientific Name	Location
Common reed	*Phragmites australis*	Shoreline of Accotink Bay
Japanese knotweed	*Polygonum cuspidatum*	Subwatershed from Fairfax County Parkway to Accotink Creek
Oriental bittersweet	*Celastrus orbiculatus*	Along both sides of Accotink Creek starting at the footbridge and going south along Beaver Pond Nature Trail and Accotink Creek Trail
		Scattered along roadsides throughout the post
English ivy	*Hedera helix*	Southside of Accotink Creek near the suspension footbridge
Chinese lespedeza	*Lespedeza cuneata*	Fields, open areas and roadsides throughout the post
Japanese stiltgrass	*Microstegium vimineum*	Trails and old road beds

3.8.2.3 Threatened and Endangered Plant Species

The small whorled pogonia (*Isotria medeoloides*) is an herbaceous, perennial orchid that is federally listed as threatened under the ESA and state-listed as endangered by the Commonwealth of Virginia (2VAC5-320-10). The plant has been previously documented on FBNA and areas of suitable habitat have been identified throughout Fort Belvoir, including DAAF. Neither small whorled pogonia nor suitable habitat for it was observed during a recent presence and habitat suitability survey conducted at DAAF (Fort Belvoir, 2014d). The survey noted that the floodplain and floodplain wetlands adjacent Accotink Creek were observed to be too wet to support the plant.

A baseline Natural Heritage Inventory of Fort Belvoir (Main Post and FBNA) was performed by Virginia Department of Conservation and Recreation's (VDCR) Natural Heritage Program to identify unique or exemplary natural communities, rare plants and animals, and other significant natural areas. The inventory identified four rare plant species and three 'watchlist' plant species. The four rare plant

species, velvety sedge (*Carex vestita*), vetchling (*Lathyrus palustris*), water plantain crowfoot (*Ranunculus ambigens*), and river bulrush (*Bolboschoenus fluviatilis*), occur in the freshwater tidal marsh wetlands within the Accotink Bay Wildlife Refuge. The locations of three watchlist species, creeping spikerush (*Eleocharis smallii*), blueflag *(Iris versicolor*), and giant bur-reed (*Sparganium eurycarpum*), were not identified although all are wetland species.

3.8.3 Wildlife

3.8.3.1 Birds

Two hundred and seventy-eight (278) bird species have been identified on Fort Belvoir (Fort Belvoir, 2018b). Thirty-two percent (88 species) of Fort Belvoir bird species are year-round residents, twenty-six percent (71 species) are neotropical migrants, and thirty-six percent (101 species) are temperate migrants. Common species occurring on the installation include the following:

- Resident landbirds: red-bellied woodpecker (*Melanerpes carolinus*), American crow (*Corvus brachyrhynchos)*, tufted titmouse (*Parus bicolor*), and Northern cardinal (*Cardinalis cardinalis*).
- Resident waterbirds: great blue heron (*Ardea herodias*), Canada goose (*Branta canadensis*), mallard (*Anas platyrhynchos*), and wood duck *(Aixsponsa*).
- Temperate migrants: American robin (*Turdus migratorius*), dark-eyed junco (*Junco hyemalis*), ring-billed gull (*Larus delawarensis*), and white-throated sparrow (*Zonotrichia albicollis*).
- Neotropical stopover migrants: black-throated blue warbler (*Dendroica caerulescens*), black-throated green warbler (*Dendroica virens*), blackpoll warbler (*Dendroica striata*), and American redstart (*Setophaga ruticilla*).
- Neotropical breeding migrants: red-eyed vireo (*Vireo olivaceus*), Acadian flycatcher (*Empidonax virescens*), ovenbird (*Seiurus aurocapillus*), wood thrush (*Hylocichla mustelina*) and indigo bunting (*Passerina cyanea*).

Fort Belvoir recognizes and, to the extent practicable, prioritizes the management of habitat for multiple species of birds identified as SOC by USFWS, PIF, and DoD. Because such species are typically the most sensitive to habitat conditions, improving habitats for them generally benefits habitat conditions for other species as well. Habitat management for bird species of concern at Fort Belvoir is based on guidance developed by the following agencies and organizations:

- **USFWS BCC** (USFWS 2008): The USFWS BCC report identifies species, subspecies, and populations of all migratory nongame birds that are of conservation or management concern due to low numbers, declining population trends, or recent delisting. Fifteen species listed in this report have been previously documented at Fort Belvoir (**Table 3.8-3**).

Table 3.8-3: Fort Belvoir Birds of Management Concern

Common Name	Scientific Name	USFWS BCC	PIF SOC	DoD MSS	Season	Occurrence[1]
Bald Eagle	*Haliaeetus leucocephalus*	X			Year- round	Common
Black-billed Cuckoo	*Coccyzus erythropthalmus*	X	X	X	Breeding	One record in 20 years
Blue-winged Warbler	*Vermivora pinus*	X		X	Breeding	Not likely, annual migrant
Cerulean Warbler	*Dendroica cerulea*			X	Breeding	Not likely, near annual migrant
Fox Sparrow	*Passerella iliaca*	X			Wintering	Annual
Kentucky Warbler	*Oporornis formosus*	X	X	X	Breeding	Ten records in 20 years
Least Bittern	*Ixobrychus exilis*	X			Breeding	Two records in 30 years
Peregrine Falcon	*Falco peregrinus*	X			Wintering	Near annual
Prairie Warbler	*Setophaga discolor*	X	X	X	Breeding	Annual but declining
Prothonotary Warbler	*Protonotaria citrea*	X	X	X	Breeding	Annual but declining
Red-headed Woodpecker	*Melanerpes erythrocephalus*	X		X	Year- round	One breeding record, near annual winter resident

Table 3.8-3: Fort Belvoir Birds of Management Concern (con't.)

Common Name	Scientific Name	USFWS BCC	PIF SOC	DoD MSS	Season	Occurrence[1]
Rusty Blackbird	*Euphagus carolinus*	X		X	Wintering	Near annual
Short-eared Owl	*Asio flammeus*	X			Wintering	Not likely, possible in county
Willow Flycatcher	*Empidonax traillii*	X			Breeding	Possible, known in county
Wood Thrush	*Hylocichla mustelina*	X	X	X	Breeding	Common
Worm Eating Warbler	*Helmitheros vermivorum*	X			Breeding	Annual
Grasshopper Sparrow	*Ammodramus savannarum*			X	Breeding	Annual
Eastern Whip-poor- will	*Caprimulgus vociferus*		X		Breeding	Historic annual breeder but not in last nine years

Note:

1. Derived from Fort Belvoir migratory bird survey data.

Source: Fort Belvoir, 2018b

- **Partners in Flight (PIF) 2016 SOC Watch List:** PIF is an international conservation initiative and network of more than 150 partner organizations, to which DoD and the Army are signatories. This list identifies species of highest conservation concern. Fort Belvoir is within PIF Bird Conservation Region 30; all six of the species on the PIF SOC Watch List occurring within Bird Conservation Region 30 have been documented at Fort Belvoir (**Table 3.8-3**). Additionally, Fort Belvoir has identified three of these species as "indicator species" to evaluate the health of specific habitat types (see additional discussion below).
- **DoD MSS:** DoD has developed an MSS list in collaboration with PIF to highlight bird species that occur on DoD lands and are at risk of becoming listed as threatened or endangered under the ESA. The list helps DoD resource managers prioritize monitoring and management efforts of those species and their habitats having the highest potential to impact the military mission should they become federally listed. Ten MSS species have been documented or have potential to occur at Fort Belvoir (**Table 3.8-3**).

Species identified as USFWS BCC, PIF SOC, or DoD MSS that have been documented or have potential to occur at Fort Belvoir are listed in **Table 3.8-3**. Projects potentially disturbing migratory birds or their habitat on the installation must adhere to the requirements of Fort Belvoir Policy Memorandum #78, *Conservation of Migratory Birds*.

Of the species listed in **Table 3.8-3**, Fort Belvoir has identified six as BBMC. These species have been documented on the installation during the breeding season and are included in the USFWS BCC, PIF SOC, and DoD MSS. Five of the six species of BBMC have been documented on DAAF:

- Grasshopper sparrow (*Ammodramus savannarum*)
- Prairie warbler (*Setophaga discolor*)
- Kentucky warbler (*Oporornis formosus*)
- Prothonotary warbler (*Protonotaria citrea*)
- Wood thrush (*Hylocichla mustelina*)

Fort Belvoir has established 500-foot buffers around areas where these species have been documented. These buffers and their locations on DAAF are further discussed in **Section 3.8.5.3**.

The prothonotary warbler, wood thrush, grasshopper sparrow, and prairie warbler have been further identified by Fort Belvoir as "indicator species" against which the effectiveness of its habitat management and conservation programs can be measured, as these species share habitat with a variety of common and protected terrestrial species on the installation. BBMC habitat for the grasshopper sparrow habitat is primarily designated in the area south of Santjer Road and west of Gavin Road; however, areas of habitat for this species have also been designated near the northern and southern ends of the airfield's runway. Notably, grassland habitat on and adjacent to DAAF is the only place on Fort Belvoir and within Fairfax County where the grasshopper sparrow has been documented breeding.

Fort Belvoir has implemented a wildlife hazard management plan (WHMP) as a component of the INRMP to minimize the potential for collisions between aircraft and birds or other wildlife. The WHMP establishes personnel roles and responsibilities, techniques to disperse birds and wildlife from the airfield and decrease the attractiveness of the airfield to birds and wildlife, and procedures for adjusting

or discontinuing flying operations as necessary when birds and wildlife present an unreasonable risk to aircraft. When necessary, Fort Belvoir removes wildlife from the airfield in accordance with population control permits issued by the Virginia Department of Game and Inland Fisheries (VDGIF).

3.8.3.2 Mammals

Forty-three (43) species of mammals have been identified as occurring or potentially occurring on Fort Belvoir (Fort Belvoir, 2018b). Resident mammal species are those expected to occur in the mix and quality of on-post habitat types. The northern short-tailed shrew (*Blarina brevicauda*) is likely the most abundant mammal on post, occurring in a wide variety of terrestrial habitats.

Extensive stream, marsh, and riparian habitats on post, including those of Accotink Creek, support water dependent mammal species such as beaver (*Castor canadensis*), muskrat (*Ondatra zibethicus*), river otter (*Lutra canadensis*), mink (*Mustela vison*), and star-nosed mole (*Condylura cristata*). Beaver are of management interest on Fort Belvoir not only from a problem standpoint, but because they can significantly alter habitat conditions through tree removal and dam building. Beaver impoundments appear to be responsible for creating extensive areas of palustrine wetland along Dogue Creek and within drainages to Accotink and Pohick Creeks.

3.8.3.3 Fish

Sixty-five (65) species of fish have been identified in baseline fish surveys of Fort Belvoir (Fort Belvoir, 2018b). Fish communities in Accotink Creek primarily comprise species common to Piedmont and Coastal Plain streams of the Atlantic slope of the eastern United States and are classified as warm freshwater fisheries. On DAAF, fish habitat in Accotink Creek is considered fair to good with riffle-run-pool and an abundance of woody debris to provide cover for adult and juvenile fish. The predominant groups of fish in Accotink Creek, both in numbers of species and in abundance, are cyprinids (minnows), such as blacknose dace (*Rhinichthys atratulus*) and spottail shiner (*Notropis hudsonius*), as well as centrarchids (sunfish), such as bluegill (*Lepomis macrochirus*) and pumpkinseed (*Lepomis gibbosus*). Other dominant species include banded killifish (*Fundulus diaphanus*), yellow perch (*Perca flavescens*), white perch (*Morone americana*) and American eel (*Anguilla rostrata*). Aquatic habitat provided by lower-order streams on DAAF (i.e., tributaries of Accotink Creek) is likely non-existent or of low quality and inadequate to support noteworthy propagation of aquatic organisms.

Two species of river herring, alewife (*Alosa pseudoharengus*) and blueback herring (*Alosa aestivalis*), are documented to migrate up Accotink Creek during the spawning season although they do not appear to travel far up installation creeks (EA Engineering, Science & Technology, 1999, as cited in US Army, 2018, 2018; EA Engineering, Science & Technology, 2000, as cited in US Army, 2018, 2018).

None of the fish identified in Fort Belvoir waterways have federal or state threatened or endangered designations. One state species of concern, the bridle shiner (*Notropis bifrenatus*) has been identified in several locations in Accotink Creek (EA Engineering, Science & Technology, 2000, as cited in US Army, 2018, 2018). This species is found in slow moving streams and rarely enters tidal or brackish waters.

3.8.3.4 Benthic Community

Studies of macrobenthic organisms on unrestored streams within Fort Belvoir indicate a macroinvertebrate community fairly typical of upper Coastal Plain streams. These studies show a predominance of pollution tolerant species such as *Chironomidae*, *Naidinae*, *Cyclopoidea*, *Amphipod*, and *Isopods*. Studies conducted on Fort Belvoir suggest decreased occurrence of the traditional non-pollution tolerant species (i.e., *Ephemeroptera*, *Plecoptera*, *Trichoptera* [EPT]) typically associated with optimal streams. The species composition found in tributary streams indicates a benthic community tolerant of impaired physical habitats as well as poor to fair water quality. Some streams contain benthic communities that have a greater dominance of non-pollution tolerant species of EPT; however, most benthic communities resemble a composition of pollution tolerant communities due to the past 70 years of development.

A mussel survey was conducted in 2015 to determine the status of the mussel population in Accotink Creek. The survey included a 300-meter segment of Accotink Creek immediately upstream of DAAF but not the stream segment within DAAF's boundaries. Several species of mussels, predominantly the eastern elliptio (*Elliptio complanata)*, were observed in the upper reaches of Accotink Creek, especially in the tailrace of Accotink Lake. However, no mussels were observed in the reach immediately above DAAF (Daguna Consulting, 2015).

3.8.3.5 Reptiles

Thirty-four (34) species of reptiles have been identified as occurring or likely to occur on Fort Belvoir, including 12 turtles, 18 snakes, and four lizards (Fort Belvoir, 2018b). These species are all typical of the northern Virginia upper Coastal Plain region, although several are at the limits of their ranges. The northern copperhead (*Agkistrodon contortrix*), the only venomous snake endemic to Fort Belvoir, is a habitat generalist that most often occurs in moist deciduous/mixed woods.

The wood turtle, a state-listed threatened species, occurs at Fort Belvoir. Several individuals of this species have been observed at various locations along the Accotink Creek and Dogue Creek drainages, indicating a possible on-post population. The potential occurrence of the wood turtle on DAAF is discussed in more detail in **Section 3.8.4.1**. The spotted turtle, while abundant on Fort Belvoir, is decreasing throughout its range and as of April 2017 has been added to the USFWS National Listing Workplan (NLW)to evaluate the species need for federal protection.

3.8.3.6 Amphibians

Twenty-seven (27) species of amphibians have been identified as occurring or potentially occurring on Fort Belvoir, including 12 frogs, three toads, and 12 salamanders. Aquatic and woodland habitats at Fort Belvoir, including extensive wetlands, woodlands traversed by extensive drainage systems, and ephemeral ponds provide areas of suitable amphibian habitat. Microhabitat conditions (e.g., extensive leaf litter, woodland debris, such as fallen logs, and undercut banks in the natural areas on-post) enhance the quality of this habitat. Fort Belvoir's relatively rich amphibian population is vulnerable to losses from predation, disease, climatic and/or physical land surface changes (e.g., development, loss of

cover) that cause loss of surface waters or loss of natural ground-level humidity at the forest floor, fragmentation of habitat, and disruption of natural travel corridors.

3.8.3.7 Aquatic Invasive Species

In letters dated February 7, 2017 and February 24, 2017, VDGIF requested that Fort Belvoir's *Invasive Species Management Plan* be expanded to include invasive aquatic species recognized by regional (i.e., Mid- Atlantic Panel on Aquatic Invasive Species) or state (i.e., Virginia Invasive Species Workgroup of the Virginia Department of Conservation and Recreation, Division of Natural Heritage [VDCR-DNH]) authorities, such as zebra mussel (*Dreissena polymorpha*). The letters also requested that mitigation measures be implemented to address potential transference of these species during water withdrawal and discharge, and on construction equipment and personal vehicles

The Virginia Invasive Species Management Plan, available through the Mid-Atlantic Panel on Aquatic Invasive Species, describes aquatic plants and animals that have been documented in each state (Virginia Invasive Species Advisory Committee, 2012). Aquatic invasive plant and animal species identified in these documents include but are not limited to:

- Northern snakehead fish (*Channa argus*)
- Asian clam (*Corbicula fluminea*)
- Mute swan (*Cygnus olor*)
- Didymo (*Didymosphenia geminata*)
- Zebra mussel (*Dreissena polymorpha*)
- Chinese mitten crab (*Erlochelr sinensis*)
- Hydrilla (*Hydrilla verticillata*)
- Silver carp (*Hypophthalmichtys molitrix*)
- Purple loosestrife (*Lythrum salicaria*)
- Rusty crayfish (*Orconectes rusticus*)
- Virile crayfish (*Orconectes virilis*)
- Common reed (*Phragmites autralis*)
- Rapa whelk (*Rapana venosa*)

3.8.4 Protected Species and Habitats

3.8.4.1 Rare, Threatened, and Endangered Species

Thirteen (13) species documented or with potential to occur on Fort Belvoir are listed as federally and/or state threatened or endangered, on the USFWS NLW, or identified by the Army as Species at Risk (ASAR) for listing (**Table 3.8-4**) (Fort Belvoir, 2018b). The NLW is a prioritized listing of species that the USFWS is currently reviewing for federal protection. Four resident animal species occurring on Fort Belvoir are recognized as special status species and managed by the installation as such:

- Northern long-eared bat (*Myotis septentrionalis*) – federally listed as threatened
- Wood turtle (*Clemmys insculpta)* – Virginia threatened reptile species
- Northern Virginia Well Amphipod *(Stygobromus phreaticus)* – Virginia species of concern
- Bald Eagle (*Haliaeetus leucocephalus)* – federally and internationally protected. The bald eagle previously represented the only federally listed animal species known to inhabit the installation. It was delisted from the ESA list in 2007 and was delisted from the Virginia state list on January 1, 2013 but is still protected under the Bald and Golden Eagle Protection Act and the MBTA.

The Army has consulted with USFWS in accordance with ESA Section 7 regarding the Proposed Action's potential effects on protected species and habitats. Copies of relevant correspondence are provided in **Appendix A**. Because the Proposed Action is programmatic in nature, additional Section 7 consultation will be conducted with applicable regulatory agencies as planning, design, and implementation of the individual proposed projects continues.

The northern long-eared bat, wood turtle, Northern Virginia well amphipod, and bald eagle are discussed in additional detail below.

Northern Long-Eared Bat

The northern long-eared bat is designated as *threatened* under the ESA (2015). It is a medium-sized bat, approximately 3 to 3.7 inches long with a wingspan of 9 to 10 inches. This bat has medium to dark brown colored fur on its back and tawny to pale-brown fur on its underside. As its name suggests, it is distinguished by long ears, particularly as compared to other bats in the same genus. Northern long-eared bats spend winters hibernating in caves and mines. During the summer, they roost singly or in colonies underneath bark, in cavities, or in crevices of live and dead trees. These bats are found across much of the eastern and north-central United States; however, populations have declined by 99 percent in recent years because of white-nose syndrome (USFWS 2015).

In consultation with USFWS, Army agreed to implement conservation measures for all activities and operations that could adversely affect the northern long-eared bat. These include a time-of-year restriction for tree cutting or clearing from 15 April to 15 September. The Army also agreed to further consultation with the USFWS for actions that (1) clear 10 acres or more of trees or (2) involve clear cutting within 0.25 miles or overstory tree removal within 100 meters of a documented maternity roost tree or 0.5 miles of a known hibernacula. Fort Belvoir formalized the agreed-upon conservation

measures by a memorandum of instruction for northern long-eared bat protection on 21 October 2015 (DA 2015).

Table 3.8-4: Special Status Species Known or with Potential to Occur on Fort Belvoir

Species	Scientific Name	Federal Status	State Status	USFWS NLW	ASAR	Documented at Fort Belvoir
Plant						
Small whorled pogonia	*Isotria medeoloides*	Threatened	Endangered			**X**
Mammals						
Northern long-eared bat	*Myotis septentrionalis*	Threatened	Threatened			**X**
Tricolored bat	*Perimyotis subflavis*		Endangered	**X**		**X**
Little brown bat	*Myotis lucificus*		Endangered	**X**		
Birds						
Bald eagle	*Haliaeetus leucocephalus*	(see Note 1)				**X**
Peregrine falcon	*Falco peregrinus*		Threatened			**X**
Reptiles						
Wood turtle	*Glyptemys insculpta*		Threatened	**X**		**X**
Spotted turtle	*Clemmys guttata*			**X**		**X**
Invertebrates						
Northern Virginia well amphipod	*Stygobromus phreaticus*			**X**	**X**	**X**
Tidewater amphipod	*Stygobromus indentatus*			**X**		**X**
Insects						
Monarch butterfly	*Danaus plexippus*			**X**		
Rusty patched bumble bee	*Bombus affinis*	Endangered				
Fish						
Atlantic Sturgeon[2]	*Acipenser oxyrinchus*	Endangered	Endangered			**X**[3]

Notes**:**

1. Protected under the Bald and Golden Eagle Protection Act of 1940 and the MBTA.
2. The National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service has designated Critical Habitat for the Atlantic sturgeon Chesapeake Bay Distinct Population Segment in the Potomac River and some of its bays and tributaries near Fort Belvoir.
3. Documented in the Potomac River near Fort Belvoir.

Wood Turtle

Populations of the wood turtle have been in decline in the Piedmont and Coastal Plain provinces of the mid-Atlantic area due to the degradation of aquatic habitats, loss of wetlands, habitat fragmentation, urbanization, vehicular traffic mortality, and pet trade collections (NatureServe, 2018). In Virginia, the wood turtle has a restricted range which includes Fairfax County. It occurs in a variety of habitats including forested floodplains, fields, and wet meadows near streams.

The wood turtle is thought to potentially occur on DAAF, due to the suitable habitat of Accotink Creek and a previous siting in the upper Accotink Creek watershed. As part of a threatened and endangered species survey for the construction of the STF on DAAF, the US Army conducted a survey of the presence and habitat suitability of the wood turtle in Accotink Creek. The survey indicated the presence of suitable overwintering habitat for the wood turtle as well as suitable summer foraging habitat within the floodplain wetlands associated with Accotink Creek. Although suitable habitat was present, no wood turtles were observed (EEE Consulting, Inc., 2013).

Bald Eagle

Fort Belvoir provides roosting, foraging and nesting habitat for bald eagles. While foraging and roosting occurs year-round, the greatest eagle use and presence is during the winter. This led to Fort Belvoir's shoreline being included in Virginia's designated Mason Neck Eagle Concentration Area. This is one of only five such designated Eagle Concentration Areas in all of Virginia. Historic records indicate that eagles nested along the river and embayment shorelines, as well as in the installation interior along sloped drainages. Six bald eagle nests have been documented on Fort Belvoir; all are located on the Southwest Area, or South Post, near Fort Belvoir's shoreline.

Northern Virginia Well Amphipod

The northern Virginia well amphipod is a groundwater-dwelling species that is only known to occur on Fort Belvoir in a groundwater seep within the T-17 Refuge on South Post. Suitable habitat for the species has also been identified on FBNA, although no individuals have been documented there. The species has an ASAR designation and has been added to the NLW.

3.8.4.2 Rare Ecological Communities

Seventeen (17) ecological community types have been identified on Fort Belvoir's Main Post (McCoy & Fleming, 2000). Of these, four are ranked very rare or extremely rare and three are ranked as rare to uncommon. VDCR-DNH has delineated the boundaries of three areas on Fort Belvoir to encompass all of the rare plant species and rare ecological communities, and most of the rare animal species.

Of these, only the Coastal Plain/Piedmont Acidic Seepage Swamps have been identified on DAAF. VDCR-DNH has identified this type of swamp as 'very rare.' These swamps are characterized by forested vegetation of braided headwaters stream bottoms and seeping toe-slopes saturated by abundant groundwater discharge. Vegetation occurring in these swamps include a variety of overstory trees, small trees and shrubs, and herbaceous species such as red maple and blackgum (*Nyssa sylvatica*), tulip-tree

(*Liriodendron tulipifera*), loblolly pine (*Pinus taeda*), highbush blueberries (*Vaccinium* spp.), swamp azalea (*Rhododendron viscosum*), smooth winterberry (*Ilex laevigata*), cinnamon fern (*Osmundastrum cinnamomeum var. cinnamomeum*), and netted chain fern (*Woodwardia areolata*).

The Coastal Plain/Piedmont Acidic Seepage Swamp covers approximately 1.4 acres on the southern side of DAAF (**Figure 3.8-2**).

3.8.5 Special Natural Areas

In accordance with DoDI 4715.03, Fort Belvoir has designated five locations on post as Special Natural Areas (**Figure 3.8-2**). These areas have natural resources that have been assigned a high conservation priority through federal or state statute or regulation (e.g., ESA, Bald and Golden Eagle Protection Act) and/or DoD and Army policies (e.g., DoDI 4715.03), DoD-partnered programs (e.g., Chesapeake Bay Program, USFWS BCC, PIF, DoD MSS), NEPA mitigation commitment (e.g., Base Realignment and Closure actions in 1988 and 2005; Fort Belvoir RPMP Update in 2015), the state Natural Heritage Program, or have been recognized as being important to local or regional ecosystem function (e.g., wildlife migratory routes). Of these five Special Natural Areas, three pertain to DAAF:

- Accotink Bay Wildlife Refuge (ABWR)
- Fort Belvoir FWC
- BBMC buffers

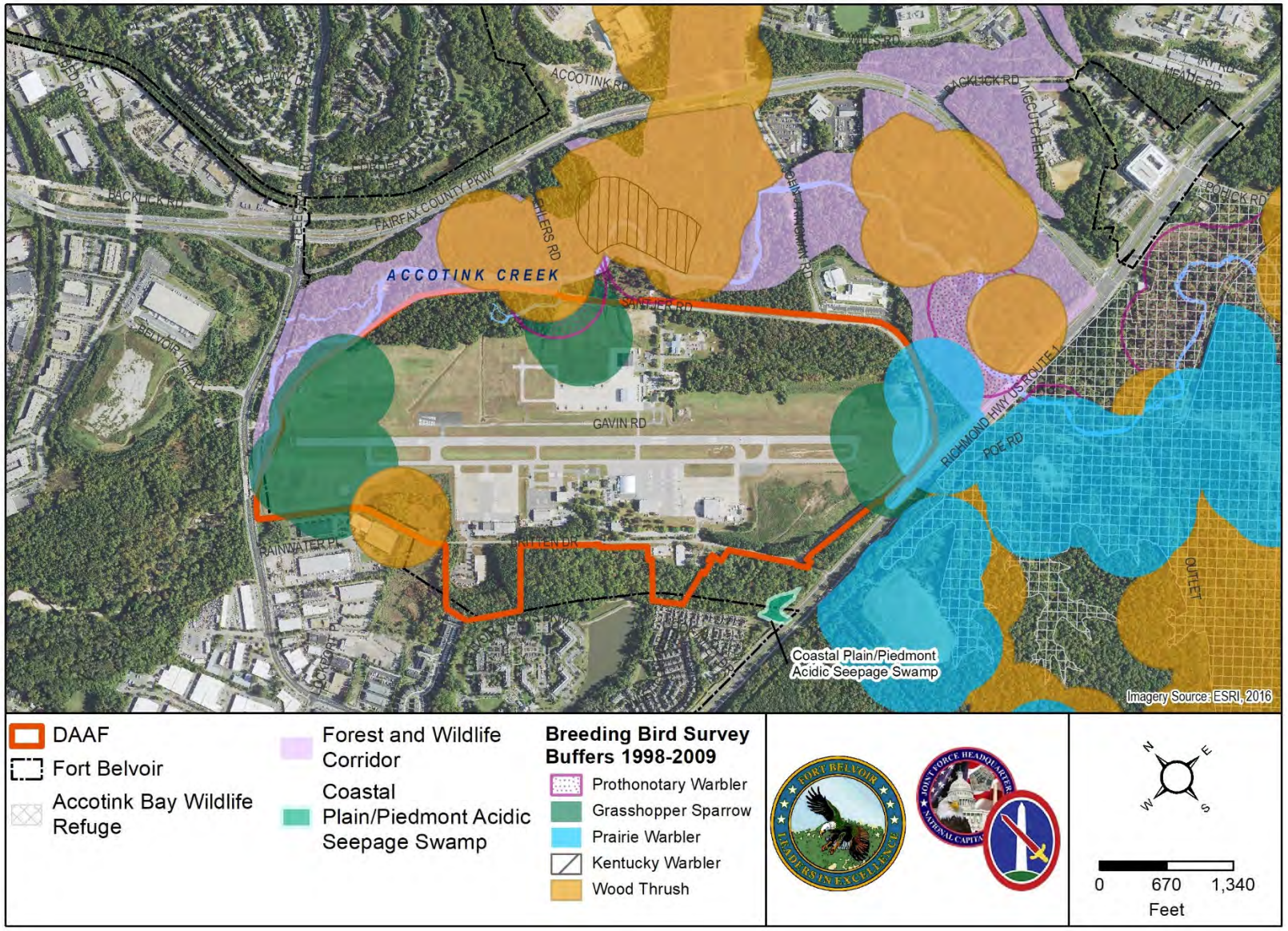
Each of these areas is described in the following subsections.

3.8.5.1 Accotink Bay Wildlife Refuge

Accotink Creek discharges to Accotink Bay approximately one mile south of US Route 1 (Richmond Highway), the nominal southern boundary of DAAF. The ABWR was established in 1979 to protect areas of recognized ecological significance, most notably the freshwater tidal marsh and climax hardwood forest adjacent to Accotink Bay. ABWR includes the shoreline with its attendant slopes and all of the tidal marsh wetlands associated with Accotink and Pohick Bays. ABWR also encompasses the entire riparian area along Accotink Creek south of US Route 1. Several rare plant and animal species and rare plant communities occur in these wetlands. The refuge includes the lower part of Sub-watershed 48 (**Section 3.7.3.1**), a rare example of an undisturbed Mid-Atlantic upper Coastal Plain stream, and the riparian protection areas associated with lower Accotink Creek, Accotink Bay, lower Pohick Creek and Pohick Bay

Accotink and Pohick Creeks are used by anadromous and other migratory fish. The refuge includes several active bald eagle nest sites, and is within the federal- and state-designated Potomac River Eagle Concentration Area. The refuge includes habitat for a federally threatened bat, several state-threatened and endangered bats, federal threatened (state endangered) small whorled pogonia, state-threatened wood turtle, and multiple PIF Species of Concern.

Figure 3.8-2: Special Natural Areas on DAAF



3.8.5.2 Fort Belvoir Forest and Wildlife Corridor

The Fort Belvoir FWC was established to protect significant wildlife habitat and to maintain a continuous area of natural forest habitat connecting larger natural areas to the north and south of Fort Belvoir, facilitating wildlife movement through the installation. This designated wildlife corridor is a vital link between the Jackson Miles Abbott Wildlife Refuge in the northeast portion of Fort Belvoir and the ABWR. The FWC is owned and managed by Fort Belvoir as part of its internal natural resource programs.

Portions of Accotink Creek and its 100-year floodplain on DAAF are within the FWC (**Figure 3.8-2**). The FWC includes all of the riparian forest buffer and wetlands along Accotink Creek, and along two major drainages to Accotink Creek. The FWC includes the majority of the installation's habitat for the state threatened wood turtle, federal threatened bat and several state endangered and threatened bats, federal threatened (state endangered) small whorled pogonia, and several PIF Species of Concern.

Fort Belvoir does not permit development within the FWC. Accotink Creek, associated Chesapeake Bay RPAs, and 100-year floodplain are also located within this wildlife corridor ensuring that proposed development actions remain outside these jurisdictional areas. This corridor is a natural constraint to development and provides a boundary and buffer for proposed development at Fort Belvoir, including DAAF.

3.8.5.3 Breeding Birds of Management Concern Buffers

Fort Belvoir has established 500-foot buffers on the installation for six species of BBMC (**Section 3.8.3.1**). These buffers collectively cover approximately 3,600 acres on Main Post. The 500-foot buffers indicate areas where these species have been documented and potential nesting, breeding, and/or foraging habitat (some buffers have been adjusted to incorporate habitat changes or less desirable habitat conditions). Avoidance of these areas during construction or similar development activities, and/or mitigation for removal of habitat when avoidance is not possible, is recommended.

BBMC buffers cover approximately 370 acres on DAAF, representing approximately 10 percent of BBMC buffers on Main Post (**Figure 3.8-2**). Portions of the BBMC buffers on DAAF overlap areas of the ABWR and FWC. Five of the six BBMC managed within these buffers by Fort Belvoir (grasshopper sparrow, prairie warbler, Kentucky warbler, prothonotary warbler, and wood thrush) have been documented on DAAF. **Table 3.8-5** summarizes the areas of the buffers for each of these species on DAAF and Main Post.

BBMC buffers on the northeastern side of the airfield between the existing aircraft parking apron and Fairfax County Parkway provide suitable habitat for the grasshopper sparrow, prothonotary warbler, Kentucky warbler, and wood thrush. Additional BBMC habitat for the grasshopper sparrow is at the southeastern and northwestern ends of the runway (Fort Belvoir 2018). As previously noted, grassland habitat on and adjacent to DAAF is the only place on Fort Belvoir and within Fairfax County where the grasshopper sparrow has been documented breeding (**Section 3.8.3.1**).

Table 3.8-5: BBMC Buffer Area on DAAF and Main Post

Species	Total BBMC Buffer on DAAF (acres)[1]	Total BBMC Buffer on DAAF (percent of Main Post)	Total BBMC Buffer on Main Post (acres)[1]
Black Billed Cuckoo	0.0	0.0%	18.0
Grasshopper Sparrow	85.6	94%	91.2
Kentucky Warbler	16.4	28.4%	57.8
Prairie Warbler	24.8	6.3%	396.8
Prothonotary Warbler	63.0	9.9%	636.7
Wood Thrush	178.4	7.4%	2,414.9
Total	**368.2**	10.2%	**3,615.4**

Note:

1. Areas of existing impervious surface on DAAF have been deducted from BBMC buffer acreages provided by Fort Belvoir.

3.9 Health and Safety

3.9.1 Introduction

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. Occupational safety and health (OSH) programs address the health and safety of people at work. These programs impose regulatory requirements for the benefit of employees and the public, including implementation of engineering and administrative practices that aim to reduce risks of illness, injury, death, and property damage.

The ROI for human and environmental health is defined as the Washington, DC metropolitan area within which all components of the Proposed Action and Alternatives would be implemented.

3.9.2 Occupational Safety and Health

The Occupational Safety and Health Act (OSHA) is the primary federal statute for regulating the safety and health of workers in the United States. It establishes worker-protection standards that must be followed to prevent and minimize potential safety and health risks. In Virginia, the OSH Safety Compliance Division enforces state and federal laws and regulations pertaining to worker health and safety (Virginia Department of Labor and Industry, 2016). OSH regulations 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 via administrative or engineering controls, substitution, or use of personal protective equipment (PPE).

The health and safety of onsite military and civilian workers are safeguarded by numerous DoD and military branch-specific requirements designed to comply with standards issued by federal OSHA,

USEPA, and state OSH agencies. These standards specify health and safety requirements, the amount and type of training required for workers, the use of PPE, administrative controls, engineering controls, and permissible exposure limits for workplace stressors. OSH requirements applicable to the Proposed Action address workers' and public health and safety during and following construction, demolition, and operational activities.

Health and safety hazards can often be identified and reduced or eliminated before an activity begins. Necessary elements for an accident-prone situation or environment include the presence of the hazard itself, together with the exposed (and possibly susceptible) population or public. The degree of exposure depends primarily on the proximity of the hazard to the population.

Hazards include transportation, maintenance, and repair activities, and the creation of a noisy environment or a potential fire hazard. The proper operation, maintenance, and repair of vehicles and equipment carry important safety implications. Any facility or human-use area with potential explosive or other rapid oxidation process creates unsafe environments due to noise or fire hazards for nearby populations. Noisy environments can also mask verbal or mechanical warning signals such as sirens, bells, or horns.

OSH is the responsibility of each employer, as applicable. Although such responsibilities vary by industry or employment sector, employer responsibilities include the following:

- Review potentially hazardous workplace conditions;
- Monitor exposure to workplace chemical (e.g., asbestos, lead, hazardous substances), physical (e.g., noise propagation, falls), and biological (e.g., infectious waste, wildlife, poisonous plants) agents, and ergonomic stressors;
- Recommend and evaluate controls (e.g., prevention, administrative, engineering, PPE) to ensure exposure to personnel is eliminated or adequately controlled; and
- Ensure a medical surveillance program is in place to perform occupational health physicals for those workers subject to the use of respiratory protection, engaged in hazardous waste work, asbestos, lead, or other work requiring medical monitoring.

On Fort Belvoir, all military and civilian personnel conducting work on post are subject to applicable OSH regulations. Such regulations include those pertaining to the construction and operation of the Proposed Action as promulgated and enforced by the DoD and federal and state regulatory authorities. Fort Belvoir's Directorate of Emergency Services oversees law enforcement, access control, and FES on post. Additionally, a military police detachment provides law enforcement and public safety services, including physical security, traffic, canine, and related operations (Fort Belvoir, 2015a).

3.10 Hazardous Materials and Waste

3.10.1 Introduction

Hazardous materials are defined 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]" (49 CFR 171.8).

Hazardous wastes are defined by the Resource Conservation and Recovery Act of 1976 (RCRA) in 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."

In addition to threatening human health and well-being, the improper release of or exposure to hazardous materials and wastes may threaten wildlife, plants, fish, and their habitats, soil systems, and water resources. Localized conditions such as soil, topography, water resources, and climate may affect the extent of contamination from or exposure to hazardous substances.

Hazardous substances and hazardous waste at Fort Belvoir are managed by DPW-ED in accordance with:

- RCRA;
- Toxic Substances Control Act (TSCA) of 1978;
- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980;
- Superfund Amendments and Reauthorization Act of 1986 (amendments to CERCLA);
- Defense Environmental Restoration Program (10 USC 2701);
- OSHA regulations;
- VDEQ hazardous waste regulations;
- Virginia storage tank regulations, including *Facility and Aboveground Storage Tank (AST) Regulation* (9 VAC 25-91-10 et seq.) and *Underground Storage Tanks: Technical Standards and Corrective Action Requirements* (9 VAC 25-580);
- DoD regulations, including those identified in DoD Manual 4715.20, *Defense Environmental Restoration Program Management*, dated March 9, 2012; and
- Army regulations, including AR 200-1, effective December 27, 2007.

Current and former RCRA facilities, corrective action sites, and operational and training ranges at Fort Belvoir can present potential constraints to future development because assessment, potential cleanup, and closure of these sites are required before the land can be redeveloped. Cleanups and closures are subject to regulatory approvals.

The term "hazardous material" as used in this EIS refers to contaminants (i.e., chemicals, substances, or compounds) that have been determined to present potential risks to health, safety, or the environment when they occur at certain concentrations, and that are managed under one or more applicable regulatory programs. Substances that are or have been used in the past on Fort Belvoir that are

classified as hazardous include petroleum products, asbestos used in building materials, lead formerly used in paint, pesticides, radioactive materials, and unexploded ordnance (UXO), munitions of explosive concern (MEC), and munitions constituents (MC) formerly used on training ranges.

The ROI for hazardous materials and wastes includes DAAF, and in particular, areas that may be affected by development.

3.10.2 Hazardous Materials and Hazardous Wastes

3.10.2.1 Hazardous Materials

Activities requiring the use of hazardous materials at DAAF include:

- aircraft fueling, defueling, and deicing;
- aircraft maintenance and repair;
- aerospace ground equipment maintenance;
- ammunition supply and weapons maintenance;
- vehicle maintenance and washing; and
- facilities maintenance and repair.

Hazardous materials used in these types of activities include fuels and lubricating oils, chlorinated solvents and other solvents/degreasers, paints and thinners, antifreeze and deicing compounds, and acids. Such materials are used by DoD personnel and civilian contractors in maintenance shops, hangars, and similar facilities throughout DAAF. The use, handling, storage, and management of hazardous materials at DAAF is in accordance with applicable regulatory requirements including Chapter 18, Section 10 of AR 385-10, *The Army Safety Program* and Chapter 9, Section 1 of AR 200-1.

Hazardous materials at DAAF are used and applied in strict accordance with label and manufacturer instructions. When not used, these materials are stored in appropriate, clearly labeled containers and secured in hazardous materials storage lockers or cabinets that are accessible only by authorized personnel. Procedures to prevent and manage accidental spills of petroleum and other hazardous substances on the installation are outlined in Fort Belvoir's *Hazardous Waste Management and Minimization Plan* (HWMMP), as are procedures specifying the prevention, containment, and response to discharges of hazardous materials on the installation (Fort Belvoir, 2014e).

3.10.2.2 Hazardous Wastes

Activities that require the use of hazardous materials may also generate hazardous wastes. Fort Belvoir is regulated by USEPA as a large quantity generator (LQG) of hazardous waste because it generates 1,000 kilograms (kg) (2,205 lbs) or more of hazardous waste and/or one kg (2.2 lbs) or more of acutely hazardous waste (i.e., pure or commercial grade formulations of certain chemicals that may be fatal to humans or animals in low doses) per month. There is no limit on the amount of hazardous waste that a USEPA-regulated LQG may accumulate on-site; however, LQGs may only accumulate hazardous waste

on-site for 90 days, after which time the waste must be transported to a permitted disposal facility. In 2015, the most recent year for which data was available, Fort Belvoir generated 13.7 tons of hazardous waste (USEPA, 2017).

Hazardous waste at Fort Belvoir is generated, handled, managed, and disposed of in accordance with the installation's HWMMP. In accordance with the HWMMP, up to 55 gallons of hazardous waste and/or one quart of acutely hazardous waste may accumulate over an indefinite period of time at the point of generation, which is identified as a satellite accumulation area (SAA). Universal wastes and certain non-regulated wastes are also managed in Fort Belvoir's SAAs. Shops, laboratories, or other work areas where small amounts of hazardous waste are produced typically have SAAs. Each SAA must be located at or near the area where the waste is generated and must be under the direct control of the organization generating the waste. The amount of waste allowed to be stored in each SAA is determined by Fort Belvoir DPW-ED when the area is established; these amounts are based on the type of waste and the quantity typically generated.

SAAs are currently located in five buildings at DAAF (**Table 3.10-1**; **Figure 3.10-1**). The number and locations of SAAs at Fort Belvoir periodically change based on deployments and other operational factors. Wastes accumulated in these areas include used aerosol cans, used fuel, spent batteries, soiled rags and absorbents, used paint and thinner, and used paint booth filters.

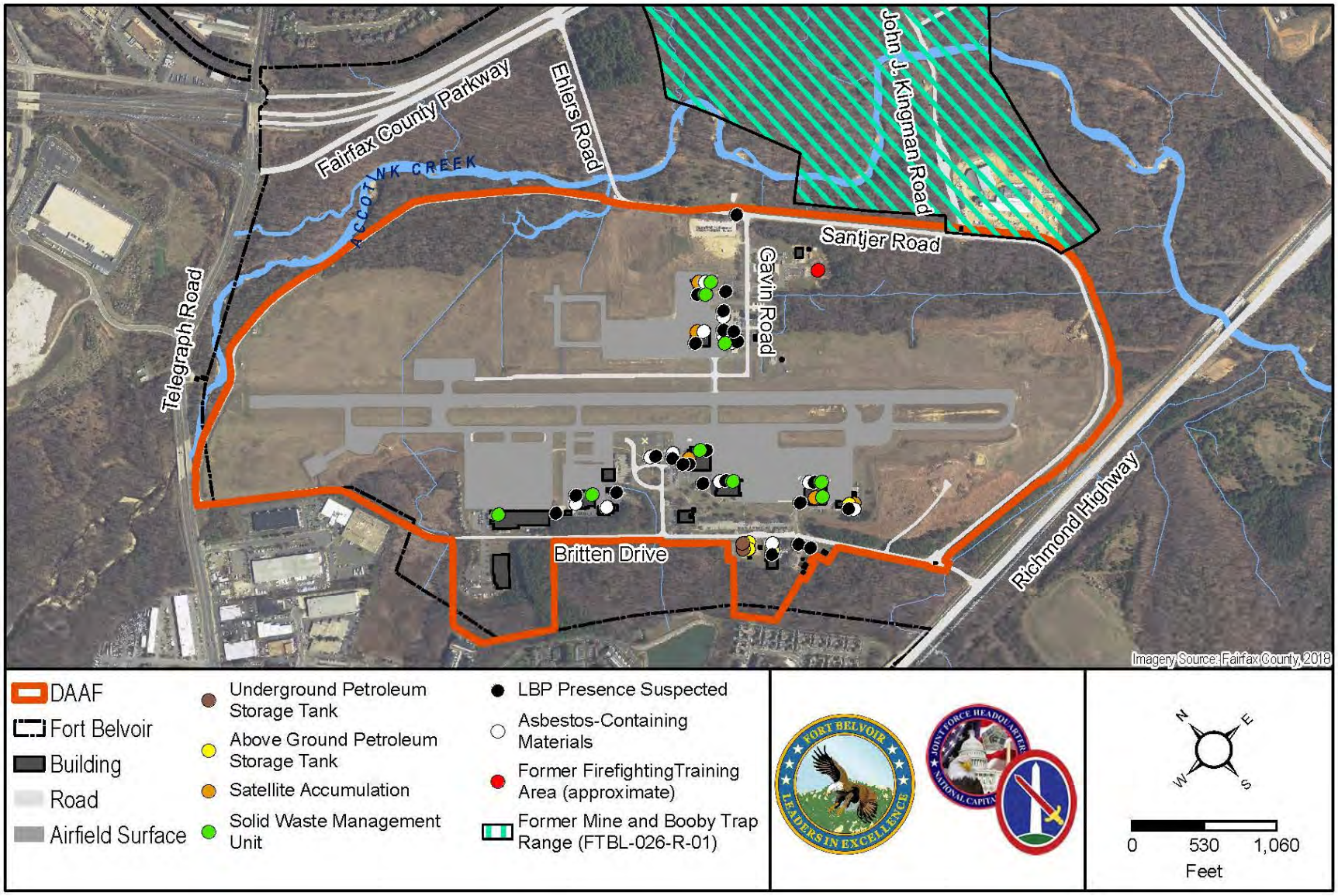
Table 3.10-1: DAAF Hazardous Waste SAAs

Building No.	Tenant / Function	Action Under EIS Alternatives	
		Full Implementation (Preferred Alternative) (Project No.)	Partial Implementation (Project No.)
3141	12th AV BN, B Company / Airfield Operations Maintenance Shop	Demolish (6)	Demolish (6)
3151	12th AV BN, D Company / Hangar	Modernize (3, 17) Demolish (20)	Modernize (3, 17)
3231	12th AV BN, A Company / Hangar	Demolish (11)	Demolish (11)
3232	12th AV BN, C Company / Hangar	Modernize (4) Demolish (12)	Modernize (4)

Source: (Fort Belvoir, 2019a; Fort Belvoir, 2019b; Fort Belvoir, 2019c; Fort Belvoir, 2019d)

Once quantities of hazardous waste at DAAF SAAs reach the 55-gallon accumulation threshold (or one quart for acutely hazardous waste), the container(s) constituting the SAA is transferred to Fort Belvoir's main hazardous waste accumulation site (HWAS) in Building 1495 on South Post. The HWAS is operated by Fort Belvoir DPW-ED. The 90-day limit for removing hazardous waste from Fort Belvoir and disposing of it at a permitted off-site facility begins when it is received at the HWAS. Hazardous waste is collected from the HWAS by licensed private contractors and transported off-site in accordance with applicable federal and state regulations (Fort Belvoir, 2014e).

Figure 3.10-1: Hazardous Materials and Waste



Off-post transportation of hazardous waste by Fort Belvoir tenant organizations is strictly forbidden. Tenants generating hazardous waste are permitted to transport such waste from SAAs to the HWAS on South Post in accordance with applicable regulations, including motor vehicle safety standards set forth in Chapter 11, Section 3 of AR 385-10 (Fort Belvoir, 2014e).

3.10.3 Perfluoroalkyl Substances and Aqueous Film Forming Foam

Perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) are two types of human-made fluorinated organic chemicals that are part of a larger group of chemicals referred to as perfluoroalkyl substances (PFAS). These chemicals are used in a wide range of household products (e.g., cookware, clothing, furniture) as well as industrial processes and firefighting foam. They are persistent in the environment (i.e., don't break down rapidly) and can accumulate over time (USEPA, 2018b; US Army, 2019a). Scientific studies have shown that exposure to high concentrations of these chemicals or exposure over a long period of time has the potential to have adverse health effects in humans and animals. The presence of PFOS and PFOA in drinking water (obtained from groundwater as well as surface water bodies) is a potential pathway to human exposure.

The USEPA does not currently regulate PFAS, including PFOA and PFOS, as hazardous substances. In 2016, USEPA established a lifetime health advisory (LHA) of 70 parts per trillion (ppt) for human exposure (i.e., ingestion) to PFOA and PFOS in drinking water (for context, one ppt is equivalent to one drop of water in 20 Olympic-sized swimming pools; this means an individual would have to consume that much water containing PFOA and PFOS to meet the LHA value) (US Army, 2019a). The LHA is non-enforceable and is intended to inform state agencies and public health officials on health effects, analytical methodologies, and treatment technologies associated with drinking water contamination (USEPA, 2016). A PFAS Action Plan released by USEPA in 2019 identifies key actions for addressing human exposure and risk to PFAS including developing new methods to characterize PFAS in the environment; evaluating cleanup approaches and guidance for contaminated groundwater; regulating PFAS under TSCA to prevent future contamination; and addressing PFAS in drinking water using regulatory and other tools (USEPA, 2019).

The Army began using aqueous film forming foam (AFFF) containing PFOS and PFOA in the 1970s to suppress fuel fires (AFFF containing PFOS and PFOA is also commonly used by civilian firefighters). The Army has ceased the use of AFFF containing PFOS except for emergencies. In 2019, the Army will begin replacing AFFF containing PFOS in firefighting vehicles and equipment with C6 PFAS AFFF formulations that have been identified in the DoD AFFF Military Standard (MILSPEC) (Army 2019).

The Army completed water sampling in 2017 for PFOS and PFOA at 2,905 current and former Army locations, including 380 Army drinking water systems. Analysis of the drinking water samples indicated 13 Army locations with PFOS/PFOA levels above the LHA. The Army has implemented mitigation measures at 13 Army sites within and outside the United States for PFOS and PFOA in drinking water above the USEPA LHA; investigations are being conducted at an additional nine sites in the United States where PFOS and PFOA exceed the LHA in groundwater. None of these sites are at Fort Belvoir or DAAF. The closest affected site to DAAF is the former Vint Hill Farms Station in Fauquier County, Virginia where

concentrations of PFOS and PFOA in groundwater exceeded the LHA (US Army, 2019b). This facility is approximately 26 miles west of Fort Belvoir and was closed by the Army in 1997 (DoD OEA, 2017).

With one exception, AFFF containing PFOS and PFOA has been replaced in all firefighting vehicles, equipment, and facility sprinkler systems at DAAF within the last five to six years and is no longer applied in emergencies. The exception is two 125-gallon tanks in Building 3121 that supply the facility's sprinkler system. Independently of the Proposed Action, AFFF in that tank will be emptied of the Proposed Action during the next five-year "dump test" conducted by FES and replaced with an AFFF formulation meeting the current MILSPEC. There have been no aircraft crashes or other emergencies at DAAF requiring the application of AFFF within the last five years (Jett, personal comm., 2019).

A former firefighting training area is located east of Building 3242, the DAAF fire station (**Figure 3.10-1).** It is likely that AFFF containing PFOS and PFOA was historically used during fire training exercises conducted in this area; as such, there is potential that PFOS and PFOA from AFFF migrated to surface or groundwater at DAAF. As noted above, however, drinking water samples collected at Fort Belvoir by the Army did not exceed the USEPA LHA for PFOS and PFOA; it is not known if surface and groundwater at DAAF have been analyzed for those chemicals. There are no potable drinking water wells at DAAF (**Section 3.7.2**).

3.10.4 Petroleum Storage Tanks

AST and underground storage tanks (UST) at Fort Belvoir are managed by the installation's Petroleum Management Program in accordance with applicable federal, state, and Army regulations and requirements. Two ASTs and two USTs containing varying quantities of gasoline, diesel, and JP-8 (aircraft fuel) are in use at Building 3162 on the southwest side of the airfield (**Figure 3.10-1**). Neither Building 3162 nor ASTs and USTs associated with it would be affected by the Proposed Action.

3.10.5 Pesticides

The application of all pesticides at Fort Belvoir, including herbicides, fungicides, insecticides, and rodenticides, is performed in accordance with the Army's integrated pest management procedures and the installation's Integrated Pest Management Program. The intent of Fort Belvoir's Integrated Pest Management Program is to reduce reliance on pesticides, enhance environmental protection, and maximize the use of integrated pest management techniques. The majority (approximately 75 percent) of pesticides used at Fort Belvoir are applied on the North Post golf course (Fort Belvoir, 2015b).

Pesticides are periodically applied at DAAF to manage vegetation and control populations of insects and rodents. All pesticides are applied at DAAF by licensed contractors in accordance with the installation's Integrated Pest Management Program. No pesticides are stored at the airfield; rather, they are mixed off-site by licensed contractors prior to application, and immediately removed from DAAF afterward. All pesticide and pesticide applications are coordinated with DPW-ED Pest and Pesticides Program Manager.

3.10.6 Asbestos, Lead-based Paint, and Radon

3.10.6.1 Asbestos

Asbestos is a group of naturally occurring minerals that separate into fibers. Asbestos that is capable of being crumbled, pulverized, or reduced to powder by hand pressure is described as "friable." Inhalation of asbestos fibers has been linked to cancer and other diseases in humans.

Asbestos and asbestos-containing materials (ACM) are commonly used in certain building materials and automotive parts. Uses of asbestos and ACM are regulated by the USEPA (40 CFR Part 61 and 40 CFR Part 763), OSHA (29 CFR 1926.58), the US Department of Transportation (49 CFR 171 and 172), and individual states. Army requirements for managing asbestos are established in AR 200-1 and AR 420-1, *Army Facilities Management*. These regulations govern the control of asbestos fiber emissions to protect the environment and public health.

As part of its asbestos management program, Fort Belvoir maintains a database of information on the presence of ACM in most on-post facilities. Proposed facility modernization and demolition projects are reviewed by the Asbestos Program Manager to determine the potential for ACM to be present. Supplemental surveys are conducted as needed to verify the presence of ACM in facilities proposed for modernization or demolition. When disturbance of ACM during modernization or demolition projects is anticipated, it is abated in accordance with applicable Army, federal, and state regulations and disposed of at a permitted off-post facility.

ACM has been documented in 13 DAAF facilities included in the Proposed Action (**Table 3.10-2; Figure 3.10-1**).

3.10.6.2 Lead-based Paint

The manufacture and use of lead-based paint (LBP) was banned in the United States in 1978. LBP in Army facilities is managed in accordance with AR 200-1, AR 420-1, *Army Facilities Management*, and applicable federal and state regulations.

All buildings and structures at DAAF built prior to 1978 may contain LBP. Painted surfaces suspected of being coated with LBP are inspected prior to disturbance in accordance with Fort Belvoir's lead program. LBP abatement is performed by licensed private contractors when required. Following abatement, materials containing LBP are disposed of at permitted facilities outside the installation.

Table 3.10-3 lists facilities at DAAF identified for modernization or demolition in the Proposed Action that were built before 1978 and may contain LBP. The locations of these facilities are shown on **Figure 3.10-1**.

Table 3.10-2: DAAF Facilities with Documented ACM

Building No.	Tenant / Function	Action Under EIS Alternatives	
		Full Implementation (Preferred Alternative) (Project No.)	Partial Implementation (Project No.)
3126	NVESD / Aircraft Component Maintenance Shop	Demolish (17)	Demolish (17)
3128	NVESD / Operations	Demolish (17)	Demolish (17)
3136	Airfield Division / Operations	Demolish (10)	Demolish (10)
3138	Airfield Division / Heat Plant	Demolish (6)	Demolish (6)
3145	OSA-A/OSACOM / Hangar	Modernize (2) Demolish (21)	Modernize (2)
3151	12th AV BN, D Company / Hangar	Modernize (3, 17) Demolish (20)	Modernize (3, 17)
3153	12th AV BN, D Company / Aircraft Component Maintenance Shop	Demolish (20)	N/A
3165	OSA-A/OSACOM / Administration	Modernize (16) Repurpose (22)	Modernize (16)
3231	12th AV BN, A Company / Hangar	Demolish (11)	N/A
3232	12th AV BN, D Company / Hangar	Modernize (4) Demolish (12)	Modernize (4)
3234	12th AV BN / Airfield Operations	Demolish (6)	Demolish (6)
3235	12th AV BN / Battalion Headquarters	Demolish (6)	Demolish (6)
3237	12th AV BN / Flight Operations	Demolish (6)	Demolish (6)

Source: (Fort Belvoir, 2018c)

Table 3.10-3: DAAF Facilities Potentially Containing LBP

Building No.	Tenant / Function	Year of Construction	Action Under EIS Alternatives	
			Full Implementation (Preferred Alternative) (Project No.)	Partial Implementation (Project No.)
3125	Storage Handling Equipment	1976	Demolish (17)	Demolish (17)
3126	NVESD / Aircraft Component Maintenance Shop	1960	Demolish (17)	Demolish (17)
3131	NVESD / Operations	1960	Demolish (17)	Demolish (17)
3136	Airfield Division / Operations	1966	Demolish (10)	Demolish (10)
3138	Airfield Division / Heat Plant	1955	Demolish (6)	Demolish (6)

Table 3.10-3: DAAF Facilities Potentially Containing LBP (con't.)

Building No.	Tenant / Function	Year of Construction	Action Under EIS Alternatives	
			Full Implementation (Preferred Alternative) (Project No.)	Partial Implementation (Project No.)
3140	12th AV BN, B Company / Hangar	1955	Demolish (6)	Demolish (6)
3141	Airfield Operations Maintenance Shop	Not known; assumed to contain LBP	Demolish (6)	Demolish (6)
3142	Storage Air Traffic Control (Command Aviation)	Not known; assumed to contain LBP	Demolish (6)	Demolish (6)
3143	Vacant	Not known; assumed to contain LBP	Demolish (6)	Demolish (6)
3145	OSA-A/OSACOM / Hangar	1970	Modernize (2) Demolish (21)	Modernize (2)
3149	Vacant	Not known; assumed to contain LBP	Demolish (6)	Demolish (6)
3150	General Purpose Storehouse	1975	Demolish (20)	N/A
3151	12th AV BN, D Company / Hangar	1961	Modernize (3, 17) Demolish (20)	Modernize (3, 17)
3153	12th AV BN, D Company / Aircraft Component Maintenance Shop	1978	Demolish (20)	N/A
3165	OSA-A/OSACOM / Administration	1976	Modernize (16) Repurpose (22)	Modernize (16)
3170	General Purpose Storehouse	1958	Demolish (21)	N/A
3171	Flammable Material Storehouse	1960	Demolish (21)	N/A
3231	12th AV BN, A Company / Hangar	1958	Demolish (11)	N/A
3232	12th AV BN, D Company / Hangar	1960	Modernize (4) Demolish (12)	Modernize (4)
3234	12th AV BN / Airfield Operations	1958	Demolish (6)	Demolish (6)
3235	12th AV BN / Battalion Headquarters	1958	Demolish (6)	Demolish (6)
3236	Flammable Materials Storehouse	1960	Demolish (6)	Demolish (6)

Table 3.10-3: DAAF Facilities Potentially Containing LBP (con't.)

Building No.	Tenant / Function	Year of Construction	Action Under EIS Alternatives	
			Full Implementation (Preferred Alternative) (Project No.)	Partial Implementation (Project No.)
3237	12th AV BN / Flight Operations	1958	Demolish (6)	Demolish (6)
3238	Transformer Building	1958	Demolish (6)	Demolish (6)
3260	Sentry Station	1976	Demolish (5)	Demolish (5)

Source: (Fort Belvoir, 2018a)

3.10.6.3 Radon

Radon is an odorless, colorless, naturally occurring radioactive gas that develops in soils and rocks as uranium decays. It has been determined to increase the risk of lung cancer in humans. Radon has a tendency to accumulate in enclosed, below-ground spaces with poor ventilation (i.e., basements and crawlspaces). USEPA recommends mitigation for radon levels at or above 4 picocuries per liter (pCi/L) inside residential structures but has not established a threshold for commercial buildings.

Fairfax County, Virginia is in Zone 1 as shown on USEPA's map of radon zones (USEPA, 2018a). Zone 1 indicates areas of high potential where predicted average indoor radon screening levels exceed 4 pCi/L. Radon surveying and detection is a function and responsibility of the Fort Belvoir Community Hospital. Radon levels at or above 4 pCi/L have not been documented at facilities on Fort Belvoir, including DAAF.

3.10.7 Solid Waste Management Units

Fort Belvoir has an active program to manage and remediate SWMUs and potentially contaminated sites that is conducted in accordance with federal, state, and Army regulations. Currently, Fort Belvoir manages 21 SWMUs on DAAF in accordance with RCRA Part B permit VA7213720082. Fourteen SWMUs are present near or adjacent to sites of projects in the Proposed Action (**Table 3.10-4**; **Figure 3.10-1**).

The majority of the SWMUs on DAAF have received administrative closure or letters of NFA from applicable regulatory agencies (administrative closure or NFA letters for these sites were issued between 2008 and 2014). As such, applicable regulatory requirements have been met and there are no limitations or restrictions on current or futures uses occurring on these sites.

Table 3.10-4: DAAF SWMUs

Site ID No.	Site Name	Current Building No.[1]	Site Status	Action Under EIS Alternatives	
				Full Implementation (Preferred Alternative) (Project No.)	Partial Implementation (Project No.)
C-04	Building 1338 Wash Rack	3126	Administrative closure	Demolish Building 3126 (17)	Demolish Building 3126 (17)
C-05	Building 1357 Wash Rack	3232	Administrative closure	Demolish Building 3232 (12)	N/A
C-06	Building 1338 Aircraft Wash Rack	3126	Administrative closure	Demolish Building 3126 (17)	Demolish Building 3126 (17)
E-04	Building 1348 Waste POL Storage Area	3121	Administrative closure	Modernize (1)	Modernize (1)
E-07	Building 1388 Waste POL Storage Area	Unknown	Administrative closure	Unknown	Unknown
E-12	Building 1339 Waste POL Storage Area	3151	NFA – unrestricted use	Modernize (3, 17) Demolish (20)	Modernize (3, 17)
L-06	Building 317 HF Scrubber System	Unknown	Administrative closure	Unknown	Unknown
L-26	Building 1335 Trench Drain	3145	Administrative closure	Modernize (2) Demolish (21)	Modernize (2)
L-27	Building 1339 Trench Drain	3151	Administrative closure	Modernize (3) Demolish (20)	Modernize (3)
L-28	Building 1357 Trench Drain	3232	Administrative closure	Modernize (4) Demolish (12)	Modernize (4)
E-01/L-12	Building 1357 Waste POL & Empty Drum Storage	3232	NFA – unrestricted use		

Table 3.10-4: DAAF SWMUs (con't.)

Site ID No.	Site Name	Current Building No.[1]	Site Status	Action Under EIS Alternatives	
				Full Implementation (Preferred Alternative) (Project No.)	Partial Implementation (Project No.)
N-20	Building 1330 Waste POL Storage Area	3140	Site was granted NFA in 2013 based on current and anticipated land use. Fort Belvoir will implement LUCs to address n-Nitrosodimethylamine and benzo(a)pyrene that were detected above the USEPA residential screening level and protect construction worker health and safety in the event that earth disturbing activities are conducted on the site.	Demolish (6)	Demolish (6)
FTBL-026-R-01	Mines and Booby Trap Area	N/A – east side of airfield (**Figure 3.10-1**)	Site is administered under Fort Belvoir's Military Munitions Response Program (MMRP) and is currently at the Remedial Investigation / Feasibility Study phase. LUCs are in place to regulate development and site access.	Replace Farrar Gate ACP and install redundant communications line (19)	N/A
Building 3233	Building 3233 Petroleum Site	3233	A Site Characterization Report prepared in 2018 recommended NFA and site closure; regulator concurrence is pending.	Demolish (6)	Demolish (6)

Note:

1. With the exception of Building 3233, building numbers in site names are out of date. Current building numbers are provided for reference.

Source: (Fort Belvoir, 2018c)

Three SWMUs at DAAF are undergoing additional investigation and/or have land use controls (LUCs) in place to regulate site access or uses:

- **Site N-20 – Building 1330 Waste POL Storage Area:** This site was formerly an outdoor storage area for waste POL adjacent to Building 3140 (formerly Building 1330). Concentrations of VOC and semi-volatile organic compounds (SVOC) in soil samples collected at the site in 2013 exceeded applicable industrial risk screening criteria. Risk evaluation of the site data concluded that the detections were isolated and thus, not significant. USEPA concurred with Fort Belvoir's NFA recommendation for this site in 2013.

  The site is currently covered by concrete associated with adjacent aircraft parking aprons and taxiways. Fort Belvoir will implement LUCs to address n-Nitrosodimethylamine and benzo(a)pyrene that were detected above the USEPA residential screening level. LUCs will also require the preparation of an Activity Hazard Analysis to determine the risk of construction worker exposure as well as a site-specific health and safety plan for projects that would potentially disturb the site (Fort Belvoir, 2015b).

- **Site FTBL-026-R-01 – Mines and Booby Trap Area:** This site covers approximately 110 acres between Santjer Road and Fairfax County Parkway. It was formerly used as a training area for the installation and removal of anti-personnel mines and booby trap devices between 1943 and 1947. Although initially recommended for NFA in 2008, evidence of MC and/or MEC were documented on the site in 2010. A Remedial Investigation and Feasibility Study were subsequently conducted on the site.

  The site is mostly undeveloped, although a portion of the site underlies the Mosby Army Reserve Center at the intersection of Farrar Road and Fairfax County Parkway. Also, the STF was recently built within a portion of the site at the intersection of Santjer and Farrar Roads. A portion of Fort Belvoir's FWC overlies the site.

  LUCs in place for the site include development restrictions and prohibited uses (e.g., children's daycare, school, hospital, or residential uses) as well as warning signage and/or fencing to restrict access where applicable. Proposed development within the site is subject to issuance of an earth disturbance permit by Fort Belvoir DPW-ED upon its review and approval of the project. In addition, the development proponent may be required to have one or more certified explosive ordnance disposal (EOD) safety technicians onsite while earth disturbing activities are being conducted to observe and identify suspected MC or MEC if it is encountered.

- **Building 3233 Petroleum Release Site:** A 5,000-gallon heating oil UST was formerly located on the site. A release of petroleum constituents associated with the tank was observed in 2013 and the tank was removed in 2015. A Site Characterization Report prepared in 2018 concluded that there are no unacceptable risks to potential receptors for the current use of the site and that there is no vapor intrusion risk at buildings adjacent to the site. Based on these conclusions, the site was recommended for NFA (US Army Garrison Fort Belvoir, 2018). VDEQ provided its concurrence with this determination to Fort Belvoir DPW in correspondence dated December 26, 2018 (**Appendix A**).

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4 Environmental Consequences

4.1 Introduction

This chapter presents the analysis of potential impacts from the Proposed Action and Alternatives on the resources described in **Chapter 3**. The introduction to each resource section establishes the analytical thresholds used to determine a potential "significant" adverse impact in this EIS. For analysis purposes, only potential adverse impacts on resources above these thresholds are considered "significant"; all other potential impacts, those below applicable significance thresholds, are considered "less than significant."

The terms "impacts" and "effects" are used interchangeably throughout this Chapter; they are synonymous for the purpose of this EIS. The use of the term "significant" and derivations thereof in this document is consistent with the definition and guidelines in the CEQ's regulations implementing NEPA (40 CFR Part 1508.27), which require consideration of both the context and intensity of impacts. The following terms are used throughout this EIS to indicate the relative degree of severity of predicted environmental impacts:

- **No Effect** – No change to the resource or built system.
- **Less-than-significant Adverse Effects** – Adverse effects do not exceed the threshold of significance established for the resource or built system. Adverse effects may be detectable, but they are within or approximate to normal variability and do not appreciably affect the extent or value of the resource or built system. Adverse impacts are easily absorbed without mitigation and do not contribute toward long-term consequences.
- **Less-than-significant Adverse Effects with Mitigation** – Adverse impacts with mitigation applied do not exceed the threshold of significance established for the resource or built system.
- **Significant Adverse Effects** – Adverse impacts exceed normal variability, appreciably affect the value or extent of the resource or built system, and may affect the viability of the resource or built system. Full mitigation of adverse impacts is not possible or mitigation success is not likely, and long-term deterioration of the resource or built system may be unavoidable.
- **Beneficial Effects –** Impacts on the resource are positive.

For analysis purposes, mitigation measures only apply to significant impacts. Conversely, management measures used to prevent or reduce non-significant impacts are referred to as BMPs or standard protocols and procedures associated with the Proposed Action. Fort Belvoir DPW-ED would review each of the proposed ADP projects prior to implementation to identify environmentally sensitive areas that could potentially be impacted and work with the project proponent to identify alternatives to avoid impacts or measures to minimize or mitigate potential impacts.

The Environmental Consequences of the Proposed Action and Alternatives presented herein are structured in accordance with the Army's plan to implement the DAAF ADP in phases over an

approximately 30-year period, as described in **Chapter 2**. With some minor deviations in scope, all of the proposed short-range ADP projects would be implemented under either the Full Implementation Alternative (Preferred Alternative) or Partial Implementation Alternative. By comparison, the Partial Implementation Alternative would not implement all mid-range projects and would not implement any long-range ADP projects, in contrast to the Full Implementation Alternative (Preferred Alternative). Accordingly, the Environmental Consequences presented in this Chapter are organized as follows:

- Short-Range ADP Projects (Full Implementation Alternative [Preferred Alternative] and Partial Implementation Alternative)
- Mid- to Long-Range ADP Projects (Full Implementation Alternative [Preferred Alternative])
- Mid-Range ADP Projects (Partial Implementation Alternative)

Chapter 5 analyzes the potential cumulative Environmental Consequences of the Proposed Action and Alternatives using this same organizational construct.

4.2 Land Use, Aesthetics, and Coastal Zone Management

4.2.1 Thresholds of Significance

This section evaluates potential impacts of the No Action, Full Implementation Alternative (Preferred Alternative), and Partial Implementation Alternative on land use, plans, aesthetics and visual quality, and coastal zone management. Existing conditions for these resources are discussed in **Section 3.2**.

The following criteria were used to determine the potential for a significant adverse impact:

- If the alternative were to directly or indirectly introduce a new permanent land use that is incompatible with existing adjacent or nearby DAAF or Fairfax County land uses and prevent the continuation of an existing land use or permanently replace a compatible use.
- If the alternative would not be consistent with the plans' relevant goals and objectives or would interfere with the timely completion of planned or ongoing projects.
- If the alternative would not be aesthetically or visually consistent with other DAAF facilities or with design guidelines set forth in the Fort Belvoir IPS, or would affect the integrity of National Register-listed or -eligible properties adjacent to DAAF (either on Fort Belvoir or in Fairfax County) and could not be mitigated or if it resulted in an adverse effect on a National Register-eligible or -listed property.

The consistency of the Proposed Action with the enforceable policies of the Virginia CZM Program is briefly discussed in **Section 4.2.6**. The Army's Federal Consistency Determination for the Proposed Action is included as **Chapter 7** of this EIS.

4.2.2 No Action Alternative

Under the No Action Alternative, the DAAF ADP would not be adopted and none of the proposed ADP projects would be implemented. Current land use conditions at DAAF would continue for the

foreseeable future. Anderson Park would remain inconsistent with the underlying Airfield land use designation; however, this would not create incompatibilities with other land uses at DAAF. Therefore, the No Action Alternative would have no effects on land use at DAAF or in areas of Fairfax County near the airfield.

Failure to adopt the ADP under the No Action Alternative would leave DAAF without an updated ADP to guide future development at the airfield, thereby failing to comply with UFC 2-100-01, Change 1. Consequently, the No Action Alternative would not provide facilities and infrastructure required by DAAF's tenants to support their missions. The No Action Alternative would not contribute to the objectives of Fort Belvoir's RPMP to create and sustain a world-class installation and efficiently maximize land and previously developed areas within the installation's boundaries. However, neither would the No Action Alternative prevent the fulfillment of goals and objectives of the Fort Belvoir RPMP through initiatives occurring elsewhere on the installation. Thus, the No Action Alternative would have long-term, less-than-significant adverse impacts on plans relevant to Fort Belvoir.

There would be no changes in visual characteristics or the appearance of facilities at DAAF under the No Action Alternative. This would have no impacts on aesthetics at the airfield or in its vicinity.

4.2.3 Short-Range ADP Projects – Full Implementation Alternative (Preferred Alternative) and Partial Implementation Alternative

4.2.3.1 DAAF Land Use

Construction, demolition, and site preparation activities (e.g., soil excavation, grading) associated with short-range ADP projects involving land disturbance (i.e., **Projects 5** through **9**) would result in temporary, localized changes in land use as the project sites become active construction areas. Such activities occurring on the sites, particularly vegetation clearing and grading during site preparation, facility demolitions associated with **Projects 5** and **6**, and increased construction-related traffic would have the potential to generate noise and dust that could cause annoyance to adjacent or nearby land uses.

To minimize effects on other land uses during these projects, construction contractors would use BMPs to minimize the generation of fugitive dust such as wetting or sweeping of pavements and temporarily vegetating exposed soils. In most cases, construction activities would be limited to normal working hours (i.e., 8 a.m. to 5 p.m. Monday through Friday), thereby minimizing the potential for annoyance from construction-related noise. Construction activities occurring outside of those time frames would be coordinated well in advance with neighboring facilities to minimize or eliminate potential nuisances.

Implementation of the projects over a period of 10 years would ensure that not all construction activities occur simultaneously, further minimizing impacts on adjacent or nearby land uses. Construction activities associated with the proposed short-range ADP projects would not impede or prevent the operation of existing facilities and activities at DAAF. Upon the completion of each project, construction activities and any associated nuisance would cease.

Although some signs of construction-related activity would be evident in the vicinity of short-range facility modernization ADP projects (**Projects 1** through **4**), the majority of these activities would be confined to interior spaces of those facilities. It is unlikely that these projects would cause annoyance to, or in some cases even be noticeable, from adjacent or nearby land uses. For these reasons, short-range ADP projects would have no or less-than-significant construction-related impacts on DAAF land use.

The short-range ADP projects consist of facility and infrastructure modernization and construction projects that would support airfield operations and associated activities such as aircraft maintenance and repair. These projects have been planned and designed to be compatible with one another, existing airfield facilities that would remain under the Full and Partial Implementation Alternatives, and the underlying Airfield land use designation at DAAF. None of the proposed projects would introduce land uses, activities, or operations on DAAF that are not already present at the airfield. No land use incompatibilities would result from implementation of the short-range projects and no changes to the underlying land use designation or Fort Belvoir's Land Use Plan would be required.

Implementation of **Projects 5** and **6** under either alternative would encroach on Anderson Park for the realignment of Santjer Road and construction of the 1.3-acre, 147-space parking lot associated with the 8-bay 12th AV BN hangar, respectively. This encroachment would likely preclude the continued use of the underlying and adjacent land as a park. Although the park is compatible with other DAAF facilities, it is inconsistent with the underlying Airfield land use designation (**Section 3.2.2**). Removal of the park to implement **Project 6**, a facility that would directly support airfield operations and tenants, would eliminate this inconsistency. Personnel assigned to DAAF would continue to have access to other park and open space areas on and around Fort Belvoir (**Section 3.2.3**).

None of the proposed short-range projects would encroach on the portion of the FWC within DAAF's boundaries. However, **Projects 5**, **6**, and **9** would have the potential to permanently encroach on approximately 18 acres of BBMC buffers on the airfield. These impacts are discussed further in **Section 4.8**.

For these reasons, implementation of the short-range ADP projects under either alternative would have no adverse and some beneficial impacts on DAAF land use in the long term.

4.2.3.2 Surrounding Land Use

All of the proposed ADP projects, including the short-range projects, would be implemented within the boundaries of DAAF. It is unlikely that construction activities on DAAF associated with the proposed projects would be noticeable from Fairfax County land uses outside the airfield. None of the proposed projects would have the potential to interfere with or preclude the continued use of land outside the airfield's boundaries during their construction or operation, nor would they require changes to existing designations in applicable Fairfax County land use plans.

Therefore, the short-range ADP projects would have no short- or long-term adverse impacts on Fairfax County land uses near DAAF.

4.2.3.3 Relevant Plans

Adoption of the DAAF ADP and implementation of the proposed short-range projects would be consistent with guiding principles articulated in Fort Belvoir's RPMP (**Section 3.2.4.1**) by contributing to the development of a world-class installation through the replacement of outdated, inefficient buildings with modern, highly-efficient facilities; maximizing the use of previously developed areas and available land within the installation's boundaries; and minimizing environmental impacts to the extent possible. Adoption of the DAAF ADP would also ensure compliance with UFC-2-100-01, Change 1. As applicable, the short-range ADP projects would be implemented in accordance with guidance set forth in the IPS and DAAF regulating plan to ensure consistent character of development and efficient use of available land.

Projects 5 and **6** would be implemented along the northern side of DAAF in an area identified as least suitable for development on Fort Belvoir's current land use map. **Project 5** would represent redevelopment of an existing facility; following realignment of the road, the abandoned road segment would be demolished and replanted with native vegetation or otherwise returned to a permeable condition. Thus, effects on potentially sensitive features in this area would be minimal.

Analysis of tenant requirements and natural, physical, and operational constraints at the airfield identified the site of **Project 6** as most suitable to meet the needs of the 12th AV BN while supporting the airfield's mission and minimizing impacts on other DAAF tenants, airfield operations, and natural features (**Section 2.2**). The project would be designed, built, and operated in a manner that minimizes effects on these elements to the extent practicable and as such, would be consistent with the Fort Belvoir RPMP.

The short-range ADP projects are included in the DAAF ADP's Preferred COA and represent facilities and actions required by DAAF's tenants to fulfill their missions. The projects would be fully consistent with the DAAF ADP and directly support the fulfillment of that plan's goals and objectives.

As previously noted, the proposed ADP projects would occur entirely within the boundaries of DAAF and would have no potential to adversely affect areas of Fairfax County outside the airfield. Although the DAAF ADP and its short-range projects would not directly support or contribute to the fulfillment of goals and objectives articulated in planning documents applicable to areas of Fairfax County adjacent to DAAF, neither would they delay their fulfillment.

For these reasons, the short-range ADP projects under either alternative would have no adverse impacts on the goals and objectives of the Fort Belvoir RPMP, the DAAF ADP, or the Fairfax County Comprehensive Plan, with beneficial impacts on the Fort Belvoir RPMP and DAAF ADP.

4.2.3.4 Aesthetics

In the short term, land disturbance, construction, and demolition activities associated with **Projects 5** through **9** would have the potential to temporarily degrade the aesthetics and visual character of DAAF as project sites become active construction areas. However, as no unique or pristine aesthetic or visual characteristics are present at DAAF, any such effects would be minimal. Construction activities

associated with these projects would be similar to other projects of similar scale occurring relatively frequently in the Northern Virginia and Washington, DC Metro areas and would not result in particularly unusual or unsightly visual conditions at the airfield. The implementation of the proposed projects over a period of approximately 10 years would minimize any visual impacts, as not all projects would be implemented simultaneously. Any degradation in visual conditions resulting from the projects would cease upon their completion, ensuring that such effects remain temporary.

As noted above, **Projects 5** and **6** would encroach on Anderson Park and likely prevent the continued use of that land as a park. Although this would result in a reduction of open space on DAAF, such a reduction would be small in the context of the airfield. Substantial amounts of wooded, undeveloped land would remain at DAAF, particularly along the northern and eastern sides of the airfield between Fairfax County Parkway and the intensively developed area around the runway. The projects would provide facilities that directly support the missions of DAAF's tenants and would be consistent with the underlying Airfield land use designation. Thus, the removal of the park resulting from the short-term ADP projects would have long-term, less-than-significant adverse impacts on aesthetics at DAAF.

Projects 1 through **4** and **6** would modernize existing or build new facilities in accordance with Fort Belvoir's IPS and DAAF regulating plan. This would ensure that the facilities are visually compatible with one another and existing facilities at the airfield. None of the proposed projects would be visible from historic properties outside the airfield and as such, would have no potential to adversely affect historic properties listed or eligible for listing in the National Register.

For these reasons, the short-range ADP projects would have less-than-significant construction-related adverse impacts and no adverse operational impacts on aesthetics and visual character at or near DAAF. Facilities modernized or built in accordance with the Fort Belvoir IPS and regulating plan would have beneficial long-term impacts on aesthetics and visual character at DAAF.

4.2.4 Mid- and Long-Range ADP Projects – Full Implementation Alternative (Preferred Alternative)

4.2.4.1 DAAF Land Use

Impacts on land use at DAAF from the mid- and long-range ADP projects would be similar to those described for the short-range projects (**Section 4.2.3.1**). Construction-related activities associated with each project would have the potential to cause annoyance to adjacent or nearby land uses at the airfield but would not prevent or interfere with their operation during the projects' construction phases. The staggered implementation of the projects over a 20-year period would ensure that any nuisances resulting from the proposed projects do not occur simultaneously. Once operational, each of the projects would be consistent with one another, other uses at DAAF, and the underlying Airfield land use designation; no land use incompatibilities would be created.

Therefore, mid- and long-range ADP projects would have no or less-than-significant adverse construction-related impacts and no adverse operational impacts on land use at DAAF. **Projects 11** and **13** would permanently encroach on approximately 3.3 acres of BBMC habitat at DAAF; these impacts are discussed in **Section 4.8**.

4.2.4.2 Surrounding Land Use

As described for the short-range ADP projects (**Section 4.2.3.2**), all of the mid- and long-range projects would be implemented within the boundaries of DAAF; thus, it is unlikely that construction activities associated with the projects would be noticeable from Fairfax County land uses outside the airfield. Once operational, the proposed projects would not interfere with or prevent the continued operation of adjacent or nearby land uses in Fairfax County. No changes to Fairfax County land use plans or designations would be required.

Thus, the mid- and long-range ADP projects would have no adverse construction-related or operational impacts on Fairfax County land use.

4.2.4.3 Relevant Plans

Like the short-range ADP projects (**Section 4.2.3.3**), the mid- and long-range ADP projects would support the guiding principles of the Fort Belvoir RPMP and would be consistent with development guidelines set forth in the IPS and DAAF regulating plan to ensure consistent character of development and efficient use of available land. All or portions of **Projects 11**, **12**, **13**, **19**, and **23** would be implemented in areas of DAAF identified as least suitable for development on Fort Belvoir's current land use map. For reasons similar to those discussed for **Project 6**, these areas were identified during development of the DAAF ADP as most suitable to support DAAF's mission and tenant operations while minimizing impacts on other DAAF tenants, airfield operations, and natural features (**Section 2.2**). **Project 19** represents redevelopment of an existing facility, while **Project 23** would be a linear use functionally similar to the existing perimeter road (Santjer Road) in that area. All of the proposed projects would be designed, built, and operated in a manner that minimizes effects on natural and human-made features in that portion of the airfield. Thus, the projects would be consistent with the Fort Belvoir RPMP.

The mid- and long-range projects would be fully consistent with the DAAF ADP and support the fulfillment of its planning goals and objectives. None of the projects would have the potential to interfere with areas of Fairfax County outside DAAF or delay or preclude the achievement of planning goals and objectives applicable to those areas.

Mid- and long-range projects would be fully consistent with the DAAF ADP and support the fulfillment of its planning goals and objectives. None of the projects would have the potential to interfere with areas of Fairfax County outside DAAF or delay or preclude the achievement of planning goals and objectives applicable to those areas.

For these reasons, the mid- and long-range ADP projects would have beneficial impacts on the Fort Belvoir RPMP and DAAF ADP and no impacts on the Fairfax County Comprehensive Plan.

4.2.4.4 Aesthetics

Construction-related and operational impacts on aesthetics and visual character at DAAF resulting from the mid- and long-range ADP projects would be similar to those described for the short-range projects (**Section 4.2.3.4**). The degradation of the aesthetic and visual character of DAAF during construction-

related activities would be minimal and temporary, as any such degradation would cease upon the completion of the projects. The staggered implementation of the projects over a 20-year period would minimize visual impacts, as not all of the projects would be implemented simultaneously.

Projects 10 through **16** and **18** through **24** would be designed and built in accordance with Fort Belvoir's IPS and DAAF regulating plan, thereby ensuring that new and modernized facilities are visually compatible with one another and existing facilities at the airfield. None of the proposed projects would be visible from historic properties outside the airfield and as such, would have no potential to adversely affect historic properties listed or eligible for listing on the National Register.

Therefore, the mid- and long-range ADP projects would have less-than-significant construction-related adverse impacts and no adverse operational impacts on aesthetics and visual character at or near DAAF. Facilities modernized or built in accordance with the Fort Belvoir IPS and regulating plan would have beneficial long-term impacts on aesthetics and visual character at DAAF.

4.2.5 Mid-Range ADP Projects – Partial Implementation Alternative

4.2.5.1 DAAF Land Use

Impacts on land use at DAAF resulting from mid-range ADP projects under the Partial Implementation Alternative would be similar to those described for the short-range projects (**Section 4.2.3.1**). There would be temporary, less-than-significant adverse impacts on land uses adjacent to or near the project sites from dust, noise, or other nuisances generated by project-related construction activities. However, such impacts would cease upon the completion of each project. Implementation of the projects over a period of 10 years would minimize these impacts. The implementation of fewer mid-range and no long-range projects under the Partial Implementation Alternative would further minimize construction-related impacts relative to the Full Implementation Alternative.

New or modernized facilities in the mid-range projects would be designed and built to be compatible with one another and existing facilities at DAAF. None of the projects would interfere with or prevent the operation of existing facilities or uses at DAAF, no land use incompatibilities would be created, and no changes to the underlying Airfield land use designation or Fort Belvoir's Land Use Plan would be required.

None of the mid-range projects in the Partial Implementation Alternative would temporarily or permanently encroach on the FWC or BBMC buffers on DAAF.

Therefore, Partial Implementation Alternative mid-range projects would have less-than-significant construction-related adverse impacts on land use and no long-term impacts.

4.2.5.2 Surrounding Land Use

As described for the short-range ADP projects (**Section 4.2.3.2**), it is unlikely that the construction or operation of mid-range ADP projects under the Partial Implementation Alternative would be noticeable from Fairfax County land uses outside DAAF. Therefore, mid-range projects would have no adverse short-term or long-term impacts on surrounding land use under this Alternative.

4.2.5.3 Relevant Plans

Implementation of the mid-range projects in the Partial Implementation Alternative would contribute positively towards the fulfillment of the goals and objectives of the Fort Belvoir RPMP and DAAF ADP. None of the mid-range ADP projects in the Partial Implementation Alternative would be implemented on the north side of the airfield in areas identified as least suitable for development in the Fort Belvoir RPMP. Because fewer mid-range and no long-range projects would be implemented, the facility and infrastructure requirements of DAAF's tenants would not be fully met and, consequently, the fulfillment of the DAAF ADP's goals and objectives not fully achieved by the Partial Implementation Alternative. However, it would substantially improve conditions and adequately fulfill the airfield's vision to create a safe, secure, sustainable, and consolidated aviation complex. Further, it would not preclude later implementation of mid- and long-range projects not included in the alternative.

Mid-range projects in the Partial Implementation Alternative would have no potential to delay or preclude the fulfillment of goals and objectives in the Fairfax County Comprehensive plan, as the proposed projects would have no impacts on activities in areas of the county outside DAAF.

For these reasons, mid-range projects in the Partial Implementation Alternative would have no adverse effects on the Fort Belvoir RPMP and Fairfax County Comprehensive Plan. Adverse impacts on the DAAF ADP resulting from the alternative would be less than significant.

4.2.5.4 Aesthetics

As described for the short-range ADP projects (**Section 4.2.3.4**), mid-range projects under this Alternative would have adverse, less-than-significant construction-related impacts on aesthetics and visual character at DAAF. It is likely that the intensity and duration of such impacts would be less than those described for the short-range ADP projects, as the number of mid-range projects implemented under the Partial Implementation Alternative would be less than the number of short-range projects implemented under either Alternative. In the long term, the mid-range ADP projects would have beneficial impacts on the aesthetics and visual character of DAAF.

4.2.6 Coastal Zone Management

The Army prepared a Federal Consistency Determination analyzing the Proposed Action's consistency with the enforceable policies of the Virginia CZM Program. The summary analysis provided in the Federal Consistency Determination is based on the more detailed impact analyses presented in this EIS. Based on these analyses, the Army has determined that the Proposed Action would be consistent to the maximum extent practicable with the enforceable polices of the Virginia CZM Program.

The Federal Consistency Determination for the Proposed Action is included as **Chapter 7** of this EIS. The Draft EIS, including the Federal Consistency Determination, was submitted to VDEQ's Office of Environmental Impact Review for review and comment during the 45-day Draft EIS public comment period. VDEQ conditionally concurred with the Army's determination in a letter dated September 3, 2020. A copy of the VDEQ concurrence letter is included in **Appendix A**. As a condition of VDEQ's

concurrence, the Army will prepare project-specific Federal Consistency Determinations prior to the implementation of each proposed ADP project and submit to VDEQ for further review and concurrence.

4.3 Historic and Cultural Resources

4.3.1 Thresholds of Significance

The criteria used to determine the potential for a significant adverse impact on historic and cultural resources, including resources listed in or eligible for listing in the NRHP, are the same as those specified under NHPA Section 106. That is, potential impacts on these resources are as determined by Section 106 consultations with the VDHR and other relevant consulting parties. These may include past, present, and, for some of the planned ADP projects, future consultations at either a program- or project-level. For the purpose of analysis in this EIS, a significant adverse impact would result when a measurable effect is not resolvable through the Section 106 consultation process.

4.3.2 No Action Alternative

Under the No Action Alternative, none of the proposed ADP projects would occur. The existing built environment comprising DAAF would not change in the foreseeable future, nor would any land-disturbing activities take place on the airfield. Existing views and noise levels to and from DAAF would not change under this Alternative. Historic and cultural resources management on DAAF would continue in accordance with Fort Belvoir's ICRMP.

4.3.3 Short-Range ADP Projects – Full Implementation Alternative (Preferred Alternative) and Partial Implementation Alternative

4.3.3.1 Architectural Resources

Potential adverse effects on historic properties may occur directly through their physical loss or degradation, or indirectly, by means that diminish their use and enjoyment. Indirect effects may be caused by obstructed views, noise, traffic congestion, and similar effects, as perceived or measured.

There are currently no historic architectural resources, properties or districts, associated with DAAF that are listed, or eligible for listing, in the NRHP (Fort Belvoir, 2014c). Consequently, the short-range ADP projects under the Full and Partial Implementation Alternatives would be unlikely to affect any such resources on DAAF, directly or indirectly. No structural impacts from vibration or ground-disturbing activities would occur, and no such effects would extend beyond the airfield. Over time, in accordance with the installation's ICRMP, the Army would continue to survey for and investigate relevant architectural features on DAAF pursuant to the NHPA. As project designs move from conceptual to specific, further NEPA study and NHPA Section 106 consultation would evaluate potential adverse impacts on architectural resources, as appropriate.

Under the Alternatives, potential indirect effects on historic properties and districts located within the APE beyond DAAF's boundaries could occur. As described, these include a segment of the Fort Belvoir

Military Railroad on post and portions of the Mount Air and Pohick Church Historic Overlay Districts (**Figure 3.3-2**).

Implementation of the Alternatives would not obstruct the viewsheds of any historic properties or districts. Nonetheless, all of the short-range ADP projects under the Alternatives would comply with the building height restrictions specified in Fort Belvoir's IVDP and IPS. Based on known and conceptual facility and infrastructure designs, the maximum vertical height of these proposed structures would not exceed 55 feet from ground surface or 95 feet in elevation asl. Topography, vegetation, and the suburban-urban landscape on and around DAAF would further limit any discernable views of the airfield from any of the historic properties within the APE. Under the Alternatives, operations on DAAF to include aircraft departures and arrivals would not change substantially from existing conditions; by extension, temporary viewshed obstructions from airfield operations would not be anticipated to increase.

The existing noise environment on and around DAAF is characterized by local road traffic, aircraft overflights, construction and maintenance activities, and other sounds commonly occurring in the suburban-urban environment of the Northern Virginia and Washington, DC Metro areas. No additional noise would be generated from increases in personnel or aircraft; however, **Project 9** would result in a minor change to the modeled extent of the aircraft operational noise contours associated with DAAF because of changes in some aircraft engine run-up locations on the airfield (**Sections 4.5.6** and **4.5.7**). Noise generated by the operation of new facilities and infrastructure under the Alternatives would be minimal and limited to DAAF only.

The Alternatives would generate noise from facility construction and demolition activities. Construction activities would generate varying levels of noise dependent on equipment usage and whether activities take place individually or concurrently. Noise in the immediate vicinity of a construction site typically ranges from 80 to 90 dBA; however, some major equipment operations can generate considerably high noise levels up to approximately 800 feet (0.2 mile) from the source (USEPA, 1971). Building demolitions under the Alternatives would generate impulse noise as a single event. On average, building demolitions generate noise levels up to approximately 99 dBA, but noise above 80 to 90 dBA is limited to within approximately 800 feet (0.2 mile) from the source (Center for Construction Research and Training, 2019).

Under the Alternatives, noise generated from construction and demolition activities would not likely be discernable beyond DAAF itself, particularly within the context of the existing noise environment. Within the APE, construction-related noise on DAAF would not be likely to occur beyond 800 feet or 0.2 mile from DAAF. No potentially affected architectural resources are located within this radius. Only major equipment operations and building demolitions could be discernable from this distance. When accounting for other natural environmental features such as topography and vegetation, noise generated under the Alternatives would not likely reach any historic properties or districts within the APE.

No impacts on architectural resources on or in the vicinity of DAAF are anticipated to result from the construction or operation of the Alternatives. The potential for adverse effects on these resources would be minimal to non-existent based on factors such as distance from source; the type, duration, and

timing of activity; development regulation; and the baseline environment, among others. Potential adverse impacts on architectural resources would be less than significant under the Alternatives.

4.3.3.2 Archaeological Resources

Potential adverse effects on archaeological resources primarily include their direct physical loss or degradation, particularly from land-disturbing activities. Indirect effects on archaeological resources may include natural or man-made processes such as erosion, sedimentation, and flooding.

As described, there are five known archaeological sites on DAAF, none of which are listed, or eligible for listing, in the NRHP (Fort Belvoir, 2014c). The project sites would be reviewed for archaeological potential during Fort Belvoir DPW-ED's review of the site and construction plans for each project. Additional archaeological surveys would be conducted if determined necessary by these reviews prior to implementation of the proposed projects.

Under the Full and Partial Implementation Alternatives, in accordance with Fort Belvoir's ICRMP, no ground disturbance activities would occur within a 50-foot radius of each respective site (Fort Belvoir, 2014c). No ground disturbance on or around these sites would result from the operation of the Alternatives. Any potential indirect effects on these sites would be limited to DAAF and negligible in the context of standard construction site BMPs as described in this EIS. No potential adverse impacts on these archaeological sites would occur under the Alternatives.

An inadvertent discovery of archaeological materials or human remains would be possible during construction of the Alternatives. However, given prior land-disturbing activities conducted on and around the airfield, unanticipated discoveries are not likely. Nonetheless, the Army would adhere to the policies and procedures for such discoveries as per Fort Belvoir's ICRMP. Upon discovery of materials or remains during ground disturbance activities under the Alternatives, the Army would:

- immediately cease work and notify the Fort Belvoir Cultural Resources Manager;
- ensure no unauthorized personnel access the site and no further damage to the suspected materials or remains is incurred; and
- comply with applicable laws and regulations prior to conducting any further activity on the site.

Archaeological resources potentially affected under the Alternatives would be limited to DAAF where management measures and procedures are carried out in accordance with Fort Belvoir's ICRMP. Adherence to these standards or practices would ensure potential adverse impacts on DAAF's archaeological sites would be less than significant.

4.3.4 Mid- and Long-Range ADP Projects – Full Implementation Alternative (Preferred Alternative)

The potential adverse impacts of the mid- and long-range ADP projects under the Full Implementation Alternative on historic and cultural resources would be identical to those described in **Section 4.3.3**. Over time, in accordance with the installation's ICRMP, the Army would continue to survey for and investigate relevant architectural features on DAAF pursuant to the NHPA. As project designs move from

conceptual to specific, further NEPA study and NHPA Section 106 consultation would evaluate potential adverse impacts on any known architectural or archaeological resources, as appropriate. The project sites would be reviewed for archaeological potential during Fort Belvoir DPW-ED's review of the site and construction plans for each project. Additional archaeological surveys would be conducted if determined necessary by these reviews prior to implementation of the proposed projects. Potential adverse impacts would be less than significant.

4.3.5 Mid-Range ADP Projects – Partial Implementation Alternative

The potential adverse impacts of the mid-range ADP projects under the Partial Implementation Alternative on historic and cultural resources would be identical to those described in **Section 4.3.3**. Over time, in accordance with the installation's ICRMP, the Army would continue to survey for and investigate relevant architectural features on DAAF pursuant to the NHPA. As project designs move from conceptual to specific, further NEPA study and NHPA Section 106 consultation would evaluate potential adverse impacts on any known architectural or archaeological resources, as appropriate. The project sites would be reviewed for archaeological potential during Fort Belvoir DPW-ED's review of the site and construction plans for each project. Additional archaeological surveys would be conducted if determined necessary by these reviews prior to implementation of the proposed projects. Potential adverse impacts would be less than significant.

4.4 Air Quality

4.4.1 Thresholds of Significance

Potential impacts on air quality resulting from the No Action, Full Implementation, and Partial Implementation Alternatives are described in the following sections. Under the No Action Alternative, existing conditions at DAAF would continue for the foreseeable future. Neither the Full nor Partial Implementation Alternatives would add new emission sources or change airfield (i.e., aircraft) operations. These alternatives consist of facility and infrastructure construction and modernization projects that would be implemented over 30 years. No increases in air emissions from airfield operations are anticipated. Therefore, the analysis is limited to air quality impacts during modernization and construction activities.

Due to the extended duration of the proposed project implementation schedule (i.e., 30 years) and the lack of programmed projects (with the exception of **Project 6**), assumptions have been made to estimate potential air emissions from the proposed construction and modernization projects in the Alternatives based on the anticipated square footage of each project and emissions estimates for previous RONA analyses prepared for Fort Belvoir (Fort Belvoir, 2017).

The following thresholds were used to determine the potential significance of an adverse impact in the air quality analysis:

- If the Proposed Action interferes with the region's ability to achieve the NAAQS in a timely manner or leads to a violation of the conditions in Fort Belvoir's Title V operating permit.

- If emissions of GHGs would exceed CEQ thresholds.

4.4.2 No Action Alternative

Implementation of the No Action Alternative would result in no changes to air quality at DAAF. No construction, changes in traffic, or changes in aircraft operations at DAAF would occur. Fort Belvoir's contribution to regional air quality would not change. Ambient air quality trends and planning would continue as described in **Section 3.4**.

4.4.3 Full Implementation Alternative (Preferred Alternative)

Long-range projects would have less-than-significant adverse effects on air quality. Similar to the effects described for short- and mid-range projects (**Section 4.4.4.1**), short-term effects would be due to the generation of airborne dust and other pollutants during construction and demolition. It is assumed that since there would be no changes in the aircraft operations and no new emissions resulting from the implementation of the proposed ADP projects, there would be no long-term effects from commuting activities or the introduction of new stationary sources of pollutants. Although there may be increases in the size of buildings it has been assumed that all additional space heating and cooling would be supplied by existing grid power.

4.4.3.1 Impacts from Long-Range ADP Projects

General Conformity

Unless a project is ongoing, the GCR determination is only applicable for a five-year period following the proposed federal action. Therefore, the activities outlined in the long-range ADP projects would require additional emission estimations at the time the action was proposed to ensure the total direct and indirect emissions from the projects would not exceed the applicability thresholds and that the GCR would not apply. Notably, these activities would be well beyond the Act-mandated attainment year for the region's pollutants of concern. It is likely that the attainment status, air quality rules, and regulations within the region would change appreciably by that time.

Although applicability to the GCR cannot be determined at this time, for comparison purposes, construction emissions from the long-range projects were approximated based on building square feet and the square footage and emission estimates for a previous RONA analysis for Fort Belvoir (Fort Belvoir, 2017). The applicability thresholds for nonattainment areas are presented in (**Table 4.4-1**). In general, the total emissions of NO_X, VOCs, $PM_{2.5}$, and SO_2 in any given year (**Table 4.4-2**) are expected to be well below the applicability thresholds. Although additional analysis would be required prior to implementation, the annual emissions would likely be de minimis and the general conformity requirements would likely not apply. Adverse effects would be less than significant.

Table 4.4-1: Applicability Thresholds for Nonattainment Areas

Criteria Pollutants	Applicability Threshold (tons per year)	Applies to Activities at Fort Belvoir (Yes/No)
O_3 (NO_x and VOCs)		
Serious Nonattainment Areas	50	No
Severe Nonattainment Areas	25	No
Extreme Nonattainment Areas	10	No
Other O_3 Nonattainment Areas outside an O_3 Transport Region	100	No
Marginal and Moderate Nonattainment Areas inside an O_3 Transport Region		
VOC	50	**Yes**
NO_x	100	**Yes**
CO		
All Nonattainment Areas	100	No
SO_2 and NO_x		
All Nonattainment Areas	100	No
PM_{10}		
Moderate Nonattainment Areas	100	No
Serious Nonattainment Areas	70	No
$PM_{2.5}$ ($PM_{2.5}$, SO_2 and NO_x)		
All Nonattainment Areas	100	**Yes**
Lead		
All Nonattainment Areas	25	No

Sources: 40 CFR 93.153 and 71 FR 40420

Table 4.4-2: Estimated Annual Emissions - Full Implementation Alternative (Preferred Alternative)

Activity/Source[1]	Estimated Annual Air Emissions (tons per year)			
	NO_x	$PM_{2.5}$	SO_2	VOC
Short-Range ADP Projects (Years 1 to 10)	15.19	1.40	1.30	1.61
Mid-Range ADP Projects (Years 11 to 20)	7.71	0.58	0.59	1.46
Long-Range ADP Projects (Years 21 to 30)	6.82	0.52	0.52	1.29
Total – Full Implementation Alternative (Preferred Alternative)	**29.7**	**2.50**	**2.41**	**4.36**

Table 4.4-2: Estimated Annual Emissions - Full Implementation Alternative (Preferred Alternative) (con't.)

Activity/Source[1]	Estimated Annual Air Emissions (tons per year)			
	NO_x	$PM_{2.5}$	SO_2	VOC
Applicability Threshold (tons per year)	*100*	*100*	*100*	*50*
Full Implementation Alternative Exceeds Applicability Threshold?	No	No	No	No

Note:

1. Analysis under the GCR is only applicable for a five-year period, and activities outlined in the long-range projects would require additional emission estimates prior to project implementation.

Regulatory Review

Permitting requirements and BMPs for stationary sources of air emissions from the long-range ADP projects would be similar to those outlined under the short- and mid-range projects. Permitting scenarios can vary based on the types and sizes of new stationary sources, timing of the projects, and the types of controls ultimately selected. However, during the final design stage and the permitting process, if the equipment is not exempt from permitting, either:

1. the actual equipment, controls, or operating limitations would be selected to reduce the PTE below the major modification threshold; or
2. the NNSR permitting process would require emissions offsets be obtained.

Therefore, regardless of the ultimate permitting scenario, these effects would be less than significant. Air quality regulations and applicable standards are updated frequently. All permitting of stationary sources and construction would be accomplished in full compliance with Virginia regulatory requirements at the time of construction.

Greenhouse Gases

The proposed facilities outlined in the long-range projects are in the planning stages; therefore, a precise list of new equipment is not available. Although it cannot be precisely determined at this time, it is unlikely that the PTE of GHG for any of the proposed projects would exceed the major modification thresholds under the Tailoring Rule. By building new and modernizing existing facilities at DAAF, GHG emissions would be minimized. The DoD is continuing to implement initiatives to reduce GHG emission. Overall, these effects would be minor.

Mobile Sources

Effects from mobile sources of air emissions would be similar to those discussed for the short- and mid-range ADP projects. It is anticipated that the proposed projects would not change aircraft operations or increase the use of automobiles. Therefore, adverse impacts on air quality from mobile sources as a result of the Full Implementation Alternative would be less than significant.

As described for the short- and mid-range ADP transportation projects and for similar reasons:

- No increases in vehicular traffic or automobile use at DAAF are anticipated to result from the proposed ADP projects; therefore, "hot-spot" analysis is not necessary for this EIS.
- Traffic associated with the long-range projects is not anticipated to be an air quality concern for particulates because it does not involve new highways or expressways, and the intersections affected are primarily secondary arterial roads (US DOT; FHWA/USEPA, 2006).
- Vehicle and fuel regulations, coupled with the fleet being replaced over time with newer, cleaner operating vehicles, would cause substantial reductions that would cause Mobile Source Air Toxics (MSAT) levels to be significantly lower than today (USDOT; FHWA, 2012).

4.4.3.2 Impacts from Long-Range Transportation Projects

As with the short- and mid-range transportation projects, long-range transportation projects would have less-than-significant adverse effects. Increases in emissions would be relatively small and would not contribute to a violation of any federal, state, or local air regulation. Construction emissions would be similar in nature and level as those outlined under the short- and mid-range projects (**Section 4.4.4.1**). Construction emissions would be temporary and include emissions from heavy equipment, fugitive dust, and emissions from construction vehicles traveling to and from the project sites. Construction of long-range transportation projects would be performed in full compliance with regulations outlined in **Section 3.4**. These effects would be minor.

There would be no permanent sources of air emissions associated with the long-range transportation projects. The long-range transportation projects would be specifically designed to relieve congestion and reduce the number of vehicle miles traveled by commuters and others using the roadways near Fort Belvoir. Small changes in traffic patterns on- and-off post would have less-than-significant long-term effects on air quality both regionally and locally. As with the short- and mid-range transportation projects and for similar reasons, the long-range transportation projects may need to be identified in a conforming transportation improvement plan (TIP) and Constrained Long Range Plan prior to implementation.

4.4.4 Partial Implementation Alternative

The Partial Implementation Alternative would have less than significant adverse effects on air quality from construction and stationary source emissions. Increases in emissions would be below the GCR applicability thresholds and would not contribute to a violation of any federal, state, or local air quality standards.

The Partial Implementation Alternative could affect air quality in two ways: through airborne dust generated on the project sites and emissions of pollutants from construction vehicles and equipment. A detailed analysis of potential effects from short- and mid-range projects under the Partial Implementation Alternative is presented in the following sections.

4.4.4.1 Impacts from Short- and Mid-Range ADP Projects

The proposed short and mid-range ADP projects would have less-than-significant short- and long-term adverse impacts on air quality. Short-term impacts would result from the generation of airborne dust and other pollutants during construction. Long-term effects would be from the operation of new facilities. Increases in emissions would be below the GCR applicability thresholds and would not contribute to a violation of any federal, state, or local air regulation.

General Conformity

An applicability analysis under the GCR was conducted to determine if a formal conformity determination would be required. The GCR specifies threshold emissions levels by pollutant to determine the applicability of conformity requirements for a federal action (**Table 3.4-1**). For an area in moderate nonattainment for the 8-hour O_3 NAAQS within the OTR, the applicability criterion is 100 tons per year for NO_x and 50 tons per year for VOCs (40 CFR 93.153). For an area in nonattainment for the $PM_{2.5}$ NAAQS, the applicability criterion is 100 tons per year for $PM_{2.5}$, NO_x, and SO_2 (71FR 40420). VOCs and ammonia were also identified as potential $PM_{2.5}$ precursors. However, neither Virginia nor USEPA has found that ammonia contributes to $PM_{2.5}$ problems in AQCR 47 or other downwind areas. Therefore, ammonia was not carried forward for detailed analysis, while VOC emissions are addressed as a precursor to O_3.

For the purpose of determining if the GCR applies, all direct and indirect emissions from the short- and mid-range ADP projects were estimated. Emissions have been combined throughout this discussion. The analysis accounted for emissions from:

- *Construction and demolition activities*: Use of construction equipment (e.g., bulldozers, backhoes), worker vehicles, and use of VOC paints, paving off-gases, and fugitive particles from surface disturbances.
- *Operational activities*: Commuting from new personnel and equipment are exempt from permitting under 9 VAC 5, Chapters 80-1105 (i.e. gaseous fuel burning units w/ max heat input less than 50,000,000 British thermal units per hour and diesel generators with electrical output of 1,125 kilowatts). Notably, the portion of an action that includes major or minor new or modified stationary sources that require a permit under the NSR program (Section 110(a)(2)(c) and Section 173 of the Act) or the PSD program (title I, part C of the Act) are exempt from the GCR. None of the proposed activities in the Partial Implementation Alternative would require a NSR permit application.

At the group level, the total emissions of NO_x, VOCs, $PM_{2.5}$, and SO_2 in any given year would be less than the applicability thresholds (**Table 4.4-1**). The annual emissions assume all of the projects would occur in one year as opposed to the proposed 20-year implementation period for short- and mid-range ADP projects (**Table 4.4-3**). Even assuming that all of the emissions occur in one year, the estimated emissions are well below threshold levels and the general conformity requirements do not apply; thus, a formal conformity determination is not required. As the emissions at the group level were less than the

applicable thresholds, no single project would have emissions that meet or exceed the applicable thresholds. Detailed methodologies for estimating air emissions and a Record of Non-Applicability (RONA) are provided in **Appendix E** of this EIS.

Table 4.4-3: Estimated Annual Emissions – Partial Implementation Alternative (Short- and Mid-Range Projects)

Activity/Source	Estimated Annual Air Emissions (tons per year)			
	NO_x	$PM_{2.5}$	SO_2	VOC
Short-Range ADP Projects (Years 1 to 10)	15.19	1.40	1.30	1.61
Mid-Range ADP Projects (Years 11 to 20)	7.71	0.58	0.59	1.46
Total – Partial Alternative	**22.90**	**1.98**	**1.89**	**3.07**
Applicability Threshold (tons per year)	*100*	*100*	*100*	*50*
Exceeds Applicability Threshold?	No	No	No	No

Notably, construction activities would be staggered over a twenty-year period, and no individual year's construction emissions would be marginal or borderline relative to the applicability thresholds.

Therefore, unless the ultimate implementation schedule for the short-range and mid-range ADP projects were to change appreciably, annual emissions would be well below the applicability thresholds. In addition, small changes in the siting or ultimate design of the proposed facilities or moderate changes in quantity and types of equipment used would not substantially change these emission estimates, and would not change the determination under the GCR or level of effects under NEPA.

Operational Emissions and Regulatory Review

The proposed short-range and mid-range ADP projects at DAAF would not add new emissions sources or increase emissions beyond those included in the current Title V operation permit. Operational emissions following the implementation of the proposed ADP projects would be the same as or less than current operational emissions. Although there may be increases in sizes of buildings, it is assumed that all additional space heating would be supplied by existing grid power. Therefore, operational emissions from the proposed facilities do not require a regulatory review.

Greenhouse Gases and Climate Change

Since no new emission sources or changes in airfield (i.e., aircraft) operations are anticipated, no increases in air emissions from airfield operations are anticipated. Therefore, all operational activities associated with the short-range and mid-range ADP projects would generate quantities of GHG emissions similar to or less than current emissions. Therefore, impacts would be less than significant.

Mobile Sources

Mobile sources of concern primarily include increases in automobile use near Fort Belvoir. The primary air pollutants from mobile sources are CO, NO_x, and VOCs. It is anticipated that there would be no increases in the operation or use of automobiles at DAAF resulting from the implementation of the short-range

and mid-range ADP projects. Automobile emissions would be *de minimis* (i.e., of minimal importance), and a formal conformity determination would not be required. Therefore, impacts from mobile sources resulting from the Partial Implementation Alternative would be less than significant.

"Hot-Spot" Analysis

CO is a site-specific pollutant with higher concentrations found adjacent to roadways and signalized intersections. Project-level analysis is performed to identify localized hot spots of criteria pollutants at the intersection level. This analysis is often conducted on a project-specific basis in regions where CO is of particular concern.

Notably, under the recent Base Realignment and Closure action at Fort Belvoir that proposed an increase of approximately 22,000 personnel on the installation, the modeled CO concentrations increased about 1 part per million (ppm) for the 1-hour peak and 0.5 ppm under the 8-hour average for intersections that were most affected. Neither the modeled 1-hour nor 8-hour concentrations approached the NAAQS (US Army, 2007b). Since it is assumed that the proposed ADP projects would not increase the number of personnel working at DAAF, the short- and mid-range projects would have virtually no effect on CO concentrations at nearby intersections.

Traffic associated with the Partial Implementation Alternative is not anticipated to be an air quality concern for PM because it does not involve new highways or expressways, and the intersections affected are primarily secondary arterial roads (US DOT; FHWA/USEPA, 2006). A detailed qualitative $PM_{2.5}$ analysis has not been conducted because the projects do not meet any of the following criteria:

1. A new or expanded highway project that serves a significant volume, or would result in a significant increase in diesel vehicles such as facilities with greater than 125,000 annual average daily traffic and 8 percent or more of such annual average daily traffic being diesel truck traffic.
2. A project that creates a new, expanded, or improved accessibility to an existing bus or rail terminal or transfer point that would have a significant number of diesel vehicles congregating at that location, or that is defined as regionally significant.
3. A project that affects intersections that are at LOS D, E or F with a significant number of diesel vehicles, or that would change to LOS D, E or F because of increased traffic volumes from a significant number of diesel vehicles related to the project.
4. A project otherwise considered to be an *air quality concern* as outlined in 40 CFR 93.123 (b)(1)(i),(ii),(iii) or (iv).

MSAT are a subset of the 188 air toxics defined by the CAA. The MSAT are compounds emitted from highway vehicles and non-road equipment. As with particulate matter, traffic from increases in personnel at DAAF is not anticipated for the Partial Implementation Alternative and changes in traffic patterns, if any, are expected to be very small. Quantitative procedures to address MSAT analysis have not yet been standardized and are not standard practice for projects on secondary arterial roads; therefore, such analysis is not included in this EIS (USDOT; FHWA, 2012). However, USEPA's vehicle and fuel regulations, coupled with fleets being replaced over time with newer, cleaner operating vehicles,

would likely result in substantial reductions over time that, in almost all cases, would cause MSAT levels to be significantly lower than today (USDOT; FHWA, 2009).

4.4.4.2 Impacts from Short- and Mid-Range Transportation Projects

Short- and mid-range transportation projects would have less-than-significant adverse effects on air quality. Increases in emissions would be minor and would not contribute to a violation of any federal, state, or local air regulation.

Short-term effects would be due to construction emissions during roadway and intersection improvements, and construction of new and improvements to existing access control points. Construction emissions are included in the short- and mid-range ADP projects (**Section 4.4.4.1**). Construction emissions would be short-term, temporary, and include emissions from heavy equipment, fugitive dust, and emissions from construction vehicles traveling to and from the sites. Construction of short-range transportation projects would be performed in full compliance with regulations outlined in **Section 3.4**. These effects would be less than significant.

There would be no permanent sources of air emissions associated with the short- and mid-range transportation projects. Small changes in traffic patterns on and off post would have less-than-significant long-term effects on air quality both regionally and locally.

Transportation Conformity

The Transportation Conformity Rules are applicable to highways and mass transit projects within non-attainment areas and establish the criteria and procedures for determining that transportation plans, programs, and projects conform to SIPs. Transportation projects within the Commonwealth of Virginia must be included in a conforming TIP.

MWCOG is responsible for developing conformity demonstrations for transportation programs within the NCR This includes all planned transportation projects in the region. The TIP for Virginia contains a comprehensive list of all proposed transportation projects to be built in Virginia's portion of the region. The transportation conformity demonstration for this plan evaluates the ability of the project inventory contained in the long-range TIP to comply with the SIP. Prior to implementation, the short-range transportation projects and any transportation projects would need to be identified in a conforming TIP and Constrained Long-Range Plan. As a result, MWCOG would include the changes in vehicle patterns when developing these plans.

4.5 Noise

4.5.1 Thresholds of Significance

Noise impacts resulting from the Alternatives would be considered significant if noise generated by construction activities or aircraft operations would impede or prevent the operation of noise-sensitive land uses at DAAF, Fort Belvoir, or in Fairfax County.

None of the proposed ADP projects would create a new source of noise at DAAF. Because noise from aircraft operations would represent the primary source of noise at DAAF in the long term, operational noise conditions were modeled collectively for each alternative based on the end state of the proposed ADP projects. As such, construction-related noise impacts (**Sections 4.5.3** through **4.5.5**) and operational noise impacts (**Sections 4.5.6** and **4.5.7**) resulting from the Full and Partial Implementation Alternatives are discussed separately in this section.

4.5.2 No Action Alternative

Under the No Action Alternative, the proposed ADP projects would not be implemented and existing noise conditions at and around DAAF would remain consistent with the status quo (**Section 3.5**). No new or different sources of noise would be generated by DAAF's training or operational missions in the short term. In the long term, the airfield would continue to be the subject of development proposals, the type, scope, timing, and duration of which are not yet known.

4.5.3 Short-Range ADP Projects – Full Implementation Alternative (Preferred Alternative) and Partial Implementation Alternative

Construction-related activities associated with the short-range ADP projects under either Alternative would have the potential to generate noise that would cause a nuisance to adjacent or nearby land uses at DAAF. The primary sources of construction-related noise would be construction vehicles and equipment traveling to and used on the project sites. Noise generated by **Projects 1** through **4** would likely be minimal as these projects would primarily consist of interior modernization work. Construction-related activities generating noise during implementation of **Projects 5** through **9** would include demolition of existing roads and other paved surfaces (**Projects 5, 6,** and **7**); building demolitions (**Project 6**); site grading, trenching, soil excavation, and/or vegetation removal (**Projects 5** through **9**); and construction of new facilities (**Project 6**).

Noise generated by these activities would be similar to that of projects of similar scale occurring with relative frequency throughout the Northern Virginia region as well as other areas of Fort Belvoir. No particularly unusual or extraordinary types or volume of noise would be generated by the proposed ADP projects. The staggered implementation of the proposed projects over a 10-year period would ensure that the volume, intensity, and duration of noise generated by construction-related activities would vary substantially during that time. The majority of construction-related activities would occur during normal working hours (Monday through Friday, 8:00 a.m. to 5:00 p.m.); in the event work outside those hours is required, personnel working at potentially affected facilities would be notified and coordination would be conducted with adjacent or nearby facilities as necessary to ensure that potential disruptions are minimized or prevented.

Noise generated by construction-related activities during the short-range projects would have no potential to delay or prevent the operation of adjacent or nearby land uses. Noise from construction-related activities would cease upon the completion of each project, ensuring that any adverse effects are temporary. Throughout the projects' implementation phases, the dominant source of noise would continue to be aircraft operations at DAAF.

For these reasons, impacts from construction-related noise associated with the short-range ADP projects would be less than significant under the Full and Partial Implementation Alternatives.

4.5.4 Mid-Range and Long-Range ADP Projects – Full Implementation Alternative (Preferred Alternative)

Construction-related noise impacts resulting from mid- and long-range ADP projects under the Full Implementation Alternative would be similar to those described for the short-range ADP projects (**Section 4.5.3**). The implementation of the projects over a period of 20 years would minimize the volume, intensity, and duration of construction-related noise. Noise from construction-related activities would cease upon the completion of each project, ensuring that any adverse effects would be temporary. Throughout the projects' implementation phase, the dominant source of noise would continue to be aircraft operations at DAAF.

Therefore, construction-related noise impacts resulting from the mid- and long-range ADP projects under the Full Implementation Alternative would remain less than significant.

4.5.5 Mid-Range ADP Projects – Partial Implementation Alternative

Noise generated by construction-related activities associated with mid-range ADP projects under the Partial Implementation Alternative would be similar to that described for the short-range projects (**Section 4.5.3**). Because the Partial Implementation Alternative includes three fewer mid-range projects, no long-range projects, and fewer associated building demolition, it is anticipated that the volume, intensity, and duration of construction-related noise would be substantially less relative to the Full Implementation Alternative.

Thus, impacts from construction-related noise generated by mid-range ADP projects under the Partial Implementation Alternative mid-range projects would remain less than significant.

4.5.6 Full Implementation Alternative (Preferred Alternative) – Operational Noise Impacts

Under the Full Implementation Alternative, DAAF aircraft flight operations would continue as they currently do (**Section 3.5**). The Helicopter Runway and Delta Pad run-up locations (**Figure 3.5-1**), however, would be removed and the sites of other run-up locations at DAAF would change slightly relative to existing conditions. These data were incorporated into the NOISEMAP and AAM models to generate noise contours for the Full Implementation Alternative.

DNL noise contours generated by aircraft operations and engine run-ups at DAAF under the Full Implementation Alternative are shown on **Figure 4.5-1**. DNL noise contours under the Full Implementation Alternative would essentially remain the same as compared to existing baseline conditions (**Section 3.5**; **Figure 3.5-2**). The highest noise levels (Zone III, > 75 dB DNL) would be entirely confined to DAAF, as would noise levels of 70 dB DNL and greater. No noise-sensitive land uses would be located within the modeled 65 dB DNL and 70 dB DNL noise contours (i.e., Zone II), which includes areas of Fairfax County encompassed by the 65 dB DNL contour extending beyond DAAF's boundaries.

No on- or off-post sensitive land uses would be within incompatible noise zones. Therefore, operational impacts from noise resulting from the Full Implementation Alternative would be less than significant.

4.5.7 Partial Implementation Alternative – Operational Noise Impacts

Under the Partial Implementation Alternative, existing aircraft flight operations would continue as they currently do (**Section 3.5**). However, the number and location of engine run-up locations at DAAF would change slightly. Noise contours were generated for the Partial Implementation Alternative by the NOISEMAP and AAM models incorporating this data.

DNL noise contours generated by aircraft operations and engine run-ups at DAAF under the Partial Implementation Alternative are shown on **Figure 4.5-2**. DNL contours under this alternative would be essentially the same as baseline conditions (**Section 3.5**; **Figure 3.5-2**), particularly for portions of the 65 dB DNL contour extending into areas of Fairfax County beyond Fort Belvoir's boundaries. The highest noise levels (Zone III, > 75 dB DNL) would be entirely confined to DAAF, as would noise levels of 70 dB DNL or greater.

No on- or off-post sensitive land uses would be within incompatible noise zones generated by aircraft operations and engine run-ups at DAAF. Therefore, operational impacts from noise resulting from the Partial Implementation Alternative would be less than significant.

Figure 4.5-1: Noise Levels – Full Implementation Alternative (Preferred Alternative)

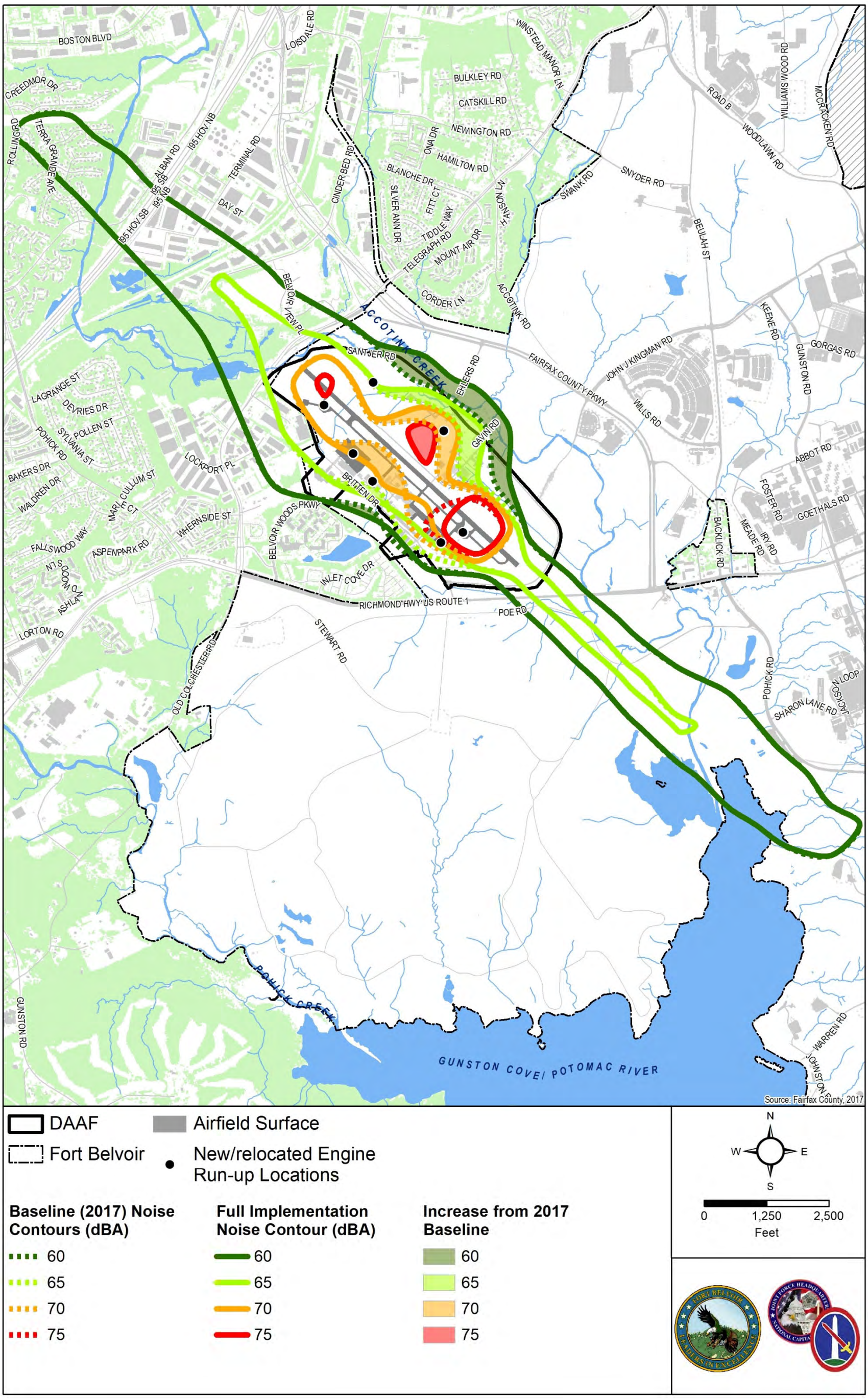

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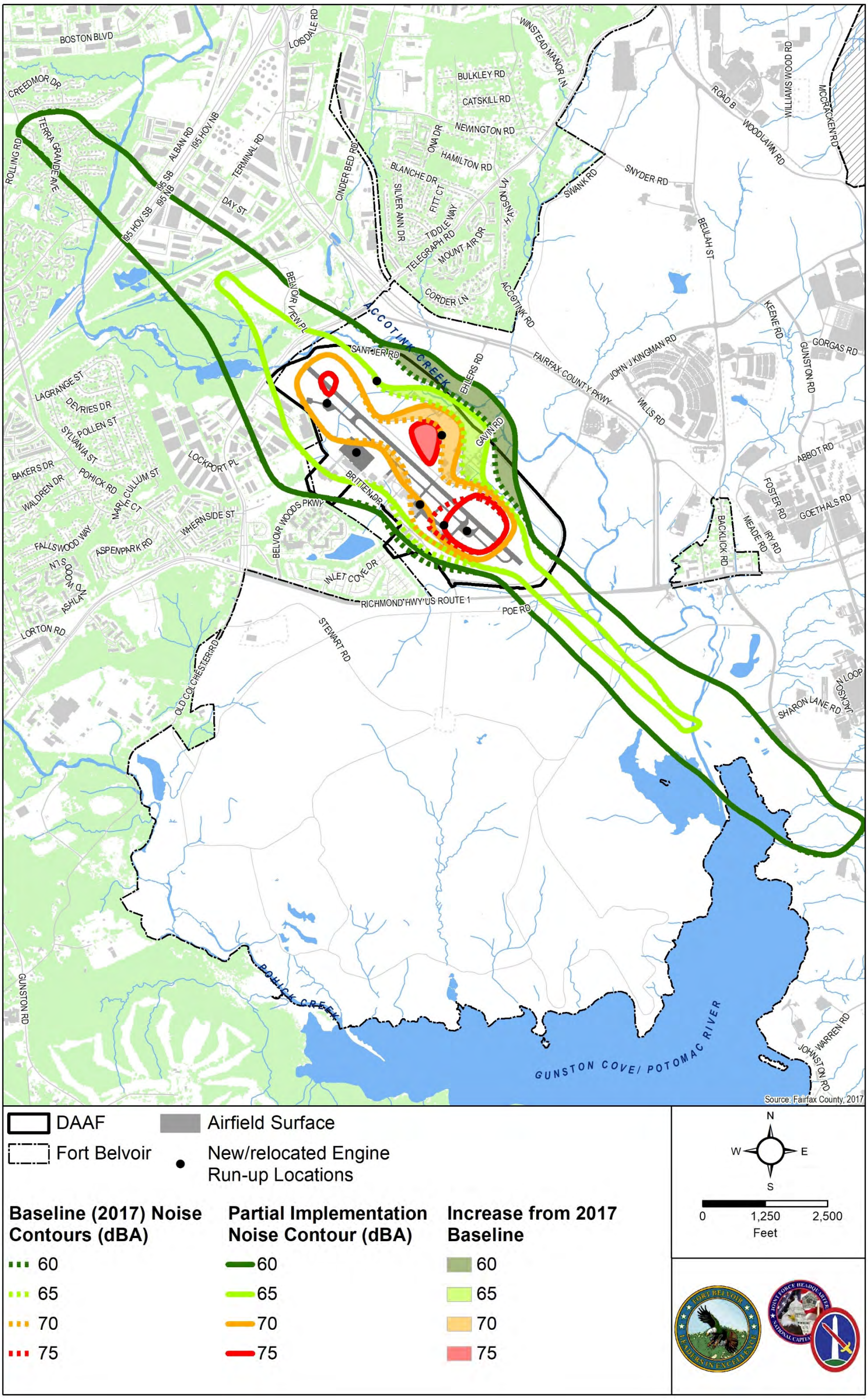
Figure 4.5-2: Noise Levels – Partial Implementation Alternative



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4.6 Geology, Topography, and Soils

4.6.1 Thresholds of Significance

The criteria used to determine the potential for a significant adverse impact on geology, topography, and soils resources include:

- **Geology**. If the affected strata or formations are of special significance or worth (e.g. known to contain fossils) or subject to destabilization and/or substantial alteration from their current state or condition.
- **Topography.** If undisturbed terrain is altered such that a measurable function (e.g. drainage or slope stability) or aesthetic value is substantially compromised or lost.
- **Soils.** If an action results in measurable soils loss, contamination, substantial degradation, or loss of functional value.

4.6.2 No Action Alternative

Under the No Action Alternative, the Army would not implement the ADP projects on DAAF. Airfield operations would continue in accordance with existing conditions and none of the proposed site, facility, or infrastructure changes would occur. The geology, topography, and soil resources of DAAF would continue in their current state as affected by the ongoing military mission. No new or different effects on these resources would occur under the No Action Alternative.

4.6.3 Short-Range ADP Projects – Full Implementation Alternative (Preferred Alternative) and Partial Implementation Alternative

4.6.3.1 Geology

The short-range ADP projects under the Full and Partial Implementation Alternatives could affect geology in cases where facilities or infrastructure require a deep foundation. The extent and nature of these effects would be determined by site-specific soil properties and depth to bedrock. Where soils lack sufficient load bearing capacity to support development, a pile foundation emulating a rock platform or bedrock structural support may be required. Under the Alternatives, sites where these conditions may occur underlie all or portions of **Projects 5** and **6**.

Project 5 would accommodate the construction of **Project 6** in the north-central portion of the airfield. Soils associated with each project site include components that are classified as hydric and are subject to potential shrink/swell and subsidence when developed. This portion of DAAF also has a high seasonal water table and minimal depth to bedrock, down to 6 feet bgs in some areas. As such, deep foundation support may be required.

Under the Alternatives, geotechnical surveys would characterize subsurface conditions and inform project design decisions with respect to facility and infrastructure foundations. These site-specific investigations would allow potential effects on geology to be minimized. Minor potential adverse effects

on geology would be anticipated from the construction of **Projects 5** and **6**; however, these effects would occur intermittently and would be temporary in nature. The proposed ADP projects would have no effects on geological features of special significance or worth, as none are present under DAAF. Therefore, no long-term adverse impacts on geology would occur.

No other short-range ADP projects under the Alternatives would encounter or intercept bedrock, or disturb any unconsolidated sediments in proximity to bedrock. Excavation depths for all other projects would be restricted to previously disturbed, surficial soils. The operation of the Alternatives would not affect the geology underlying DAAF. As such, potential adverse impacts on geology would be less than significant.

4.6.3.2 Topography

The short-range ADP projects under the Alternatives would affect topography. Construction would include ground disturbance activities such as excavating, grading, leveling, and ditching or trenching. Where backfilling of soils is required to support development, reshaping of the land contour during and post-construction would also occur.

Under the Alternatives, **Projects 5** through **9** would involve ground disturbance. Construction site preparation would include facility and infrastructure demolition and removal, and/or new construction to include related earthwork. Most of the project sites would be situated on or adjacent to the existing developed or maintained portion of the airfield, which contains previously disturbed areas with relatively flat topography. In such cases, changes to topography would be minimal and limited in scope. All projects under the Alternatives would achieve positive surface drainage post-construction, directing stormwater offsite to prevent water accumulation. When possible, consistent with airfield operational safety, native vegetation would also be re-established on and around the sites post-demolition or post-construction.

Project 8 would alter the topography south of the runway near Richmond Highway to remove the earthen knoll. Approximately 337,000 cubic yards of soil comprising this earthen knoll would be excavated as its elevation violates the airfield's Transitional Surface (**Section 2.1.1**) and is considered an airfield safety obstruction. Upon removal of the knoll, the site would be graded and leveled to integrate with the surrounding landscape and achieve positive drainage. **Project 8** would result in minor localized changes to surface flow and direction on this portion of DAAF; however, the area would continue to drain east to southeast towards a drainage ditch that parallels Richmond Highway. The topography of the earthen knoll does not provide any unique function or aesthetic value on DAAF or relative to the surrounding landscape. As such, **Project 8** would result in minor, temporary potential adverse impacts on topography. No long-term adverse effects on topography would be anticipated to occur.

No unique or valued topographic features on DAAF would be affected by implementation of the Alternatives. Most projects with potential to affect topography would result in only minor deviations from existing conditions. As appropriate, site designs and engineering practices would sufficiently restore or improve topography by re-directing surface water flows to achieve positive drainage. All changes to topography under the Alternatives would occur intermittently over an approximately 10-year construction period, thereby reducing the potential for adverse effects. The operation of the

Alternatives would have minimal to no impact on topography. As such, potential adverse impacts on topography would be less than significant.

4.6.3.3 Soils

The short-range ADP projects under the Alternatives would disturb up to approximately 29 acres of land area on DAAF. The project sites include pervious and impervious areas managed to support airfield operations that would be subject to disturbance at varying times over an approximately 10-year time period. The extent of disturbance would range by individual project from approximately 0.6 to 23 acres.

The soils on DAAF were considered during planning and development of the Proposed Action. Their respective properties both limit and support development. The majority of soils that would be affected under the Alternatives are suitable for development. However, select projects would be sited in areas where soils can limit development with respect to load bearing strength, shrink/swell potential, drainage capacity, and potential for subsidence. Most soils that exhibit one or more these characteristics are situated north of the airfield in association with Accotink Creek.

All or portions of **Projects 5** and **6** would be sited on soils with potential development limitations. However, these soils would be analyzed at the project level to determine and quantify their suitability to support development. As necessary, designs and engineering practices would adequately address relevant soil limitations at each project site. All other projects associated with the Alternatives would be sited on previously developed Grist Mill or Urban Land soils that are considered suitable for development.

Soils would also be affected by implementation of the Alternatives. Construction site preparation would include facility and infrastructure demolition and removal, and/or new construction, including related earthwork. These activities would expose soils and increase their susceptibility to water and wind erosion. Inclement weather (i.e., rain or wind) could increase the probability and severity of any potential impacts on soils.

Soils could be affected by the accidental release of contaminants or unintentional disturbance and movement of contaminated soils that already persist in the environment. For example, vehicle and equipment usage or aircraft maintenance operations could result in accidental spills of petroleum-based constituents into soil media. Operating heavy vehicles and equipment or founding new facilities and infrastructure could result in soil compaction. In a compacted state, their normal function may be altered (e.g., water storage, infiltration, or filtration). Where the use of clean fill soils is required to support development, soil structure, composition, and function would also be altered.

Under the Alternatives, potential adverse effects on soils, including soil loss, contamination, and structural alteration, would be managed at a project level. The construction contractor would obtain and comply with the VPDES Permit for Discharges of Stormwater from Construction Activities (i.e., CGP; No. VAR10) when projects would disturb 1 acre or more of land. The CGP would require the preparation, approval, and implementation of a site-specific SWPPP prior to construction, including appropriate structural and non-structural erosion, sediment, and waste control BMPs. Potential impacts on the structural integrity of local soils would also be addressed by construction site BMPs at the project level.

These measures may include planning and operational considerations such as staging construction equipment and materials on existing gravel or paved surfaces or minimizing or restricting vehicle movements to select areas on DAAF. The design of the Alternatives would also incorporate LID measures to maintain or restore each site's pre-development hydrology, either voluntarily or as required to comply with Section 438 of the EISA. For example, **Project 6** would employ the use of an infiltration bed on the northern, southern, and western sides of the facility to capture sheet flow draining towards the facility. **Project 6** would also incorporate approximately 24,000 square feet of permeable pavement into the site plan and design. These project-specific measures would minimize potential adverse impacts on soils.

Under the Alternatives, soils associated with each individual project site would be screened and sampled for waste characterization prior to any land disturbance. All contaminated soils in exceedance of regulatory thresholds would be managed accordingly for transportation and disposal at a permitted facility offsite. Construction contractors would prepare waste profiles for soils being transported off-site for disposal. Profiles and manifests would be signed by Fort Belvoir DPW-ED staff. Other excavated soils would be transported offsite for disposal.

Under the Alternatives, several projects would require more substantial excavation than others. As appropriate, soils would be excavated and replaced with clean fill soils to support development. Clean fill soils would be placed and compacted onsite, resulting in localized changes to the underlying soil stratum. Soil excavation would be required to construct and found **Projects 5** and **6**. **Project 8** (removal of earthen knoll) would require clean fill soils, which would also be transported to the site from outside sources. The amount of soil to be removed and replaced with clean fill soils for **Project 5** is subject to further study and design; however, **Project 6** would excavate approximately 91,000 cubic yards of soil, replacing with clean fill soils of a comparable amount. Once placed and compacted, the clean fill soils would be graded to align with the finished grade of the adjacent airfield. Areas around the site would also be graded to conform to local topography and achieve positive surface drainage.

Projects 5 and **6** would remove soils in localized areas of DAAF and replace it with clean fill soils, changing the structure and composition of the affected soil media. However, a substantial degradation or loss of soil functional value would not be anticipated to occur (e.g., effects on hydrology in association with Accotink Creek). **Project 5** would be sited on parkland already subject to soil compaction from human activities. **Project 6** would be only partially located within the outer extent of the Accotink Creek floodplain (**Section 4.7.3.5**). The affected soil media is situated in areas adjacent to the airfield where soil structure and composition is already influenced by past development activities. As such, these soils are not considered to be a central component of the hydrologic regime underlying DAAF. Further, soils with proximity to the project sites would not be altered substantially from their current state.

Most soils associated with the Alternatives are previously disturbed from prior development or use, either directly or indirectly. Potential adverse impacts on soils would be managed at an individual project level in compliance with applicable laws and regulations. Project designs would incorporate LID measures where feasible, further reducing the potential for soils to be transported offsite in surface runoff. No substantial alterations to soil condition or function would occur under the Alternatives.

Potential adverse effects on soils would be further reduced by construction phasing over an approximately 10-year period. As such, potential adverse impacts on soils would be less than significant.

4.6.4 Mid- and Long-Range ADP Projects – Full Implementation Alternative (Preferred Alternative)

4.6.4.1 Geology

The mid- and long-range ADP projects under the Full Implementation Alternative could affect geology in cases where facilities or infrastructure require a deep foundation. Under this Alternative, sites where such conditions may exist underlie all or portions of **Projects 11, 13, 19** and **23**.

Potential adverse impacts on geology under this Alternative would be addressed at a project level. Geotechnical surveys would characterize subsurface conditions and inform project design decisions with respect to facility and infrastructure foundations. These site-specific investigations would allow potential effects on geology to be minimized. Minor potential adverse effects on geology would be anticipated from the construction of **Projects 11, 13, 19** and **23**; however, these effects would occur intermittently and would be temporary in nature. The proposed ADP projects would have no effects on geological features of special significance or worth, as none are present under DAAF. Therefore, no long-term adverse impacts on geology would occur.

No other mid- and long-range ADP projects under the Full Implementation Alternative would encounter or intercept bedrock, or disturb any unconsolidated sediments in proximity to bedrock. Excavation depths for all other projects under this Alternative would be restricted to surficial soils. The operation of this Alternative would not affect the geology underlying DAAF. As such, potential adverse impacts on geology would be less than significant.

4.6.4.2 Topography

The mid- and long-range ADP projects under the Full Implementation Alternative would affect topography. Construction would include ground disturbance activities such as excavating, grading, leveling, and ditching or trenching. Where backfilling of soils is necessary to support development, reshaping of the land contour during and post-construction would also occur.

With the exception of **Project 16**, all projects under this Alternative would involve ground disturbance. Construction and site preparation would include facility and infrastructure demolition and removal, and/or new construction to include related earthwork. Most of the project sites would be situated on or adjacent to the existing developed or maintained portion of the airfield, which consists of previously disturbed areas where topography is relatively flat. In such cases, changes to topography would be minimal and limited in scope. All projects under this Alternative would achieve positive surface drainage post-construction, directing stormwater offsite to prevent water accumulation. When possible, consistent with airfield operational safety, native vegetation would also be re-established on and around the sites post-demolition or -construction.

Several long-range ADP projects under the Full Implementation Alternative would alter areas of more elevated terrain near DAAF's southernmost boundary. All or portions of **Projects 20, 22, 23**, and **24** would be sited on this portion of the airfield. These project sites would require varying amounts of excavation and, in some cases, backfilling of soils more suitable for development. As such, earthwork during site preparation would result in localized changes to topography and elevation. All sites would be designed to achieve positive drainage post-construction, with only minor changes to surface water flow and direction anticipated to occur. Further, the steep terrain in this area of DAAF does not provide any unique function or aesthetic value as the surrounding landscape is mostly developed.

No unique or valued topographic features on DAAF would be affected by this Alternative. Most projects with potential to affect topography would result in only minor deviations from existing conditions. As appropriate, site designs and engineering practices would sufficiently restore or improve topography by re-directing surface water flows to achieve positive drainage. All changes to topography under this Alternative would occur intermittently over an approximately 20-year construction period, thereby reducing potential adverse effects. The operation of this Alternative would have minimal to no impact on topography. As such, potential adverse impacts on topography would be less than significant.

4.6.4.3 Soils

Construction activities associated with the mid- and long-range ADP projects under the Full Implementation Alternative would disturb approximately 55 acres of land area on DAAF. These lands include pervious and impervious areas managed to support airfield operations, as well as previously undeveloped areas proximate to the airfield. Ground disturbance would occur at varying times over the course of an approximately 20-year time period. The level of disturbance would range by individual project from approximately 0.3 to 17 acres in land area.

The majority of soils affected under the Full Implementation Alternative are suitable for development. However, select projects would be sited in areas where soils can limit development with respect to erosion potential, load bearing strength, shrink/swell potential, drainage capacity, and potential for subsidence. As discussed, soils that exhibit one or more these characteristics are situated north of the airfield in association with Accotink Creek. Under this Alternative, other areas on DAAF where soil attributes can limit development are situated immediately south of the airfield, where poor drainage capacity and erosion potential are a potential concern.

All or portions of **Projects 11, 13, 14, 19, 20, 22, 23,** and **24** would be sited on soils with potential development limitations. However, these soils would be analyzed at a project level to determine and quantify their suitability to support development. As necessary, designs and engineering practices would adequately address relevant soil limitations at each site. All other projects under this Alternative would be sited on previously developed Grist Mill or Urban Land soils that are considered suitable for development.

Under this Alternative, soils associated with each individual project site would be screened and sampled for waste characterization prior to any land disturbance. All contaminated soils in exceedance of regulatory thresholds would be managed accordingly for transportation and disposal at a permitted facility offsite. Construction contractors would prepare waste profiles for soils being transported off-site

for disposal. Profiles and manifests would be signed by Fort Belvoir DPW-ED staff. Other excavated soils would be transported offsite for disposal.

Most soils associated with this Alternative are previously disturbed from prior development or use, either directly or indirectly. Potential adverse effects that could result from the mid- and long-range ADP projects under the Full Implementation Alternative include soil loss, contamination, and structural alteration. These potential effects would be managed at an individual project level in compliance with applicable laws and regulations. For example, preparing and implementing site-specific SWPPPs prior to construction that include appropriate structural and non-structural erosion, sediment, and waste control BMPs. At a later date, when more detailed site plans and designs are developed, the projects under this Alternative would also incorporate LID measures to maintain or restore each site's pre-development hydrology, either voluntary or as required to comply with Section 438 of the EISA.

Overall, these project-specific measures would minimize potential adverse impacts on soils under this Alternative. No substantial alterations to soil condition or function would occur. Potential adverse effects on soils would be further reduced by construction phasing over an approximately 20-year period. As such, potential adverse impacts on soils would be less than significant.

4.6.5 Mid-Range ADP Projects – Partial Implementation Alternative

4.6.5.1 Geology

Implementation of the mid-range ADP projects under the Partial Implementation Alternative would not affect geology. None of the projects would encounter or intercept bedrock or disturb any unconsolidated sediments in proximity to bedrock. Excavation depths under this Alternative would be restricted to previously disturbed, surficial soils. The operation of this Alternative would not affect the geology underlying DAAF. As such, potential adverse impacts on geology would be less than significant.

4.6.5.2 Topography

The mid-range ADP projects under the Partial Implementation Alternative would affect topography. Construction site preparation would include facility and infrastructure demolition and removal, and/or new construction to include related earthwork. All of the project sites would be situated on or adjacent to the existing developed or maintained portion of the airfield, which contains previously disturbed areas where topography is relatively flat. All changes to topography under this Alternative would be minimal and limited in scope, and all projects would achieve positive surface drainage post-construction. When possible, consistent with airfield operational safety, native vegetation would also be re-established on and around the sites post-demolition or -construction.

No unique or valued topographic features on DAAF would be affected by this Alternative. Most projects with potential to affect topography would result in only minor deviations from existing conditions. As appropriate, site designs and engineering practices would sufficiently restore or improve topography by re-directing surface water flows to achieve positive drainage. All changes to topography under this Alternative would occur intermittently over an approximately 10-year construction period, thereby

reducing potential adverse effects. The operation of this Alternative would have minimal to no impact on topography. As such, potential adverse impacts on topography would be less than significant.

4.6.5.3 Soils

The mid-range ADP projects under the Partial Implementation Alternative would disturb up to approximately 6.4 acres of land area on DAAF. These lands include pervious and impervious areas managed to support airfield operations that would be subject to disturbance at varying times over a 10-year time period. The level of disturbance would range by individual project from approximately 0.3 to 3.4 acres in land area.

With the exception of **Project 14**, all soils affected under this Alternative are suitable for development. These projects would be sited on previously developed Grist Mill or Urban Land soils. Although **Project 14** would be sited on soils with potential development limitations (e.g., poor drainage capacity and erosion potential), the affected area is previously disturbed, of a minimal size, and located adjacent to the existing developed airfield. Further, site-specific analyses would confirm and quantify soil suitability to support development onsite. As necessary, design and engineering practices would adequately address relevant soil limitations at the site.

Under this Alternative, soils associated with each individual project site would be screened and sampled for waste characterization prior to any land disturbance. All contaminated soils in exceedance of regulatory thresholds would be managed accordingly for transportation and disposal at a permitted facility offsite. Construction contractors would prepare waste profiles for soils being transported off-site for disposal. Profiles and manifests would be signed by Fort Belvoir DPW-ED staff. Other excavated soils would be transported offsite for disposal.

Most soils associated with this Alternative are previously disturbed from prior development or use, either directly or indirectly. Potential adverse effects that could result from the mid- and long-range ADP projects under the Full Implementation Alternative include soil loss, contamination, and structural alteration. These potential effects would be managed at an individual project level in compliance with applicable laws and regulations. For example, preparing and implementing site-specific SWPPPs prior to construction that include appropriate structural and non-structural erosion, sediment, and waste control BMPs. At a later date, when more detailed site plans and designs are developed, the projects under this Alternative would also incorporate LID measures to maintain or restore each site's pre-development hydrology, either voluntary or as required to comply with Section 438 of the EISA.

Overall, these project-specific measures would minimize potential adverse impacts on soils under this Alternative. No substantial alterations to soil condition or function would occur. Potential adverse effects on soils would be further reduced by construction phasing over an approximately 10-year period. As such, potential adverse impacts on soils would be less than significant.

4.7 Water Resources

4.7.1 Thresholds of Significance

The criteria used to determine potential for a significant adverse impact on water resources consist of the following:

- **Groundwater**. An individual project, alternative phase, or complete alternative would substantially interfere with groundwater recharge such that a net deficit in aquifer volume or a lowering of the local groundwater table occurs; or, result in an increased risk of contaminant migration into to a potable groundwater supply source.
- **Surface Waters and Water Quality.** An individual project, alternative phase, or complete alternative would:
  - alter the Accotink Creek stream channel, redirect or divert the creek's flow, dam the creek, or withdraw water from it;
  - contribute to an increase of 1 percent (89.7 acres) or more of impervious surface in the overall Accotink Creek watershed[9];
  - increase impervious cover within the Main Post portion of the Accotink Creek watershed by 37 percent (150.8 acres) or more such that the percentage of impervious cover within the Main Post portion of the watershed reaches or exceeds 15 percent (556.2 acres)[9];
  - result in changes to facilities and/or operations at DAAF such that quantities and types of pollutants generated by those facilities could no longer be regulated under the airfield's current Major Industrial Stormwater Permit;
  - result in discharges of pollutants to Accotink Creek in concentrations that exceed thresholds specified in the Major Industrial Stormwater Permit.
- **Wetlands, Streams, and Chesapeake Bay RPAs.** An individual project, alternative phase, or complete alternative would temporarily and/or permanently impact one acre or more of non-tidal wetland or open water or 1,500 linear feet of stream; or an individual project, project phase, or complete alternative would permanently impact one percent (27 acres) of RPAs on Fort Belvoir[9].
- **Floodplains.** An individual project, alternative phase, or complete alternative would increase the surface elevation of the regulatory floodway by more than 1 foot; increase the outer (horizontal) extent of the flood fringe by more than 2 feet; present an unacceptable risk to property or life; or, substantially reduce a measurable floodplain function or value.

[9] Impact thresholds for impervious surface increases, wetlands, and RPAs are based on those used in the Fort Belvoir RPMP Final EIS to maintain consistency with the analyses presented in that document.

4.7.2 No Action Alternative

Under the No Action Alternative, the Army would not implement the ADP projects on DAAF. Airfield operations would continue in accordance with existing conditions and none of the proposed site, facility, or infrastructure changes would occur. Water resources that are present on and around DAAF would not be affected; however, unintentional stormwater detention adjacent to the airfield would likely worsen over time without management.

4.7.3 Short-Range ADP Projects – Full Implementation Alternative (Preferred Alternative) and Partial Implementation Alternative

4.7.3.1 Groundwater

Potential adverse impacts on groundwater resources could result from increases in development that diminish or degrade their natural recharge from precipitation, infiltration, and runoff. For example, adverse impacts could occur from impervious surfaces that convey stormwater away from natural recharge areas or introduce contaminated stormwater via discharge into such areas.

The short-range ADP projects under the Full and Partial Implementation Alternatives would affect groundwater associated with the perched aquifer on DAAF. This upper layer of groundwater is not potable. None of the proposed ADP projects would require new or additional withdrawals of groundwater, nor would they be likely to discharge pollutants into groundwater at DAAF. No direct or indirect adverse effects on deep groundwater in the confined aquifer system underlying DAAF would occur under the Alternatives.

Construction of the short-range ADP projects (**Figures 4.7-1** and **4.7-2**) would result in localized changes to the rate and direction of overland surface water flows on and across the airfield. These projects would also increase the amount of impervious surface on DAAF by an estimated 18.5 acres (23 percent) relative to existing conditions. Taken together, these changes would affect the site's hydrology. For example, localized changes to overland surface flow (e.g., rate and discharge point) would affect the location and extent of groundwater recharge onsite. As such, the short-range ADP projects would employ measures to manage and control water onsite, to the maximum extent practicable. Stormwater detention and LID practices would be incorporated into the design of each individual project, when possible, to maintain the site's pre-development hydrology. With these measures in place, the quantity of stormwater runoff that would be transported offsite would not change substantially from existing conditions.

As groundwater recharge functions would largely be replaced onsite, no substantial interference or change to local groundwater or water table levels would likely occur. Thus, there would be no potential to substantially interfere with groundwater recharge such that a net deficit in aquifer volume or a lowering of the local groundwater table would occur.

Figure 4.7-1: Surface Water Feature Impacts – Full Implementation Alternative (Preferred Alternative)

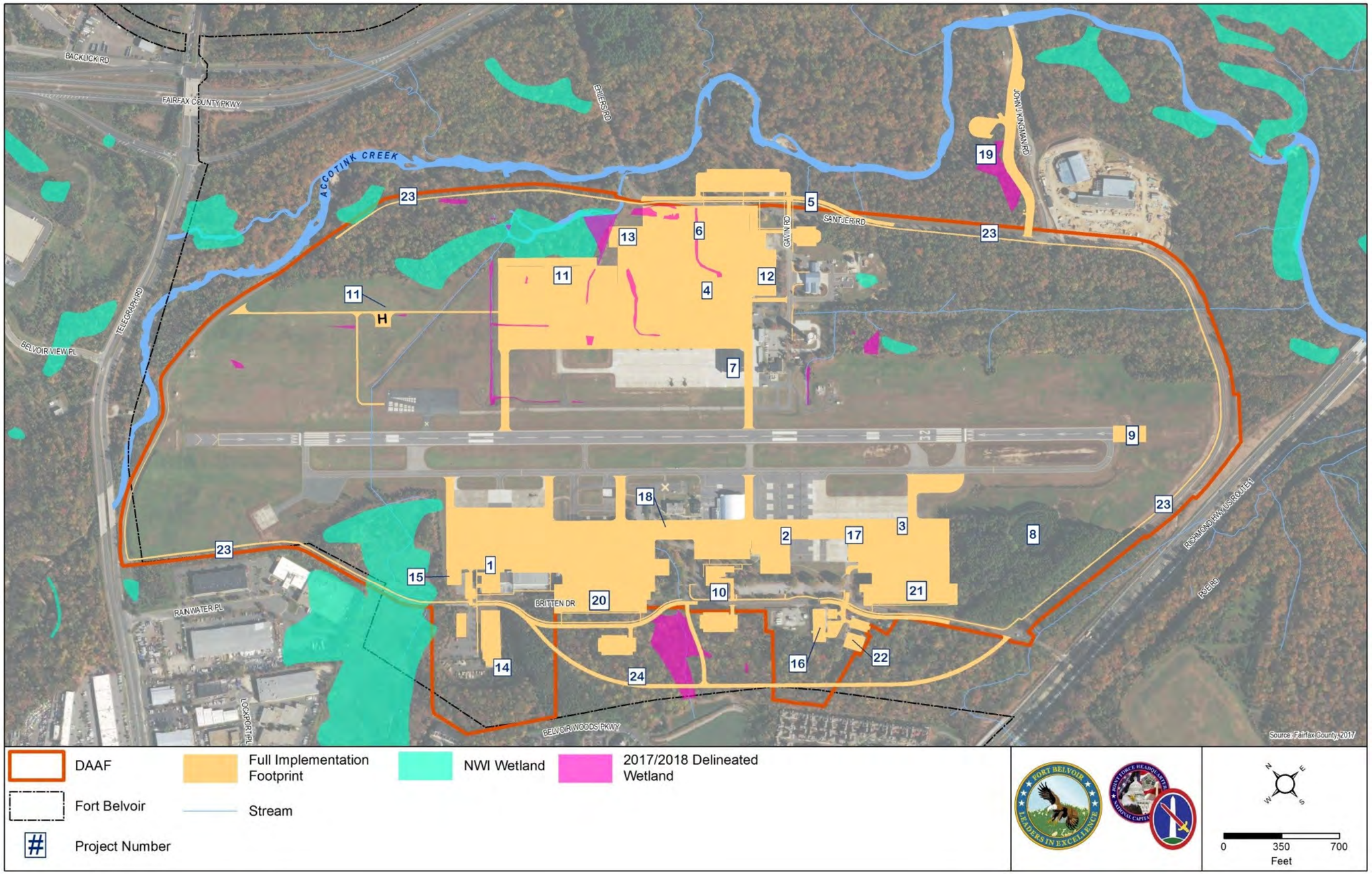

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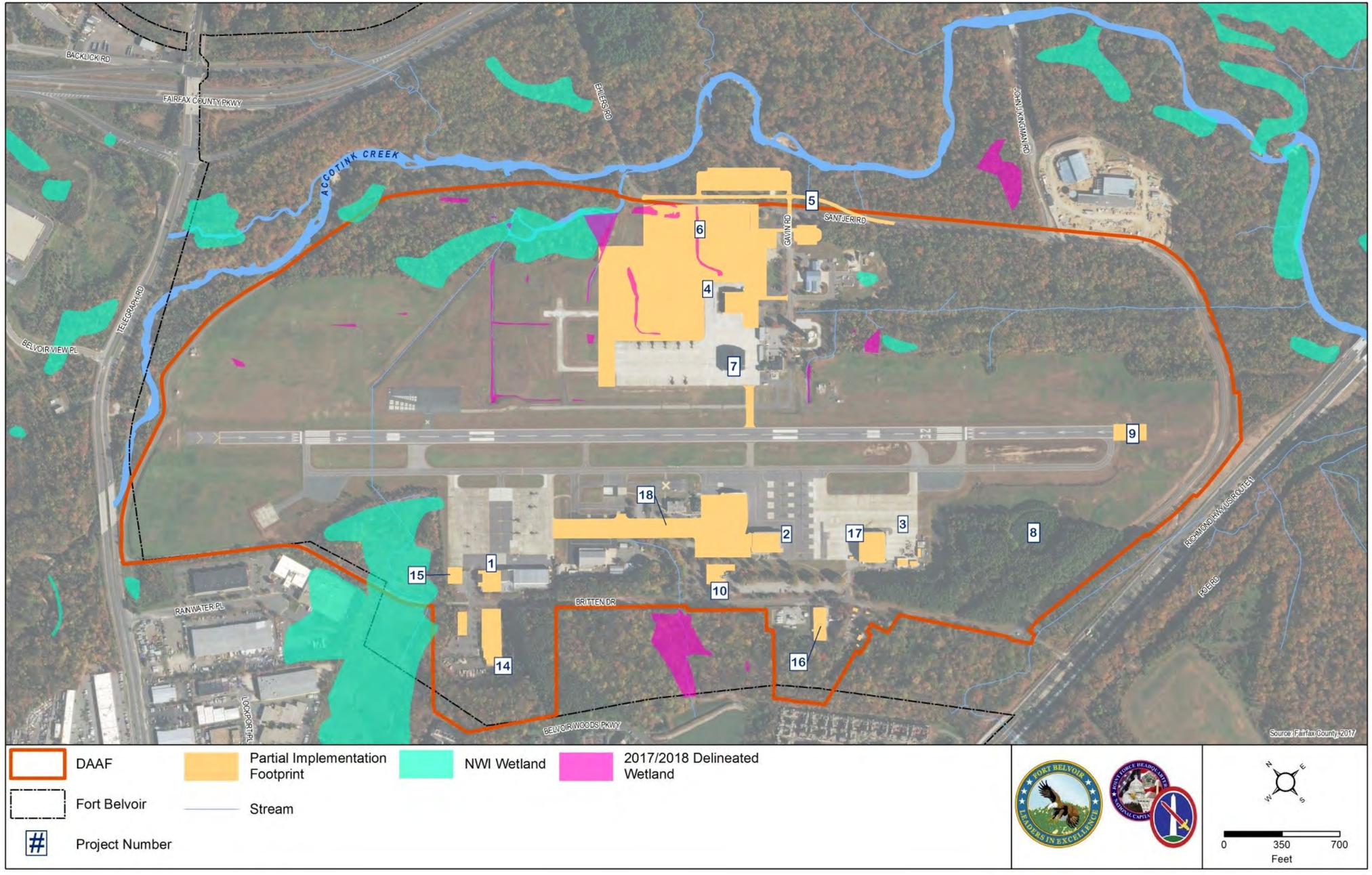
Figure 4.7-2: Surface Water Feature Impacts – Partial Implementation Alternative



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The construction and operation of the short-range ADP projects would increase the use of fuels, solvents, and other hazardous and toxic substances at DAAF (**Section 4.10**). Accidental releases of such substances into the environment would result in potential direct and indirect effects on the quality of groundwater, particularly in areas with a high water table. Standard construction site and operational BMPs (e.g., construction phasing to avoid seasonally high water tables; and training on management and monitoring protocols) would, however, minimize the potential for such an occurrence. The proposed projects would also be carried out consistent with applicable pollution prevention and spill response plans, among others, further limiting potential groundwater contamination.

Projects 5 and **6** would occur in areas with a seasonally or naturally high water table. Dewatering of excavated areas would occur, as needed, prior to the placement of any required clean fill soils, and the use of a mat or shallow spread footing foundation would act as a confining layer over the water table. The clayey content and low permeability of some affected soils to the north of the existing airfield would help protect groundwater from any accidental releases of contaminants under the Alternatives. None of the other short-range ADP projects would be anticipated to encounter groundwater.

Under either Alternative, short-range ADP projects would be implemented over an approximately 10-year construction period. Site-specific soil and geotechnical investigations would inform decisions with respect to specific project sites potentially subject to a shallow water table. Pre-construction BMPs, engineering practices during construction, and onsite environmental conditions, would further reduce the potential for groundwater contamination. Potential adverse impacts on groundwater resources would be minor, temporary, and less than significant.

4.7.3.2 Surface Water and Water Quality

Implementation of the short-range ADP projects would have the potential to result in short-term impacts on surface water and water quality from the erosion of soils exposed during land disturbance associated with construction of **Projects 5**, **6**, **7**, **8**, and **9**. Overall, construction activities associated with the short-range ADP projects would collectively disturb an estimated 29 acres of land at DAAF. Such disturbance would have the potential to result in increased quantities of pollutants and sediment in stormwater runoff generated on the project sites and discharged to Accotink Creek.

To minimize or eliminate such impacts during construction, contractors would obtain coverage under the CGP, as each project would disturb more than one acre, and prepare and adhere to the requirements of site-specific SWPPPs as well as E&SC and SWM plans in accordance with the requirements of Fort Belvoir's MS4 permit. Adherence to the requirements of these plans and the CGP during each project's construction phase would ensure that short-term impacts on surface water quality from stormwater discharged from the project sites remains minimal and less than significant. Phasing of the proposed projects over a period of approximately 10 years would also ensure that impacts on water quality from construction-related stormwater discharges do not occur simultaneously, further minimizing impacts.

In the long term, the short-range ADP projects under either Alternative would increase impervious surfaces on DAAF by 18.5 acres. This would represent an increase of 4.6 percent over existing

impervious surface (approximately 405 acres; **Section 3.7.3.1**, **Table 3.7-1**) in the Main Post portion of the Accotink Creek watershed, but only a 0.2 percent over existing impervious surface (8,971 acres) in the Accotink Creek watershed as a whole. These increases would remain below the thresholds defined in **Section 4.7.1**.

To minimize impacts on water quality from increased imperviousness of the watershed, short-range ADP projects involving 5,000 square feet or more of land disturbance (**Projects 5** through **9**) would incorporate LID measures to the maximum extent technically feasible in accordance with Section 438 of the EISA to maintain the pre-development hydrology of the project sites. Runoff from the aircraft wash rack included in **Project 6** would discharge to the airfield's sanitary sewer system, and would include an O/WS to manage runoff in accordance with applicable regulations. Additionally, as each of the proposed ADP projects are planned, built, and become operational, DAAF's Major Industrial Stormwater Permit and corresponding SWPPP would be updated accordingly to incorporate and address the new or expanded facilities as well as account for changes associated with those facilities potentially affecting the quality, quantity, and other applicable characteristics of stormwater generated on the airfield. Fort Belvoir would continue to sample runoff discharged from DAAF to Accotink Creek and implement corrective actions as needed to ensure pollutant concentrations remain within regulatory thresholds. This would ensure that the quantity and quality of stormwater generated at DAAF and discharged to Accotink Creek would continue to meet the requirements of Fort Belvoir's Major Industrial Stormwater Permit and prevent further degradation of surface water quality.

Impervious surface increase at DAAF resulting from the short-range ADP projects would not exceed the one percent threshold of significance for the overall Accotink Creek watershed, nor would it meet or exceed the 15 percent threshold of significance for the proportion of impervious surface in the portion of the watershed on Main Post. As almost 90 percent of the Accotink Creek watershed is upstream of Main Post and intensively developed (**Section 3.7.3**), the water quality of Accotink Creek in the vicinity of DAAF would continue to be highly dependent on development and stormwater management practices upstream of the airfield.

None of the proposed projects involve altering, damming, redirecting, channelizing, culverting, or spanning the Accotink Creek stream channel, nor would they require water withdrawals from Accotink Creek or any other surface water body. For the reasons discussed above, impacts on surface water and water quality resulting from the short-range ADP projects would be less than significant under the Full and Partial Implementation Alternatives.

4.7.3.3 Stormwater

Construction activities associated with **Projects 5**, **6**, **8**, and **9** would each disturb more than one acre of land; therefore, as noted above, contractors for those projects would obtain coverage under the CGP and prepare and adhere to E&SC and SWM plans and site-specific SWPPPs accordingly. Adherence to the requirements of these plans and the CGP during each project's construction phase would ensure that short-term impacts on surface water quality from stormwater discharged from the project sites remains minimal and less than significant. Phasing of the proposed projects over a period of

approximately 10 years would also ensure that impacts from construction-related stormwater discharges do not occur simultaneously, further minimizing impacts.

In the long term, the construction of new facilities, expansion of aircraft parking aprons, and the development of associated access roads and parking areas under **Projects 5**, **6**, and **9** would increase impervious surfaces on DAAF by 18.5 acres or 0.2 percent over existing impervious surface in the Accotink Creek watershed as a whole (**Table 4.7-1**). This would also represent a 4.6 percent increase in impervious surface within the portion of the Main Post portion of the Accotink Creek watershed, bringing the percentage of impervious cover within the Main Post portion of the watershed to 11.4 percent (424 acres). This increase would remain below the thresholds defined in **Section 4.7.1**. However, such an increase in impervious surface would have the potential to generate a correspondingly larger volume of stormwater on DAAF and discharged to Accotink Creek, with resultant effects such as stream scour, erosion, turbidity, and deposition of sediments and pollutants.

To comply with Section 438 of the EISA, LID measures would be incorporated into **Projects 5**, **6**, and **9**, to the maximum extent technically feasible. These design measures would help to maintain or restore stormwater runoff with regard to temperature, rate, volume, and duration of flow. Each of these project sites would use an analysis of pre-development hydrology to establish a baseline condition and set design objectives for stormwater management. Under the Alternatives, if design objectives cannot be met within the ADP project footprint, LID measures would be considered for application in areas downstream of DAAF.

Individually and collectively, the short-range ADP projects would not increase the imperviousness of the Accotink Creek watershed by more than one percent. Impervious surface within the Main Post portion of the Accotink Creek watershed would increase by an estimated 4.6 percent to account for 11.4 percent of the watershed's land area on Main Post. This would not cause the proportion of impervious surface in the Main Post portion of the Accotink Creek watershed to meet or exceed the 15 percent threshold of significance defined in **Section 4.7.1**.

Table 4.7-1: Estimated Accotink Creek Watershed Impervious Surface Changes (acres) – Short-Range ADP Projects (Full and Partial Implementation Alternatives)

Alternative Phase	Accotink Creek Watershed (All)		Accotink Creek Watershed on Main Post	
	Impervious Surface Change (acres)	Impervious Surface Change (percent)	Impervious Surface Change (percent)	Impervious Surface Area Following Implementation (percent)
Short-Range ADP Projects (Full or Partial Implementation Alternatives)	18.47	0.2	4.6	11.4

As each of the proposed ADP projects are planned, built, and become operational, DAAF's Major Industrial Stormwater Permit and corresponding SWPPP would be updated as needed to incorporate and address the new or expanded facilities as well as account for changes associated with those facilities potentially affecting the quality and quantity of stormwater generated on the airfield. Fort Belvoir would continue to sample water discharged from DAAF to Accotink Creek and implement corrective actions as needed to ensure pollutant concentrations remain within regulatory thresholds. This would ensure that the quantity and quality of stormwater generated at DAAF and discharged to Accotink Creek would continue to meet the requirements of the Major Industrial Stormwater Permit and prevent further degradation of surface water quality. LID measures would be incorporated into **Projects 5**, **6**, and **9** to the maximum extent technically feasible in accordance with Section 438 of the EISA to maintain the pre-development hydrology of each site, further minimizing increases in the volume of stormwater resulting from additional impervious surface created by the proposed projects.

Impervious surface covers approximately 30 percent of the Accotink Creek watershed upstream of Main Post (**Section 3.7.3**). As such, a localized increase at DAAF would be unlikely to have a substantial adverse effect on water quality in Accotink Creek. Accotink Creek water quality in the vicinity of DAAF would continue to be highly dependent on development and stormwater management practices upstream of the airfield.

For these reasons, implementation of the short-range projects under this alternative would individually and collectively have no significant short- or long-term adverse effects on stormwater management at DAAF.

4.7.3.4 Wetlands, Streams, and Chesapeake Bay Resource Protection Areas

Wetlands and Streams

Table 4.7-2 summarizes estimated temporary and permanent impacts on wetlands and streams from the short-range ADP projects under either Alternative. Wetland and stream impacts are shown on **Figure 4.7-1**.

Table 4.7-2: Estimated Temporary and Permanent Wetland and Stream Impacts (acres) – Short-Range ADP Projects (Full and Partial Implementation Alternatives)

Project No.	Project	Wetlands (acres)			Streams (linear feet)		
		Temporary	Permanent	Total	Temporary	Permanent	Total
5	Realign Santjer Road and Gavin Road	0	0	**0**	106	25	**131**
6	Construct 12th AV BN 8-Bay Aircraft Maintenance Hangar	0.8	0.6	**1.4**	285	101	**386**
Total – Short-Range ADP Projects[1]		**0.8**	**0.6**	**1.4**	**391**	**126**	**517**

As shown in **Table 4.7-2**, neither **Project 5** nor **Project 6** would meet or exceed the significance threshold for streams, defined in **Section 4.7.1** as 1,500 linear feet or more of temporary and/or permanent impacts. However, **Project 6** would temporarily and permanently impact an estimated 1.4 acres of wetlands at DAAF, thereby exceeding the significance threshold for wetlands defined in **Section 4.7.1** and resulting in a *significant adverse impact* on wetlands. Consequently, impacts from the short-range alternative phase would collectively exceed the applicable significance threshold for wetlands under either the Full or Partial Implementation Alternative.

Permanent impacts on wetlands and streams would consist of converting such areas to a developed condition such as a building or paved surface. Temporary impacts would occur in areas outside the immediate project footprint that would facilitate the maneuvering of workers, vehicles, and equipment during construction of the projects. Temporarily impacted areas would be limited in size to that needed to construct the projects. Temporary, indirect impacts on wetlands and streams from the erosion of exposed soils and corresponding sedimentation of receiving water bodies would be minimized by adherence to the requirements of site-specific E&SC plans and SWPPPs that would be a condition of obtaining coverage under the CGP for both projects, as they would each involve one or more acres of total land disturbance. Following the completion of the proposed projects, temporarily disturbed areas would be recontoured, replanted with native vegetation, and/or otherwise restored to a pre-disturbance condition.

As planning of the proposed ADP projects continues, facilities would be designed to avoid or minimize impacts on wetlands and streams to the extent practicable. Fort Belvoir DPW-ED would review each of the proposed ADP projects prior to implementation to identify environmentally sensitive areas that could potentially be impacted and work with the project proponent to identify alternatives to avoid impacts or measures to minimize or mitigate potential impacts. Wetlands and streams on or near the project sites would be field-delineated and jurisdictional approvals of wetland boundaries would be obtained from USACE prior to beginning construction. To minimize unavoidable temporary and permanent wetland and stream impacts, the construction contractor would obtain coverage under applicable permits issued by USACE in accordance with the CWA prior to beginning construction and would adhere to avoidance, mitigation, and/or compensation requirements specified therein. Because **Project 6** would disturb more than 0.1 acre of wetlands, permitting requirements would likely include the preparation of a compensatory mitigation plan, which could include, but would not be limited to, some or all of the following measures:

- the restoration of wetlands and streams elsewhere on Fort Belvoir or the surrounding area;
- the payment of in-lieu fees to an approved restoration program; or,
- the purchase of credits from an approved mitigation bank.

Permit requirements would also likely include monitoring of mitigation measures for a specified time period to ensure their success or determine alternative measures in the event that mitigation objectives are not achieved. Adherence to avoidance, mitigation, and/or compensation requirements specified in applicable permits issued for the project by USACE in accordance with the CWA would minimize wetland and stream impacts to the extent possible. Impacts would be confined to resources within DAAF's

boundaries. Overall, impacts on wetlands from **Project 6** would represent approximately 0.7 percent of wetlands on DAAF and 0.1 percent of those on Fort Belvoir's Main Post as a whole.

A Finding of No Practicable Alternative (FONPA) was prepared in accordance with EO 11990 to evaluate the potential impacts of the Proposed Action on wetlands (**Appendix F**).

Chesapeake Bay Resource Protection Areas

Vegetation clearing and soil excavation, fill, and compaction during construction activities associated with **Projects 5** and **6** would temporarily impact an estimated 21.5 acres of RPAs on DAAF (**Table 4.7-3**; **Figures 4.7-3** and **4.7-4**). Vegetation clearing and soil disturbance would be limited to the minimum needed to construct the proposed facilities. Adherence to requirements of the CGP to include project-specific SWPPPs (**Section 4.7.3.3**) would minimize or prevent erosion offsite and downstream of DAAF. The staggered implementation of the proposed projects within a 10-year timeframe would further minimize impacts. Therefore, construction-related impacts on RPAs would be less than significant.

Table 4.7-3: Estimated Temporary and Permanent RPA Impacts (acres) – Short-Range ADP Projects (Full and Partial Implementation Alternatives)

Project No.	Project	Temporary Impact	Permanent Impact
5	Realign Santjer Road and Gavin Road	2.3	0.7
6	Construct 12th AV BN 8-Bay Aircraft Maintenance Hangar	19.2	14.0
Sub-total – Short-Range ADP Projects		**21.5**	**14.7**

Project 5 involves redevelopment in the RPA, as it would realign a segment of existing roadway already in the RPA. Following realignment, the abandoned road segment would be demolished and returned to a permeable condition. As such, the net loss of RPA from this project (0.7 acre) would be small. Landscaping installed as part of the project would potentially improve the quality of disturbed portions of the RPA in the vicinity of the realigned road segment.

Project 6 would permanently convert approximately 14 acres (3 percent) of the RPA on DAAF to facilities, pavements, or otherwise impervious surfaces. This would be an adverse effect and would constitute approximately 0.5 percent of RPAs on Fort Belvoir.

As planning and design of these projects continues, RPAs on the sites would be delineated to determine the precise area that would be impacted. Fort Belvoir DPW-ED would review each of the proposed ADP projects prior to implementation to identify environmentally sensitive areas that could potentially be impacted and work with the project proponent to identify alternatives to avoid impacts or measures to minimize or mitigate potential impacts. As practicable, native vegetation would be planted on or around the project sites to replace vegetation lost during construction of the facilities and restore their functional value for minimizing erosion of exposed soils and filtering pollutants in runoff.

Figure 4.7-3: RPA Impacts – Full Implementation Alternative (Preferred Alternative)

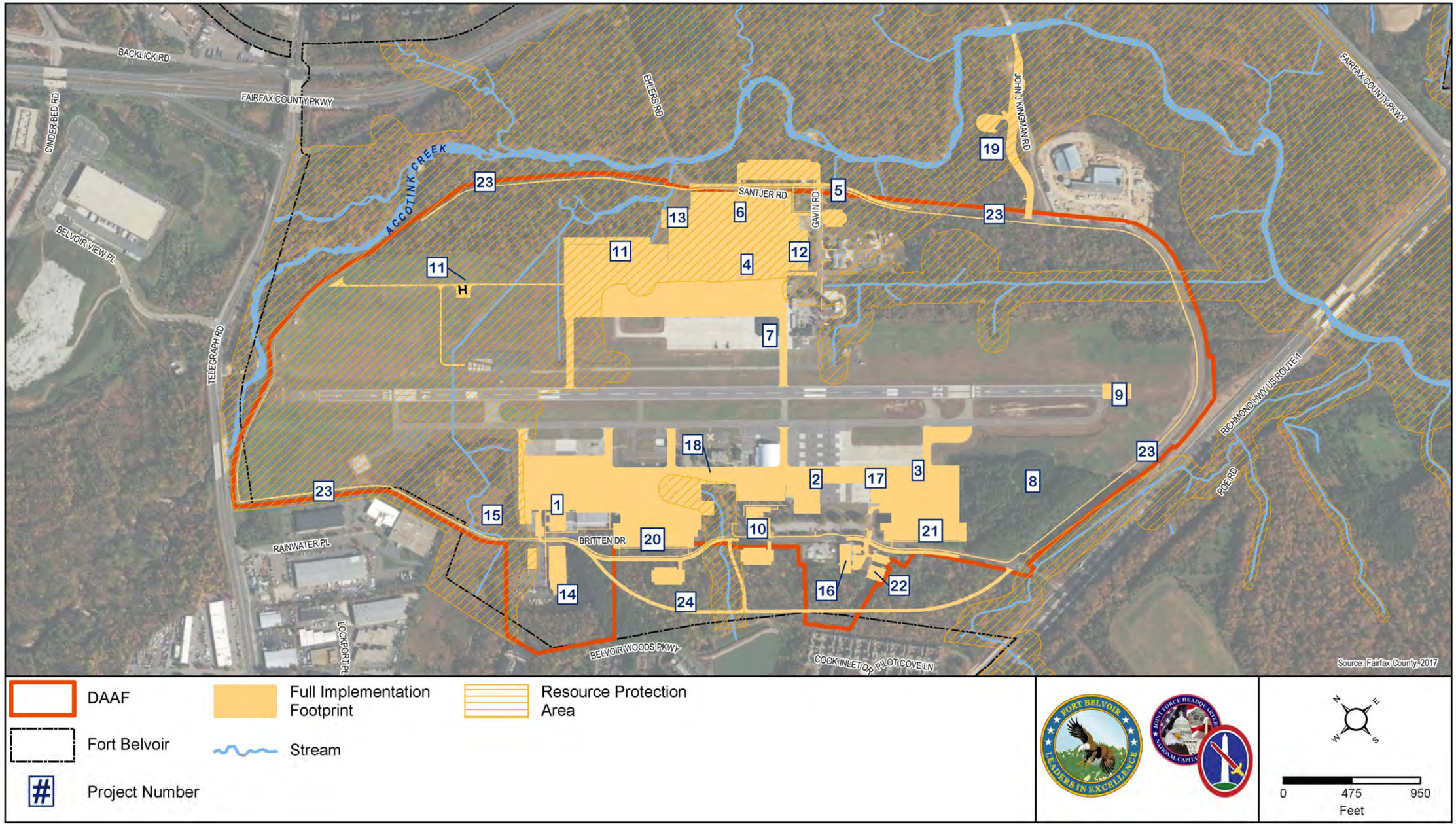

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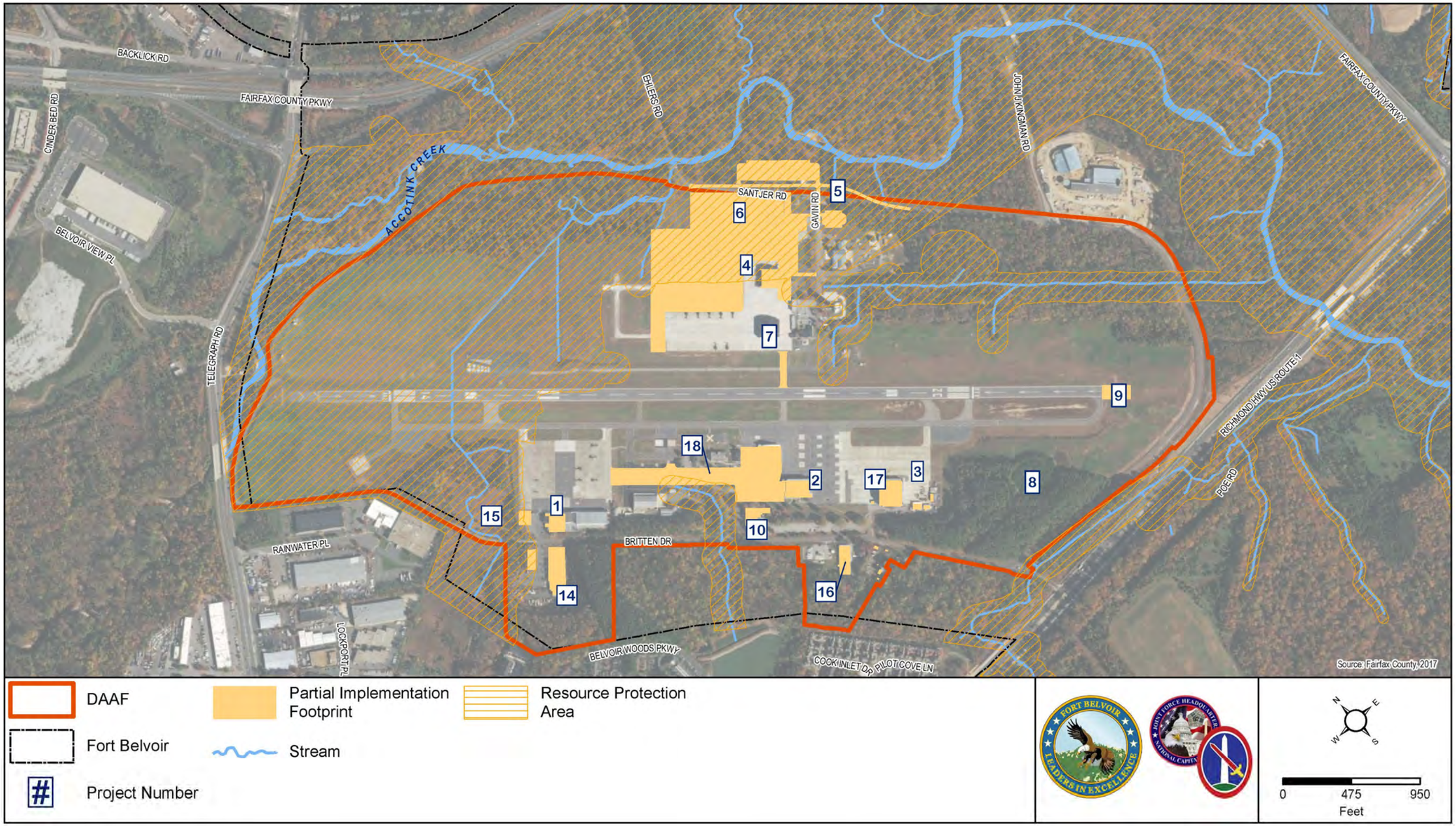
Figure 4.7-4: RPA Impacts – Partial Implementation Alternative



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Generally, projects with potential to permanently impact RPAs on DAAF would be planned, conducted, and mitigated as applicable in accordance with the requirements of Fort Belvoir's *Guide for Resource Protection Areas (RPAs) and Stream Buffers* dated 21 September 2016 (Fort Belvoir, 2016). Such requirements could include the preparation of a WQIA in accordance with 9 VAC 25-830-140 and approval by Fort Belvoir DPW-ED, and on-site or off-site mitigation plantings at ratios specified in the guidance to replace vegetation removed from the RPA (**Table 4.7-4**).

Table 4.7-4: Fort Belvoir RPA Vegetation Removal Replacement Ratios

Vegetation Removed from RPA	Preferred Vegetation Replacement in RPA	Acceptable Vegetation Alternative in RPA
1 tree or sapling at 4 inches diameter and breast height (DBH) or greater	2 trees at 1.5 to 2.5 inches DBH	2 large shrubs at 3 to 4 feet or 10 small shrubs at 15 to 18 inches
1 tree greater than 4 inches DBH	1 tree at 1.5 to 2.5 inches DBH	1 large shrub at 3 to 4 feet or 5 small shrubs at 15 to 18 inches
1 large shrub at 3 to 4 feet	1 large shrub at 3 to 4 feet	5 small shrubs at 15 to 18 inches

Source: (Fort Belvoir, 2016)

Additionally, incorporation of LID measures into the projects to the maximum extent technically feasible in accordance with Section 438 of the EISA (**Section 4.7.3.3**) would maintain the project sites' predevelopment hydrology and help to minimize the volume of additional stormwater generated by new impervious area created by the project and discharged to Accotink Creek. Similarly, updating DAAF's Major Industrial Stormwater Permit and accompanying SWPPP as applicable to incorporate the new facilities and modify stormwater management practices as needed would ensure that concentrations of pollutants in stormwater potentially generated by the new facilities would remain in accordance with regulatory thresholds and minimize impacts on the Chesapeake Bay watershed.

Individually and collectively, the short-range ADP projects affecting RPAs on DAAF would not exceed the one percent threshold of significance defined in **Section 4.7.1**. Thus, impacts on RPAs from the short-range ADP projects would be less than significant under the Full and Partial Implementation Alternatives.

4.7.3.5 Floodplains

Floodplain impacts associated with development include the loss or degradation of their natural function benefits such as water storage, infiltration, and filtration. These impacts extend to their intrinsic value, or the benefits associated with their use such as wildlife habitat, recreation, or aesthetic enjoyment. Floodplain functions and values are both susceptible to changes in the volume, rate, and quality of stormwater discharge, particularly as influenced by the amount of impervious surface within a watershed or sub-unit thereof. A FONPA was prepared in accordance with EO 11988 to evaluate the potential impacts of the Proposed Action on floodplains and the viability of alternatives to developing within the floodplain (**Appendix F**).

The short-range ADP projects under the Full and Partial Implementation Alternatives would affect the 100-year floodplain on DAAF, directly and indirectly (**Figures 4.7-5** and **4.7-6**). Under the Full and Partial

Implementation Alternatives, construction activities would disturb approximately 16 acres of land encompassing the 100-year floodplain. Potential indirect effects would extend to portions of the floodplain adjacent to or downstream of the project sites or airfield.

Project 5 would be located entirely within the floodplain, while **Project 6** would be partially located in the floodplain. As necessary to support development, clean fill soils would be placed and compacted in the excavated portions of these sites (areas that would be excavated and replaced with clean fill soils to support **Projects 5** and **6** would also initiate site preparation for **Projects 11** and **13** under the mid-range phase of the Full Implementation Alternative [**Section 4.7.4.5**]). The resultant site grades would be raised to or above the base flood elevation to minimize flood risk. As identified by more detailed engineering and design studies that would be prepared as the project progresses, site grades may be elevated further to account for future conditions or changes that could increase the base flood elevation. Additionally, the placement of fill within these flood prone areas would consider factors such as its consolidation with underlying soil layers to avoid settlement and maximize water infiltration on the site.

Construction of **Projects 5** and **6** in the floodplain would not result in a substantial or permanent change to local water table levels. Collectively, these projects would permanently impact an estimated 3 acres of the 100-year floodplain on DAAF. Stormwater detention ponds would be sized in accordance with the 100-year storm event, and new facilities would be linked and equipped with storm sewer piping systems that offer more storage below grade to reduce peak discharge rates. Additionally, LID practices associated with **Project 6** would include a strategically placed linear infiltration bed that parallels the southern, western, and northern sides of the facility, as well as the use of permeable pavement to support non-mission critical operations. These measures would foster the percolation and infiltration of stormwater onsite and reduce peak discharge rates. LID measures (and others not yet determined) in combination with traditional stormwater management techniques would ensure that surface elevations within the regulatory floodplain remain less than 1 foot, both on and offsite. None of the other short-range ADP projects under the Alternatives would be located in the 100-year floodplain.

To examine potential adverse impacts on the 100-year floodplain overlying portions of DAAF, the Army performed a floodplain encroachment analysis using the HEC-RAS-modeled 100-year floodplain as the baseline (**Section 3.7.6**). The model generated cross sections for DAAF using downstream water surface elevations collected during field surveys to support the HEC-RAS model (**Section 3.7.6**). Hydraulic calculations were then made for each subsequent upstream cross section on DAAF based upon the scope of the proposed ADP projects under the Alternatives. The upstream data calculations included estimated increases in elevation to account for fill and facility construction in areas proposed for development. Based on these inputs, the HEC-RAS model simulated changes to the horizontal extent of the 100-year floodplain on DAAF (**Figures 4.7-5** and **4.7-6**).

Figure 4.7-5: Floodplain Impacts – Full Implementation Alternative (Preferred Alternative)

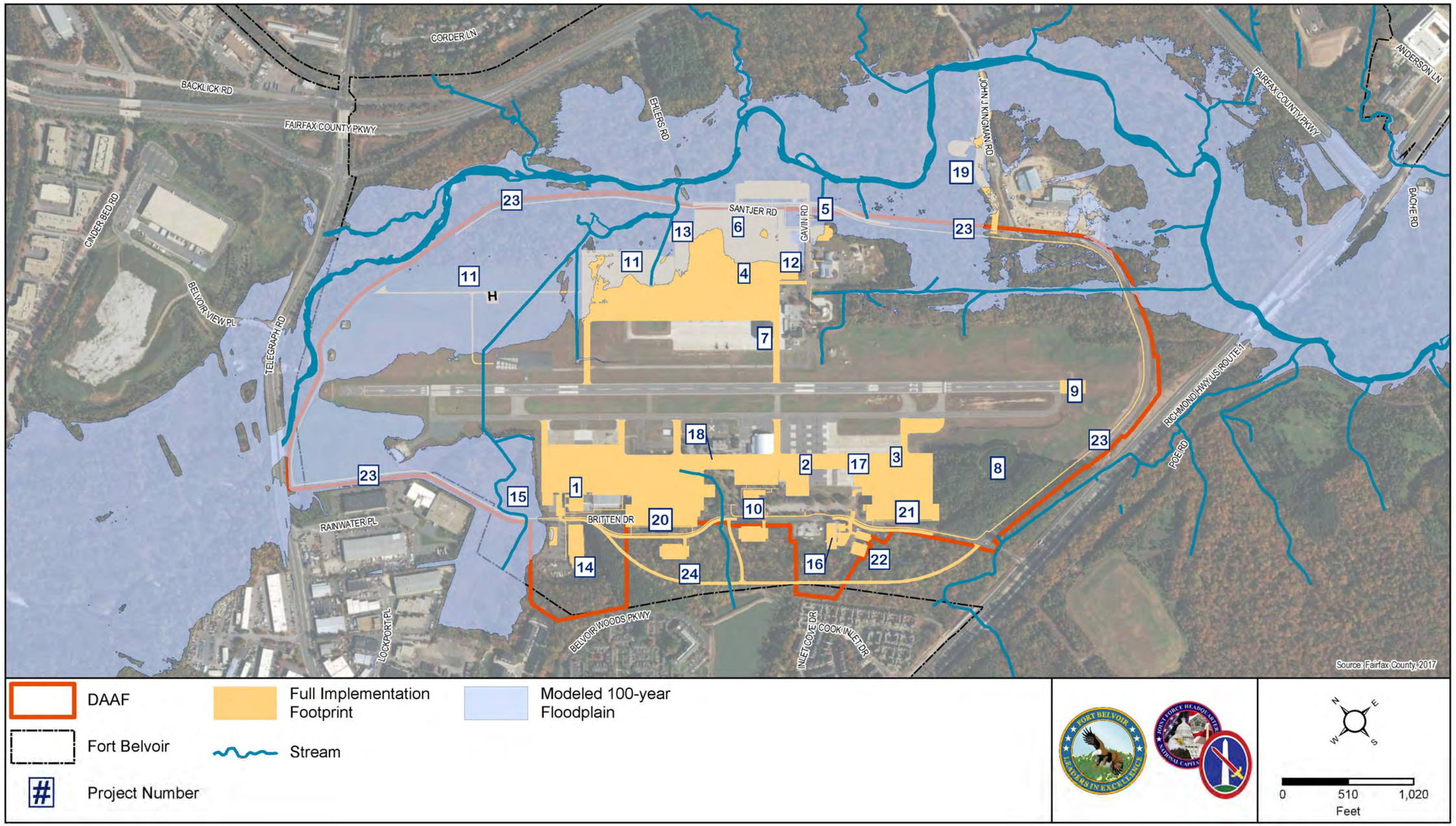

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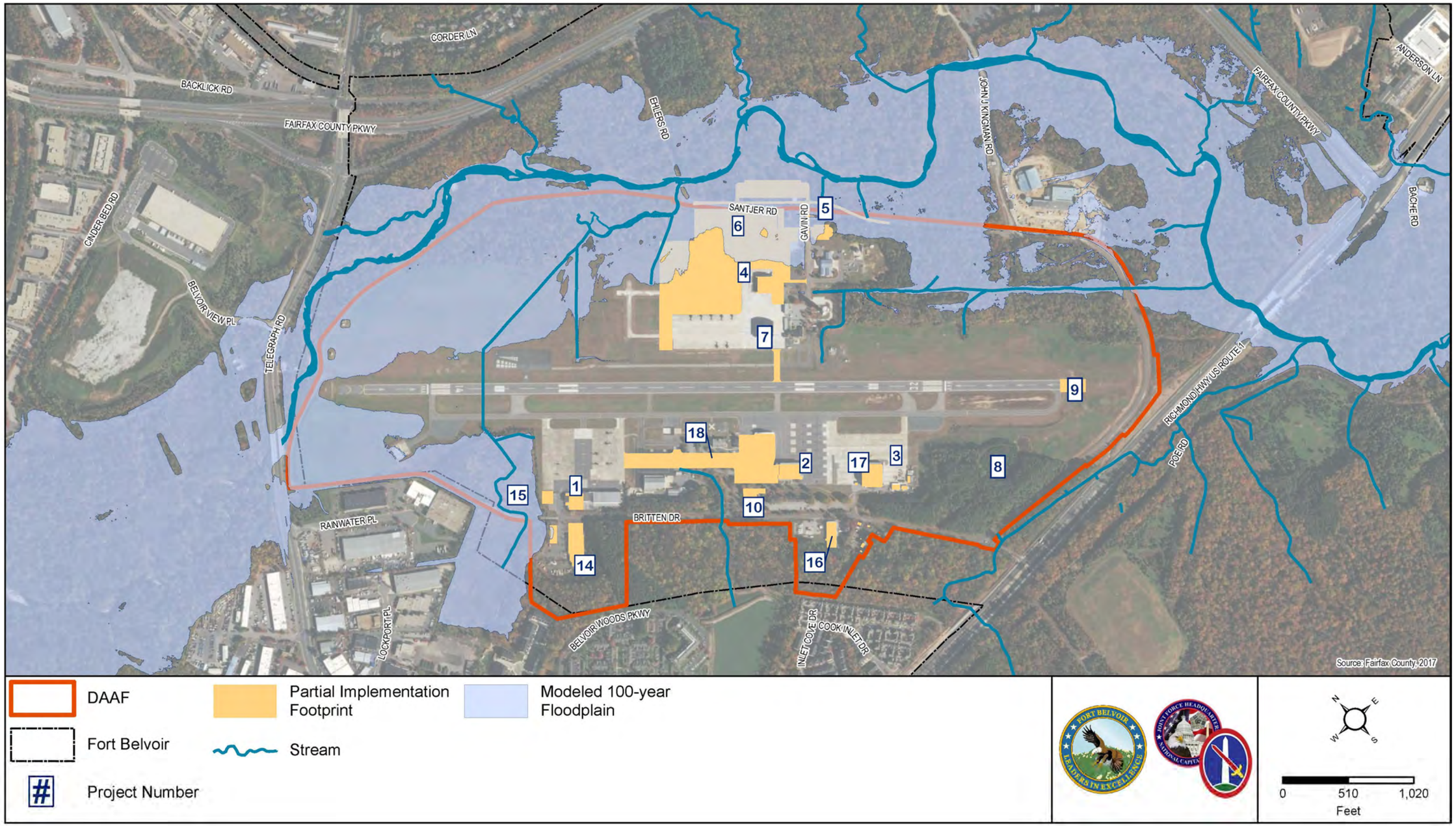
Figure 4.7-6: Floodplain Impacts – Partial Implementation Alternative



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Not accounting for any proposed or yet to be determined mitigation measures, the HEC-RAS analysis concluded that the maximum increase to the horizontal extent of the floodplain would not exceed approximately 2 feet (immediately downstream of Ehlers Road) under either of the alternative scenarios. Overall, the results of the HEC-RAS analysis indicate that risks to life or property under the Alternatives would be minimal and restricted to Fort Belvoir. Additionally, potential adverse impacts on life or property downstream of the airfield itself would largely accrue in the post's Southwest Area, which primarily consists of undeveloped land in a conservation status.

Under the Alternatives, the BMPs and LID measures proposed would reduce the potential for adverse impacts on the 100-year floodplain and areas downstream. Areas of the 100-year floodplain not built on or otherwise developed by the proposed projects would be replanted with native vegetation or restored to an otherwise impermeable condition to maintain the functions and values of those floodplain areas. Site preparation activities (i.e., clean fill soils) necessary to support **Projects 5** and **6** would not result in any substantial adverse effects on natural or beneficial floodplain values.

All potential adverse impacts on property or life downstream of the Alternatives would be limited in scope to DAAF and areas on Fort Belvoir that are currently undeveloped and in a conservation status. The Army would adhere to Fairfax County floodplain management requirements in accordance with Article 2, Part 9 of the Fairfax County Zoning Ordinance and would and notify the county of any floodplain changes that might impact FEMA Flood Insurance Rate Maps as planning and design of the proposed projects continues.

For these reasons, potential adverse impacts on the 100-year floodplain under the Alternatives would be less than significant.

4.7.4 Mid- and Long-Range ADP Projects – Full Implementation Alternative (Preferred Alternative)

4.7.4.1 Groundwater

Impacts on groundwater resulting from implementation of mid-range and long-range projects would be similar to those described for implementation of the short-range projects (**Section 4.7.3.1**). For the mid- and long-range projects, the estimated net increase in impervious surface of 18 acres would reduce the area of effective recharge to the surficial aquifer underlying DAAF. Because the reduction in recharge area would be small in the context of the surficial aquifer's total area (i.e., hundreds of acres), impacts on groundwater would be negligible, and there would be no net deficit in aquifer volume or a lowering of the local groundwater table.

During construction activities associated with the proposed mid- and long-range projects, contractors would use, handle, store, and dispose of hazardous materials in accordance with applicable federal, state, Army, and Fort Belvoir regulatory requirements to minimize or eliminate the potential for these substances to migrate to groundwater underlying DAAF. In the long term, none of the proposed projects would require new or additional withdrawals from, or discharges of pollutants to, groundwater underlying DAAF.

Thus, mid- and long-range projects under the Full Implementation Alternative would have less-than-significant impacts on groundwater at DAAF.

4.7.4.2 Surface Water and Water Quality

Short-term impacts on surface water and water quality resulting from mid- and long-range ADP projects under the Full Implementation Alternative would be similar to those described for the short-range projects. However, such impacts would likely be more intensive relative to the short-range ADP projects, as the mid-and long-range projects would collectively result in a larger area of land disturbance at the airfield. Specifically, construction activities associated with mid- and long-range ADP projects under the Full Implementation Alternative (with the exception of **Project 16**) would disturb an estimated 55 acres of land at DAAF.

As described for the short-range ADP projects, contractors would prepare E&SC and SWM plans for **Projects 10** , **15**, and **17** as they would disturb more than 2,500 square feet or more but less than one acre and obtain coverage under the CGP as well as prepare and adhere to site-specific SWPPPs for projects that disturb one acre or more **(Projects 11** through **14**, **16**, **18** through **21**, **23**, and **24**) in accordance with Fort Belvoir's MS4 permit. Adherence to these requirements would manage the quantity and quality of stormwater generated on the project sites and minimize concentrations of construction-related pollutants ultimately discharged to Accotink Creek. Phasing of the proposed projects over a period of 20 years would ensure that water quality impacts from construction-related stormwater discharges do not occur simultaneously, further minimizing impacts.

In the long term, the mid- and long-range ADP projects under the Full Implementation Alternative would increase impervious surface on DAAF by an estimated 18 acres or 0.2 percent over existing impervious surface in the Accotink Creek watershed (**Section 4.7.4.3**). This would be in addition to the 18.5-acre increase in impervious surface at DAAF resulting from the short-range ADP projects (**Section 4.7.3.2**), for a total increase of approximately 36.5 acres of impervious surface on the airfield under the Full Implementation Alternative. This would represent a 0.4 percent increase over existing impervious surface in the overall Accotink Creek watershed and a 9 percent increase over existing conditions in the Main Post portion of the watershed, bringing the percentage of impervious cover within the Main Post portion of the watershed to approximately 12 percent (442 acres). This increase would remain below the thresholds defined in **Section 4.7.1**.

Projects involving 5,000 square feet or more of land disturbance (anticipated to be all mid- and long-range projects except **Projects 16** and **17**) would incorporate LID measures to the maximum extent technically feasible in accordance with Section 438 of the EISA to maintain the pre-development hydrology of the project sites and minimize corresponding impacts on water quality from increase imperviousness. The aircraft wash racks included in **Projects 15** and **20** would discharge to the airfield's sanitary sewer system, and would include an O/WS to manage runoff in accordance with applicable regulations.

DAAF's Major Industrial Stormwater Permit and corresponding SWPPP would be updated accordingly for each of the proposed ADP projects and runoff discharged to Accotink Creek would continue to be sampled and corrective actions implemented as needed to ensure pollutant concentrations remain

within regulatory thresholds. Adherence to these measures would ensure that the quantity and quality of stormwater generated at DAAF and discharged to Accotink Creek would continue to meet the requirements of Fort Belvoir's Major Industrial Permit and prevent further degradation of surface water quality.

The total increase in impervious surface from the short-, mid-, and long-range projects under the Full Implementation Alternative would not exceed the one percent threshold of significance for the overall Accotink Creek watershed, nor would it meet or exceed the 15 percent threshold of significance for impervious surface in the Main Post portion of the Accotink Creek watershed. Water quality in Accotink Creek in the vicinity of DAAF would continue to be highly dependent on development and stormwater management practices upstream of the airfield, as almost 90 percent of the Accotink Creek watershed is upstream of Main Post and intensively developed (**Section 3.7.3**).

None of the proposed projects involve altering, damming, redirecting, channelizing, culverting, or spanning the Accotink Creek stream channel, nor would they require water withdrawals from Accotink Creek or any other surface water body.

Based on this analysis, impacts on surface water and water quality resulting from the mid- and long-range ADP projects would be less than significant under the Full Implementation Alternative.

4.7.4.3 Stormwater

Short-term and long-term impacts on stormwater management resulting from mid- and long-range ADP projects under the Full Implementation Alternative would be similar to those described for the short-range projects (**Section 4.7.3.3**). Contractors would prepare and adhere to E&SC and SWM plans for **Projects 10**, **15**, **17**, and **22** as they would disturb more than 2,500 square feet of land but less than one acre; coverage under the CGP would not be required. Construction activities disturbing one acre or more of land (anticipated to include all mid- and long-range projects except **Projects 10**, **15**, **16,** and **22**) would obtain coverage under the CGP and adhere to the requirements of E&SC and SWM plans and site-specific SWPPPs accordingly. Adherence to the requirements of these plans and the CGP would ensure that short-term impacts on surface water quality from discharges of stormwater during the construction phase of each project remains minimal and less than significant. Phasing of the proposed projects over a period of approximately 20 years would ensure that impacts from construction-related stormwater discharges do not occur simultaneously, further minimizing impacts.

In the long term, mid- and long-range ADP projects under the Full Implementation Alternative would result in an estimated net increase of 18 acres in impervious surface at DAAF or 0.2 percent over existing impervious surface in the Accotink Creek watershed as a whole (**Table 4.7-5**). This would be in addition to the 18.5-acre increase in impervious surface at DAAF resulting from the short-range ADP projects (**Section 4.7.3.2**), for a total increase of approximately 36.5 acres of impervious surface on the airfield under the Full Implementation Alternative. This would represent a 0.4 percent increase over existing impervious surface in the overall Accotink Creek watershed and a 9 percent increase over existing conditions in the Main Post portion of the watershed. Following implementation of the Full Implementation Alternative, the proportion of impervious surface in the Main Post portion of the Accotink Creek watershed would be approximately 12 percent (442 acres).

Table 4.7-5: Estimated Accotink Creek Watershed Impervious Surface Changes (acres) – Mid- and Long-Range ADP Projects with Short-Range ADP Projects – Full Implementation Alternative (Preferred Alternative)

Alternative Phase	Accotink Creek Watershed (All)		Accotink Creek Watershed on Main Post	
	Impervious Surface Change (acres)	Impervious Surface Change (percent)	Impervious Surface Change (percent)	Impervious Surface Area Following Implementation (percent)
Short-Range ADP Projects (Full or Partial Implementation Alternatives)	18.5	0.2	4.6	11.4
Mid- and Long-Range ADP Projects (Full Implementation Alternative only)	18.0	0.2	4.4	11.4
Total	**36.5**	**0.4**	**9.0**	**11.9**

Individually and collectively, the mid- and long-range ADP projects under the Full Implementation Alternative when combined with the short-range ADP projects would not increase the imperviousness of the Accotink Creek watershed as a whole by more than one percent. Impervious surface within the Main Post portion of the Accotink Creek watershed would increase under the Full Implementation Alternative by an estimated 9 percent to account for 12 percent (442 acres) of the watershed's land area therein. This would not cause the proportion of impervious surface in the Main Post portion of the Accotink Creek watershed to meet or exceed the 15 percent threshold of significance (556.2 acres) defined in **Section 4.7.1**.

As described for the short-range ADP projects, DAAF's Major Industrial Stormwater Permit and corresponding SWPPP would be updated accordingly for each project. Fort Belvoir would continue to sample water discharged from DAAF to Accotink Creek and implement corrective actions as needed to ensure pollutant concentrations remain within regulatory thresholds. This would prevent further degradation of surface water quality in Accotink Creek and downstream waters by ensuring that the quantity and quality of stormwater generated at DAAF continues to meet the requirements of the Major Industrial Permit. To the maximum extent technically feasible, LID measures would be incorporated into each project as applicable (with the exception of **Projects 16** and **17**) in accordance with the requirements of Section 438 of the EISA to maintain the pre-development hydrology of each site, further minimizing increases in the volume of stormwater generated by additional impervious surface created by the proposed projects.

Impervious surface increase at DAAF resulting from the mid- and long-range ADP projects under the Full Implementation Alternative, combined with the short-range ADP projects, would not exceed the one percent threshold of significance for the overall Accotink Creek watershed, nor would it meet or exceed the 15 percent threshold of significance for the proportion of impervious surface in the portion of the watershed on Main Post. Impervious surface covers approximately 30 percent of the Accotink Creek

watershed upstream of Main Post (**Section 3.7.3**). As such, a localized increase at DAAF would be unlikely to have a substantial adverse effect on water quality in Accotink Creek. Accotink Creek water quality in the vicinity of DAAF would continue to be highly dependent on development and stormwater management practices upstream of the airfield.

Therefore, impacts on stormwater management resulting from the implementation of the mid- and long-range projects under the Full Implementation Alternative would be less than significant.

4.7.4.4 Wetlands, Streams, and Chesapeake Bay Resource Protection Areas

Wetlands and Streams

Individually, none of the mid- and long-range ADP projects in the Full Implementation Alternative would exceed the significance thresholds for wetland and stream impacts defined in **Section 4.7.1** (**Table 4.7-6**). Collectively, however, the long-range ADP projects would exceed the applicable significance threshold defined in **Section 4.7.1** by impacting approximately 1.7 acres of wetlands. Collective mid-range ADP projects would not exceed the significance threshold for streams or wetlands. Therefore, only the long-range alternative phase would have *significant adverse impact* on wetlands.

Taking the Full Implementation Alternative into consideration as a whole, impacts on streams and wetlands would also exceed the previously defined significance thresholds (**Section 4.7.1**). A total of 3.6 acres of wetlands and 2,026 linear feet of streams would be permanently and temporarily impacted from implementing the proposed ADP projects (**Table 4.7-6**). Therefore, *significant adverse impacts* on streams and wetlands would also result from the Full Implementation Alternative as a whole.

Table 4.7-6: Estimated Temporary and Permanent Wetland and Stream Impacts (acres) – Mid-Range and Long-Range ADP Projects – Full Implementation Alternative (Preferred Alternative)

Project No.	Project Name	Wetlands (acres)			Streams (linear feet)		
		Temporary Impact	Permanent Impact	Total	Temporary Impact	Permanent Impact	Total
Mid-Range ADP Projects							
11	Construct 12th AV BN 10 - Bay Storage Hangar	0.2	0.04	0.24	224	159	383
13	Construct 12th AV BN Aircraft Paint Shop	0.2	0.04	0.24	86	54	140
18	Expand Aircraft Parking Apron	0	0	0	168	0	168
Sub-Total – Mid-Range ADP Projects		**0.4**	**0.1**	**0.5**	**478**	**213**	**691**

Table 4.7-6: Estimated Temporary and Permanent Wetland and Stream Impacts (acres) – Mid-Range and Long-Range ADP Projects – Full Implementation Alternative (Preferred Alternative) (con't.)

Project No.	Project Name	Wetlands (acres)			Streams (linear feet)		
		Temporary Impact	Permanent Impact	Total	Temporary Impact	Permanent Impact	Total
Long-Range ADP Projects							
19	Replace Farrar Gate Access Control Point and Install Redundant Communications Line	0.6	0.2	0.8	0	0	0
20	Construct NVESD Hangar	0.1	0.0	0.1	129	23	152
23	Construct Perimeter Road Multi-Purpose Trail	0.1	0.0	0.1	525	46	571
24[2]	Construct Alternative Perimeter Road	0.5	0.2	0.7	72	23	95
Sub-Total – Long-Range ADP Projects		**1.3**	**0.4**	**1.7**	**726**	**92**	**818**
Sub-Total – Short-Range ADP Projects **(Table 4.7-2)**		***0.8***	***0.6***	***1.4***	***391***	***126***	***517***
Total – Full Implementation Alternative (Preferred Alternative)		**2.5**	**1.1**	**3.6**	**1,595**	**431**	**2,026**

Wetland and stream impacts from the mid- and long-range ADP projects are shown on **Figure 4.7-1**. Temporary and permanent impacts on wetlands and streams resulting from these projects would be similar to those described for the short-range ADP projects (**Section 4.7.3.4**).

The proposed facilities would be designed to avoid or minimize impacts on wetlands and streams to the extent practicable as planning for the ADP projects continues. Fort Belvoir DPW-ED would review each of the proposed ADP projects prior to implementation to identify environmentally sensitive areas that could potentially be impacted and work with the project proponent to identify alternatives to avoid impacts or measures to minimize or mitigate potential impacts. Wetlands and streams on or near the project sites would be field-delineated and jurisdictional approvals of wetland boundaries would be obtained from USACE prior to beginning construction. When impacts on wetlands and streams are unavoidable, disturbance during construction and/or demolition activities would be limited to the area required to implement the proposed projects. Impacts on wetlands and streams would affect non-contiguous areas distributed across the airfield.

Adherence to requirements of applicable permits issued by USACE in accordance with the CWA, as well as E&SC plans and SWPPPs that would be a condition of obtaining coverage under the CGP for each of the projects noted above, would minimize temporary wetland and stream impacts. Following the completion of each project, temporarily disturbed areas of wetlands and streams would be recontoured, replanted with native vegetation, and/or otherwise restored to a pre-disturbance condition. The staggered implementation of the proposed projects over a period of 20 years would also minimize impacts, as not all impacts would occur simultaneously.

Wetland and stream impacts would be minimized by adherence to applicable avoidance, compensation, and mitigation requirements specified in permits that would be issued by USACE in accordance with the CWA prior to beginning construction of each project. The area of wetlands impacted by the mid- and long-range ADP projects under the Full Implementation Alternative would represent approximately 1.1 percent of wetlands on DAAF and 0.2 percent of those on Main Post. Permitting requirements for projects disturbing 0.1 acre or more of wetlands would likely include the preparation of a compensatory mitigation plan, which could include measures similar to those described in **Section 4.7.3.4**. It is anticipated that preparation of such plans would be required for all mid- and long-range ADP projects. Adherence to avoidance, mitigation, and/or compensation requirements specified in applicable permits issued for the projects by USACE in accordance with the CWA, and associated compensatory mitigation plans, would minimize wetland and stream impacts to the extent possible.

Chesapeake Bay Resource Protection Areas

Under the Full Implementation Alternative, construction of all or portions of mid- and long-range ADP **Projects 11**, **12**, **13**, **14**, **15**, **18**, **19**, **23**, and **24** would occur within RPAs at DAAF (**Figure 4.7-1**). Approximately 26.5 acres of RPAs would be disturbed during construction of these projects (**Table 4.7-7**). Short-term, construction-related impacts on RPAs would be similar to those described for the short-range ADP projects (**Section 4.7.3.4**). Adherence to the requirements of E&SC and SWM plans and CGP and accompanying SWPPPs as applicable during the mid- and long-range projects (**Section 4.7.4.3**) would manage the quantity and quality of runoff generated on the project sites and discharged to Accotink Creek and the Potomac River and Chesapeake Bay further downstream. Ground disturbance associated with the proposed projects occurring in RPAs would be limited to that needed to support development of each project. The phased implementation of the proposed projects over 20 years would ensure that not all projects occur simultaneously, further minimizing impacts. As such, short-term impacts on RPAs would be less than significant.

Collectively, the mid- and long-range ADP projects noted above would permanently convert approximately nine acres of RPAs to facilities, pavements, or otherwise impervious surface, resulting in a long-term adverse impact. Projects would be designed to minimize encroachment on RPAs to the extent possible. **Projects 18** and **19** would represent redevelopment of existing developed areas already partially within RPAs at DAAF; as practicable, areas of existing impervious surface demolished by those projects would be restored to a permeable condition to minimize impacts on the RPA.

Table 4.7-7: Estimated Temporary and Permanent RPA Impacts (acres) – Mid-Range and Long-Range ADP Projects – Full Implementation Alternative (Preferred Alternative)

Project No.	Project Name	Temporary Impact	Permanent Impact
Mid-Range ADP Projects			
11	Construct 12th AV BN 10-Bay Storage Hangar	8.8	3.5
12	Construct 12th AV BN 4-Bay Storage Hangar and Secondary Parking Lot	1.5	0.6
13	Construct 12th AV BN Aircraft Paint Shop	1.6	0.6
14	Modernize and Expand Building 3212, DCARNG Readiness Center	0.5	0.2
15	Construct DCARNG Aircraft Wash Rack	0.4	0.1
18	Expand Aircraft Parking Apron	0.6	0.2
Sub-total – Mid-Range ADP Projects		**13.3**	**5.2**
Long-Range ADP Projects			
19	Replace Farrar Gate Access Control Point and Install Redundant Communications Line	4.1	1.6
23	Construct Perimeter Road Multi-Purpose Trail	8.1	1.5
24	Construct Alternative Perimeter Road	1.0	0.3
Sub-total – Long-Range ADP Projects		**13.2**	**3.4**
Sub-total – Mid- and Long-range ADP Projects		**26.5**	**8.6**
Sub-total – Short-range ADP Projects **(Table 4.7-3)**		***21.5***	***14.7***
Total – Full Implementation Alternative (Preferred Alternative)		**48.0**	**23.3**

Projects with potential to permanently impact RPAs on DAAF would be planned, conducted, and mitigated as applicable in accordance with the requirements of Fort Belvoir's *Guide for Resource Protection Areas (RPAs) and Stream Buffers* (Fort Belvoir, 2016). Fort Belvoir DPW-ED would review each of the proposed ADP projects prior to implementation to identify environmentally sensitive areas that could potentially be impacted and work with the project proponent to identify alternatives to avoid impacts or measures to minimize or mitigate potential impacts. To the extent possible, native vegetation would be planted on or around the project sites to replace vegetation lost during construction of the new facilities and restore its functional value for minimizing erosion of exposed soils and filtering pollutants in runoff from the sites. LID measures would be incorporated into each project disturbing 5,000 square feet or more of land to the maximum extent technically feasible in accordance with Section 438 of the EISA (**Section 4.7.4.3**) to maintain pre-development hydrology and minimize the volume of additional stormwater generated by the new impervious area created by the projects and discharged to Accotink Creek. DAAF's Major Industrial Stormwater Permit and accompanying SWPPP would be updated to incorporate the new facilities and modify stormwater management practices as needed, thereby ensuring that concentrations of pollutants in stormwater potentially generated by the new facilities would remain in accordance with regulatory thresholds and minimize impacts on the Chesapeake Bay watershed.

Collectively, the short-, mid-, and long-range ADP projects under the Full Implementation Alternative would permanently impact an estimated 23 acres of RPAs at Fort Belvoir. These impacts would not exceed the one percent threshold of significance defined in **Section 4.7.1** and would remain less than significant.

4.7.4.5 Floodplains

Mid- and long-range ADP projects under the Full Implementation Alternative would affect the 100-year floodplain on DAAF, directly and indirectly (**Figure 4.7-5**). Under this Alternative, all or portions of **Projects 11, 12, 13, 19**, and **23** would be located entirely within the floodplain.

Construction activities associated with these projects would disturb an estimated 23 acres of the 100-year floodplain under this Alternative. Potential indirect effects would extend to portions of the floodplain adjacent to or downstream of the project sites or airfield. None of the other mid- or long-range projects would be located in or adjacent to the floodplain. Construction of mid- and long-range ADP projects in the floodplain would not result in a substantial or permanent change to local water table levels.

In the long term, the mid- and long-range ADP projects would permanently impact an estimated 4.4 acres of the 100-year floodplain. Under the Full Implementation Alternative, BMPs and LID measures would be implemented to reduce the potential for adverse impacts on the 100-year floodplain and areas downstream thereof. Areas of the 100-year floodplain not built on or otherwise developed by the proposed projects would be replanted with native vegetation or restored to an otherwise impermeable condition to maintain the functions and values of those floodplain areas.

Site preparation activities would not result in any substantial adverse effects on natural or beneficial floodplain values. The Army would adhere to Fairfax County floodplain management requirements in accordance with Article 2, Part 9 of the Fairfax County Zoning Ordinance and would and notify the county of any floodplain changes that might impact FEMA Flood Insurance Rate Maps as planning and design of the proposed projects continues.

Therefore, potential adverse impacts on the 100-year floodplain under the Full Implementation Alternatives would be less than significant.

4.7.5 Mid-Range ADP Projects – Partial Implementation Alternative

4.7.5.1 Groundwater

None of the construction activities associated with the mid-range ADP projects in the Partial Implementation Alternative would require new or additional withdrawals of groundwater. During construction, contractors would use, handle, apply, and store hazardous substances in accordance with applicable regulatory requirements, thereby preventing the migration of such substances to groundwater underlying DAAF. The use of heavy construction equipment and grading and excavation activities associated with the proposed projects would have the potential to compact soils on the project sites, thereby decreasing or preventing the percolation of precipitation or runoff into underlying

groundwater and resulting in an adverse impact. Notwithstanding this, the staggered implementation of the projects over 10 years would ensure that these impacts do not occur simultaneously, thereby minimizing their severity. For these reasons, construction-related impacts on groundwater from mid-range projects in the Partial Implementation Alternative would be less than significant.

In the long term, areas of project sites not paved or built on would be re-planted with native vegetation or otherwise maintained in a permeable condition, which would allow the infiltration of precipitation and runoff into underlying groundwater. None of the proposed projects include the installation of groundwater wells nor would they require withdrawals of groundwater, as prohibited on Fort Belvoir. Similarly, none of the facilities that would be built or modernized by the mid-range projects would inject or discharge pollutants or other substances to groundwater. Although new areas of impervious surface created by the proposed projects would prevent infiltration of precipitation and runoff, these areas would remain small within the context of the surficial aquifer underlying DAAF. Therefore, impacts on groundwater from mid-range projects in the Partial Implementation Alternative would be less than significant, as there would be no net deficit in aquifer volume or a lowering of the local groundwater table.

4.7.5.2 Surface Water and Water Quality

Short-term impacts on surface water and water quality resulting from mid-range ADP projects under the Partial Implementation Alternative would be similar to those described for the short-range ADP projects. These impacts would be somewhat less intensive, however, as approximately 6 acres of land would be disturbed by the mid-range projects under the Partial Implementation Alternative in comparison to the 29 acres that would be disturbed by the short-range projects. As previously described (**Sections 4.7.3.2** and **4.7.4.2**), construction contractors would prepare and adhere to the requirements of E&SC and SWM plans for projects disturbing more than 2,500 square feet but less than one acre (**Projects 10**, **14**, and **15**) and obtain coverage under the CGP and prepare a site-specific SWPPP for **Project 17** in accordance with Fort Belvoir's MS4 permit. Adherence to the requirements of these plans and the CGP as applicable during each project's construction phase would ensure that short-term impacts on surface water quality from stormwater discharged from the project sites remains minimal and less than significant. Phasing of the proposed projects over a period of approximately 10 years would also ensure that impacts on water quality from construction-related stormwater discharges do not occur simultaneously, further minimizing impacts.

In the long term, mid-range ADP projects under the Partial Implementation Alternative would increase impervious surface on DAAF by 2.5 acres or 0.03 percent over existing impervious surface in the Accotink Creek watershed as a whole (**Section 4.7.5.3**). This would be in addition to the 18.5-acre increase in impervious surface on the airfield that would result from the short-range ADP projects (**Section 4.7.3.2**) for a total increase of 21.0 acres of impervious surface at DAAF under the Partial Implementation Alternative. This would represent a 0.2 percent increase over existing impervious surface in the Accotink Creek watershed as a whole and a five percent increase over existing impervious surface in the Main Post portion of the Accotink Creek watershed, bringing the percentage of

impervious cover within the Main Post portion of the watershed to approximately 11.5 percent (426.4 acres). This increase would remain below the thresholds defined in **Section 4.7.1**.

To maintain the pre-development hydrology of the project sites and minimize corresponding impacts on water quality from increase imperviousness, projects disturbing 5,000 square feet or more of land (anticipated to be **Projects 10**, **15**, and **18**) would incorporate LID measures to the maximum extent technically feasible in accordance with Section 438 of the EISA. The aircraft wash rack that would be constructed by **Project 15** would discharge to the airfield's sanitary sewer system, and would include an O/WS to manage runoff in accordance with applicable regulations. DAAF's Major Industrial Stormwater Permit and corresponding SWPPP would be updated accordingly for each of the proposed projects and runoff discharged from DAAF to Accotink Creek would continue to be sampled and corrective actions implemented as needed to ensure pollutant concentrations remain within regulatory thresholds. Adherence to these measures would ensure that the quantity and quality of stormwater generated at DAAF and discharged to Accotink Creek would continue to meet the requirements of Fort Belvoir's Major Industrial Permit and prevent further degradation of surface water quality.

The total increase in impervious surface from the short- and mid-range projects under the Partial Implementation Alternative would not exceed the one percent threshold of significance for the overall Accotink Creek watershed, nor would it meet or exceed the 15 percent threshold of significance for impervious surface in the Main Post portion of the Accotink Creek watershed. As almost 90 percent of the Accotink Creek watershed is upstream of Main Post and intensively developed (**Section 3.7.3**), water quality in Accotink Creek in the vicinity of DAAF would continue to be highly dependent on development and stormwater management practices upstream of the airfield,

None of the proposed projects involve altering, damming, redirecting, channelizing, culverting, or spanning of the Accotink Creek stream channel, nor would they require water withdrawals from Accotink Creek or any other surface water body.

Based on this analysis, impacts on surface water and water quality resulting from mid-range ADP projects under the Partial Implementation Alternative would be less than significant.

4.7.5.3 Stormwater

Short-term and long-term impacts on stormwater from mid-range ADP projects under the Partial Implementation Alternative would be similar to those described for short-, mid-, and long-range projects under the Full Implementation Alternative. Contractors would prepare and adhere to the requirements of E&SC and SWM plans for **Projects 10**, **14**, **15**, and **18** as they would disturb more than 2,500 square feet of land during construction. Additionally, the contractor for **Project 18** would obtain coverage under the CGP and prepare and adhere to a site-specific SWPPP. Adherence to the requirements of these plans and the CGP would ensure that short-term impacts on surface water quality from discharges of stormwater during the construction phase of each project remains minimal and less than significant. Phasing of the proposed projects over a period of approximately 10 years would ensure that impacts from construction-related stormwater discharges do not occur simultaneously, further minimizing impacts.

In the long term, mid-range projects under the Partial Implementation Alternative would create an estimated 2.5 acres of new impervious surface at DAAF in addition to the 18.5 acres resulting from the short-range projects (**Section 4.7.3.2**) for a total of 21.0 acres of new impervious surface at DAAF (**Table 4.7-8**). This would represent an approximately 0.2 percent increase over existing impervious surface in the overall Accotink Creek watershed and a five percent increase in the Main Post portion of the watershed. Following implementation of the Partial Implementation Alternative, the proportion of impervious surface in the portion of the Accotink Creek watershed on Main Post would be approximately 11.5 percent (426.4 acres).

Table 4.7-8: Estimated Accotink Creek Watershed Impervious Surface Changes (acres) – Mid-Range ADP Projects with Short-Range ADP Projects (Partial Implementation Alternative)

Alternative Phase	Accotink Creek Watershed		Accotink Creek Watershed on Main Post	
	Impervious Surface Change (acres)	Impervious Surface Change (percent)	Impervious Surface Change (percent)	Impervious Surface Area Following Implementation (percent)
Short-Range ADP Projects (Full and Partial Implementation Alternatives)	18.5	0.2	5.0	11.4
Mid-Range ADP Projects (Partial Implementation Alternative only)	2.5	0.03	0.6	11.0
Total	**21**	**0.2**	**5.2**	**11.5**

Individually and collectively, mid-range ADP projects under the Partial Implementation Alternative when combined with the short-range ADP projects would not increase the imperviousness of the Accotink Creek watershed as a whole by more than one percent. Impervious surface within the Main Post portion of the Accotink Creek watershed would increase under the Partial Implementation Alternative by an estimated five percent to account for 11.5 percent of the watershed's land area on the installation. This would remain similar to the existing amount of impervious cover in the Main Post portion of the Accotink Creek watershed (approximately 11 percent) and would remain below the corresponding 15 percent threshold of significance defined in **Section 4.7.1**.

As described for the short-range ADP projects, DAAF's Major Industrial Stormwater Permit and corresponding SWPPP would be updated accordingly for each project. Fort Belvoir would continue to sample water discharged from DAAF to Accotink Creek and implement corrective actions as needed to ensure pollutant concentrations remain within regulatory thresholds. This would prevent further degradation of surface water quality in Accotink Creek and downstream waters by ensuring that the quantity and quality of stormwater generated at DAAF continues to meet the requirements of the Major Industrial Stormwater Permit. To the maximum extent technically feasible, LID measures would be incorporated into each project as applicable (with the exception of **Projects 14**, **16**, and **17**) in

accordance with the requirements of Section 438 of the EISA to maintain the pre-development hydrology of each site.

Impervious surface increase at DAAF resulting from the mid-range ADP projects under the Partial Implementation Alternative, combined with the short-range ADP projects, would not exceed the one percent threshold of significance for the overall Accotink Creek watershed, nor would it meet or exceed the 15 percent threshold of significance for the proportion of impervious surface in the portion of the watershed on Main Post. As impervious surface covers approximately 30 percent of the Accotink Creek watershed upstream of Main Post (**Section 3.7.3**), such a localized increase at DAAF would be unlikely to have a substantial adverse effect on water quality in Accotink Creek. Accotink Creek water quality in the vicinity of DAAF would continue to be highly dependent on development and stormwater management practices upstream of the airfield.

For these reasons, impacts on stormwater management resulting from the implementation of the mid-range projects under the Partial Implementation Alternative would be less than significant.

4.7.5.4 Wetlands and Chesapeake Bay Resource Protection Areas

Wetlands

None of the individual mid-range ADP projects under the Partial Implementation Alternative would impact wetlands on DAAF. As a whole, however, the Partial Implementation Alternative would result in a *significant adverse impact* on wetlands because impacts from **Project 6** in the short-range ADP project phase (**Section 4.7.3.4**) would exceed the significance threshold defined in **Section 4.7.1**.

It is anticipated that **Project 18** would temporarily impact approximately 168 linear feet of streams but would have no permanent stream impacts. The project would be designed to avoid or minimize stream impacts to the extent possible as planning continues. Fort Belvoir DPW-ED would review each of the proposed ADP projects prior to implementation to identify environmentally sensitive areas that could potentially be impacted and work with the project proponent to identify alternatives to avoid impacts or measures to minimize or mitigate potential impacts. Streams for which impacts could not be avoided would be field-delineated and jurisdictional approvals obtained from USACE prior to construction. Adherence to the requirements of applicable permits issued by USACE in accordance with the CWA prior to beginning construction would minimize temporary stream impacts to the extent practicable. Therefore, impacts on streams would remain less than significant.

Indirect, short-term impacts on and streams from erosion and corresponding runoff of exposed soils during construction activities would be minimized or eliminated by adherence to the requirements of site-specific E&SC plans and SWPPPs that would be a condition of obtaining coverage under the CGP for projects involving one or more acres of land disturbance (i.e., **Projects 15** and **18**). The staggered implementation of the proposed projects over a period of 10 years would also minimize impacts, as not all impacts would occur simultaneously.

Chesapeake Bay Resource Protection Areas

Under the Partial Implementation Alternative, **Projects 15**, **17**, and **18** would have short-term, temporary impacts and long-term, permanent impacts on Chesapeake Bay RPAs on DAAF (**Figure 4.7-4**; **Table 4.7-9**). These impacts and their minimization measures would be similar to those described for the short-range, mid-range, and long-range ADP projects (**Sections 4.7.3.4** and **4.7.4.4** respectively); however, impacts from mid-range ADP projects under the Partial Implementation Alternative would be substantially less intensive relative to the Full Implementation Alternative as only three projects affecting RPAs would be implemented.

Table 4.7-9: Estimated Temporary and Permanent RPA Impacts (acres) – Mid-Range ADP Projects (Partial Implementation Alternative)

Project No.	Project Name	Temporary Impact	Permanent Impact
14	Modernize and Expand Building 3212, DCARNG Readiness Center	0.48	0.18
15	Construct DCARNG Aircraft Wash Rack	0.35	0.09
18	Expand Aircraft Parking Apron	0.6	0.17
Sub-total – Mid-Range ADP Projects (Partial Implementation Alternative)		**1.43**	**0.44**
***Sub-total – Short-range ADP Projects* (Table 4.7-3)**		***21.48***	***14.68***
Total – Partial Implementation Alternative		**22.91**	**15.12**

Projects 14, **15**, and **18** would collectively disturb an estimated 1.0 acre of RPAs on DAAF during construction and result in the permanent conversion of approximately 0.4 acre. Although these impacts would be adverse, they would not meet or exceed the one percent threshold of significance individually, collectively, or when combined with the impacts of the short-range ADP projects (**Section 4.7.3.4**). The projects would be planned, conducted, and mitigated as applicable in accordance with the requirements of Fort Belvoir's *Guide for Resource Protection Areas (RPAs) and Stream Buffers* (Fort Belvoir, 2016). Fort Belvoir DPW-ED would review each of the proposed ADP projects prior to implementation to identify environmentally sensitive areas that could potentially be impacted and work with the project proponent to identify alternatives to avoid impacts or measures to minimize or mitigate potential impacts. For these reasons, long-term impacts on RPAs from the Partial Implementation Alternative would be less than significant.

4.7.5.5 Floodplains

Collectively, mid-range ADP **Projects 14** and **15** would temporarily and permanently impact less than one acre of the 100-year floodplain on DAAF under the Partial Implementation Alternative. Areas of the 100-year floodplain not built on or otherwise developed by the proposed projects would be replanted with native vegetation or restored to an otherwise impermeable condition to maintain the functions and values of those floodplain areas. The Army would adhere to Fairfax County floodplain management requirements in accordance with Article 2, Part 9 of the Fairfax County Zoning Ordinance and would notify the county of any floodplain changes that might impact FEMA Flood Insurance Rate Maps as

planning and design of the proposed projects continues. Effects on the 100-year floodplain from these projects would be less than significant.

4.8 Biological Resources

4.8.1 Thresholds of Significance

The following thresholds were used to determine the significance of adverse impacts on biological resources:

- **Plant Communities and Forest Resources**. If the alternative would result in the permanent loss of more than two percent of the native plant communities at Fort Belvoir.
- **Aquatic Macroinvertebrates/Fish.** If the alternative would result in the loss of more than two percent of the available habitat at Fort Belvoir.
- **Wildlife.** If the alternative would interrupt the continuity of habitats or result in the loss of more than two percent of the habitat on Fort Belvoir.
- **Rare, Threatened, and Endangered Species and Their Habitats.** If the alternative would result in an adverse effect on a federally or state protected species that cannot be resolved through mitigation in consultation with applicable regulatory agencies.
- **Special Natural Areas.** If the alternative would impact more than two percent of a Special Natural Area on Main Post.

4.8.2 No Action Alternative

Under the No Action Alternative, none of the proposed ADP projects would be implemented. Current conditions at DAAF would continue for the foreseeable future. This would have no impact on environmental resources, landscape features, or established conservation areas important to maintaining the biodiversity of Fort Belvoir and surrounding areas, including refuges and other large tracts of habitat; forested areas; wetlands; rare, threatened and endangered species, or bald eagles and their critical habitats.

4.8.3 Short-Range ADP Projects – Full Implementation Alternative (Preferred Alternative) and Partial Implementation Alternative

4.8.3.1 Plant Communities

Under either alternative, short-range ADP **Projects 5**, **6**, and **8** would temporarily impact approximately 2.2 acres of plant communities on DAAF (**Table 4.8-1; Figures 4.8-1** and **4.8-2**). These impacts would primarily result from vegetation clearing, soil grading, and general site preparation activities associated with the construction of **Projects 5** and **6**, and the clearing and grubbing of vegetation prior to or during removal of the earthen knoll under **Project 8**. Vegetation would be permanently removed in proposed "hardscape" areas (i.e., pavement and buildings), but would be replaced in areas of temporary disturbance, such as

construction staging areas and access roads, or areas to be landscaped. The realignment of Santjer Road (**Project 5**) would require the removal of all or most trees in the 0.6-acre area where the new roadbed would be placed. As part of this project, the portion of original roadbed that would be abandoned following the realignment would be demolished, re-graded, and replanted with native vegetation.

Table 4.8-1: Estimated Temporary and Permanent Plant Community Impacts from Short-Range ADP Projects

Plant Community	Temporary Impact (acres)	Permanent Impact (acres)	Percent of Plant Community on DAAF Permanently Impacted (Percent of All DAAF Plant Communities Permanently Impacted)	Percent of Plant Community on Fort Belvoir Permanently Impacted (Percent of All Fort Belvoir Plant Communities Permanently Impacted)
Mixed Pine-Hardwood Forest	0.5	0.1	0.2%	0.1%
Floodplain Hardwood Forest	0.5	0.3	0.3%	0.1%
Loblolly Pine Forest	0.6	0.0	0.0%	0.0%
Tulip Poplar Mesic-Mixed Hardwood Forest	0.6	0.1	0.1%	<0.1%
Sub-total – Short-Range ADP Projects[1, 2]	**2.2**	**0.5**	**(0.12%)**	**(<0.1%)**

Notes:
1. **Projects 5**, **6**, and **8** would have temporary plant community impacts.
2. **Projects 5** and **6** would have permanent plant community impacts.

Removal of the knoll would include the clearing and grubbing of existing vegetation, which primarily consists of maintained grass, low-lying shrubs, and tree stumps remaining from a recent clearing action (impacts from that action were analyzed in the *Davison Army Airfield Hazardous Tree Removal Environmental Assessment* and Finding of No Significant Impact [Fort Belvoir 2016]). Following disturbance of ground surfaces resulting from construction activities, disturbed areas would be landscaped with native vegetation as practicable and in accordance with Fort Belvoir requirements. In addition to the direct effects of removal, indirect adverse effects on plant communities could potentially occur through the introduction of invasive species, by creating edge environments or through the dispersal of plant propagules by construction machinery. Therefore, construction contractors would adhere to the requirements of Fort Belvoir's invasive species management program to prevent the introduction of invasive species to the extent possible.

Generally, the mid- and long-range ADP projects would be implemented in previously disturbed areas of the installation where vegetation consists of maintained grass and ornamental landscape vegetation (e.g., trees, shrubs). The removal of mature trees would be limited to those needed to accommodate the particular project. Areas of project sites not built on or otherwise developed would be replanted with native vegetation or otherwise returned to a permeable condition. Trees removed by the proposed projects would be replaced in accordance with Fort Belvoir's *Tree Removal and Protection Policy #27* (Fort Belvoir 2015a).

Figure 4.8-1: Plant Community Impacts – Full Implementation Alternative (Preferred Alternative)

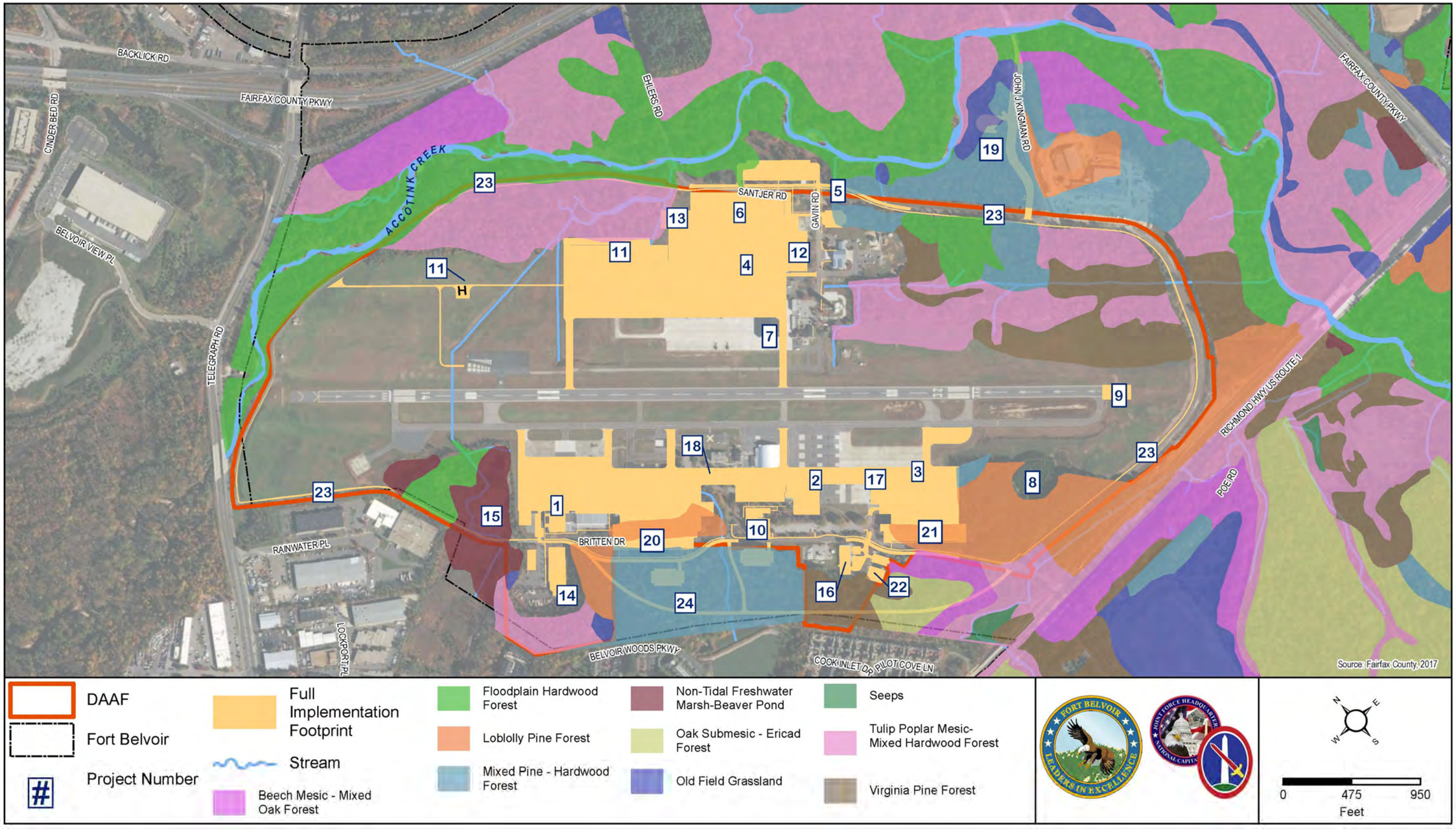

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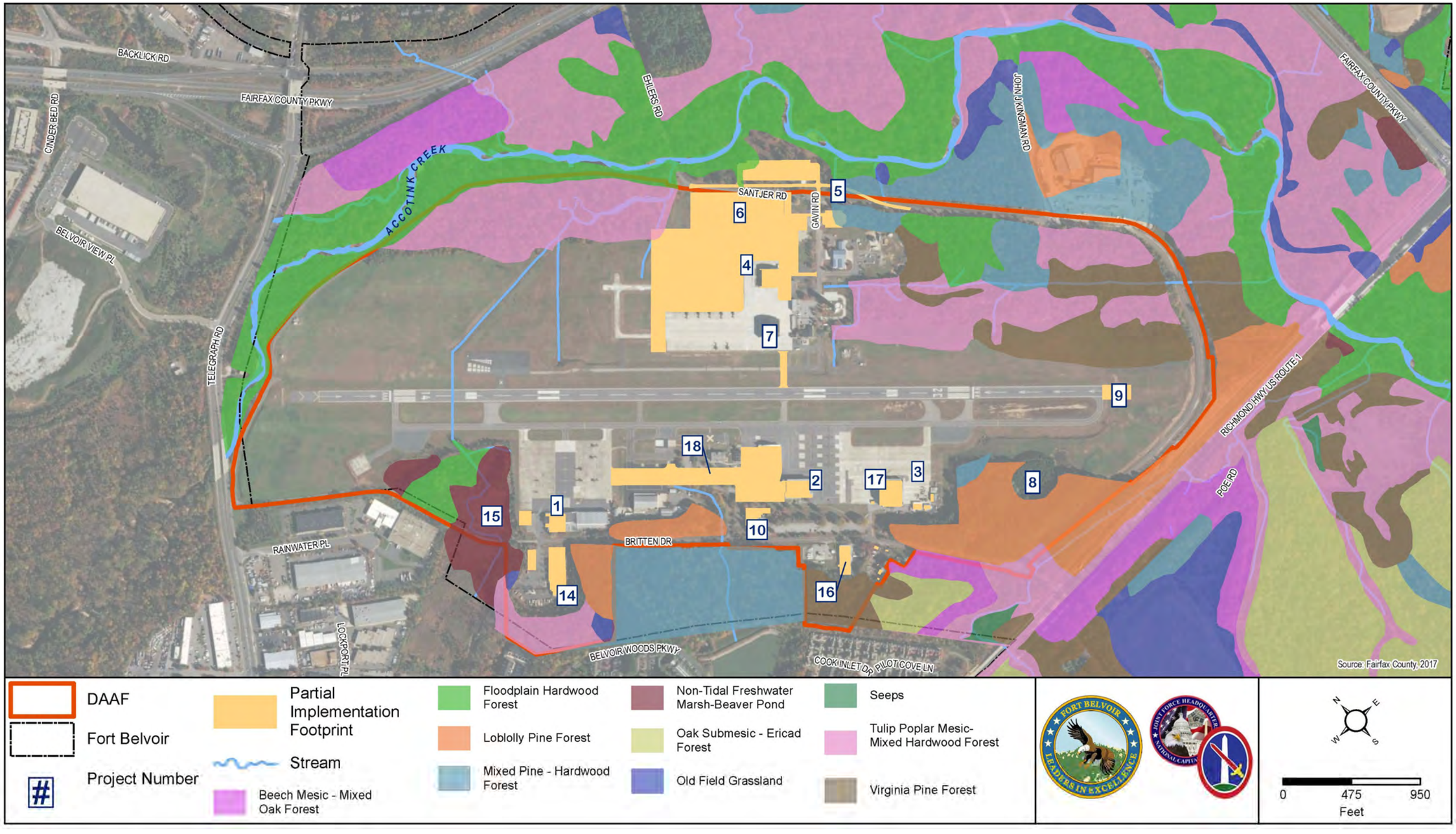
Figure 4.8-2: Plant Community Impacts – Partial Implementation Alternative



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Collectively, the short-range ADP projects under either alternative would permanently remove approximately 0.5 acre of vegetation on DAAF, which would remain below the threshold of significance defined for plant communities (**Section 4.8.1**). Therefore, adverse impacts on plant communities from the short-range ADP projects, individually and collectively, would remain less than significant.

During demolition activities associated with the proposed projects, deposition of airborne particulates on vegetation could result in a negligible temporary reduction of photosynthetic processes. However, because most buildings slated for demolition are located in developed areas of DAAF where vegetation consists primarily of ornamental landscaping (e.g., trees and shrubs), demolition would have a negligible impact on these plant communities. Following demolition and site cleanup, the re-planting with native vegetation of areas of project sites not built on or otherwise developed would provide small increases in vegetative cover at some sites. Buildings demolished that are not replaced by new facilities would be primarily planted and maintained as mowed lawn. Thus, there would be no significant short- or long-term adverse effects on plant communities at DAAF from the implementation of short-range ADP projects under the Full and Partial Implementation Alternatives.

4.8.3.2 Aquatic Macroinvertebrates and Fish

Implementation of the short-range ADP projects would have short-term, less-than-significant adverse effects on the fish and macroinvertebrate communities of Accotink Creek and downstream waterways. None of the short-range ADP projects would result in alteration (i.e., filling, culverting) of Accotink Creek, which is the main source of higher-quality aquatic habitat on DAAF, and therefore, would have no potential to eliminate or degrade the quality of habitat it provides.

Construction, demolition, grading, excavation, and trenching activities associated with the short-range ADP projects would collectively disturb approximately 29 acres of soils underlying DAAF. Short-term adverse impacts could potentially result from the erosion of soils exposed during these activities associated with **Projects 5**, **6**, **7**, **8**, and **9** and the corresponding sedimentation of receiving water bodies. This would have the potential to degrade habitat for aquatic macroinvertebrates and fish within those water bodies.

Adherence to conditions of the CGP for projects disturbing one or more acres of land and the requirements of site- specific E&SC plans and SWPPPs would minimize or eliminate the potential for such impacts (**Section 4.7.3.2**). These requirements would be applicable for **Projects 5**, **6**, **8**, and **9**. The staggered implementation of the projects over 10 years would further minimize impacts, as not all impacts would occur simultaneously. Although such impacts could adversely affect individual macroinvertebrates or fish in receiving water bodies on or near DAAF, there would be no adverse effects at the population or species level. The propagation of macroinvertebrate and fish species in water bodies on and near DAAF would continue. Short-term adverse impacts on aquatic macroinvertebrate and fish habitat would remain below two percent. Thus, short-term impacts on aquatic macroinvertebrates and fish resulting from the short-range ADP projects would be less than significant.

In the long term, the estimated 18.5-acre increase in impervious surface on DAAF resulting from the short-range ADP projects (**Section 4.7.3.2**) would potentially generate increased volumes of stormwater runoff which could accelerate the erosion of stream banks and channels in receiving water bodies. Such

erosion could degrade features of receiving water bodies providing habitat for fish, reptiles, aquatic insects, and other invertebrates. Moreover, increased turbidity resulting from suspended sediment and particulates generated by erosion could degrade water quality downstream by decreasing light penetration, obstructing and abrading the gills of fish and invertebrates, altering the physical and chemical characteristics of benthic substrate, and potentially burying invertebrate communities. Additionally, increased stormwater volumes would have the potential to convey pollutants such as oil and grease, herbicides, and dissolved nutrients to downstream surface waters. Exposure of aquatic fauna to pollutants in the water column could affect their survival, growth, and reproduction.

As required by Section 438 of the EISA, short-range ADP projects involving 5,000 square feet or more of land disturbance would incorporate LID features to the maximum extent technically feasible to maintain the pre-development hydrology of the project site. This would ensure that increases in the volume of stormwater runoff resulting from the proposed projects, if any, would remain minimal. None of the proposed projects are anticipated to increase the number of point source discharges at DAAF or Fort Belvoir. Stormwater discharged from DAAF would continue to be managed in accordance with Fort Belvoir's VPDES permit, including monitoring. Adherence to these requirements would ensure that long-term impacts resulting from the short-term ADP projects on aquatic macroinvertebrates and fish in water bodies at and downstream of DAAF would be less than significant.

4.8.3.3 Wildlife

With the exception of **Projects 5, 6**, and **9**, short-range ADP projects under either Alternative would either consist of interior modernization projects or would occur in areas of the airfield that are already built on or developed and contain little or no suitable wildlife habitat. As such, most of the short-range projects would have no or minimal potential to affect common species of wildlife occurring on DAAF.

In the short term, construction and demolition activities associated with **Projects 5** and **6**, including vegetation clearing, the generation of noise by construction vehicles and equipment, and increased human presence would have the potential to disturb or displace common species of terrestrial wildlife and reduce, degrade, or remove habitat. In some instances, slower or less-mobile animals could be inadvertently destroyed by these activities. It is anticipated that most individuals disturbed or displaced by project activities would relocate to other areas of suitable habitat on or near the airfield. While such disturbance, displacement, or destruction would represent an adverse impact on wildlife, these impacts would occur at the individual rather than population or species level and would not inhibit or prevent the continued propagation of any species. Implementation of the projects over an approximately 10-year period would ensure that project-related disturbance does not occur simultaneously, further minimizing impacts.

Projects 5, **6**, and **9** would temporarily impact approximately 25 acres of BBMC buffers designated on DAAF for the grasshopper sparrow, prothonotary warbler, and wood thrush (**Figures 4.8-3** and **4.8-4**). In the long term, those projects would permanently encroach on an estimated 18 acres of BBMC buffers for the same species. Kentucky warbler and prairie warbler habitat would not be affected by the projects. Impacts on BBMC buffers are further discussed in **Section 4.8.3.5**.

As birds possess a relatively high degree of mobility, it is likely that individuals of these species that are present would be alerted by increased human presence and activity and would relocate a safe distance from the project sites to other areas on or near DAAF providing suitable habitat. Thus, most impacts on individual BBMC would be minimized or avoided.

To minimize or prevent impacts on BBMC at DAAF resulting from the proposed projects and as determined necessary through coordination with the Environmental Division of Fort Belvoir DPW, surveys would be conducted on and/or near the project sites prior to implementing construction and demolition activities to determine their presence. Project proponents would adhere to applicable time of year restrictions for these species as warranted to further minimize or avoid impacts. Projects with the potential to disturb migratory birds or their habitat would adhere to the requirements of Fort Belvoir Policy Memorandum #78, *Conservation of Migratory Birds*. Adherence to these measures and procedures would ensure that construction- and demolition-related impacts on BBMC remain at the individual rather than population or species level and would not inhibit or prevent the continued propagation of these species. As described above for common wildlife species, short-term impacts on BBMC would be further minimized by the implementation of the proposed projects over an approximately 10-year period.

Following the completion of construction and demolition activities, individual animals of common wildlife species and BBMC would return to areas of DAAF providing suitable habitat. While the encroachment on Anderson Park by **Project 5** would represent a permanent impact on habitat for common wildlife species, this habitat would remain small in the context of available habitat that would remain elsewhere on DAAF, Fort Belvoir, and in surrounding areas of Fairfax County. Similarly, although an area of BBMC buffer for grasshopper sparrow and smaller areas of such habitat for prothonotary warbler and wood thrush would be permanently removed by the projects, other areas of suitable habitat for those species would remain elsewhere on DAAF and the installation. The proposed ADP projects would have no potential to inhibit or prevent the continued propagation of common wildlife species.

For the reasons described above, short-term and long-term impacts on wildlife resulting from the short-range ADP projects would remain less than significant under either Alternative.

4.8.3.4 Rare, Threatened, and Endangered Species and Their Habitats

Implementation of the short-range ADP projects would have no significant adverse effects on rare, threatened, and endangered species and their habitats. Prior to implementation, each project would be reviewed by Fort Belvoir DPW-ED, which would request the preparation of site-specific species and/or habitat surveys if potential impacts on rare, threatened, and endangered species and their habitats are identified.

It is anticipated that construction and operational activities associated with the proposed projects would have no potential to disturb the small whorled pogonia, as the species has not been documented at DAAF (**Section 3.8.2.3**). If the plant or suitable habitat is suspected to be present on any of the project sites where land disturbance would occur (i.e., **Projects 5**, **6**, **7**, **8**, and **9**), surveys would be conducted prior to the implementation of the projects and applicable avoidance procedures would be adhered to

as necessary. Thus, the short-range ADP projects would have no adverse effects on the species.

No federally listed threatened or endangered animal species are known to inhabit DAAF. In addition to direct impacts from construction activities resulting in the loss or degradation of habitat, noise generated by construction machinery or the day-to-day operation of a new facility could cause annoyance to sensitive animal species, such as the bald eagle, and disrupt breeding, nesting, or feeding activities. However, given the distance (i.e., more than one mile) between DAAF and the nearest bald eagle nests and shoreline habitat on Fort Belvoir (**Section 3.8.4.1**), the proposed projects would have no potential to directly or indirectly affect the species.

The realignment of Santjer Road (**Project 5**) and the construction of the 12th AV BN 8-Bay Hangar (**Project 6**) would occur in proximity to Accotink Creek, which has the potential to provide suitable habitat for the wood turtle. Although the species has not been documented at DAAF (**Section 3.8.4.1**), species surveys would be conducted along Accotink Creek in the vicinity of those projects prior to their implementation if determined necessary during continued project planning and design. Based on the results of these surveys, avoidance or other mitigation measures would be incorporated into the projects to ensure that no adverse impacts on the wood turtle would occur.

Seasonal restrictions would be implemented to avoid and minimize potential impacts on the northern long-eared bat. Clearing of trees greater than 3 inches in diameter at breast height associated with the proposed ADP projects (i.e., **Projects 5, 6,** and **8**) would not be conducted between April 15 and September 15 of any year in accordance with Fort Belvoir management policies. Adherence to this restriction would also ensure that impacts on the state-endangered little brown bat and tri-colored bat are avoided and/or minimized. In addition, incidental clearing of shrubs, bushes, and small trees would occur outside the primary bird and wildlife nesting season of April 1 through July 31. If vegetation removal is required within this timeframe, the affected area would be surveyed for nesting wildlife species and if an active nest is discovered, the nest area would be partitioned and left undisturbed until the nest is naturally vacated.

Changes in the surface water quality of Accotink Creek, Accotink Bay, and the Potomac River resulting from increased sedimentation from the erosion of soils exposed during land disturbing activities could adversely affect fish species. To date, no federally listed threatened or endangered fish species have been observed on Fort Belvoir, despite numerous surveys. None of the short- or long-range projects would involve construction in the Potomac River or its tidal embayments. Therefore, implementation of the short-range projects would have no potential to adversely affect the Atlantic or shortnose sturgeon.

The Army has determined that the Proposed Action is *not likely to adversely affect* federally listed threatened and endangered species and has prepared a USFWS Self-Certification consultation package in accordance with ESA Section 7. A copy of the Self-Certification package is provided in **Appendix A**.

As noted in **Section 3.8.4.1**, additional Section 7 consultation will be conducted as planning, design, and implementation of the individual proposed projects continues to determine their potential effects on federally listed species.

Figure 4.8-3: Special Natural Area Impacts – Full Implementation Alternative (Preferred Alternative)

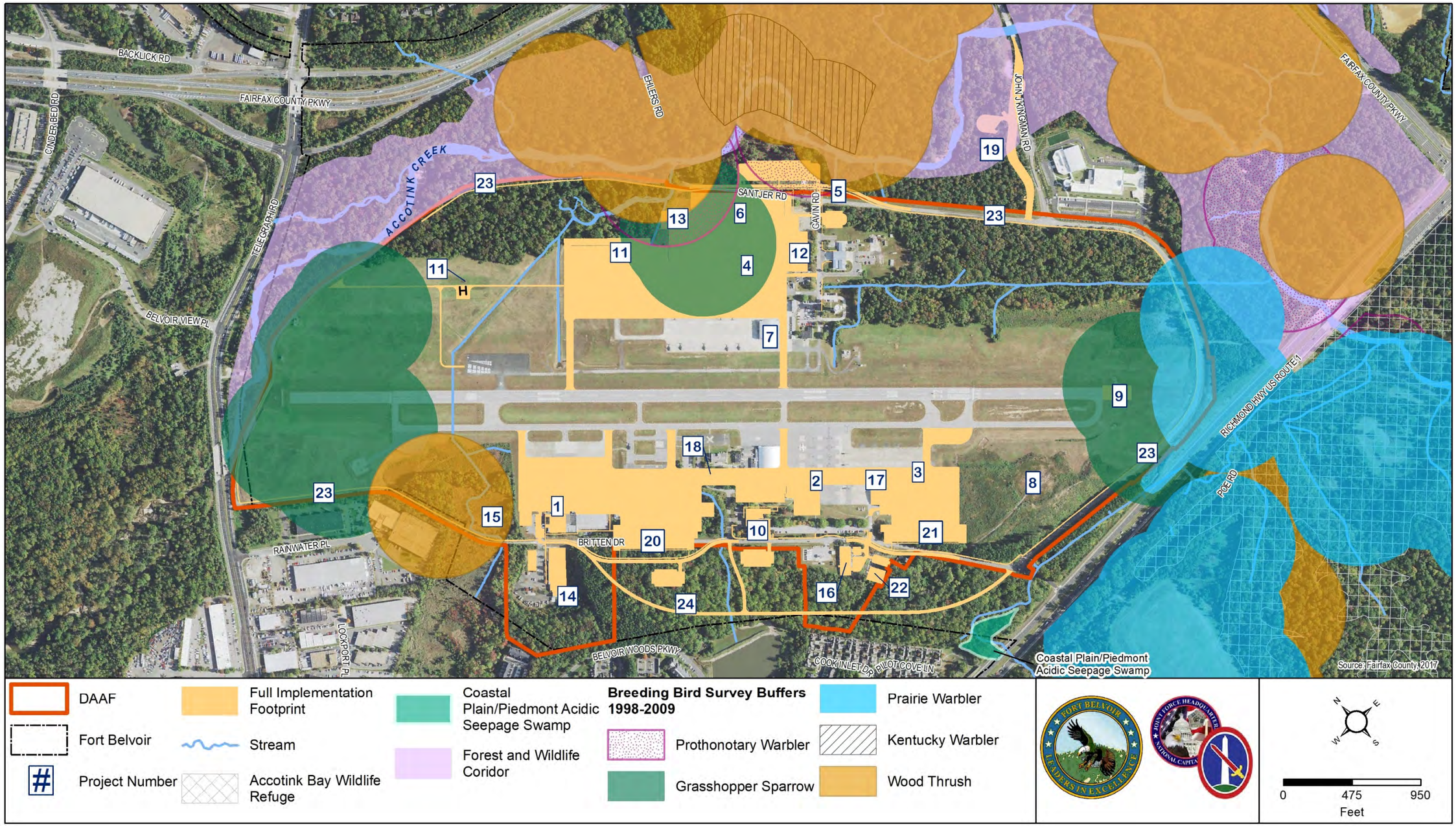

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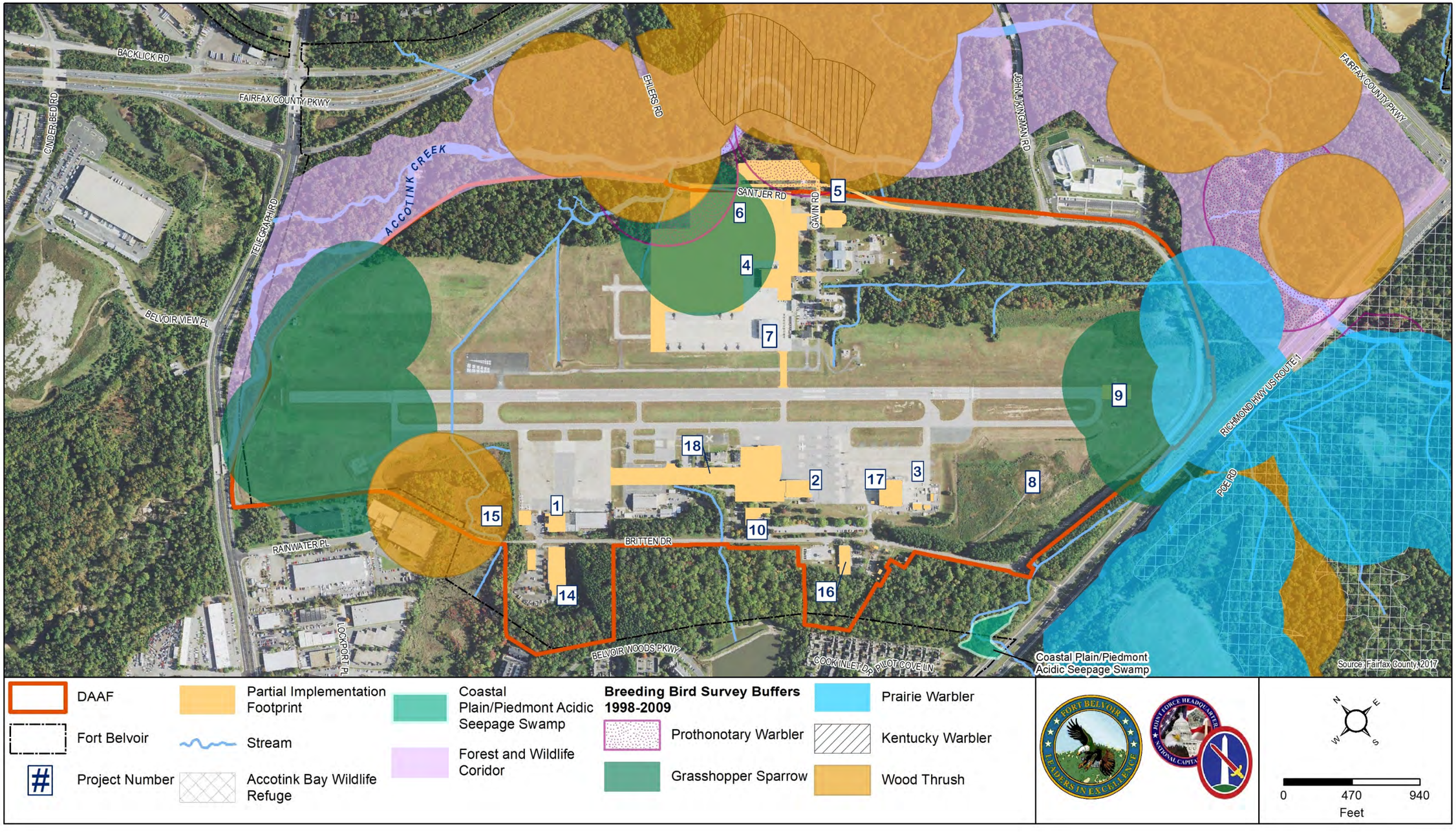
Figure 4.8-4: Special Natural Area Impacts – Partial Implementation Alternative



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4.8.3.5 Rare Ecological Communities and Special Natural Areas

None of the short-term ADP projects would be implemented near the Coastal Plain/Piedmont Acidic Seepage Swamp on the southern side of DAAF (**Figures 4.8-3** and **4.8-4**) and therefore, would have no potential to affect that resource.

Wildlife corridors provide a mechanism for the reduction or moderation of the adverse effects of habitat fragmentation by facilitating the dispersal of individuals between areas of remaining habitat. Disruptions of the interconnectivity of habitats adversely affects wildlife by reducing a species' ability to breed with individuals outside their family group, thereby compromising population sustainability, decreasing opportunities for long term genetic interchange, and limiting foraging range. None of the short-range ADP projects would encroach on the FWC or ABWR (**Figures 4.8-3** and **4.8-4**).

In the short term, **Projects 5, 6**, and **9** would temporarily disturb approximately 25 acres of BBMC buffers on DAAF and result in an estimated 18 acres of permanent encroachment (**Table 4.8-2**). **Project 6** would have substantially larger amounts of temporary and permanent impacts than **Projects 5** and **9** combined. Permanent impacts on BBMC buffers from these projects would represent 4.9 percent of BBMC habitat on DAAF but less than 1 percent of such habitat on Fort Belvoir.

Temporary disturbances resulting from the short-range ADP projects would be limited to that needed to implement the projects. Limits of disturbance for these projects would be delineated by temporary barriers, signage, and/or similar measures. As noted in **Section 4.8.3.3**, surveys would be conducted in and around BBMC buffers overlapping the project sites to determine the presence of BBMC, and applicable time of year restrictions would be adhered to as warranted to prevent or minimize impacts on BBMC. The projects would be implemented over an approximately 10-year period and disturbance of these areas would not occur simultaneously, thereby minimizing impacts.

Project 6 would permanently remove approximately 12.6 acres of grasshopper sparrow BBMC buffer on the north side of the airfield and would encroach to lesser degrees on habitat for the other BBMC species noted in **Section 4.8.3.3**. Encroachment on BBMC buffers from **Project 5** would be limited to relatively small areas of habitat for the grasshopper sparrow, wood thrush, and prothonotary warbler. **Project 9** would encroach on a small area of grasshopper sparrow BBMC buffer at the eastern end of the runway but would not affect habit for any other BBMC species.

Overall, **Projects 5**, **6**, and **9** would permanently encroach on a total of approximately 18.1 acres of BBMC buffers on DAAF. This would represent approximately 5 percent of all BBMC buffers on DAAF but less than 1 percent of BBMC buffers on Main Post (**Table 4.8-2**). While this would represent an adverse impact on these areas, it would remain below the threshold of significance defined in **Section 4.8.1**. The majority of such habitat on Fort Belvoir would remain intact. Fort Belvoir DPW-ED would review each of the proposed ADP projects prior to implementation to identify environmentally sensitive areas that could potentially be impacted and work with the project proponent to identify alternatives to avoid impacts or measures to minimize or mitigate potential impacts. Further, project proponents would implement or incorporate the following measures to minimize or prevent impacts on BBMC, as determined necessary through coordination with the Environmental Division of Fort Belvoir DPW:

- Surveys would be conducted on and/or near the project sites prior to implementing construction and demolition activities to determine the presence of BBMC.
- Project proponents would adhere to applicable time of year restrictions for BBMC as warranted.
- Project proponents would coordinate with DPW to identify and establish suitable areas of BBMC buffer on DAAF or Fort Belvoir to replace BBMC buffer on DAAF permanently lost from the implementation of the proposed projects.

As such, impacts from the short-range ADP projects on BBMC buffers would be less than significant under either Alternative.

4.8.4 Mid-Range and Long-Range ADP Projects – Full Implementation Alternative (Preferred Alternative)

4.8.4.1 Plant Communities

Short-term and long-term impacts on plant communities from the implementation of the mid-range and long-range ADP projects under the Full Implementation Alternative would be similar to those described for the short-range projects (**Section 4.8.3.1**). Collectively, construction activities associated with the mid- and long-range ADP projects would temporarily impact approximately 30 acres of plant communities on DAAF (**Table 4.8-3**). Approximately 11 acres of plant communities on DAAF would be impacted by these projects in the long-term. When considered with the short-range ADP projects (**Table 4.8-1**), the Full Implementation Alternative (Preferred Alternative) would permanently impact 11.4 acres of plant communities on DAAF, which would represent approximately 2.7 percent of plant communities on the airfield and approximately 0.1 percent of plant communities on Fort Belvoir.

Generally, the mid- and long-range ADP projects would be implemented in previously disturbed areas of the installation where vegetation consists of maintained grass and ornamental landscape vegetation (e.g., trees, shrubs). The removal of mature trees would be limited to those needed to accommodate the particular project. Areas of project sites not built on or otherwise developed would be replanted with native vegetation or otherwise returned to a permeable condition. Trees removed by the proposed projects would be replaced in accordance with Fort Belvoir's *Tree Removal and Protection Policy #27* (Fort Belvoir, 2015a). The distribution of the projects over approximately 30 years would minimize impacts on plant communities by ensuring that all impacts do not occur simultaneously.

Individually and collectively, short-term and long-term impacts on plant communities from the mid-range and long-range ADP projects would not meet or exceed the thresholds of significance defined for this resource (**Section 4.8.1**). Therefore, adverse impacts on plant communities on DAAF and Fort Belvoir would be less than significant.

Table 4.8-2: Estimated Temporary and Permanent BBMC Buffer Impacts (acres) – Short -Range ADP Projects (Full and Partial Implementation Alternatives)

Project No.	Project	Species												Total Permanent Impact on DAAF BBMC Buffers - All Species (acres)	Percent of DAAF BBMC Buffers Permanently Impacted – All Species	Percent of Main Post BBMC Buffers Permanently Impacted – All Species
		Grasshopper Sparrow				Prothonotary Warbler				Wood Thrush						
		Short-term / Temporary (acres)	Long-term / Permanent (acres)	Percent of DAAF Habitat Permanently Impacted	Percent of Main Post Habitat Permanently Impacted	Short-term / Temporary (acres)	Long-term / Permanent (acres)	Percent of DAAF Habitat Permanently Impacted	Percent of Main Post Habitat Permanently Impacted	Short-term / Temporary (acres)	Long-term / Permanent (acres)	Percent of DAAF Habitat Permanently Impacted	Percent of Main Post Habitat Permanently Impacted			
5	Realign Santjer Road and Gavin Road	0.8	0.2	0.2	0.2	1.5	0.4	0.6	0.1	0.5	0.2	0.1	0.01	0.8	0.2	0.02
6	Construct 12th AV BN 8-Bay Aircraft Maintenance Hangar	15.5	12.6	14.7	13.8	5.1	3.9	6.2	0.6	0.7	0.4	0.2	0.02	16.9	4.6	0.5
9	Construct Runway Safety Overrun	0.8	0.4	0.5	0.4	0	0	0	0	0	0	0	0	0.4	0.1	0.01
Total – Short-Range ADP Projects		**17.1**	**13.2**	**15.4**	**14.5**	**6.6**	**4.3**	**6.8**	**0.7**	**1.2**	**0.6**	**0.3**	**0.02**	**18.1**	**4.9**	**0.5**

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Table 4.8-3: Estimated Temporary and Permanent Plant Community Impacts from Mid- and Long-Range ADP Projects – Full Implementation Alternative (Preferred Alternative)

Plant Community	Temporary Impact (acres)	Permanent Impact (acres)	Percent of Plant Community on DAAF Permanently Impacted (Percent of All DAAF Plant Communities Permanently Impacted)	Percent of Plant Community on Fort Belvoir Permanently Impacted (Percent of All Fort Belvoir Plant Communities Permanently Impacted)
Mixed Pine-Hardwood Forest	1.3	0.8	1.5%	0.4%
Tulip Poplar Mesic-Mixed	0.6	0.0	N/A	N/A
Loblolly Pine Forest	2.1	1.8	5.0%	0.8%
Sub-total – Mid-Range ADP Projects[1, 2]	**4.0**	**2.6**	**(0.6%)**	**(<0.1%)**
Old Field Grassland	0.7	0.5	5.1%	0.2%
Mixed Pine-Hardwood Forest	9.5	3.5	6.6%	1.6%
Floodplain Hardwood Forest	2.3	0.5	0.6%	<0.1%
Beech Mesic-Mixed Oak Forest	0.8	0.2	1.1%	<0.1%
Loblolly Pine Forest	7.3	2.5	6.9%	1.0%
Tulip Poplar Mesic-Mixed Hardwood Forest	2.4	0.4	0.2	<0.1%
Non-Tidal Freshwater Marsh-Beaver Pond	0.8	0.1	0.9%	0.1%
Virginia Pine Forest	1.1	0.3	1.0%	0.1%
Oak Submesic-Ericad Forest	1.0	0.3	8.1%	<0.1%
Sub-total – Long-Range ADP Projects[3, 4]	**25.9**	**8.3**	**(2.0%)**	**(0.1%)**
Sub-total – Mid-Range and Long-Range ADP Projects	**29.9**	**10.9**	**(2.6%)**	**(0.1%)**
***Sub-total – Short-range ADP projects* (Table 4.8-1)**	***2.2***	***0.5***	***(0.12%)***	***(<0.1%)***
Total – Full Implementation Alternative (Preferred Alternative)	**32.1**	**11.4**	**(2.7%)**	**(0.1%)**

Notes:

1. **Projects 10**, **11**, **12**, **13**, **17**, and **18** would have temporary plant community impacts.
2. **Projects 10**, **12**, **and 18** would have permanent plant community impacts.
3. **Projects 19** through **24** would have temporary plant community impacts.
4. **Projects 19**, **20**, **21**, **23**, and **24** would have permanent plant community impacts.

4.8.4.2 Aquatic Macroinvertebrates and Fish

Short- and long-term impacts on macroinvertebrate and fish communities inhabiting Accotink Creek and downstream waterways from the implementation of the mid-range and long-range ADP projects under the Full Implementation Alternative would be similar to those described for the short-range projects in **Section 4.8.3.2**. There would be no direct adverse impacts on Accotink Creek, which is the main source of habitat on DAAF for aquatic macroinvertebrates and fish. Impacts on macroinvertebrate and fish habitat would remain below the two percent significance threshold defined in **Section 4.8.1** and thus, would remain less than significant.

4.8.4.3 Wildlife

Projects 12, **18**, **20**, and **22** would be implemented in developed, previously disturbed areas of the airfield that contain little or no suitable wildlife habitat; **Project 16** would consist of interior modernization only; **Project 17** would consist of unit relocation and interior modernization; and **Project 23** would be implemented adjacent to existing roads on DAAF and require minimal clearing of vegetation that would primarily be limited to areas of maintained lawn and/or ornamental vegetation. Thus, these projects would have no or minimal potential to disturb, displace, or inadvertently destroy individual animals of common wildlife species in the short or long term.

Short-term impacts from construction- and demolition-related activities associated with **Projects 11**, **13**, **14**, **15**, **19**, **21**, **23**, and **24** would be similar to those described for the short-range ADP projects (**Section 4.8.3.3**). These activities would have the potential to disturb, displace and, in some cases, inadvertently destroy individual animals of common wildlife species. Most individuals would relocate a safe distance from the project sites to areas of similar habitat on or around DAAF. While these effects would be adverse, they would occur at the individual rather than population or species level and would not inhibit or prevent the continued propagation of any species. Not all disturbance would occur simultaneously because the proposed projects would be implemented over a period of approximately 20 years, further minimizing impacts.

Projects 11, **13**, and **23** would temporarily and/or permanently encroach on portions of BBMC buffers on the northwestern, northeastern, and southeastern sides of DAAF providing habitat for the grasshopper sparrow, prothonotary warbler, and wood thrush (**Figure 4.8-3**) (see **Section 4.8.4.5** for additional discussion of impacts on BBMC buffers). Individual birds of these species would likely be alerted by increased human presence and activity and would relocate a safe distance from the project sites to other areas on or near DAAF providing suitable habitat. As such, most or all impacts on individual BBMC would be minimized or avoided. The preparation of species surveys and adherence to applicable time of year restrictions as warranted would ensure that construction- and demolition-related impacts on BBMC remain at the individual rather than population or species level and would not inhibit or prevent the continued propagation of these species. Projects with the potential to disturb migratory birds or their habitat would adhere to the requirements of Fort Belvoir Policy Memorandum #78, *Conservation of Migratory Birds*. As described above for common wildlife species, short-term impacts on BBMC would be further minimized by the implementation of the proposed projects over an approximately 20-year period.

In the long term, individual animals of common wildlife species and BBMC would return to areas of DAAF providing suitable habitat once construction and demolition activities have been completed. Overall, the area of existing habitat potentially available to wildlife on DAAF that would be removed by the proposed projects would be small in the context of all available habitat on DAAF, Fort Belvoir, and in surrounding areas of Fairfax County. Although a small area of BBMC buffer for grasshopper sparrow and smaller areas of such habitat for prothonotary warbler, Kentucky warbler, and wood thrush would be permanently removed by the projects, other areas of suitable habitat for those species would remain elsewhere on DAAF and the installation. The proposed ADP projects would have no potential to inhibit or prevent the continued propagation of common wildlife species.

For the reasons described above, short-term and long-term impacts on wildlife resulting from the mid- and long-range ADP projects under the Full Implementation Alternative would remain less than significant.

4.8.4.4 Rare, Threatened, and Endangered Species and Their Habitats

As described in **Section 4.8.3.4** and for similar reasons, it is anticipated that mid-range and long-range ADP projects under the Full Implementation Alternative would have no potential to adversely affect rare, threatened, and endangered species occurring or potentially occurring at DAAF. Prior to implementation, each project would be reviewed by Fort Belvoir DPW-ED, which would request the preparation of site-specific species and/or habitat surveys if potential impacts on rare, threatened, and endangered species and their habitats are identified. Applicable measures to avoid, relocate, or minimize adverse effects on the species or habitat would be incorporated into project planning in consultation with the USFWS or NOAA Fisheries.

The Army has determined that the Proposed Action is *not likely to adversely affect* federally listed species. A copy of the Army's ESA Section 7 Self-Certification package is provided in **Appendix A**. As noted in **Section 4.8.3.4**, additional Section 7 consultation will be conducted as planning, design, and implementation of the individual proposed projects continues to determine their potential effects on federally listed species.

4.8.4.5 Rare Ecological Communities and Special Natural Areas

The eastern segment of **Project 24** near its proposed intersection with Britten Drive would be implemented near the Coastal Plain/Piedmont Acidic Seepage Swamp (**Figure 4.8-3**). This project would be designed to avoid impacts on this resource; adherence to applicable E&SC and stormwater management BMPs would also prevent temporary impacts during construction.

None of the mid- and long-range ADP projects under the Full Implementation Alternative would encroach on the ABWR; **Project 19** would temporarily impact approximately 2.8 acres of the FWC and permanently encroach on less than one acre of that area (**Figure 4.8-3**). This would represent less than 0.01 percent of the FWC on the installation and remain below the two percent threshold of significance.

Mid-range and long-range ADP projects would temporarily encroach on a total of 17.4 acres of BBMC buffer on DAAF (**Table 4.8-2**). Measures to minimize temporary impacts on BBMC buffers during the

mid- and long-range ADP projects would be similar to those described for the short-range ADP projects (**Section 4.8.3.5**). Fort Belvoir DPW-ED would review each of the proposed ADP projects prior to implementation to identify environmentally sensitive areas that could potentially be impacted and work with the project proponent to identify alternatives to avoid impacts or measures to minimize or mitigate potential impacts. The implementation of the projects over approximately 20 years would ensure that all construction- and demolition-related disturbance does not occur simultaneously, further minimizing impacts.

In the long term, the mid- and long-range ADP projects under the Full Implementation Alternative would permanently encroach on 2.2 acres and 1.1 acres of BBMC buffer, respectively, for a total of 3.3 acres of permanent encroachment (**Table 4.8-4**). When combined with the short-range ADP projects (**Section 4.8.3.3**), the mid- and long-range ADP projects would permanently impact approximately 21.4 acres of BBMC buffer on DAAF under the Full Implementation Alternative. While this would be an adverse impact, it would represent an estimated 0.6 percent of BBMC buffer on Main Post as a whole and would remain below the two percent threshold of significance defined in **Section 4.8.1**. Thus, permanent impacts on BBMC buffers from the mid- and short-range ADP projects and the Full Implementation Alternative in its entirety would be less than significant. Further, project proponents would implement minimization measures to reduce or avoid impacts on BBMC to the greatest extent practicable (**Section 4.8.3.5**).

4.8.5 Mid-Range ADP Projects – Partial Implementation Alternative

4.8.5.1 Plant Communities

Short-term and long-term impacts on plant communities resulting from mid-range ADP projects under the Partial Implementation Alternative would be similar to those described for the short-range projects (**Section 4.8.3.1**). Impacts from the mid-range ADP projects under this alternative would be less substantial as fewer mid-range and no long-range projects would be implemented (**Figure 4.8-2**). Mid-range ADP projects under the Partial Implementation Alternative would temporarily impact approximately 3.1 acres of plant communities on DAAF (**Table 4.8-5**). In the long term, these projects would permanently impact approximately 2.4 acres of DAAF plant communities. When considered with the short-range ADP projects, the Partial Implementation Alternative would permanently impact approximately 2.9 acres of plant communities on DAAF, which would represent approximately 0.7 percent of plant communities on the airfield and less than 0.1 percent of plant communities on Fort Belvoir.

Table 4.8-4: Estimated Temporary and Permanent BBMC Buffer Impacts (acres) – Mid- and Long-Range Projects – Full Implementation Alternative (Preferred Alternative)

Project No.	Project	Species												Total Permanent Impact on DAAF BBMC Buffers - All Species (acres)	Percent of DAAF BBMC Buffers Permanently Impacted – All Species	Percent of Main Post BBMC Buffers Permanently Impacted – All Species
		Grasshopper Sparrow				Prothonotary Warbler				Wood Thrush						
		Short-term / Temporary (acres)	Long-term / Permanent (acres)	Percent of DAAF Habitat Permanently Impacted	Percent of Main Post Habitat Permanently Impacted	Short-term / Temporary (acres)	Long-term / Permanent (acres)	Percent of DAAF Habitat Permanently Impacted	Percent of Main Post Habitat Permanently Impacted	Short-term / Temporary (acres)	Long-term / Permanent (acres)	Percent of DAAF Habitat Permanently Impacted	Percent of Main Post Habitat Permanently Impacted			
Mid-Range ADP Projects																
11	Construct 12th AV BN 10-Bay Storage Hangar	2.8	1.0	1.2	1.1	0.3	0.01	0.0[1]	0.0[1]	0	0	0	0	1.01	0.3	0.03
13	Construct 12th AV BN Aircraft Paint Shop	1.4	0.5	0.6	0.5	1.4	0.5	0.8	0.1	0.5	0.2	0.1	0.01	1.2	0.3	0.03
Sub-Total – Mid-Range ADP Projects		**4.2**	**1.5**	**1.8**	**1.6**	**1.7**	**0.51**	**0.8**	**0.1**	**0.5**	**0.2**	**0.1**	**0.01**	**2.2**	**0.6**	**0.06**
Long-Range ADP Project																
23	Construct Perimeter Road Multi-Purpose Trail	5.3	0.3	0.4	0.3	2.0	0.3	0.5	0	1.9	0.3	0.2	0.01	1.1	0.3	0.03
Sub-Total – Mid-Range + Long-Range ADP Projects		**9.5**	**1.8**	**2.1**	**2.0**	**3.7**	**0.8**	**1.3**	**0.1**	**2.4**	**0.5**	**0.3**	**0.02**	**3.3**	**0.9**	**0.09**
Sub-Total – Short-Range ADP Projects (Table 4.8-2)		***17.1***	***13.2***	***15.4***	***14.5***	***6.6***	***4.3***	***6.8***	***0.7***	***1.2***	***0.6***	***0.3***	***0.02***	***18.1***	***4.9***	***0.5***
Total – Full Implementation Alternative (Preferred Alternative) (Short-, Mid-, and Long-Range ADP Projects)		**26.6**	**15.0**	**17.5**	**16.4**	**10.3**	**5.1**	**8.1**	**0.8**	**3.6**	**1.1**	**0.6**	**0.05**	**21.4**	**5.8**	**0.6**

Note:

1. Impact would be less than 0.01%.

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Table 4.8-5: Estimated Temporary and Permanent Plant Community Impacts from Mid-Range ADP Projects (Partial Implementation Alternative)

Plant Community	Temporary Impact (acres)	Permanent Impact (acres)	Permanent Impact as a Percentage of Plant Community on DAAF (percentage of all DAAF vegetation communities)	Permanent Impact as a Percentage of Plant Community on Fort Belvoir (percentage of all Fort Belvoir vegetation communities)
Mixed Pine-Hardwood Forest	0.7	0.6	1.1%	0.3%
Tulip Poplar Mesic-Mixed Hardwood Forest	2.1	0	N/A	N/A
Loblolly Pine	0.3	1.8	5.0%	0.8%
Sub-total – Mid-Range ADP Projects[1, 2]	**3.1**	**2.4**	**(0.6%)**	**(<0.1%)**
***Sub-total – Short-range ADP projects* (Table 4.8-1)**	***2.2***	***0.5***	***(0.12%)***	***(<0.1%)***
Total – Partial Implementation Alternative	**5.3**	**2.9**	**(0.7%)**	**(<0.1%)**

Notes:
1. **Projects 10**, **17**, and **18** would have temporary plant community impacts.
2. **Projects 10** and **18** would have permanent plant community impacts.

Generally, the mid-range ADP projects would be implemented in previously disturbed areas of the installation where vegetation consists of maintained grass and ornamental landscape vegetation (e.g., trees, shrubs). The removal of mature trees would be limited to those needed to accommodate the particular project. Areas of project sites not built on or otherwise developed would be replanted with native vegetation or otherwise returned to a permeable condition. Trees removed by the proposed projects would be replaced in accordance with Fort Belvoir's *Tree Removal and Protection Policy #27* (Fort Belvoir, 2015a). The distribution of the projects over approximately 20 years would minimize impacts on plant communities by ensuring that all impacts do not occur simultaneously.

Individually and collectively, impacts from mid-range ADP projects under this Alternative would not meet or exceed the threshold of significance defined for plant communities (**Section 4.8.1**). Therefore, short-term and long-term impacts on plant communities and forest resources at DAAF resulting from mid-range ADP projects in the Partial Implementation Alternative would be less than significant.

4.8.5.2 Aquatic Macroinvertebrates and Fish

Short-term and long-term impacts on macroinvertebrate and fish communities resulting from mid-range ADP projects under the Partial Implementation Alternative would be similar to those described for the short-range projects (**Section 4.8.3.2**). There would be no direct adverse impacts on Accotink Creek, which is the main source of habitat on DAAF for aquatic macroinvertebrates and fish. Impacts from the

mid-range ADP projects under this alternative would be less intense as fewer projects would be implemented. Implementation of the mid-range projects over 10 years would further minimize impacts. Impacts from mid-range ADP projects under the alternative would not meet or exceed thresholds of significance for aquatic macroinvertebrates and fish described in **Section 4.8.1**. For these reasons, short-term and long-term impacts on aquatic macroinvertebrates and fish at DAAF resulting from mid-range projects under the Partial Implementation Alternative would be less than significant.

4.8.5.3 Wildlife

Projects 10 and **14** through **18** would be implemented in intensively developed, previously disturbed areas of DAAF that provide little or no suitable wildlife habitat and thus, would have no or minimal potential to disturb, displace, or inadvertently destroy individual animals of common wildlife species in the short or long term. Individual animals displaced by construction and/or demolition activities would relocate to other areas of suitable habitat on or near DAAF and would potentially return to areas of suitable habitat on the project sites, if available, following the completion of those activities. None of the proposed projects would inhibit or prevent the continued propagation of any species. implementation of the proposed projects over a period of approximately 10 years would further minimize impacts.

Therefore, short-term and long-term impacts on wildlife from mid-range ADP projects under the Partial Implementation Alternative would be less than significant.

4.8.5.4 Rare, Threatened, and Endangered Species and Their Habitats

Effects on rare, threatened, and endangered species occurring or potentially occurring at DAAF resulting from mid-range ADP projects under the Partial Implementation Alternative would be similar to those described for the short-range projects (**Section 4.8.3.4**). Prior to implementation, each project would be reviewed by Fort Belvoir DPW-ED, which would request the preparation of site-specific species and/or habitat surveys if potential impacts on rare, threatened, and endangered species and their habitats are identified. If determined necessary based on the survey results, applicable avoidance, relocation, or mitigation measures would be incorporated into project plans in consultation with USFWS or NOAA Fisheries to ensure effects on such species and/or their habitat occurring on or near the project sites would be non-adverse. For these reasons, effects on rare, threatened, and endangered species resulting from mid-range projects under the Partial Implementation Alternative would not meet or exceed thresholds of significance described in **Section 4.8.1** and thus, would not be significant.

The Army has determined that the Proposed Action is *not likely to adversely affect* federally listed species. A copy of the Army's ESA Section 7 Self-Certification package is provided in **Appendix A**. As noted in **Sections 4.8.3.4** and **4.8.4.4**, additional Section 7 consultation will be conducted as planning, design, and implementation of the individual proposed projects continues to determine their potential effects on federally listed species.

4.8.5.5 Rare Ecological Communities and Special Natural Areas

Mid-range ADP projects under the Partial Implementation Alternative would have no impacts on rare ecological communities or special natural areas at DAAF or Fort Belvoir because none of the projects would temporarily or permanently encroach on the Coastal Plain/Acidic Seepage Swamp or FWC, ABWR, or BBMC buffers (**Figure 4.8-4**). No minimization or mitigation measures would be necessary.

Short-range ADP projects under the Partial Implementation Alternative would permanently encroach on approximately 18 acres of BBMC buffer on DAAF (**Section 4.8.3.5**). While this would be an adverse effect, it would represent approximately 0.5 percent of BBMC buffer on Fort Belvoir and remain below the two percent significance threshold defined in **Section 4.8.1**. Fort Belvoir DPW-ED would review each of the proposed ADP projects prior to implementation to identify environmentally sensitive areas that could potentially be impacted and work with the project proponent to identify alternatives to avoid impacts or measures to minimize or mitigate potential impacts.

As such, short-term and long-term impacts on BBMC buffer on Fort Belvoir from the Partial Implementation Alternative as a whole, would be less than significant. Project proponents would implement minimization measures to reduce or avoid impacts on BBMC to the greatest extent practicable (**Section 4.8.3.5**).

4.9 Health and Safety

4.9.1 Thresholds of Significance

The criteria used to determine potential for a significant adverse impact on human and environmental health includes any work or operational activity carried out in non-compliance with applicable OSH regulations.

4.9.2 No Action Alternative

Under the No Action Alternative, none of the proposed ADP projects would be implemented. Current built environment conditions (i.e., existing buildings, facilities, roads, etc.) at DAAF would continue and there would be no additional safety and health risks associated with the planned construction, demolition, and operational activities. All military and civilian personnel on DAAF would continue to be subject to OSH regulations pertaining to workplace safety.

4.9.3 Short-Range ADP Projects – Full Implementation Alternative (Preferred Alternative) and Partial Implementation Alternative

The short-range ADP projects under the Full and Partial Implementation Alternatives would increase health and safety risk for workers, personnel, and visitors on and in vicinity of DAAF. These risks would extend to the Washington, DC metropolitan area for work-related travel or job duties that occur regionally, beyond DAAF itself.

Human and environmental health impacts under the Alternatives include the potential for a physical injury or fatality, or an exposure to a hazardous substance, to occur during construction, demolition, and operational activities. Risks may be associated with the construction of a new building or demolition of an antiquated building containing a hazardous substance such as ACM or LBP.

To comply with applicable health and safety regulations, all short-range ADP projects would require the preparation of a site-specific health and safety plan. The health and safety plans would contain guidance and direction to prevent or minimize potential risks associated with each project site. These plans would include, at a minimum, emergency response and evacuation procedures; operational manuals; PPE recommendations (e.g., breathing and hearing protection); protocols and procedures for handling, storing, and disposing of hazardous materials and wastes; information on the effects and symptoms of potential exposures; and guidance with respect to hazard identification. The responsible party would also be required to submit each health and safety plan to Fort Belvoir for review and approval, and for educating workers onsite through daily briefings.

Facility modernization and demolition under the Alternatives would involve several structures known to contain ACM and/or LBP (**Section 3.10.6**). Specifically, **Projects 2, 3, 4, 5,** and **6** would modernize or demolish facilities that contain one or both of these substances. Prior to these activities, surveys for ACM and/or LBP would be conducted by a qualified contractor to determine measures to safely manage these substances. These measures would be developed to comply with all applicable laws and regulations pertaining to ACM and LBP disturbance, handling, removal, and disposal to include appropriate steps to avoid generating airborne particulates. Workers responsible for carrying out the Alternatives would be trained to identify and address ACM- and LBP-related risks and would don proper PPE to further reduce the potential for exposure.

Under the Alternatives, workers would also be at risk of exposure to soils containing various types of petroleum constituents (**Section 3.10.7**). Such an exposure could occur directly through contact with the contaminated media or indirectly via inhalation or ingestion of airborne PM. If not properly managed, soils and PM could also present a risk to other human receptors in vicinity of a project site. More specifically, **Project 6** would demolish a facility within an area previously used to store POL waste. As described in **Section 3.10.7**, soils associated with this site, currently under concrete cover, contain concentrations of VOC and SVOC in exceedance of industrial risk screening criteria (Fort Belvoir, 2015a). To address these concerns, an Activity Hazard Analysis (AHA) would be conducted under the Alternatives in accordance with Army and Fort Belvoir regulations to evaluate this hazard. The AHA would identify potential exposure risks specific to the site and, if necessary, recommend engineering and administrative controls to protect human and environmental health. All onsite workers involved in this project would comply with the PPE recommendations, as specified in and required by the AHA. The responsible party would also be required to submit the AHA to Fort Belvoir for review and approval, and for educating workers onsite through daily briefings.

Under the Alternatives, to minimize risk of exposure to the contaminated media, all workers handling soils would be required to take appropriate precautions to ensure safety. Such precautions would include procedural training to avoid contact with contaminants during any ground disturbance activities, as well as to prevent the spread of contamination offsite. All workers at risk of potential exposure would

don protective clothing and wear respirators equipped with filters that remove dust and contaminants from the air. Clothing and equipment would subsequently be washed and disposed of at the project site. Vehicle tires and exteriors would also be washed onsite before each departure. As necessary, workers would conduct air monitoring to ensure dust and contaminant vapors do not pose a breathing risk or suppress airborne contaminants by other means, on or around the project site. Any excavated soils associated with **Project 6** would be covered and stored prior to disposal to prevent airborne dust or contaminant transport offsite via surface water runoff. By adhering to site-specific safety requirements, potential exposure risks to workers would be sufficiently managed. Additionally, the project site would be fenced, and signage posted to further reduce safety risks to personnel or visitors. Once completed, the area would be backfilled with clean soil, as necessary, and paved over under the Alternatives.

New facilities and infrastructure developed under the Alternatives would meet current, applicable regulatory compliance standards. For example, new petroleum storage and hazardous waste facilities would comply with standards pertaining to construction materials, leak protection, monitoring, and spill containment. Further, all hazardous and petroleum wastes generated from the Alternatives would be handled, stored, and disposed of in accordance with Fort Belvoir's RCRA permit. Overall, compliance with current regulatory standards and management plans would ensure safety and health precautions remain in place during the operation of the Alternatives.

Under the Alternatives, the construction, demolition, and operation of the short-range ADP projects would comply with all applicable health and safety requirements. This would eliminate and reduce the potential for adverse impacts on human and environmental health to occur under the Alternatives. Because the short-range ADP projects would be located on an active military installation with controlled access, public safety risks would be negligible. Site-specific health and safety plans and procedures would sufficiently manage risk unique to each project site. As such, potential adverse impacts on human and environmental health would be less than significant.

4.9.4 Mid- and Long-Range ADP Projects – Full Implementation Alternative (Preferred Alternative)

The mid- and long-range ADP projects under the Full Implementation Alternative would increase health and safety risks to workers, personnel, and visitors on and in vicinity of DAAF. These risks would extend to the Washington, DC metropolitan area for work-related travel or job duties that occur regionally, beyond DAAF itself.

Facility modernization and demolition under this Alternative would involve several structures known to contain ACM and/or LBP (**Section 3.10.7**). **Projects 11, 12, 16, 17, 20, 21,** and **22** would modernize or demolish facilities that contain one or both of these substances. The measures described in **Section 4.9.3** would eliminate and minimize the potential for ACM or LBP exposure under this Alternative.

Under this Alternative, **Projects 19** and **23** would occur within an area known to contain MCs and/or MEC. The area of concern is mostly undeveloped and consists of approximately 110 acres between Santjer Road and Fairfax County Parkway. As described in **Section 3.10.7**, LUCs are in place to manage

potential human and environmental health impacts that may result from development of the site. Accordingly, the construction of **Projects 19** and **23** would be subject to the applicable LUCs.

There are no land use restrictions that would preclude the construction and operation of **Projects 19** and **23**. However, MCs and MEC documented to occur onsite would require specific health and safety actions and controls prior to and during construction of this project. Soil testing and geotechnical survey to determine the full extent and location of both contaminants and explosives would be required before development of these sites. Site preparation may also require the removal of MEC by a qualified EOD team or the oversight of ground-disturbing construction activities by one or more certified EOD safety technicians. In addition to the measures described in **Section 4.9.3** (i.e., construction site safety and exposure to hazardous substances), health and safety for these projects would also be regulated through Fort Belvoir's excavation permit process as part of its design review. Additionally, the safety notification buffer to include fencing and signage around the area of concern would continue to be enforced during and post-construction of **Projects 19** and **23**, respectively.

Under this Alternative, the construction, demolition, and operation of the mid- and long-range ADP projects would comply with all applicable health and safety requirements. This would eliminate and reduce the potential for adverse impacts on human and environmental health under this Alternative. Because the mid- and long-range ADP projects would be located on an active military installation with controlled access, public safety risks would be negligible. Site-specific health and safety plans and procedures would sufficiently manage risk unique to each project site. As such, potential adverse impacts on human and environmental health would be less than significant.

4.9.5 Mid-Range ADP Projects – Partial Implementation Alternative

The mid-range ADP projects under the Partial Implementation Alternative would increase health and safety risks to workers, personnel, and visitors on and in vicinity of DAAF. These risks would extend to the Washington DC metropolitan area for work-related travel or job duties that occur regionally, beyond DAAF itself.

Facility modernization and demolition under this Alternative would involve several structures known to contain ACM and/or LBP (**Section 3.10.6**). **Projects 10, 16,** and **17** would modernize or demolish facilities that contain one or both of these substances. However, the measures described in **Section 4.9.3** would eliminate and minimize the potential for ACM or LBP exposure under this Alternative.

Under this Alternative, the construction, demolition, and operation of the mid-range ADP projects would comply with all applicable health and safety requirements. This would eliminate and reduce the potential for adverse impacts on human and environmental health under this Alternative. Because the mid-range ADP projects would be located on an active military installation with controlled access, public safety risks would be negligible. Site-specific health and safety plans and procedures would sufficiently manage risk unique to each project site. As such, potential adverse impacts on human and environmental health would be less than significant.

4.10 Hazardous Materials and Waste

4.10.1 Thresholds of Significance

This section addresses impacts involving hazardous substances potentially resulting from the No Action, Full Implementation, and Partial Implementation Alternatives. Hazardous materials existing conditions are discussed in **Section 3.10**.

The criteria used to determine the potential for a significant adverse impact on hazardous materials and waste include:

- If the alternative would cause an increase in the amount of hazardous substances used, stored, or requiring disposal at DAAF.
- If the alternative would increase the risk of soil or groundwater contamination by hazardous substances; if it interrupted, delayed, or impeded any ongoing cleanup efforts; or if it would create new or substantial human or environmental health risks.

4.10.2 No Action Alternative

Under the No Action Alternative, hazardous materials and hazardous wastes would continue to be used, handled, stored, and disposed of at DAAF in accordance with existing procedures, practices, and applicable regulations as they currently are. AFFF meeting the current MILSPEC would continue to be used at DAAF and no new sources of PFOS or PFOA would be introduced. No releases of PFOS or PFOA to groundwater or surface water would occur. Pesticides would continue to be applied on the airfield as necessary by licensed applicators in accordance with established procedures and regulations. This would have no impacts on hazardous materials, hazardous wastes, PFOS and PFOA, or pesticides at DAAF.

Several facilities known or suspected to contain ACM and LBP (**Sections 3.10.6.1** and **3.10.6.2**) would not be modernized and/or demolished under the No Action Alternative as they would be under the Full and/or Partial Implementation Alternatives. ACM and LBP would continue to be managed in these facilities as they currently are and would be removed and disposed of in accordance with established procedures and applicable regulatory requirements when work with potential to disturb those substances is conducted. However, the opportunity to permanently remove ACM and LBP from as many as 27 facilities at DAAF would not be realized under the No Action Alternative. This would represent a minor adverse impact on the management of ACM and LBP at DAAF in the long term.

Radon has not been identified as a concern at DAAF; as such, the No Action Alternative would have no effect on this condition at the airfield.

SWMUs would continue to be managed as they currently are at DAAF. There would be no effects on SWMUs at DAAF under the No Action Alternative.

The No Action Alternative would have no impacts on hazardous materials, hazardous wastes, pesticides, radon, or SWMUs at DAAF. Because no facilities with documented or suspected ACM or LBP would be modernized or demolished, the No Action Alternative would have a minor adverse impact on the management of those substances at DAAF in the long term.

4.10.3 Short-Range ADP Projects – Full Implementation Alternative (Preferred Alternative) and Partial Implementation Alternative

4.10.3.1 Hazardous Materials

The storage and use of some hazardous substances such as oils, lubricants, paints, or similar products would be required on the project sites during construction, modernization, and demolition activities associated with the short-range ADP projects (**Figure 4.10-1**). Quantities would be limited to those required for the projects and construction contractors would manage them in accordance with applicable federal, state, Army, and Fort Belvoir regulations and procedures. Appropriate BMPs would be used to prevent pollutants from migrating to soil, groundwater, or surface water. Contractors would be required to perform daily inspections of equipment, maintain appropriate spill-containment materials onsite, and store all fuels and other materials in appropriate containers. Equipment maintenance activities would not be conducted on the project sites.

Projects 5 through **9** would likely involve soil disturbance during site preparation and grading activities. Soils with concentrations of contaminants exceeding applicable regulatory criteria would be categorized as hazardous waste and transported by licensed contractors to a permitted off-post disposal facility. Soils characterized as non-hazardous would be transported off the installation for disposal at a suitable location.

All or components of **Projects 1, 2, 3, 4,** and **6** are on or adjacent to current or former SWMUs at DAAF (**Figures 4.10-1** and **4.10-2**). The SWMUs near **Projects 1** through **4** have all received administrative closure or NFA letters, indicating no limitations or restrictions on uses at these sites; therefore, it is anticipated that soils with concentrations of hazardous substances exceeding regulatory thresholds would not be encountered during construction of these projects.

Project 6 includes the demolition of Buildings 3140 and 3233 which are associated with SWMU Sites N-20 and Building 3233, respectively (**Table 3.10-4**; **Figure 3.10-1**). For the reasons discussed in **Section 3.10.7**, it is unlikely that contaminated soils would be encountered at Building 3233; however, soil disturbance and excavation would be conducted at Buildings 3233 and 3140 in accordance with the requirements of applicable LUCs. Any contaminated soils encountered at that site would be characterized, handled, reused, or disposed of as described above.

The staggered implementation of the short-range ADP projects over approximately 10 years would minimize the quantities of project-related hazardous materials present at DAAF at any given time during that period, thereby minimizing their impacts. Therefore, there would be no or minor construction-related hazardous materials impacts from the short-range ADP projects.

Figure 4.10-1: Hazardous Materials and Waste – Full Implementation Alternative (Preferred Alternative)

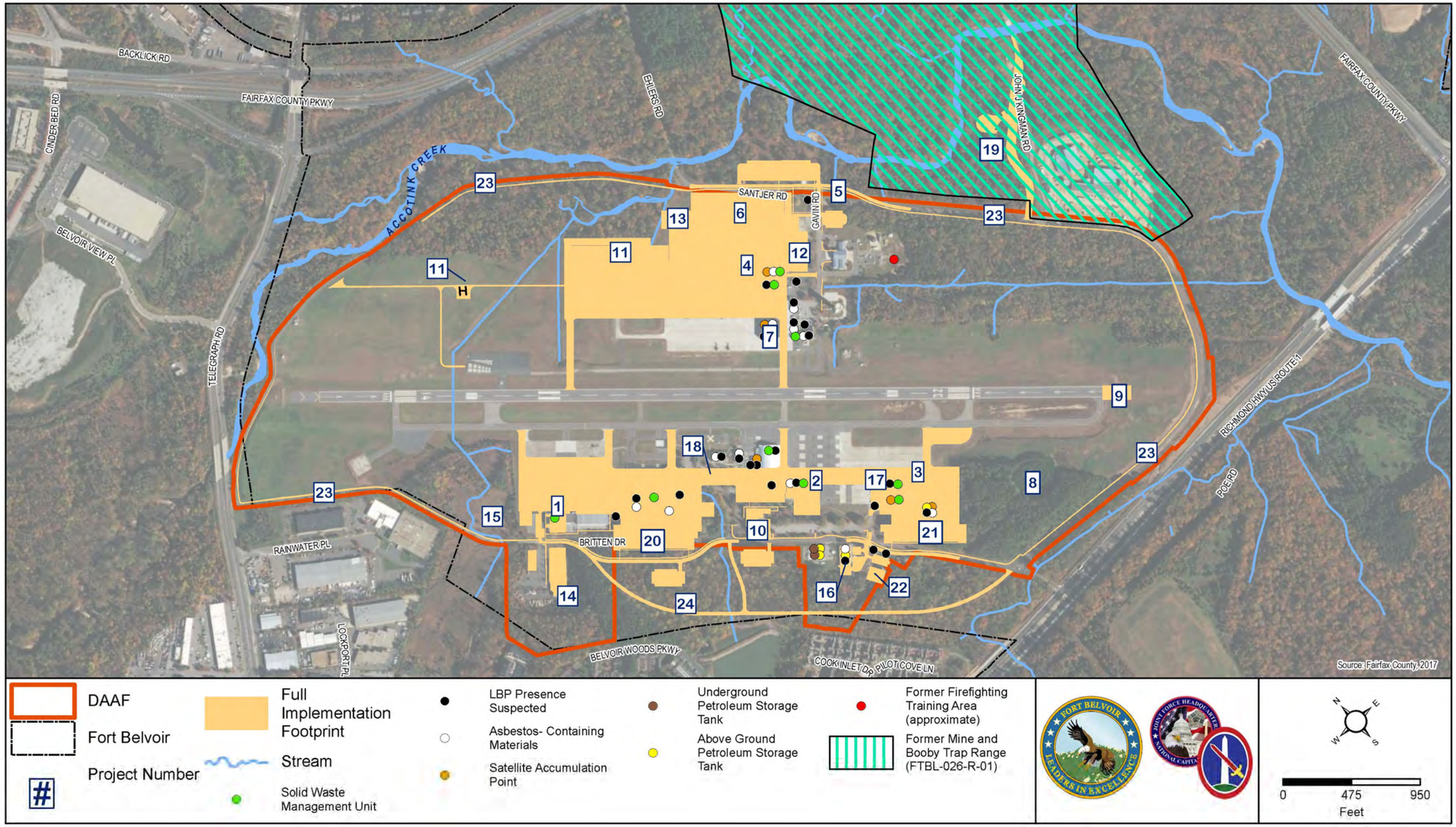

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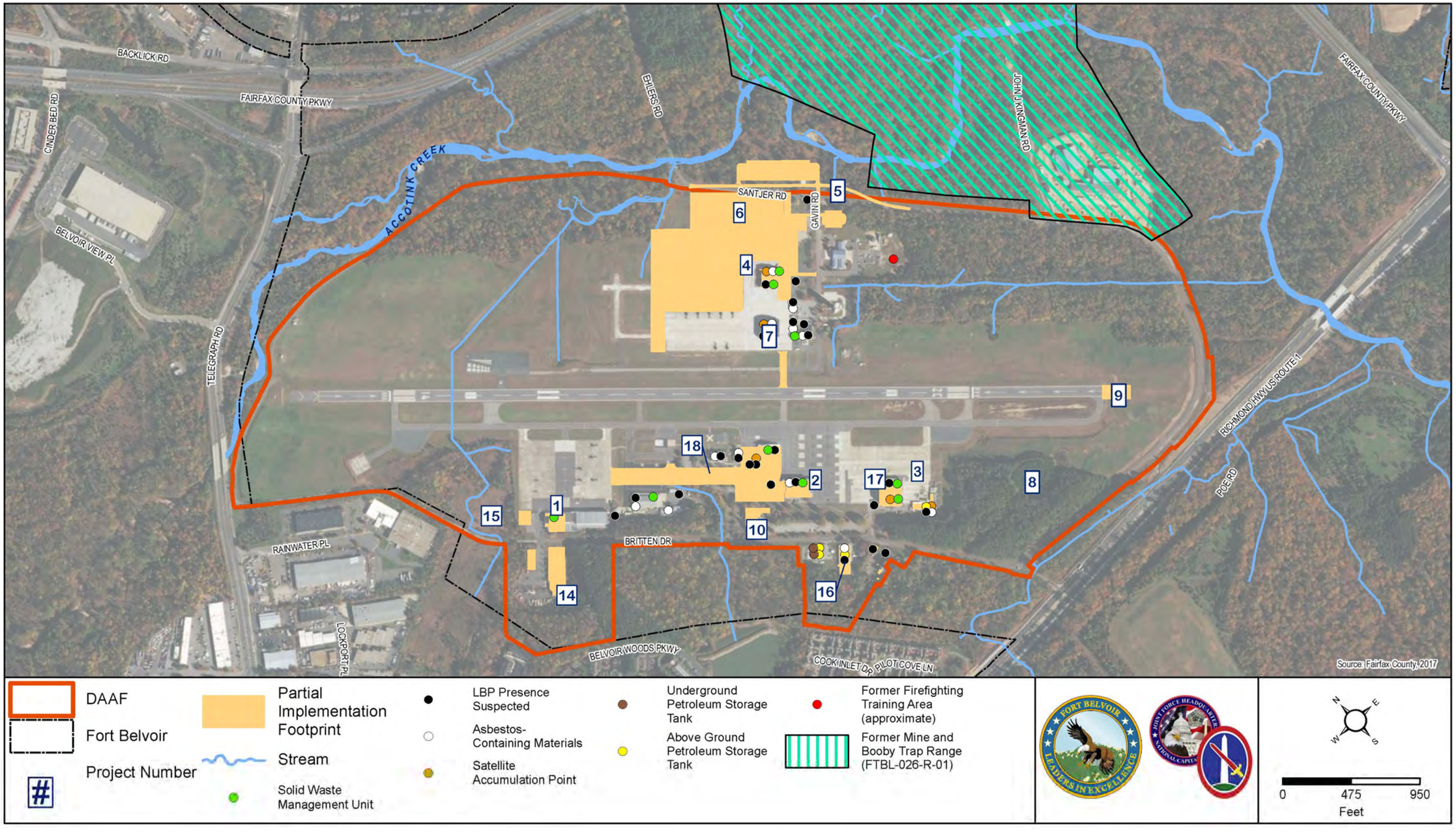
Figure 4.10-2: Hazardous Materials and Waste – Partial Implementation Alternative



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There would be no change or increase in the type of hazardous materials stored and used at DAAF following the implementation of the short-range ADP projects. None of the short-range ADP projects would introduce new hazardous materials not currently in use at DAAF. Hazardous materials would continue to be used and stored at DAAF in accordance with applicable federal and Army regulatory requirements. As applicable, the airfield's Major Industrial Stormwater Permit and accompanying SWPPP would be updated to reflect the locations of hazardous material storage areas in the new, modernized, and/or expanded facilities. For these reasons, the short-range ADP projects would have no adverse long-term hazardous materials impacts at DAAF under the Full or Partial Implementation Alternatives.

Modernization of the OSA-A/OSACOM hangar under **Project 2** and 12th AV BN hangars under **Projects 3** and **4** would provide the opportunity to improve or upgrade hazardous material storage areas in those facilities. Consolidation of the 12th AV BN's B and D Companies to a single hangar facility under **Project 6** would also consolidate to a single location the hazardous materials used, handled, and stored by those units. These projects would have beneficial hazardous materials impacts at DAAF in the long term.

For these reasons, short-range ADP projects under the Full or Partial Implementation Alternatives would have no or minor construction-related hazardous materials impacts, with no adverse and some beneficial hazardous materials impacts during the operational phase.

4.10.3.2 Hazardous Wastes

Quantities of hazardous waste may be produced at construction sites as the short-range ADP projects are being implemented under either alternative. Contractors would manage such waste in accordance with federal, state, Army, and Fort Belvoir requirements. Project-related hazardous waste would be segregated from non-hazardous waste, stored in appropriate containers, and transported by licensed contractors for disposal at a permitted off-post facility. Staggered implementation of the short-range ADP projects over a period of approximately 10 years would minimize the quantity of project-related hazardous waste being generated and disposed of at any particular time during that period and would not exceed the capacity of Fort Belvoir or the contractors to manage it, thereby minimizing impacts. For these reasons, construction-related hazardous waste impacts would be minor.

Once operational, the short-range ADP projects would not increase the quantity or change the types of hazardous waste generated at DAAF. No new types of hazardous waste would be generated by the proposed projects. The quantities and types of hazardous waste generated at the airfield would remain within Fort Belvoir's capacity to manage such waste. The airfield's Major Industrial Stormwater Permit would be updated as applicable to reflect the locations of SAAs in the new, modernized, and/or expanded facilities. Hazardous waste generated by the proposed projects would continue to be managed, handled, and disposed of in accordance with established federal, state, Army, and Fort Belvoir regulatory requirements.

Modernization of the OSA-A/OSACOM hangar under **Project 2** and 12th AV BN hangars under **Projects 3** and **4** would provide the opportunity to improve or upgrade hazardous waste SAAs in those facilities. Consolidation of the 12th AV BN's B and D Companies to a single hangar facility under **Project 6** would

also consolidate the number and location of SAAs authorized for those units. These projects would have a beneficial long-term impact on hazardous materials at DAAF.

Thus, there would be no adverse and some beneficial hazardous waste impacts during the operational phase of the short-range ADP projects under the Full or Partial Implementation Alternative.

4.10.3.3 Perfluoroalkyl Substances and Aqueous Film Forming Foam

None of the short-range ADP projects would introduce new sources of PFOS and PFOA at Fort Belvoir. AFFF used in sprinkler systems of the new or modernized facilities (**Projects 1**, **2**, **3**, **4**, and **6**) would meet the current DoD MILSPEC. Independently of the Proposed Action, non-MILSPEC AFFF in the two 125-gallon tanks at Building 3121 would be replaced with AFFF meeting current DoD standards (**Section 3.10.3**); alternatively, the tanks could be potentially replaced altogether under **Project 1** depending on the final determination of modernization activities to be undertaken at Building 3121. None of the proposed projects would involve disturbance of the fire training area east of Building 3242 (**Figure 3.10-1**), nor would any of the projects have the potential to release PFOS or PFOA to groundwater or surface water at DAAF.

For these reasons, there would be no adverse impacts from PFOS or PFOA under short-range ADP projects in the Full and Partial Implementation Alternatives.

4.10.3.4 Petroleum Storage Tanks

Portable ASTs may be used during the implementation of some or all of the short-range ADP projects for on-site refueling of construction vehicles and equipment. **Projects 5, 6, 7, 8,** and **9** would be the most likely to use portable ASTs during all or a portion of their construction phases. Portable ASTs would be used in accordance with applicable federal, state, Army, and Fort Belvoir regulatory requirements. Construction contractors would use secondary containment around portable ASTs and maintain spill containment and cleanup materials nearby to prevent the migration of accidentally spilled petroleum products to soils, surface, or groundwater. Portable ASTs would be clearly identifiable and maintained a safe distance from intensive construction- and/or demolition-related activities on the project sites to minimize the possibility of inadvertent damage from construction vehicles and equipment. The staggered implementation of the short-range ADP projects over a period of approximately 10 years would minimize the number of portable ASTs in use at any given time at DAAF. Therefore, construction-related AST impacts during the short-range ADP projects would be minor.

None of the short-range ADP projects under either alternative would involve the removal or alteration of existing ASTs or USTs at Building 3162 (**Section 3.10.4**). As such, there would be no impacts on existing petroleum storage tanks at DAAF.

A 500-gallon waste POL storage tank would be installed and operated as part of **Project 6**. It is assumed that the tank would be constructed of steel and installed aboveground for ease of maintenance and periodic emptying. The tank would be installed in or adjacent to the proposed 8-bay hangar, would include secondary containment and appropriate fire suppression and life safety systems, and would be operated and maintained in accordance with applicable federal, Army, Fort Belvoir, and state regulatory

requirements. If installed outdoors, the tank's design and construction would be appropriate for exterior use. Waste POL would be periodically drained from the tank by a licensed contractor and transported for disposal at a permitted off-post facility.

At this time, plans are not sufficiently defined to determine if new ASTs or USTs would be installed at DAAF as part of the other short-range ADP projects. In the event that new ASTs or USTs are included in any of the proposed projects under either alternative, they would be constructed, installed, operated, and maintained in accordance with their intended use as well as applicable permit and federal, state, Army, and Fort Belvoir regulatory requirements. As applicable, petroleum storage tanks associated with facilities proposed for construction in or near the 100-year floodplain (**Project 6**) would be installed above the base flood elevation and would include additional measures as warranted to prevent or minimize the potential for accidental leaks during a flood event. New ASTs or USTs installed at DAAF as part of **Project 6** or any of the other short-range ADP projects would not exceed Fort Belvoir's capacity to manage them.

For these reasons, the operational phase of short-range ADP projects in the Full and Partial Implementation Alternatives would have no impacts on ASTs and USTs at DAAF.

4.10.3.5 Pesticides

Throughout the construction and operational phases of the short-range ADP projects, pesticides would continue to be applied at DAAF by licensed applicators in accordance with applicable regulatory requirements. The short-range projects' construction and operational phases would not require increases in the quantities or changes in the types of pesticides applied at DAAF nor in the frequency of their application.

Therefore, the short-range ADP projects would have no construction-related or operational impacts on pesticides at DAAF.

4.10.3.6 Asbestos, Lead-based Paint, and Radon

Modernization activities in short-range ADP **Projects 2, 3,** and **4** and facility demolitions associated with **Projects 5** and **6** would have the potential to disturb ACM and LBP in existing DAAF facilities (**Table 4.10-1**). Prior to implementing modernization and demolition activities, ACM and LBP identified in the affected facilities would be removed by licensed contractors in accordance with applicable federal, state, Army, and Fort Belvoir requirements and disposed of at permitted off-post facilities. This would ensure that there would be no construction-related or operational adverse impacts from ACM or LBP. The modernization of three facilities and the demolition of 12 where ACM and LBP are known or suspected to be present (**Table 4.10-1**) would represent a beneficial long-term impact on the management of these substances at DAAF and Fort Belvoir.

The potential for radon accumulation and human exposure in occupied facilities would be evaluated during the planning and design phase of short-range ADP **Projects 1, 2, 3, 4,** and **6**. Appropriate measures would be incorporated into the design of each facility if needed to prevent radon

accumulation. Therefore, no impacts from radon would occur during the construction or operational phases of those projects under either the Full or Partial Implementation Alternative.

Table 4.10-1: Status of DAAF Facilities Containing ACM and LBP – Short-Range ADP Projects (Full and Partial Implementation Alternatives)

Project No.	Building No.	Tenant/Function	Action Under Short-Range Projects (Full and Partial Implementation Alternatives)	Substance(s) Present	
				ACM	LBP
2	3145	OSA-A/OSACOM / Hangar	Modernize	X	X
3	3151	12th AV BN, D Company / Hangar	Modernize	X	X
4	3232	12th AV BN, D Company / Hangar	Modernize	X	X
5	3260	Sentry Station	Demolish		X
6	3138	Airfield Division / Heat Plant	Demolish	X	X
	3140	12th AV BN, B Company / Hangar			X
	3141	Airfield Operations Maintenance Shop			X
	3142	Storage Air Traffic Control (Command Aviation)			X
	3143	Vacant			X
	3149	Vacant			X
	3234	12th AV BN / Airfield Operations		X	X
	3235	12th AV BN / Battalion Headquarters		X	X
	3236	Flammable Materials Storehouse			X
	3237	12th AV BN / Flight Operations		X	X
	3238	Transformer Building			X

4.10.3.7 Solid Waste Management Units

Prior to implementation, construction plans for each short-range ADP project and existing documentation for each project site would be reviewed by Fort Belvoir DPW to determine the potential for worker exposure to hazardous substances and/or applicable LUC requirements at current or former DAAF SWMUs. As needed, additional remediation would be conducted on or near the project sites to eliminate risk to workers. Generally, projects occurring north of Santjer Road (**Project 5** and portions of **Project 6**) would potentially require investigation for and/or remediation of UXO, MEC, or MC due to their proximity to Site FTBL-026-R-01, the former mine and booby trap area (**Section 3.10**). Depending on investigation and remediation results, the presence of one or more certified EOD safety technicians may also be required during some or all of those projects' construction phases. Following any necessary remediation activities, the construction contractor would apply for an excavation permit, which would then be reviewed and issued by DPW. These procedures and other requirements stipulated by DPW would ensure that risks from worker exposure to hazardous substances remain low.

Projects 1 through **4** consist of facility modernizations that would occur in buildings at or near DAAF SWMUs that have been administratively closed or received NFA for unrestricted use (**Figure 4.10-1**; **Table 3.10-4**). All of these projects would consist of interior work and no earth disturbance would be involved. Therefore, it is unlikely that the review and permitting procedures described above would apply.

Project 6 includes the demolition of Building 3140 where Fort Belvoir will implement LUCs associated with SWMU N-20 to protect construction worker health and safety in the event that earth disturbing activities are conducted on the site (**Table 3.10-4**). Thus, in the event that this demolition includes earth-disturbing activities (e.g., to remove foundation elements or buried utility lines servicing the facility), the construction contractor would apply for an excavation permit which DPW would review and issue.

Adherence to these procedures would ensure that there are no impacts from DAAF SWMUs during the construction or operational phases of the short-term ADP projects under the Full Implementation or Partial Implementation Alternative.

4.10.4 Mid- and Long-Range ADP Projects – Full Implementation Alternative (Preferred Alternative)

4.10.4.1 Hazardous Materials

Hazardous materials impacts during the construction and operational phases of the mid- and long-range ADP projects under the Full Implementation Alternative would be similar to those described for the short-range ADP projects (**Section 4.10.3.1**). There would be no or minor adverse construction-related impacts and no adverse operational impacts from hazardous materials. The staggered implementation of the proposed projects over approximately 20 years would ensure that adverse impacts resulting from construction activities do not occur simultaneously, thereby minimizing the severity of any such impacts.

None of the proposed projects would change the type or increase the quantity of hazardous materials used at DAAF, nor would they introduce new types of hazardous materials. Quantities of hazardous

materials used at the airfield would remain within Fort Belvoir's capacity to manage them. The modernization of existing facilities (**Projects 10, 14, 16, 17**), construction of new facilities (**Projects 11, 12, 13, 20, 21, and 22**), and relocation (**Projects 11, 12, 13, 17, 20,** and **21**) of DAAF tenants to those modernized or new facilities under the proposed projects would provide the opportunity to improve or upgrade hazardous materials storage areas and potentially consolidate or decrease the number of hazardous materials storage areas on the airfield. The airfield's Major Industrial Stormwater Permit and accompanying SWPPP would be updated as applicable to reflect the locations of hazardous material storage areas in the new, modernized, and/or expanded facilities. Overall, long-term hazardous materials impacts from the mid- and long-range ADP projects would be beneficial.

4.10.4.2 Hazardous Wastes

Impacts from hazardous waste during the construction and operational phases of the mid- and long-range ADP projects under the Full Implementation Alternative would be similar to those described for the short-range projects (**Section 4.10.3.2)**. There would be no or minor adverse hazardous waste impacts during the projects' construction phase and no operational impacts. The proposed projects' staggered implementation over a period of 20 years would minimize the severity of any potential construction-related hazardous waste impacts by ensuring that such impacts do not occur simultaneously.

Once operational, none of the proposed projects would increase the quantity or change the types of hazardous waste generated at DAAF, and no new types of hazardous waste would be generated. Quantities of hazardous waste generated at DAAF would remain within the installation's capacity to manage them. The modernization of existing facilities (**Projects 10, 14, 16,** and **17**) and construction of new facilities (**Projects 11, 12, 13, 20, 21,** and **22**) would provide the opportunity for improved or upgraded hazardous waste SAAs in those facilities, and/or the consolidation of the number and location of SAAs authorized to particular tenants or units. As applicable, the airfield's Major Industrial Stormwater Permit would be updated to reflect the locations of SAAs in the new, modernized, and/or expanded facilities. Therefore, mid- and long-range ADP projects would have beneficial long-term hazardous waste impacts at DAAF under the Full Implementation Alternative.

4.10.4.3 Perfluoroalkyl Substances and Aqueous Film Forming Foam

None of the proposed mid- and long-range projects under the Full Implementation Alternative would introduce new sources of PFOS and PFOA at DAAF. AFFF used in sprinkler systems of the new, modernized, and/or expanded facilities (**Projects 10, 11, 12, 13, 14, 16, 20, 21,** and **22**) would meet the current DoD MISPEC. None of the proposed projects would involve disturbance of the fire training area east of Building 3242, nor would any of the projects have the potential to release PFOS or PFOA to groundwater or surface water at DAAF.

Thus, there would be no adverse impacts from PFOS or PFOA under mid- and long-range projects in the Full Implementation Alternative.

4.10.4.4 Petroleum Storage Tanks

Construction-related and operational petroleum storage tank impacts potentially resulting from the mid- and long-range ADP projects under the Full Implementation Alternative would be similar to those described for the short-range ADP projects (**Section 4.10.3.4**). **Projects 11, 12, 13, 16, 18, 19, 20, 21, 22,** and **24** would be the most likely to use portable ASTs for all or portions of their construction phases. Portable ASTs would be used in accordance with applicable federal, state, Army, and Fort Belvoir regulatory requirements. Contractors would use secondary containment and other measures to ensure that accidental spills do not migrate to soils, surface, or groundwater. The projects' staggered implementation over approximately 20 years would minimize the number of portable ASTs in use at any particular time and thereby minimize the severity of any impacts that were to occur. Thus, mid- and long-range projects in the Full Implementation Alternative would have minor construction-related AST impacts.

None of the mid- or long-range ADP projects would affect Building 3162 or the existing ASTs and USTs associated with that facility.

It is likely that **Projects 11, 12, 13, 19, 20,** and **21** would include one or more ASTs or USTs for the storage of new and/or used POL; however, the precise number, type, capacity, and contents of ASTs and/or USTs included in the mid- and long-range ADP projects is not known at this time. Any ASTs or USTs included with those projects would be installed, maintained, and operated in accordance with applicable federal, state, Army, and Fort Belvoir regulatory requirements. The contents of used POL ASTs or USTs would be periodically emptied by a licensed contractor and transported to a permitted off-post facility for disposal. As applicable, petroleum storage tanks associated with facilities proposed for construction in or near the 100-year floodplain (**Projects 11**, **12**, and **19**) would be installed above the base flood elevation and would include additional measures as warranted to prevent or minimize the potential for accidental leaks during a flood event. The inclusion of new ASTs or USTs with the mid-range and long-range ADP projects would not exceed Fort Belvoir's capacity to manage them. Therefore, there would be no impacts on petroleum storage tanks at DAAF during the operational phase of mid- and long-range projects under the Full Implementation Alternative.

4.10.4.5 Pesticides

During the construction and operational phases of the mid- and long-rage ADP projects under the Full Implementation Alternative, pesticides would continue to be applied by licensed applicators at DAAF as they currently are (**Section 3.10.5**). There would be no adverse construction-related pesticides impacts from the mid- and long-range projects.

Under the Full Implementation Alternative, impervious surfaces at DAAF would increase by approximately 36.3 acres or 45 percent over existing conditions. This would potentially result in a decrease in areas requiring pesticide treatment at DAAF and a corresponding decrease in the quantity of pesticides applied at the airfield. This would have a beneficial long-term impact on pesticide use at DAAF. There would be no adverse pesticides impacts at DAAF in the long term.

4.10.4.6 Asbestos, Lead-based Paint, and Radon

ACM, LBP, and radon impacts resulting from the mid- and long-range Full Implementation Alternative projects would be similar to those described for the short-range ADP projects (**Section 4.10.3.6**). Two facilities containing ACM and LBP would be modernized by **Projects 16** and **17**. An additional 10 buildings containing or potentially containing those substances would be demolished by **Projects 11, 12, 16, 17, 20, 21**, and **22** (**Table 4.10-2**). **Projects 12, 20,** and **21** would also include the demolition of three buildings (3232, 3151, and 3145) where ACM and LBP would be removed by modernization activities under **Projects 4, 3**, and **2**, respectively (also see Note 1 in **Table 4.10-2**).

Table 4.10-2: Status of DAAF Facilities Containing ACM and LBP – Mid- and Long-Range ADP Projects – Full Implementation Alternative (Preferred Alternative)

Project No.	Building No.	Tenant/Function	Action under Full Implementation Alternative (Preferred Alternative)	ACM	LBP
Mid-Range Projects (11-20 Years)					
10	3136	Airfield Division / Operations	Demolish	X	X
11	3231	12th AV BN, A Company / Hangar	Demolish	X	X
12	3232[1]	13th AV BN, D Company / Hangar	Demolish	X	X
16	3165	OSA-A/OSACOM / Administration	Modernize	X	X
Long-Range Projects (21-30 Years)					
20	3150	General Purpose Storehouse	Demolish		X
	3151[1]	13th AV BN, D Company / Hangar		X	X
	3153	12th AV BN, D Company / Aircraft Component Maintenance Shop		X	X
21	3145[1]	OSA-A/OSACOM / Hangar		X	X
	3170	General Purpose Storehouse			X
	3171	Flammable Material Storehouse			X
22	3165[2]	OSA-A/OSACOM / Administration	Repurpose	X	X

Notes:

1. ACM and LBP in Buildings 3145, 3151, and 3232 would be removed during modernization activities under short-range ADP **Projects 2, 3,** and **4**, respectively (**Table 4.10-1**).
2. Building 3165 would be modernized by mid-range ADP **Project 16**.

Prior to modernization and demolition activities, ACM and LBP identified in the affected facilities would be removed by licensed contractors in accordance with applicable federal, state, Army, and Fort Belvoir requirements and disposed of at permitted off-post facilities. This would ensure that there would be no construction-related adverse impacts from ACM or LBP.

Mid- and long-range ADP projects in the Full Implementation Alternative would remove ACM and LBP from 12 facilities at DAAF. When considered with facility modernizations and demolitions in the short-range ADP projects (**Section 4.10.3.6**; **Table 3.10-1**), the Full Implementation alternative would remove ACM and LBP from a total of 27 facilities at DAAF. Overall, this would represent a beneficial long-term impact on the management of ACM and LBP at DAAF and Fort Belvoir.

The potential for radon accumulation and human exposure in occupied facilities would be evaluated during the planning and design phases of **Projects 10, 11, 12, 13, 14, 16, 17, 19, 20, 21,** and **22**. Appropriate measures would be incorporated into the design of each facility to prevent radon accumulation as determined necessary by these reviews. This would ensure that there would be no impacts from radon during the construction or operational phases of the mid- and long-range ADP projects under the Full Implementation Alternative.

4.10.4.7 Solid Waste Management Units

Procedures to review mid- and long-range projects in the Full Implementation Alternative to determine the potential for worker exposure to hazardous substances and/or applicable LUC requirements at current or former DAAF SWMUs, as well as to eliminate risks to workers would be similar to those described for the short-range ADP projects (**Section 4.10.3.7**).

Projects 12, 17, 20, and **21** include facility demolitions that would occur at or near DAAF SWMUs that have received NFA for unrestricted use or been administratively closed (**Figure 4.10-1**; **Table 3.10-4**). Although hazardous substances on these sites have been removed or remediated below applicable regulatory thresholds, Fort Belvoir DPW would review earth-disturbing activities associated with the projects to verify conditions on the sites do not pose a risk to worker health and safety.

Once demolished, the sites of Buildings 3232 (**Project 12**), 3126 (**Project 17**), 3151 (**Project 20**), and 3145 (**Project 21**) would be incorporated into aircraft parking aprons and would remain in an impermeable condition. As such, SWMUs associated with these facilities would have no potential to pose a risk to worker health and safety in the long term.

Project 19 would be implemented within SWMU Site FTBL-026-R-01, the former Mine and Booby Trap Range (**Figure 4.10-1**; **Section 3.10.7**). Fort Belvoir DPW would review the project's construction plans and existing documentation for the site to determine the potential for worker exposure to MC or MEC. If determined necessary by this review, additional remediation would be conducted on or around the project site to minimize or eliminate risks from UXO, MEC, or MC during construction. Once cleared by DPW, an excavation permit would be issued to the construction contractor; however, depending on the results of the DPW project review the presence of one or more certified EOD safety technicians may be required during some or all of the project's construction phase. Compliance with these requirements and other requirements stipulated by DPW would ensure that risks from worker exposure to MEC or MC

remain low. Implementation of **Project 19** and any required remediation would contribute to the cleanup of Site FTBL-026-R-01.

Therefore, mid- and long-range ADP projects in the Full Implementation Alternative would have minor adverse construction-related SWMU impacts and no adverse operational impacts. **Project 19** would have a beneficial long-term impact on SWMUs at DAAF by contributing to the cleanup and release of SWMU Site FTBL-026-R-01.

4.10.5 Mid-Range ADP Projects – Partial Implementation Alternative

4.10.5.1 Hazardous Materials

Hazardous materials impacts from mid-range ADP projects under the Partial Implementation Alternative would be similar to those described for the short-range ADP projects (**Section 4.10.3.1**). There would be no or minor adverse construction-related impacts and no adverse operational impacts from hazardous materials. The intensity of any adverse construction-related hazardous materials impacts from mid-range Partial Implementation Alternative projects would potentially be less in comparison to the Full Implementation Alternative, as fewer projects would be implemented.

In the long term, the smaller number of mid-range projects in the Partial Implementation Alternative and absence of long-range projects would likely limit opportunities to improve and upgrade or consolidate and decrease the number of hazardous materials storage areas on the airfield to **Projects 14** and **17**. However, hazardous materials would continue to be used at DAAF in accordance with applicable regulatory requirements as they currently are. As applicable, the airfield's Major Industrial Stormwater Permit and accompanying SWPPP would be updated to reflect the locations of hazardous material storage areas in facilities that would be modernized and/or expanded by **Projects 14** and **17**. None of the mid-range projects in the Partial Implementation Alternative would change the type or increase the quantity of hazardous materials at DAAF, introduce new types of hazardous materials not already in use, or exceed Fort Belvoir's capacity to manage them.

Therefore, mid-range projects in the Partial Implementation Alternative would have no adverse operational hazardous materials impacts. The extent of any beneficial hazardous materials impacts during the projects' operational phase would be limited in comparison to the Full Implementation Alternative.

4.10.5.2 Hazardous Wastes

As described for the short-range ADP projects (**Section 4.10.3.2**) and for similar reasons, mid-range projects in the Partial Implementation Alternative would have no or minor adverse construction-related hazardous waste impacts and no adverse operational impacts. The intensity of any construction-related adverse impacts would likely be less than those potentially resulting from the Full Implementation Alternative due to the smaller number of projects. However, the opportunity to improve or update hazardous waste SAAs or consolidate and decrease the number of SAAs at DAAF would not be fully realized in comparison to the Full Implementation Alternative (**Section 4.10.4.2**).

Hazardous wastes at DAAF would continue to be managed as they currently are. None of the proposed projects would change the type or increase the quantity of hazardous wastes generated at DAAF, nor would they introduce new types of hazardous wastes. As applicable, the airfield's Major Industrial Stormwater Permit would be updated to reflect the locations of SAAs in the modernized and/or expanded facilities. Quantities of hazardous waste generated at DAAF by Partial Implementation Alternative mid-range projects would remain within Fort Belvoir's capacity to manage them.

For these reasons, mid-range projects in the Partial Implementation Alternative would have no adverse operational hazardous waste impacts. Any potential beneficial operational hazardous waste impacts would be limited in comparison to the Full Implementation Alternative.

4.10.5.3 Perfluoroalkyl Substances and Aqueous Film Forming Foam

As described for mid- and long-range projects in the Full Implementation Alternative and for similar reasons, there would be no adverse impacts from PFOS or PFOA under mid-range ADP projects in the Partial Implementation Alternative.

4.10.5.4 Petroleum Storage Tanks

Construction-related and operational petroleum storage tank impacts potentially resulting from mid-range projects under the Partial Implementation Alternative would be similar to those described for the short-range ADP projects (**Section 4.10.3.4**). The use of portable ASTs during construction of the mid-range Partial Implementation Alternative projects would likely be limited to **Projects 16** and **18**. Such tanks would be used in accordance with applicable regulatory requirements. Due to the smaller number of mid-range projects, the intensity of adverse construction-related impacts potentially resulting from the use of portable ASTs would potentially be less in comparison to the Full Implementation Alternative.

Building 3162 and existing ASTs and USTs associated with that facility would not be affected by mid-range projects in the Partial Implementation Alternative.

It is anticipated that none of the mid-range Partial Implementation Alternative projects would include the installation of new ASTs or USTs at DAAF.

Thus, mid-range Partial Implementation Alternative projects would have no or minor construction-related adverse impacts and no adverse operational impacts.

4.10.5.5 Pesticides

As described for the short-range ADP projects (**Section 4.10.3.5**), the application of pesticides by licensed applicators at DAAF would continue during the construction and operational phases of the mid-range ADP projects under the Partial Implementation Alternative. There would be no adverse construction-related pesticides impacts from the mid-range projects.

The amount of impervious surface at DAAF would increase by an estimated 21 acres under the Partial Implementation Alternative. This could potentially result in a corresponding decrease in the amount of area requiring treatment with pesticides on the airfield and a similarly corresponding decrease in the

quantity of pesticides used at DAAF. Such a decrease could have a beneficial long-term impact on the overall management, use, and application of pesticides on Fort Belvoir.

4.10.5.6 Asbestos, Lead-based Paint, and Radon

Mid-range ADP projects in the Partial Implementation Alternative would have similar ACM, LBP, and radon impacts as described for the short-range projects (**Section 4.10.3.6**). The removal of ACM and LBP prior to the modernization of two facilities (**Projects 16** and **17**) and the demolition of five facilities (**Projects 10** and **17**) would ensure that there would be no construction-related adverse impacts from those substances (**Table 4.10-3**). When considered with the short-range ADP projects, the Partial Implementation Alternative would remove ACM and LBP from a total of 22 DAAF facilities through facility modernizations and demolitions. While this would constitute a beneficial long-term impact on the management of ACM and LBP at DAAF and Fort Belvoir, it would be somewhat less substantial in comparison to the 27 facilities containing ACM and LBP that would be removed by the Full Implementation Alternative.

Table 4.10-3: Status of DAAF Facilities Containing ACM and LBP – Mid-Range Projects (Partial Implementation Alternative)

Project No.	Building No.	Tenant / Function	Action Under Mid-Range Projects (Partial Implementation Alternative)	Substance(s) Present	
				ACM	LBP
10	3136	Airfield Division / Operations	Demolish	X	X
16	3165	OSA-A/OSACOM / Administration	Modernize	X	X
17	3125	Storage Handling Equipment	Demolish		X
	3126	NVESD / Aircraft Component Maintenance Shop		X	X
	3128	NVESD / Operations		X	
	3131	NVESD / Operations			X
	3151	12th AV BN, D Company / Hangar	Modernize	X	X

As described in **Section 4.10.4.6**, the potential for radon accumulation and human exposure in occupied facilities would be evaluated during the planning and design phase of mid-range **Projects 10, 14, 16,** and **17**. Appropriate measures to prevent radon accumulation would be incorporated as determined necessary by these reviews. This would ensure that there would be no impacts from radon during the construction or operational phases of the mid-range ADP projects under the Partial Implementation Alternative.

4.10.5.7 Solid Waste Management Units

Due to its association with two DAAF SWMUs (Sites C-04 and C-06) that have received administrative closure, the demolition of Building 3126 as part of **Project 17** would be reviewed by Fort Belvoir DPW as described in **Section 4.10.3.7** prior to implementation to verify that conditions on the project site do not pose a risk to worker health and safety. Once demolished, the site of Building 3126 would be incorporated into the aircraft parking apron on the southwest side of the runway and would not pose a risk to worker health and safety in the long term.

It is unlikely that the modernization of Building 3151 as part of **Project 17** would involve earth disturbing activities triggering DPW review.

None of the other mid-range Partial Implementation Alternative projects involving earth disturbance would occur near current or former SWMUs at DAAF.

For these reasons, mid-range projects in the Partial Implementation Alternative would have no or minor construction-related SWMU impacts and no operational SWMU impacts.

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5 Cumulative Impacts

5.1 Introduction

This section analyzes the potential cumulative effects of the Proposed Action in combination with other past, present, and reasonably foreseeable federal and non-federal actions within the same ROI. As defined by CEQ Regulations in 40 CFR 1508.7, a cumulative impact is that which "results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions." NEPA requires the lead federal agency to consider the cumulative environmental effect of a proposed action, as it may potentially affect resources in the same time and space. This analysis of cumulative effects must determine if construction and operation of the Proposed Action would have the possibility to result in either adverse or beneficial cumulative impacts when considering other past, present, and future projects in the ROI.

Cumulative effects may be accrued over time and/or in conjunction with pre-existing effects from other activities in the ROI; previous impacts and multiple smaller impacts should be considered. Cumulative impacts can result from individually minor but collectively significant actions expected to occur in a similar location and during a similar time period.

5.2 Study Area

The study area, or ROI, for the cumulative analysis primarily encompasses DAAF and the surrounding vicinity of North Post on Fort Belvoir. For certain resources, the ROI extends to adjoining off-post areas within Fairfax County as applicable (**Table 5.2-1**).

The temporal scope of the cumulative analysis spans over the next 30 years to cover construction and operation of proposed short-, mid-, and long-range ADP projects. Short-range projects are planned for the next ten years, mid-range projects are planned for 11 to 20 years thereafter, and long-range projects are planned for 21 to 30 years thereafter.

Table 5.2-1: Cumulative Effects Analysis Region of Influence by Technical Resource Area

Technical Resource Area	ROI	Rationale
Land Use and Plans Biological Resources Geological Resources Historic and Cultural Resources Noise Health and Safety Hazardous Materials and Waste	Project site and surrounding vicinity of North Post	Potential cumulative effects on these resource areas would occur within the project site and surrounding areas that would experience visual, auditory, and health effects. Distance or physical barriers (e.g. major roadways and highways) make it unlikely that resource areas in neighboring areas would be affected.

Table 5.2-1: Cumulative Effects Analysis Region of Influence by Technical Resource Area (con't.)

Technical Resource Area	Region of Influence	Rationale
Air Quality	Regional airshed	Potential cumulative impacts on air quality would likely affect the regional airshed.
Water Resources	Watershed Management Areas (WMAs) of the Accotink Creek watershed adjacent to and containing Fort Belvoir	Potential cumulative impacts on water resources would likely affect the Accotink Creek watershed as a whole to varying degrees; impact significance is expected to be greater in areas downstream of, and adjacent/local to the project site.

5.3 Methodology

The cumulative analysis evaluates incremental impacts of the Proposed Action in conjunction with potential impacts of past, present, and reasonably foreseeable future projects within the ROI. The collective impacts were characterized and assessed to establish whether the Proposed Action would have meaningful cumulative impacts on each resource considered in this EIS. As the ROI includes DAAF and North Post, the majority of past, present, and reasonably foreseeable future projects are Army actions. These projects were identified through discussions with Fort Belvoir and Army representatives as well as review of the Fort Belvoir RPMP EIS completed in 2015. Off-post projects were identified through researching publicly available information sources, such as local master plans (Fairfax County Comprehensive Plan, 2017 Edition), news articles, and federal, state, and local agencies (VDOT, Federal Highway Administration [FHWA], and Fairfax County Department of Public Works and Environmental Services [DPWES]).

It is important to note that reasonably foreseeable future projects from the Fort Belvoir RPMP EIS are only scoped through 2030 (approximately 9 years from the anticipated completion of this EIS), while the Fairfax County Comprehensive Plan, which informs the majority of development activities in the county, considers anticipated changes to the county over the next 20 years only. As such, reasonably foreseeable future actions may not cover the entire temporal scope of the Proposed Action (30 years). Although substantial development over the next 30 years is almost guaranteed given DAAF's location in the rapidly urbanizing Northern Virginia region, it would be speculative to include actions that have not been proposed at this time. To prevent overestimating potential cumulative effects, this analysis only includes reasonably foreseeable future projects that are currently proposed or planned, including those that may be already programmed and funded.

5.4 Past, Present, and Reasonably Foreseeable Future Projects

Cumulative impacts relevant to the Proposed Action evaluated in this EIS are primarily the incremental impact of the action when added to the impact of other past, present, and reasonably foreseeable future transportation, infrastructure, and institutional development projects (**Figure 5.4-1**). This analysis focuses on ongoing and reasonably foreseeable future projects, as the effects of past projects have been incorporated in the environmental baseline presented in **Chapter 3** of this EIS and are thereby considered in the impact analysis presented in **Chapter 4**. Past projects are considered if their long-term and operational impacts would affect similar resource areas at the same time as the Proposed Action, contributing to cumulative impacts.

Table 5.4-1 lists the projects evaluated in the cumulative impacts analysis and includes the following information for each:

- Project name,
- Project proponent,
- Project type (e.g. commercial, residential, transportation, etc.),
- Construction start and end dates,
- Current status (e.g. proposed, approved, under construction, or complete),
- Brief description, and
- General Location.

The cumulative analysis continues in the sub-sections following **Table 5.4-1**.

Figure 5.4-1: Past, Present, and Reasonably Foreseeable Future Projects

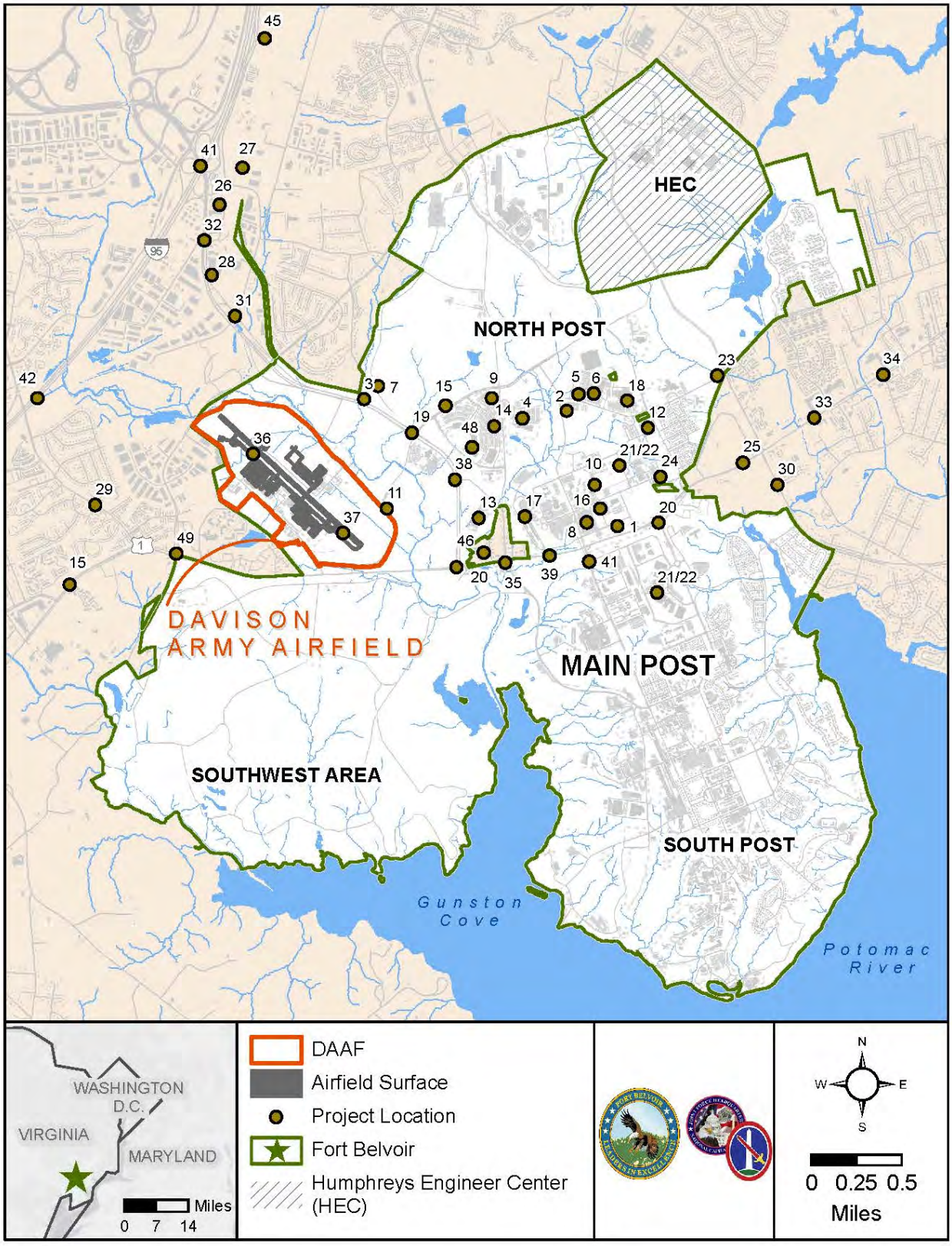

Table 5.4-1: Past, Present, and Reasonably Foreseeable Future Projects

Project No.	Name	Proponent	Type	Status	Description
1	Access Road and Control Point-Lieber Gate	DoD	Transportation	Under Construction	A new access control point, including a new gate and roadway connecting Richmond Highway to Gunston Road would provide direct access from Richmond Highway to North Post. The facility would replace the former Lieber Gate.
2	Army and Air Force Exchange Service (AAFES) Car Wash	DoD	Commercial	Planned / Proposed	An AAFES car wash facility is proposed on North Post, east of Gunston Road and south of the existing North Post Shoppette at the southeast corner of the Gunston Road/Gorgas Road intersection. The 3,750-square-foot facility would be equipped with a water reclamation system that would recycle approximately 54 gallons of water per car wash.
3	National Museum of the United States Army (NMUSA) Roads and Infrastructure Improvements	DoD	Infrastructure	Under Construction	Roads, parking lots, and infrastructure improvements are proposed for the NMUSA project. The site is not served by water, sanitary sewer, gas, electrical, or information systems. Existing roads do not provide adequate access.
4	INSCOM Headquarters Expansion, Phase 1-4	DoD	Institution	Under Construction	This project would expand INSCOM's headquarters facilities, including a new parking garage, additional stories to the existing building, modernization, and updated facilities.
5	AAFES Car Care Center	DoD	Commercial	Planned / Proposed	A 9,000-square-foot car maintenance facility with 10 service bays and 25 to 30 parking spaces is proposed for a 1.5-acre site near the new Post Exchange (PX)/Commissary site. A record of environmental consideration was completed in October 2010. Approximately 15 added personnel are anticipated.
6	Name Brand Casual Dining Restaurant	DoD	Commercial	Planned / Proposed	A 6,500-square-foot Old Chicago restaurant would be built on an 8,700-square-foot site used as a parking lot for the former PX. Approximately 50 added personnel are anticipated.

Table 5.4-1: Past, Present, and Reasonably Foreseeable Future Projects (con't.)

Project No.	Name	Proponent	Type	Status	Description
7	NMUSA Phase 1-4	DoD	Commercial	Under Construction	Construction of the NMUSA would occur in four phases. The NMUSA facility would include: the main museum building (3.6-acre multi-story building with exhibit halls, a theater, food and retail areas, and administrative spaces); an armored tank simulator on a 2,000-square-foot pad; 1.3-acre memorial garden; 4-acre parade ground and grandstand; a 6,700-square foot amphitheater; a 3,000 feet long educational trail; and a 2,000-square-foot powder storage building.
8	29th Infantry Headquarters (HQ)	DoD	Institution	Planned / Proposed	A new 29th Infantry HQ is planned for the southeast corner of the Gunston Road and Goethals Road intersection. The 9.2-acre site is currently almost entirely paved. Approximately 300 added personnel are anticipated.
9	DLA Parking Garage	DoD	Infrastructure	Planned / Proposed	Two 350,000-square foot garages are proposed for the DLA's existing paved parking lot to make space for the new administrative building. The two multi-story garages would accommodate approximately 1,650 vehicles.
10	Unaccompanied Enlisted Personnel Barracks	DoD	Institution	Planned / Proposed	Construction of a new barracks (87,840 square feet) to house 240 single enlisted soldiers assigned to Fort Belvoir is proposed. In addition to the proposed barracks, there would also be a company operation building (16,120 square feet). Approximately 90,000 square feet of pavement and concrete would be demolished to build the new buildings. Parking would be accommodated on existing, underused parking lots nearby. Approximately 200 added personnel are anticipated.
11	Skills Training Facility (STF)	DoD	Institution	Completed	A new training compound was recently completed at DAAF on an approximately 9.5-acre site. The new compound is located on the eastern corner of the Santjer Drive/John J. Kingman Road intersection on a wooded lot backing up to Accotink Creek. Facilities include a two-story 65,000-square foot classroom and administration building and a 29,000-square foot fitness training building.

Table 5.4-1: Past, Present, and Reasonably Foreseeable Future Projects (con't.)

Project No.	Name	Proponent	Type	Status	Description
12	Religious Education Center	DoD	Institution	Planned / Proposed	A new religious education center would be constructed on a 1.4-acre site located between Woodlawn Road and Woodlawn Chapel. The project would require 20 additional personnel and build an 18,093-square foot religious education center with lobby, assembly area, classrooms, offices, kitchen, and a resource room.
13	911th Engineering Company Operations Complex	DoD	Institution	Planned / Proposed	A new consolidated complex for the 911th Engineering Company is proposed. The 39,810-square foot building would comprise a tactical equipment maintenance facility, an administrative facility, an equipment and oil storage facility, vehicle parking, and a vehicle storage facility. The new complex would be built on an 8.5-acre site between the Fairfax County Parkway and Accotink Village. Approximately 110 added personnel are anticipated.
14	DLA Administrative Center	DoD	Institution	Planned / Proposed	A 267,000-square foot administrative center for DLA would be developed on an existing parking lot. Approximately 1,000 personnel would work in the new building and 1,000 additional personnel are anticipated.
15	John J. Kingman Road/Fairfax County Parkway Intersection Improvements	DoD	Transportation	Planned / Proposed	Left and right turn lanes would be added or expanded to increase the capacity of this intersection. Traffic signals would be upgraded as needed.
16	Lower North Post District	DoD	Institution	Planned / Proposed	The project is part of a highly conceptual plan to guide potential future development in the area. The project involves continued redevelopment of an approximately 24-acre block in the Lower North Post District as an institutional center. No specific developments, tenants, etc. have been identified. Approximately 1,200 added personnel are anticipated.

Table 5.4-1: Past, Present, and Reasonably Foreseeable Future Projects (con't.)

Project No.	Name	Proponent	Type	Status	Description
17	Lower North Post West District	DoD	Institution	Planned / Proposed	The project is part of a highly conceptual plan to guide potential future development in the area. Development of the Lower North Post West District is an alternative site to development of the South Post Industrial Area District for new, low-density warehouses and supporting administrative uses. Sites would be developed to support heavy and light industrial uses and administrative uses. No specific developments, tenants, etc. have been identified.
18	North Post Community Support District	DoD	Mixed-use	Planned / Proposed	The project is part of a highly conceptual plan to guide potential future development in the area. As such, no specific developments, tenants, etc. have been identified.
19	Fairfax County Parkway/John J. Kingman Road Intersections and NMUSA Entrance	DoD; VDOT	Transportation	Planned / Proposed	This project would convert the John J. Kingman Road and NMUSA entrance intersections with the Fairfax County Parkway into a highway-style interchange using grade separation and ramps in order to increase the capacity of the intersections and alleviate traffic delays. Improvements to the Fairfax County Parkway/John J. Kingman Road intersection would be performed by VDOT in collaboration with Fort Belvoir. Fort Belvoir would be responsible for improvements to the intersection of Fairfax County Parkway and the NMUSA entrance road (Liberty Drive).
20	Richmond Highway Intersections with Fairfax County Parkway, Pohick Road, and Belvoir Road	DoD	Transportation	Planned / Proposed	This project would monitor traffic flows at the Richmond Highway intersections with the Fairfax County Parkway, Pohick Road, and Belvoir Road, following completion of the Richmond Highway Widening project.
21	Richmond Highway Overpass	DoD	Transportation	Planned / Proposed	This project would construct a second overpass over Route 1, likely having a southern terminus on 1st Street on South Post, crossing Route 1 following the alignment of Constitution Road, then proceeding on a new alignment to Meeres Road in the vicinity of the Post Exchange and Commissary.

Table 5.4-1: Past, Present, and Reasonably Foreseeable Future Projects (con't.)

Project No.	Name	Proponent	Type	Status	Description
22	Abbott Road, 3rd Street, 6th Street	DoD	Transportation	Planned / Proposed	This project would extend Abbott Road to connect with Woodlawn Road.
23	Meeres Gate	DoD	Transportation	Planned / Proposed	This project proposes to open Meeres Gate, located where Old Mill Road currently meets the alignment of Mulligan Road.
24	Goethals Road	DoD	Transportation	Planned / Proposed	Goethals Road would be widened to four lanes and extended east to Woodlawn Road.
25	Richmond Highway Corridor Improvements	VDOT; Fairfax County Department of Transportation (FCDOT)	Transportation	Planned / Proposed	Three miles of roadway (Jeff Todd Way to Napper Road in Mt Vernon) would be expanded from four to six lanes. Bicycle and pedestrian accommodations will be added to both sides of the roadway. The project is currently in the design phase and construction is anticipated to begin in 2023.
26	Reforest for WQ at FCPA	Fairfax County DPWES	Stormwater	Ongoing	Reforestation efforts at Levelle W. Dupell Park.
27	Newington Solid Waste/Huntington Operating Facility Sewage Treatment Works Partnership	Fairfax County DPWES	Stormwater	Ongoing	Installation of BMPs, including bioretention, an underground sand filter, and nine hydrocarbon inlet inserts in partnership with BDCD.
28	Backlick Road over CSX Railroad Bridge Replacement	VDOT	Transportation	Under Construction	This project, which is part of the Atlantic Gateway improvements, is replacing the existing bridge that carries Backlick Road (Route 617) over the CSX Railroad with a slightly higher bridge that accommodates the addition of new rail tracks. Other improvements include: wider shared-use path on bridge; new pavement on both ends of the bridge; new curb and gutter on the southern approach to the bridge; and wider entry at the north end of the bridge to provide more room for vehicles, particularly trucks.
29	Pohick Road Widening from Richmond Highway to I-95	FCDOT	Transportation	Planned / Proposed	This project proposes to widen Pohick Road to four lanes, and improve intersections, pedestrian, and bicycle facilities.

Table 5.4-1: Past, Present, and Reasonably Foreseeable Future Projects (con't.)

Project No.	Name	Proponent	Type	Status	Description
30	Mount Vernon Memorial Highway--Potomac Heritage National Scenic Trail	FCDOT	Recreation	Planned / Proposed	This project proposes to complete missing links of pedestrian and bicycle trail near Washington's Mill Historic State park to Grist Mill Park, including the bridge over Dogue Creek. Project is currently in design.
31	Cinderbed Road Bikeway	FCDOT	Transportation	Planned / Proposed	This project would provide approximately 3 miles of bikeway from Fairfax County Parkway to Franconia-Springfield Metrorail Station.
32	Fairfax County Parkway/Terminal Road Improvement	FCDOT	Transportation	Planned / Proposed	This project would add a left turn lane on Terminal Road.
33	Route 1 Pedestrian Intersection Improvements	FCDOT	Transportation	Under Construction	This project would improve Route 1 intersections for pedestrian access at Lukens Lane, Frye Road, Mohawk Lane, Ladson Lane, and Belford Drive.
34	Embark Richmond Highway	Fairfax County Department of Planning and Zoning, FCDOT (presumed), private developers (presumed)	Transportation ; Mixed-use	Approved	This project plans to update the 10.4-mile corridor between North Kings Highway at Huntington Avenue/Telegraph Road to the Fairfax County Parkway near Fort Belvoir to include a bus rapid transit (BRT) system, road widening, and pedestrian and bike paths/facilities. The BRT would have potentially nine stations to connect the Huntington Metro Station to Accotink/Fort Belvoir. In addition, the plan proposes new mixed-use and residential development around the nine BRT stations, new park spaces, and two open space concepts. Four existing community business centers would be transformed into communities with distinct characteristics and identities via residential, retail, open space, and tourism development. There would be a total of 15 million square-feet of new development.

Table 5.4-1: Past, Present, and Reasonably Foreseeable Future Projects (con't.)

Project No.	Name	Proponent	Type	Status	Description
35	DAAF Communications Line Extension	DOD	Infrastructure	Approved	A new communications ductbank will be constructed between the core area of Fort Belvoir and DAAF, traversing a distance of approximately 2 miles along existing utility corridors and ROWs.
36	DAAF Tree Removal	DOD	Infrastructure	Approved	Trees that project into imaginary surfaces at DAAF will be removed or lowered to a distance that does not violate airfield and airspace criteria.
37	Aviation Restructure Initiative	DOD	Institution	Planned / Proposed	Under the ARI, the Army proposes a concept plan for the 12th AV BN to support mission readiness. Implementation of the concept plan would increase personnel and aircraft.

Table 5.4-1: Past, Present, and Reasonably Foreseeable Future Projects (con't.)

Project No.	Name	Proponent	Type	Status	Description
38	Fairfax County Parkway & Franconia-Springfield Parkway Corridor Study, Existing Program Funding Opportunity	VDOT; FDOT	Transportation	Planned / Proposed	The multimodal corridor study evaluated existing transportation issues and proposes recommendations for short-term improvements. Projects that do not fall under the purview of the existing VDOT programmatic improvements do not have funding readily available. Improvements under this category could have an implementation timeframe of 2 to 10 years. The following improvements are pertinent to the Proposed Action: 1. Fairfax County Parkway and Richmond Highway intersection: Install overhead intersection street lighting and advance intersection warning signs 800 to 1000 feet before the stop bar. 2. Fairfax County Parkway and John J. Kingman Road/Farrar Drive intersection: Install a detectable warning surface. 3. Fairfax County Parkway/Terminal Road intersection: Install yield bars in advance of the crosswalk; upgrade curb ramps to be ADA compliant; install retroreflective backplates on all signals; and install next signal signs 600 to 700 feet before the stop bar. 4. Fairfax County Parkway/Loisdale Road intersection: Remove asphalt at the corner and install trail wayfinding signage; install retroreflective backplates on all signals; add I-95 shield pavement marking and overhead signage 600 to 700 feet before the stop bar; and add I-95 shield pavement markings and lane use/designation guide sign 445 feet before the stop bar. 5. Fairfax County Parkway and Richmond Highway intersection: Extend the FCP trail between Backlick Road and Richmond HWY. 6. Fairfax County Parkway and John J. Kingman Road/Farrar Drive intersection: Extend the right-turn lane. 7. Fairfax County Parkway/Terminal Road intersection: Install crosswalk, curb ramps, pedestrian signals, and pushbuttons; construct third through lane; relocate bus stop out of channelizing island, install sidewalk connection. 8. Fairfax County Parkway/Loisdale Road intersection: create a buffer between the trail and the roadway; and construct a full-length through lane.

Table 5.4-1: Past, Present, and Reasonably Foreseeable Future Projects (con't.)

Project No.	Name	Proponent	Type	Status	Description
39	HWY Project 55	VDOT	Transportation	Planned / Proposed	This project would widen a segment of Richmond Highway to 6 lanes.
40	HWY Project 79	VDOT	Transportation	Planned / Proposed	This project would widen a segment of Pohick Rd to 4 lanes
41	HWY Project 41	VDOT	Transportation	Planned / Proposed	This project proposes improvements at the I-95/Fairfax County Pkwy interchange.
42	HWY Project 58	VDOT	Transportation	Planned / Proposed	This project would widen a segment of Richmond Highway to 6 lanes.
43	High Occupancy Vehicle (HOV) Project 14	VDOT	Transportation	Planned / Proposed	This project proposes improvements to the HOV lanes on VA-289 (Franconia/Springfield Pkwy) at the interchange with Neuman St.
44	Transit Project 14	VDOT	Transportation	Planned / Proposed	This project proposes a BRT line from Huntington Metro Station to Woodbridge.
45	Transit Project 18	VDOT	Transportation	Planned / Proposed	This project proposes to reduce headways along the Manassas and Fredericksburg VRE Lines.
46	Accotink Village Apartments and Retail	Chesapeake Realty Partners	Mixed-use	Completed	A total of 283 housing units and approximately 12,000 square-feet of retail space were constructed on 6.6 acres on Richmond Highway, between Fairfax County Parkway and Fort Belvoir's Tulley Gate.
47	VA 638 Rolling Road	VDOT	Transportation	Planned / Proposed	The project proposes to widen the section between VA 286 Fairfax Co Pkwy to VA 644 Old Keene Mill Rd to 4 lanes.
48	Defense Threat Reduction Agency (DTRA) Secure Administration Facility	DOD	Institution	Planned / Proposed	DTRA will be constructing a new Secure Administration Facility potentially on or off Fort Belvoir.
49	Richmond Highway Widening	FHWA	Transportation	Complete	A 3.6-mile stretch of Richmond Highway (Telegraph Road to Mount Vernon Highway) was widened from four lanes to six lanes. The project also added turn lanes and medians, a new bridge, and upgraded traffic signals. The project was completed in September 2017.

Table 5.4-1: Past, Present, and Reasonably Foreseeable Future Projects (con't.)

Project No.	Name	Proponent	Type	Status	Description
50	Dogue Creek Bridge Repair	DOD	Transportation	Planned / Proposed	Bridge repair/replacement project near Walker Gate on Fort Belvoir.
51	Old Guard Caisson Platoon Area Development Plan	DOD	Infrastructure	Planned / Proposed	ADP to address training facility deficiencies on Fort Belvoir for the Caisson Platoon.
52	SM-1 Decommissioning	DOD	Institution	Planned / Proposed	USACE is preparing to decommission the Army's deactivated SM-1 Reactor Facility located on Fort Belvoir's South Post adjacent to Gunston Cove.

5.4.1 Commercial Development

Commercial developments include on-post facilities providing dining services, vehicle services, and entertainment. These developments would primarily occur on previously developed land.

A 3,750-square-foot AAFES Car Wash (see Project 2 in **Table 5.4-1**[10]) is proposed for the southeast corner of the Gunston Road and Gorgas Road intersection, while a 9,000-square-foot AAFES Car Care Center (Project 5) is approved for development on a 1.5-acre site near the new PX/Commissary. The car maintenance facility would include 10 service bays and 25 to 30 parking spaces. Future projects also include a 6,500-square-foot *Old Chicago* restaurant (Project 6) and a 185,000-square-foot NMUSA (Project 7). NMUSA is currently under construction and scheduled for completion in 2020.

5.4.2 Institutional Development

Institutional projects are facilities that support administrative functions, training, and day-to-day operations on Fort Belvoir. The INSCOM Headquarters Expansion (Project 4) is currently under construction and anticipated to be completed in 2019. The project would expand INSCOM's headquarters facility, as well as renovate and update existing building space. The STF (Project 11) is an approved project. The STF would be built on a 9.5-acre site on DAAF and include a two-story, 65,000-square-foot classroom and administration building, and a 29,000-square-foot fitness training building.

Several institutional projects are proposed on North Post, including a new 29th Infantry Headquarters (HQ; Project 8), a new Unaccompanied Enlisted Personnel Barracks (Project 10), DLA Administrative Center (Project 14), and redevelopment of the Lower North Post West District (Project 17). None of these projects are expected to introduce new impervious surface. A new 39,810-square-foot 911th Engineering Company Complex (Project 13) would be constructed on an 8.5-acre site between the Fairfax County Parkway and Accotink Village. Approximately 110 new personnel would be required to support the new facility. The proposed ARI (Project 37) is anticipated to increase personnel at DAAF. Implementation of the ARI would add up to 100 personnel and 10 aircraft.

DTRA also proposes a new Secure Administration Facility (Project 48); however, no site location has been determined to date. An 18,093-square-foot Religious Education Center (Project 12) is proposed for a 1.4-acre site between Woodlawn Road and Woodlawn Chapel. Redevelopment of the Lower North Post District (Project 16) would require demolition of existing surface parking lots on the Office of the Chief, Army Reserve site to accommodate development of new office buildings.

5.4.3 Recreational Development

The Mount Vernon Memorial Highway-Potomac Heritage National Scenic Trail (Project 30) is proposed for modernization. Missing sections of pedestrian and bicycle trails from Washington's Mill Historic State Park to Grist Mill Park would be completed. The project is currently in the design phase.

[10] Project numbers referenced in **Section 5** correspond to those listed in **Table 5.4-1** unless otherwise noted.

5.4.4 Mixed-use Development

The North Post Community Support District (Project 18) is planned for redevelopment into a mixed-use area comprising new townhomes, administrative offices, retail services, community facilities, and recreational facilities. The proposed facilities, which would be built on an approximately 21.5-acre site, would be centered around a pedestrian promenade with amenities to serve the community.

The recently completed Accotink Village apartments and retail development (Project 48) includes 283 housing units and approximately 12,000 square feet of retail space. This 6.6-acre complex is located on Richmond Highway near Fort Belvoir's Tulley Gate.

The Embark Richmond Highway project (Project 34) plans to update a 10.4-mile corridor between North Kings Highway in Huntington to the Fairfax County Parkway near Fort Belvoir. The project primarily comprises transportation development but also includes new mixed-use development. Four existing community business centers would be transformed into communities with residential, retail, open space, and tourism development. The project was recently approved (March 2018) to move forward with environmental assessments.

5.4.5 Infrastructure Development

Infrastructure projects in the ROI include updates to parking structures and utility systems. The NMUSA Roads and Infrastructure Improvements project (Project 3) is proposed to provide new infrastructure to the NMUSA. The site is not currently served by water, sanitary sewer, gas, electrical, or information systems, and existing roads and parking lots do not provide adequate access. New utility lines would be extended to provide service to the site and new roadway surfaces would be constructed. The Army is also proposing to build two 350,000-square foot multi-story garages on the existing DLA parking lot (Project 9) to accommodate 1,650 vehicles. The new garages would include stairwells, elevators, security lighting, utility connections, fire protection systems, and stormwater management.

A new communications ductbank is planned between DAAF and the main garrison area of Fort Belvoir (Project 35). The project would require the excavation of a two-foot-wide by six-foot-deep trench to install underground telecommunication conduits along Poe Road. Conduits will then be placed in this trench and encased with cast-in-place concrete. The communications line would traverse a distance of approximately two miles.

The FNSI for the DAAF Tree Removal Project (Project 36) was signed on December 5, 2016. The project will clear trees and shrubs that currently penetrate imaginary surfaces at the airfield, violating the Primary Surface, approach-departure clearance surface, Transitional Surface, taxiway clearance, and apron clearance safety areas. Trees would be removed from five sections of DAAF: 3.5 acres of tree removal in the Northeast Section, less than one acre in the West Section, 2.5 acres in the Northwest Section, 9.2 acres in the Southwest Section, and 4.7 acres in the Southeast Section.

5.4.6 Stormwater Projects

The Fairfax County DPWES is currently undertaking two stormwater projects in the Long Branch South Watershed Management Area (WMA), which contains DAAF. One project involves reforestation efforts at Levelle W. Dupell Park (Project 26). The Newington Solid Waste/Huntington Operating Facility Sewage Treatment Works Partnership project (Project 27) is installing BMPs, such as bioretention, an underground sand filter, and nine hydrocarbon inlet inserts.

5.4.7 Transportation Projects

There are seven transportation projects planned in the ROI under the RPMP. These projects include intersection improvements for Fairfax County Parkway (Project 15) and Richmond Highway (Project 20), road expansions and extensions (Projects 22 and 24), updates to access gates (Project 23), and a new overpass (Project 21). As part of the NMUSA development, the John J. Kingman Road and NMUSA entrance intersections with the Fairfax County Parkway would be converted into a highway-style interchange (Project 19). This project is approved and would be implemented by VDOT in collaboration with Fort Belvoir. Grade separation and ramps would help increase the capacity of the intersections and alleviate traffic delays.

Proposed transportation projects also include Fairfax County Department of Transportation (FCDOT) improvements to Pohick Road (Project 29), Cinderbed Road Bikeway (Project 31), Terminal Road (Project 32), and Richmond Highway pedestrian services (Project 33). FCDOT has multiple short-term improvements planned for Fairfax County Parkway, in collaboration with VDOT (Projects 25 and 38), such as the installation of signals, signs, and crosswalks.

VDOT also has multiple projects planned for the region, including six major highway projects (Projects 39 to 43), road improvements (Project 47), an HOV project on Franconia/Springfield Parkway (44), and several improvements to the Virginia Railway Express and metro system (Projects 45 and 46).

Transportation projects currently under construction include a new access control point at the former Lieber Gate on North Post (Project 1) and Richmond Highway intersection improvements for pedestrians at Lukens Lane, Frye Road, Mohawk Lane, and Belford Drive in Mount Vernon (Project 33). VDOT is also currently replacing the existing bridge that carries Backlick Road over the CSX Railroad with a slightly higher bridge to accommodate the addition of new rail tracks (Project 28). The bridge is located approximately 300 feet east of the Backlick Road/Fairfax County Parkway (Route 286) intersection south of I-95.

The Richmond Highway Widening Project (49) was recently completed in September 2017. A 3.6-mile stretch of Richmond Highway, from Telegraph Road to Mount Vernon Highway, was widened from four to six lanes. This project also added turn lanes, medians, and updated traffic signals.

5.5 Assessment of Cumulative Impacts

For the purposes of this analysis, cumulative effects are considered to be potentially significant if they meet either of the following criteria:

- Effects of past, present, and reasonably foreseeable future projects without the Proposed Action are not potentially significant, but the Proposed Action's additional impact is substantial enough, when added to the effects of other projects, to result in a potentially significant cumulative impact.
- Effects of past, present, and reasonably foreseeable future projects without the Proposed Action are already potentially significant and the Proposed Action contributes measurably to the cumulative effect. The term "measurably" is defined as being noticeable to a reasonable person.

5.5.1 No Action Alternative

Under the No Action Alternative, the updated ADP would not be adopted and none of the proposed ADP projects would be implemented. The continuation of existing conditions at DAAF under the No Action Alternative would have no potential to contribute to cumulative impacts when taken into consideration with past, present, and reasonably future projects occurring at and in the vicinity of the airfield.

5.5.2 Short-Range ADP Projects – Full Implementation Alternative (Preferred Alternative) and Partial Implementation Alternative

5.5.2.1 Land Use, including Aesthetics and Coastal Zone Management

Impacts of Past, Present, and Reasonably Foreseeable Future Projects

Past, present, and reasonably foreseeable future projects considered in this cumulative analysis would have less-than-significant effects on land use and aesthetics in the ROI. Development of proposed and future projects would temporarily turn some areas into construction sites, causing potential adverse effects (e.g., noise, dust, visual interruptions, etc.) on nearby land uses. No adjacent or nearby existing facilities, however, would become unusable due to construction efforts and any adverse impact would be minimized to the extent practicable. Construction would be short-term and projects would be primarily developed on previously disturbed land and areas of consistent zoning. Operation of past, present, and reasonably foreseeable future projects would result in beneficial impacts by improving the visual landscape of the ROI through modern and new facilities, while optimizing land utility to develop new residential, commercial, retail, and recreational space. Although 1.3 acres of recreational space at the Fort Belvoir Golf Course was recently eliminated as part of the NMUSA project, this loss is small relative to the amount of available space and the number of recreational facilities available for use within the ROI. Past, present, and reasonably foreseeable future projects would result in short-term, less-than-significant adverse impacts from construction disturbance, and long-term, beneficial impacts from land optimization.

Cumulative Impacts

Implementation of proposed short-range ADP projects in conjunction with past, present, and future projects would not impede or prevent the operation of existing facilities and activities in the ROI. Upon the completion of each project, construction activities and any associated adverse cumulative impacts

would cease. In the long term, short-range ADP projects and past, present, and future actions would improve the visual landscape of the ROI with modernized and new facilities. Although **Projects 5** and **6** would reduce available recreational space by encroaching on Anderson Park, in conjunction with the recent reconfiguration of the golf course for the NMUSA development, the cumulative reduction of available open space and recreational land would be small in the context of the ROI. There are numerous federal-, state-, regional-, and locally managed facilities available for use within the ROI. In addition, removal of Anderson Park would eliminate the existing inconsistency with the Airfield's underlying land use designation. As neither the incremental effects of the Proposed Action nor the effects of past, present, and reasonably foreseeable future projects are significant, when combined, the cumulative effect is not substantial enough to meet the thresholds for significance. Therefore, incremental impacts from short-range ADP projects in combination with past, present, and reasonably foreseeable future projects would have less-than-significant short-term cumulative impacts from temporary construction activities and long-term, beneficial cumulative impacts from optimized land utility and increased visual appeal.

As the Proposed Action would be consistent to the maximum extent practicable with the enforceable polices of the Virginia CZM Program, no cumulative impacts on the coastal zone would occur, when implemented in conjunction with past, present, and reasonably foreseeable future actions.

5.5.2.2 Historic and Cultural Resources

Impacts of Past, Present, and Reasonably Foreseeable Future Projects

Adverse impacts from past, present, and reasonably foreseeable future projects on cultural and historical resources would result primarily from construction activities; these effects would be periodic and short term. Construction activities would potentially present visual impacts while producing residual dust, noise, and vibrations, which may affect the physical and acoustic environment of historic properties during the construction periods. Construction of present and future projects would also potentially contribute adverse impacts on cultural and historic resources due to new development and excavation that would affect archaeological resources and unanticipated cultural discoveries. Per Section 106 requirements, consultation is required for federal actions to determine: (1) historic resources in the APE prior to approval; and (2) a resolution or avoidance of any potential adverse impacts. Therefore, activities that are required to comply with Section 106 would likely include a construction monitoring plan and other mitigation measures designed to avoid or minimize impacts on archaeological and historic resources. In addition, if impacts are unavoidable, recovery of the resources would occur prior to construction. Therefore, potential adverse impacts on historic and cultural resources from past, present, and future projects would be short-term and less than significant.

Cumulative Impacts

Construction of short-range ADP projects may have short-term, less-than-significant, indirect adverse effects on architectural resources in the APE. However, these potential adverse effects would be further minimized by factors such as distance from source; the type, duration, and timing of activity;

development regulation; and baseline environmental conditions. The Proposed Action would not disturb known archaeological sites on DAAF, although unanticipated discoveries may occur. This is unlikely, however, given prior land-disturbing activities conducted on and around the airfield. With implementation of avoidance, minimization, and mitigation measures (as required), and adherence to Fort Belvoir's ICRMP, short-range ADP projects would result in less-than-significant adverse impacts on architectural and archaeological resources. As neither the incremental effects of the Proposed Action nor the effects of past, present, and reasonably foreseeable future projects are significant, when combined, the cumulative effect is not substantial enough to meet the thresholds for significance. Therefore, incremental impacts of the Proposed Action, in conjunction with the less than-significant effects of past, present, and future projects, would result in less than-significant cumulative impacts on historic and cultural resources from implementation of short-range ADP projects.

5.5.2.3 Air Quality

Impacts of Past, Present, and Reasonably Foreseeable Future Projects

Projects currently under construction as well as future construction activities from reasonably foreseeable future projects would generate emissions and dust that would temporarily contribute to the deterioration of local air quality. The handling and transportation of excavated and imported materials during construction, as well as the use of heavy-duty, diesel-powered trucks traveling to and from construction sites, would generate direct and indirect criteria pollutant emissions. Construction activities would also produce fugitive dust, while stationary equipment would generate HAP emissions. These emissions are not expected to contribute to adverse effects on regional air quality or human health.

Operating permits are required for major and non-major stationary sources of air pollution. Facilities must annually certify compliance with applicable requirements and renew permits to adhere with VDEQ standards. Past, present, and future projects that require air permits would be in compliance with VDEQ air quality standards, and projects that do not require air permits would not contribute to adverse air quality impacts. Project proponents would be responsible for complying with local and regional air quality standards. In the long term, these projects may generate emissions, particularly from institutional and commercial buildings as well as transportation projects affecting changes in traffic patterns in the ROI.

Cumulative Impacts

Airborne dust and other pollutants would be generated during construction of the short-range ADP projects. Short-range ADP projects would add an incremental increase of emissions in the ROI, and therefore produce a cumulative impact in conjunction with emissions from past, present, and reasonably foreseeable actions. As the emissions from past, present, and future actions are not anticipated to contribute to significant adverse effects on overall air quality or human health, the cumulative increase in emissions from the Proposed Action would be less than significant. At the group level, the total emissions from short-range ADP projects in any given year would be less than the general conformity applicability thresholds, meaning no single short-range ADP project would have emissions that

meet or exceed the applicable thresholds. Construction activities would be spread out over a 10-year period and would be executed in compliance with state and regional air quality standards. Even assuming that all of the emissions occur in one year, the estimated emissions are well below threshold levels and would not be significant when added to emissions from past, present, and future actions. As neither the incremental effects of the Proposed Action nor the effects of past, present, and reasonably foreseeable future projects are significant, when combined, the cumulative effect is not substantial enough to meet the thresholds for significance. Therefore, incremental impacts from construction of the Proposed Action, when minimized to the extent practicable, would result in short-term, less-than-significant cumulative adverse impacts on air quality, when combined with less-than-significant adverse impacts of past, present, and future projects.

In the long term, operation of short-range ADP projects would generate emissions, although there would be no new emission sources and no increase in emissions beyond those included in Fort Belvoir's Title V operation permit. Under the Alternatives, there would be incremental changes in traffic patterns on- and off-post from the realignment of Santjer Road and Gavin Road (**Project 5**), contributing less-than-significant adverse long-term effects on air quality. In conjunction with operation of past, present, and future projects, the Proposed Action would result in long-term adverse cumulative effects on air quality. Cumulative effects, however, would be minimized to less-than-significant levels. Traffic management approaches outlined in the RPMP Transportation Management Plan would reduce any mobile emissions associated with Fort Belvoir activities. Measures include staggering work hours, restricting parking, providing transit and vanpool discounts, establishing reserved carpool/vanpool parking spaces, and encouraging public bus service to Metrorail stations. Long-term, adverse cumulative impacts of past, present, and future projects and short-range ADP projects on air quality, when minimized to the extent practicable, would be less than significant.

5.5.2.4 Noise

Impacts of Past, Present, and Reasonably Foreseeable Future Projects

Construction of present and reasonably foreseeable future projects would create additional noise in the ROI, specifically from construction equipment and vehicles. Sensitive noise receptors (e.g., hospitals, religious institutions, schools, and residences) are present in North Post and may be affected by construction noise. It is expected that most noise would be generated in the early phases of construction, particularly when demolition, vegetation clearing, and excavation would take place. Noise would decrease throughout the duration of construction and cease entirely after construction is completed. During operation of past, present, and reasonably foreseeable future projects, the main source of new noise would be from increased vehicular traffic due to an increase in commuters from an increase in personnel (over 3,000 from development of present and future projects) on the installation. The Aviation Restructure Initiative (Project 37) would increase aircraft traffic for 12th AV BN operations, which may potentially increase airfield noise.

Cumulative Impacts

Construction of short-range ADP projects would generate noise as well. Noise generated by these activities would be similar to that of projects of similar scale occurring with relative frequency throughout the Northern Virginia region as well as other areas of Fort Belvoir. No particularly unusual or extraordinary types or volume of noise would be generated by the proposed ADP projects. While excessive construction noise could occur if the construction phases of short-range ADP projects and nearby projects, such as the STF and DAAF Communications Line Extension, overlap, it is unlikely given that short-range ADP projects would take place over a ten-year period. The staggered implementation of the proposed projects over a 10-year period would ensure that the volume, intensity, and duration of noise generated by construction-related activities would vary substantially during that time. Thus, any adverse cumulative impacts on noise during construction would be short-term, intermittent, and less than significant. Conversely, operation and maintenance of short-range ADP projects would not result in any long-term impacts on noise, as aircraft flight operations would remain the same as existing conditions; thus, no long-term cumulative impacts from noise would occur.

5.5.2.5 Geology, Topography, and Soils

Impacts of Past, Present, and Reasonably Foreseeable Future Projects

Construction of past, present, and reasonably foreseeable future projects would disturb soils, as installation of foundation piles would require extensive excavation and fill work. The process of excavating native soils for development typically results in a loss of soil structure and a mixing of soil horizons. While clean soils are often placed back into the excavated areas as fill, the mixing of the soils results in a long-term loss of productivity. Construction activities would also cause increased erosion and sediment runoff. Topography would be altered from grading and cut-and-fill activities, particularly from projects involving road and pavement work, while potential adverse effects on geology may occur from construction activities requiring pile foundations. Site-specific E&SC plans would minimize potentially significant adverse impacts on soils. Geotechnical surveys would help determine suitable foundations to minimize geological impacts. As construction would be temporary and occur in previously disturbed areas, representing a relatively small percentage of land in the ROI, construction of present and reasonably foreseeable future projects would not result in significant impacts or changes in area geology, topography, and soils.

Cumulative Impacts

Construction of short-range ADP projects, particularly **Projects 5**, **6**, **7**, and **8**, would involve grading, leveling, excavation, and filling. These activities would contribute to adverse cumulative effects on topography and soils in the ROI, in conjunction with construction of past, present, and future projects. As the majority of DAAF and the surrounding vicinity is covered by paved and developed surfaces and is underlain by previously disturbed soils, adverse cumulative impacts are expected to be less than significant. As short-range ADP projects would occur in phased development over a ten-year period, it is unlikely that significant cumulative disturbance of topography and soil would occur. Developers are also

expected to implement BMPs, such as E&SC measures, to minimize adverse impacts. Incremental impacts of short-range ADP projects from construction activities when added to the impacts of past, present, and future projects would contribute less-than-significant adverse cumulative impacts on topography and soils.

Under the Alternatives, **Projects 5** and **6** may adversely affect geological conditions at DAAF as soils lacking sufficient load bearing capacity potentially underlie these sites and would require a pile foundation emulating a rock platform or bedrock structural support. In conjunction with past, present, and reasonably foreseeable future projects, the Proposed Action would result in adverse cumulative impacts on geology. Through geotechnical surveys implemented to characterize subsurface conditions and inform project design decisions with respect to foundations, adverse cumulative impacts on geology would be minimized. In addition, construction activities would be temporary in nature and occur intermittently. Therefore, cumulative adverse impacts on geology from construction of short-range ADP projects and past, present, and reasonably foreseeable future actions would be less than significant.

5.5.2.6 Water Resources

Impacts of Past, Present, and Reasonably Foreseeable Future Projects

Potential adverse impacts of past, present, and reasonably foreseeable future projects on water resources in the ROI would occur primarily through construction activities. Construction would disrupt groundwater flow due to foundation installation and dewatering. Construction sites would be sources of soil and sediment disturbance, which would lead to sediment and contamination transport and runoff into nearby waterbodies and coastal zone-regulated areas. A net increase in impervious surfaces (at least 34 acres from projects currently under or proposed for construction) would increase storm surge flooding and alter downstream water quality. Nevertheless, developers are expected to implement stormwater management controls to reduce erosion and sediment transport, while new projects would incorporate BMPs and LID measures to reduce the potential for long-term significant adverse impacts on areas downstream.

These measures would also minimize adverse effects on floodplains that would potentially occur from development of projects within or adjacent to floodplains. Specifically, the NMUSA project is currently under construction and partially occurs within Accotink Creek's 100-year floodplain, while the new STF would occur adjacent to the floodplain. A short stretch of the Richmond Highway Corridor Improvements project (between Jeff Todd Way and Sacramento Drive) would occur within 100-year and 500-year floodplains. Adverse impacts on water resources from development of past, present, and reasonably foreseeable future projects would be less than significant. With respect to potential wetland impacts from construction and development, project proponents would obtain coverage under applicable permits issued by USACE in accordance with the CWA and would adhere to avoidance, mitigation, and/or compensation requirements to ensure that impacts on WOUS would remain less than significant.

Cumulative Impacts

Short-range ADP projects would result in similar impacts on water resources. Construction of short-range ADP projects and past, present, and future projects would cumulatively disrupt groundwater flow and lead to sediment and contamination transport and runoff into nearby waterbodies and coastal zone-regulated areas. Increases in impervious surface from past, present, and future projects considered in this cumulative analysis (at least 34 acres) and short-range ADP projects (18.5 acres) would result in a cumulative increase in storm surge flooding and potentially alter downstream water quality. This amount of new impervious surface, however, is not expected to alter hydrology significantly, especially in an urbanized setting that is consistent with the developed and disturbed environment of DAAF and the surrounding ROI. Total impervious surface increase (at least 52.5 acres) would be approximately 0.6 percent of impervious area within the Accotink Creek watershed and approximately 0.2 percent of the watershed's total land area (**Table 4.7-1**). Resulting cumulative impacts on groundwater, surface water and quality, and stormwater would be less than significant with implementation of BMPs.

The encroachment on an estimated 3 acres of the 100-year floodplain on DAAF from short-range ADP projects under the Full and Partial Implementation Alternatives, in conjunction with floodplain encroachment from past, present, and reasonably foreseeable future projects, would result in adverse cumulative impacts on floodplains. The BMPs and LID measures proposed, however, would reduce the potential for significant adverse cumulative impacts on the 100-year floodplain and areas downstream, as would flood mitigation. Therefore, short-range ADP projects, when taken into consideration with past, present, and reasonably foreseeable future projects, would not cumulatively raise flood elevations or encroach on the floodplain.

Cumulative impacts on wetlands from implementation of the short-range ADP projects and past, present, and future projects would be potentially significant. The temporary and permanent cumulative impact on wetlands from all short-range ADP projects is anticipated to be 1.4 acres, under both Partial and Full Implementation Alternatives. Other regional development could adversely impact wetlands as well, adding to cumulative wetland impacts in the ROI. Total quantifiable wetland impacts from RPMP projects would be just over 1 acre (Fort Belvoir, 2015a). Project-specific mitigation measures, such as adherence to USACE permit conditions and associated avoidance, mitigation, and compensation measures, would minimize cumulative significant impacts on wetlands to the greatest extent practicable. In addition, impacts from short-range ADP projects would not likely appreciate over the life of the project or increase its contribution to cumulative effects.

5.5.2.7 Biological Resources

Impacts of Past, Present, and Reasonably Foreseeable Future Projects

Past, present, and reasonably foreseeable future projects in the ROI would disturb biological resources. Construction activities would require vegetation clearing and tree removal, resulting in loss of plant communities and vegetation resources. In areas of temporary disturbance (e.g., construction staging areas and access roads), trees and vegetation would be replaced after construction activities cease.

Permanent removal of vegetation for development of Fort Belvoir projects would adhere to the Fort Belvoir *Tree Removal and Protection Policy*, ensuring replacement of trees on the installation. The DAAF Tree Removal project would adhere to this policy as well. As such, adverse impacts on vegetation would be short-term. Construction, demolition, grading, excavation, and trenching would also disturb soils and cause erosion. The corresponding sedimentation of receiving water bodies would have the potential to degrade habitat for aquatic macroinvertebrates and fish within those water bodies. Adherence to conditions of the CGP for projects disturbing one or more acres of land and the requirements of site-specific E&SC plans and SWPPPs would minimize or eliminate the potential for such impacts; thus, adverse impacts on aquatic species would be less than significant.

The conversion of pervious surfaces to impervious surfaces for construction of several projects, such as the NMUSA, INSCOM HQ Expansion, and STF, would reduce the amount of vegetation available to wildlife as habitat, as would clearing for site access and equipment staging. The majority of past, present, and reasonably foreseeable future projects, however, take place on previously disturbed and/or already developed land. Construction noise and vibration impacts would also disturb nearby wildlife. These impacts would be negligible to species accustomed to changes in urban environments; however, disturbance of sensitive species would require adherence to construction BMPs and permit conditions (e.g., seasonal restrictions and buffers). Therefore, adverse impacts on wildlife, including rare, threatened, and endangered species and their habitats, would be less than significant.

Cumulative Impacts

While short-range ADP projects would permanently clear all or most trees in a 0.6-acre area for **Project 6**, all tree clearing would be mitigated in compliance with the Fort Belvoir *Tree Removal and Protection Policy #27*, which ensures that no significant cumulative loss of trees occurs on the post, through adherence to a 2:1 replacement ratio and other measures. Adherence to this policy during the Proposed Action as well as past, present, and future projects on the installation would not result in significant cumulative impacts on plant communities. The removal of the earthen knoll under ADP **Project 8** (**Section 2.1.1**) would also clear existing vegetation, although this area primarily consists of maintained grass. Disturbed areas would be landscaped with native vegetation following the completion of construction activities. With compliance to replanting policies for permanent tree removal and revegetation for temporary disturbance, and given the previously disturbed nature of much of the ROI, adverse cumulative impacts on vegetation and plant communities would be less than significant.

As the Proposed Action and past, present, and reasonably foreseeable future projects would adhere to CGP conditions for projects disturbing one or more acres of land, impacts on receiving water bodies from erosion and sedimentation would be minimized. Thus, cumulative adverse impacts on aquatic species would be less than significant. Cumulative adverse impacts on wildlife and sensitive species would be less than significant as well. No federally listed species are known to inhabit DAAF. Construction of the Proposed Action and past, present, and future actions would implement avoidance or other mitigation measures to ensure that no adverse impacts on sensitive species and their habitats would occur. When taken into consideration with the less-than-significant adverse effects of past, present, and future projects, the incremental impacts of short-range ADP projects would result in short-

term, less-than-significant cumulative impacts on wildlife, including rare, threatened, and endangered species.

5.5.2.8 Health and Safety

Impacts of Past, Present, and Reasonably Foreseeable Future Projects

Potential adverse impacts of past, present, and reasonably foreseeable future projects on health and safety would occur during construction. Construction activities can be sources of accidents and safety hazards, contributing to the potential for a physical injury or fatality or an exposure to a hazardous substance. With the adherence to standard construction BMPs, safety protocol, and hazardous waste management plans, however, construction contractors would minimize any potential significant health and safety risks. Further, construction sites would be fenced and only accessible to contractors; thus, any risks to the safety of passers-by would be unlikely. It is also expected that operation of past, present, and future projects would comply with all applicable health and safety requirements, eliminating any long-term or permanent risks.

Cumulative Impacts

Construction of short-range ADP projects would result in less-than-significant adverse impacts on health and safety due to an elevated risk for injury and accidents. The construction, demolition, and disposal of demolition debris, if conducted without additional characterization and special precautions, may disperse hazardous substances into the environment, potentially exposing construction workers to these substances. Workers would be required to take appropriate precautions, such as donning proper PPE and receiving procedural training to avoid hazardous substances, to ensure safety. In conjunction with less-than-significant impacts of past, present, and reasonably foreseeable future projects, adverse incremental impacts of short-range ADP projects would result in less-than-significant adverse cumulative impacts when conducted in compliance with applicable OSHA regulations and safety standards. In addition, because the short-range ADP projects would be located on an active military installation with controlled access, public safety risks would not be a concern. As such, potential adverse cumulative impacts on human and environmental health would be short-term and less than significant.

5.5.2.9 Hazardous Materials and Waste

Impacts of Past, Present, and Reasonably Foreseeable Future Projects

The primary adverse impact of past, present, and reasonably foreseeable future projects from hazardous materials and waste include discharge, spills, and contamination during construction efforts, as well as encounters with unexpected hazardous materials. Any construction activities requiring ground disturbance would potentially cause subsurface disturbance of hazardous materials and contribute to the spread of contaminants into the environment, leading to runoff of contaminated soil and/or groundwater. Adverse impacts may also occur from the operation of several institutional and commercial projects that may generate hazardous waste (e.g., AAFES Car Care Center [Project 5] and Name Brand Casual Dining Restaurant [Project 6]). To minimize adverse impacts, it is expected that

appropriate controls, as well as proper permitting and compliance, would be in place to prevent exposure and the spread of contamination; thus, short- and long-term adverse impacts would be less than significant. Potential beneficial impacts may occur from the removal and disposal of contaminated soils. Such soils excavated during construction activities would be characterized and transported to proper disposal facilities, contributing toward a removal of contaminants from the ROI.

Cumulative Impacts

The Proposed Action, in conjunction with past, present, and future projects would result in short-term, less-than-significant adverse cumulative impacts on hazardous materials and waste, in addition to long-term beneficial cumulative impacts. Construction of short-range ADP projects and past, present, and future projects would require the use of hazardous materials, such as fuel, oils, and lubricants. The use of these materials could potentially contaminate runoff, soils, and groundwater in the ROI; however, all hazardous materials would be handled in accordance with applicable health and safety regulations and procedures. Precautions would be taken to minimize the risk of spills and address spills that may occur. Similarly, the use, storage, and disposal of hazardous substances during implementation of short-range ADP projects would be conducted in compliance with applicable federal, state, and local laws and regulations and in accordance with the Army's established policies. As neither the incremental effects of the Proposed Action nor the effects of past, present, and reasonably foreseeable future projects are significant, when combined, the cumulative effect is not substantial enough to meet the thresholds for significance. Therefore, the Proposed Action, in conjunction with past, present, and foreseeable future projects, would result in short-term, less-than-significant adverse cumulative impacts from hazardous materials and waste.

Conversely, operation of the Proposed Action and past, present, and future projects would result in long-term beneficial cumulative impacts. Construction activities would require the excavation of soil, requiring any excavated soil to be sampled for contaminants and subsequently disposed of. Removal of contaminated soil would contribute to a beneficial impact on the ROI in the long term. There would be no cumulative impacts on petroleum storage tanks, pesticides, ACM, LBP, radon, or SWMUs from implementation of the Proposed Action and past, present, and future actions, as the short-range ADP projects would result in no incremental effects on these resources.

5.5.3 Mid- and Long-Range ADP Projects – Full Implementation Alternative (Preferred Alternative)

5.5.3.1 Land Use, including Aesthetics and Coastal Zone Management

Impacts of Past, Present, and Reasonably Foreseeable Future Projects

Impacts from past, present, and reasonably foreseeable future projects on land use resources are the same as discussed in **Section 5.5.2.1**.

Cumulative Impacts

Cumulative impacts on land use, plans, and aesthetics from mid- and long-range ADP projects, in conjunction with past, present, and reasonably foreseeable future projects, would be similar to those described for the short-range ADP projects (**Section 5.5.2.1**). Construction-related activities would have the potential to cause annoyance to noise-sensitive land uses in the ROI but would not prevent or interfere with operations. The staggered implementation of mid- and long-range ADP projects over a 20-year period would ensure that any incremental nuisances are not significant. Therefore, short-term, adverse cumulative impacts from construction of the Proposed Action in conjunction with construction of past, present, and future projects would be less than significant.

As **Projects 10** through **16** and **18** through **24** would be designed and built in accordance with Fort Belvoir's IPS and DAAF regulating plan, the Proposed Action would build facilities that are visually compatible with the airfield and the ROI, in conjunction with new and modernized facilities from past, present, and future projects. As such, there would be long-term cumulative benefits from modernized facilities contributing to an overall cohesive visual landscape.

5.5.3.2 Historic and Cultural Resources

Impacts of Past, Present, and Reasonably Foreseeable Future Projects

Impacts from past, present, and reasonably foreseeable future projects on historic and cultural resources are the same as discussed in **Section 5.5.2.2**.

Cumulative Impacts

Under the Full Implementation Alternative, cumulative impacts from mid- and long-range ADP projects and past, present, and future projects would be similar to cumulative impacts described for the short-range ADP projects (**Section 5.5.2.2**). Short-term, less-than-significant, indirect adverse effects on architectural resources located within the APE may result from construction of the short-range ADP projects. These potential adverse effects would be minimized by factors such as distance from source; the type, duration, and timing of activity; development regulation; and the baseline environment, among others. The Proposed Action would not disturb known archaeological sites on DAAF, although unanticipated discoveries may occur. As mid-range ADP projects would occur on previously disturbed land, unanticipated cultural discoveries are not expected. The discovery of unanticipated cultural resources is possible during construction of long-range ADP projects, as undiscovered remnants of previous historic-era occupation may be present in areas where previous disturbance is not prevalent; specifically, the proposed ROW for **Project 24** is situated in a primarily vegetated and undisturbed area.

Compliance with Fort Belvoir's ICRMP with regard to unanticipated discoveries would render any adverse effects to less-than-significant levels. As neither the incremental effects of the Proposed Action nor the effects of past, present, and reasonably foreseeable future projects are significant, when combined, the cumulative effect is not substantial enough to meet the thresholds for significance. With implementation of standard construction BMPs and federal, state, and local regulations, construction of

mid- and long-range ADP projects would result in less-than-significant adverse cumulative effects on historic and cultural resources in the ROI, in conjunction with past, present, and future projects.

5.5.3.3 Air Quality

Impacts of Past, Present, and Reasonably Foreseeable Future Projects

Impacts from past, present, and reasonably foreseeable future projects on air quality are the same as discussed in **Section 5.5.2.3**.

Cumulative Impacts

The implementation of mid- and long-range ADP projects combined with past, present, and reasonably foreseeable future projects would result in similar cumulative impacts as short-range ADP projects (**Section 5.5.2.3**). Collectively, construction of the ADP projects and past, present, and reasonably foreseeable future projects would generate air emissions and fugitive dust. These construction activities, however, would not take place at the same time and would adhere to regional air quality standards. Estimated emissions for mid-range ADP projects are well below threshold levels and the general conformity requirements do not apply. Similarly, annual emissions for long-range ADP projects would likely be *de minimis* as well. As neither the incremental effects of the Proposed Action nor the effects of past, present, and reasonably foreseeable future projects are significant, with the assumption that project proponents would meet applicable air quality standards, the cumulative effect, when combined, is not substantial enough to meet the thresholds for significance. Therefore, any cumulative adverse impacts on air quality from construction of mid- and long-range ADP projects would be short-term and less than significant.

Operation of mid- and long-range ADP projects may contribute incremental changes in traffic patterns on and off post from the new access gate (**Project 19**) and the new perimeter road (**Project 24**), resulting in incremental long-term effects on air quality both regionally and locally. Resulting adverse effects would, however, be minimized to less-than-significant levels and ADP projects would not add new emission sources or increase emissions beyond those included in the current Title V operation permit. The operational emissions would be less than or similar to current operational emissions. In addition, **Project 24** would contribute toward minimizing vehicular emissions by improving access from the new perimeter road to Britten Drive, as would reasonably foreseeable future transportation projects in the ROI, such as Fairfax County Parkway and Richmond Highway improvements. Therefore, adverse cumulative impacts of past, present, and future projects and the operation of mid- and long-range ADP projects on air quality, when minimized to the extent practicable, would be less than significant.

5.5.3.4 Noise

Impacts of Past, Present, and Reasonably Foreseeable Future Projects

Impacts from past, present, and reasonably foreseeable future projects on noise are the same as discussed in **Section 5.5.2.4**.

Cumulative Impacts

Construction and operation of mid- and long-range ADP projects in conjunction with past, present, and reasonably foreseeable future projects would contribute similar cumulative impacts on noise as short-range ADP projects (**Section 5.5.2.4**). Any adverse incremental impacts on noise during construction of mid- and long-range ADP projects would be short-term and less than significant, as would construction of past, present, and reasonably foreseeable future projects. Increased noise would cease once construction activities have ended. As neither the incremental effects of the Proposed Action nor the effects of past, present, and reasonably foreseeable future projects are significant, when combined, the cumulative effect is not substantial enough to meet the thresholds for significance. Therefore, mid- and long-range ADP projects in conjunction with past, present, and reasonably foreseeable future projects would result in short-term, less-than-significant adverse cumulative impacts.

5.5.3.5 Geology, Topography, and Soils

Impacts of Past, Present, and Reasonably Foreseeable Future Projects

Impacts from past, present, and reasonably foreseeable future projects on geology, topography, and soils are the same as discussed in **Section 5.5.2.5**.

Cumulative Impacts

Construction of mid- and long-range ADP projects under the Full Implementation Alternative would result in similar cumulative impacts on topography and soils as construction of short-range ADP projects, in conjunction with past, present, and reasonably foreseeable future projects (**Section 5.5.2.5**). Construction of **Projects 11, 13, 19** and **23** would require deep foundations, potentially affecting geologic conditions, while grading, leveling, excavation, and filling for all mid- and long-range ADP projects, with the exception of **Project 16**, would disturb the topography of the immediate project site. These actions would occur intermittently and would be temporary in nature. There would also be disturbance to soils from development of these projects. **Projects 11, 13, 14, 19, 20, 22, 23,** and **24** would be sited on soils with potential development limitations; however, these soils would be analyzed at a project level to determine and quantify their suitability to support development. All other projects would be sited on previously developed soils that are considered suitable for development. Adverse impacts would be minimized through implementation of site-specific BMPs and incorporation of LID measures. As neither the incremental effects of mid- and long-range ADP projects nor the effects of past, present, and reasonably foreseeable future projects are significant, when combined, the cumulative effect is not substantial enough to meet the thresholds for significance; therefore, adverse cumulative impacts on geology, topography, and soils would be short-term and less than significant.

5.5.3.6 Water Resources

Impacts of Past, Present, and Reasonably Foreseeable Future Projects

Impacts from past, present, and reasonably foreseeable future projects on water resources are the same as discussed in **Section 5.5.2.6**.

Cumulative Impacts

Construction and operation of mid- and long-range ADP projects would contribute similar types of impacts on water resources as short-range ADP projects; as such, cumulative impacts would be similar (**Section 5.5.2.6**). Construction of ADP projects and past, present, and future projects would cumulatively disrupt groundwater flow and lead to sediment and contamination transport and runoff into nearby waterbodies. Construction activities would be temporary and minimized by standard BMPs and the proper use, handling, storage, and disposal of potential contaminants. Increases in impervious surface from past, present, and future projects (at least 34 acres) and mid- and long-range ADP projects (19 acres) would result in a total impervious surface increase of at least 53 acres, potentially increasing storm surge flooding and altering downstream water quality. This amount of new impervious surface, however, is not expected to alter hydrology significantly, particularly in an urbanized setting that is consistent with the developed and disturbed environment of DAAF and the surrounding ROI. The cumulative increase would be approximately 1.3 percent of impervious area within the Accotink Creek watershed and approximately 0.2 percent of the watershed's total land area (**Table 4.7-1**). Resulting cumulative impacts on groundwater, surface water and quality, and stormwater would be less-than-significant with implementation of BMP.

Projects 11, 12, 14, 19, and **23** would be located entirely within the floodplain, encroaching upon approximately 4.4 acres. In conjunction with floodplain encroachment from past, present, and reasonably foreseeable future projects, there would be adverse cumulative impacts on floodplains. The BMPs and LID measures proposed, however, would reduce the potential for significant adverse cumulative impacts on the 100-year floodplain and areas downstream, as would flood mitigation. Therefore, short-range ADP projects, when taken into consideration with past, present, and reasonably foreseeable future projects, would not cumulatively raise flood elevations or encroach on the floodplain.

As the collective impact on wetlands from all long-range ADP projects is anticipated to be 1.7 acres, which exceeds the significance threshold for wetland impacts, the cumulative impact on wetlands from the long-range alternative phase is expected to be significant as well. Mid-range ADP projects would not by themselves significantly affect wetlands, but they would contribute 0.5 acre of wetland impact to the total for the Full Implementation Alternative. It is important to note that at the programmatic level, the temporary and permanent impact on wetlands from implementing the Full Implementation Alternative is approximately 3.6 acres. In addition to wetland impacts from other actions, such as the RPMP projects which would impact just over 1 acre of wetlands, the total cumulative impact on wetlands is expected to be 4.6 acres from implementation of mid- and long-range ADP projects. Full implementation of the ADP would also result in significant impacts on streams (2,026 linear feet), which exceeds the threshold of significance for stream impacts. In conjunction with anticipated wetland and stream impacts from past,

present, and future actions, the Full Implementation Alternative would contribute toward potentially significant impacts on wetlands and streams.

At both the alternative phase and complete alternative levels, wetland and stream impacts would likely not increase substantially beyond the estimates presented in the EIS and thus, would not increase its cumulative contribution when taken into consideration with other past, present, and reasonably foreseeable future projects. In addition, a large amount of land within the ROI is expected to remain in a conservation status (e.g., the Southwest Area), thereby preserving existing wetlands. Throughout the 30-year life of the project, wetland impacts would continue to be evaluated on an individual basis prior to implementation. Further, the Proposed Action's potentially significant contribution to cumulative adverse impacts on wetlands and streams would be further minimized with project-specific adherence to applicable permitting requirements and associated avoidance, mitigation, and compensation requirements.

5.5.3.7 Biological Resources

Impacts of Past, Present, and Reasonably Foreseeable Future Projects

Impacts from past, present, and reasonably foreseeable future projects on biological resources are the same as discussed in **Section 5.5.2.7**.

Cumulative Impacts

Construction and operation of mid- and long-range ADP projects, in conjunction with implementation of past, present, and reasonably foreseeable future projects, would result in similar cumulative impacts on biological resources as short-range ADP projects (**Section 5.5.2.7**). As none of the mid- and long-range ADP projects would meet or exceed the thresholds of significant for impacts on plant communities, aquatic species, wildlife, or sensitive species and protected habitats, incremental effects of the Proposed Action would be less than significant. Adverse impacts would be further minimized through adherence to applicable permit conditions (e.g., seasonal restrictions, construction buffers) and federal, state, and local regulations, along with implementation of BMPs. Therefore, mid- and long-range ADP projects in conjunction with past, present, and reasonably foreseeable future projects would result in short-term, less-than-significant adverse cumulative effects.

5.5.3.8 Health and Safety

Impacts of Past, Present, and Reasonably Foreseeable Future Projects

Impacts from past, present, and reasonably foreseeable future projects on health and safety are the same as discussed in **Section 5.5.2.8**.

Cumulative Impacts

Mid- and long-range ADP projects would result in similar cumulative impacts on health and safety as short-range ADP projects, in conjunction with past, present, and reasonably foreseeable future projects

(**Section 5.5.2.8**). During construction, potential risks to health and safety, such as accidents and injury, would potentially occur. In addition, if conducted without additional characterization and special precautions, construction activities may disperse hazardous substances into the environment, potentially exposing construction workers to these substances. The construction, demolition, and operation of mid- and long-range ADP projects would comply with all applicable health and safety requirements to eliminate and reduce the potential for adverse impacts on health and safety. As neither the incremental effects of the Proposed Action nor the effects of past, present, and reasonably foreseeable future projects are significant, when combined, the cumulative effect is not substantial enough to meet the thresholds for significance. Therefore, cumulative adverse impacts of mid- and long-range ADP projects and past, present, and future projects would be less than significant.

5.5.3.9 Hazardous Materials and Waste

Impacts of Past, Present, and Reasonably Foreseeable Future Projects

Impacts from past, present, and reasonably foreseeable future projects on hazardous materials and waste are the same as discussed in **Section 5.5.2.9**.

Cumulative Impacts

Mid- and long-range ADP projects would result in similar cumulative impacts on hazardous materials and waste as short-range ADP projects, in conjunction with past, present, and reasonably foreseeable future projects, as the types and magnitude of projects (and subsequently, incremental effects) would be similar (**Section 5.5.2.9**). Construction of mid- and long-range ADP projects would require the use of hazardous materials, such as fuel, oils, and lubricants. All hazardous materials, however, would be handled in accordance with applicable health and safety regulations and procedures. Precautions would be taken to minimize the risk of spills. Further, the staggered implementation of the proposed projects over approximately 20 years would ensure that adverse impacts from hazardous materials and wastes resulting from construction activities do not occur simultaneously, thereby minimizing the severity of any such impacts. As neither the incremental effects of the Proposed Action nor the effects of past, present, and reasonably foreseeable future projects are significant, when combined, the cumulative effect is not substantial enough to meet the thresholds for significance. Therefore, the Proposed Action, in conjunction with past, present, and foreseeable future projects, would result in short-term less-than-significant adverse cumulative impacts on hazardous materials and waste.

Conversely, operation of the Proposed Action and past, present, and future projects would result in long-term beneficial cumulative impacts. The modernization of past, present, and future projects and existing facilities (**Projects 10, 14, 16, 17**) in addition to the construction of new facilities (**Projects 11, 12, 13, 20, 21,** and **22**) would provide the opportunity to improve or upgrade hazardous materials storage areas and potentially consolidate or decrease the number of hazardous materials storage areas in the ROI. Construction activities would require the excavation of soil, requiring any excavated soil to be sampled for contaminants and subsequently disposed of. Removal of contaminated soil and hazardous substances would contribute to a beneficial impact on the ROI in the long term. There would

be no adverse cumulative impacts on petroleum storage tanks, pesticides, ACM, LBP, radon, or SWMUs from implementation of the Proposed Action and past, present, and future actions, as the mid- and long-range ADP projects would result in no incremental effects on these resources.

5.5.4 Mid-Range ADP Projects – Partial Implementation Alternative

Cumulative impacts from mid-range ADP projects under the Partial Implementation Alternative, in conjunction with past, present, and reasonably foreseeable future projects, would be similar to cumulative impacts from the Full Implementation Alternative. Although construction of mid-range ADP projects under the Partial Implementation Alternative would require less ground disturbance, as fewer projects would be implemented, overall adverse impacts would remain less than significant. As neither the incremental effects of the mid-range ADP projects under the Partial Implementation Alternative nor the effects of past, present, and reasonably foreseeable future projects are significant, when combined, the cumulative effect is not substantial enough to meet the thresholds for significance. Therefore, implementation of mid-range ADP projects under the Partial Implementation Alternative would not result in any significant adverse cumulative impacts when taken into consideration with implementation of past, present, and reasonably foreseeable future projects.

6 Mitigation and Management Measures, and Summary of Impacts

6.1 Introduction

Mitigation measures are those that the Army would identify and implement to mitigate significant adverse impacts on resources as identified in the EIS. Such measures would include those specified in applicable permits, which would likely include, but would not be limited to, the preparation of and adherence to a compensatory mitigation plan.

Management measures associated with the Proposed Action may include standard protocols, procedures, and requirements the Army would implement to minimize potential adverse effects (i.e., minimization measures or BMPs), or project-specific requirements not routinely implemented by the Army.

This section outlines minimization and anticipated mitigation measures under the Proposed Action; however, additional measures may be identified as more detailed project data is made available over the course of the Proposed Action. These data could include further study to document existing conditions on DAAF, more advanced project designs, and the results of ongoing regulatory consultations (e.g., permitting), among others, to address known or potential resource-specific impacts on a project-by-project basis. In this manner, the Army would satisfy all regulatory requirements applicable to the Proposed Action.

The management measures outlined in this section are organized by resource or resource area, as presented in **Chapter 4**. Implementation of the mitigation and management measures outlined below will ensure that significant adverse impacts are mitigated to the extent possible, and that less-than-significant adverse impacts do not exceed applicable significance thresholds.

Specific measures to minimize potential adverse effects will be identified in the Army's ROD for the Proposed Action (**Section 1.5.4**).

6.2 Mitigation and Management Measures

6.2.1 Mitigation Measures

Prior to beginning construction, contractors would obtain coverage under applicable permits issued by USACE in accordance with the CWA and adhere to applicable avoidance, mitigation, and/or compensation measures specified therein for proposed ADP projects anticipated to either individually (i.e., **Project 6**) or collectively (i.e., short-range and long-range ADP projects) contribute to significant adverse impacts on wetlands and/or streams (**Section 4.7**). Such measures would likely include the preparation of and adherence to a compensatory mitigation plan, which could include, but would not be limited to, some or all of the following:

- the restoration of wetlands and streams elsewhere on Fort Belvoir or the surrounding area;
- the payment of in-lieu fees to an approved restoration program; or,
- the purchase of credits from an approved mitigation bank.

Permit requirements would also likely include monitoring of mitigation measures for a specified time period to ensure their success or determine alternative measures in the event that mitigation objectives are not achieved.

6.2.2 Minimization Measures / Best Management Practices

6.2.2.1 Water Resources

- In keeping with the RPMP, locate future development away from stream valleys and surface waters to avoid impacts on streams, floodplains, and Chesapeake Bay RPAs as much as possible.
- Design and develop future projects in accordance with RPMP guidance; Army guidance; federal, Virginia, and Fairfax County laws, regulations, and guidance pertaining to development in Chesapeake Bay RPAs, floodplains, and wetlands; and stormwater management, as applicable. For each project:
    - Comply with the applicable requirements of the Virginia Stormwater Management Law, Virginia Stormwater Management Regulations, and Virginia Erosion and Sediment Control Law, Regulations, and Certification Regulations, as applicable;
    - In accordance with the Virginia Stormwater Program (9 VAC 25-870), prepare and implement SWPPPs for activities disturbing land areas one acre or greater in size;
    - Apply appropriate EISA Section 438 and stormwater management guidelines; and
    - Include on-site management measures, or, where on-site measures are not practicable, contribute to stream and wetland restoration projects at stream and wetland mitigation sites on Fort Belvoir.
- Potential impacts on Accotink Creek and downstream waterbodies will be minimized by designing and permitting construction activity following state and federal stormwater management and water quality protection requirements. Redevelopment planning will include appropriate management of stormwater quality and quantity in accordance with federal, state, and local regulations, including Fort Belvoir's MS-4 permit program and EISA Section 438 requirements. Fort Belvoir's MS-4 program includes specific stormwater management requirements for construction projects, including installation and maintenance of appropriate E&SC measures to protect land quality and ensure adequate perimeter controls and buffers are used to protect off-site areas from sediment migration. These requirements apply to all DAAF activities involved in any earth disturbance or stockpiling of earth materials that would impact wetlands or would change or affect stormwater runoff at DAAF.
- Projects with potential to permanently impact RPAs on DAAF would be planned, conducted, and mitigated as applicable in accordance with the requirements of Fort Belvoir's *Guide for Resource Protection Areas (RPAs) and Stream Buffers* dated 21 September 2016 (Fort Belvoir 2016). Such

requirements could include the preparation of a Water Quality Impact Assessment in accordance with 9 VAC 25-830-140 and approval by DPW-ED, and on-site or off-site mitigation plantings at ratios specified in the guidance to replace vegetation removed from the RPA.

- VPDES Industrial Stormwater Major Permit #VA0092771 and the accompanying SWPPP for DAAF would be updated accordingly as the proposed projects become operational to account for changes in the quantity and quality of stormwater generated by the new facilities and changes to stormwater management practices necessitated by them. Fort Belvoir would continue to periodically sample runoff discharged from outfalls at DAAF and implement corrective actions as needed to ensure pollutant concentrations remain within regulatory thresholds established by the permit. This would ensure that the quantity and quality of stormwater generated at DAAF and discharged to Accotink Creek would continue to meet the requirements of the Major Industrial Stormwater Permit and prevent further degradation of surface water quality. Any and all changes to the permit and SWPPP necessitated by the proposed projects will be coordinated with Fort Belvoir's Industrial Stormwater Program Manager.

6.2.2.2 Biological Resources

- Comply with all Federal, state, and local environmental laws, orders, regulations and permit requirements for implementation of all short-, mid-, and long-range ADP projects.
- Adhere to general management measures in the Comprehensive Natural Resources Management Plan and the Strategic Environmental Compliance Plan for Fort Belvoir.
- The Fort Belvoir Tree Removal and Protection Policy provides for several mitigation options, including replacing the removed trees at a 2- to-1 ratio or an "out-of-kind" mitigation action such as stream restoration or habitat enhancement. The out-of-kind mitigation budget would be determined by the current industry cost of the 2-to-1 tree replacement option.
- All final mitigation projects would be selected by the Fort Belvoir DPW-ED staff. DPW-ED would also continue to identify opportunities where actions such as removing abandoned pavement or structures would benefit fish and wildlife resources. For each project, Fort Belvoir may need to conduct a survey for potentially present federal and state-listed species and their habitat.
- Implement management measures from the Integrated Natural Resource Management Plan.
- Implement seasonal restrictions to avoid and minimize potential impacts on the northern long-eared bat by not clearing trees greater than 3 inches in diameter at breast height between April 15 and September 15 of any year.
- Project proponents would implement or incorporate the following measures to minimize or prevent impacts on BBMC resulting from the proposed projects, as determined necessary through coordination with the Environmental Division of Fort Belvoir DPW: conduct surveys on and/or near the project sites prior to implementing construction and demolition activities to determine the presence of BBMC; adhere to applicable time of year restrictions for BBMC as warranted; and, coordinate with DPW to identify and establish suitable areas of BBMC buffer on DAAF or Fort Belvoir to replace BBMC buffer on DAAF permanently lost from the Proposed Action.

- Mitigate cumulative impacts through “out-of-kind” mitigation, if feasible. An example of such mitigation includes the addition of acreage to the protected FWC, including the Accotink Bay Wildlife Refuge. Where available, parcels to be added to the FWC and the Accotink Bay Wildlife Refuge would contain sensitive areas such as wetlands, rare ecotypes, and wildlife migration corridors. Protecting these parcels under the FWC and refuge designations would preserve their ecological value.

6.3 Comparison of the Alternatives

This EIS has evaluated the potential environmental effects of implementation of the ADP. Two alternatives were evaluated in addition to the No Action Alternative. A comparison of the environmental consequences of these alternatives is provided in **Table 6.3-1**. Mitigation measures, BMPs, and standard management measures would mitigate significant adverse impacts and minimize less-than-significant impacts to the extent possible.

Table 6.3-1: Summary of Impacts from the Proposed Action

Resource	No Action Alternative	Full Implementation Alternative (Preferred Alternative)	Partial Implementation Alternative
Land Use, Plans, Aesthetics and Visual Quality, and Coastal Zone Management (**EIS Sections 3.2** and **4.2**)	Long-term, less-than-significant adverse impacts on plans relevant to Fort Belvoir. No impacts on land use, plans, aesthetics and visual quality at Davison Army Airfield (DAAF) or Fairfax County, or on the county's Comprehensive Plan.	Short-term, less-than-significant adverse impacts on land use and aesthetics at DAAF, during construction activities. Long-term beneficial impacts on DAAF land use and aesthetics from projects that are consistent with the Airfield land use designation in accordance with Fort Belvoir's Installation Planning Standards (IPS) and DAAF regulating plan. Beneficial impacts on the goals and objectives of the Fort Belvoir Real Property Master Plan (RPMP) and DAAF Area Development Plan (ADP). No adverse effects on Fairfax County land use, aesthetics, or Comprehensive Plan. Consistent to the maximum extent practicable with the enforceable policies of Virginia's Coastal Zone Management (CZM) Program.	Short-term impacts would be similar to those under the Full Implementation Alternative. Long- term impacts would be less substantial due to the reduced scope of this alternative.
Historic and Cultural Resources (**EIS Sections 3.3** and **4.3**)	No impacts on historic and cultural resources in the Area of Potential Effect (APE).	Short-term, less-than-significant, indirect adverse effects on architectural resources in the APE due to changes in viewshed or noise environment. No ground disturbance would occur within a 50-foot radius of the known, non-listed, non-eligible archaeological sites on DAAF. Any potential indirect effects would be negligible through adherence to standard construction site BMPs. In the unlikely event that an inadvertent discovery of undocumented archaeological materials or human remains occurs during ground disturbing activities, work would stop immediately and the Army would adhere to the policies and procedures for such discoveries in Fort Belvoir's *Integrated Cultural Resources Management Plan* (ICRMP).	Impacts would be similar to those under the Full Implementation Alternative.
Air Quality (**EIS Sections 3.4** and **4.4**)	No impacts on local or regional ambient air quality.	Short-term, less-than-significant adverse impacts on air quality from the generation of fugitive dust and emissions of exhaust fumes from construction-related equipment and vehicles.	Short-term impacts would be similar to those under the Full Implementation Alternative. Long- term impacts would be less substantial due to the reduced scope of this alternative.

Table 6.3-1: Summary of Impacts from the Proposed Action (con't.)

Resource	No Action Alternative	Full Implementation Alternative (Preferred Alternative)	Partial Implementation Alternative
Air Quality (con't.) (**EIS Sections 3.4** and **4.4**)	(see above)	No new permanent sources of emissions would be established at DAAF by the proposed facilities nor would they contribute to exceedances of National Ambient Air Quality Standards (NAAQS) or the degradation of regional air quality. Long-term adverse impacts on air quality resulting from additional mobile sources during operation (i.e., increased vehicle use) would be less than significant.	(see above)
Noise (**EIS Sections 3.5** and **4.5**)	No impacts on existing noise conditions at and around DAAF.	Short-term, less-than-significant impacts from construction-related noise (e.g., construction vehicles and equipment). The dominant source of noise at DAAF would continue to be aircraft operations. Short- and long-term, less-than-significant impacts on on- and off-post land uses, including noise-sensitive land uses, from operational activities. No on- or off-post sensitive land uses would be within incompatible noise zones.	Short-term impacts would be similar to those under the Full Implementation Alternative. Long- term impacts would be less substantial due to the reduced scope of this alternative. The highest operational noise levels would be entirely confined to DAAF.
Geology, Topography, and Soils (**EIS Sections 3.6** and **4.6**)	No new or different effects on geology, topography, and soils at DAAF as affected by the ongoing military mission.	Short- and long-term, less-than-significant adverse impacts on geology, soils, and topography from construction-related disturbance/alteration. Short-term, less-than-significant adverse impacts on geology from the construction of foundations for some proposed projects. No effects on geological features of special significance or worth, as none are present under DAAF. No long-term adverse impacts on geology. Short- and long-term, less-than-significant adverse impacts on topography from excavation, grading, filling, and trenching on project sites. No unique or valued topographic features on DAAF would be affected by the proposed projects. Short- and long-term, less-than-significant impacts on soils resulting from disturbance on up to approximately 84 acres of land area. No substantial alterations of soil condition or function would occur. Project-specific disturbances would be temporary and intermittent, ranging from approximately 0.3 to 23 acres.	Short-term and long-term impacts would be similar to those from the Full Implementation Alternative. Impacts would be less substantial due to the reduced scope of this alternative. Approximately 36 acres of land area would be disturbed by construction activities associated with this alternative.

Table 6.3-1: Summary of Impacts from the Proposed Action (con't.)

Resource	No Action Alternative	Full Implementation Alternative (Preferred Alternative)	Partial Implementation Alternative
Water Resources (**EIS Sections 3.7** and **4.7**)	No impacts on water resources at or in the vicinity of DAAF.	*Significant adverse impacts* on wetlands and streams from unavoidable disturbance of approximately 3.6 acres of wetlands and 2,026 linear feet of streams during construction and operation of multiple ADP projects over the Alternative's approximately 30-year implementation period. Impacts would be confined to resources within DAAF's boundaries. Short- and long-term, less-than-significant adverse impacts on groundwater from accidental releases of hazardous substances (e.g., fuel spills) during construction and a 36-acre increase in impervious surfaces and corresponding localized changes in groundwater recharge area and rates. Short-term, less-than-significant adverse impacts on water quality from increased concentrations of sediments and pollutants in runoff during construction. Long-term, negligible adverse impacts on water quality during operational activities from increased stormwater runoff. Long-term, direct, less-than-significant adverse impacts on Resource Protection Areas (RPAs) from permanent loss of approximately 23 acres of land designated as such. Long-term, less-than-significant adverse impacts on the 100-year floodplain from development of approximately 7.5 acres in the floodplain on DAAF. The maximum increase to the horizontal extent of the floodplain on DAAF would not exceed 2 feet. Potential adverse impacts of increased flooding downstream of DAAF would occur on land within Fort Belvoir in conservation status. Therefore, risks to life and property from flooding downstream of DAAF would be minimal. A Finding of No Practicable Alternative (FONPA) addressing potential impacts on floodplains and wetlands is included in **Appendix F**.	*Significant adverse impact* on wetlands from unavoidable disturbance of approximately 1.4 acres of wetlands during construction and operation of multiple ADP projects over the Alternative's approximately 20-year implementation period. Wetland impacts would be confined to resources within DAAF's boundaries. Short- and long-term, less-than-significant adverse impacts on streams from 517 linear feet of temporary and permanent disturbance. Less-than-significant impacts on other water resources would be similar to those under the Full Implementation Alternative. Impacts would be less substantial due to the reduced scope of this alternative. Impervious surface on DAAF would increase by approximately 21 acres under this alternative. Projects in the alternative would permanently impact an estimated 15 acres of RPAs. Approximately 3.2 acres of the 100- year floodplain on DAAF would be developed under this alternative.
Biological Resources (**EIS Sections 3.8** and **4.8**)	No impacts on biological resources at DAAF.	Long-term, less-than-significant adverse impacts on plant communities from vegetation removal (and associated displacement of common wildlife species) and, indirectly, introduction of invasive species or creation of edge habitats.	Short- and long-term impacts would be similar to those under the Full Implementation Alternative. Impacts would be less substantial due to the reduced scope of this alternative.

Table 6.3-1: Summary of Impacts from the Proposed Action (con't.)

Resource	No Action Alternative	Full Implementation Alternative (Preferred Alternative)	Partial Implementation Alternative
Biological Resources (con't.) (**EIS Sections 3.8** and **4.8**)	(see above)	Short- and long-term, intermittent, less-than-significant adverse impacts on aquatic macroinvertebrates and fish from degraded water quality resulting from increased concentrations of pollutants and sediments in runoff discharged to receiving water bodies. Long-term, less-than-significant adverse impacts on wildlife from loss of approximately 11.4 acres of vegetation and forested habitat, and encroachment on approximately 21 acres of Breeding Birds of Management Concern (BBMC) habitat. No federally listed threatened or endangered species have been documented at DAAF; as such, adverse impacts would not be anticipated. **ESA Section 7 determination:** *Not likely to adversely affect* federally listed threatened and endangered species.	This alternative would permanently encroach on approximately 18 acres of BBMC habitat. **ESA Section 7 determination:** *Not likely to adversely affect* federally listed threatened and endangered species.
Health and Safety (**EIS Sections 3.9** and **4.9**)	No impacts on health and safety.	Short-term, less-than-significant potential adverse impacts on human and environmental health from accidents during construction activities and potential exposure to asbestos-containing material (ACM), lead-based paint (LBP), contaminated soils, and munitions constituents/munitions of explosive concern (MEC). Negligible risks to public safety outside the airfield.	Short- and long-term impacts would be similar to those under the Full Implementation Alternative. Impacts would be less substantial due to the reduced scope of this alternative.
Hazardous Materials and Wastes (**EIS Sections 3.10** and **4.10**)	No impacts on hazardous materials, hazardous wastes, pesticides, radon, or solid waste management units (SWMUs).	Short- and long-term, less-than-significant adverse impacts from hazardous materials and wastes due to use and handling of such materials during construction activities, as well as from the potential for accidental spills or discovery of contaminated soils. No permanent adverse impacts from hazardous materials and waste since there would be no changes in the quantity of hazardous materials and waste used at DAAF or in the capacity of Fort Belvoir to manage these substances.	Short- and long-term impacts would be similar to those under the Full Implementation Alternative. Impacts would be less substantial due to the reduced scope of this alternative. Beneficial effects from ACM and LBP removal would be limited relative to the Full Implementation Alternative because fewer buildings containing these substances would be removed.

Table 6.3-1: Summary of Impacts from the Proposed Action (con't.)

Resource	No Action Alternative	Full Implementation Alternative (Preferred Alternative)	Partial Implementation Alternative
Hazardous Materials and Wastes (con't.) (**EIS Sections 3.10** and **4.10**)	Long-term, less- than-significant adverse impact on the management of ACM and LBP as those substances would not be removed from existing facilities proposed for modernization or demolition under the Proposed Action.	Long-term, beneficial impacts on hazardous materials and waste from consolidation and modernization of associated storage areas, the removal of ACM and LBP in up to 27 facilities, and potential decrease in areas requiring pesticide treatment. No short-term or long-term impacts from radon.	(see above)
Cumulative Impacts (**EIS Chapter 5**)	No potential to contribute to significant adverse cumulative effects on the resources analyzed in the EIS.	When considered with the incremental effects of other past, present, and reasonably foreseeable future projects occurring on and in the vicinity of DAAF, the environmental consequences of the Full Implementation Alternative would contribute significant adverse cumulative effects on wetlands and streams under the Full Implementation Alternative from the construction and operation of multiple short-, mid-, and long-range ADP projects. No significant cumulative adverse effects are expected to occur on the other resources analyzed in the EIS.	Short-term contribution to potential adverse cumulative impacts would be similar to that under the Full Implementation Alternative. Long-term contribution to potential adverse cumulative impacts would be overall less substantial due to the reduced scope of this alternative. In addition, significant cumulative impacts would only occur on wetlands from construction and operation of short-range ADP projects.

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7 Federal Consistency Determination

Pursuant to Section 307 of the Coastal Zone Management Act of 1972, as amended, and 15 CFR Part 930(c), this chapter consists of a Federal Consistency Determination for the Army's Proposed Action to adopt and implement an updated ADP for DAAF at US Army Garrison Fort Belvoir (Fort Belvoir) in Fairfax County, Virginia. The location of DAAF and its existing layout are shown on **Figures 1.2-1** and **1.2-3**, respectively.

Fairfax County is located in Virginia's designated coastal zone. As a federal installation, Fort Belvoir is statutorily exempt from Virginia's coastal zone. However, activities occurring at Fort Belvoir may have the potential to affect Virginia coastal zone resources. Thus, the Army is required to determine the consistency of proposed activities potentially affecting Virginia's coastal resources or coastal uses with the enforceable policies of Virginia's CZM Program.

This consistency determination represents an analysis of the Proposed Action with regard to the established enforceable policies and programs of the Virginia CZM Program. Furthermore, submission of this consistency determination reflects the Army's commitment to comply with those enforceable policies and programs. The Proposed Action would be implemented in a manner consistent with the Virginia CZM Program. The Army has determined that the Proposed Action would have less-than-significant effects on land and water uses and natural resources of the Commonwealth of Virginia's coastal zone and would be consistent to the maximum extent practicable with the enforceable policies of the Virginia CZM Program (note that the terms "impact" and "effect" are used synonymously in this Federal Consistency Determination).

7.1 Description of Proposed Action

The Army proposes to adopt and implement an updated ADP for DAAF. The Proposed Action consists of multiple construction, infrastructure, and facility modernization projects that would provide DAAF and its tenant organizations with the required facilities and infrastructure to fully support their ongoing missions (**Section 2.1**). The proposed projects would replace numerous outdated and undersized facilities at the airfield. The Proposed Action would also demolish several existing buildings that are within safety clearance zones associated with the airfield's runway (**Section 1.2.3.4**), as well as facilities that would be redundant or unnecessary once the proposed facilities are operational (**Sections 2.2.2.2** and **2.2.2.3**).

Projects in the Proposed Action would be implemented over a 30-year period. All of the proposed projects would be implemented within the boundaries of DAAF. The Proposed Action is illustrated on **Figure 2.2-4**.

The proposed projects would be implemented in previously disturbed areas of DAAF. An estimated 84 acres of soils would be disturbed by construction, demolition, and similar earth- disturbing activities during implementation of the proposed projects (**Section 4.6**). For projects disturbing one or more acres of land, construction contractors would obtain coverage under the CGP and prepare and adhere to site-specific SWPPPs to manage the quality and quantity of stormwater generated on the project sites and

minimize quantities of construction-related pollutants and sediments discharged to receiving water bodies. E&SC and stormwater management (SWM) plans would be prepared for projects disturbing between 2,500 square feet and one acre of land. The staggered implementation of the projects over approximately 30 years would ensure that not all soil impacts occur simultaneously. Following the completion of construction activities, soils remaining exposed would be vegetated or would otherwise consist of permeable surfaces, thereby minimizing or eliminating the potential for continued erosion.

The Proposed Action would increase impervious surface at DAAF by 36.3 acres (**Section 4.7**). As applicable, projects in the Proposed Action would incorporate LID measures in accordance with Section 438 of the EISA to the maximum extent technically feasible to maintain the pre-development hydrology of their sites. The Army would update the VPDES Major Industrial Stormwater Permit for DAAF and corresponding SWPPP accordingly to manage and monitor runoff generated by the proposed facilities as they become operational. The Accotink Creek watershed, where Fort Belvoir is located, is already 27 percent impervious, and nearly 90 percent of the watershed's land area is upstream of DAAF. As such, any increase in impervious surface at DAAF resulting from the Proposed Action would be small in this context and would have no or negligible effects on water quality within the watershed.

Projects in the Proposed Action would permanently encroach on up to 7.5 acres of the 100-year floodplain on DAAF associated with Accotink Creek (**Section 4.7**). The Army has conducted modeling using the US Army Corps of Engineers' HEC-RAS software to update the boundaries of the floodplain on DAAF and evaluate potential impacts from the proposed project. Inputs to the model included data collected in the field and through desktop analysis. Based on this modeling, vertical increases in flood elevation and horizontal increases in flooding extent resulting from construction of the proposed facilities in the 100-year floodplain would be minimal (i.e., less than two feet) and contained entirely within the boundaries of DAAF. Facilities to be built in the 100-year floodplain would be designed to prevent the downstream displacement of floodwaters. Site preparation activities (e.g., grading, soil excavation/filling, localized re-contouring of site topography) associated with the Proposed Action would have no substantial adverse effects on floodplain values. The Army is coordinating with FEMA to update floodplain mapping at and in the vicinity of DAAF.

Collectively, approximately 3.6 acres of non-tidal wetlands on DAAF would be impacted by individual projects in the Proposed Action over the 30-year implementation period (**Section 4.7**). The Army would obtain all applicable federal and local permits to impact wetlands and would avoid, mitigate, or compensate for impacts on wetlands in accordance with permit requirements. Other applicable BMPs would also be used to ensure that construction and operational impacts on wetlands and water bodies are minimized or eliminated.

Projects in the Proposed Action would permanently encroach on up to an estimated 23.2 acres of Chesapeake Bay RPAs on DAAF (**Section 4.7**). Projects with potential to permanently impact RPAs on DAAF would be planned, conducted, and mitigated as applicable in accordance with the requirements of Fort Belvoir's *Guide for Resource Protection Areas (RPAs) and Stream Buffers* dated 21 September 2016 (Fort Belvoir 2016). Such requirements could include the preparation of a Water Quality Impact Assessment in accordance with 9 VAC 25-830-140 and approval by Fort Belvoir DPW-ED, and on-site or off-site mitigation plantings at ratios specified in the guidance to replace vegetation removed from the

RPA. The incorporation of LID measures to the maximum extent practicable in accordance with Section 438 of the EISA, as applicable, and updating the airfield's Major Industrial Stormwater Permit and SWPPP to account for the new facilities would manage the quality and quantity of stormwater generated by the proposed projects and discharged to Accotink Creek. Adherence to these requirements would, at minimum, partially offset the loss of undeveloped land in RPAs on DAAF. Project proponents would develop and implement mitigation measures in coordination with Fort Belvoir DPW-ED as necessary to further offset RPA losses resulting from the Proposed Action.

7.2 Assessment of Probable Effects

The Commonwealth of Virginia has developed and implemented a federally approved CZM Program encompassing nine enforceable policies for the coastal zone pertaining to:

- Fisheries management
- Subaqueous lands management
- Wetlands management
- Dunes management
- Non-point source pollution control
- Point source pollution control
- Shoreline sanitation
- Air pollution control
- Coastal lands management

In compliance with NEPA, the Army is preparing an EIS to evaluate environmental impacts on the human and natural environment potentially resulting from implementation of the Proposed Action. The summary analysis of the Proposed Action's consistency with or applicability to each of the Virginia CZM Program's enforceable policies is based on the more detailed analyses presented in the EIS and summarized in **Table 7.3-1**. The Draft EIS was distributed for a 45-day public and agency review period that began on July 24, 2020 and ended on September 8, 2020.

7.3 Summary of Findings

Detailed discussions of potential effects from the Proposed Action are presented in **Chapter 4** of the EIS. For all of the projects in the Proposed Action, the Army would ensure that: the project design includes appropriate BMPs; the construction contractor uses and maintains appropriate BMPs; project proponents and/or their contractors obtain requisite permits and approvals, as applicable; and proposed management measures are implemented. Proposed management measures are summarized in **Chapter 6** of the EIS.

Fort Belvoir has determined that the Proposed Action, which would be implemented in accordance with associated management measures, would not appreciably affect the land or water uses or natural

resources of Virginia. Therefore, the Proposed Action would be consistent to the maximum extent practicable with the enforceable policies of the federally approved Virginia CZM Program, pursuant to the Coastal Zone Management Act of 1972 (16 USC 1456(c)), as amended, and in accordance with 15 CFR Part 930 (c).

Table 7.3-1: Effects of the Proposed Action on Virginia CZM Program Enforceable Policies

Enforceable Policy	Effect(s) of the Proposed Action
Fisheries Management The program stresses the conservation and enhancement of finfish and shellfish resources and the promotion of commercial and recreational fisheries to maximize food production and recreational opportunities. This program is administered by the Virginia Marine Resources Commission (VMRC) (*Virginia Code §28.2-200 through §28.2-713*) and the VDGIF (*Virginia Code §29.1-100 through §29.1- 570*). The State Tributyltin (TBT) Regulatory Program has been added to the Fisheries Management program. The General Assembly amended the Virginia Pesticide Use and Application Act as it related to the possession, sale, or use of marine antifoulant paints containing TBT. The use of TBT in boat paint constitutes a serious threat to important marine animal species. The TBT program monitors boating activities and boat painting activities to ensure compliance with TBT regulations promulgated pursuant to the amendment. The VMRC, VDGIF, and Virginia Department of Agriculture and Consumer Services share enforcement responsibilities (*Virginia Code §3.2-3904 and §3.2-3935 to 3.2-3937*).	**Consistent to Maximum Extent Practicable? *Yes*** Effects on fish and aquatic species are assessed in **Section 4.8** of the EIS. Adherence to the CGP, site-specific SWPPPs, and E&SC and SWM plans as applicable during construction and the VPDES Major Industrial Stormwater Permit once the proposed facilities are operational would ensure that the Proposed Action has no or negligible impacts on fish and aquatic species in receiving bodies of surface water on and near DAAF including Accotink Creek, its tributaries, and the Potomac River. None of the proposed projects would build facilities on or in the Potomac River or its tributaries or require the use of boats or boat paint. Therefore, the Virginia TBT regulatory Program does not apply.
Subaqueous Lands Management The management program for subaqueous lands establishes conditions for granting or denying permits to use state-owned bottomlands based on considerations of potential effects on marine and fisheries resources, wetlands, adjacent or nearby properties, anticipated public and private benefits, and water quality standards established by the VDEQ Water Division. The program is administered by the *Virginia Code §28.2-1200 through §28.2-1213).*	**N/A –** The Proposed Action does not involve encroachment in, on or over state-owned subaqueous lands. Therefore, this enforceable policy is not applicable and is not addressed in this Federal Consistency Determination or in the EIS.

Table 7.3-1: Effects of the Proposed Action on Virginia CZM Program Enforceable Policies (con't.)

Enforceable Policy	Effect(s) of the Proposed Action
Wetlands Management The purpose of the wetlands management program is to preserve tidal wetlands, prevent their despoliation, and accommodate economic development in a manner consistent with wetlands preservation. • The tidal wetlands program is administered by the VMRC (*Virginia Code §28.2-1301 through §28.2-1320)*. • The Virginia Water Protection Permit program administered by the VDEQ includes protection of wetlands, both tidal and non-tidal. This program is authorized by *Virginia Code §62.1-44.15.20 and §62.1-44.15-21* and the Water Quality Certification 01 of the CWA of 1972.	**Consistent to the Maximum Extent Practicable? *Yes*** The Proposed Action would not affect tidal wetlands at Fort Belvoir. Impacts on non-tidal wetlands are assessed in **Section 4.7** of the EIS. The Proposed Action would collectively impact approximately 3.6 acres on DAAF. These impacts would occur over the Proposed Action's approximately 30-year implementation period. Prior to beginning construction activities, the Army would obtain coverage under applicable federal and local wetland permits and adhere to BMPs as well as avoidance, mitigation, and/or compensation measures specified therein. As applicable, construction contractors would prepare and adhere to the requirements of site-specific E&SC plans as well as SWPPPs to further minimize impacts on downstream wetlands and water bodies.
Dunes Management Dune protection is carried out pursuant to the Coastal Primary Sand Dune Protection Act and is intended to prevent destruction or alteration of primary dunes. This program is administered by VMRC Code §28.2-1400 through §28.2-1420).	**N/A –** The Proposed Action has no potential to affect coastal primary sand dunes, as none are located at DAAF or Fort Belvoir. Therefore, this enforceable policy is not addressed in this Federal Consistency Determination or in the EIS.
Non-point Source Pollution Control Virginia's Erosion and Sediment Control Law requires soil-disturbing projects to be designed to reduce soil erosion and to decrease inputs of chemical nutrients and sediments to the Chesapeake Bay, its tributaries, and other rivers and waters of the Commonwealth. This program is administered by the VDEQ *Virginia Code §62.1-44.15:51 et seq.*	**Consistent to the Maximum Extent Practicable? *Yes*** Impacts on soils and water resources are addressed in **Sections 4.6** and **4.7** of the EIS, respectively. Short-term impacts on Accotink Creek and/or its watershed would potentially consist of increased concentrations of construction-related sediments and pollutants from stormwater runoff generated on the project sites and discharged to receiving waterbodies. Construction contractors would prepare and adhere to E&SC and SWM plans for projects disturbing between 2,500 square feet and one acre of land. For projects disturbing one acre or more, contractors would obtain coverage under the CGP and prepare and adhere to site-specific SWPPPs to manage the quality and quantity of stormwater generated on the project sites and discharged to Accotink Creek. The staggered implementation of the proposed projects over approximately 30 years would ensure that impacts do not occur simultaneously. Following the completion of earth-disturbing projects, soils not developed or built on would be revegetated or otherwise remain in a permeable condition, thereby minimizing or eliminating the potential for continued erosion and corresponding sedimentation of receiving waterbodies.

Table 7.3-1: Effects of the Proposed Action on Virginia CZM Program Enforceable Policies (con't.)

Enforceable Policy	Effect(s) of the Proposed Action
Point Source Pollution Control The point source program is administered by the State Water Control Board pursuant to Virginia Code §62.1-44.15. Point source pollution control is accomplished through the implementation of the NPDES permit program established pursuant to Section 402 of the federal CWA and administered in Virginia as the VPDES permit program. The Water Quality Certification requirements of Section 401 of the CWA of 1972 are administered under the Virginia Water Protection Permit program.	**Consistent to the Maximum Extent Practicable? *Yes*** No new point sources of stormwater discharge would be established at DAAF under the Proposed Action. The Army would update the VPDES Major Industrial Stormwater Permit and accompanying SWPPP for DAAF as the new facilities become operational to account for additional stormwater and/or pollutants generated by them. Periodic sampling of runoff discharged from outfalls at DAAF would continue in accordance with the permit requirements to ensure that concentrations of pollutants and sediments in runoff remain below applicable regulatory thresholds. Corrective action would be taken as needed to address any exceedances of those thresholds. This would prevent further degradation of surface water quality in Accotink Creek and downstream waters by ensuring that the quantity and quality of stormwater generated at DAAF continues to meet applicable permit requirements.
Shoreline Sanitation The purpose of this program is to regulate the installation of septic tanks, set standards concerning soil types suitable for septic tanks, and specify minimum distances that tanks must be placed away from streams, rivers, and other waters of the Commonwealth. This program is administered by the Department of Health, *Virginia Code §32.1-164 through §32.1-165*).	**N/A –** No septic systems are located at DAAF, and the Proposed Action does not involve the installation or modification of such systems. Therefore, this enforceable policy is not addressed in this Federal Consistency Determination or in the EIS.

Table 7.3-1: Effects of the Proposed Action on Virginia CZM Program Enforceable Policies (con't.)

Enforceable Policy	Effect(s) of the Proposed Action
Air Pollution Control The program implements the federal Clean Air Act to provide a legally enforceable SIP for the attainment and maintenance of NAAQS. This program is administered by the State Air Pollution Control Board, *Virginia Code §10.1-1300 through 10.1-1320).*	**Consistent to the Maximum Extent Practicable? *Yes*** Effects on air quality are addressed in **Section 4.4** of the EIS. The generation of fugitive dust and exhaust fumes from construction-related trucks and equipment during construction of the proposed projects would have minor, temporary adverse effects on air quality. However, construction-related emissions would remain below GCR applicability thresholds and would not contribute to the further degradation of local or regional air quality nor result in a violation of applicable federal, state, and local air quality regulations. Overall, the staggered implementation of the proposed projects over a period of approximately 30 years would ensure that adverse impacts on air quality remain negligible. The Proposed Action would establish no new emissions sources at DAAF. There would be no long-term effects on air quality.
Coastal Lands Management Coastal Lands Management is a state-local cooperative program administered by VDEQ's Water Division and 84 localities in Tidewater, Virginia established pursuant to the Chesapeake Bay Preservation Act (*Virginia Code §§ 62.1-44.15:67 through 62.1-44.15:79)* and Chesapeake Bay Preservation Area Designation and Management Regulations *9 VAC 10-20-10 et seq.).*	**Consistent to the Maximum Extent Practicable? *Yes*** The Proposed Action would affect up to an estimated 23.2 acres of Chesapeake Bay RPAs on DAAF over an approximately 30-year period. Implementation of the projects in accordance with Fort Belvoir's *Guide for Resource Protection Areas (RPAs) and Stream Buffers*; replacement of vegetation lost during construction; adherence to Section 438 of the EISA to the maximum extent technically feasible; and compliance with project-specific SWPPPs and E&SC and SWM plans as applicable would partially offset the loss of RPAs on DAAF resulting from the Proposed Action. RPA impacts would be further offset by management measures to be developed by project proponents in coordination with Fort Belvoir DPW-ED, as necessary and appropriate.

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9 Distribution and Review of the Draft EIS

The Draft EIS was distributed for a 45-day public review and comment period that began on July 24, 2020 and ended on September 8, 2020.

9.1 Public Notice

The 45-day Draft EIS public review period officially began with the publication of an NOA in the *Federal Register* on July 24, 2020. A copy of the NOA as published in the *Federal Register* is included in **Appendix A**. The NOA provided a brief description of the Proposed Action; the beginning and end dates of the public review period; the dates and times of public meetings (**Section 9.3**) to provide the public with information about and opportunities to comment on the Proposed Action and the Draft EIS; email and US Postal Service addresses for submitting comments on the Draft EIS; contact information for how to obtain a printed or electronic copy of the Draft EIS; and other relevant information. An abbreviated version of the NOA was published in the *Washington Post* on July 24, 2020 and in the *Mount Vernon Gazette* on July 30, 2020.

9.2 Distribution of the Draft EIS

Email notifications were sent to 101 agencies, tribes, organizations, and individuals on July 24, 2020 announcing the availability of the Draft EIS and Draft FONPA for public review during the 45-day public review period. These recipients are listed in **Table A-1** in **Appendix A**. A copy of the newspaper announcement for the Draft EIS public review period was included as an attachment to the notification email. A representative copy of the notification email and attachment is provided in **Appendix A**. Follow-up emails were sent to the same recipients on August 19, 2020 and August 26, 2020 to remind them of the Draft EIS public meetings (**Section 9.3**) and deadline to submit comments on the Draft EIS, respectively.

Electronic versions of the Draft EIS, Draft FONPA, and associated documents were posted on the Fort Belvoir DPW-ED website for viewing and download throughout the duration of the 45-day public review period. A link to the website was provided in each of the notification emails described above.

9.3 Public Meetings

Due to restrictions on public gatherings associated with the COVID-19 pandemic, two publicly accessible teleconferences were held on August 24, 2020 to provide agency representatives and members of the public with the opportunity to learn about and comment on the Proposed Action and the Draft EIS. To maximize opportunities for participation by agency representatives and the general public while minimizing the potential for technical problems, the teleconferences were conducted in an audio-only format and did not include a visual or video component. The teleconferences were conducted in accordance with Army guidance on interim procedures for NEPA public involvement processes issued on June 15, 2020. A copy of this guidance is included in **Appendix A**.

To accommodate the varying schedules of potential participants, the first teleconference was held from 1:00 p.m. to 3:00 p.m. and the second was held from 6:00 p.m. to 8:00 p.m. The teleconference dates, times, toll-free phone number, and passcodes were provided in the *Federal Register* NOA and the email notifications that were sent on July 24 and August 19, 2020. Electronic copies of fact sheets and posters supporting the teleconference discussion and the information presented in the Draft EIS were posted on the Fort Belvoir DPW-ED website for viewing and download throughout the duration of the 45-day Draft EIS public review period. These materials also included the date, times, and call-in information for the public teleconferences. Copies of the fact sheets and posters are included in **Appendix A**.

The format and content of each teleconference was the same and generally consisted of opening remarks and introductions, an overview of DAAF, the ADP, and the Draft EIS, and a timed question and comment period. Fourteen individuals called in for the 1:00 p.m. teleconference and two called in for the 6:00 p.m. teleconference. Three comments were received during the 1:00 p.m. teleconference and one audience member commented twice during the 6:00 p.m. teleconference. Transcripts of the meetings are provided in **Appendix A**.

Following the teleconferences, a brief presentation summarizing the primary meeting discussion points as well as the ADP and Draft EIS was distributed via email on August 26 to the same recipients who received the July 24 and August 19 email notifications (**Section 9.2**). A copy of this presentation is included in **Appendix A**.

9.4 Comments on the Draft EIS

One hundred ninety-four (194) distinct comments were received during the 45-day Draft EIS public review period from federal, state, and local agencies, non-governmental organizations, Native American tribes, and members of the general public. All comments received were considered when preparing the Final EIS. Changes made in the Final EIS to address the comments consist of factual or editorial corrections, or clarification of information presented in the Draft EIS. No changes were made to the alternatives, EIS analysis methodology, or findings of the analysis.

Comments that were received during the Draft EIS public review period, including those that were received during the public teleconferences described above, are summarized in **Tables A-2** through **A-7** in **Appendix A**. The Army's responses to the comments are also provided. Copies of written comments as received are included in **Appendix A**.

10 Preparers

Avatar Environmental, LLC

Chuck Dobroski, 42 years of experience. MS, Marine Biology. Role: Water Resources, Biological Resources

Kurt Philipp, 42 years of experience. PhD, Marine Biology and Biochemistry; MS, Geography and Climatology. Role: Water Resources (Wetlands), Biological Resources.

David Gosse, 20 years of experience. MS, Marine Affairs. Role: Water Resources (Wetlands), Biological Resources.

Tod DeLong, 30 years of experience. MS, Wildlife Ecology. Role: Biological Resources.

Louis Militana, 28 years of experience. MS, Meteorology. Role: Air Quality Resources.

Rachel Urban, 5 years of experience. MS, Civil Engineering. Role: Water Resources, Biological Resources.

AECOM

Brian W. Boose, Senior Environmental Planner/Project Director: 30 years of experience in environmental planning and impact assessment. University of California Davis, BS, Biological Sciences/Ecology.

Michael Robertson, Environmental Planner/Project Manager: 15 years of experience in environmental planning and impact assessment. Virginia Tech, BS, Crop and Soil Environmental Science; University of Newcastle-upon-Tyne, MA, Environmental Studies.

Larry Neal, Senior Reviewer: More than 40 years of experience in environmental impact assessment and permitting. Emory & Henry College, BA, Biology; Old Dominion University, MS, Oceanography.

Carrie K. Kyzar, Senior Environmental Planner: 18 years of experience in environmental planning. Oregon State University, BS, Environmental Science; University of Maryland University College, MS, Environmental Management.

Craig Carver, NEPA Specialist/Deputy Project Manager: 10 years of experience in environmental planning and impact assessment. Virginia Commonwealth University, BA, Music; Virginia Commonwealth University, Master of Urban and Regional Planning.

Fang Yang, Senior Noise Specialist: 28 years of experience in acoustics studies including environmental noise and vibration measurements and modeling assessment. Fudan University, BS, Physics; New York University, MS, Atmospheric Science.

Brian Brownworth, Noise Analyst: 14 years of experience in environmental noise and vibration measurements and modeling studies. State University of New York, BS, Mathematics; Manhattan College, MS, Environmental Engineering.

Jason Huang, Noise Analyst and GIS Specialist: 4 years of experience in noise and vibration measurements and modeling studies. New York University, MS, Environmental Science.

Joseph Huesmann, PE, Senior Project Engineer: 23 years of experience in hydrology and hydraulics engineering. University of Maryland, BS, Civil Engineering; MS, Environmental Engineering.

Charlene Wu, Environmental Planner: 6 years of experience in environmental planning and impact assessment. University of Maryland, BS, Environmental Science & Policy; Duke University, Master of Environmental Management.

Brian Norris, Geographic Information Science Specialist: 3 years of experience in map production, geospatial analysis, and data management. Florida State University, BS, Economics; Florida State University, MS, Geography.

Michael Busam, Environmental Planner: 3 years of experience in environmental planning and impact assessment. University of Maryland, BS, Environmental Science & Policy.

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