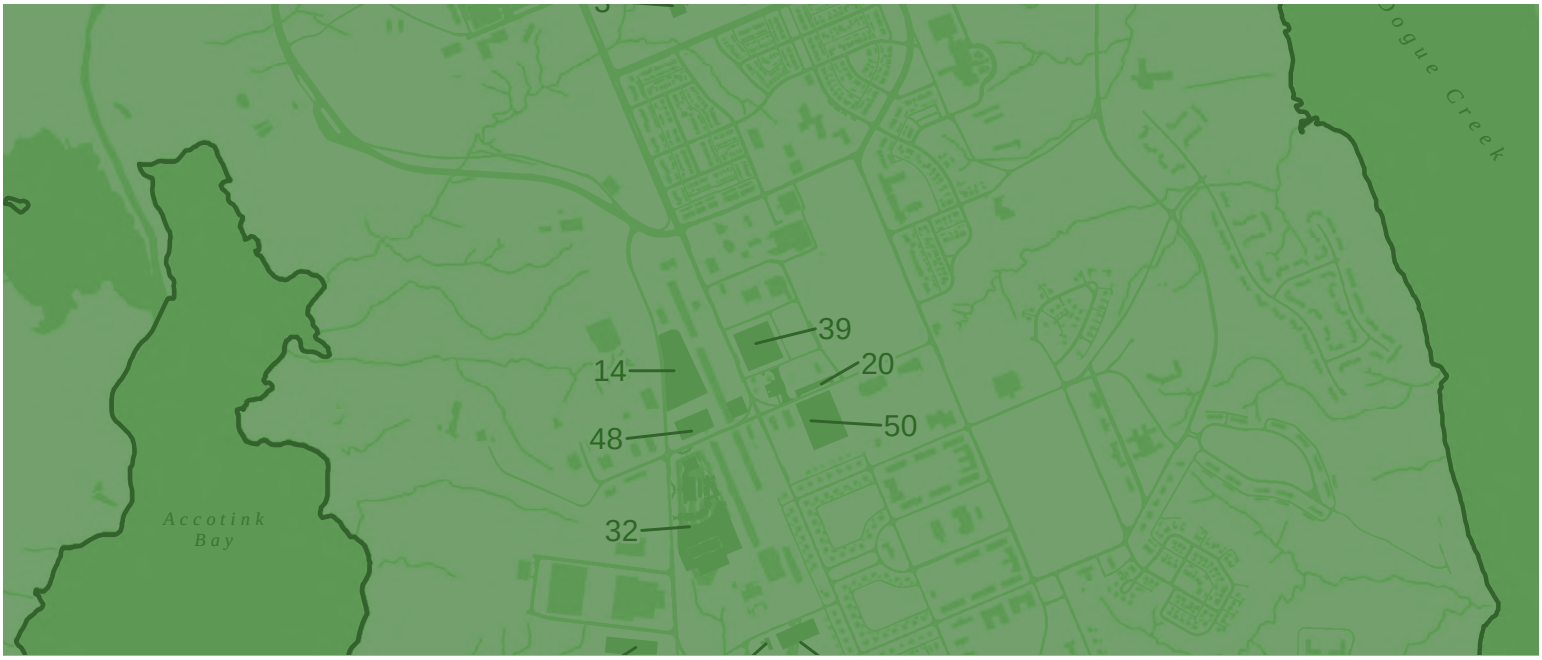


Final Environmental Impact Statement for

Short-Term Projects & Real Property Master Plan Update

Fort Belvoir, Virginia | June 2015 | **Volume I**



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FINAL ENVIRONMENTAL IMPACT STATEMENT
SHORT-TERM PROJECTS AND
REAL PROPERTY MASTER PLAN UPDATE

US ARMY GARRISON FORT BELVOIR
FAIRFAX COUNTY, VIRGINIA

June 2015

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FINAL ENVIRONMENTAL IMPACT STATEMENT

SHORT-TERM PROJECTS AND REAL PROPERTY MASTER PLAN UPDATE, US ARMY GARRISON FORT BELVOIR FAIRFAX COUNTY, VIRGINIA

Lead Agency:	Department of the Army
Title of Proposed Action:	Fort Belvoir Real Property Master Plan (RPMP) Update and Short-Term Projects
Designation:	Final Environmental Impact Statement (FEIS)
Affected Jurisdictions:	Fairfax County, Virginia and the Greater Washington, DC Metropolitan Area
Prepared by:	US Army Garrison Fort Belvoir Environmental and Natural Resources Division Directorate of Public Works Fort Belvoir, Virginia
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Abstract: This Final Environmental Impact Statement (FEIS) evaluates the potential environmental impacts of updating US Army Garrison Fort Belvoir's Real Property Master Plan (RPMP) and implementing the plan's short-term projects by 2017 and long-term projects by 2030. The purpose of the proposed action is to provide Fort Belvoir with an updated RPMP that reflects current missions, needs, and conditions and addresses short-term program facility and infrastructure needs. An updated RPMP is needed to provide Fort Belvoir with a blueprint for future real property planning through 2030. The updated RPMP would also enable Fort Belvoir to manage the projected growth of its workforce by 5,000 personnel by 2017 and an additional 12,000 personnel by 2030. Updating the master plan fulfills the requirements of Army Regulation 210-20 for periodic updates of Army installation RPMPs to reflect current conditions. In addition to the No Action Alternative of not growing further, the EIS evaluates three alternatives with different growth patterns and levels of installation population. The FEIS incorporates the comments received on the Draft EIS published in September 2014. Only minor factual and editorial corrections were made to the document. No changes were made to the alternatives or the findings of the analysis.

ORGANIZATION OF THE ENVIRONMENTAL IMPACT STATEMENT

This document follows the format established in the National Environmental Policy Act (NEPA) 9 regulations (Title 40 Code of Federal Regulations Parts 1500 to 1508). The following paragraphs outline information contained in the chapters and appendices so that readers may find the parts of interest to them.

Acronyms and Abbreviations – Includes a list of acronyms and abbreviations used throughout the EIS to which the reader can refer.

Executive Summary – Contains a summary of the main topics and conclusions described in the body of the EIS. The reader can obtain additional, more-detailed information from the actual text of the EIS.

***Chapter 1 –Purpose and Need for Proposed Action*:** Describes: the proposed action; the background, purpose of, and need for the proposed action; the scope and content of the EIS; the public participation process, including a summary of comments made during the scoping process; and the decision to be made by the Army.

***Chapter 2 –Proposed Action and Alternatives*:** Describes: the proposed action elements more fully, including a land use plan and short-term facility and transportation projects and long-term facility and transportation projects; the selection criteria used to identify a range of reasonable alternatives to be carried forward for full evaluation in the FEIS; and the alternatives, including the No Action Alternative, that were carried forward for evaluation.

***Chapter 3 –Affected Environment and Environmental Consequences*:** Describes: the present condition of the environment that would be affected by implementation of the proposed action alternatives; the probable direct and indirect, short-term and long-term effects on the human environment that would result from implementing each of the proposed action alternatives; short-term uses versus long-term productivity, unavoidable impacts, and irreversible or irretrievable impacts.

***Chapter 4 –Cumulative Effects*:** Describes the cumulative effects of the proposed action alternatives on each of the resources considered in Chapter 3 when considered with other past, present, and future actions taking place in the affected area.

Chapter 5 –Mitigation and Protective Measures: Describes the mitigation and protective measures that would be carried out to minimize environmental impacts on each affected resource.

Chapter 6 – Coastal Consistency Determination: Includes the federal coastal consistency determination developed in response to the requirements of the Coastal Zone Management Act.

***Chapter 7 –References*:** Lists the references cited in the EIS.

***Chapter 8 –Distribution and Notification List*:** Lists the agencies, organizations, and individuals who received a copy of the Draft EIS.

***Chapter 9 –Preparers and Contributors*:** Identifies the people who researched, wrote, and within the Army, reviewed the EIS.

Appendix A – Public Participation: Includes a summary of the EIS public scoping process, the materials presented at the meetings, comments received during the scoping period, comments received on the Draft EIS, and the Army's responses to these comments.

Appendix B – Economic Impact Forecasts: Documents the economic impact forecast summary included in Section 3.3, Socioeconomics.

Appendix C – Cultural Resources Section 106 Consultation: Documents the National Register of Historic Places Section 106 process for this project, supporting the conclusions in Section 3.3, Cultural Resources.

Appendix D –Transportation and Traffic: Documents the analysis performed to support the conclusions in Section 3.4, Transportation and Traffic.

Appendix E – Air Quality: Documents the analysis performed to support the conclusions in Section 3.5, Air Quality and includes the Clean Air Act General Conformity Rule Record of Non-Applicability (RONA).

Appendix F – Natural Resources Coordination: Describes coordination with state and federal natural resources agencies, supporting the conclusions in Section 3.9, Biological Resources.

Appendix G – Geology, Topography, and Soils: Includes "Small Area Maps" to provide detailed views of the relationship between project sites and the resources discussed in Section 3.7, Geology, Topography, and Soils.

Appendix H – Hazardous Substances and Potentially Contaminated Sites: Includes "Small Area Maps" to provide detailed views of the relationship between project sites and the resources discussed in Section 3.11, Hazardous Substances and Potentially Contaminated Sites.

ACRONYMS AND ABBREVIATIONS

A

AAFES	Army and Air Force Exchange Service
AAG	Agency Advisory Group (transportation agencies)
ACM	asbestos containing material(s)
ADNL	A-weighted day-night sound level
AM	*ante meridiem* (midnight to noon)
APE	area of potential effect
AQCR(s)	air quality control region(s)
ASHRAE	American Society of Heating, Refrigerating, and Air Conditioning Engineers
ASL	above sea level
AT/FP	anti-terrorism and force protection

B

BACT	best available control technology
BMP(s)	best management practice(s)
BRAC	base realignment and closure

C

CAA	Clean Air Act
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CEWMP	Comprehensive Energy and Water Management Plan
CFR	Code of Federal Regulations
CLRP	National Capital Region Long Range Transportation Plan
CO	carbon monoxide
CRM	cultural resources manager

D

DAAF	Davison Army Airfield
dB	decibel(s)
dBA	A-weighted decibel(s)
DC	District of Columbia
DEIS	draft environmental impact statement
DHR	(Virginia) Department of Historic Resources
DLA	Defense Logistics Agency
DNL	day-night sound level
DoD	Department of Defense
DP&Z	Department of Planning and Zoning (Fairfax County)
DPW	Directorate of Public Works (Fort Belvoir)
DPWES	Department of Public Works and Environmental Services (Fairfax County)
DRPT	(Virginia) Department of Rail and Public Transportation
DVP	Dominion Virginia Power

E

EA(s)	environmental assessment(s)
EIS	environmental impact statement
EISA	Energy Independence and Security Act
ENRD	Environmental and Natural Resources Division (Fort Belvoir)
EO	executive order
EPAct	Energy Policy Act of 2005
EPG	Engineer Proving Ground (now called the Fort Belvoir North Area [FBNA])
EQC	environmental quality corridor
ESC	erosion and sediment control

F

FBCH	Fort Belvoir Community Hospital
FBDH	Fort Belvoir Historic District
FBMRR	Fort Belvoir Military Railroad
FBNA	Fort Belvoir North Area (formerly called the Engineer Proving Ground)
FEIS	final environmental impact statement
FHWA	Federal Highway Administration
FNSI	finding of no significant impact
FPD	Facilities Planning Division (Fort Belvoir)
FR	Federal Register
FWC	forest and wildlife corridor (Fort Belvoir)
FY	fiscal year

G

GCR	general conformity rules
GHG	greenhouse gases
GIS	geographic information system(s)
GSA	General Services Administration

H

HAP(s)	hazardous air pollutant(s)
HEC	Humphreys Engineer Center
HOT	high-occupancy toll lanes
HOV	high-occupancy vehicle lanes
HQ	headquarters
Hz	hertz

I

ICRMP	Integrated Cultural Resources Management Plan
INRMP	Integrated Natural Resources Management Plan
INSCOM	US Army Intelligence and Security Command
IPS	Installation Planning Standards (Fort Belvoir RPMP)
IVDP	Installation Vision and Development Plan (Fort Belvoir RPMP)

L

LBP	lead-based paint(s)
LEED	Leadership in Energy and Environmental Design
Leq	equivalent sound level
LID	low impact development
LOS	levels of service
LT	long-term project
LTT	long-term transportation project
LUPZ	land use planning zone (for noise)

M

MACT	Maximum Achievable Control Technology
MBtu/kSF	British thermal units per thousand square feet
MD	Maryland
MDA	Missile Defense Agency
mgd	million gallons per day
MILCON	military construction projects
MOA	memorandum of agreement
MOP	maintenance, operations, and planning
MS4	municipal separate storm sewer system
MSAT	mobile source air toxics
MWCOG	Metropolitan Washington Council of Governments
MWR	Morale, Welfare, and Recreation (Fort Belvoir)

N

NA	not applicable or not available
NAAQS	National Ambient Air Quality Standards
NCPC	National Capital Planning Commission
NEC	Network Enterprise Center
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NGA	National Geospatial-Intelligence Agency
NHL	National Historic Landmark
NHPA	National Historic Preservation Act
NICoE	National Intrepid Center of Excellence
NMUSA	National Museum of the US Army
NNSR	Nonattainment New Source Review
NO_x	oxides of nitrogen
NOA	notice of availability of EIS
NOI	notice of intent to prepare an EIS
NRHP	National Register of Historic Places
NSPS	New Source Performance Standards
NSR	New Source Review
NVSWCD	Northern Virginia Soil and Water Conservation District

O

O_3	ozone
OCAR	Office of the Chief, Army Reserve
OSEG	Operational Security Evaluation Group
OSHA	Occupational Safety and Health Administration
OTR	ozone transport region

P

PA	programmatic agreement
PAL	Privatized Army Lodging
Pb	lead
PCBs	polychlorinated biphenyls
PEM	Palustrine Emergent (Wetland)
PFO	Palustrine Forested (Wetland)
PIF	Partners in Flight Program
PL	Public Law
PM	*post meridiem* (noon to midnight)
$PM_{2.5}$	very fine particulate matter (particulate matter with a diameter ≤ 2.5 microns)
PM_{10}	fine particulate matter (particulate matter with a diameter ≤ 10 microns)
POM	Program Objective Memorandum
PSD	prevention of significant deterioration
PTE	potential to emit
PX	Post Exchange

R

RCRA	Resource Conservation and Recovery Act
REC(s)	record(s) of environmental consideration
RIMS	Regional Input-Output Model
ROD(s)	record(s) of decision
ROI	region of influence
RONA	record of non-applicability
RPA	resource protection area
RPMP	real property master plan (Fort Belvoir)

S

SARA	Superfund Amendments and Reauthorization Act
SHPO	State Historic Preservation Officer
SIP(s)	State Implementation Plan(s)
SOV	single occupant vehicle
SWMU	solid waste management unit
SR	state route
ST	short-term project
STT	short-term transportation project

T

TDM	transportation demand management
TIP	transportation improvement plan
TMDL	total maximum daily load

TMP	Transportation Management Plan (Fort Belvoir RPMP)
TSCA	Toxic Substances Control Act

U

US	United States
USACE	US Army Corps of Engineers
USAGFB	US Army Garrison Fort Belvoir
USAIMC	US Army Installation Management Command
USC	United States Code
USDOT	US Department of Transportation
USEPA	US Environmental Protection Agency
USFWS	US Fish and Wildlife Service
USGS	US Geological Survey
USO	United Service Organizations

V

VA	Virginia
VAC	Virginia Code
V/C	volume-to-capacity ratio for roadways
VDCR-DNH	Virginia Department of Conservation and Recreation – Division of Natural Heritage (Natural Heritage Program)
VDEQ	Virginia Department of Environmental Quality
VDGIF	Virginia Department of Game and Inland Fisheries
VDOT	Virginia Department of Transportation
VEC(s)	valued environmental component(s)
VMT	vehicle miles of travel
VOC	volatile organic compounds

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Executive Summary



This environmental impact statement (EIS) evaluates the potential environmental consequences of the United States (US) Army's implementing a Real Property Master Plan (RPMP) update for US Army Garrison Fort Belvoir. The RPMP and this EIS cover Fort Belvoir's 7,682-acre Main Post and the 807-acre Fort Belvoir North Area (FBNA, previously known as the Engineer Proving Ground or EPG) (Figure ES-1). The EIS and RPMP do not cover properties Fort Belvoir manages at Rivanna Station near Charlottesville, Virginia and the Mark Center in Alexandria, Virginia. Nor do the EIS and RPMP include the Humphreys Engineer Center, which is adjacent to North Post but is under the control of the US Army Corps of Engineers. Main Post includes South Post, North Post, the Southwest Area, and the Davison Army Airfield (DAAF).

The Army has prepared this EIS as a public document for use by the Army, other governmental agencies, and the public. The EIS identifies and evaluates reasonable alternatives, potential environmental consequences, cumulative effects, and mitigation measures to inform Army decisionmaking on implementing the RPMP's elements, which include 56 short-term projects by 2017 (52 construction, demolition, or renovation projects and 4 stand-alone transportation improvement projects) and 19 long-term projects by 2030 (9 development projects and 10 transportation improvement projects).

Fort Belvoir is located approximately 18 miles southwest of Washington, DC, and 17 miles south of the Pentagon, on the Potomac River in Fairfax County, Virginia. As a strategic sustaining base for America's Army in the National Capital Region, Fort Belvoir provides logistical, intelligence, and administrative support to a diverse group of more than 140 Army and Department of Defense (DoD) organizations. Fort Belvoir contributes to the nation's defense primarily by providing a secure operating environment for regional and worldwide DoD missions and functions. The garrison also provides housing, medical services, recreational facilities, and other support services for active duty military members and retirees in the National Capital Region.

ES.1 BACKGROUND

The Army established Fort Belvoir during World War I as Camp A.A. Humphreys, which was built to accommodate 20,000 soldiers. In 1919, the Army Engineer School relocated to Camp Humphreys and remained on the installation until 1988. After World War II, Fort Belvoir's mission began to shift from training to research, development, test, and evaluation activities. In the 1950s, the installation's mission expanded to include hosting DoD organizations. With the departure of the Army Engineer School in 1988, Fort Belvoir's mission to support DoD organizations grew.

Fort Belvoir's 1993 master plan was prepared when Fort Belvoir's role as an administrative support center for DoD organizations was growing while its role in troop support and training was waning. Fort Belvoir's ability to accommodate DoD organizations requiring secure settings coupled with its mission as a support facility for

the National Capital Region led to a migration of organizations onto the post even before the September 11, 2001 terrorist attacks. Following those attacks, security was increased and more agencies moved to Fort Belvoir from less secure settings in the region.

In September 2005, the Defense Base Closure and Realignment (BRAC) Commission recommended numerous realignment and closure actions for military installations across the United States to advance the goals of transformation by improving military capabilities. Six major DoD organizations were realigned to Fort Belvoir. The amended 1993 land use plan was reconsidered and a plan developed to accommodate the BRAC-mandated facilities. New building sites and existing buildings to be remodeled were selected. Consistent with timelines established under BRAC law, facilities were to be completed and occupied no later than September 15, 2011. Options for accommodating the growth resulting from the BRAC realignment were analyzed in an EIS completed in 2007. Revisions to the 1993 land use plan as amended in 2002 to accommodate BRAC facilities were adopted in 2007.

In September 2011, following full implementation of the BRAC 2005 recommendations, the workforce on the installation was approximately 39,000, an increase of 15,000 over 2005 levels. Building space (not including housing) on Main Post and FBNA totaled 15.9 million square feet, an increase of 5.1 million square feet from 2005 levels. By February 2013, the workforce had grown to 39,740 as the result of incremental growth in agency personnel. This EIS uses the September 2011 post-BRAC workforce of approximately 39,000 as the baseline for analyzing impacts.

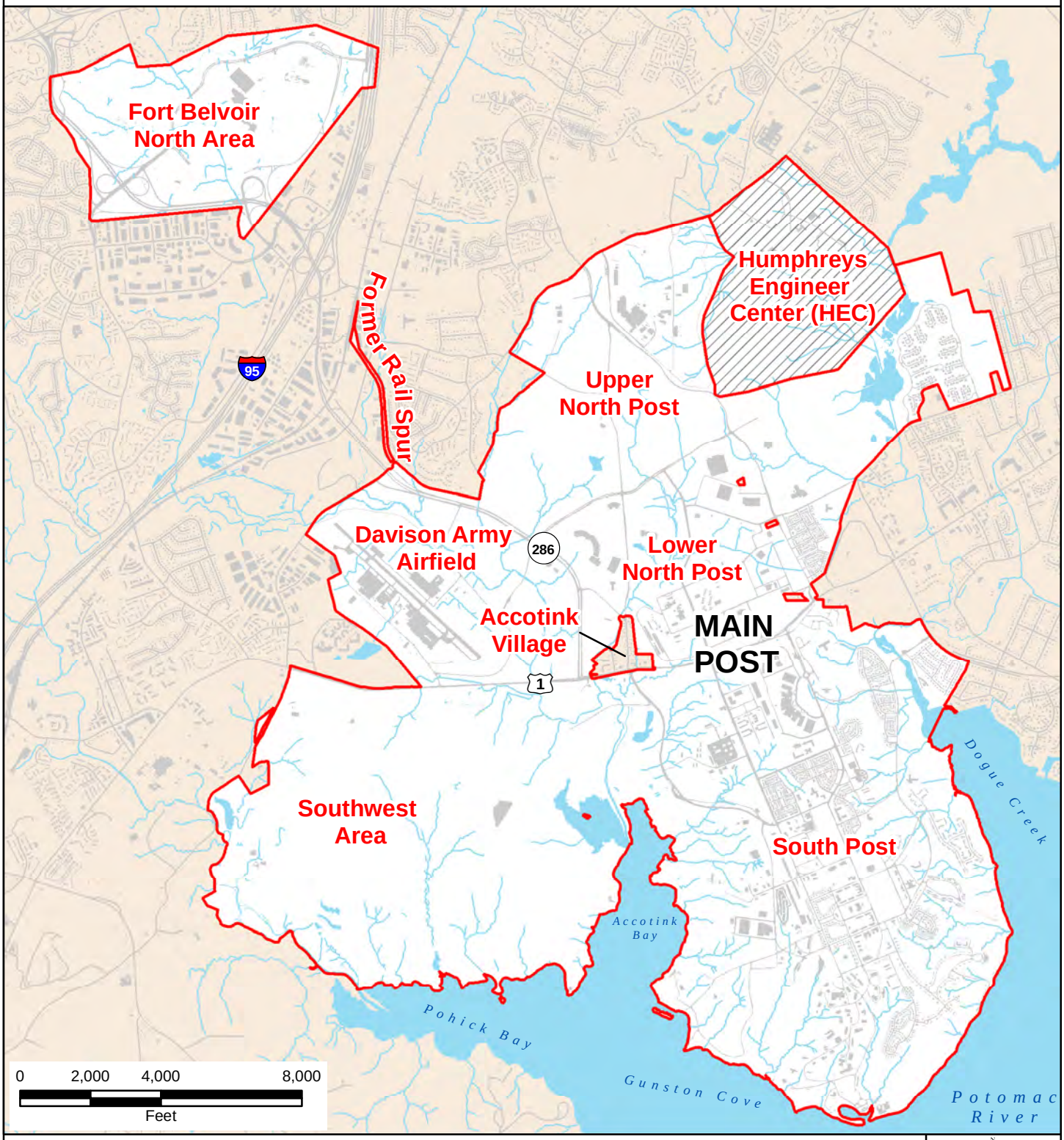
ES.2 PURPOSE AND NEED

Fort Belvoir prepared a master plan in 1993 and amended it in 2002 and 2007. In light of the substantial changes that have occurred on post since 1993, the amended 1993 master plan no longer serves to adequately guide the management and use of real property assets – land, facilities, resources, and infrastructure – on the installation. Therefore, Fort Belvoir has prepared an updated master plan to establish a framework for developing and managing real property on the post through the year 2030.

The purpose of the Proposed Action is to provide Fort Belvoir with an updated master plan that reflects current missions, needs, and conditions, and addresses short-term program facility and infrastructure needs. An updated RPMP would allow Fort Belvoir to manage its real property resources in the future in a manner that fully supports the post's overall mission. Building the short-term projects by 2017 would address outstanding, unmet infrastructure and facility needs.

An updated master plan is needed to provide Fort Belvoir with a blueprint for future real property planning through 2030 now that the 2005 BRAC recommendations for the post have been implemented. The BRAC realignment increased the installation's building space by 47 percent and its workforce by 73 percent in a mere seven years. The focus on planning and building to accommodate these changes from 2005 through 2011 resulted in less focus on non-BRAC missions and garrison needs. The BRAC realignment also resulted in a need for new transportation infrastructure (interior road widenings and Lieber Gate, a new gate on US Route 1) to support the increased workforce that have not been completed and are part of the RPMP short-term projects. Updating the master plan and building short-term projects now shifts the planning focus to encompass non-BRAC-related as well as BRAC-related facilities, tenants, and missions.

Fort Belvoir



Fort Belvoir Installation Boundary

Humphreys Engineer Center (HEC)*

Fort Belvoir RPMP EIS

* HEC, controlled by the U.S. Army Corps of Engineers, is adjacent to Fort Belvoir but is not included in the RPMP or the RPMP EIS.

Figure ES-1

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ES.3 PROPOSED ACTION

The Army is proposing to adopt and implement an updated RPMP for Fort Belvoir, implement the short-term projects identified in the plan by 2017, and eventually implement the long-term projects identified in the plan between 2018 and 2030. In November 2011, as a step in the master planning process, Garrison staff and tenants met to develop a vision for Fort Belvoir and create guiding principles for future development on the post. The vision articulated was: "Fort Belvoir is an outstanding place to work, train, and live that embraces a culture of diversity, innovation, and challenge while continuing its legacy as a 'Beautiful to See'[Belvoir in French means "beautiful view"] installation." The principles articulated were for future development that efficiently uses land, maximizes the use of previously disturbed areas and historic structures, minimizes the impact on the environment, facilitates transit, improves connectivity, promotes walkable, mixed-use town centers, supports local and regional planning objectives, and creates a sustainable, world-class installation.

The RPMP Installation Vision and Development Plan incorporates the master plan vision, an assessment of the Fort Belvoir site and environs, and a land use plan. Consideration of these elements culminated in the framework development plan, shown in Figure ES-2. This plan recommends the type and location of future development but not specific projects, allowing the plan to serve as a flexible, overall guiding framework. The plan provides the framework for accommodating workforce growth to the year 2030; focuses future development in areas that have already been developed and have utility connections, thereby minimizing new land disturbance, increases in impervious surfaces, infrastructure costs, and incursions into protected areas and green space; redevelops old facilities and promotes in-fill development, which would use less energy and recycle existing facilities in a sustainable manner; provides a dense core of mixed-use development on the plateau that extends north-south down Main Post, allowing concentration of the workforce and promoting walkability and transit use; maintains the historic Fort Belvoir railroad right-of-way for potential transit use; reserves parcels for recreation and open space as well as maintains viable green space through all developed areas; and preserves parcels for development beyond 2030.

The RPMP presents Fort Belvoir's proposed short-term (ST) projects implemented or planned for implementation from 2012 through 2017. These projects address current and near-term functional needs on the post. Table ES-1 lists the 52 short-term construction, demolition, and/or renovation projects by program year (see Figure ES-5 for the location of those projects). Short-term transportation projects are also proposed (Table ES-2 and Figure ES-3). Although some of the short-term projects have already been built or NEPA documentation has already been completed or is underway, they are included in the EIS because they form part of the Proposed Action, which is to implement the whole RPMP update, including the short-term projects. Their inclusion also allows for a better evaluation of the cumulative impacts of all projects on Fort Belvoir following the BRAC realignment.

Long-term projects to be implemented on Main Post and the FBNA from 2018 to 2030 are defined in the master plan based on agency plans and projected needs. The siting, design, and timing of these projects are less well-defined than those of the short-term projects. Consequently, the impact analysis for these projects is broadly conceptual in nature and further NEPA analysis would be conducted, as applicable, when the projects reach a more advanced stage of planning. Table ES-3 lists the long-term (LT) facility projects (see Figure ES-5 for project locations). Table ES-4 lists long-term transportation (LTT) projects that would support the proposed increase in workforce and facilities. Figure ES-4 shows the LTT projects.

Table ES-1
Short-Term (FY 2012-2017) Projects

Project #	Project Name	Project Number	Location	Building size (square feet)	Disturbed Area (acres)	Impervious Surface (net acres)	Added Personnel	Status/Comments
FY 2012 Construction								
ST 1	Army & Air Force Exchange Service (AAFES) Post Exchange (PX)	71074	North Post	270,000	24.3	16.8	75	The new PX opened in June 2013 and consolidated three existing facilities.
ST 2	Privatized Army Lodging (PAL – East of Belvoir Road Circle	64293	South Post	103,402	5.4	2.1	30	A new, 141-room transient lodging facility is being built near Pence Gate under terms of the PAL agreement
ST 3	National Intrepid Center of Excellence (NICoE)	NA	South Post	18,074	2.8	0.6	50	The facility opened in July 2013 and provides treatment for traumatic brain injuries and post-traumatic stress disorders.
ST 4	Mulligan Road[1] Phase II	62297 56062	North Post	NA	32	20	0	This project was completed in 2014. The project included the completion of Mulligan Road (officially dedicated as Jeff Todd Way in August 2014) between Telegraph Road and US Route 1 plus associated work to Telegraph Road, Old Mill Road, and US Route 1.
ST 5	Fisher House 1	NA	South Post	10,000	1.8	0.8	4	This project was completed in May 2012 and is a single-story brick residential facility with 12 bedrooms/ suites. The facility provides a temporary residence and support functions for service men and women and their families receiving care at the Fort Belvoir Community Hospital (FBCH).
ST 6	USO Wounded Warrior and Family Center	NA	South Post	25,000	3.5	0.9	15	The facility, which opened in February 2013, provides recreational/community support functions for recovering Soldiers and their Families.
ST 7	Expansion of DAAF Fire Station	74885	DAAF	4,050	0.4	0.04	25	This project is currently under construction and would expand the existing fire station to accommodate a third fire company.

Project #	Project Name	Project Number	Location	Building size (square feet)	Disturbed Area (acres)	Impervious Surface (net acres)	Added Personnel	Status/Comments
ST 8	Child Development Center 144	70067	North Post	13,020	3.7	1.4	45	The child development center, completed in 2013 and opened in March 2014, provides care for up to 144 children of active duty and authorized civilian personnel. The facility is located near the Woodlawn family housing area.
ST 9	Family Travel Camp Phase 1	66807	South Post	1,630	9.6	1.6	6	Phase 1 of this project opened in May 2013 in the Tompkins Basin area. The facility provides spaces for recreational vehicles and camping support buildings. Active-duty military, their families, military retirees, and eligible civilians are eligible to use the facility.
ST 10	Water/Wastewater Utility Upgrades (not mapped)	NA	Main Post	NA	Temporary disturbance to replace pipes, etc.	± 0	0	Currently under construction, this project would repair and replace aging infrastructure, including pipes, lift stations, and water towers.
FY 2013 Construction								
ST 11	Child Development Center 1	75997	FBNA	10,640	7 total for both	2.7	35	Two child development centers, each with a capacity of 124 children, are under construction adjacent to one another to provide childcare for military personnel and eligible civilians working on FBNA.
ST 12	Child Development Center 2	75998		10,640			36	
ST 13	Access Road & Control Point – Lieber Gate	80573	North Post	1,500	8	6	0	A new access control point with construction slated to begin in late 2014 would allow access to North Post from US Route 1. The facility would replace the former Lieber Gate, which was closed after the September 2001 terrorist attacks.
ST 14	Regional Stormwater Management Facility	NA	South Post	NA	3.5	0	0	This project would build a regional stormwater management facility to serve several buildings. The project is still conceptual. The proposed site requires environmental remediation.
ST 15	AAFES Car Wash	0307-03-001	North Post	1,350	0.13	0.1	0	A car wash facility for privately-owned vehicles would be built adjacent to the Class VI store at the intersection of Gunston and Gorgas Roads.

Project #	Project Name	Project Number	Location	Building size (square feet)	Disturbed Area (acres)	Impervious Surface (net acres)	Added Personnel	Status/Comments
ST 16	PX Demolition	N/A	North Post	NA	3.2	-3.2	0	The former PX building has been demolished to make space available for the construction of the new Commissary (see ST 1 and ST 28).
ST 17	36-Hole Golf Course Reconfiguration	73679	North Post	NA	33.8	1.3	0	Six of the 36 holes at Fort Belvoir's golf course would be reconfigured to accommodate construction of the National Museum of the US Army (NMUSA) (see projects 18, 27, 34, 38, and 41).
ST 18	National Museum of the US Army (NMUSA) Roads and Infrastructure Improvements	71149	North Post	NA	25.9 for buildings, parking lots, infrastruc-ture	16.7 for buildings, parking lots, infrastruc-ture	0	Roads and utility infrastructure would be extended and parking lots would be built to serve the future NMUSA facilities (see ST 17, 27, 34, 38, and 41).
ST 19	US Army Intelligence and Security Command (INSCOM) Headquarters Expansion, Phase 1	57508	North Post	420,000	21.9 for all 4 phases	4.3 total for all 4 phases	0	Under construction, this project would build the first of four phases (also see ST projects 26, 33, and 46) to expand INSCOM's headquarters facilities. The first phase includes a 1,400-space parking garage, utility building, partial reconfiguration of parking lots, and site work.
ST 20	Replacement of South Post Fire Station	61453	South Post	10,297	1.5	0.07	12	A new fire station for two fire companies is under construction near the site of the existing station. The existing station would be repurposed as a 911 communications center.
ST 21	AAFES Car Care Center	0301-10-001	North Post	9,000	0.2	0.01	15	A car maintenance facility with 10 service bays would be built on an outparcel of the PX/ Commissary site.
ST 22	Pet Care Center	74317	South Post	5,200	1.0	0.2	8	A pet care center to provide pet care and kennel boarding for the pets of military personnel, their families, and eligible civilians would be built near the intersection of 21st Street and Warren Road.

Project #	Project Name	Project Number	Location	Building size (square feet)	Disturbed Area (acres)	Impervious Surface (net acres)	Added Personnel	Status/Comments
ST 23	National Geospatial-Intelligence Agency (NGA) Canine Training / Rest Facility	NA	FBNA	1,200	0.5	0.04	10	This project would build a canine training and rest facility with an administrative area, kennels with dog runs, and a canine exercise area for NGA working dogs.
ST 24	Fairfax County School Expansion	NA	North Post	92,254	4.4	2.1	75	A new elementary school would be built next to the existing Fort Belvoir Elementary School to accommodate up to 492 students. In September 2013, Fairfax County submitted an initial project proposal to DoD for funding.
FY 2014 Construction								
ST 25	Name Brand Casual Dining Restaurant	NA	North Post	6,500	0.2	0.15	50	An Old Chicago restaurant would be built on an outparcel of the PX/Commissary development site.
ST 26	INSCOM HQ Expansion, Phase 2	58849	North Post	188,000	Included in ST 19	Included in ST 19	0	The expansion of the INSCOM HQ facilities would continue under this project (see also ST 19, 33 and 46).
ST 27	NMUSA, Phase 1	NA	North Post	195,130	Included in ST 18	Included in ST 18	0	A national museum to showcase the history and artifacts of the US Army would be built (see also ST 17, 18, 34, 38 and 41).
ST 28	Main Post Commissary	64327	North Post	132,000	19.4	2.2	75	This project would provide a new, larger Commissary for use by military personnel, their families, area retirees, and eligible civilians.
ST 29	Defense Logistics Agency (DLA) Visitor Control Center	80446	North Post	2,960	0.5	0.35	4	A standard DoD visitor control center for employees and visitors accessing DLA would be built under this project.
ST 30	Fisher House 2	NA	South Post	10,000	1.8	0.5	4	A second Fisher House would be built adjacent to Fisher House 1 (ST 5). The two houses would share the same purpose, design, and parking lot.
ST 31	Family Travel Camp, Phase 2	66808	South Post	NA	1.3	0.9	0	Car camping sites and cabins would be added to the family travel camp described under ST 9.

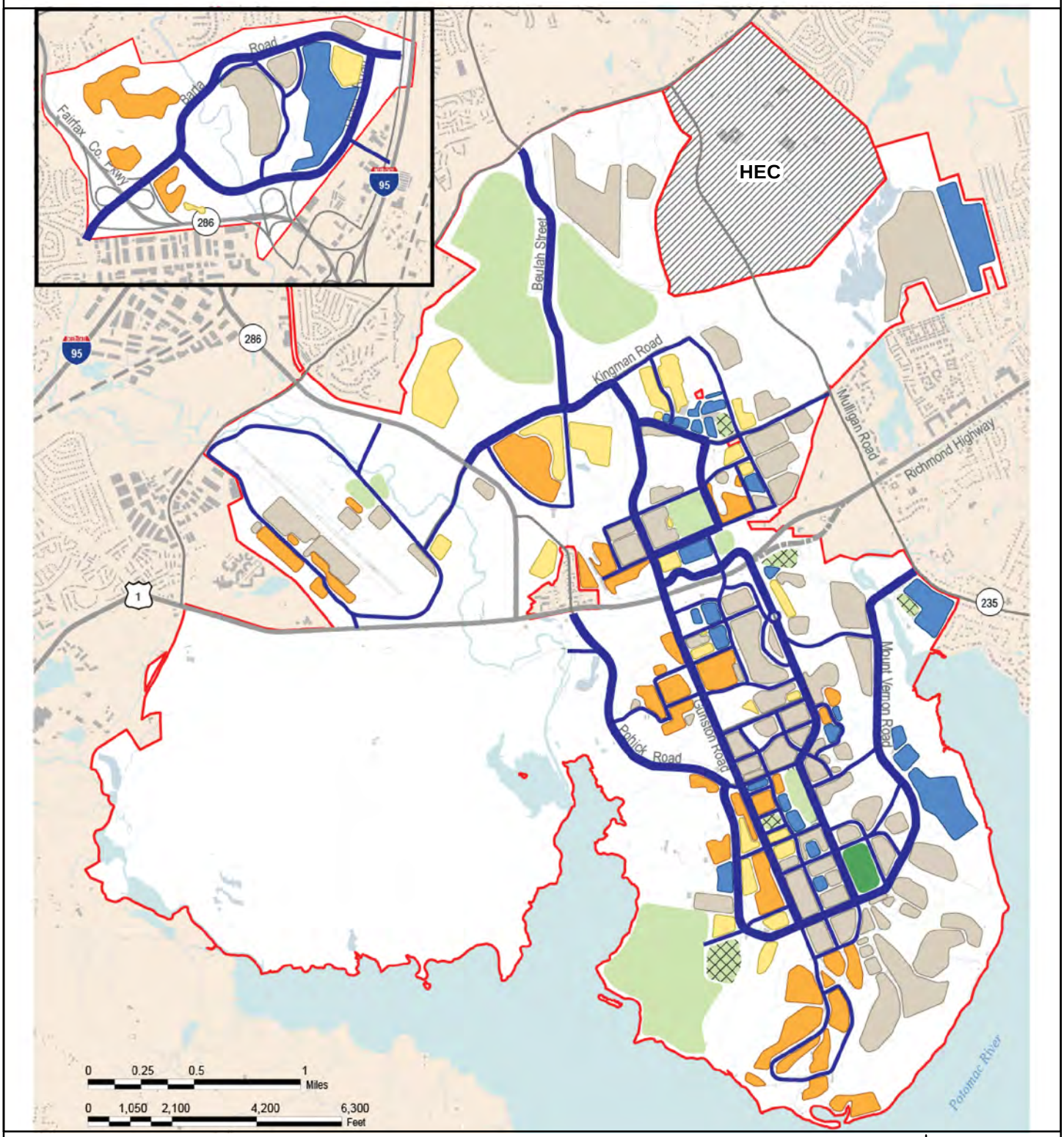
Project #	Project Name	Project Number	Location	Building size (square feet)	Disturbed Area (acres)	Impervious Surface (net acres)	Added Personnel	Status/Comments
FY 2015 Construction								
ST 32	249th Battalion HQ	59554	South Post	81,783	10.5	4.1	200	A new HQ complex would be built on the site of the existing recreational vehicle parking area near the intersection of Theote Road and 16th Street. The facility would include administrative areas, classrooms, and equipment maintenance shops.
ST 33	INSCOM HQ Expansion, Phase 3	62243	North Post	194,000	Included in ST 19	Included in ST 19	0	Expansion of INSCOM HQ facilities would continue under this project (see also 19, 26, and 46).
ST 34	NMUSA, Phase 2	NA	North Post	111,000 (divided among Phases 2-4)	Included in ST 18	Included in ST 18	30	This project would continue the construction of NMUSA facilities (see also ST 17, 18, 27, 38, and 41).
ST 35	Retail Fuel Point	78926	South Post	784 (plus 7,781 for 2 canopies)	1.0	0.8	0	An unattended vehicle fueling station for military and other federal vehicles would be built near the intersection of Theote and Warren Roads. It would replace the existing facility on South Post.
FY 2016 Construction								
ST 36	29th Infantry HQ	510009	North Post	33,258	7.4	0	300	This project would construct a new HQ complex for the 29th Infantry at the intersection of Gunston and Goethals Roads.
ST 37	Medical Office Building	77285	South Post	21,948	0.6	0.45	110	A new facility to accommodate new students, staff, and plant maintenance personnel would be added to FBCH.
ST 38	NMUSA, Phase 3	NA	North Post	111,000 (divided among Phases 2-4)	Included in ST 18	Included in ST 18	30	Construction of NMUSA facilities would continue under this project (see also ST 17, 18, 27, 34, and 41).
ST 39	Multipurpose Fields	NA	South Post	NA	1.9	0.36	0	This project would build new recreational facilities in the Town Center area, including tennis courts, a basketball court, and a little league/softball field.

Project #	Project Name	Project Number	Location	Building size (square feet)	Disturbed Area (acres)	Impervious Surface (net acres)	Added Personnel	Status/Comments
ST 40	DLA Parking Garage	80437	North Post	700,000	1.2	0	0	Two multi-story parking structures with a capacity of 1,650 parking spaces would be built on the existing DLA parking lot. The parking structures would make space available to build ST 52, DLA Administrative Center.
FY 2017 Construction								
ST 41	NMUSA, Phase 4	NA	North Post	111,000 (divided among Phases 2-4)	Included in ST 18	Included in ST 18	30	The final phase of NMUSA would be built under this project (see also ST 17, 18, 27, 34, 38).
ST 42	Unaccompanied Enlisted Personnel Barracks	64270	North Post	103,960	0.6	0	200	A barracks and operations facility would be built to house 240 enlisted personnel realigned by BRAC 2005 from Walter Reed Army Medical Center to FBCH. The facility would not include a dining hall.
ST 43	OSEG Training Compound	69249	DAAF	96,000	9.5	4	200	A permanent compound for OSEG training and operations would be built to replace temporary facilities on North Post.
ST 44	Baseball Field Replacement	64148	South Post	NA	0.9	0	0	This project would replace a baseball field that would be demolished to widen US Route 1. It would be located next to two existing baseball fields.
ST 45	Secure Administrative Facility	76378	South Post	107,193	3.8	0.35	300	An administrative building and parking structure would be built near the intersection of Gunston Road and 5th Street.
ST 46	INSCOM HQ Expansion, Phase 4	77905	North Post	Renovation only	Included in ST 19	Included in ST 19	946	The existing INSCOM HQ building would be renovated under the final phase of this project (see also ST 19, 26, and 33).
ST 47	Religious Education Center	65746	North Post	18,093	1.1	1.0	20	A facility with worship assembly area, classrooms, and offices would be built between the Woodlawn Chapel and Woodlawn Road.
ST 48	INSCOM Controlled Humidity Warehouse	80247	South Post	57,116	1.24	0	25	The project would provide a warehouse with a climate-controlled environment for Fort Belvoir tenants engaged in intelligence-gathering activities. The facility would be built near the intersection of Theote Road and 16th Street.

Project #	Project Name	Project Number	Location	Building size (square feet)	Disturbed Area (acres)	Impervious Surface (net acres)	Added Personnel	Status/Comments
ST 49	911th Engineering Company Operations Complex	70935	North Post	39,810	6.8	1.0	110	A medium-duty tactical equipment maintenance complex with integrated company operations administrative space would be built between Accotink Village and Fairfax County Parkway.
ST 50	Vehicle Maintenance Shop	50356	South Post	25,565	6.2	-2.3	25	The existing motor pool on 16th Street would be redeveloped by demolishing existing shops and pavement and building new, general-purpose equipment maintenance facilities and pavement.
ST 51	Information Systems Facility for the Network Enterprise Center (NEC)	80305	South Post	75,000	0.9	0.3	200	A new data center would be built on Warren Road near the Fort Belvoir Residential Historic District.
ST 52	DLA Administrative Center	74314	North Post	267,000	3.9	0	1,000	A general purpose HQ facility for DLA and Defense Energy Support Center operations would be built on an existing parking lot.
TOTALS	**All ST Projects**			**3,482,138**	**275.3**	**88.7**	4,300	
2012 - 2017 Incremental Growth of Existing Agencies							455	Estimated growth, in the short-term, of existing agencies. This can vary based upon agency mission requirements.
TOTAL	**All ST Projects and Organic Growth**						**4,755**	

Note:
1. In August 2014, Mulligan Road was dedicated by Fairfax County as Jeff Todd Way.

Framework Development Phasing Plan



Fort Belvoir RPMP EIS

Figure ES-2

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Table ES-2
Short-Term (FY 2012-2017) Transportation Projects

Project #	Project Name	Location	Disturbed Area (acres)	Impervious Surface (net acres)	Status/Comments
STT 1[1]	Mulligan Road[2], Phase 2a	North Post	32	20	Project to complete Mulligan Road (i.e., Jeff Todd Way, 4 lanes) from US Route 1 to Telegraph Road almost done.
STT 2[1]	Telegraph Road Widening (Mulligan Road[2], Phase 2b)	North Post			Widen Telegraph Road from 2 lanes to 4 from Beulah Street to Mulligan Road (i.e., Jeff Todd Way).
STT 3[3]	Lieber Gate Access Road and Control Point	North Post	8	6	Construct AT/FP-compliant access control point and associated access road from US Route 1.
STT 4	John J. Kingman Road/Fairfax County Parkway Intersection Improvements	North Post	0.7	0.54	Add and/or expand left and right turn lanes and upgrade signals as needed.
STT 5	Transit Hub	South Post	3	2.2	Construct a transit transfer center at either Pence Gate to connect the Medical District to US Route 1 or at 12th Street and Gunston Road to connect the Town Center to existing public transit services. Final location to be determined based on demand.
STT 6	On-Post Intersection and Road Improvements	Variable As Needed			Evaluate on-post intersections and roads for improvements as needed (e.g., new signals, signal improvements, intersection and entry turn lanes, Kingman Road widening to PX/ Commissary).
STT 7	Walker Gate Improvements	South Post	0.2	0.11	Improve Walker Gate & Mount Vernon Memorial Highway intersection by adding a turn lane into Fort Belvoir from the east.
TOTALS	**All STT Projects**		**43.9**[2]	**28.9**[3]	

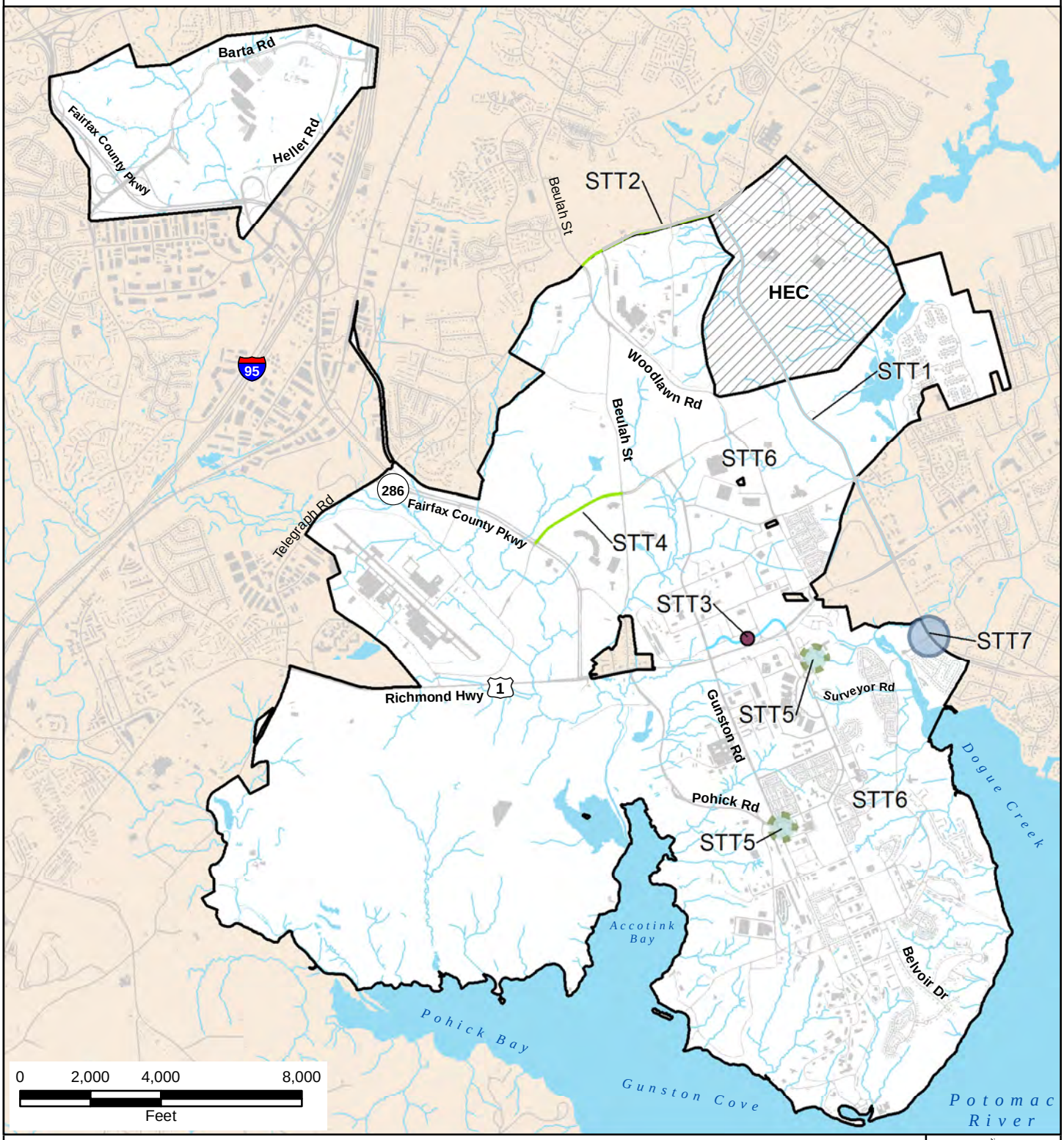
Notes:
1. Project is part of ST 4.
2. In August 2014, Mulligan Road was dedicated by Fairfax County as Jeff Todd Way.
3. Project is part of ST 13.

Table ES-3
Long-Term (2018-2030) Projects

Project #	Project Areas	Location	Building size (square feet)	Disturbed Area (acres)	Impervious Surface (acres)	Added Personnel	Status/Comments[1]
LT 1	Lower North Post District	North Post	240,000	8.2	2.2	1,200	Continue redevelopment of parcels adjacent to the OCAR facility (to the east) and 29th Infantry headquarters complex (to the west) (see ST 36).
LT 2	1400 East District	South Post	266,000	10.3	0.5	1,330	Redevelop parcels currently occupied by Army Materiel Command relocatable buildings, other administrative facilities, and parking lots.
LT 3	South Post Community Support District	South Post	20,000	8	3.5	100	Build another Fisher House and recreational facilities.
LT 4	Administrative Campus District	South Post	220,000	5.4	1.8	1,100	Demolish existing Dewitt Army Community Hospital and replace with a new administrative facility up to eight stories.
LT 5	Town Center District	South Post	80,000	2.6	-0.6	400	Redevelop areas south of 12th Street and east of Gunston Road to expand town center.
LT 6	Industrial Area District	South Post	20,000	1.4	0	100	Redevelop multiple sites generally west of Gunston Road to create transition zones between heavy and light industrial uses and office and community support uses.
LT 6A	Lower North Post West District	North Post					Alternative to LT 6. If selected, building size, acreage disturbed, and personnel would be the same.
LT 7	North Post Community Support District	North Post	20,000	16.5	-10	100	Continue the redevelopment of the North Post Community Support Center in a town center-style, mixed-use development.
LT 8	Historic Core District	South Post	40,000	4.1	0.9	200	Build a new administrative building and parking structure on separate sites. New facilities would replace surface parking lots.
LT 9	Fort Belvoir North Area District	FBNA	1,500,000	42.4	35	7,500	Build an administrative center on a secure campus to accommodate up to 7,500 personnel on a previously-disturbed site.
TOTALS	**LT Projects**		**2,406,000**	**98.9**	**33.3**	**12,030**	
	Parking structures for estimated 40% of personnel		**1,443,600**				
	Total Area of Building Construction – LT Projects		**3,849,600**				

*Note: Building sizes approximated by assuming 200 square feet per person.
[1] Further NEPA evaluation would be prepared for the long-term projects as planning progresses, as applicable.

Proposed Short-Term Transportation Improvements



Legend

- New ACP 2017
- Short-Term Improved Road
- Short-Term New Road
- Short-Term Intersection Improvement
- Transit Transfer Center

Fort Belvoir RPMP EIS

Figure ES-3

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Table ES-4
Long-Term (2018-2030) Transportation Projects

Project #	Project Name	Disturbed Area (acres)	Impervious Surface (acres)	Status/Comments[1]
LTT 1	John J. Kingman Gate	0.1	0.1	Improve Kingman Gate by adding lanes.
LTT 2	Fairfax County Parkway/John J. Kingman Road Intersections &NMUSA Entrance	6.3	4.8	Grade-separate intersections along Fairfax County Parkway at John J. Kingman Road and the NMUSA entrance.
LTT 3	US Route 1 intersections with Fairfax County Parkway, Pohick Road, and Belvoir Road	TBD	TBD	Monitor intersections along US Route 1 at Fairfax County Parkway, Pohick Road, and Belvoir Road to determine need for future improvements.
LTT 4	US Route 1 Overpass	0.8	0.6	Construct US Route 1 overpass and a two-lane road connecting 1st Street and Gorgas Road.
LTT 5	Internal cross streets	3.1	1.7	Add internal cross streets (Abbott Road, 3rd Street, and 6th Street).
LTT 6	Gunston Road from 12th Street to 16th Street	3.4	0.6	Extend four-lane widening of Gunston Road from 12th Street to 16th Street.
LTT 7	13th Street Improvements	0.3	0	Convert 13th Street to two-way traffic and connect to 12th Street as part of the future Town Center redevelopment.
LTT 8	Heller Road	2.9	1.9	Complete the Heller Road loop at FBNA.
LTT 9	Meeres Gate	0.5	0.4	Potentially open Meeres Gate (subject to long-term security and mission requirements that are to be determined).
LTT 10	Goethals Road	0.4	0.3	Widen Goethals Road to four lanes and extend to Woodlawn Road.
TOTALS	**LTT Transportation Improvements**	**17.8**	**10.4**	

[1] Further NEPA evaluation would be prepared for all long-term projects, as applicable, as planning progresses.

ES.4 ALTERNATIVES

In accordance with NEPA, the Army considered a range of reasonable alternative ways to implement the RPMP as well as the No Action Alternative. The range of alternatives developed had to: meet the project purpose and need; minimize environmental impacts; recognize the possibility of funding delays, which could postpone projects; and ensure that access to the FBNA was sufficient to accommodate future development. The net workforce increases are measured from the fall 2011 workforce of approximately 39,000.

No Action Alternative

To serve as a baseline for evaluating the impacts of the action alternatives, the No Action Alternative assumes that the proposed RPMP Update would not be implemented and that no further development would take place on Fort Belvoir.

Alternative 1 – Full Implementation – The Preferred Alternative

Alternative 1 assumes that all parts of the RPMP would be approved and implemented, including the *Fort Belvoir Real Property Master Plan Installation Vision and Development Plan*, the *Fort Belvoir Real Property Master Plan Installation Planning Standards*, and the *Fort Belvoir Transportation Management Plan*. The proposed short- and long-term projects that are part of the plan are listed in Tables ES-1 through ES-4. Figure ES-5 illustrates the Alternative 1 short-term and long-term projects (the numbers of the projects correlate to the numbers in Tables ES-1 through ES-4). Full implementation would result in a total post workforce of approximately 44,000 by 2017 and 56,000 by 2030.

Alternative 2 – Modified Long-Term

Alternative 2 assumes full implementation except that there would be no long-term development project on the FBNA (LT 9, a proposed secure campus for 7,500 personnel). Also, ST 40 and ST 52, expansion of the Defense Logistics Agency, would be delayed until the long-term (and become part of LT 10a). Alternative 2 allows a comparison of the transportation system effects of not building on the FBNA in the long term with building a major, new, secure campus for 7,500 personnel in the long term under Alternatives 1 and 3. Implementing Alternative 2 would result in approximately 43,000 personnel on post by 2017 and 50,000 by 2030. Figure ES-6 illustrates the Alternative 2 short- and long-term projects.

Alternative 3 – Modified Short-Term

Alternative 3 assumes almost full implementation of the master plan except that implementation of the majority of short-term projects would be delayed from the short-term (2012-2017) to the long-term (2018-2030) and some projects would have fewer personnel than under Alternative 1. Figure ES-7 illustrates the Alternative 3 short- and long-term projects. Projects postponed until 2018 or later would still be implemented. Implementing this alternative would result in approximately 40,000 personnel by 2017 and 55,000 by 2030.

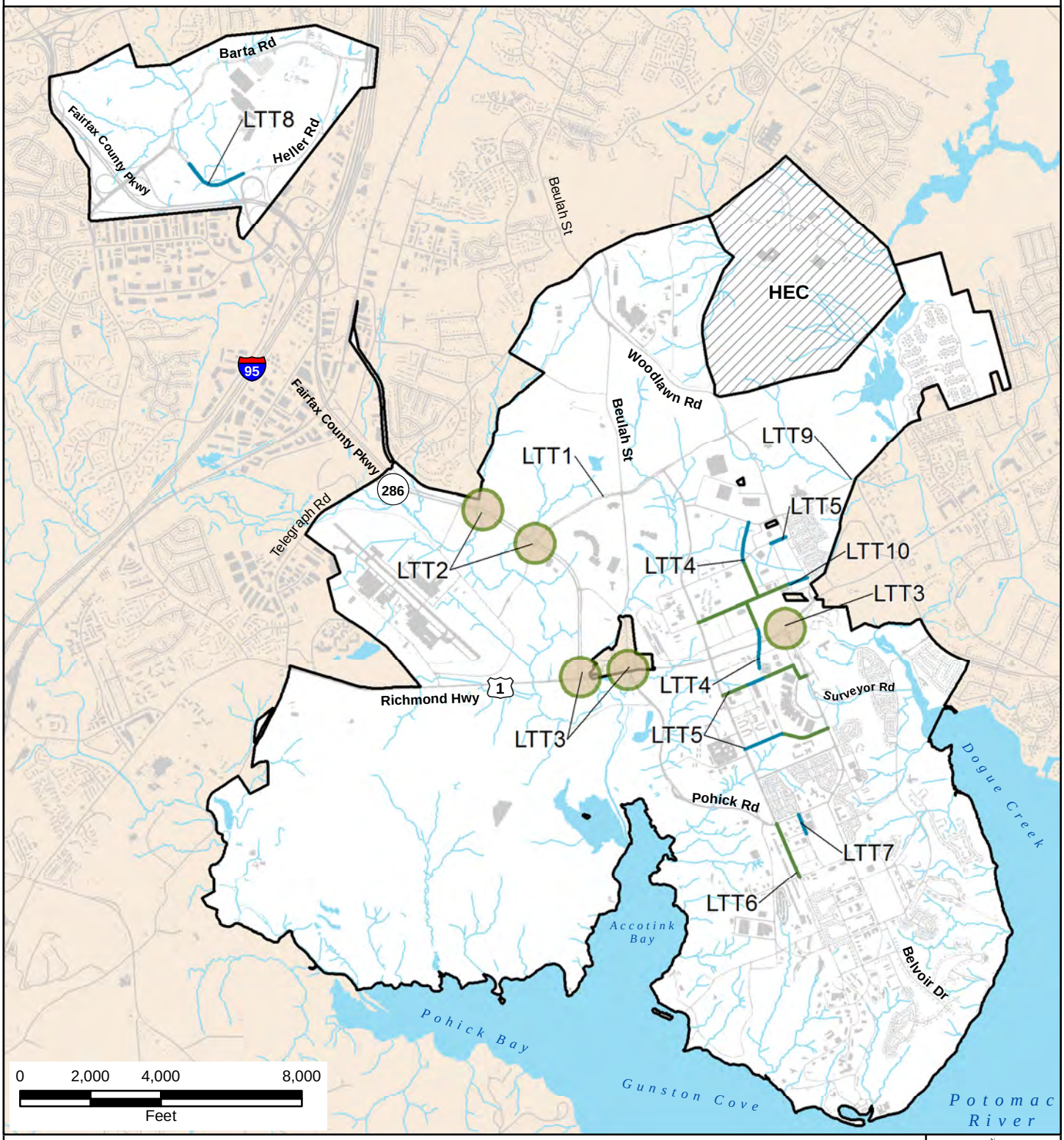
Alternative Summary

Table ES-5 summarizes the alternatives.

Table ES-5
EIS Alternatives

Alternative	Short-Term Projects	Long-Term Projects	2017 Post Workforce (Increase from Sept 2011)	2030 Post Workforce (Increase from Sept 2011)
No Action Alternative	None	None	No increase	No increase
Alternative 1 Full Implementation - The Preferred Alternative	All Implemented	All Implemented	44,000 (+5,000)	56,000 (+17,000)
Alternative 2 Modified Long-Term	ST 40 and 52 deferred to LT	LT 9 on FBNA not implemented	43,000 (+4,000)	50,000 (+11,000)
Alternative 3 Modified Short-Term	Many ST projects deferred to LT	Most ST and all LT projects implemented	40,000 (+1,000)	55,000 (+16,000)

Proposed Long-Term Transportation Improvements



Long Term Improved Road

Long-Term Intersection Improvement

Long Term New Road

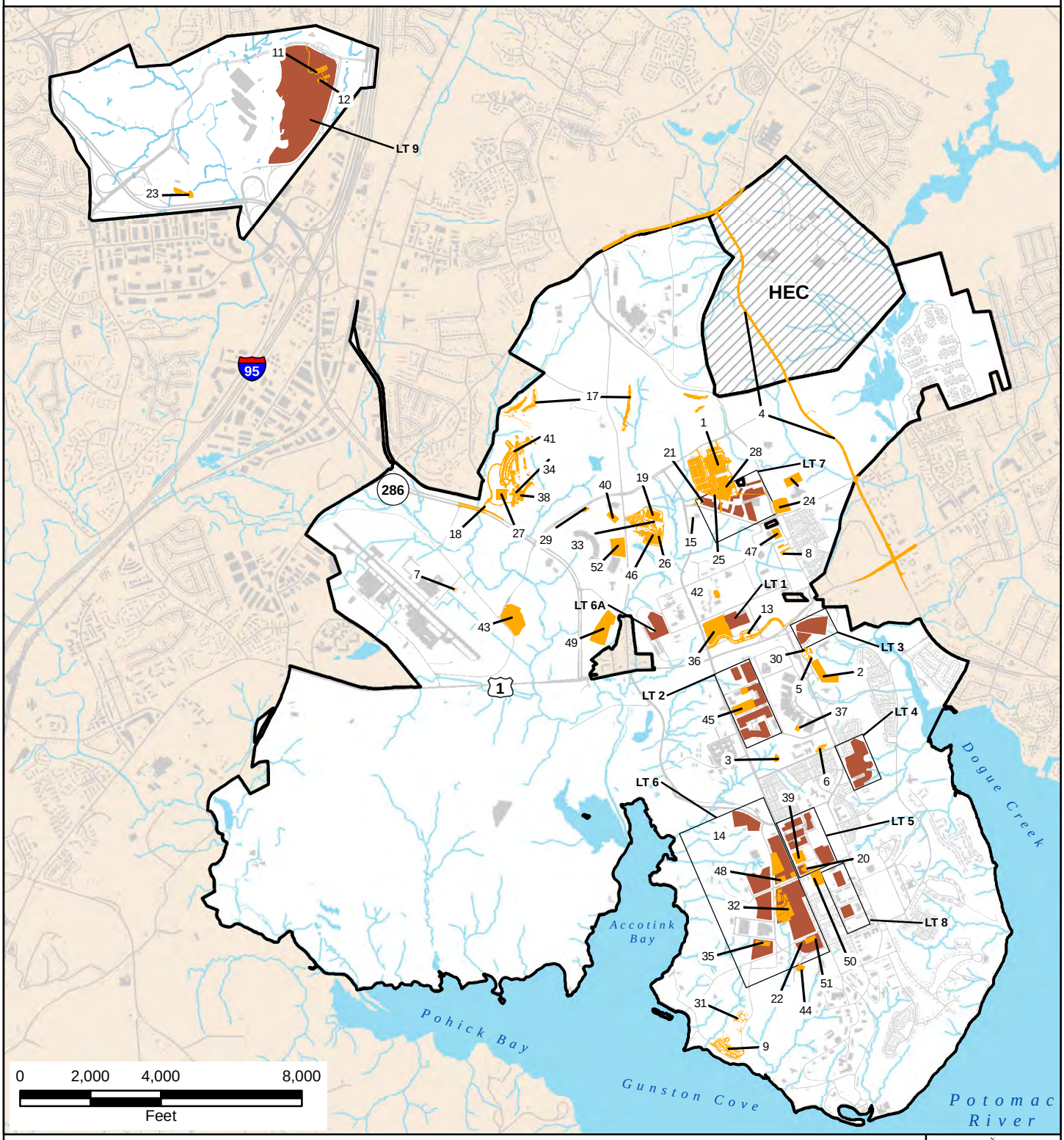
Fort Belvoir RPMP EIS

Figure ES-4

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Alternative 1 - Full Implementation



Short-Term Project Sites
(Construction FY 2012 - 2017)

Long-Term Project Sites
(Construction FY 2018 - 2030)

Fort Belvoir RPMP EIS

Figure ES-5

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Alternative 2 - Modified Long-Term

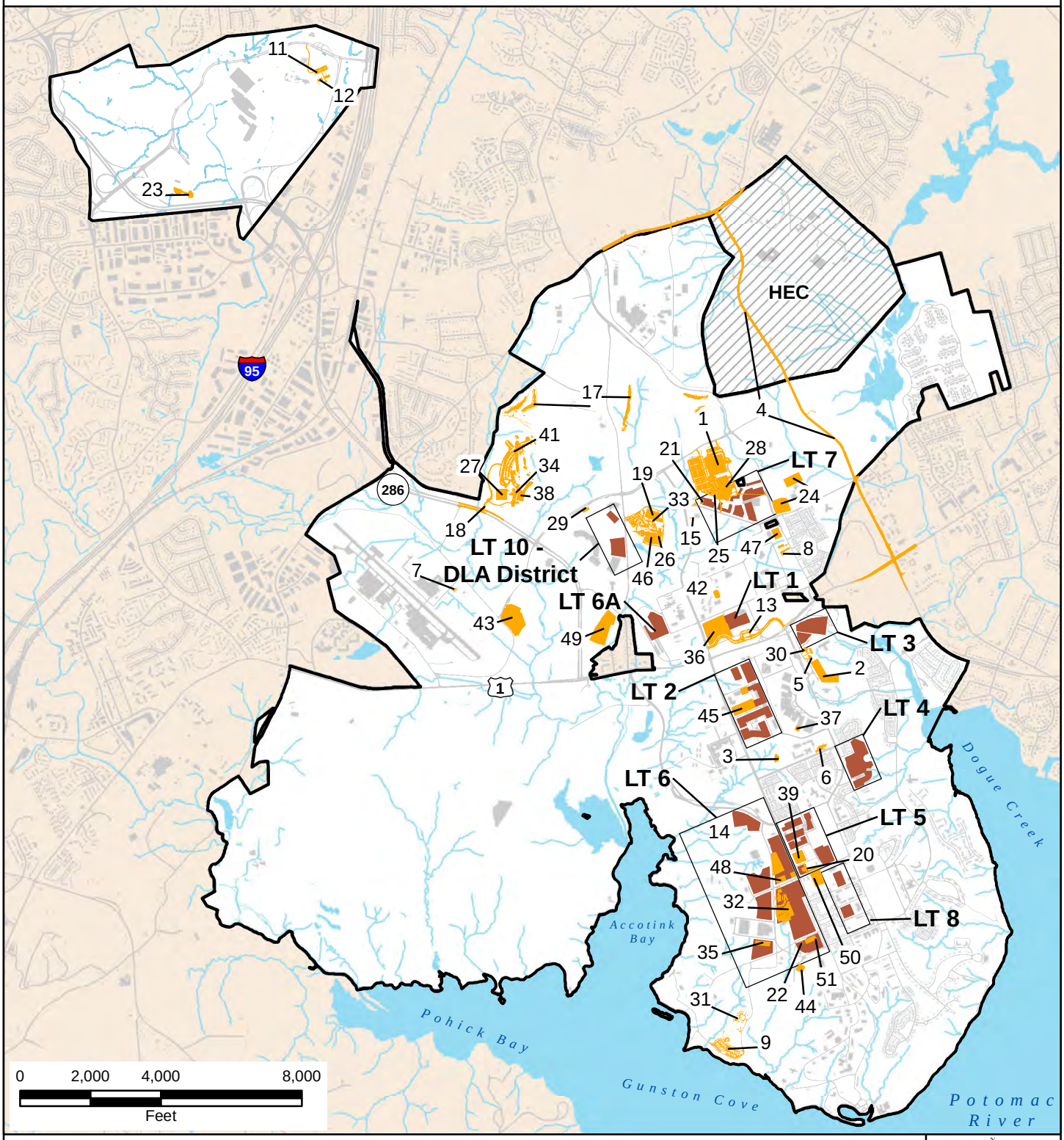
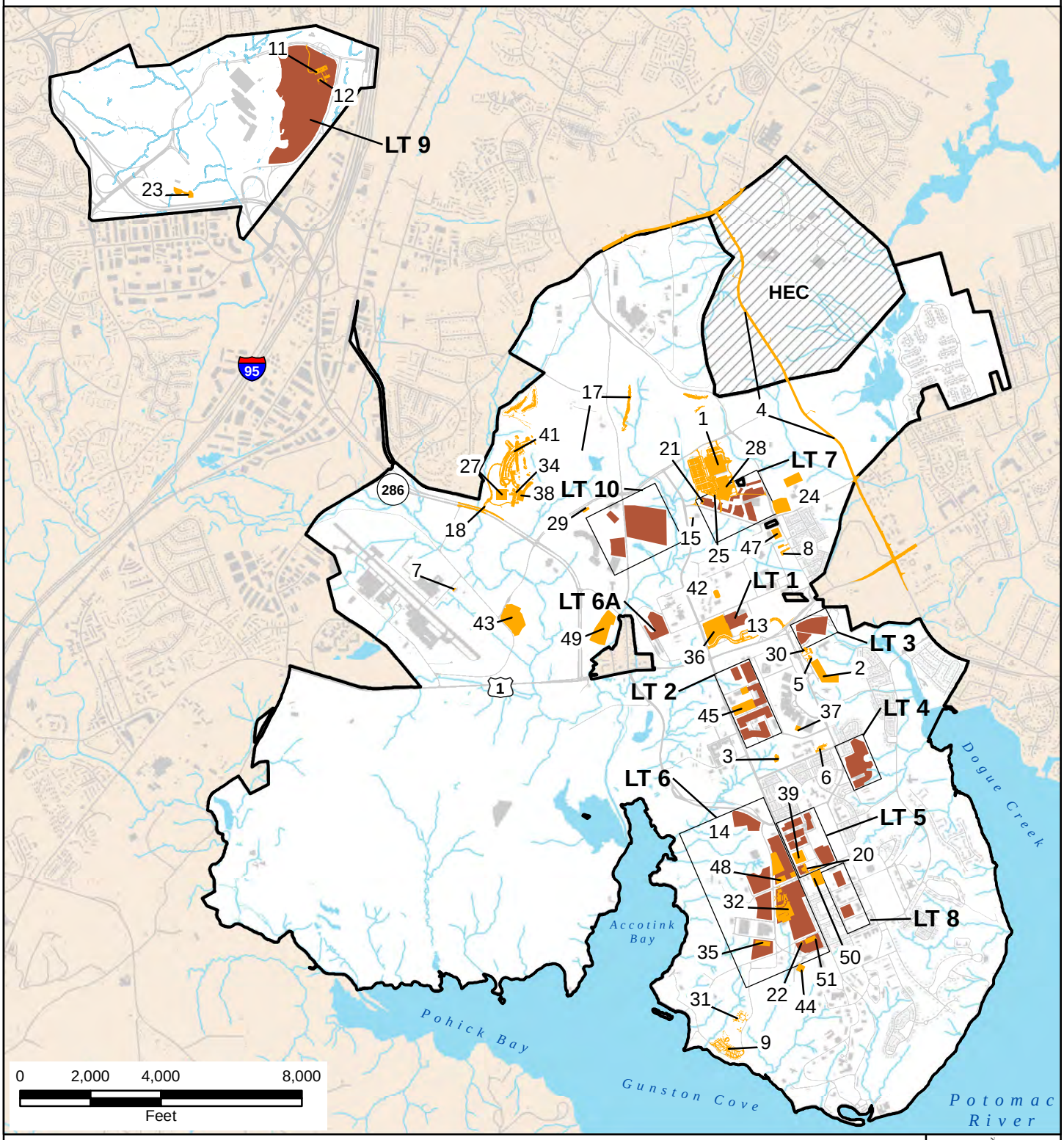


Figure ES-6

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Alternative 3 - Modified Short-Term



Short-Term Project Sites
(Construction FY 2012 - 2017)

Long-Term Project Sites
(Construction FY 2018 - 2030)

Fort Belvoir RPMP EIS

Figure ES-7

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ES.5 PUBLIC INVOLVEMENT

To promote sound decision-making and ensure that all interested parties are heard, the Army is providing opportunities for the public and other agencies to comment on the update of the RPMP and on the EIS. The public involvement process began with the Army's publication of a Notice of Intent to prepare an EIS in the *Federal Register* on September 10, 2012. The Army also published notices in five local newspapers on September 26 and 27, 2012 announcing the environmental impact analysis process was beginning and that a public scoping meeting would be held.

On October 11, 2012, the Army conducted the public scoping meeting as well as an agency scoping meeting to assist in identifying EIS alternatives and to determine the scope of the analysis. In addition to the aforementioned newspaper notices, the scoping meeting was publicized through letters sent to a list of potentially interested organizations and individuals. The scoping process resulted in the submission of oral and written comments from two individuals and seven agencies. All comments were considered in determining the alternatives and the scope of the analysis.

The Army released the Draft EIS (DEIS) for public review and comment on September 12, 2014. A notice of availability (NOA) was published in the *Federal Register* on September 12, 2014, the *Mount Vernon Voice* on September 17, 2014, and the *Washington Post* and the *Belvoir Eagle* on September 18, 2014. The DEIS was made available on line and at five public libraries. Copies could also be requested from Fort Belvoir. The comment period ran from September 12 through November 11, 2014.

On Tuesday, September 30, 2014, a public hearing was held at the South County Center on US Route 1 from 5 pm to 9 pm. Eleven persons attended. No comments were submitted.

During the DEIS public comment period, comments were received from the following agencies: the Commonwealth of Virginia, Fairfax County, the US Environmental Protection Agency, and the US Department of the Interior/National Park Service. No comments were received from the general public. The FEIS has been prepared with consideration of all comments. Changes made to the document consisted only of factual or editorial corrections. No changes were made to the alternatives or conclusions of the analysis.

The FEIS will be publicly available for at least 30 days before the Army makes a decision and issues a Record of Decision (ROD). Before making its decision, the Army will consider all relevant environmental information, all comments received during the EIS process, mission requirements, availability of funding, and the professional judgment of senior military leaders. After thoroughly evaluating this information, decision makers will document the decision in the ROD. The ROD will articulate the decision made, provide a supporting explanation, and identify mitigation measures to address any 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 purpose and need. Decision makers will also identify the environmentally preferred alternative. Once the ROD is signed, the Army will publish an NOA for the ROD in the *Federal Register*.

ES.6 ENVIRONMENTAL CONSEQUENCES

The environmental consequences of implementing the RPMP Update focus primarily on the impacts of implementing the short-term projects and secondarily on the impacts of implementing the long-term projects. The short-term projects are more fully-articulated, with some built, some being constructed, and some in the design stage. The long-term projects are more notions of what would be developed in areas defined by the RPMP; many factors may change before development occurs on the long-term sites.

The resources evaluated in this EIS include: land use and planning; socioeconomics, including environmental justice; cultural resources; transportation and traffic; air quality; noise; geology, topography and soils; water resources; biological resources; utilities; hazardous substances and potentially contaminated

sites; and energy use and sustainability. The following paragraphs summarize the environmental consequences of implementing the alternatives on these resources. Table ES-6 lists the environmental consequences for the resource areas assessed in the EIS and summarizes their potential to generate beneficial effects or less than significant adverse effects, significant adverse effects, or less than significant adverse effects with mitigation. Cumulative impacts are presented in Table ES-7.

Land Use and Plans

Under the No Action Alternative, the RPMP would not be adopted, and none of the short-term or long-term projects would be implemented. Implementation of the No Action Alternative would have no effects on surrounding land use, relevant plans and studies, or current and future development projects near Fort Belvoir. The continuation of existing inconsistencies between actual land uses and the underlying Community designation in areas of South Post would have less than significant adverse effects on on-post land use.

The effects on Fort Belvoir land use, land uses in the areas around the post, and current and future development near the post would be similar or the same for the three action alternatives. RPMP implementation would have beneficial effects on land use on Fort Belvoir by correcting the inconsistencies between actual and underlying land uses on South Post; encouraging the development of needed Professional/Institutional facilities while consolidating Industrial facilities; and focusing future development primarily in areas of the installation that have been previously developed and are currently served by existing transportation and utility infrastructure. Implementation of the short-term and long-term projects would have beneficial impacts on Fort Belvoir's land use by clustering compatible development, redeveloping previously-disturbed sites, and avoiding environmentally-sensitive areas. The action alternatives would be compatible with and would have beneficial impacts on relevant plans and studies for areas around Fort Belvoir. As none of the long-term or short-term projects would require the acquisition of private property, change the designation of off-post land uses, or create land use inconsistencies or incompatibilities with land uses in Fairfax County, the alternatives would have no effect on off-post land uses and would have beneficial effects on current and future development near Fort Belvoir.

Socioeconomics

The No Action Alternative would not affect economic activitiy in the region of influence (ROI) and would not affect the sociological environment. Based on the analyses presented in the EIS on traffic, air quality, noise, and water resources, the No Action Alternative would not result in disproportionately high and adverse human health or environmental effects on minority populations and low-income populations, and would not pose disproportionate environmental health or safety risks to children.

The Proposed Action would have beneficial effects on employment and income, regardless of the alternative selected. In general, the Proposed Action would have the same economic effects under each alternative. These effects would arise from construction expenditures and the operation of the National Museum of the US Army (NMUSA) along with the spending of museum visitors. Estimated construction expenditures would be similar under each alternative and would result in one-time increases in ROI economic output, employment, and earnings. The operation of the NMUSA and the spending of museum visitors would create ongoing annual impacts. The Proposed Action would have less than significant adverse impacts on population, regardless of the alternative selected. The proposed short-term and long-term projects would generate net increases in the Fort Belvoir workforce. As most of the affected personnel are anticipated to be federal civilian and contractor employees already residing in the National Capital Region, jobs would simply be shifted from one location to another within the region. Although some of the affected personnel may relocate within the ROI, this redistribution would not result in a change in ROI employment or population.

The social effects of the Proposed Action would range from beneficial effects to less than significant adverse effects, regardless of the alternative selected. The timing of construction of the facilities on Fort Belvoir would vary with each alternative; however, effects on sociological resources, on population, and on demand for housing and public services would be similar. The Proposed Action would have beneficial effects on housing; family support and social services; and shops, services, and recreation on Fort Belvoir and on schools on and near the post, as specific short-term projects would provide housing accommodations, services, and a new elementary school. Similarly, specific projects would benefit law enforcement, fire protection, and medical services on post.

From a regional perspective, the Proposed Action, regardless of the alternative selected, would have less than significant adverse effects on housing, services, and schools. Although the proposed short-term and long-term projects would generate net increases in the workforce on Fort Belvoir, the resulting redistribution of personnel and their families would not result in a change in ROI employment or population. As households relocate within the ROI, increases and decreases in households would occur in communities throughout the ROI and the impact on any one particular community would be negligible. Households moving into receiving communities would increase the demand for services such as police, fire, and medical care; schools; social services; and shopping facilities. In the short-term, services would be expected to decrease as population increases and expansion of services would be necessary to maintain levels of service. The population increases attributable to the Proposed Action would be minor relative to projected regional population growth, however. In addition, population changes would occur over a number of years, as the Proposed Action would not be fully implemented until 2030. Tax revenues from new residents would provide funding for public services (police, fire, medical, schools, and social services). The number and type of shopping and service businesses, and community support and recreation facilities and services likely would increase with demand.

The establishment of new shops and services on Fort Belvoir may draw business from similar businesses off post, potentially having negative impacts on those businesses. With the exception of the Post Exchange (PX) and the Commissary, however, the scale of these new services is small and not likely to have an impact on any one of the many similar businesses off post. The new PX, with expanded offerings and services, may draw customers from other PXs and non-military retailers in the ROI, particularly discount stores near Fort Belvoir or near the place workers live. The proposed Commissary may also draw sales from competing commissaries and grocery stores, though it would not represent as much of an expansion in size and services as the new PX, being more like the scale of the current Commissary. Initially, sales may be captured from other stores because of the novelty factor, but this initial novelty spike in business likely would not last long. Therefore, while other PXs and commissaries as well as other stores in the ROI may lose sales to the new stores, the sizeable number of workers and residents at Fort Belvoir who can shop there combined with the sheer size of the ROI's inventory of similar types of stores suggests that adverse impacts on other stores are likely to be less than significant, even for stores on nearby US Route 1.

The potential population relocation associated with Alternative 1 would indirectly contribute to, but not significantly increase, demand for recreation facilities in the receiving cities and counties in the ROI.

Based on the analyses presented in the EIS on traffic, air quality, noise, and water resources, regardless of the alternative selected, the Proposed Action would have no disproportionate impacts on minority and low-income populations, or on children. The effects of implementing the short-term and long-term projects would ripple throughout the affected area and would not be appreciably more severe or greater in magnitude in minority or low-income communities, or communities with high concentrations of children.

Cultural Resources

Under the No Action Alternative, the RPMP would not be adopted and none of the short-term or long-term projects would be implemented. The No Action Alternative would have no effects on archaeological resources or historic architectural resources at Fort Belvoir.

Most of the projects included in the Proposed Action, regardless of the alternative selected, would not or are not anticipated to adversely affect archaeological resources or historic architectural resources. As much as possible, Fort Belvoir would avoid affecting cultural resources when implementing the proposed projects. As each project proceeds, if further review under Section 106 of the National Historic Preservation Act of 1966 indicates that unavoidable adverse effects would occur, these adverse effects would be mitigated through the development of a Memorandum of Agreement among Fort Belvoir, the Virginia State Historic Preservation Officer, and other consulting parties, as appropriate. Therefore, under NEPA, the Proposed Action, under each alternative, would have less than significant adverse effects on archaeological resources and historic architectural resources, with mitigation. For those projects requiring it, mitigation measures would be developed on a case-by-case basis by Fort Belvoir in consultation with the Virginia State Historic Preservation Officer and other consulting parties, as appropriate, as part of the Section 106 review for the project.

With regard to cultural resources, the difference between the alternatives is minor. The main difference pertains to architectural resources. Delaying short-term projects under Alternative 2 and 3 may result in more resources being potentially affected, as existing structures age and reach the 50-year threshold for potential eligibility to the National Register of Historic Places. Thus, under these alternatives, more resources may have to be considered than would be the case under the Preferred Alternative. This is particularly the case with Alternative 3, under which multiple short-term projects would be deferred to the long term.

Transportation and Traffic

The No Action Alternative would have beneficial effects on the roadways in the study area as the implementation of transportation demand management strategies that are part of the RPMP's Transportation Management Plan (TMP) would lead to a decrease in single-occupant vehicle (SOV) use by Fort Belvoir commuters. The TMP strategies include increasing Fort Belvoir commuters' use of transit, ridesharing, bicycles, and walking, which would lessen traffic congestion on roads on and near Fort Belvoir.

For the Proposed Action in the short term, transportation improvements on and adjacent to Fort Belvoir (widening of US Route 1, Jeff Todd Way [formerly Mulligan Road], Lieber Gate, I-95 high occupancy vehicle [HOV] ramp to FBNA) would mitigate most of the traffic effects of the short-term projects. The short-term projects would significantly adversely increase delays, with a consequent decline in levels of service from D to E, at two intersections – one public and one on Fort Belvoir. Fort Belvoir would mitigate the effects on the Fairfax County Parkway and John J. Kingman Road intersection on Fort Belvoir by adding turning lanes and improving the traffic signals. For the adversely affected Lorton Road at US Route 1 intersection (southwest of the installation), Fort Belvoir would coordinate with the Virginia Department of Transportation (VDOT) and the Fairfax County Department of Transportation (FCDOT) on solutions.

The long-term projects are projected to have significant adverse effects on some roadway segments on and near Fort Belvoir by 2030, degrading levels of service from D to E and F. Fort Belvoir would improve the affected Fort Belvoir roadways and intersections and would coordinate with VDOT and FCDOT to monitor long-term effects on public roads. Notably, Fort Belvoir would work with VDOT to grade-separate the Fairfax County Parkway, John J. Kingman Road, and NMUSA entrance road intersections in accordance with the terms of the memorandum of agreement executed between the two agencies in August 2011.

Implementing Fort Belvoir's TMP would increase transit, ridesharing, bicycle, and pedestrian use and decrease SOV use, which would be beneficial by improving traffic conditions on and near Fort Belvoir in the short and long terms. Depending on the SOV reductions achieved, much of the predicted impact on public roads near the installation may be ameliorated.

Air Quality

The No Action Alternative would have no effect on air quality. No construction, changes in traffic, or changes in operations at Fort Belvoir would be expected and the post's contribution to regional air quality would not change. Ambient air quality trends and planning would not change either.

The Proposed Action, regardless of the alternative selected, would have less than significant adverse effects on air quality with mitigation for construction and stationary source emissions. Increases in emissions would not contribute to a violation of any federal, state, or local air quality standards.

All construction would be accomplished in full compliance with current and pending Virginia regulatory requirements, through the use of compliant practices and products. During construction, reasonable precautions would be taken to prevent fugitive dust from becoming airborne. The total emissions from the proposed short-term and long-term projects, excluding short-term and long-term transportation projects, would be below General Conformity Rules applicability thresholds. Therefore, the general conformity requirements do not apply and no formal conformity determination is required. Increases in emissions from the short-term and long-term transportation projects would be included in the regional transportation conformity determination.

Several of the proposed facilities would require backup generators and several of the facilities would require natural gas boilers for heating. Any new stationary sources of air emissions could be subject to federal and state air permitting regulations and would be added to Fort Belvoir's air permit. The overall operational emissions would be *de minimis* (of minimal importance).

Implementing the RPMP would increase total vehicle miles traveled within the National Capital Air Quality Control Region but resulting mobile source emissions would be *de minimis*. The overall effects on local and regional air quality would be less than significant and not distinguishable from existing conditions.

Noise

The No Action Alternative would have no effect on the existing noise environment. No construction, changes in traffic, or changes in operations at Fort Belvoir would occur. The ambient noise environment would not change.

The Proposed Action, regardless of the alternative selected, would have less than significant adverse effects on the noise environment. Minor increases in noise are not expected to contribute to a violation of any federal, state, or local regulations or to create areas of incompatible land use due to noise.

The proposed short-term and long-term projects would include an appreciable amount of construction activities at Fort Belvoir. Individual pieces of heavy equipment typically generate noise levels of 80 to 90 A-weighted decibels at a distance of 50 feet. With multiple items of equipment operating concurrently, noise levels can be relatively high at locations within several hundred feet of active construction sites. The zone of relatively high construction noise typically extends to distances of 400 to 800 feet from the site of major equipment operations. Locations beyond 800 feet seldom experience appreciable levels of heavy equipment noise. Effects due to construction noise would be temporary, minor, and would end with the construction phase of each short- and long-term project. Construction noise would not be concentrated in any one area for the long term and would move from site to site across the post.

Future sources of noise on the installation would be similar in nature and overall level to those currently present. Increases in traffic volumes and changes in traffic patterns would have long-term adverse but less than significant effects on the noise environment. Changes in noise levels for receptors adjacent to the main traffic routes and key transportation projects would not be perceptible when compared to no action conditions. There would be no change to small arms training, artillery training, use of demolitions, or aircraft operations at Fort Belvoir; therefore, there would be no change in noise levels from these types of activities. All the short-term and long-term projects would be fully compatible with the existing noise

environment and the selected sites for the new facilities would not be in areas of incompatible land use due to noise generated by air operations at DAAF.

Geology, Topography, and Soils

The No Action Alternative would have no impact on Fort Belvoir's topography, geology, or soils because no RPMP projects would be implemented and no ground-disturning activities would occur.

Under the Proposed Action, regardless of the alternative selected, implementation of the short-term and long-term projects would not change the geology of the area. The Proposed Action, regardless of the alternative selected, would have less than significant adverse effects on topography and soils with mitigation. Most of the proposed short-term and long-term projects would be concentrated in the relatively level areas on the uplands and plateaus of the post. The short-term projects would disturb about 280 acres, or 3.3 percent of Fort Belvoir's surface area. The short- and long-term projects combined would result in the disturbance of approximately 400 acres, or 4.7 percent of the land on Fort Belvoir. The land surface that would be disturbed represents only a small portion of Fort Belvoir; much of it has been disturbed in the past; and much of the disturbance would be temporary and related to construction activities. Soil erosion would be minimized by developing and implementing soil erosion control and stormwater management plans.

Water Resources

The No Action Alternative would have no effects on Fort Belvoir's watersheds or on the quality of the surface waters that flow within or through the installation. It would, however, forego the opportunity to use the permitting process to correct ongoing watershed and water quality problems caused by past development practices. The No Action Alternative would have no effect on Chesapeake Bay resource protection areas, riparian buffers along intermittent streams, or floodplains.

The Proposed Action, regardless of the alternative selected, would physically affect Fort Belvoir's watersheds by changing the topography, exposing soils to erosion, and changing the capacity of the watersheds to absorb rainwater via infiltration. An increase in impervious surface in a watershed leads to an increase in the amount and rate of stormwater runoff; it changes the hydrology of the watershed and its receiving streams. The Proposed Action would create about 135 acres of new impervious surface on Fort Belvoir. None of the proposed projects would increase the imperviousness of a watershed by as much as one percent. The short-term and long-term projects would individually and cumulatively have less than significant adverse effects on Fort Belvoir's watersheds.

The Proposed Action, regardless of the alternative selected, would have less than significant adverse effects on the quality of Fort Belvoir's surface waters and on waters downstream provided best management practices are used (i.e., with mitigation), particularly during construction. The proposed short-term and long-term projects would cause short-term impacts such as erosion and sedimentation downstream during construction while soils are exposed. Strict adherence to Virginia erosion and sediment control regulations and Virginia stormwater management program permit monitoring requirements would minimize these impacts. Redevelopment of older facilities would benefit surface water quality by replacing old stormwater management facilities where they exist and adding new ones where none exist now.

Biological Resources

The No Action Alternative would have no effect on biological resources. It would not affect any of the environmental resources, landscape features, or established conservation areas important to maintaining the biodiversity of Fort Belvoir and surrounding areas, namely: refuges and other large tracts of habitat; forested areas; wetlands; and protected species or their critical habitats.

The Proposed Action, regardless of the alternative selected, would have no effect on wildlife refuges, federally threatened and endangered species and their critical habitats, or mitigation sites established as the

result of NEPA or wetland / stream permit actions. Some of the projects would have less than significant adverse effects on forest resources, habitat for Partners-in-Flight (PIF) concern species, state-listed threatened and endangered species habitats, and wetlands.

To avoid fragmenting large tracts of forest land, the RPMP clusters the proposed short-term and long-term projects, to the extent practicable, in the central core of the installation, in areas that have already been developed. Nonetheless, the Proposed Action projects would result in the loss of up to approximately 107 acres of forest resources, or about 1.9 percent of the on-post forest resources. In all cases, the loss of trees would be mitigated, as much as possible, through the application of the Fort Belvoir Tree Removal and Protection Policy, which promotes site planning techniques and construction practices that maximize retention and protection of existing trees before considering removal. The Proposed Action, regardless of the alternative selected, would have less than significant adverse effects on forest resources.

The short-term projects, regardless of the alternative selected, would result in the loss of a maximum of approximately 60 acres of PIF habitat, or about 1.4 percent of the on-post habitat. This would be a less than significant adverse effect. Three long-term projects have the potential to impact PIF habitat. As it is likely that project designers would be able to minimize impacts on this habitat and habitat loss would be mitigated at least partially through replanting according to the Fort Belvoir Tree Mitigation Policy, development at the long-term project sites would have a less than significant adverse effect.

Based on numerous surveys, the only federal Endangered Species Act-listed species found on Fort Belvoir is the small whorled pogonia (*Isotria medeoloides*), which has been documented at one location on FBNA. None of the proposed projects would affect this species. The short-term projects, regardless of the alternative selected, would result in the loss of a maximum of approximately 28 acres of potential wood turtle (*Glyptemys insculpta*) habitat, a less than significant adverse effect on the wood turtle population as this lost habitat is a minor fraction (1.4 percent) of the overall potential wood turtle habitat on the post. One long-term transportation project would involve constructing grade-separated intersections that could contribute to the loss of several acres of potential wood turtle habitat associated with tributaries of Accotink Creek. This impact would remain less than significant considering the amount of wood turtle habitat on the installation. None of the other long-term projects overlap protected species habitats.

Three short-term projects are located near but not within the T-17 Refuge, which was created to protect the Northern Virginia well amphipod (*Stygobromus Phreaticus*), a small crustacean that lives in seeps and has only been documented at three sites in Northern Virginia, including Fort Belvoir. The state and federal government have not listed this extremely rare species for protection because the T-17 Refuge, its only known recent habitat, protects it. The three projects would not affect groundwater, seeps, or the amphipod.

The northern long-eared bat (*Myotis septentrionalis*) was recently listed as “threatened” under the Endangered Species Act (effective May, 2015) and may occur in forested areas on Fort Belvoir. In May 2015, the Army completed Programmatic Informal Consultation on the northern long-eared bat with the US Fish and Wildlife Service under Section 7 of the ESA. The Programmatic Informal Consultation identified criteria under which construction projects would be considered “Not Likely to Adversely Affect” the northern long-eared bat. Fort Belvoir would use the Army’s Programmatic Informal Consultation for northern long-eared bat when screening each upcoming construction project, and would conduct local Section 7 consultation for any project that does not meet the criteria for “Not Likely to Adversely Affect.”

Cumulatively, the proposed short-term projects, regardless of the alternative selected, would affect less than 0.09 percent of the estimated wetlands on Fort Belvoir. Of all the long-term projects, based on planning-level mapping, only one has the potential to impact streams. Although planning for the long-term projects is very preliminary and no detailed site designs have been developed, it is likely that the site could be designed to avoid streams, if they exist, or to limit impacts to no more than a few hundred feet. Therefore, the adoption of the RPMP would have a less than significant adverse impact on wetlands and streams.

Utilities

The No Action Alternative would cause no immediate adverse effects on the utility systems that support Fort Belvoir and its tenants, and would not increase demand for utilities above existing levels. Parts of the utility infrastructure on post date from the 1930s and 1940, however, and they are nearing the end of their useful life. The No Action Alternative would forego upgrading the water and wastewater systems on post.

Regardless of the alternative, the Proposed Action would have impacts on utility systems from increased demand that are similar in magnitude under any of the action alternatives. As the projected demand would not exceed the ability of the respective utility providers to supply the required services, these impacts would not be significant. This includes drinking water, sanitary sewer, electricity, communications, natural gas, and solid waste disposal. There would be no effect on steam use and the steam system.

Hazardous Substances and Potentially Contaminated Sites

Under the No Action Alternative, no proposed short-term or long-term projects would be implemented and no further development would take place on Fort Belvoir. Continued maintenance and repair activities would occur but the use of hazardous substances and generation of hazardous waste would remain at current levels. The No Action Alternative would have less than significant adverse effects on hazardous substance and hazardous waste generation, storage, and disposal.

The Proposed Action, regardless of the alternative selected, would have less than significant adverse effects from an increase in petroleum usage caused by increased base population and activity levels. Storage capacity requirements for petroleum may also increase. Any construction of new storage facilities would be done in accordance with applicable laws regarding construction materials, leak protection, monitoring, and spill containment.

Short-term construction-related use of hazardous substances would have less than significant adverse effects. As construction activity increases with implementation of the short-term and long-term projects, the amount of hazardous substances used would increase as would the volume of hazardous waste generated and the amount of storage required. A long-term increase in the use of hazardous substances for operations would have less than significant adverse effects, as would an increase in spills associated with the use of more hazardous substances. Established controls such as spill containment, emergency response, and clean-up procedures would limit the impact of spills.

Asbestos-containing materials and lead-based paints present in existing buildings would be handled in a manner consistent with applicable rules and regulations when buildings are demolished or renovated to accommodate the proposed short-term and long-term projects. The controlled removal and disposal of these substances would have less than significant adverse effects in the short term and long-term beneficial effects. Long-term beneficial effects would also result from cleaning up petroleum release sites, hazardous waste sites, and solid waste management units to make way for new facilities.

Energy Use and Sustainability

The lack of renovation and new building construction under the No Action Alternative would forego the opportunity to re-purpose and upgrade older buildings to meet present and future mission needs. The increased costs of energy for building and transportation needs; an aged building stock; and the need to sustain a world-class installation would constrain the post's ability to support fully its overall mission. The post would forego the opportunity to reduce water consumption through renovated and retrofitted structures as part of a new construction program. Under the No Action Alternative, sustainable planning elements that have become a central component of Army design and construction policy since the 1993 RPMP was approved would not be applied to Fort Belvoir. Thus implementation of the No Action Alternative would adverse impacts on building energy use on Fort Belvoir, though these impacts would be less than significant.

Under the three action alternatives, the proposed short- and long-term projects would consume building materials and resources and increase Fort Belvoir's energy consumption, energy consumption intensity, and water consumption. Alternatives 1 and 3 would have effects similar in magnitude; the effects of Alternative 2, with no development on the FBNA, would be somewhat less. Since buildings use the largest portion of the energy consumed at Fort Belvoir, the implementation of the proposed short- and long-term projects would increase the installation's energy consumption. Average-energy intensity buildings constructed under the Proposed Action would maintain energy use intensity at current levels or may lower overall intensity, provided energy efficiency technologies outstrip increases in energy use by computer server operations in those buildings. High-energy intensity buildings are projected to raise the energy use intensity, however. This increase would constrain the post's ability to meet federal energy efficiency standards.

The Proposed Action, regardless of the alternative selected, would substantially increase the amount of water consumed by the post, although the increased consumption levels are not anticipated to exceed the capacity of the existing county water system to meet the demand. The increase in the number of data centers would likely drive up the water consumption intensity, as they typically require more water for cooling needs than needed to meet the conditioning requirements of office space.

Federal mandates and Army policies, adherence to the recommendations in the *Comprehensive Energy & Water Management Plan* for Fort Belvoir, and implementation of the prescriptive guidance and standards of the RPMP would greatly ameliorate the adverse effects of implementing the short-term and long-term projects, as would implementation of many of the projects themselves.The RPMP, including the short- and long-term transportation projects, would promote higher-density, clustered, infill development, which can reduce vehicle miles traveled, improve air quality, and improve quality of life.

ES.7 PROPOSED MITIGATION MEASURES

Table ES-8 summarizes proposed mitigation measures by resource that would be considered to minimize the impacts of the Proposed Action. **These mitigation measures would be subject to the availability of funding.**

Table ES-6
Summary of Impacts by Alternative

Resource	Environmental Consequence	No Action	Alternative 1 – Full Implementation – The Preferred Alternative	Alternative 2 – Modified Long-Term	Alternative 3 – Modified Short-Term
Land Use and Plans	**Short-Term Projects**				
	Fort Belvoir Land Use	Less than significant adverse effects	Beneficial effects	Beneficial effects	Beneficial effects
	Surrounding Area Land Use	No effect	No effect	No effect	No effect
	Relevant Plans and Studies	No effect	Beneficial effects	Beneficial effects	Beneficial effects
	Current and Future Development near Fort Belvoir	No effect	Beneficial effects	Beneficial effects	Beneficial effects
	Long-Term Projects				
	Fort Belvoir Land Use	No effect	Beneficial effects	Beneficial effects	Beneficial effects
	Surrounding Area Land Use	No effect	No effect	No effect	No effect
	Relevant Plans and Studies	No effect	Beneficial effects	Beneficial effects	Beneficial effects
	Current and Future Development near Fort Belvoir	No effect	Beneficial effects	Beneficial effects	Beneficial effects
Socioeconomics	**Short-Term Projects**				
	Short-term increased employment and income from construction spending and labor	No effect	Beneficial effects	Beneficial effects	Beneficial effects
	Ongoing increased employment and income from NMUSA operations	No effect	Beneficial effects	Beneficial effects	Beneficial effects
	Population relocation in the ROI	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
	Improved housing facilities on post	No effect	Beneficial effects	Beneficial effects	Beneficial effects
	Increased housing demand off post	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
	Improved law enforcement, fire protection, and emergency services on post	No effect	Beneficial effects	Beneficial effects	No effect
	Increased demand for law enforcement, fire protection, and emergency services off post	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
	Increased school capacity on and near post	No effect	Beneficial effects	Beneficial effects	Beneficial effects

Resource	Environmental Consequence	No Action	Alternative 1 – Full Implementation – The Preferred Alternative	Alternative 2 – Modified Long-Term	Alternative 3 – Modified Short-Term
Socioeconomics	**Relocation of school children in the ROI**	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
	Improved family support and social services on post	No effect	Beneficial effects	Beneficial effects	Beneficial effects
	Increased demand for family support and social services off post	No effect	Less than significant adverse effects / Beneficial effects	Less than significant adverse effects / Beneficial effects	Less than significant adverse effects / Beneficial effects
	Improved provision of shops, services, and recreation on post	No effect	Beneficial effects	Beneficial effects	Beneficial effects
	Reduced business for shops, services, and recreation off post	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
	Disproportionately high and adverse effects on minority or low-income populations	No effect	No effect	No effect	No effect
	Disproportionate environmental health or safety risks to children	No effect	No effect	No effect	No effect
	Long-Term Projects				
	Short-term increased employment and income from construction spending and labor	No effect	Beneficial effects	Beneficial effects	Beneficial effects
	Ongoing increased employment and income from NMUSA operations	No effect	Beneficial effects	Beneficial effects	Beneficial effects
	Population relocation in the ROI	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
	Improved housing facilities on post	No effect	No Effect	No Effect	No Effect
	Increased housing demand off post	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
	Improved law enforcement, fire protection, and emergency services on post	No effect	No effect	No effect	No effect
	Increased demand for law enforcement, fire protection, and emergency services off post	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
	Increased school capacity on and near post	No effect	No effect	No effect	No effect
	Relocation of school children in the ROI	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects

Resource	Environmental Consequence	No Action	Alternative 1 – Full Implementation – The Preferred Alternative	Alternative 2 – Modified Long-Term	Alternative 3 – Modified Short-Term
	Improved family support and social services on post	No effect	No effect	No effect	No effect
	Increased demand for family support and social services off post	No effect	No effect	No effect	No effect
	Improved provision of shops, services, and recreation on post	No effect	No effect	No effect	No effect
	Reduced business for shops, services, and recreation off post	No effect	No effect	No effect	No effect
	Disproportionately high and adverse effects on minority or low-income populations	No effect	No effect	No effect	No effect
	Disproportionate environmental health or safety risks to children	No effect	No effect	No effect	No effect
Cultural Resources	**Short-Term Projects**				
	Effects on Historical Architectural and Archaeological Resources	No effect	Less than significant adverse effects with mitigation	Less than significant adverse effects with mitigation	Less than significant adverse effects with mitigation
	Long-Term Projects				
	Effects on Historical Architectural and Archaeological Resources	No effect	Less than significant adverse effects with mitigation	Less than significant adverse effects with mitigation	Less than significant adverse effects with mitigation
Transportation and Traffic	**Short-Term Projects**				
	Intersection or Merge/Diverge/Weaving Area LOS Deterioration to E or F	Beneficial effects from continuing TMP implementation	Significant adverse effects on one public and one Fort Belvoir intersection	Significant adverse effects on one public and one Fort Belvoir intersection	Significant adverse effects on one public and one Fort Belvoir intersection
	Transit, Ridesharing, Bicycle, or Pedestrain Use Decline	Beneficial effects from continuing TMP implementation	Beneficial effects – continuing TMP implementation would increase use	Beneficial effects – continuing TMP implementation would increase use	Beneficial effects – continuing TMP implementation would increase use
	Long-Term Projects				
	Roadway Capacity Deteriorates to Near or Over Capacity	Beneficial effects from continuing TMP implementation	Significant adverse effects on some public and Fort Belvoir roadway segments	Significant adverse effects on some public and Fort Belvoir roadway segments	Significant adverse effects on some public and Fort Belvoir roadway segments

Resource	Environmental Consequence	No Action	Alternative 1 – Full Implementation – The Preferred Alternative	Alternative 2 – Modified Long-Term	Alternative 3 – Modified Short-Term
	Transit, Ridesharing, Bicycle, or Pedestrain Use Decline	Beneficial effects – continuing TMP implementation would increase use	Beneficial effects – continuing TMP implementation would increase use	Beneficial effects – continuing TMP implementation would increase use	Beneficial effects – continuing TMP implementation would increase use
Air Quality	**Short-Term Projects**				
	Construction effects would exceed applicable air quality thresholds	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
	Operational effects would exceed applicable air quality thresholds	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
	Greenhouse Gases would exceed CEQ threshold	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
	Mobile Sources would exceed applicable air quality thresholds	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
	Construction effects would generate fugitive dust	No effect	Less than significant adverse effects with mitigation	Less than significant adverse effects with mitigation	Less than significant adverse effects with mitigation
	Long-Term Projects				
	Construction effects would exceed applicable air quality thresholds	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
	Operational effects would exceed applicable air quality thresholds	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
	Greenhouse Gases would exceed CEQ threshold	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
	Mobile Sources would exceed applicable air quality thresholds	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
	Construction effects would generate fugitive dust	No effect	Less than significant adverse effects with mitigation	Less than significant adverse effects with mitigation	Less than significant adverse effects with mitigation
Noise	**Short-Term Projects**				
	Temporary noise increases from construction activities	No effect	Less than significant adverse effects with mitigation	Less than significant adverse effects with mitigation	Less than significant adverse effects with mitigation

Resource	Environmental Consequence	No Action	Alternative 1 – Full Implementation – The Preferred Alternative	Alternative 2 – Modified Long-Term	Alternative 3 – Modified Short-Term
	Long-term noise increases from operations	No effect	Less than significant adverse effects with mitigation	Less than significant adverse effects with mitigation	Less than significant adverse effects with mitigation
	Long-term increases in noise from traffic	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
	Long-term compatibility with noise-sensitive land uses	No effect	No effect	No effect	No effect
	Long-Term Projects				
	Temporary noise increases from construction activities	No effect	Less than significant adverse effects with mitigation	Less than significant adverse effects with mitigation	Less than significant adverse effects with mitigation
	Long-term noise increases from operations	No effect	Less than significant adverse effects with mitigation	Less than significant adverse effects with mitigation	Less than significant adverse effects with mitigation
	Long-term increases in noise from traffic	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
	Long-term compatibility with noise-sensitive land uses	No effect	No effect	No effect	No effect
Geology, Topography, and Soils	**Short-Term Projects**				
	Unstable soils/subsurface conditions affect integrity of new structures	No effect	No effect with mitigation	No effect with mitigation	No effect with mitigation
	Increased soil erosion during and after construction	No effect	Less than significant adverse effects with mitigation	Less than significant adverse effects with mitigation	Less than significant adverse effects with mitigation
	Long-Term Projects				
	Unstable soils/subsurface conditions affect integrity of new structures	No effect	No effect with mitigation	No effect with mitigation	No effect with mitigation
	Increased soil erosion during and after construction	No effect	Less than significant adverse effects with mitigation	Less than significant adverse effects with mitigation	Less than significant adverse effects with mitigation
Water Resources	**Short-Term Projects**				
	Short-term construction-related impacts on surface water quality	No effect	Less than significant adverse effects with mitigation	Less than significant adverse effects with mitigation	Less than significant adverse effects with mitigation

Resource	Environmental Consequence	No Action	Alternative 1 – Full Implementation – The Preferred Alternative	Alternative 2 – Modified Long-Term	Alternative 3 – Modified Short-Term
	Long-term impact on watersheds	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
	Long-term impact on surface water quality	No effect	Less than significant adverse effects with mitigation to beneficial effects	Less than significant adverse effects with mitigation to beneficial effects	Less than significant adverse effects with mitigation to beneficial effects
	Long-term impact on Chesapeake Bay RPAs, Fort Belvoir Riparian Buffers, and the Accotink Conservation Corridor	No effect	Less than significant adverse effects; no effect on the Accotink Conservation Corridor	Less than significant adverse effects; no effect on the Accotink Conservation Corridor	Less than significant adverse effects; no effect on the Accotink Conservation Corridor
	Long-term impact on floodplains	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
	Long-Term Projects				
	Short-term construction-related impacts on surface water quality	No effect	Less than significant adverse effects with mitigation	Less than significant adverse effects with mitigation	Less than significant adverse effects with mitigation
	Long-term impact on watersheds	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
	Long-term impact on surface water quality	No effect	Less than significant adverse effects with mitigation to beneficial effects	Less than significant adverse effects with mitigation to beneficial effects	Less than significant adverse effects with mitigation to beneficial effects
	Long-term impact on Chesapeake Bay RPAs, Fort Belvoir Riparian Buffers, and the Accotink Conservation Corridor	No effect	Less than significant adverse effects, if any; no effect on Chesapeake Bay RPAs and Accotink Conservation Corridor	Less than significant adverse effects, if any; no effect on the Accotink Conservation Corridor	Less than significant adverse effects, if any; no effect on the Accotink Conservation Corridor
	Long-term impact on floodplains	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
Biological Resources	**Short-Term Projects**				
	Affect Plant Communities and Forest Resources	No effect	Less than significant adverse effects with mitigation	Less than significant adverse effects with mitigation	Less than significant adverse effects with mitigation
	Affect Fish and Wildlife	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
	Affect Rare, Threatened, and Endangered Plants	No effect	No effect	No effect	No effect

Resource	Environmental Consequence	No Action	Alternative 1 – Full Implementation – The Preferred Alternative	Alternative 2 – Modified Long-Term	Alternative 3 – Modified Short-Term
	Affect Rare, Threatened, and Endangered Animals	No effect	No effect, except less than significant adverse effect on wood turtle habitat	No effect, except less than significant adverse effect on wood turtle habitat	No effect, except less than significant adverse effect on wood turtle habitat
	Affect Wetlands	No effect	Less than significant adverse effects with mitigation	Less than significant adverse effects with mitigation	Less than significant adverse effects with mitigation
	Affect Established Mitigation/Restoration Sites	No effect	Beneficial effects	Beneficial effects	Beneficial effects
	Long-Term Projects				
	Affect Plant Communities and Forest Resources	No effect	Less than significant adverse effects with mitigation	Less than significant adverse effects with mitigation	Less than significant adverse effects with mitigation
	Affect Fish and Wildlife	No effect	Less than significant adverse effects to beneficial effects	Less than significant adverse effects to beneficial effects	Less than significant adverse effects to beneficial effects
	Affect Rare, Threatened, and Endangered Plants	No effect	No effect	No effect	No effect
	Affect Rare, Threatened, and Endangered Animals	No effect	No effect, except less than significant adverse effect on wood turtle habitat	No effect, except less than significant adverse effect on wood turtle habitat	No effect, except less than significant adverse effect on wood turtle habitat
	Affect Wetlands	No effect	Less than significant adverse effects with mitigation	No effect	Less than significant adverse effects with mitigation
	Affect Established Mitigation/Restoration Sites	No effect	Beneficial effects	Beneficial effects	Beneficial effects
Utilities	**Short-Term Projects**				
	Projected water demand exceeds available supply	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
	Projected sewage flow exceeds available capacity	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
	Projected electric demand exceeds available capacity	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
	Projected telecommunication and information services demand exceeds available capacity	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
	Projected steam demand exceeds available supply	No effect	No effect	No effect	No effect

Resource	Environmental Consequence	No Action	Alternative 1 – Full Implementation – The Preferred Alternative	Alternative 2 – Modified Long-Term	Alternative 3 – Modified Short-Term
	Projected natural gas demand exceeds available supply	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
	Projected solid waste generation exceeds available capacity	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
	Long-Term Projects				
	Projected water demand exceeds available supply	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
	Projected sewage flow exceeds available capacity	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
	Projected electric demand exceeds available capacity	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
	Projected telecommunication and information services demand exceeds available capacity	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
	Projected steam demand exceeds available supply	No effect	No effect	No effect	No effect
	Projected natural gas demand exceeds available supply	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
	Projected solid waste generation exceeds available capacity	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
Hazardous Substances and Potentially Contaminated Sites	**Short-Term Projects**				
	Human health or safety risk from use of hazardous substances during construction	No effect	Less than significant adverse effects with mitigation	Less than significant adverse effects with mitigation	Less than significant adverse effects with mitigation
	Release of hazardous substances into the environment	No effect	Less than significant adverse effects with mitigation	Less than significant adverse effects with mitigation	Less than significant adverse effects with mitigation
	Long-Term Projects				
	Human health or safety risk from use of hazardous substances during construction	No effect	Less than significant adverse effects with mitigation	Less than significant adverse effects with mitigation	Less than significant adverse effects with mitigation
	Release of hazardous substances into the environment	No effect	Less than significant adverse effects with mitigation	Less than significant adverse effects with mitigation	Less than significant adverse effects with mitigation

Resource	Environmental Consequence	No Action	Alternative 1 – Full Implementation – The Preferred Alternative	Alternative 2 – Modified Long-Term	Alternative 3 – Modified Short-Term
Energy Use and Sustainability	**Short-Term Projects**				
	Building energy mandates and policies are not met	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
	Use of materials and resources is not sustainable	No effect	Beneficial effects	Beneficial effects	Beneficial effects
	Water consumption mandates and policies are not met	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
	Land use and transportation systems are not sustainable	No effect	Beneficial effects	Beneficial effects	Beneficial effects
	Long-Term Projects				
	Building energy mandates and policies are not met	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
	Use of materials and resources is not sustainable	No effect	Beneficial effects	Beneficial effects	Beneficial effects
	Water consumption mandates and policies are not met	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
	Land use and transportation systems are not sustainable	No effect	Beneficial effects	Beneficial effects	Beneficial effects
	Building energy mandates and policies are not met	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects

Table ES-7
Summary of Cumulative Impacts

Resource	Environmental Consequence	No Action Alternative	Proposed Action
Cumulative Impacts	**Short-term increased employment and income from construction spending and labor**	No effect	Beneficial effect
	Ongoing increased employment and income	No effect	Beneficial effect
	Increased housing demand	No effect	Less than significant adverse effect
	Increased demand for law enforcement, fire protection, and emergency services	No effect	Less than significant adverse effect
	Relocation of school children	No effect	Less than significant adverse effect
	Reduced business for shops, services, and recreation	No effect	Less than significant adverse effect
	Transportation and Traffic	No effect	Significant adverse effect
	Construction effects would exceed applicable air quality thresholds	No effect	Less than significant adverse effect
	Operational effects would exceed applicable air quality thresholds	No effect	Less than significant adverse effect
	Greenhouse Gases would exceed CEQ threshold	No effect	Less than significant adverse effect
	Mobile Sources would exceed applicable air quality thresholds	No effect	Less than significant adverse effect
	Construction effects would generate fugitive dust	No effect	Less than significant adverse effect
	Increased soil erosion during and after construction	No effect	Less than significant adverse effect with mitigation
	Long-term impact on watersheds	No effect	Less than significant adverse effect
	Short-term construction-related impact on surface water quality	No effect	Less than significant adverse effect with mitigation
	Long-term impact on surface water quality	No effect	Less than significant adverse effect with mitigation / Beneficial effect

Table ES-8
Summary of Proposed Mitigation or Protective Measures by Resource

Environmental Resource	Proposed Mitigation or Protective Measures
Land Use	No mitigation or protective measures are necessary.
Socioeconomics	Fort Belvoir would: • Monitor response times for law enforcement, fire protection, and medical services on the installation through 2030 to verify that as new projects are completed and the workforce grows, response times do not decline. If they do start to decline, reasonable and appropriate actions may be taken to adjust services, add personnel, or expand or build facilities. • Monitor family support and social services on the installation to make accommodations that may include expanding existing services or offering new ones.
Cultural Resources	On a project-by-project basis, Fort Belvoir, in consultation with the Virginia State Historic Preservation Officer and other consulting parties, as appropriate, would develop mitigation measures and execute memoranda of agreement if review under Section 106 of the National Historic Preservation Act indicates that adverse effects are unavoidable. The exact character of the mitigation measures would be determined on a case-by-case basis.
Transportation and Traffic	Fort Belvoir would: • Coordinate with the Virginia Department of Transportation (VDOT) and the Fairfax County Department of Transportation (FCDOT) to monitor and study public intersections and roadways near Fort Belvoir to ensure that they maintain acceptable levels of service. If levels of service deteriorate and the deterioration is at least 50 percent due to growth at Fort Belvoir, Fort Belvoir would consider seeking Defense Access Road program or other federal funding for improvements: – In the short term, study levels of service at US Route 1 and Pohick Road; Jeff Todd Way intersections with US Route 1 and Telegraph Road; and US Route 1 and Lorton Road. – In the long term, study levels of service at US Route 1 and the Fairfax County Parkway, US Route 1 and Pohick Road, and US Route 1 and Belvoir Road. • Coordinate with VDOT and FCDOT concerning transit, bicycle, and pedestrian corridor studies, such as use of the US Route 1 median and the former Fort Belvoir Military Railroad right-of-way for light rail or bus rapid transit connections to Metrorail and Virginia Railway Express stations; and use of US Route 1 right-of-way through Fort Belvoir for bicycle and hiking trails, under study by state, regional, and federal agencies. • Conduct project-level site traffic impact studies for proposed new projects in accordance with US Army Corps of Engineers and Virginia guidance. • Conduct an installation-wide traffic assessment every five years that would focus on key intersections and roadway links to determine changes in levels of service. • Update the transportation elements of the Fort Belvoir Transportation Management Plan periodically, with five years being the recommended interval. Needed short-term improvements (next five years) and longer-term major improvements (next ten years) would be identified.

Environmental Resource	Proposed Mitigation or Protective Measures
	In addition to these measures, the RPMP would include the short-term and long-term projects listed below. These transportation projects are not mitigation measures per se but elements of the proposed action. Inclusion in the RPMP of both development and transportation projects does not mean that these projects will actually occur. Rather, as development is proposed for Fort Belvoir, appropriate transportation measures would be identified from those in the RPMP as well as any site-specific measures. This process would likely be subject to project-specific NEPA analysis. The Army would need to plan so that development and transportation measures are coordinated and funded. • Short-term projects include: building Lieber Gate on US Route 1; upgrading the Fairfax County Parkway and John J. Kingman intersection by adding turning lanes and upgrading signals; implementing on-post intersection and roadway improvements; and improving Walker Gate's intersection with the Mount Vernon Memorial Highway. (The Lieber Gate Access Road and Control Point contract is funded and will be awarded soon). • Long-term projects include: improving Kingman Gate; grade-separating the Fairfax County Parkway/John J. Kingman/NMUSA intersection (with respect to the improvements to the Fairfax County Parkway/John J. Kingman Road intersection, for which VDOT would be responsible, Fort Belvoir would cooperate with VDOT in accordance with the terms of the Memorandum of Agreement executed between the two agencies in August 2011); adding internal cross streets on Abbot Road, 3rd Street, and 6th Street; widening Gunston Road from 12th Street to 16th Street; connecting 13th Street to 12th Street; completing the Heller loop on FBNA; and adding capacity to Beulah Street from John J. Kingman Road to Woodlawn Road.
Air Quality	Subject to availability of funds, mitigation measures may be required for construction and stationary source emissions. Construction projects would be carried out in full compliance with current and pending Virginia regulatory requirements using compliant practices and products. Within the region, these regulatory requirements pertain to: • Open burning (9 VAC 5, Chapter 130) • Visible emissions (9 VAC 5, Chapters 40-80) • Fugitive dust/emissions (9 VAC 5, Chapters 40-90) • Asphalt paving operations (9 VAC 5, Chapters 45-760 et seq.) • Portable fuel containers (9 VAC 5, Chapters 45-270) • Architectural and industrial maintenance coatings (9 VAC 5, Chapters 45-520 et seq.) • Adhesives and Sealants (9 VAC 5, Chapters 45-620 et seq.) • Consumer products (9 VAC 5, Chapters 45-510) In addition, because the proposed projects would be located in a VOC control area (9 VAC 5, Chapters 20-206), cutback asphalt would be prohibited during the months of April through October except when use or application as a penetrating prime coat or tack is necessary. Regardless of whether stationary sources would be above or below the major modification thresholds, one or more air pollution control permits would be required for the proposed projects. Depending on the level of permitting required, mitigation measures associated with new permitted stationary sources of emissions may include: • Best Available Control Technology review for each criteria pollutant • Maximum Achievable Control Technology review for regulated hazardous air pollutants and designated categories • Establishing procedures for measuring and recording emissions and process rates • Meeting New Source Performance Standards and National Emission Standards for Hazardous Air Pollutant requirements

Environmental Resource	Proposed Mitigation or Protective Measures
	• Lowest achievable emission rate review for qualifying nonattainment pollutants • Predictive air dispersion modeling • Acquiring emissions offsets for all contemporaneous emissions increases
Noise	To minimize noise during construction: • Construction would primarily occur during normal weekday business hours • Construction equipment mufflers would be properly maintained and in good working order • Construction personnel, and particularly equipment operators, would don adequate personal hearing protection to limit exposure and maintain compliance with federal health and safety regulations • Controls would be put in place to minimize noise from the indoor small arms range at the OSEG training compound. • All activities except those specifically exempt under the Noise Control Act of 1972 would fully comply with Fairfax County Noise Regulations. For long-term transportation projects: • During the preparation of NEPA documentation for the proposed Goethals Road expansion (LTT 10), a detailed analysis of construction noise may be conducted with a special focus on potential effects on historical areas, primarily the Alexandria Friends Meeting House. • During the preparation of NEPA documentation for other long-term transportation projects that include lane additions or new roadways, detailed traffic noise studies may be conducted, as necessary.
Geology, Topography, and Soils	• Standard engineering practices would be followed and construction plans would be prepared in accordance with Fairfax County building codes to address construction-related issues stemming from local soil and subsurface conditions. Such practices include developing appropriate design criteria (e.g. depth and location) for placement of footings and piers in preparation for buildings, roads, bridges and foundations; and considering soil characteristics in designing landscapes, slopes, and retaining walls. • In accordance with the Virginia Erosion and Sediment Control Law (9 VAC 25-840), implemented by the Virginia Department of Environmental Quality (VDEQ), proposed projects with land-disturbing construction activities (such as clearing, grading excavating, transporting and filling of land) equal to or exceeding 10,000 square feet would require the preparation and implementation of soil and erosion control plans, inclusive of BMPs to minimize soil erosion. • In accordance with the Virginia Stormwater Program (9 VAC 25-870), all proposed projects disturbing land areas one acre or greater in size would prepare and implement stormwater pollution prevention plans. • Following construction, top soil would be replaced and sites would be planted with native vegetation to the maximum extent practicable.
Water Resources	Fort Belvoir would: • In keeping with the RPMP, locate future development away from stream valleys and surface waters to avoid impacts to streams, floodplains, and Chesapeake Bay Resource Protection Areas (RPAs) as much as possible. • Design and develop future projects in accordance with RPMP guidance; Army guidance; and 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:

Environmental Resource	Proposed Mitigation or Protective Measures
	– Comply with the applicable requirements of the Virginia Stormwater Management Law and 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), for action proponent with activities disturbing land areas one acre or greater in size, prepare and implement stormwater pollution prevention plans. – Apply appropriate Energy Independence and Security Act (EISA) Section 438 and stormwater management guidelines. – Include on-site mitigation measures in the project, or, where on-site measures are not practicable, contribute to stream and wetland restoration projects at the 26 stream and wetland mitigation sites on Fort Belvoir. • To mitigate the cumulative impacts of the proposed RPMP short-term projects on water resources, pursue funding to assess, design, and restore 17 degraded stream segments. These stream restoration projects may include repairs such as culvert removals or more extensive stream channel restoration and bank stabilization. An initial stream assessment would determine the proper restoration strategy.
Biological Resources	• Project-Level Mitigation: Natural resource-related mitigations for each short-term project would be regulated through the Fort Belvoir Tree Removal and Protection policy. Mitigation actions under this policy are determined by the number of trees four inches in diameter-at-breast-height that are removed due to development. The policy provides for several mitigation options, including replacing the lost trees at a 2- to-1 ratio or an "out-of-kind" mitigation action, such as stream restoration or Partners-In-Flight (PIF) habitat enhancement. The out-of-kind mitigation budget would be determined by the current industry cost of the 2-to-1 tree replacement option. The final mitigation project would be selected by the Fort Belvoir Directorate of Public Works Environmental and Natural Resources Division (ENRD) staff. ENRD would also continue to identify opportunities where actions such as removing abandoned pavement (e.g., Woodlawn Road and Keene Road) or structures would benefit fish and wildlife resources. Also, for each project, Fort Belvoir may need to conduct a survey for potentially present federal and state-listed species and their habitat. • Cumulative, Installation-Wide Mitigation: Fort Belvoir would mitigate the cumulative impacts on natural resources of implementing the proposed short-term projects by adding approximately 110 acres of land to the protected Forest and Wildlife Corridor (FWC), approximately 65 acres to the Accotink Bay Wildlife Refuge, and approximately 59 acres of PIF mitigation areas; and by building three new wildlife crossings under US Route 1 in the Accotink Creek drainage area. The land parcels to be added to the FWC and the Accotink Bay Wildlife Refuge contain sensitive areas such as wetlands, locally-rare ecotypes, and wildlife migration corridors. Protecting these parcels under the FWC and refuge designations would preserve their ecological value.
Utilities	During the construction of new utility service lines and facilities, the mitigation measures described under Geology, Topography and Soils and Biological Resources would apply.
Hazardous Substances and Potentially Contaminated Sites	Mitigation measures for project development would include all measures normally required by Commonwealth of Virginia and Federal environmental regulations, and Army and Department of Defense requirements. Each short-term and long-term project would be reviewed during the planning phase for any impacts from known hazardous substances and contaminated areas (to include soil, groundwater, UXO, and landfill gas). If it is determined that contamination would impact the project, mitigations such as additional health and safety requirements, special material

Environmental Resource	Proposed Mitigation or Protective Measures
	handling (removal/disposal/treatment), or engineering controls may be implemented. Fort Belvoir would work with the project team during the planning phase to ensure that any special provisions are included in the construction contract and all applicable requirements are met. If a project encounters an area with unknown contamination, Fort Belvoir would review the site conditions and determine a path forward to ensure protection of human health and the environment, which may include mitigations such as those listed above.
Energy Use and Sustainability	Fort Belvoir would consider: • Enhancing the post's reporting procedures to ensure that all building square footage, energy use, and water use data in the Army Energy and Water Reporting System are current and complete for all facilities on Fort Belvoir. • Collecting an additional metric for assessing data center energy consumption, such as power usage efficiency, to enable tracking of the contribution of high energy use buildings to overall energy consumption on the post and thereby foster more sustainable operations. • Integrating land use and transportation planning to reduce transportation-related impacts.

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1 Purpose & Need for the Proposed Action



1.1 INTRODUCTION

This environmental impact statement (EIS) evaluates the potential environmental impacts of updating United States (US) Army Garrison Fort Belvoir's Real Property Master Plan (RPMP; used interchangeably with "master plan" in this EIS) and implementing the plan's short-term projects by 2017 and long-term projects by 2030. Fort Belvoir prepared a master plan in 1993 and amended it in 2002 and 2007. In light of the substantial changes that have occurred on post, the amended master plan no longer serves to guide the management and use of real property assets – land, facilities, resources, and infrastructure – on the installation adequately. Therefore, Fort Belvoir has prepared an updated master plan to establish a framework for developing and managing real property on the post through the year 2030.

Fort Belvoir is located approximately 18 miles southwest of Washington, DC, on the Potomac River in Fairfax County, Virginia (Figure 1-1). As a strategic sustaining base for America's Army in the National Capital Region, Fort Belvoir provides logistical, intelligence, and administrative support to a diverse group of more than 140 Army and Department of Defense (DoD) organizations. Fort Belvoir contributes to the nation's defense primarily by providing a secure operating environment for regional and worldwide DoD missions and functions. The garrison also provides housing, medical services, recreational facilities, and other support services for active duty military members and retirees in the National Capital Region.

Fort Belvoir's Landholdings

Fort Belvoir's landholdings in Fairfax County are in two separate areas: the 7,682-acre Main Post and the 807-acre Fort Belvoir North Area (FBNA, previously known as the Engineer Proving Ground or EPG) (Figures 1-2 and 1-3). Main Post includes the former Fort Belvoir Military Railroad right-of-way. Fort Belvoir also manages the 28-acre Rivanna Station, near Charlottesville, Virginia, and the Mark Center in Alexandria, Virginia. The 581-acre Humphreys Engineer Center (HEC) adjacent to Main Post, historically part of Fort Belvoir, is now under the control of the US Army Corps of Engineers. HEC, Rivanna Station, and the Mark Center are not considered in the Master Plan or in this EIS. Throughout this document, the terms "Fort Belvoir," "Belvoir," "the post," or "the installation" refer to Main Post and FBNA only.

1.1.1 Background

The Army established Fort Belvoir during World War I as Camp A.A. Humphreys, which was built to accommodate 20,000 soldiers. In 1919, the Army Engineer School relocated to Camp Humphreys and remained on the installation until 1988. Camp A.A. Humphreys became Fort Humphreys in 1922 and Fort Belvoir (inspired by the Belvoir Mansion plantation built by William Fairfax on the site in the 1730s) in 1935. During World War II, the Engineer School trained up to 5,000 engineers a month; the installation accommodated 24,000 soldiers. After World War II, Fort Belvoir's mission began to shift from training to

research, development, test, and evaluation activities. In the 1950s, the installation's mission expanded to include hosting DoD organizations. With the departure of the Army Engineer School in 1988, Fort Belvoir's mission to support DoD organizations grew; and today, Fort Belvoir – 17 miles in driving distance from the Pentagon – hosts more than 140 DoD organizations.

Fort Belvoir's 1993 master plan was prepared when Fort Belvoir's role as an administrative support center for DoD organizations was growing while its role in troop support and training was waning. The 1993 *Fort Belvoir Long Range Component of the Real Property Master Plan* identified Fort Belvoir's role as "the major administrative and logistics center for the Northern Virginia portion" of the Military District of Washington. Fort Belvoir's future mission was to function at the regional level for/as: contingency military support, administrative center, logistics support, recreation center, classroom center, housing, military community support, and environmental stewardship. Recognizing that Fort Belvoir would continue to attract military tenants, the plan attempted to determine the total build-out (total daily employment when all land uses have been fully developed under the constraints and limitations of the plan). The plan recognized that total build-out might never be reached and that "progress towards total build-out is mission-driven but infrastructure-constrained." The 1993 land use plan identified 3,287 acres on Main Post as developable. The total build-out was estimated by about 2040 to be 74,230 people working in 27 million square feet of building space (US Army, 1993a).

The 1993 master plan was revised in 2002 upon the adoption of a *Regional Community Support Center Sub-area Development Plan*. The plan revision addressed locating additional related activities in the portion of lower North Post designated in 1993 as the Regional Community Support Center, which is the area where the Commissary and Post Exchange (PX) are located.

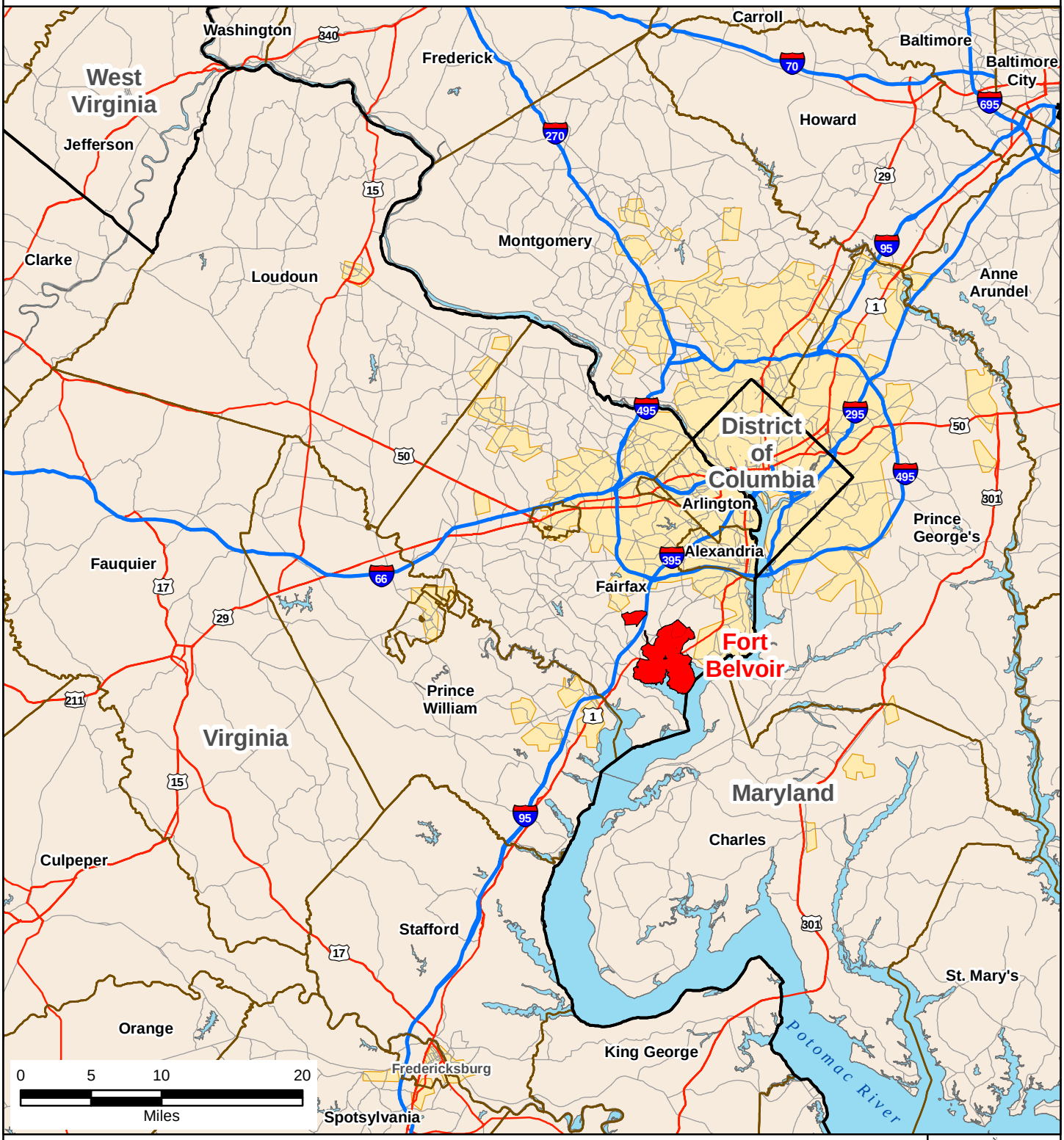
Fort Belvoir's ability to accommodate DoD organizations requiring secure settings coupled with its mission as a support facility for the National Capital Region led to a migration of organizations onto the post even before the September 11, 2001 terrorist attacks. Following those attacks, security was increased and more agencies moved to Fort Belvoir from less secure settings.

In September 2005, the Defense Base Closure and Realignment (BRAC) Commission recommended numerous realignment and closure actions for military installations across the US to advance the goals of transformation by improving military capabilities. Six major DoD organizations were realigned to Fort Belvoir:

- Washington Headquarters Service and elements of the Office of the Secretary of Defense and various defense agencies
- National Geospatial-Intelligence Agency (NGA)
- Various Army entities previously housed in leased space in the National Capital Region
- US Army Medical Command
- Program Executive Office, Enterprise Information Systems
- Missile Defense Agency (MDA) Headquarters (HQ) Command Center

The process of updating the amended 1993 master plan, which had been underway when the BRAC Commission recommendations were announced, slowed while planning efforts turned to accommodating the realigned organizations. The amended 1993 land use plan was reconsidered and a plan developed to accommodate the BRAC-mandated facilities. New building sites and existing buildings to be remodeled were selected. Consistent with timelines established under BRAC law, facilities were to be completed and occupied no later than September 15, 2011. Options for accommodating the growth resulting from the BRAC realignment were analyzed in an EIS completed in 2007 (US Army, 2007a).

Location of Fort Belvoir

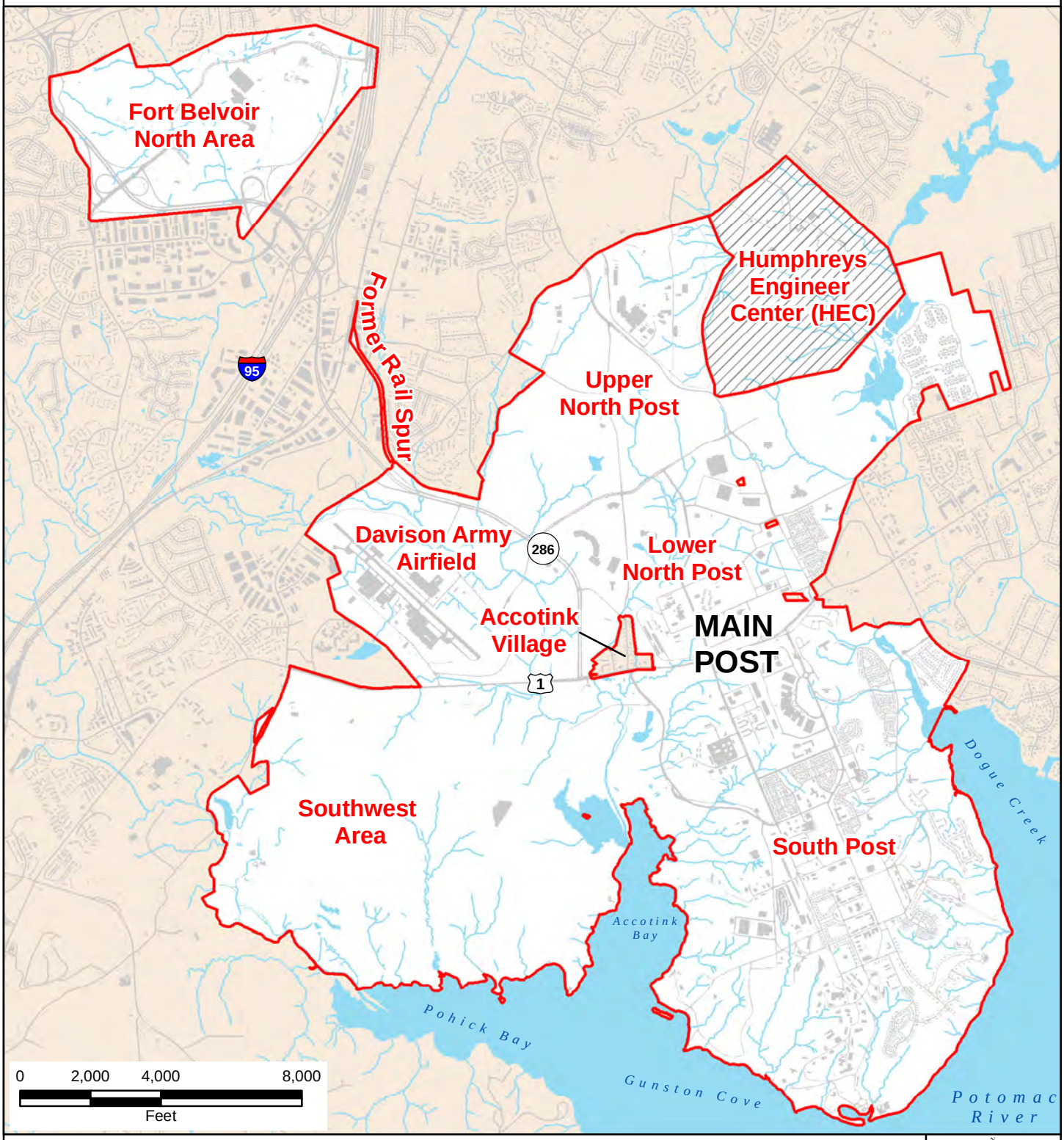


Fort Belvoir RPMP EIS

Figure 1-1

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Fort Belvoir



Legend

Fort Belvoir Installation Boundary

Humphreys Engineer Center (HEC)*

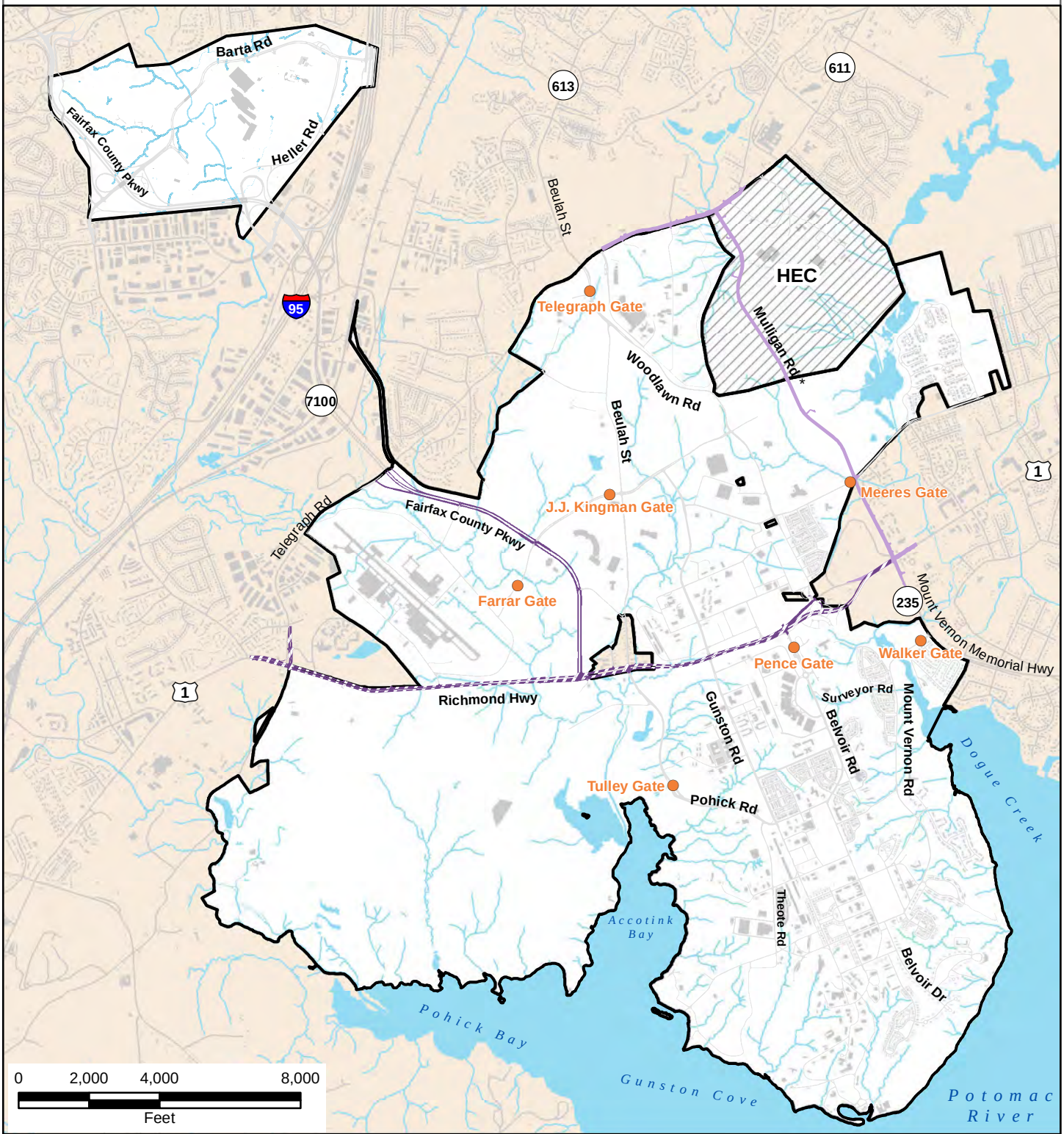
* HEC, controlled by the U.S. Army Corps of Engineers, is adjacent to Fort Belvoir but is not included in the RPMP or the RPMP EIS.

Figure 1-2

Fort Belvoir RPMP EIS

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Roads and Gates



Main Entrance Gate

Public Roads through Installation

Existing Roads

Under Construction

Future Construction/Improvements

*In August 2014, Mulligan Road was dedicated as Jeff Todd Way.

Fort Belvoir RPMP EIS

Figure 1-3

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Revisions to the 1993 land use plan as amended in 2002 to accommodate BRAC facilities were adopted in 2007. The most notable changes were: the amount of land designated for Professional/Institutional uses increased substantially; the land area dedicated to housing increased; and the South Post golf course land use changed from Outdoor Recreation to Professional/Institutional to accommodate construction of the Fort Belvoir Community Hospital (FBCH).

The Army decided that because of FBNA site access limitations, Washington Headquarters Service would move into a new building, the Mark Center, to be built along I-395 in Alexandria, Virginia, rather than to a site in the FBNA as originally planned. NGA is now located on the FBNA, and the other four major DoD organizations realigned to Fort Belvoir are on Main Post.

In 1993, when the first RPMP was prepared, the Fort Belvoir workforce totalled 11,890 (US Army, 1993b). By 2005, about 24,000 personnel worked on Fort Belvoir's Main Post daily, occupying about 10.8 million square feet of building space. In September 2011, following full implementation of the BRAC 2005 recommendations, the workforce on the installation (Main Post and the FBNA) was approximately 39,000, an increase of 15,000 over 2005 levels. Building space (not including housing) on Main Post and FBNA totaled 15.9 million square feet, an increase of 5.1 million square feet from 2005 levels. By February 2013, the workforce had grown to 39,740 as the result of incremental growth in agency personnel. As described in Chapter 2, implementation of Alternative 1, full implementation of the RPMP would result in approximately 56,000 personnel by 2030. This EIS uses the September 2011 post-BRAC workforce of approximately 39,000 as the baseline for analyzing impacts.

1.1.2 Real Property Master Planning

Master plans for Army installations are prepared in accordance with DoD's United Facilities Criteria 2-100-01 *Installation Master Planning*, updated in May 2012, and Army Regulation 210-20, *Real Property Master Planning for Army Installations*, updated in May 2005. Because this master planning process began before publication of the latest United Facilities Criteria master planning requirements, the resulting plans reflect elements of both earlier Army Regulation 210-20 requirements and new United Facilities Criteria requirements. New United Facilities Criteria requirements stress incorporating sustainable planning elements into master plans, including compact development, infilling already-developed sites, clustering new development around transportation hubs, mixing land uses, connecting transportation networks, and promoting multi-story construction, among others.

As stated in the United Facilities Criteria:

> *Master planning is a continuous analytical process that involves evaluation of factors affecting the present and future physical development and operation of an installation. This evaluation forms the basis for determination of development objectives and planning proposals to solve current problems and meet future needs. Each step or element of the process builds upon the preceding step, providing a logical framework for the planning effort. For military installations, planning is accomplished primarily at the installation level through a comprehensive and collaborative planning process that results in a Master Plan. This process provides a means for sustainable and energy-efficient installation development that supports mission requirements.*

Fort Belvoir's master planning process comprised the following plan components:

- ***RPMP Installation Vision and Development Plan (IVDP)*** – establishes the environmental baseline, basic framework, and specific options for developing and managing real property on the post. It provides development options in accordance with the installation's mission and the real property vision, goals and objectives. It includes the master plan vision, a site assessment that considers regional and installation conditions and planning considerations, a land use plan, a framework plan that is the blueprint for long-term development, and infrastructure plans.

- ***RPMP Installation Planning Standards (IPS)*** – promotes visual order, architectural consistency, sustainability, and energy efficiency for future construction on Fort Belvoir by establishing site planning standards, building design standards, circulation design standards, landscape design standards, and site element design standards.
- ***Installation Development Program*** – recommends strategies for capital investment and short-term project implementation.
- ***Complete Plan Summary*** – is an executive summary of the other plan components.

As part of the master planning process, Fort Belvoir has also prepared a ***Transportation Management Plan***, which is required by the National Capital Planning Commission (NCPC), rather than DoD. Based on analysis of existing and future transportation conditions, this plan addresses transportation deficiencies and proposes improvements to support future development in line with a primary goal of reducing single-occupant vehicle use.

1.2 PURPOSE AND NEED

The action being proposed is to adopt and implement an updated RPMP for Fort Belvoir and to implement the short-term and long-term projects identified in the plan. The purpose of the proposed action is to provide Fort Belvoir with an updated master plan that reflects current missions, needs, and conditions and addresses short-term program facility and infrastructure needs. An updated RPMP would allow Fort Belvoir to manage its real property resources in the future in a manner that fully supports its overall mission. Building the short-term projects by 2017 would address outstanding, unmet infrastructure and facility needs.

An updated master plan is needed to provide Fort Belvoir with a blueprint for future real property planning through 2030 now that the 2005 BRAC recommendations for the post have been fully implemented. The BRAC realignment increased the installation's building space by 47 percent and its workforce by 63 percent in a mere six years. The focus on planning and building to accommodate these changes from 2005 through 2011 resulted in less focus on non-BRAC missions and garrison needs. Updating the master plan and building short-term projects now shifts the planning focus to encompass non-BRAC-related as well as BRAC-related facilities, tenants, and missions.

Updating the master plan also fulfills the requirements of Army Regulation 210-20 for periodic updates of Army installation RPMPs to reflect current conditions. Although its land use plans were amended in 2002 and 2007, the 1993 RPMP is outdated and does not reflect current conditions, tenants, missions, laws, or regulations. Army Regulation 210-20 specifies that "An RPMP will be reviewed annually for change and formally updated at least every 5 years." Consequently, this proposed update – which was delayed by the need to accommodate the 2005 BRAC realignment on Fort Belvoir – is long overdue.

1.3 SCOPE AND CONTENT OF THE EIS

This EIS has been developed in accordance with the National Environmental Policy Act of 1969 (NEPA) (42 United States Code [USC] 4321), the implementing regulations issued by the President's Council on Environmental Quality (CEQ) (40 Code of Federal Regulations [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 is to inform decision makers and the public of the likely environmental consequences of the proposed action and alternatives.

1.3.1 Proposed Action Location

As described in the text box on Page 1-1, the Army's proposed action encompasses Fort Belvoir's Main Post and FBNA (Figure 1-2). It does not include HEC, Mark Center, Rivanna Center, or any other Fort Belvoir properties not addressed in the RPMP.

1.3.2 Incorporation of Other NEPA Documents

The master plan includes all programmed projects to be constructed in fiscal years 2012 through 2017; some of these projects have already been completed or are underway. This EIS looks at the combined impact of all short-term projects from 2012 to 2017. NEPA documentation has been completed for a number of these projects. The status of projects for which NEPA requirements have been completed are shown in parentheses, if the project has moved beyond design.

Three of the short-term projects, which are described in Section 2.1.3, listed in Table 2-2, and shown on Figures 2-3 to 2-6, were included in the 2007 BRAC EIS (US Army, 2007a), for which a record of decision (ROD) was signed in August 2007:

- Two Child Development Centers on FBNA (Short Term [ST] Projects 11 and 12; under construction)
- Lieber Gate Access Road and Control Point (ST 13; construction expected to start late 2014)

Environmental assessments (EAs) have been prepared and findings of no significant impact (FNSI) signed for the following ST projects:

- Construction of a new PX (ST 1; project completed); demolition of the old PX (ST 16; project completed); and construction of a new Commissary (ST 28; construction expected to begin early in fiscal year 2015)
- Privatized Army Lodging (PAL) – East of Belvoir Road Circle (ST 2; under construction)
- Mulligan Road Phase II (ST 4; opened and officially named Jeff Todd Way in mid-2014)
- Family Travel Camp (ST 9 [project completed] and ST 31)
- National Museum of the US Army (NMUSA) (ST 17, 18, 27, 34, 38, and 41)
- Expansion of US Army Intelligence and Security Command (INSCOM) HQ (ST 19 [under construction], 26, 33, and 46)
- Operational Security Evaluation Group (OSEG) Training Compound (ST 43)
- Fort Belvoir Elementary School Expansion (ST 24)

Categorical exclusions/records of environmental consideration (RECs) have been completed and signed for the following ST projects:

- National Intrepid Center of Excellence (NICoE; ST 3; project completed)
- Fisher House 1 (ST 5; project completed)
- United Service Organizations (USO) Wounded Warrior and Family Center (ST 6; project completed)
- Expand Davison Army Airfield (DAAF) Fire Station (ST 7; under construction)
- Child Development Center 144 on North Post (ST 8; project completed)
- Utility Upgrades (ST 10; under construction)
- Army and Air Force Exchange Service (AAFES) Car Wash (ST 15)

- Replace South Post Fire Station (ST 20)
- AAFES Car Care Center (ST 21)
- Pet Care Center (ST 22)
- NGA Canine Training/Rest Facility (ST 23)
- Defense Logistics Agency (DLA) Visitor Control Center (ST 29)
- Fisher House 2 (ST 30)
- Retail Fuel Point (ST 35)

The proposed action is to adopt and implement the whole RPMP, including the short-term and long-term projects. Therefore, even though some of the projects have now been completed or are under construction and their impacts have been evaluated in other NEPA documents, they are included in the proposed action considered in this EIS and their impacts are described in Chapter 3. This EIS would serve as the NEPA documentation for any short-term projects for which no NEPA documentation has thus far been completed.

1.3.3 Scope of Impact Analysis

Analysis of the environmental effects of the proposed action extends from the present to 2030, which is the end of the master plan long-term planning period. The level of analysis, however, is more in-depth for the short-term actions that are being implemented through 2017 because the location and design of the projects are better defined and their impacts more easily identified.

Planning for the long-term projects proposed for implementation from 2018 to 2030 is more conceptual in nature. The master plan has generally identified sites for the long-term projects, but many project details are not defined. For example, for administrative facilities, details such as who would occupy the facilities, whether one or more buildings would be required, or how parking would be accommodated would affect the final design and impacts. As a result, further NEPA documentation – EAs for projects more likely to have impacts and RECs for projects likely to generate little impact – would take place when the long-term projects draw closer to implementation and more is known about them.

The chronological scope of the proposed action includes the short-term actions planned for 2012 to 2017, as discussed above. Some of the projects have already been completed or are underway as of the date of publication of this EIS. This approach is being taken to allow the EIS to look at the comprehensive package of short-term projects and their associated impacts. It essentially allows the EIS to look at the cumulative impacts of all the short-term projects. If we were to eliminate the projects to which an irretrievable commitment has already been made, we would diminish the overall impacts in a way that would not show the complete picture. This approach is especially appropriate in the context of the master planning process.

Although the master plan identifies sites for future development from 2030 to 2040, impacts beyond 2030 are not evaluated in this EIS. Their occurrence is too uncertain and their prediction would be speculative.

Army policy calls for the environmental analysis to be proportionate to the nature and scope of the 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 diverse array of actions associated with adopting and implementing the proposed master plan at Fort Belvoir.

As required by NEPA, an interdisciplinary team of environmental scientists, biologists, planners, economists, engineers, transportation planners, archaeologists, and historians has analyzed the proposed action and alternatives in light of existing conditions and has identified relevant beneficial and adverse effects associated with the action. Resources and environmental conditions addressed in this EIS include: land use and plans; socioeconomic resources; cultural resources; traffic and transportation; air quality; noise;

utilities; hazardous substances; geology, topography and soils; water resources; biological resources, ecosystems, and protected resources; and energy use and sustainability.

The region of influence (ROI) for each of the environmental and socioeconomic resource areas discussed in this EIS varies, depending on their nature and relationship to Fort Belvoir. Some of the resources may generate impacts on a regional scale, such as air quality and socioeconomics. Others may have only site-specific impacts, such as impacts on soils. The ROI for each resource is described in the resource sections in Chapter 3.

This EIS covers the parts of Fort Belvoir covered by the RPMP: Main Post and FBNA. The following properties are not included in the RPMP or this EIS:

- The Humphreys Engineer Center (HEC), adjacent to North Post and historically part of Fort Belvoir, but now controlled by the US Army Corps of Engineers
- Rivanna Station, in Charlottesville, Virginia, which is managed by Fort Belvoir
- Mark Center in Alexandria, Virginia, which is managed by Fort Belvoir

1.3.4 Organization of the EIS

The remainder of the EIS is organized as follows:

- Chapter 2 – Proposed Action and Alternatives
- Chapter 3 – Affected Environment and Environmental Consequences
- Chapter 4 – Cumulative Effects
- Chapter 5 – Proposed Mitigation and Protective Measures Summary
- Chapter 6 – Coastal Consistency Determination
- Chapter 7 – References
- Chapter 8 – Distribution and Notification List
- Chapter 9 – EIS Contributors and Preparers
- Appendices

1.4 PUBLIC PARTICIPATION

The Army implements public involvement to support the NEPA process according to guidelines established by the CEQ and the Army's procedures specified in 32 CFR Part 651, *Environmental Analysis of Army Actions*. These guidelines promote sound decision making by providing opportunities for the public to be involved in the NEPA process and they form the framework for public participation in the environmental impact analysis process for the update of the master plan. The Army encourages all persons having an interest in the proposed action to participate.

The process begins with issuance by the Army of a Notice of Intent to Prepare an EIS (Section 1.4.1). Subsequent opportunities for public participation include the following:

- A public scoping process to assist in identifying alternatives and determining the scope of the analysis.
- A 60-day public review period for the draft EIS (DEIS).
- Publication of the final EIS (FEIS) at least 30 days before making a final decision and issuing the ROD.

1.4.1 Notice of Intent

Pursuant to regulations, the Army opened the public participation process for this project by publishing a notice of intent (NOI) to prepare an EIS in the *Federal Register* (FR) on September 10, 2012. The Army also published notices that the environmental impact analysis process was beginning in the *Washington Post Local Living Fairfax South Edition,* the *Fairfax Station/Clifton/Lorton Connection,* the *Mount Vernon Voice,* and the *Springfield Connection* on September 26, 2012 and the *Mount Vernon Gazette* on September 27, 2012. The Army actively solicited input and comment on the EIS process from individuals, organizations, and agencies that previously have taken an active interest in environmental affairs at the installation.

1.4.2 Public Scoping

The Army conducted a public scoping process to assist in identifying EIS alternatives and to determine the scope of the analysis. An open-house public scoping meeting was held from 5-9 p.m. on October 11, 2012 at the South County Center on US Route 1. The meeting was announced via the NOI notices in local newspapers described in the preceding paragraph as well as through letters sent to a list of interested organizations and individuals. All comments were considered in determining the alternatives and the scope of the analysis.

In addition to the aforementioned open-house public meeting, the Army held a meeting from 1:00 - 3:30 p.m. on October 11, 2012 at the South County Center to introduce the proposed action and alternatives to federal, state, regional, and local agency representatives, solicit their expertise, and encourage their participation in the master plan and NEPA processes.

These meetings resulted in the submission of oral and written comments from two individuals and seven agencies. Two agencies offered comments that pertained only to the master plan, and one agency said it did not have the resources to comment. Comments received on the scope of the EIS include the following:

Proposed Action and Alternatives

- US Environmental Protection Agency (USEPA) – Include a detailed discussion and description of the proposed buildings, and the location, size, and purpose for each facility proposed in the action alternatives.
- Fairfax County – Identify all existing development and transportation improvements. Address recently adopted and ongoing Fairfax County Comprehensive Plan amendments and other land use-related actions. Address lessons learned from the recent BRAC round, how the Garrison would respond in the event of a future BRAC round that increases or decreases the employee population, and how the county and state would be engaged to respond.

Land Use

- USEPA – Describe in detail and quantify the project area.
- NCPC – Analyze future development impacts in as much detail as possible to demonstrate compliance with the Comprehensive Plan for the National Capital.
- Fairfax County – Address specific spaces that have been programmed for beyond 2030 for new facilities or the expansion of existing facilities; discuss the rationale behind reducing the overall industrial space on Main Post and provide the acreage of industrial land being converted to other land uses.

Socioeconomics

- NCPC – Analyze impacts to demonstrate conformance with the Parks and Open Space Element policies of the Comprehensive Plan for the National Capital.
- Fairfax County – Address the additional demands on emergency services and the extent to which Fort Belvoir would be providing these services, and document funding needs and sources for additional emergency service needs. Document increases in off-site housing demand, and the range of sales and rental rates that would be considered affordable to off-site residents. Include a needs assessment that projects the overall needs of its population for indoor and outdoor recreation and leisure facilities, open space, community services, and cultural and environmental programs; and address how the needs identified would be met on site and the impact of the demand for these facilities on existing park and recreation resources in the area. Identify the magnitude of the anticipated on-post and off-post increase in the number of school-age children, sites for new schools to accommodate the expected increase, and federal funding that can be made available for school construction.

Transportation and Traffic

- NCPC – Analyze impacts to demonstrate conformance with the Transportation Element policies of the Comprehensive Plan for the National Capital. Document the detailed, up-to-date Transportation Management Plan that should support the master plan update. Provide information on and analyze how existing and future planned shuttle service is consistent with the Comprehensive Plan's policies.
- Virginia Department of Transportation (VDOT) – Include an analysis of the adequacy of the external roadway network to accommodate the development levels being considered for both the short- and long-range conditions, specifically addressing the levels of service on the roadways approaching the installation and the performance of individual intersections adjacent to Fort Belvoir. Identify the specific elements of each proposed intersection improvement and the physical impacts of these improvements, and evaluate their contribution to the performance of the roadway network. Include a specific recognition and commitment that the improvements shown within the installation would be provided by the Army in conjunction with development. Address the possibility that transportation improvements beyond the boundary of the installation may not be in place when development occurs, and evaluate the ability of the transportation network to accommodate the additional employment on Fort Belvoir and the resulting performance of the network. Identify the desired level of single-occupancy-vehicle usage to and from the installation in order to maintain satisfactory levels of service on the surrounding highway network, and the specific commitments to be undertaken by the Army and other user agencies on Fort Belvoir to achieve the desired level of usage.
- Fairfax County – Address appropriate phasing of transportation improvements and address impacts to the road network beyond the immediate vicinity of Fort Belvoir. Include in the transportation analyses performed in support of the EIS appropriate travel demand modeling and a capacity and operational study. Clearly document, for all alternatives, where both current and relocated employees and contractors are anticipated to reside and what the anticipated number and timing of vehicular trips to and from both the Main Post and the FBNA would be, and consider to what extent highway facilities would be able to accommodate increased trips. Provide analysis sufficiently comprehensive to consider the need for improvements beyond the immediate vicinity of the Main Post and FBNA. Analyze whether access points into Fort Belvoir and FBNA as currently constructed are able to handle the number of vehicles entering the installation at the peak hour periods, and the extent to which signal modifications are needed along Richmond Highway and the Fairfax County Parkway to accommodate changes in commuting patterns. Consider the impacts of the completion of the Fairfax County Parkway and Mulligan Road (i.e., Jeff Todd Way), and the

widening of Richmond Highway through the Main Post on meeting future travel demand and evaluate the ramifications of any significant delay in their construction/completion. Address how future development would be phased to the availability of necessary roadway and transit improvements. Analyze the cumulative impacts of the proposed short- and long-term projects on the surrounding infrastructure. Address the over-capacity operations projected in past environmental assessments, evaluate all intersections agreed upon through prior discussion with associated deficiencies identified, and provide improvements to correct these deficiencies. Consider the provision of an additional grade-separated connection between the North and South Post.

Non-Motorized Transportation

- NCPC – Analyze the Transportation Element bicycle-related policies of the Comprehensive Plan for the National Capital. Evaluate bicycle and pedestrian connections to off-installation trails and sidewalks to provide commuting and recreational options for Fort Belvoir employees and residents, and evaluate a meandering pedestrian trail within Fort Belvoir as a segment of the Potomac Heritage National Scenic Trail.
- Fairfax County – Include a map of planned pedestrian and bicycle trails and demonstrate how they would connect to those shown on the adopted Countywide Trails Plan, examine development of appropriate segments within and adjacent to Fort Belvoir, and identify mechanisms through which new trails would be funded, phased, and constructed. Address the extent to which pedestrian and bicycle connections would be provided between on-post and/or near-Post housing and on-post employment areas. Address the extent to which pedestrian connections and facilities would be provided to facilitate transit use by new and existing employees. Address the extent to which new office buildings would be designed to accommodate bicycle commuting. Address the extent to which employees can be expected to commute to the area via Metrorail and the extent to which transit connections between the FBNA and the Franconia-Springfield station could increase commuting via transit. Address future over-capacity concerns associated with Backlick Road at the FBNA and the I-95 ramps at the Fairfax County Parkway. Identify specific measures that would be applied to optimize the use of Metro, the Fairfax Connector, Virginia Rail Express, and Park and Ride facilities in order to reduce single-occupancy-vehicle use. Evaluate the possible use of the abandoned coal train line right-of-way for some type of transit link to and from Fort Belvoir Main Post and take into account the County's ongoing Countywide Transit Network Study. Consider improvements to transit connections between existing transit facilities, Fort Belvoir, and FBNA; the extension of Metrorail as a long-range enhancement; and studies that are underway.

Air Quality

- NCPC – Analyze impacts to demonstrate conformance with the Federal Environment Element air quality policies of the Comprehensive Plan for the National Capital.
- Fairfax County – Analyze emissions of ozone precursors that would be associated with motor vehicle trips, vehicle miles traveled, and traffic congestion, and compare alternatives in regard to the potential for carbon monoxide hot spots associated with traffic congestion.

Noise

- Fairfax County – If any of the alternatives would impact operations at DAAF, identify changes in noise impacts that would be associated with such operational changes.

Water Resources

- NCPC – Analyze impacts to demonstrate conformance with the Federal Environment Element water quality policies of the Comprehensive Plan for the National Capital. Evaluate the existing

condition of stormwater management facilities at Fort Belvoir and recommend improvements where needed.

- Fairfax County – Identify all 100-year floodplains (applying the county's definition) and all Resource Protection Areas (RPAs) on Fort Belvoir. Use post-specific information regarding locations of perennial streams and wetlands to augment county maps of Chesapeake Bay Preservation Areas, and apply Fairfax County's protocol for identification of perennial streams. Coordinate with the Stormwater Planning Division of the Department of Public Works and Environmental Services on the identification of stream and stormwater management projects in the area of the Main Post and FBNA. Identify any body of water on or near the Main Post or FBNA that is included on the list of impaired waters and address the implications of these designations. Address opportunities to minimize impervious cover and to use other low impact development and better site design techniques to replicate, to the extent possible, predevelopment hydrologic conditions through infiltration of stormwater runoff. Address how impacts to streams would be minimized and how any unavoidable impacts to streams would be mitigated. Establish that county requirements for erosion and sediment control measures, stormwater management measures, and water quality best management practices would be satisfied.

Biological Resources

- Fairfax County – Address the compatibility of all alternatives with the full extent of significant natural resources as identified in the *Fort Belvoir Integrated Natural Resource Management Plan* (INRMP); address direct and indirect impacts, and potential mitigation measures; focus on how proposed actions would comply with the guiding principles; and state what mitigating and long-term practices should be employed to offset impacts from proposed land disturbing activities. Address how impacts to wetlands would be minimized and how any unavoidable impacts to wetlands would be mitigated. Detail, account for, and minimize impacts along the Accotink Bay and Gunston Cove shorelines; in particular, identify the 17 community types on Main Post referenced in section 4.8.1.3 Rare Plant Communities of the BRAC EIS, and provide preservation measures to include buffers around the communities and protection of water resources draining to them. Include potential mitigation measures for road design and construction practices that minimize resource impacts. Address opportunities to preserve and maintain natural communities and ecosystem services at Fort Belvoir. Include a table that illustrates cumulative disturbances to designated habitat areas and the amount of acreage that has been reclaimed as a result of recent development in these habitat areas.

Utilities

- Fairfax County – Provide updated wastewater flow projections to enable a determination whether the Army would need to purchase more capacity, and recognize the need to update the sewer service agreement between the Army and the County.

Hazardous Substances and Potentially Contaminated Sites

- USEPA – Identify cleanup sites within Fort Belvoir, including detailed information of contaminants, resource areas impacted, status of cleanup, and location relative to the areas proposed for implementation in the updated master plan. Identify known hazardous substances located within the study area, discuss the status of the materials and remedial methods, and provide a detailed plan for proper disposal.
- Fairfax County – Identify sites on Fort Belvoir that have been subject to contamination, the status of efforts to clean up the sites, and the relationship between site contamination and siting decisions for new development.

Energy Use and Sustainability

- USEPA – Address adherence to Executive Order (EO) 13508, *Chesapeake Bay Protection and Restoration*, Section 502 guidance.
- NCPC – Evaluate strategies for achieving the goals set forth in EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*[1].
- Fairfax County – Provide guidance on green building performance levels that would be attained by any new development or redevelopment. Explore the option of using reclaimed water from the Noman M. Cole Jr. Pollution Control Plant for current and planned facilities and activities as a mitigation strategy.

Permits

- USEPA – Discuss the permits required before commencement of the project.

The EIS addresses these matters. The scoping materials, original comments received, and responses are included in Appendix A.

1.4.3 Draft EIS (DEIS) Public Comment Period

The Army released the DEIS for public review and comment on September 12, 2014. A notice of availability (NOA) was published in the *Federal Register* on September 12, 2014, the *Mount Vernon Voice* on September 17, 2014, and the *Washington Post* and the *Belvoir Eagle* on September 18, 2014. The DEIS was made available on line and in five public libraries. Copies could also be requested from Fort Belvoir. The comment period ran from September 12 through November 11, 2014.

On Tuesday, September 30, 2014, a public hearing was held at the South County Center on US Route 1 from 5 pm to 9 pm. Eleven persons attended. No comments were submitted.

During the DEIS public comment period, comments were received from the following agencies: the Commonwealth of Virginia, Fairfax County, the US Environmental Protection Agency, and the US Department of the Interior/National Park Service. No comments were received from the general public.

The Commonwealth of Virginia's comments addressed coastal resources, natural resources, air quality, hazardous susbtances, utilities, transportation and traffic, land use, energy use, and cultural resources.

Fairfax County's comments addressed air quality, natural resources (including water resources), land use, transportation, cultural resources, and schools. The County also suggested factual corrections and edits to the text.

The US Environmental Protection Agency's comments addressed significance levels; environmental justice; the protection of children; transportation and traffic; noise; geology, topography, and soils; utilities; hazardous substances; and cumulative impacts.

[1] Now replaced by EO 13693, Planning for Federal Sustainability in the Next Decade, signed March 19, 2015.

The Department of the Interior's comments addressed interfaces with two National Historic Trails under their jurisdiction; considering inclusion of paddle-in camping to the short-term projects to build a family travel camp along the shoreline; giving the public access to the shoreline; protecting archaeological sites; and ensuring that viewsheds from the river are preserved. The National Park Service additionally provided some textual edits for text pertaining to the national trails.

All the comments received were considered when preparing this FEIS. The comments and Fort Belvoir's responses are in Appendix A.

1.4.4 Final EIS (FEIS) Publication and Record of Decision (ROD)

This FEIS will be publicly available for at least 30 days before the Army makes a decision and issues a ROD. Before making its decision, the Army will consider all relevant environmental information, all comments received during the EIS process, mission requirements, availability of funding, and the professional judgment of senior military leaders. After thoroughly evaluating this information, decision makers will document the decision in the ROD. The ROD will articulate the decision made, provide a supporting explanation, and identify mitigation measures to address any 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 purpose and need. Decision makers will also identify the environmentally preferred alternative. Once the ROD is signed, the Army will publish an NOA for the ROD in the *Federal Register*.

As this document and the associated master plan look at growth at Fort Belvoir, the Army as a whole is getting smaller. The 2014 Quadrennial Defense Review (QDR), released in March, 2014 (DoD, 2014), makes this clear. The QDR, which "seeks to adapt, reshape, and rebalance our military to prepare for the strategic challenges and opportunities we face in the years ahead," indicates the Army as a whole must reduce its active duty strength from a war-time high force of 570,000 to 440,000-450,000 Soldiers, and that if sequestration-level cuts return in FY 2016, active duty Army end-strength would be further reduced to 420,000. It is important to stress that the Army as a whole does not know the magnitude of cuts that would be required. Fort Belvoir's organization may not be exempt from these reductions, and the Army would study extensive reductions for the installation. This raises the question of why the Army would study both growth and reduction at Fort Belvoir. Either possibility could occur. The reduction scenario is part of a nation-wide program and would have mainly economic effects at places throughout the country. It is appropriate to address this under NEPA at a nationwide programmatic level. Fort Belvoir could also grow. This could include the growth of tenant organizations that are not part of the Army and whose missions are growing in accordance with national defense strategy. The impacts of this growth would be local to Fort Belvoir and involve all of the resource areas looked at in this document. The site-specific approach for Fort Belvoir's master plan and growth scenarios is the most reasonable way of conducting the analysis. Whether Fort Belvoir would gain or lose personnel under these initiatives is impossible to predict.

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2 Proposed Action & Alternatives



2.1 PROPOSED ACTION

The Army's proposed action is to adopt and implement an updated RPMP for Fort Belvoir's Main Post and FBNA and to implement the plan's proposed short-term and long-term development. Fort Belvoir's military mission is global. As a strategic sustaining base for America's Army, Fort Belvoir's work is vital to the success of the goals and objectives of the nation's defense strategy. Because Fort Belvoir provides logistical, intelligence, and administrative support to a diverse group of more than 140 commands, activities, and agencies, its mission is singular among Army installations around the world. Blessed with an attractive natural setting, Fort Belvoir's mission encompasses stewardship of the environment to conserve the natural beauty of the land and to preserve Fort Belvoir's standing as one of America's enduring installations so Belvoir will always mean "beautiful to see."

In addition to its mission of providing logistical, intelligence, and administrative support to DoD organizations and conserving the land, Fort Belvoir also provides:

- A creative learning environment for Army and DoD training and continuing education students;
- Regional housing for active duty military families;
- Quality-of-life support for the military community that includes health services and recreation;
- Cultural resources stewardship in concert with mission support.
- Natural resources stewardship in concert with mission support.

Certain planning assumptions based on Fort Belvoir's mission and functions underlie the master planning process:

- Following full implementation of the 2005 BRAC recommendations for Fort Belvoir, the September 2011 Main Post and FBNA workforce was approximately 39,000. Future growth projections for Main Post and the FBNA indicate an increase of up to 17,000 personnel by 2030.
- Fort Belvoir will provide more services to support the military in the National Capital Region, including administrative offices, logistical support, outdoor recreation, and retiree services.
- NMUSA will be built on Fort Belvoir.
- The privatization of water and wastewater utilities on post will entail a large amount of construction for upgrades and modernization of systems. However, they do not pose a major development constraint as these systems can be integrated and planned for with future development.

2.1.1 Real Property Master Plan Mission, Vision, and Guiding Principles

Fort Belvoir's strategic mission is to provide the Army with the installation capabilities and services to support expeditionary operations in a time of persistent conflict, and to provide a quality of life for Soldiers and Families commensurate with their service.

In November 2011, as a step in the master planning process, Garrison staff and tenants met to develop a vision for Fort Belvoir and create guiding principles for future development on the post. The vision articulated was: "Belvoir is an outstanding place to work, train, and live that embraces a culture of diversity, innovation, and challenge while continuing its legacy as a 'Beautiful to See' installation." The principles articulated were to:

- 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
- Create a diverse and dynamic community
- Respect the history of Fort Belvoir to ensure the continuation of its legacy
- Strengthen community partnerships for mutual benefits

These principles aim for future development that efficiently uses land, maximizes the use of previously developed areas and historic structures, minimizes the impact on the environment, facilitates transit, improves connectivity, promotes walkable, mixed-use town centers, supports local and regional planning objectives, and creates a sustainable, world-class installation.

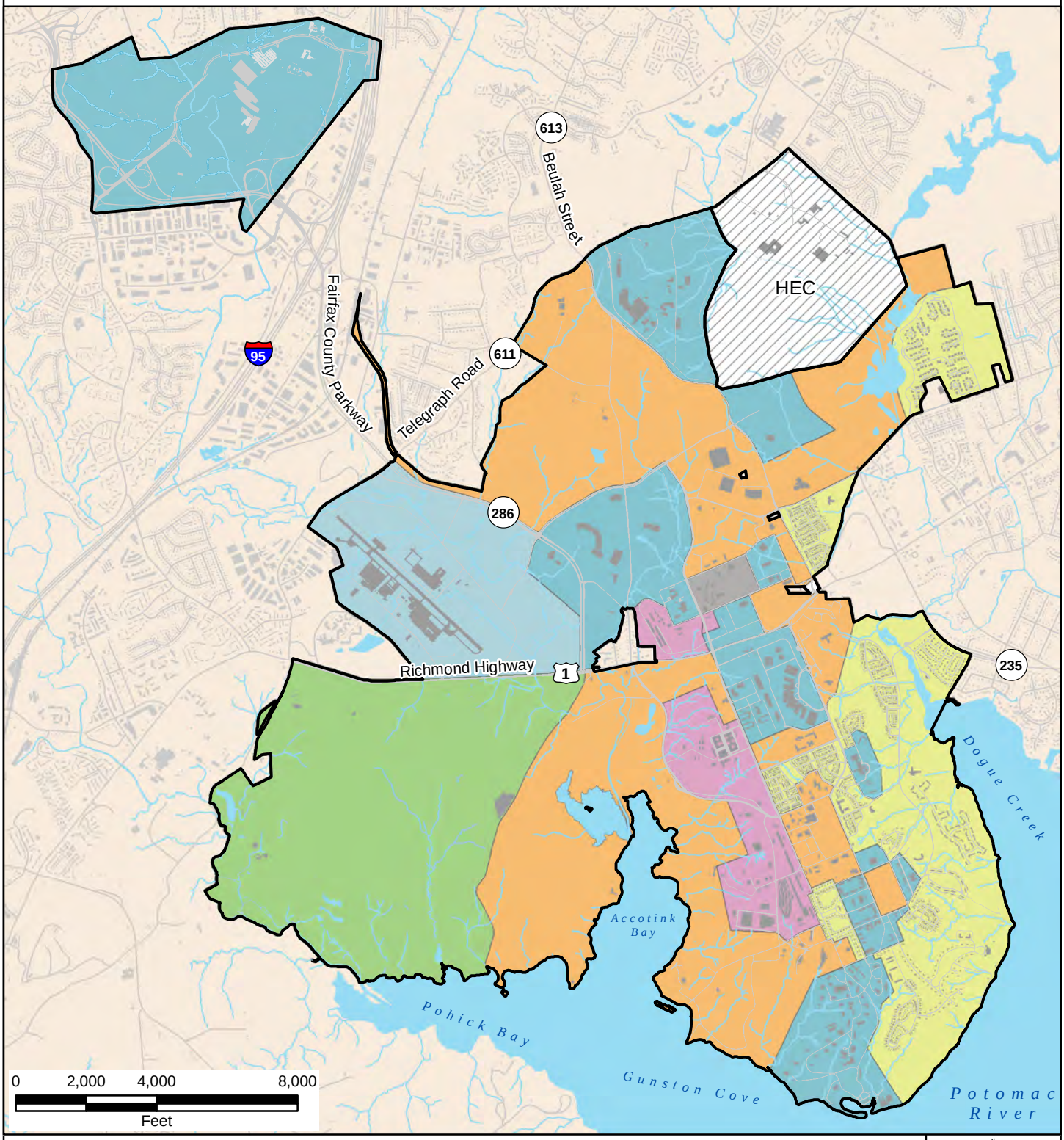
2.1.2 Land Use Plan

To support the mission statement and guiding principles, the Army proposes to revise the current land use plan. A land use plan establishes the optimal organization of uses on the land and how to allocate resources to their best and highest use. The proposed land use plan was developed by considering natural, cultural, and operational issues on post; planning initiatives; functional relationships among land uses; and spatial relationships among functions. Figure 2-1 shows the current land use plan; Figure 2-2 shows the proposed land use plan. Table 2-1 compares land use acreages between the current and proposed land use plans.

Notable proposed land use changes include:

- Establishing a new Professional/Institutional development area adjacent to the South Post Core development area (approximately 171 acres).
- Reducing the South Post Industrial land use to a smaller acreage (55 percent reduction), which would be accommodated by constructing more efficient modern facilities for these functions.
- Consolidating the Industrial land use west of Gunston Road. The small portion of Industrial land (5 acres) currently to the east of Gunston Road would be transferred to the Professional/Institutional land use category.
- Categorizing the Community land use south of FBCH as Troop because of the continued expansion of the Warriors-in-Transition development, which has eliminated many of the former community facilities that were previously located on this site.

Current Land Use Plan



Legend

- Airfield
- Community
- Industrial
- Professional / Institutional
- Residential
- Training
- Troop

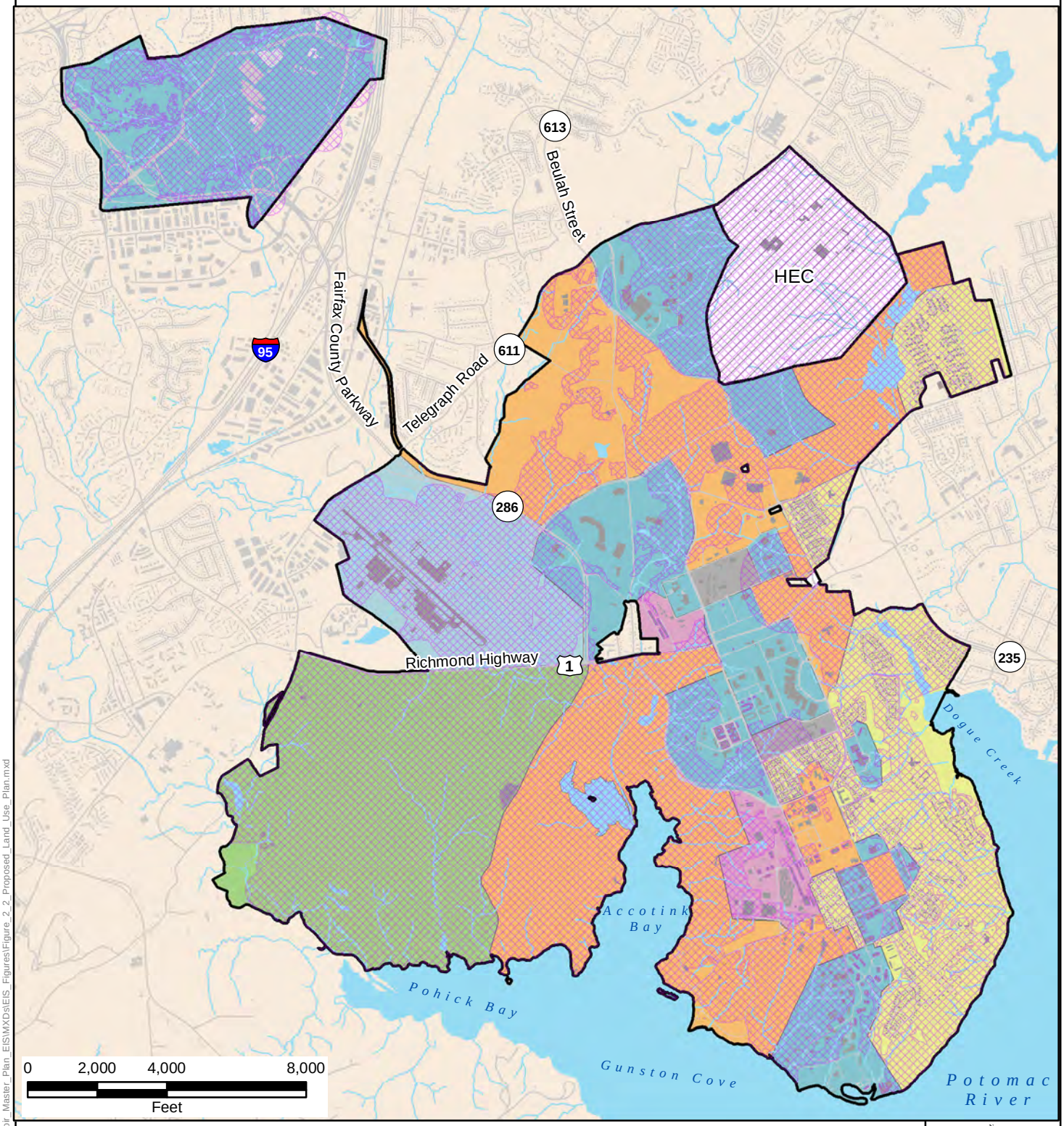
Fort Belvoir RPMP EIS

Figure 2-1

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Proposed Land Use Plan



Legend

- Constrained Development Areas
- Airfield
- Community
- Industrial
- Professional / Institutional
- Residential
- Range / Training
- Troop

Fort Belvoir RPMP EIS

Figure 2-2

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Table 2-1
Land Use Acreage Comparison

Land Use Category	Existing Land Use Acreage			Proposed Land Use Acreage			Acreage Change Developable Acres
	Total	Constrained	Developable	Total	Constrained	Developable	
Professional/ Institutional	2,113	863	1,250	2,288	914	1,374	124
Residential	1,240	655	585	1,240	655	585	0
Troop	46	0	46	86	10	76	30
Community	2,569	1,626	943	2,515	1,615	900	-43
Range/ Training	1,463	1,003	460	1,463	1,003	460	0
Airfield	690	472	218	690	472	218	0
Industrial	378	95	284	218	45	173	-111
TOTAL	8,500	4,714	3,786	8,500	4,714	3,786	0
TOTAL PERCENTAGES	100	55	45	100	55	45	Not Applicable (NA)
MAIN POST TOTAL	7,696	4,421	3,275	7,696	4,421	3,275	NA
FBNA TOTAL	804	293	511	804	293	511	NA
Source: Atkins, 2015							

2.1.3 Framework Development Plan

The RPMP Installation Vision and Development Plan (IVDP) incorporates the master plan vision, the assessment of the Fort Belvoir site and environs, and the land use plan. Consideration of these elements culminates in the framework development plan, shown in Figure 2-3. This plan recommends the type and location of future development but not specific projects, allowing this plan to serve as a flexible, overall guiding framework as soon as one project changes location. The framework plan:

- Provides the framework for accommodating workforce growth to the year 2017, with increases in workforce personnel ranging from 1,200 to 4,800, depending upon the short-term projects that are implemented. From 2011 to the year 2030, workforce personnel may increase by an additional 11,000 to 17,000, depending on the projects implemented. The total projected workforce on Main Post and the FBNA by 2030 would be 50,000 to 56,000, depending on the short-term and long-term projects that are implemented.
- Focuses future development in areas that have already been developed and have utility connections, thereby minimizing new land disturbance, increases in impervious surfaces, infrastructure costs, and incursions into protected areas and green space. Redevelopment of old facilities and additional in-fill development would use less energy and recycle existing facilities in a sustainable manner.
- Provides a dense core of mixed-use development on the plateau that extends north-south across Main Post, allowing concentration of the workforce. Workers would find it easier to walk to services, and they would be more easily and economically served by shuttle and transit services to on-post and off-post destinations.
- Maintains the historic Fort Belvoir railroad right-of-way for potential transit use.

- Reserves parcels for recreation and open space and maintains viable green space through all developed areas.
- Reserves parcels for development beyond 2030.

2.1.4 Short-Term Projects

The RPMP includes Fort Belvoir's proposed future short-term projects from 2012 through 2017, which address current and near-term functional needs on Fort Belvoir. Proposed projects are prioritized for each program year by Fort Belvoir's Real Property Planning Board and the Garrison Commander. Through time, program years may change or projects may be removed from the list or added for a number of reasons including changes in funding, delays in project design or other elements of the project, or changes in agency priorities. The Short Term Project program is considered a snapshot in time; the projects described here are current as of December, 2013.

NEPA documentation has been completed or is underway for many of the short-term projects to be implemented in the next few years, as described in Section 1.3.2. Although projects with existing NEPA RODs, RECs, or FNSIs do not require further impact evaluation, they are included in this EIS because they form part of the proposed action, which is to implement whole RPMP update, including the short-term projects in the RPMP's IDP. This also allows an evaluation of the cumulative impacts of all projects implemented and planned after BRAC through 2017.

Table 2-2 lists the 52 short-term construction, demolition, and/or renovation projects by program year. It includes project numbers and the estimated size of buildings in square feet, the acreage that would be disturbed by the project, and the acreage of impervious surface that would result. Because many of the projects would be sited on existing parking lots or replace existing buildings, project impervious area may actually decrease relative to the existing condition.

Figures 2-4 through 2-7 depict the location of the short-term facility projects, with numbers keyed to the project numbers in Table 2-2. The footprints of projects that have been designed are shown; projects not yet designed are shown as sites.

Congress authorizes projects and appropriates funds to construct projects each fiscal year. For a phased project, Congress may or may not appropriate funds for succeeding phases in consecutive fiscal years. Therefore, each phase of the project must be a complete and usable facility. The short-term projects include the following large projects that are being funded incrementally in phases over a series of fiscal years:

- Redevelopment of the North Post Town Center, including construction of a new PX (ST 1); demolition of the old PX (ST 16); construction of a new Commissary (ST 28); and construction of other supporting facilities, such as a name-brand, casual dining restaurant (ST 25).
- Expansion of US Army INSCOM HQ (ST 19, 26, 33, and 46).

Similarly, construction of the NMUSA (ST 17, 18, 27, 34, 38, and 41) would take place in phases, but the phases may vary because of the amount of donations received rather than because of Congressional budgets.

Framework Development Phasing Plan

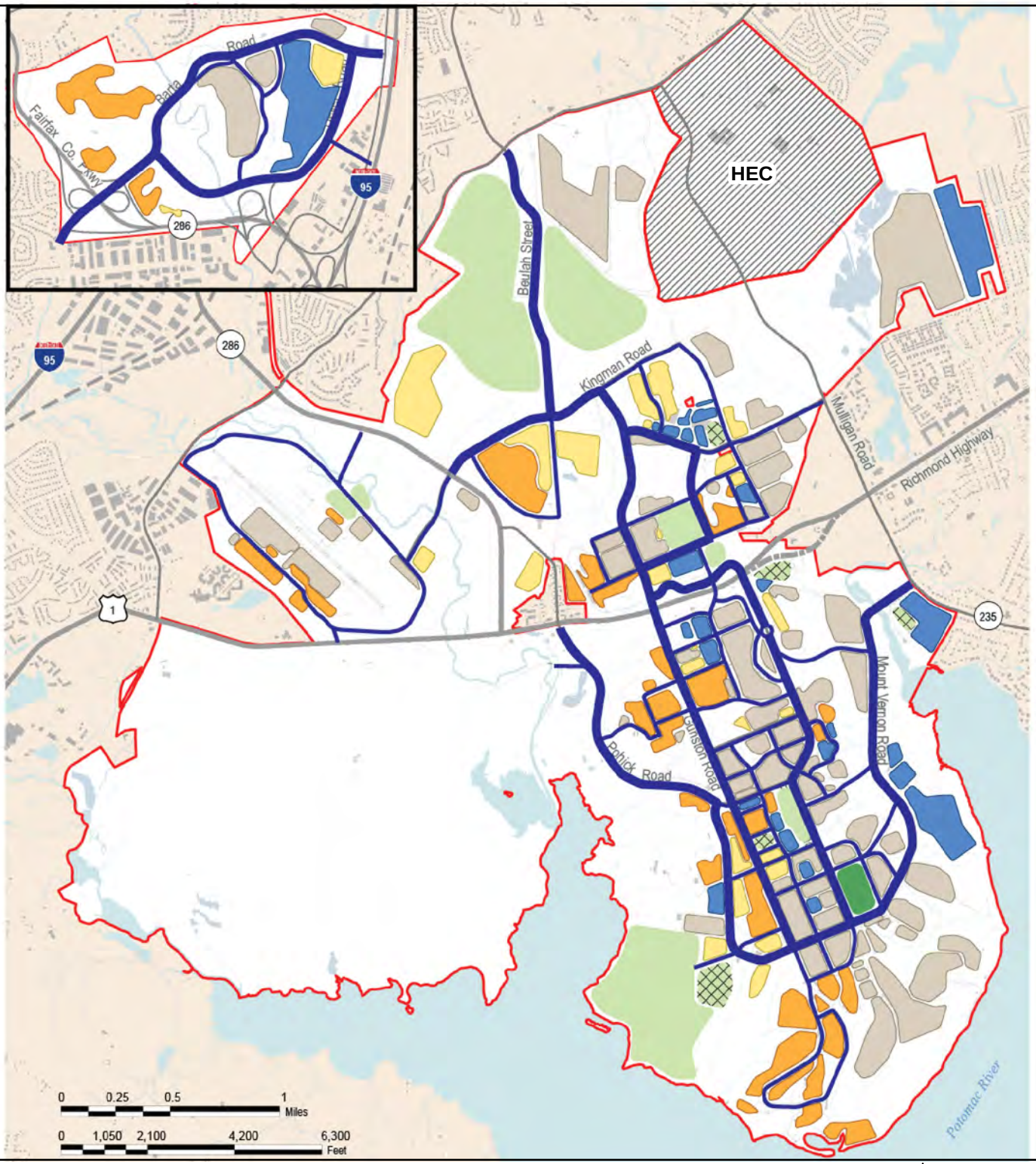
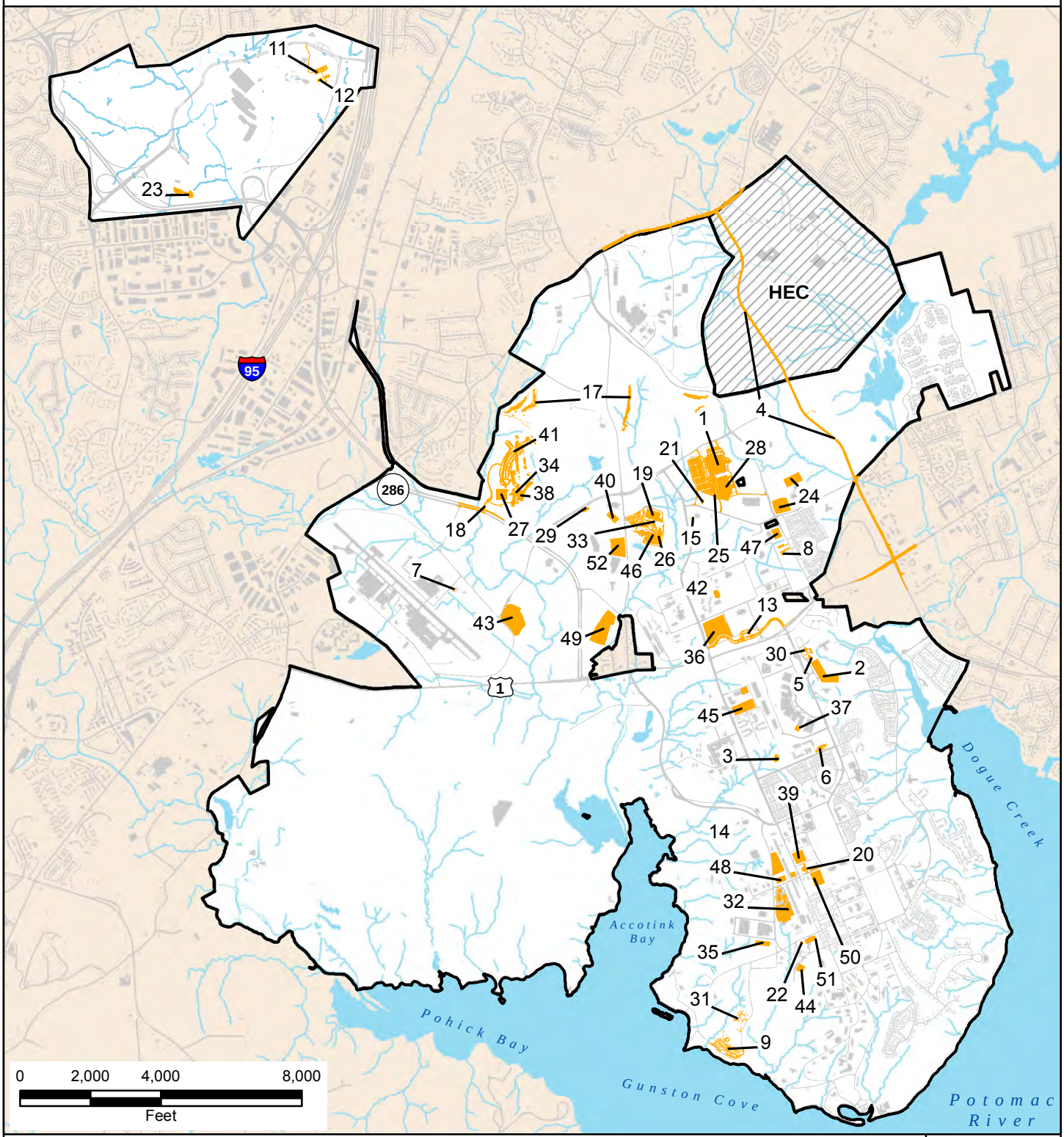


Figure 2-3

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Proposed Short-Term Projects



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Short-Term Project Sites (Construction FY 2012 - 2017)

3 Short-Term Project Number – corresponds to project numbers in Table 2-2

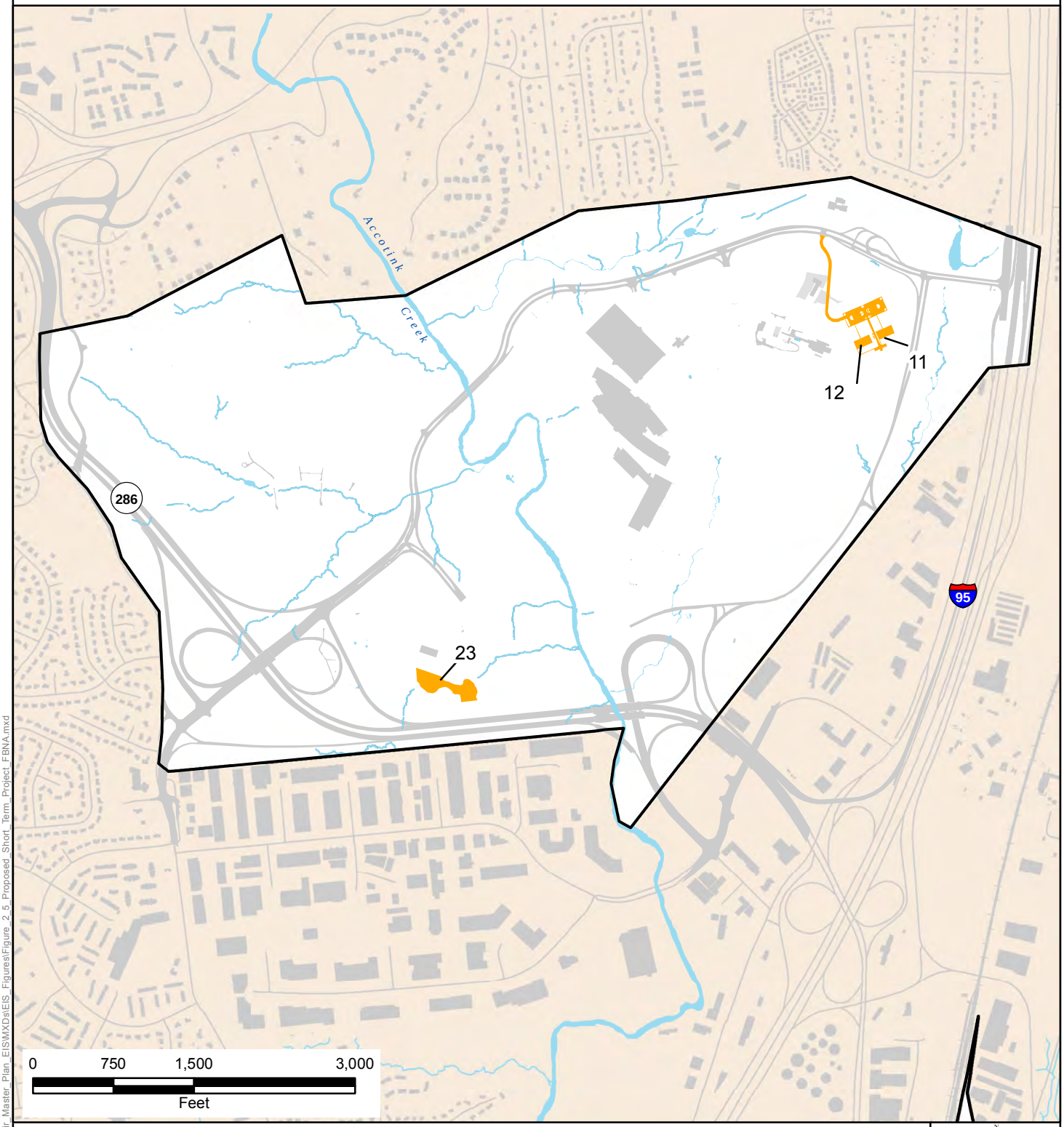
Fort Belvoir RPMP EIS

Figure 2-4

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Proposed Short-Term Projects - FBNA



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Short-Term Project Sites (Construction FY 2012 - 2017)

3 Short-Term Project Number – corresponds to project numbers in Table 2-2

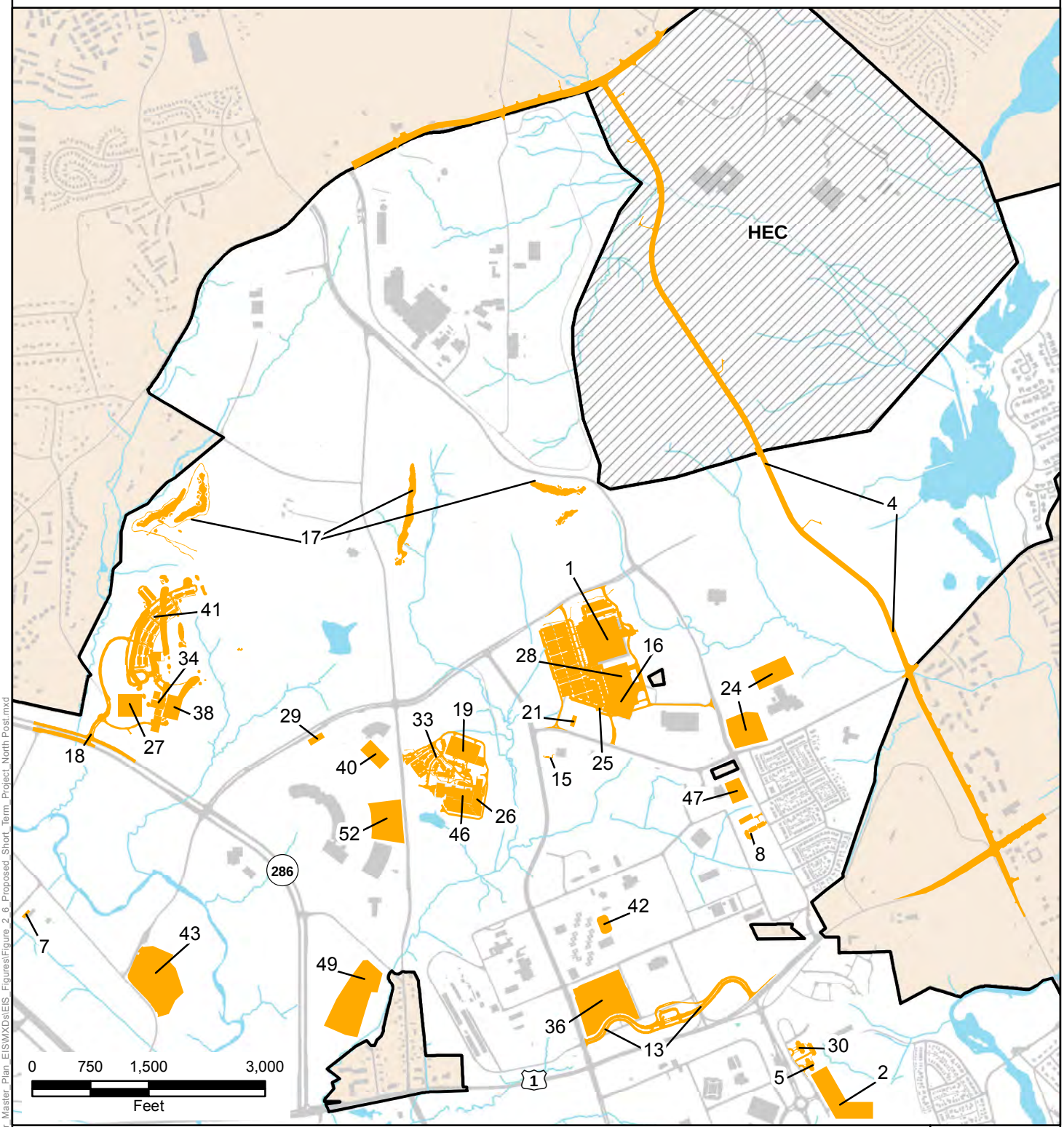
Fort Belvoir RPMP EIS

Figure 2-5

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Proposed Short-Term Projects - North Post



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Short-Term Project Sites (Construction FY 2012 - 2017)

3 Short-Term Project Number – corresponds to project numbers in Table 2-2

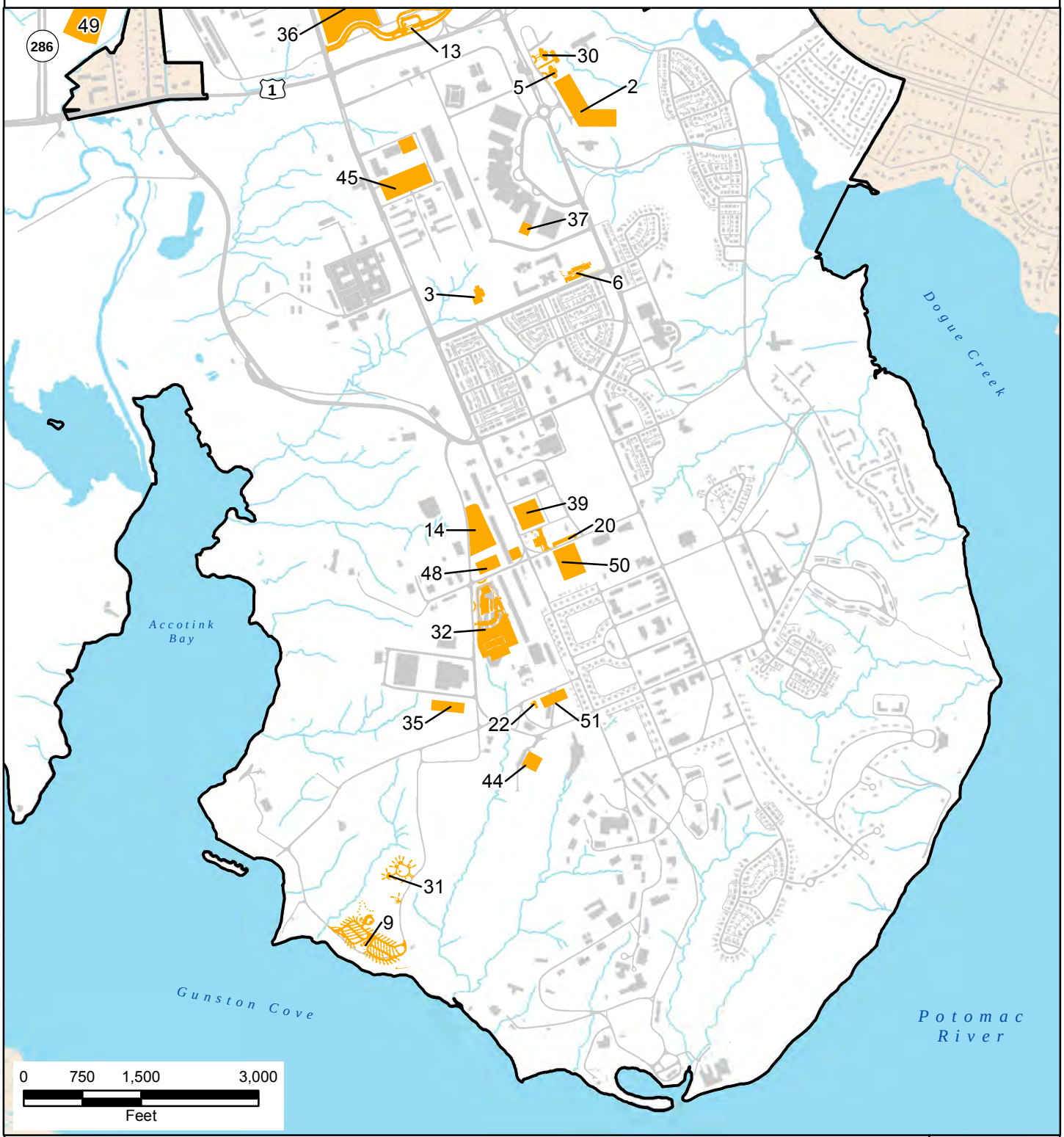
Fort Belvoir RPMP EIS

Figure 2-6

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Proposed Short-Term Projects - South Post



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Short-Term Project Sites (Construction FY 2012 - 2017)

3 Short-Term Project Number – corresponds to project numbers in Table 2-2

Fort Belvoir RPMP EIS

Figure 2-7

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Table 2-2
Short-Term (Fiscal Year [FY] 2012-2017) Projects

Project # on Figures 2-4 to 2-7	Project Name	Project Number	Location	Building size (square feet)	Disturbed Area (acres)	Impervious Surface (net acres)	Added Personnel	Status/Comments
FY 2012 Construction								
ST 1	Army & Air Force Exchange Service (AAFES) Post Exchange (PX)	71074	North Post	270,000	24.3	16.8	75	The new PX opened in June 2013 and consolidated three existing facilities.
ST 2	Privatized Army Lodging (PAL – East of Belvoir Road Circle	64293	South Post	103,402	5.4	2.1	30	A new, 141-room transient lodging facility is being built near Pence Gate under terms of the PAL agreement
ST 3	National Intrepid Center of Excellence (NICoE)	NA	South Post	18,074	2.8	0.6	50	The facility opened in July 2013 and provides treatment for traumatic brain injuries and post-traumatic stress disorders.
ST 4	Mulligan Road[1] Phase II	62297 56062	North Post	NA	32	20	0	This project was completed in 2014. The project included the completion of Mulligan Road (dedicated as Jeff Todd Way) between Telegraph Road and US Route 1 plus associated work to Telegraph Road, Old Mill Road, and US Route 1.
ST 5	Fisher House 1	NA	South Post	10,000	1.8	0.8	4	This project was completed in May 2012 and is a single-story brick residential facility with 12 bedrooms/ suites. The facility provides a temporary residence and support functions for service men and women and their families receiving care at the Fort Belvoir Community Hospital (FBCH).
ST 6	USO Wounded Warrior and Family Center	NA	South Post	25,000	3.5	0.9	15	The facility, which opened in February 2013, provides recreational/community support functions for recovering Soldiers and their Families.

Project # on Figures 2-4 to 2-7	Project Name	Project Number	Location	Building size (square feet)	Disturbed Area (acres)	Impervious Surface (net acres)	Added Personnel	Status/Comments
ST 7	Expansion of DAAF Fire Station	74885	DAAF	4,050	0.4	0.04	25	This project is currently under construction and would expand the existing fire station to accommodate a third fire company.
ST 8	Child Development Center 144	70067	North Post	13,020	3.7	1.4	45	The child development center, completed in 2013 and opened in March 2014, provides care for up to 144 children of active duty and authorized civilian personnel. The facility is located near the Woodlawn family housing area.
ST 9	Family Travel Camp Phase 1	66807	South Post	1,630	9.6	1.6	6	Phase 1 of this project opened in May 2013 in the Tompkins Basin area. The facility provides spaces for recreational vehicles and camping support buildings. Active-duty military, their families, military retirees, and eligible civilians are eligible to use the facility.
ST 10	Water/Wastewater Utility Upgrades (not mapped)	NA	Main Post	NA	Temporary disturbance to replace pipes, etc.	± 0	0	Currently under construction, this project would repair and replace aging infrastructure, including pipes, lift stations, and water towers.
FY 2013 Construction								
ST 11	Child Development Center 1	75997	FBNA	10,640	7 total for both	2.7	35	Two child development centers, each with a capacity of 124 children, are under construction adjacent to one another to provide childcare for military personnel and eligible civilians working on FBNA.
ST 12	Child Development Center 2	75998		10,640			36	
ST 13	Access Road & Control Point – Lieber Gate	80573	North Post	1,500	8	6	0	A new access control point with construction slated to begin in late 2014 would allow access to North Post from US Route 1. The facility would replace the former Lieber Gate, which was closed after the September 2001 terrorist attacks.

Project # on Figures 2-4 to 2-7	Project Name	Project Number	Location	Building size (square feet)	Disturbed Area (acres)	Impervious Surface (net acres)	Added Personnel	Status/Comments
ST 14	Regional Stormwater Management Facility	NA	South Post	NA	3.5	0	0	This project would build a regional stormwater management facility to serve several buildings. The project is still conceptual. The proposed site requires environmental remediation.
ST 15	AAFES Car Wash	0307-03-001	North Post	1,350	0.13	0.1	0	A car wash facility for privately-owned vehicles would be built adjacent to the Class VI store at the intersection of Gunston and Gorgas Roads.
ST 16	PX Demolition	N/A	North Post	NA	3.2	-3.2	0	The former PX building has been demolished to make space available for the construction of the new Commissary (see ST 1 and ST 28).
ST 17	36-Hole Golf Course Reconfiguration	73679	North Post	NA	33.8	1.3	0	Six of the 36 holes at Fort Belvoir's golf course would be reconfigured to accommodate construction of the National Museum of the US Army (NMUSA) (see projects 18, 27, 34, 38, and 41).
ST 18	National Museum of the US Army (NMUSA) Roads and Infrastructure Improvements	71149	North Post	NA	25.9 for buildings, parking lots, infrastruc-ture	16.7 for buildings, parking lots, infrastruc-ture	0	Roads and utility infrastructure would be extended and parking lots would be built to serve the future NMUSA facilities (see ST 17, 27, 34, 38, and 41).
ST 19	US Army Intelligence and Security Command (INSCOM) Headquarters Expansion, Phase 1	57508	North Post	420,000	21.9 for all 4 phases	4.3 total for all 4 phases	0	Under construction, this project would build the first of four phases (also see ST projects 26, 33, and 46) to expand INSCOM's headquarters facilities. The first phase includes a 1,400-space parking garage, utility building, partial reconfiguration of parking lots, and site work.
ST 20	Replacement of South Post Fire Station	61453	South Post	10,297	1.5	0.07	12	A new fire station for two fire companies is under construction near the site of the existing station. The existing station would be repurposed as a 911 communications center.
ST 21	AAFES Car Care Center	0301-10-001	North Post	9,000	0.2	0.01	15	A car maintenance facility with 10 service bays would be built on an outparcel of the PX/ Commissary site.

Project # on Figures 2-4 to 2-7	Project Name	Project Number	Location	Building size (square feet)	Disturbed Area (acres)	Impervious Surface (net acres)	Added Personnel	Status/Comments
ST 22	Pet Care Center	74317	South Post	5,200	1.0	0.2	8	A pet care center to provide pet care and kennel boarding for the pets of military personnel, their families, and eligible civilians would be built near the intersection of 21st Street and Warren Road.
ST 23	National Geospatial-Intelligence Agency (NGA) Canine Training / Rest Facility	NA	FBNA	1,200	0.5	0.04	10	This project would build a canine training and rest facility with an administrative area, kennels with dog runs, and a canine exercise area for NGA working dogs.
ST 24	Fairfax County School Expansion	NA	North Post	92,254	4.4	2.1	75	A new elementary school would be built next to the existing Fort Belvoir Elementary School to accommodate up to 492 students. In September 2013, Fairfax County submitted an initial project proposal to DoD for funding.
FY 2014 Construction								
ST 25	Name Brand Casual Dining Restaurant	NA	North Post	6,500	0.2	0.15	50	An Old Chicago restaurant would be built on an outparcel of the PX/Commissary development site.
ST 26	INSCOM HQ Expansion, Phase 2	58849	North Post	188,000	Included in ST 19	Included in ST 19	0	The expansion of the INSCOM HQ facilities would continue under this project (see also ST 19, 33 and 46).
ST 27	NMUSA, Phase 1	NA	North Post	195,130	Included in ST 18	Included in ST 18	0	A national museum to showcase the history and artifacts of the US Army would be built (see also ST 17, 18, 34, 38 and 41).
ST 28	Main Post Commissary	64327	North Post	132,000	19.4	2.2	75	This project would provide a new, larger Commissary for use by military personnel, their families, area retirees, and eligible civilians.
ST 29	Defense Logistics Agency (DLA) Visitor Control Center	80446	North Post	2,960	0.5	0.35	4	A standard DoD visitor control center for employees and visitors accessing DLA would be built under this project.

Project # on Figures 2-4 to 2-7	Project Name	Project Number	Location	Building size (square feet)	Disturbed Area (acres)	Impervious Surface (net acres)	Added Personnel	Status/Comments
ST 30	Fisher House 2	NA	South Post	10,000	1.8	0.5	4	A second Fisher House would be built adjacent to Fisher House 1 (ST 5). The two houses would share the same purpose, design, and parking lot.
ST 31	Family Travel Camp, Phase 2	66808	South Post	NA	1.3	0.9	0	Car camping sites and cabins would be added to the family travel camp described under ST 9.
FY 2015 Construction								
ST 32	249th Battalion HQ	59554	South Post	81,783	10.5	4.1	200	A new HQ complex would be built on the site of the existing recreational vehicle parking area near the intersection of Theote Road and 16th Street. The facility would include administrative areas, classrooms, and equipment maintenance shops.
ST 33	INSCOM HQ Expansion, Phase 3	62243	North Post	194,000	Included in ST 19	Included in ST 19	0	Expansion of INSCOM HQ facilities would continue under this project (see also 19, 26, and 46).
ST 34	NMUSA, Phase 2	NA	North Post	111,000 (divided among Phases 2-4)	Included in ST 18	Included in ST 18	30	This project would continue the construction of NMUSA facilities (see also ST 17, 18, 27, 38, and 41).
ST 35	Retail Fuel Point	78926	South Post	784 (plus 7,781 for 2 canopies)	1.0	0.8	0	An unattended vehicle fueling station for military and other federal vehicles would be built near the intersection of Theote and Warren Roads. It would replace the existing facility on South Post.
FY 2016 Construction								
ST 36	29th Infantry HQ	510009	North Post	33,258	7.4	0	300	This project would construct a new HQ complex for the 29th Infantry at the intersection of Gunston and Goethals Roads.
ST 37	Medical Office Building	77285	South Post	21,948	0.6	0.45	110	A new facility to accommodate new students, staff, and plant maintenance personnel would be added to FBCH.
ST 38	NMUSA, Phase 3	NA	North Post	111,000 (divided among Phases 2-4)	Included in ST 18	Included in ST 18	30	Construction of NMUSA facilities would continue under this project (see also ST 17, 18, 27, 34, and 41).

Project # on Figures 2-4 to 2-7	Project Name	Project Number	Location	Building size (square feet)	Disturbed Area (acres)	Impervious Surface (net acres)	Added Personnel	Status/Comments
ST 39	Multipurpose Fields	NA	South Post	NA	1.9	0.36	0	This project would build new recreational facilities in the Town Center area, including tennis courts, a basketball court, and a little league/softball field.
ST 40	DLA Parking Garage	80437	North Post	700,000	1.2	0	0	Two multi-story parking structures with a capacity of 1,650 parking spaces would be built on the existing DLA parking lot. The parking structures would make space available to build ST 52, DLA Administrative Center.
FY 2017 Construction								
ST 41	NMUSA, Phase 4	NA	North Post	111,000 (divided among Phases 2-4)	Included in ST 18	Included in ST 18	30	The final phase of NMUSA would be built under this project (see also ST 17, 18, 27, 34, 38).
ST 42	Unaccompanied Enlisted Personnel Barracks	64270	North Post	103,960	0.6	0	200	A barracks and operations facility would be built to house 240 enlisted personnel realigned by BRAC 2005 from Walter Reed Army Medical Center to FBCH. The facility would not include a dining hall.
ST 43	OSEG Training Compound	69249	DAAF	96,000	9.5	4	200	A permanent compound for OSEG training and operations would be built to replace temporary facilities on North Post.
ST 44	Baseball Field Replacement	64148	South Post	NA	0.9	0	0	This project would replace a baseball field that would be demolished to widen US Route 1. It would be located next to two existing baseball fields.
ST 45	Secure Administrative Facility	76378	South Post	107,193	3.8	0.35	300	An administrative building and parking structure would be built near the intersection of Gunston Road and 5th Street.
ST 46	INSCOM HQ Expansion, Phase 4	77905	North Post	Renovation only	Included in ST 19	Included in ST 19	946	The existing INSCOM HQ building would be renovated under the final phase of this project (see also ST 19, 26, and 33).
ST 47	Religious Education Center	65746	North Post	18,093	1.1	1.0	20	A facility with worship assembly area, classrooms, and offices would be built between the Woodlawn Chapel and Woodlawn Road.

Project # on Figures 2-4 to 2-7	Project Name	Project Number	Location	Building size (square feet)	Disturbed Area (acres)	Impervious Surface (net acres)	Added Personnel	Status/Comments
ST 48	INSCOM Controlled Humidity Warehouse	80247	South Post	57,116	1.24	0	25	The project would provide a warehouse with a climate-controlled environment for Fort Belvoir tenants engaged in intelligence-gathering activities. The facility would be built near the intersection of Theote Road and 16th Street.
ST 49	911th Engineering Company Operations Complex	70935	North Post	39,810	6.8	1.0	110	A medium-duty tactical equipment maintenance complex with integrated company operations administrative space would be built between Accotink Village and Fairfax County Parkway.
ST 50	Vehicle Maintenance Shop	50356	South Post	25,565	6.2	-2.3	25	The existing motor pool on 16th Street would be redeveloped by demolishing existing shops and pavement and building new, general-purpose equipment maintenance facilities and pavement.
ST 51	Information Systems Facility for the Network Enterprise Center (NEC)	80305	South Post	75,000	0.9	0.3	200	A new data center would be built on Warren Road near the Fort Belvoir Residential Historic District.
ST 52	DLA Administrative Center	74314	North Post	267,000	3.9	0	1,000	A general purpose HQ facility for DLA and Defense Energy Support Center operations would be built on an existing parking lot.
TOTAL	**All ST Projects**			**3,482,138**	**275.3**	**88.7**		
2012 - 2017 Incremental Growth of Existing Agencies							455	Estimated growth, in the short-term, of existing agencies. This can vary based upon agency mission requirements.
TOTAL	**All ST Projects and Organic Growth**						**4,755**	

Note:
1. In August 2014, Mulligan Road was dedicated by Fairfax County as Jeff Todd Way.

Each of the projects listed in Table 2-2 is described in the following sections to the extent that the project has been defined or designed. Many of the proposed sites have been disturbed in the past and still include pavement and buildings that would be demolished. To evaluate the impacts of projects without site plans, based on the experience of the Fort Belvoir Directorate of Public Works (DPW) Facilities Planning Division, the disturbed area was assumed to be 80 percent of the total project site. Further, the impervious surface was assumed to be 60 percent of the project site with any existing impervious surface, in the form of old buildings or pavement, deducted from the total. As a result, some of the projects, which would be entirely built on impervious surfaces such as parking lots, would result in zero increase in impervious surfaces.

The projects are sorted by fiscal year. Federal government fiscal years begin October 1 and end September 30. A fiscal year is designated by the calendar year in which it ends; for example, fiscal year 2013 began on 1 October, 2012 and ends on 30 September, 2013. Projects are to be ready for immediate advertisement for construction (design-build or design bid-build) as soon as the fiscal year begins (or when the authorization and appropriation process is completed and respective bills signed into law). For purposes of this EIS, it is assumed that project construction commences at the beginning of the fiscal year and is completed within the same fiscal year.

2.1.4.1 Fiscal Year 2012 Projects

ST 1 – Post Exchange

AAFES has built a new 270,000-square foot PX, and the Defense Commissary Agency has plans for a 132,000-square foot Commissary (see ST 28) at Fort Belvoir as part of the North Post Community Support Center area. This area would also include future community-mixed-use and residential development. The purpose of replacing the former PX (and existing Commissary) is to provide customers with upgraded facilities offering a wider variety of merchandise, services and amenities that would ultimately provide Soldiers, Families, military retirees and eligible civilian personnel with a destination for shopping, dining and social activities. The previous and existing facilities cannot meet the future demands. It is anticipated that the new PX and Commissary would continue to be the central focus of the Upper North Post Community Support area. This would enable additional future development to build upon the services and amenities provided by the PX and Commissary, thereby creating an enhanced Community Support area.

The new PX opened in June 2013 on North Post between the old PX and John J. Kingman Road, in an area designated for Community land use. The new one-story PX facility is used by active-duty military personnel, eligible family members and civilians, and area retirees. The new facility represents a 17 percent increase over the total floor space of the old PX and consolidates the former Home and Garden Center (69,220 square feet) and Military Clothing Sales Store (10,419 square feet), which were previously located on South Post. The new PX is certified Silver by the Leadership in Energy and Environmental Design (LEED) classification system.

Parking for the new PX has been provided according to Fairfax County guidelines of four spaces per 1,000 square feet of retail sales space, or approximately 1,000 parking spaces. The total developed area of the new PX encompasses approximately 35 acres. This includes associated surface parking areas, sidewalks, access roads, and electric, telecommunications, water, and sanitary sewer utilities. The former PX has been demolished by the Defense Commissary Agency to make way for construction of the new Commissary (see ST 16 and 28).

An EA prepared for the Community Support Center Development, inclusive of the PX, Commissary, and future mixed-use development area, determined that no significant impacts on human health or the environment would result from the proposed action and a FNSI was issued with the Final EA in September 2010 (US Army, 2010b, 2010c).

ST 2 – Privatized Army Lodging – East of Belvoir Road Circle

The PAL program is in response to the Military Housing Privatization Initiative established in the 1996 Defense Authorization Act and is an effort to improve facilities and services for travelers. Under the initiative, the Army is authorized to obtain private capital by leveraging government contributions, making efficient use of limited resources and using a variety of private-sector approaches to build, renovate, and operate lodging. This project, which is under construction, is building a privatized 141-room Army lodging facility on South Post on an approximately 6-acre parcel east of the Belvoir Road Circle and north of Building 1200 (Gerber Hall), which houses the Fort Belvoir Community Center. Approximately one-third of the site is occupied by the northern portion of the paved parking lot associated with the Community Center. The remainder of the site is composed of a wooded area, which likely was disturbed for construction many decades ago of the Gray's Hill Village housing area, since demolished. Implementation of the PAL program at Fort Belvoir was evaluated in a 2010 EA (US Army, 2010e), which resulted in a FNSI that was signed in July 2011 (US Army, 2011i). ST 2 was specifically addressed in a second EA published in July 2012 (US Army, 2012b). The FNSI was signed in January 2013 (US Army, 2013a).

ST 3 – National Intrepid Center of Excellence

The NICoE project opened a 50-room, 18,074-square-foot outpatient treatment facility on South Post in July 2013. The facility is located along the north side of 9th Street near its intersection with Gunston Road. NICoE is a DoD institute, headquartered at Walter Reed Military Medical Center in Bethesda, Maryland. The center provides evaluation, treatment planning, research, and education for active-duty service members and their families dealing with mild traumatic brain injury and post-traumatic stress disorders. The facility's location is immediately west of Buildings 1261 and 1263, which are part of the Wounded Warrior Complex, and south of FBCH. This location allows for convenient treatment of Soldiers undergoing other forms of rehabilitative therapy at nearby facilities. A REC was signed for this project in May 2012 (US Army, 2012a).

ST 4 – Mulligan Road Phase II

Mulligan Road/Jeff Todd Way

In August 2014, Fairfax County officially dedicated as "Jeff Todd Way" the facility known until then as "Mulligan Road." Because most of the EIS was completed before the new roadway's dedication, "Mulligan Road" is used throughout this document to refer to Jeff Todd Way.

Construction of this project was largely completed in August 2014. The new, recently-opened four-lane Mulligan Road connects US Route 1 to Telegraph Road with an alignment through North Post. Construction of Mulligan Road was undertaken primarily to mitigate Fort Belvoir's closure of Beulah Street and Woodlawn Road, which carried substantial amounts of vehicular traffic between Telegraph Road and US Route 1 before the closure of those roads to civilian traffic following the September 11, 2001 terrorist attacks. Until the new road was opened in August 2014, the only alternative available to civilian motorists for travel between Telegraph Road and US Route 1 in the vicinity of Fort Belvoir has been the Fairfax County Parkway. This has resulted in greater congestion and increased travel times.

Mulligan Road traverses a heavily-wooded area on North Post between the Woodlawn Village housing area to the east and the Aerospace Data Facility-East to the west. Approximately one mile of the road's northernmost stretch crosses HEC. Approximately 32 acres have been cleared and graded for roadbed and associated infrastructure along the road's approximately 1.6-mile-long primary right-of-way. Mulligan Road is a four-lane facility with 12-foot-wide travel lanes and a 16-foot median. A paved shared-use path for pedestrians and bicyclists runs parallel to the roadway along its entire length. The total width of the facility is 97 feet. New bridges carry the roadway over John J. Kingman Road and Piney Run.

The work included widening Telegraph Road from two lanes to four between Beulah Street and Leaf Road; building a bridge to carry Telegraph Road over Piney Run; and upgrading the Telegraph Road-Mulligan Road intersection. The work also included widening Old Mill Road from two to four lanes between Pole Road and US Route 1 to match Mulligan Road's four-lane right-of-way, and the realignment of the Old Mill Road/Mount Vernon Memorial Highway/US Route 1 intersection. This improves the alignment of the Old Mill Road and Mount Vernon Memorial Highway right-of-ways, which have been offset from one another on either side of US Route 1, creating an awkward and potentially dangerous condition at this intersection.

The construction of Mulligan Road was evaluated in an EA prepared by the US Department of Transportation's (USDOT) Federal Highway Administration (FHWA), Eastern Federal Lands Highway Division in 2006. A FNSI was issued in 2007 (USDOT, 2007).

ST 5 – Fisher House 1

Fisher Houses are comfort homes built by the Fisher House Foundation, which provides free or low cost lodging to veterans and military families receiving treatment at military medical centers. Fisher House 1 on South Post, east of Belvoir Road near Pence Gate, opened in May 2012. The facility is maintained by the Army and provides a temporary residence and support facility for extended stays to service men and women and their families receiving care at the FBCH.

Fisher House 1 consists of a 10,000-square foot single-story brick residential housing structure with 12 bedrooms/suites and an associated common use area (kitchen, dining area, etc.). The total project site area covers approximately 1.8 acres and includes the Fisher House, driveways, and a paved parking lot. The site was previously disturbed and park-like, covered with an open tree canopy and grass. A REC was completed for this project in June 2011 (US Army, 2011g).

ST 6 – United Service Organizations Wounded Warrior and Family Center

The USO Wounded Warrior and Family Center opened in February 2013. The facility is located on the northwest corner of the intersection of Belvoir Road and 9th Street, just south of the FBCH. The center is a 25,000-square foot facility offering programs, community services, and recreational spaces for wounded, ill, and injured service members, their families, caregivers, and support staff at Fort Belvoir. The facility is a stand-alone building with common use areas, specialty rooms such as a learning center, theater, gaming room, music room, and sports lounge, as well as outdoor healing and therapeutic garden areas. The site previously included mostly paved areas, including five tennis courts and a paved parking lot, as well as some smaller areas of maintained lawn and a few trees. A REC was completed for this project in February 2011 (US Army, 2011f).

ST 7 – Expansion of the Davison Army Airfield Fire Station

A 4,050-square foot, one-story addition is being added to the existing fire station, Building 3242, at DAAF. The purpose of the expansion, which is under construction, is to accommodate the additional apparatus and fire fighters needed to provide adequate fire prevention and protection for the increase in personnel and facilities at the airfield following implementation of the BRAC 2005 realignment. The project would support an increase in fire department personnel at the station from two to three companies. The addition is being built across the front of the fire station (the side of the building facing Gavin Road) in order to minimize disturbance to buried utility lines elsewhere on the fire station property. The addition would extend the length of the fire equipment bays in order to accommodate additional and larger equipment, and would enlarge the living and sleeping quarters for personnel assigned to the station. A REC was signed for this project in September 2010 (US Army, 2010a).

ST 8 – Child Development Center 144

Construction of a 13,020-square-foot child development center with a capacity of 144 children was completed in May 2012. The facility is located west of the Woodlawn housing area on North Post between Woodlawn and Franklin Roads. The new child development center provides care for the children of personnel assigned to Fort Belvoir, including active-duty military and eligible civilian employees. The facility includes an entrance/reception area, administrative area, staff lounge/work room, full commercial kitchen, laundry, isolation room, child activity rooms, storage and supply rooms, janitor closet, adult and children's restrooms, and a 6,510-square foot fenced outdoor play area with shade structures. Site improvements include sidewalks, curbs and gutters, paving, and stormwater management.

Prior to development, the site consisted of grass, scrub brush, scattered saplings, and small trees. Overhead utility lines running parallel to Woodlawn Road cross the eastern side of the site. A REC was completed for this project in June 2009 (US Army, 2009a).

ST 9 – Family Travel Camp Phase 1

In May 2013, Fort Belvoir's Directorate of Morale, Welfare, and Recreation (MWR) opened Phase 1 of a family travel camp in the Tompkins Basin area of South Post. The need for the project arose because of a lack of such recreational facilities for military forces within or near the National Capital Region. The travel camp is for use by active duty military personnel, their families, retirees, and other authorized users.

The 9.64-acre Phase 1 site, located along Johnston Road near its intersection with Morrow Road, provides the following amenities:

- 52 recreational vehicle (RV) campsites
- 12 tent camping pads with parking
- Retail store/check-in facility with parking
- Shower house with laundry facility
- Central parking area next to the shower
- Two campfire pits
- Two picnic shelters
- Two playgrounds
- Internal gravel trails
- Connections to existing water, sewer, and other utilities
- Exterior lighting

The 52-space recreational vehicle camping area consists of 30 back-in sites and 22 pull-through sites. Each camping space has concrete vehicle and picnic pads, water, sewer, electric, phone, and communication hook-ups. The site also includes a camp support facility with laundry room, campers' lounge space, restrooms/showers, children's playgrounds, and vending machine space. The tent camping area is located in the woods adjacent to the recreational vehicle park and includes tent setup areas, tables and grills, water hook-ups, and vehicle parking spaces.

The project included the reconfiguration of Johnston Road to maximize the number of recreational vehicle pads and provide better internal traffic circulation, as well as an extension of Morrow Road with a parking lot and turn-around area. About half of the site was cleared of buildings in the past, and in that area, about half was covered with grass and half with old pavement. The remainder of the site was wooded; approximately 4.2 acres of forest was cleared for the recreational vehicle campsites and support buildings.

An EA was prepared for this project in November 2010 (US Army, 2010f), and a FNSI was issued in October 2011 (US Army, 2011a).

ST 10 – Water and Wastewater Utility Upgrades

The US Army awarded a utility privatization contract to American Water Operations and Maintenance, Inc. (American Water) for the water and wastewater infrastructure at Fort Belvoir, Virginia in September 2009. Under a 50-year lease, American Water assumed ownership and maintenance of the potable water distribution and wastewater collection systems at Fort Belvoir. Under the terms of the contract, American

Water is required to initially replace all system components of a certain age and implement a life-cycle-based replacement program, in addition to performing operation and general maintenance activities. An EA was prepared to address the program elements for replacement of infrastructure that may impact natural and cultural resources on the installation. A FNSI was issued in September 2013 (US Army, 2013c). The various infrastructure projects that were evaluated in the EA are being constructed under ST 10.

2.1.4.2 Fiscal Year 2013 Projects

ST 11 – Child Development Center 1

This is one of two modular, 10,640-square foot child development centers, each with a capacity of 124 children, which is under construction on FBNA. The facility would be built near the NGA and would provide daycare services for children of active-duty military personnel and eligible civilian employees. The child development center would include child care, administrative, and storage spaces, an adjacent playground approximately 12,400 square feet in size, and all required supporting facilities. One parking lot would serve both child development centers. The site was previously disturbed and has been cleared and graded in the past. The impacts of this project and ST 12 were addressed in the BRAC EIS (US Army, 2007a).

ST 12 – Child Development Center 2

This is the second FBNA child development centers (see ST 11), which is under construction adjacent to ST 11 on FBNA. The size and other characteristics of the two child development centers are the same.

ST 13 – Access Road and Control Point – Lieber Gate

The new Lieber Gate (shown in Figure 2-8) is intended to provide direct access from US Route 1 to North Post through a new access control point, including new gate and access road, which would meet current DoD and Army anti-terrorism/force protection standards. The old Lieber Gate (off US Route 1 on Constitution Road) has been closed since the terrorist attacks of September 11, 2001 because of its inadequate configuration. As a result, there is currently no direct access from US Route 1to North Post.

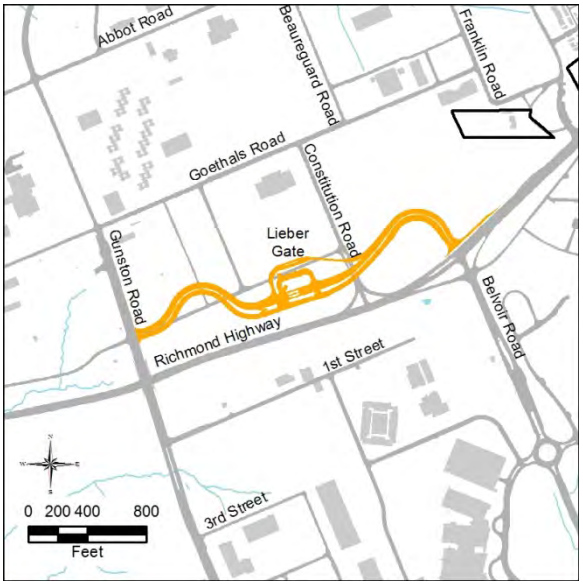


Figure 2-8 Proposed Lieber Gate

Structures and equipment to be built as part of the project include:

- 840-square foot gatehouse
- 660-square foot search building
- Search area shelter
- Two 3,120-square foot vehicle inspection canopies
- Guard booths
- Over-watch station
- Identification check canopy

The new facilities would be located upon a new access roadway connecting US Route 1 to Gunston Road. Other associated facilities and structures would include: passive vehicle guardrail, traffic control devices, lighting, pedestrian turnstiles, traffic signal, intrusion detection and closed circuit television systems, diesel

generator and switchgear, uninterruptible power supply, active vehicle barriers, sidewalks, and building information systems.

The new gate would be connected to existing electrical, water, and sanitary sewer utility systems serving the post. The impacts of this project were addressed in the BRAC EIS (US Army, 2007a). Construction is expected to begin in late 2014.

ST 14 – Regional Stormwater Management Facility

A regional (serving more than one existing or future facility) stormwater management facility would be located in the South Post Industrial Area on an approximately 2.9-acre site along the east side of Theote Road, north of 16th Street. The facility would provide stormwater detention/retention capacity for runoff from nearby existing and new facilities. Detailed plans have not yet been developed, and it has not been determined whether the facility would be at the surface or underground. Based on previously-completed engineering and soils testing it has been determined that remediation is required before the site can be developed.

ST 15 – Army and Air Force Exchange Service Car Wash

An AAFES car wash facility would be built 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 overall area of the new facility would be approximately 3,750 square feet, with the car wash building occupying approximately 1,350 square feet. The car wash would be equipped with a water reclamation system that would recycle approximately 54 gallons of water per car wash. The peak operating rate for the facility would be 12 to 15 cars per hour. A REC was completed for this project in November 2011 (US Army, 2011f).

ST 16 – Post Exchange Demolition

The former, 141,970-square foot PX (see ST 1 above) has been demolished to allow for the construction of the new Commissary (see ST 28 below). The demolition of the former PX was included in the EA prepared for the Community Support Center Development, which also evaluated the new PX, proposed Commissary, and future mixed use development area (US Army, 2010b). The EA determined that no significant impacts on human health or the environment would result from the proposed action, and a FNSI was issued with the EA (US Army, 2010c).

ST 17 – 36-Hole Golf Course Reconfiguration to Accommodate the National Museum of the US Army

This project would reconfigure the North Post 36-hole golf course in order to accommodate the construction of NMUSA (see ST 18, 27, 34, 38, and 41). Development of the museum site would eliminate five existing holes and a portion of a sixth, all in the southeastern part of the golf course. Replacement of the holes would be necessary to retain the continuity and availability of two separate 18-hole courses at any given time as well as to maintain nine-hole course continuity throughout the course. The lost holes would be replaced within the extent of the existing golf course. To accomplish the proposed reconfiguration, several existing holes would undergo alterations to include a combination of widening, lengthening, and/or regrading to support new teeboxes or stabilize slopes.

The areas where the alterations would take place currently consist of trees, shrubs, grassed fairway and rough areas, and paved cart paths. This project would clear and grade 33.8 acres of the existing golf course to accommodate the new holes. Existing golf cart paths would be removed and new ones built. The net impervious surface when the reconfiguration is complete would total 1.3 acres. Other elements of the proposed reconfiguration would include extension of the irrigation system to the new holes, course drainage system, and erosion control devices (US Army, 2010d; Stellar Architectural and Engineering Group, 2013).

Environmental effects resulting from reconfiguration of the golf course to accommodate the NMUSA were evaluated in the NMUSA EA prepared in September 2010 (US Army, 2010d).

ST 18 – National Museum of the US Army Roads and Infrastructure Improvements

The roads, parking lots, and other infrastructure improvements associated with the NMUSA (see ST 27, 34, 38, and 41) would be constructed under this project. The project area is located north of the Fairfax County Parkway and east of John J. Kingman Road. It currently consists of densely wooded areas as well as tee boxes, fairways, and greens associated with six holes of the 36-hole North Post golf course.

The site is not served by water, sanitary sewer, gas, electrical, or information systems. Existing roads do not provide adequate access and are of insufficient capacity to support NMUSA construction or projected visitation.

The proposed improvements would include the construction of new roadway surfaces for the NMUSA access road and parking lots (US Army, 2010d), including:

- Drop-off and Arrival Plaza – A 0.5-acre area for passenger drop-off.
- Parking – Up to 5.7 acres of parking for visitors and volunteers (approximately 500 to 550 spaces to be built in Phase 1) as well as employees (75 spaces).
- Bus and Recreational Vehicle Parking - Up to 0.9 acres of surface parking for larger vehicles (40 spaces).
- Entrance and Access Road (including an approximately 1,900-linear-foot section of the Fairfax County Parkway) – Construction of an entrance and access road to the NMUSA from a point on the Fairfax County Parkway approximately 600 feet east of Ehlers Road. Associated modifications would require approximately 0.7 acres of land for the new lanes and shoulders as well as the clearing of an additional 1.3 acres.
- Main Entrance and Service Entrance – The main entrance would be open to the public during operating hours while being controlled access at other times or during periods of heightened alert. A roadway would branch from the access road near the entrance to the site to provide a service entrance for employees and delivery vehicles. The service entrance road would have controlled access at all times.

New utility lines would be extended to provide natural gas, electricity, water, and sewer service to the site, requiring the excavation of approximately 113,088 cubic yards of soil. Approximately 103,651 cubic yards of the excavated material would be reused on the site as backfill, while the remainder would be disposed of off-site.

The impacts of the road and infrastructure improvements were evaluated in the NMUSA EA (US Army, 2010d).

ST 19 – US Army Intelligence and Security Command Headquarters Expansion, Phase 1

INSCOM proposes to renovate and expand its headquarters facilities on North Post. INSCOM HQ, also known as the Nolan Building, is located on a 26-acre fenced site bounded by John J. Kingman Road to the north, Beulah Street to the west, and the Fort Belvoir Forest and Wildlife Corridor (FWC) to the south and east.

The purpose of the proposed action is to provide increased space for personnel and equipment performing INSCOM intelligence missions. The need for the project is to consolidate headquarters personnel now located in commercial rental space off of Fort Belvoir or in other facilities on Fort Belvoir to increase security and efficiency; provide increased and more flexible space for personnel and equipment performing

headquarters intelligence missions to relieve current overcrowding; and ensure that the facilities meet current anti-terrorism/force protection standards. Implementing the Proposed Action would add approximately 890 workers to the INSCOM building, increasing workers from approximately 1,650 to a total of approximately 2,540. Personnel to be relocated are currently in leased space about four miles from Fort Belvoir in Springfield, Virginia or working on Fort Belvoir in three different buildings. The new space would accommodate 80 full-time personnel in the future as INSCOM's mission expands. The Proposed Action would also accommodate personnel who attend training and conferences at INSCOM HQ.

The renovation and expansion would take place in four phases:

- Phase 1 (ST 19): Under construction is a five-story parking structure with up to 1,420 spaces, access roads, sidewalks, a stormwater retention pond, retaining walls (along the north side of the proposed parking structure and around the retention pond), and reconfiguring existing surface parking areas and landscaping. During construction, about half the existing surface parking area between the Nolan Building and the proposed parking structure is needed for staging construction equipment and materials. INSCOM is building a temporary parking area onsite (on landscaped areas north and west of the Nolan Building), and the post would provide temporary parking at other locations on the post to compensate for lost spaces. Shuttle buses are ferrying employees between these parking areas and the Nolan Building.

  Phase 1 also includes construction of a central utility building located with the proposed new parking garage; a construction entrance; installation of traffic control devices within the INSCOM HQ roadway network, as needed; reconfiguration of the main entrance road; demolition of site features such as the parking area where the proposed parking structure would be located and curbs and gutters as needed to provide construction access.

- Phase 2 (ST 26): Construct two basement levels and the ground level for a new addition to the Nolan Building, totaling 188,000 square feet.

- Phase 3 (ST 33): Construct three more levels (approximately 194,000 square feet) of the building addition.

- Phase 4 (ST 46): Renovate the existing 234,000-square-foot Nolan Building and complete any remaining site work.

Site work such as reconfiguring and reconstructing the surface parking lots, landscaping, roadways, sidewalks, utilities and stormwater BMPs would proceed as needed during all four phases. A turning lane would be constructed on Beulah Street from the site entrance to John J. Kingman Road during Phase 1 to accommodate traffic as workers are moved from leased space off-post and other parts of the post to the site. The long-term reconfiguration of the surface parking lots at INSCOM HQ would result in 2,006 parking spaces onsite, including 1,524 employee, 446 visitor and student, and 36 government surface parking spaces.

The new/renovated building would receive emergency back-up power from two new energy efficient 2,250-kilowatt generators (most likely employing Open Loop Selective Catalytic Reduction), with one generator to be installed during Phase I and one generator installed as part of Phase 2. In addition, the generators providing back-up power for the existing Nolan Building would be replaced with Open Loop Selective Catalytic Reduction or similarly-efficient generators during Phases 3 and 4 of the project. The generators for the new building would be located in the new central utility building to be co-located with the proposed parking structure.

Environmental effects resulting from renovating and expanding INSCOM HQ were evaluated in an EA (US Army, 2012e) and the FNSI was signed in November 2012 (US Army, 2012f).

ST 20 – Replacement of the South Post Fire Station

A new, two-company satellite fire station is being built on South Post to replace the existing station, located in Building 191. The existing station is in poor condition, undersized, not suited to support modern firefighting operations, and inadequate for the provision of fire protection for the buildings located on South Post. The new fire station would stand on the north side of 16th Street near its intersection with Gunston Road, across the street from the current station. The site is approximately one acre and has been previously developed; it consists mostly of paved areas, with a small area of maintained lawn and trees.

The existing fire station and the site for the replacement fire station are located within the Fort Belvoir Historic District. Building 191 would be repurposed as a 911 communications center. The new fire station would be designed to be compatible with Fort Belvoir Historic District architecture.

The new station would include the following standard design features for Army fire stations:

- Drive-through structural apparatus bays
- Watch/alarm
- Emergency medical services/ decontamination facilities
- Wet and dry chemical extinguisher rooms
- Dormitory rooms
- Training and physical training rooms
- Kitchen equipment storage
- Offices
- Mechanical and electrical/uninterruptable power supply rooms
- Fire alarm and suppression systems
- Standby generator
- Building information systems

Site improvements would consist of an access road, paving, curbs and gutters, storm drainage, and parking. Administrative areas of the new fire station would be handicapped-accessible, and the facility's design would incorporate anti-terrorism/force protection measures. A REC was completed for replacement of the South Post Fire Station in October 2011 (US Army, 2011b).

ST 21 – Army and Air Force Exchange Service Car Care Center

Under this project, AAFES would build an approximately 9,000-square foot car care center that would include 10 service bays and 25 to 30 parking spaces. The facility would be located on an approximately 1.5-acre site in the southwest corner of the parking area of the former PX, near the intersection of Gorgas and Stonewall Jackson Roads on North Post. A REC was completed for this project in October 2010 (US Army, 2010g).

ST 22 – Pet Care Center

A new family pet care facility is planned for construction on South Post on a disturbed triangle of land adjacent to Buildings 629 and 630 along Warren Road. The project is needed to meet the growing demand for kennel space from active duty personnel, military family members, authorized DoD civilians, and other personnel assigned to Fort Belvoir who require short-term day boarding for their pets. There are no similar military facilities within a short driving distance of Fort Belvoir, and commercial facilities are expensive and in high demand.

The new 5,100-square foot pet care center would include 24 indoor and outdoor dog-boarding runs, a 3,900-square foot fenced outdoor run area, 15 catteries, a customer service area, office space, supply storage space, space for the storage and preparation for pet meals, retail space, and pet grooming areas. Associated site improvements would consist of sidewalks, service and access roads, a parking area for staff and patrons, exterior lighting, and stormwater management devices. A REC was completed for this project in January 2013 (US Army, 2013b).

ST 23 – National Geospatial-Intelligence Agency Canine Training/Rest Facility

A rest and training facility for NGA's working dogs would be built on a previously-disturbed grassed site designated as a utilities easement at the FBNA. The facility, close to the NGA truck inspection facility, would consist of a 1,200-square foot building with an administrative area; dog kennels with runs; and an open, fenced area for canine exercise. A REC was completed for this project in August 2012 (US Army, 2012h).

ST 24 – Fairfax County School Expansion

Fairfax County Public Schools submitted a grant application to the federal Office of Economic Adjustment in September 2013 to fund construction of a new elementary school on-post. This project would build a new Fairfax County public school on North Post adjacent to the existing 1,200-student Fort Belvoir Elementary School. The proposed two-story school would accommodate a design capacity of 492 students and 82 or more staff members. The 4.5-acre site for the new school, located on the northeast corner of the Meeres Road/Woodlawn Road intersection, is level and covered by grass because it is used by the existing elementary school for school-related recreational activities. To replace the recreational field that would be lost through construction of the new school, approximately two acres of new/improved playing fields for both schools would be built, immediately north of the existing elementary school site as part of ST 24. The new/improved playing fields would include baseball and soccer fields, as well as paved play areas immediately north of the new elementary school building. An EA has been prepared for this project and a FNSI was issued in August 2014.

2.1.4.3 Fiscal Year 2014 Projects

ST 25 – Name Brand Casual Dining Restaurant

This project provides for the construction of a casual dining restaurant – Old Chicago – on North Post as part of the reconfiguration of the PX/Commissary site on the north side of Gorgas Road, just east of Gunston Road (see ST 1 and 28). The approximately 6,500-square foot restaurant building plus associated walkways and landscaping would be built on an approximately 8,700-square foot site used as a parking lot for the former PX and existing Commissary. Parking would be provided in the future Commissary parking lot.

ST 26 – US Army Intelligence and Security Command Headquarters Expansion, Phase 2, Sensitive Compartmented Information Facility

Phase 2 of the four-phase project to renovate and expand INSCOM HQ (see ST 19) would construct two basement levels and the ground level for a new addition to the Nolan Building, totaling 188,000 square feet. The construction would include a sensitive compartmented intelligence facility, administrative areas, specialized operations space, special equipment storage, a server room, and a generator.

ST 27 – National Museum of the US Army, Phase 1

The NMUSA project would provide the American public with a museum documenting the 235-year history of the US Army and act as a focal point for managing the Army's valuable collections of artifacts. The museum would be located adjacent to the western side of the existing 36-hole Fort Belvoir Golf Course on North Post, just north of the John J. Kingman and Fairfax County Parkway intersection.

Construction of NMUSA would occur in four phases. Elements of the proposed museum are not locked into specific phases; the schedule for constructing these elements may change depending on fundraising for the museum. Reconfiguration of the 36-hole golf course (ST 17) and construction of road and infrastructure improvements (ST 18) would occur in advance of the start of museum construction. Subsequent phases of this project are described under ST 34, 38, and 41.

The elements for the initial phase of construction would likely include:

- Main Museum Building – An approximately 3.6-acre multi-story building with exhibit halls, a theater, a Veterans' Hall, food service areas, retail areas, administrative spaces, an experiential learning center, and a lobby with a visitor reception area.
- Armored Tank Simulator – On a 2,000-square foot pad.
- Memorial Garden – A contemplative 1.3-acre area to honor the service and sacrifices of US Army Soldiers, veterans, civilians, and their Families.
- Parade Ground and Grandstand – Consisting of approximately 4 acres.
- Amphitheater – A 6,700-square-foot staging and production venue providing a smaller, more intimate environment than the North Post parade ground (adjacent to US Route 1).
- Education, Survival, and Interpretive Trail – A trail 3,000 feet long and 6 feet wide, equipped with a small (2,700-square foot) comfort station, to provide an additional venue for outdoor education.
- Small Powder Storage Building – A 2,000-square-foot building for temporary storage of powder for the ceremonial cannon and other reenactment weapons used in displays and ceremonies on the parade ground.

An EA was prepared to evaluate the impacts of the construction of the NMUSA (US Army, 2010d), and a FNSI was issued in 2011 (US Army, 2011h).

ST 28 – Main Post Commissary

The Defense Commissary Agency would construct a new, 132,000-square foot Commissary on an approximately 21.5-acre site on North Post adjacent to the new PX, which was completed in June 2013 (see ST 1). Construction is expected to begin in fiscal year 2015. The proposed site is currently the location of the former PX, which has been demolished (see ST 16). The new Commissary would represent a 13 percent (17,000-foot) increase in size over the existing Commissary. Parking would be shared with the new PX and would be designed consistent with Fairfax County guidelines, as described for ST 1. Some of the existing parking associated with the existing Commissary may be reused.

The environmental impacts of this project were evaluated in the EA prepared in 2010 for the Community Support Center Development, which included the construction of the new PX and Commissary, demolition of the old PX, and future mixed use development (US Army, 2010b). A FNSI was issued (US Army, 2010c).

ST 29 – Defense Logistics Agency Visitor Control Center

A new visitor control center would be built to serve the DLA campus on North Post. Currently there is no control center at the access control point entering the secure DLA compound. Rather, visitors are processed through the guard check point at the access control point and directed to park in a visitor parking area, where they are vetted at the in-out processing station at the main building entrance. The current situation poses a security risk.

The new visitor control center would be located on the south side of John J. Kingman Road just west of the existing driveway entrance to the main parking area serving the DLA campus. Currently, the site consists of a landscaped area with maintained lawn, shrubs, and trees. The site was previously disturbed during construction of the DLA facility and its associated parking lots.

The proposed 2,960-square-foot control center building would be served by water, sewer, and electrical utilities. The project would include a short access road from the existing entry driveway and a small parking lot. The building space would include a waiting area, service counter, general office space, restrooms, and mechanical space. Heating and air conditioning would be provided by self-contained systems. Two

prefabricated over-watch booths would be installed at access control points. Utility excavation would include approximately 250 linear feet for direct burial of 600-volt electrical service; 150 linear feet of 6-inch sanitary sewer; and 275 linear feet of natural gas supply line. Site work for the project would include the following: site preparation; an access roadway requiring 4,950 square feet of pavement; passive and active vehicle barriers with comprehensive control systems; 1,650 linear feet of curbs and gutters; existing main compound entrance road modifications; parking for 20 vehicles on 10,350 square feet of pavement; and lighting, perimeter security fencing, traffic control signals, sidewalks, storm drainage, landscaping, and signage. Overall, the project would require an estimated 500 cubic yards of cut and fill. A REC was completed for this project in October 2012 (US Army, 2012g).

ST 30 – Fisher House 2

This project would be built directly north of Fisher House 1. The building would be identical to Fisher House 1, with details as described for ST 5.

ST 31 – Family Travel Camp, Phase 2

Phase 1 of the family travel camp on South Post was described under ST 9. Phase 2 would be built on a cleared, previously disturbed site along the west side of Morrow Road approximately one-quarter mile north of the Phase 1 recreational vehicle site. The facility would include 15 pre-fabricated rustic cabins, a picnic shelter, and a campfire pit. Each cabin would have two bedrooms, a bathroom, kitchen space, and a living room, as well as water, sanitary sewer, electrical utilities, and vehicle parking. Site improvements would include paved circulation roads, walking paths, landscaping, street and site lighting, utility upgrades, and stormwater management devices. An EA was prepared for this project in November 2010 (US Army, 2010f), and a FNSI was issued in October 2011 (US Army, 2011a).

2.1.4.4 Fiscal Year 2015 Projects

ST 32 – 249th Battalion Headquarters

The existing facilities for the 249th Battalion (Prime Power) at Fort Belvoir are functionally obsolete and lack adequate space for administrative, vehicle maintenance and parking, and storage uses. To remedy this situation, a new HQ complex would be built on South Post on a site along 16th Street between Theote and Dalrymple Roads. Currently used as the recreational vehicle storage lot, the site is generally level and largely composed of semi-pervious surfaces of packed gravel. A paved area approximately 0.3 acre in size is located at the northern end of the site.

Primary components of the HQ complex would include:

- An 18,000-square foot Battalion HQ building including a sensitive compartmented intelligence facility, operations center, network operations center, and classrooms.
- A two-company operations building totaling 24,394 square feet including training rooms, readiness modules, covered hardstand area, and loading/service areas.
- A 35,290-square foot vehicle maintenance complex, including maintenance bays, a 20-ton bridge crane, secure communications vault, laundry area, storage areas, and concrete maintenance aprons.

Each facility would be served by utilities consisting of heating, ventilation, and air conditioning, underground electrical grid, water and sanitary sewer, fire protection systems, communications systems, and intrusion detection systems. Facilities in the battalion HQ complex would also be connected to an energy management control system. Site preparations and improvements would include demolishing three buildings totaling 22,000 square feet; the extension of utilities and connections; and parking areas, access roads, sidewalks, site lighting, landscaping and site screening, stormwater management, and security fencing and gates.

ST 33 – US Army Intelligence and Security Command Headquarters Expansion, Phase 3

Phase 3 of this four-phase project to renovate and expand INSCOM's HQ includes constructing three more levels (approximately 194,000 square feet) of the building addition (see ST 19 and 26 for descriptions of the overall project and the first two phases). This part of the building would include the sensitive compartmented intelligence facility (built under ST 26), an administrative area, classrooms, a server room, a wellness center, a shower, and a cafeteria. For energy efficiency, approximately 30 percent of the new building would be equipped with a green roof, and another 30 percent with a roof top garden.

ST 34 – National Museum of the US Army, Phase 2

This project would continue the construction of the NMUSA begun under ST 27. Elements of the NMUSA are not locked into specific phases. See ST 27 for a complete description of the project and its associated components.

ST 35 – Retail Fuel Point

The proposed retail fuel point project would replace an obsolete facility originally built in 1934 (fuel storage tanks were replaced in 1995). The new, unattended facility would service federal General Services Administration and DoD vehicles. Fuels to be dispensed at the retail fuel point would include unleaded automotive fuel, diesel, E-85, and bio-diesel.

The facility would be located on South Post west of Theote Road and north of the Theote Road/Warren Road intersection. The proposed site is 2.78 acres in size and currently is wooded. It is located adjacent to the construction lay-down area that is used to store materials and equipment related to the construction and maintenance of on-post housing.

Primary elements of the proposed project would consist of:

- A 784-square foot fuel management building with office area.
- A 2,021-square foot canopy over the offloading and fillstand area.
- A 5,760-square foot canopy over the fuel dispensing pumps.
- Four underground fuel storage tanks ranging in size from 12,000 to 30,000 gallons.

Heating and cooling for the control building would be provided by a self-contained one-ton capacity unit. Other supporting facilities would include the following: electrical service, water, gas, wastewater and industrial waste systems, an access road, parking, sidewalks, curbs and gutters, a spill containment system, fire and safety notification and alarm systems, information systems, signage, a backup power generator, and landscaping. The stormwater management system would include a containment basin with piping, trench drains, and a bio-retention filter pond. The site would be fenced and gated.

2.1.4.5 Fiscal Year 2016 Projects

ST 36 – 29th Infantry Headquarters

A new HQ complex for the 29th Infantry Battalion would be built on North Post on a site on the southeast corner of the Gunston Road/Goethals Road intersection. The 9.2-acre site is currently occupied by facilities associated with the US Army Protective Services Battalion, and is used for the parking, maintenance, and storage of the Battalion's vehicles and equipment. The site is almost entirely paved and includes a 5,400-square foot garage/shop building that would be demolished.

The new 29th Infantry HQ facility would be similar in size and appearance to the nearby Office of the Chief, Army Reserve (OCAR) facility, located directly east of this site. That facility consists of one office building

three stories high, occupying a footprint of 33,258 square feet. Adjacent paved parking lots occupy an additional 2.7 acres.

ST 37 – Medical Office Building

The medical office building would be a 21,948-square foot addition to the southernmost wing of FBCH. The proposed location is a paved, below-grade area approximately one-quarter acre in size, currently used for receiving delivery trucks. The medical office building would be built above this receiving area and would match the height of the existing hospital (three stories). A 10,417-square foot central plant, including an estimated 65-ton air conditioning unit, would be built concurrently with the addition.

The medical office building would provide operational space for FBCH administrative functions that were either not programmed when the new hospital was designed or were later displaced due to competing spatial requirements. Specifically, FBCH is scheduled to receive approximately 1,200 additional staff and students from the Graduate Medical Education and Health Professionals Education programs as a result of the closure of Walter Reed Army Medical Center in Washington, DC. In its existing configuration, office and classroom space at FBCH is inadequate to accommodate these additional personnel. The new addition would also include operational space for the 60-person plant maintenance contractor work force, its wood/metal/plumbing workshop, and storage space for parts and supplies.

ST 38 – National Museum of the US Army, Phase 3

See ST 18, 27, 34 for a complete description of the NMUSA project and its associated infrastructure improvements.

ST 39 – Multipurpose Fields

Recreational facilities in the South Post Town Center would be expanded to incorporate three tennis courts, one basketball court, and one little league/women's softball-sized field. The new facilities would be built along the east side of Gunston Road between 14th and 15th Streets, and would be located adjacent to the existing playground and skateboard park. The project site is about 2.3 acres and is largely vacant, with the exception of an approximately 0.25-acre open storage lot and some urban trees.

ST 40 – Defense Logistics Agency Parking Garage

DLA, located on North Post, proposes to build two 350,000-square foot garages on its existing paved parking lot to make space available to build a new administrative building on the site (ST 52). The two multistory garages would accommodate 1,650 vehicles. The structures would be constructed of pre-cast concrete with an exterior finish to match surrounding administrative facilities. The new garages would include stairwells, elevators, security lighting, utility connections, fire protection systems and stormwater management.

2.1.4.6 Fiscal Year 2017 Projects

ST 41 – National Museum of the US Army, Phase 4

This is the final phase of NMUSA construction. See ST 18, 27, 34, and 38 for a complete description of the overall project and its associated components.

ST 42 – Unaccompanied Enlisted Personnel Barracks

New barracks would be constructed to house 240 single enlisted Soldiers assigned to Fort Belvoir. The proposed barracks would be 87,840 square feet in size plus a company operations building 16,120 square feet in size. Heating and air conditioning would be provided by connection to an existing plant. Supporting site improvements would include electrical service, area lighting, water and sanitary sewer lines, paving,

sidewalks, curbs and gutters, storm drainage, landscaping, and building information systems. The site is currently covered by tennis courts; 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.

ST 43 – Operational Security Evaluation Group Training Compound

A permanent replacement for the temporary OSEG training compound located on North Post would be built under this project. The new facility would be built on an approximately 9.5-acre site adjacent to DAAF, on the eastern corner of the Sanjer Drive/John J. Kingman Road intersection. The site is wooded and backs up onto Accotink Creek. The current Flood Insurance Rate Map shows the project site as being located within Accotink Creek's 100-year floodplain, but based on a site-specific floodplain study conducted for the EA, the project would be above the 100-year base flood elevation (US Army, 2014d).

Facilities would include a two-story 65,000-square foot classroom and administration building and a 29,000- square foot fitness training building consisting of:

- Administrative areas
- Specialized training facility
- Mission-specific training and development areas
- Mission equipment maintenance and preparation areas
- Arms room
- Physical readiness area
- Combat training area
- Indoor pool
- Indoor small arms range
- Ammunition storage area
- Equipment storage warehouse

The training compound would be equipped with an intrusion detection system and heating, ventilation, and air conditioning system. An EA has been prepared for this project, which has advanced into the FY 2015 program (US Army, 2014d) and a FNSI was signed in August 2014.

ST 44 – Baseball Field Replacement

A baseball field would be built to replace a baseball field to the east of Pence Gate that would be demolished to accommodate the widening of US Route 1. The replacement baseball field would be located on an approximately 5-acre site south of 21st Street adjacent two other baseball fields. The site was previously disturbed and consists of dirt paths, scattered trees, and grassed areas.

ST 45 – Secure Administrative Facility

A secure administrative facility would be built on South Post on a parcel located east of Gunston Road between 3rd and 5th Streets. The project consists of two separate sites: one site is approximately 4.0 acres and is located on the southern side of the parcel, adjacent to 5th Street, and the other is located in the northeast corner of the parcel and is approximately 0.8 acres. The majority of the larger site is currently made up of a paved surface parking area that serves the Army Materiel Command Relocatables (Buildings 1456 and 1458) and other nearby office and administrative buildings. The larger site also includes Chapek Road, a connector street between 4th and 5th Streets, as well as some sidewalks, areas of maintained lawn, and a few urban trees. The smaller site on the parcel consists almost entirely of maintained lawn and scattered urban trees. Both sites share the parcel with the US Army Legal Services Agency administration building and its associated parking structure.

The project would build an administrative center campus that would include:

- Administrative space
- Emergency operations center
- Sensitive compartmented intelligence facility

- Secure and non-secure conference rooms
- Video teleconference center
- Data processing center
- General officer/senior executive service office suites
- Storage
- Administrative support area
- Multi-level structured parking

The facility would be equipped with fire protection, intrusion detection, and building information systems, closed circuit television, and an uninterruptable power supply, and would be connected to an energy management control system. Heating, ventilation, and air conditioning would be provided by an approximately 12,000-ton, self-contained system. The facility would be connected to existing electric, water, and wastewater utilities currently serving South Post, and site improvements would include sidewalks, curbs and gutters, and stormwater management features.

ST 46 – US Army Intelligence and Security Command Headquarters Expansion, Phase 4

This project would renovate the existing, 234,000-square foot Nolan Building, and would be the final phase of the INSCOM HQ expansion, as described in ST 19, 26, and 33. The renovation would include the demolition of interior concrete and drywall partition walls, resulting in larger open work areas and fewer private offices. Windows, skylights, and glassed entryways would be replaced with blast-resistant anti-terrorism/force protection glazing, and air intake systems would be protected. The design would incorporate intrusion and access control features, non-progressive collapse design, and window, entrance and curtain-wall reinforcement. Access roads and parking lots would include vehicle entry controls and would be reconfigured to increase the clear zone between vehicles and the buildings for blast protection.

ST 47 – Religious Education Center

A new religious education center would be built on North Post on an approximately 1.4-acre site located between Woodlawn Road and Woodlawn Chapel. Currently, the site consists of maintained lawn and a few scattered trees. Overhead utility lines cross the eastern side and northeast corner of the site.

The project would build an 18,093-square foot religious education center with lobby, assembly area, classrooms, offices, kitchen, and a resource room. Supporting services to the facility would include fire alarm and protection systems, building information systems, and connection to an energy management control system. Connections would be provided to existing electric, water, and sanitary sewer utilities on North Post. Heating, ventilation, and air conditioning would be provided by an approximately 125-ton, stand-alone system. General site improvements would include street lighting, paving, parking, curbs and gutters, and connection to stormwater management systems.

ST 48 – US Army Intelligence and Security Command Controlled Humidity Warehouse

The proposed INSCOM controlled humidity warehouse would consist of a multi-story, 57,116-square foot controlled humidity warehouse on South Post on a parcel along the north side of 16th Street between Theote and Gunston Roads. The facility's proposed site consists of two separate areas on the same parcel, one approximately 1.3 acres in size and the other approximately 0.4 acres. Both sites are composed entirely of previously-developed areas that are primarily characterized by paved areas, some smaller areas of maintained lawn, scattered shrubs and urban trees, and portions of Buildings 1144 and 1145.

The controlled humidity warehouse would provide secure storage for Fort Belvoir tenants engaged in intelligence-gathering activities. The facility would include:

- Administrative office space
- Secure, covered storage

- Sensitive compartmented intelligence facility
- Freight and passenger elevators
- Video teleconference center
- Loading docks
- Parking for organizational vehicles, employees, and visitors
- Equipment storage
- Shredder facility

The facility would be equipped with fire protection, intrusion detection, and information systems, and would be connected to an energy management control system. Connections would be made to existing water, sanitary sewer, gas, and electric utilities serving South Post, and would consist of approximately 1,100 linear feet of 6-inch water line; 1,000 linear feet of 2-inch gas line; 1,000 linear feet of gas supply line; and 1,000 linear feet of sanitary sewer line. Site improvements for the facility would include approximately 14,400 square feet of paved parking and access roads; 2,800 square feet of sidewalks; 21,780 square feet of site clearing and grubbing; and approximately 2,600 cubic yards of excavation.

ST 49 – 911th Engineering Company Operations Complex

The 911th Technical Rescue Engineer Company, which responds to national emergencies in the National Capital Region, is currently spread out in several undersized facilities across Fort Belvoir. This situation negatively affects its operations and readiness. Constructing a new complex would consolidate its operations and provide it with more operating space. Project facilities would include:

- A tactical equipment maintenance facility.
- A company operations building with combined administrative and readiness areas.
- Organizational equipment storage and oil storage buildings.
- Organizational vehicle parking.
- A vehicle storage facility.
- Open and organizational equipment storage.

Buildings in the new complex would total 39,810 square feet. The complex would be built on an approximately 8.5-acre site located on North Post between the Fairfax County Parkway and Accotink Village. The site is previously-disturbed and currently houses Building 2476, a vehicle maintenance shop, and Building 2477, a modular facility. Both existing buildings, totaling 39,166 square feet, would be demolished. The site is primarily covered with grass with soils compacted by parking but also includes an approximately 1.1-acre wooded area as well as scattered trees and brush along the edges of the site.

ST 50 – Vehicle Maintenance Shop

A new vehicle maintenance shop would be built on South Post on a site along the south side of 16th Street and east of Gunston Road. Buildings 187 and 189, which house operational and administrative functions for the Fort Belvoir Motor Pool, currently occupy the site. The surrounding area is entirely paved, consistent with its use as a vehicle parking, maintenance, and storage area.

The proposed vehicle maintenance shop would be a 25,565-square foot, general-purpose tactical equipment maintenance facility with 99,000 square feet of vehicle surface parking. Primary elements of the facility would include:

- Double, drive-through structural maintenance bays
- Small arms maintenance areas
- Storage rooms
- Mechanical rooms
- Communications closets
- Administrative space
- Loading docks

- Maintenance apron
- Tool room

The facility would be equipped with fire alarm, information, and intrusion detection systems, and would be connected to an energy management control system. Heating and air conditioning would be provided by a 100-ton, stand-alone system. Utilities would be provided through connections to existing electrical, water, and sewer systems currently serving South Post, and would require approximately 1,700 linear feet of piping for potable water and 2,425 linear feet of sanitary sewer line. Site improvements would include approximately 4,050 square feet of sidewalks, 1,125 linear feet of curb and gutter, 3,000 square feet of access roads, and stormwater management systems. Eleven buildings totaling 120,267 square feet would be demolished as part of the project.

ST 51 – Information Systems Facility for the Network Enterprise Center

NEC proposes to build a 75,000-square foot information systems facility on South Post on a site along the north side of Warren Road and west of Gunston Road. The approximately 2-acre disturbed site was covered in the past by pavement and two buildings, since demolished. The project site is immediately west of five houses fronting Gunston Road that are located within the Fort Belvoir Historic District.

ST 52 – Defense Logistics Agency Administrative Center

DLA proposes to build a new 267,000-square foot administrative center on its existing parking lot. ST 40 would build two parking garages on the DLA parking lot to free up parking space to accommodate this new building. One thousand personnel would work in the new building.

2.1.4.7 Short-Term Transportation Projects

The RPMP includes proposed short-term transportation projects (STTs) that support the programmed short-term projects as well as transportation goals:

- Improve traffic circulation and wayfinding.
- Develop a grid system of roadways to distribute traffic.
- Improve connections between North and South Post.
- Improve connectivity with regional transportation systems.
- Balance roadway improvements to provide a pedestrian-friendly installation that supports multimodal travel choices (no roadway shall be more than four lanes).
- Accommodate Army and DoD security requirements.
- Actively plan and promote alternative modes of transportation.
- Guide projected growth and denser development around transit opportunities.
- Create convenient access to transit.
- Enhance public bus and/or private shuttle connections among campuses, the hospital area, the town center, the PX/Commissary, activity nodes, parking facilities, and regional transit hubs.
- Support state/local plan guidance for off-post roadway transit improvements.

The short-term transportation improvements reflect these goals and consider identified transportation system conditions, identified deficiencies, the future demand that would be generated by personnel increases resulting from implementing short-term projects, and a goal to encourage commuters to use transit or use vanpools and carpools rather than single-occupant vehicles. Transportation system conditions were assessed for and underpin the Fort Belvoir Transportation Management Plan (TMP), which addresses current

transportation system deficiencies on the post. The TMP has been prepared in response to NCPC requirements.

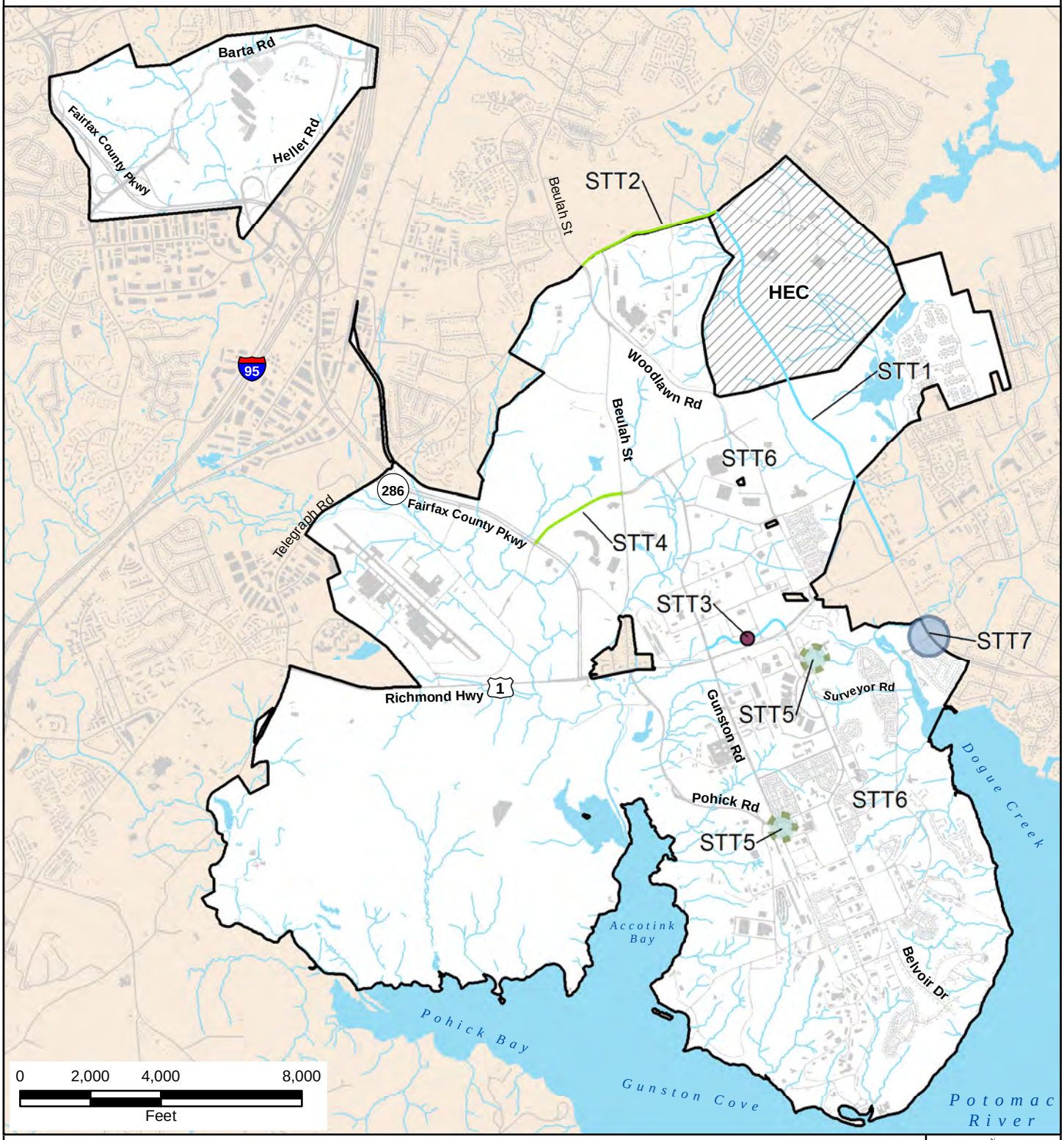
The TMP proposes both near-term and long-term qualitative and project-specific strategies that have been analyzed considering future population growth, the type and location of land uses, traffic studies, and transportation projects that are proposed by other agencies off-post. The primary goal of the TMP is to reduce single-occupant vehicle trips in the short-term from the current 85 percent to 75 percent (a 10 percent reduction) by 2017 and in the long-term from 75 percent in 2017 to 60 percent (an additional 15 percent reduction) by 2030 through numerous initiatives and programs. Two of the initiatives and programs most likely to reduce single-occupant vehicle use would be the addition of light rail or exclusive bus rapid transit lanes to US Route 1 and adjustments to on-post parking to reduce parking spaces to 0.6 spaces per employee. The proposed short-term transportation projects support future growth and the TMP's goals. Figure 2-9 illustrates the short-term transportation projects and Table 2-3 lists the projects, which are described below.

Table 2-3
Short-Term (FY 2012-2017) Transportation Projects

Project # on Figure 2-9	Project Name	Location	Disturbed Area (acres)	Impervious Surface (net acres)	Status/Comments
STT 1[1]	Mulligan Road[2], Phase 2a	North Post	32[1]	20[1]	Project to complete Mulligan Road (i.e., Jeff Todd Way, 4 lanes) from US Route 1 to Telegraph Road almost done.
STT 2[1]	Telegraph Road Widening (Mulligan Road[2], Phase 2b)	North Post			Widen Telegraph Road from 2 lanes to 4 from Beulah Street to Mulligan Road (i.e., Jeff Todd Way).
STT 3[3]	Lieber Gate Access Road and Control Point	North Post	8[3]	6[3]	Construct AT/FP-compliant access control point and associated access road from US Route 1.
STT 4	John J. Kingman Road/Fairfax County Parkway Intersection Improvements	North Post	0.7	0.54	Add and/or expand left and right turn lanes and upgrade signals as needed.
STT 5	Transit Hub	South Post	3	2.2	Construct a transit transfer center at either Pence Gate to connect the Medical District to US Route 1 or at 12th Street and Gunston Road to connect the Town Center to existing public transit services. Final location to be determined based on demand.
STT 6	On-Post Intersection and Road Improvements	Variable As Needed			Evaluate on-post intersections and roads for improvements as needed (e.g., new signals, signal improvements, intersection and entry turn lanes, Kingman Road widening to PX/ Commissary).
STT 7	Walker Gate Improvements	South Post	0.2	0.11	Improve Walker Gate & Mount Vernon Memorial Highway intersection by adding a turn lane into Fort Belvoir from the east.
TOTALS	**All STT Projects**		**43.9**[4]	**28.9**[5]	

Notes:
1. Project is part of ST 4 and included in short-term facility projects in Table 2-2.
2. In August 2014, Mulligan Road was dedicated by Fairfax County as Jeff Todd Way.
3. Project is part of ST 13 and included in short-term facility projects in Table 2-2.
4. 40 acres also included in short-term facility projects (see note 1).
5. 26 acres also included in short-term facility projects (see note 1).

Proposed Short-Term Transportation Improvements



Legend

- New ACP 2017
- Short-Term Improved Road
- Short-Term New Road
- Short-Term Intersection Improvement
- Transit Transfer Center

Fort Belvoir RPMP EIS

Figure 2-9

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STT 1 – Mulligan Road, Phase 2a

See ST 4 in Table 2-2 and described in Section 2.1.4.1.

STT 2 – Telegraph Road Widening (Mulligan Road, Phase 2b)

See ST 4 in Table 2-2 and described in Section 2.1.4.1.

STT 3 – Lieber Gate Access Road and Control Point

See ST 13 in Table 2-2 and described in Section 2.1.4.1.

STT 4 – John J. Kingman Road/Fairfax County Parkway Intersection Improvements

To increase the capacity of this heavily-used intersection and thereby decrease delays, the intersection would be upgraded by adding/expanding left and right lanes and upgrading traffic signals as needed.

STT 5 – Transit Hub

As Fort Belvoir increasingly becomes a high-density employment center, efficient connections are needed to regional transit services, commuter park-and-ride lots, and preferably access to the I-95 high-occupancy vehicle (HOV) lanes. A transit hub at Pence Gate off of Belvoir Road to connect to the medical center (or alternatively, at 12th Street and Gunston Road to connect to the town center if a site at Pence Gate is not feasible) would be a location for park-and-ride facilities, rideshare connections, and a bus transfer station. The Pence Gate location aligns with Fairfax County's *Transit Development Plan*, which recommends the addition of an "enhanced bus stop" at Pence Gate to support transfers from public bus service to a Fort Belvoir internal shuttle. A full public bus transit center is not viable at this location because of land constraints.

STT 6 – On-Post Intersection and Road Improvements

Based on traffic impact analyses that have been or would be performed for each of the proposed short-term projects that would result in increases in the number of personnel and/ or visitors when implemented, a variety of improvements may be needed to reduce the impact of the project on nearby intersections and roadways. Examples of such improvements might be new traffic signals, adjustment of the timing of existing traffic signals, or the addition of new entry turn lanes or intersection turn lanes.

STT 7 – Walker Gate Improvements

A turning lane would be added to the Mount Vernon Memorial Highway (State Route [SR] 235) for traffic approaching Walker Gate from Mount Vernon. The new turn lane would facilitate left turns into the gate in the morning peak and alleviate traffic that backs up on SR 235.

2.1.5 Long-Term Projects

Long-term projects to be implemented on Main Post and the FBNA from 2018 to 2030 are defined in the master plan based on agency plans and projected needs. The design for and timing of these projects is less-defined than for the near-term projects. Section 2.1.5.1 describes building projects and Section 2.1.5.2 describes transportation projects.

2.1.5.1 Long-Term Building Projects

Table 2-4 lists the long-term (LT) projects that are proposed for implementation from 2018-2030. Each of the projects/groups of projects listed in Table 2-4 is described to the extent that the projects have been

defined. Figure 2-10 depicts the project areas – some are shown as building parcels where planning is farther along, and for some the whole site is shown because building parcels have not yet been defined.

LT 1 – Lower North Post District

The Lower North Post District encompasses a mix of uses including administrative offices, reserve centers, troop barracks, motor pools, warehouses, and recreational facilities. Large facilities are spread across the district in low-density, office park-style development. Buildings are centrally located on land parcels with surrounding parking. The district has several areas ready for infill and redevelopment.

LT 1 projects would continue redevelopment of an approximately 24-acre block in the Lower North Post District as a professional/institutional center. The block is bounded by Goethals Road to the north, Constitution Road to the east, Meade Road to the south, and Gunston Road to the west. These projects would be in addition to the recently-completed OCAR facility, which fronts Goethals Road, and the future 29th Infantry HQ complex, scheduled to begin construction in 2016 and described under ST 36.

Primary LT 1 projects would include two new office buildings adjacent to the OCAR facility, east of Black Road, for a total personnel increase of 1,200. Surface parking lots that currently exist on the OCAR site would be demolished to accommodate development of the new office buildings. As part of the LT 1 projects, a central parking structure, shared by OCAR, the 29th Infantry HQ, and future tenants, would be built behind (south of) the buildings.

LT 2 – 1400 East District

The 1400 East District on South Post functions as an administrative center comprised of single- and multi-tenant office buildings. The development pattern is low to mid density, with the average building height at two stories, and consolidated, surface parking areas located at the periphery of the land parcels. Recent development within the 1400 East District reflects the higher density and structure parking that is typical of the compact development planned for the district. The district would be redeveloped as a higher-density professional/institutional center comprised of single- or multi-tenant office buildings with structured parking to accommodate the higher population. Most of the existing facilities would be demolished to create new developable sites as necessary.

Projects included under LT 2 would redevelop a portion of the 1400 East District as a secure administrative campus. The approximately 28.4-acre project area is generally bounded by 1st Street to the north, the FBCH campus to the east, 6th Street to the south, and Gunston Road to the west. The area is currently occupied by Army Materiel Command relocatable buildings, administrative and office buildings located east of Gunston Road between 5th and 6th Streets, and surface parking areas associated with those facilities.

Redevelopment of this area would generally consist of the demolition of the existing administrative buildings and parking lots and construction of new office buildings with one or more parking structures, largely on surfaces currently covered by pavement and buildings. This would result in the creation of a secure administrative campus. Approximately 1,330 additional personnel would work in this area after build-out of LT 2 projects.

LT 3 – South Post Community Support District

Existing development within the South Post Community Support District is low-density and suburban, with development spread across the district. Buildings are one to two stories in height with parking located at the front of the facilities. Facilities in the South Post Community Support District, such as the child development center, Fisher Houses, Community Center, and recreation fields, as well as the proposed PAL (ST 2), support Soldiers and their dependents stationed on the post and within the region.

Table 2-4
Long-Term (2018-2030) Projects[1]

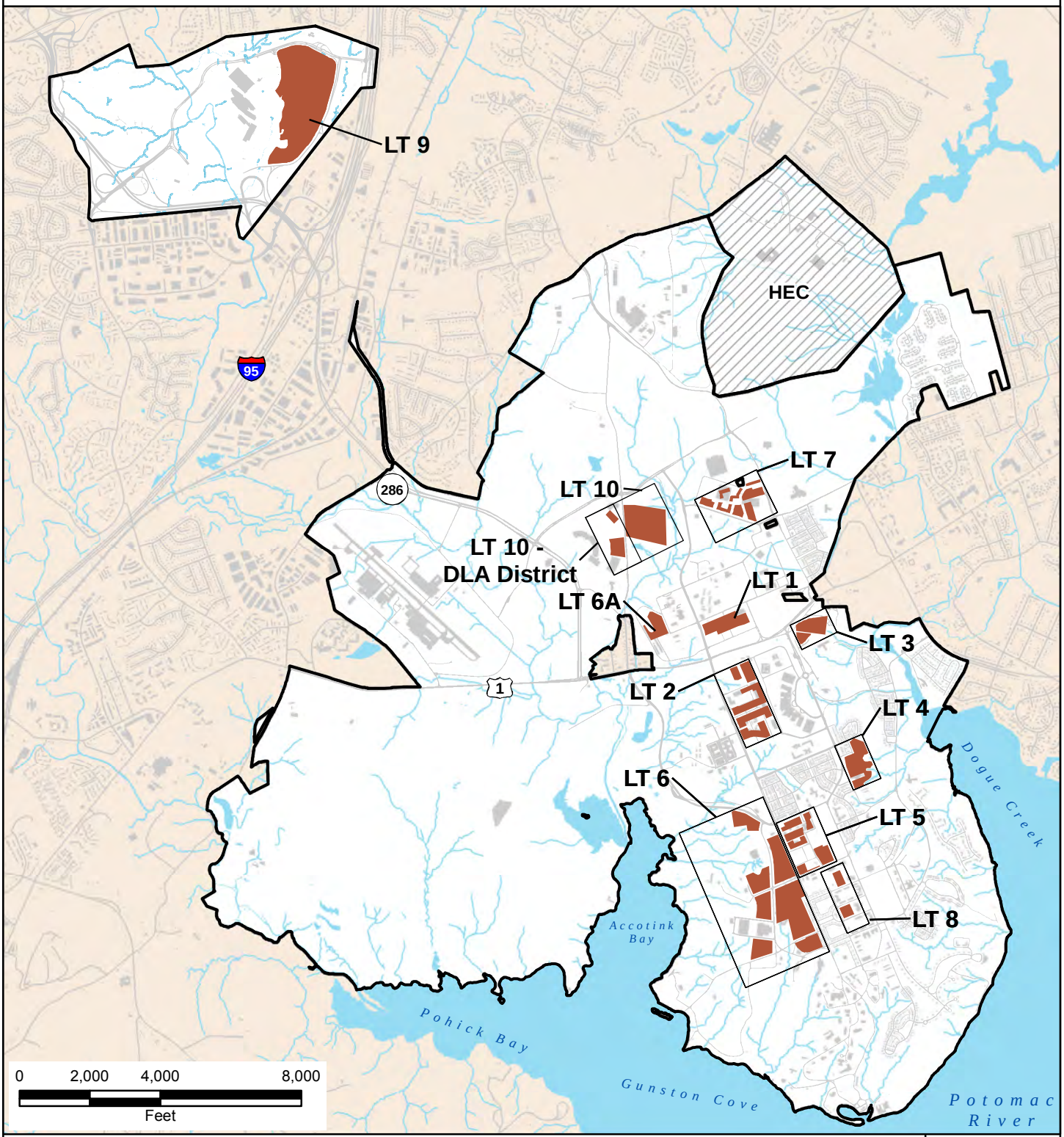
Project # on Map	Project Areas	Location	Building size[2] (square feet)	Disturbed Area (acres)	Impervious Surface (acres)	Added Personnel	Status/Comments
LT 1	Lower North Post District	North Post	240,000	8.2	2.2	1,200	Continue redevelopment of parcels adjacent to the OCAR facility (to the east) and 29th Infantry HQ complex (to the west) (see ST 36).
LT 2	1400 East District	South Post	266,000	10.3	0.5	1,330	Redevelop parcels currently occupied by Army Materiel Command relocatable buildings, other administrative facilities, and parking lots.
LT 3	South Post Community Support District	South Post	20,000	8	3.5	100	Build a third Fisher House and recreational facilities.
LT 4	Administrative Campus District	South Post	220,000	5.4	1.8	1,100	Construct a new administrative facility up to eight stories on the site of the Dewitt Army Community Hospital.
LT 5	Town Center District	South Post	80,000	2.6	-0.6	400	Redevelop areas south of 12th Street and east of Gunston Road to expand town center.
LT 6	Industrial Area District	South Post	20,000	1.4	0	100	Redevelop multiple sites generally west of Gunston Road to create transition zones between heavy and light industrial uses and office and community support uses.
LT 6A	Lower North Post West District	North Post	Refer to LT 6				Alternative to LT 6. If selected, building size, acreage disturbed, and personnel would be the same.
LT 7	North Post Community Support District	North Post	20,000	16.5	-10	100	Continue the redevelopment of the North Post Community Support Center in a town center-style, mixed-use development.
LT 8	Historic Core District	South Post	40,000	4.1	0.9	200	Build a new administrative building and parking structure on separate sites. New facilities would replace surface parking lots.
LT 9	Fort Belvoir North Area District	FBNA	1,500,000	42.4	35	7,500	Build an administrative center on a secure campus to accommodate up to 7,500 personnel on a previously-disturbed site.

Project # on Map	Project Areas	Location	Building size[2] (square feet)	Disturbed Area (acres)	Impervious Surface (acres)	Added Personnel	Status/Comments
TOTALS	LT Projects		2,406,000	98.9	33.3	12,030	
	Parking structures for estimated 40% of personnel		1,443,600				
	Total Area of Building Construction – LT Projects		3,849,600				

Notes:

1. LT 10A and LT 10, which are projects under Alternatives 2 and 3 respectively, consist of Alternative 1 short-term projects that would be pushed back to the long term under the other two alternatives. Specifically, LT 10 includes ST 19, 26, 33, 40, 46, and 52; LT 10A includes ST 40 and 52. Since these projects are already accounted for in Table 2-2, neither LT 10 nor LT10A is included in this table to avoid redundancy in total calculated building size, disturbed area, impervious surface, and personnel.
2. Building sizes approximated by assuming 200 square feet per person.

Proposed Long-Term Projects



Legend

Long-Term Project Sites (Construction FY 2018 - 2030)

LT 6 Long-Term Project Number – corresponds to project numbers in Table 2-4

Fort Belvoir RPMP EIS

Figure 2-10

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Projects under LT 3 would develop an approximately 12-acre area in the South Post Community Support District, east of Belvoir Road and just south of US Route 1, for medical-related and community support uses. The site was formerly the Gray's Hill Housing area, since demolished, and the park-like site is currently covered with grass and scattered trees. Projects would include an additional Fisher House and athletic fields/facilities to be developed and operated by the Fort Belvoir Directorate of Family and Morale, Welfare, and Recreation. The morale, welfare and recreation area would include two ball fields, approximately 100 parking spaces, a play area, picnic shelters, and recreation storage sheds. The Fisher House would be similar to the ones immediately to the south and described in ST 5 and ST 30. Up to 300 additional personnel would be employed in this area after build-out of LT 3 projects.

LT 4 – Administrative Campus District

The Administrative Campus District encompasses the site of the DeWitt Army Community Hospital, Army lodging facilities, and surface parking lots. With construction of the FBCH, the DeWitt Hospital is slated for demolition (scheduled to be completed in late 2015 - A REC for the demolition was completed in June 2012). Once the proposed PAL (ST 2) is constructed, the lodging facilities in this district also would be demolished. These demolitions would make room for higher-density future development of administrative or mixed-use facilities. Future buildings would accommodate several smaller tenants or a single large tenant, and parking would be consolidated to a structure behind the buildings to accommodate the district's increased population while also achieving design and cost efficiencies.

LT 4 would redevelop an approximately 10-acre site in the Administrative Campus District that currently houses the DeWitt Army Community Hospital to create a high-density administrative campus. Under this project, the one-story building immediately north of the DeWitt Hospital would be retained and would continue to house the pharmacy and Warrior-in-Transition program. The site of the hospital would be redeveloped with a new office building potentially up to eight stories in height, as viewshed and airfield building height restrictions do not apply to this area. The new building would likely house medical-related administrative and professional offices. Up to 800 additional personnel may work on the site after build-out of LT 4.

LT 5 – Town Center District

The Town Center District is a mixed-use district comprised of administrative offices, civic buildings, retail shops, recreation facilities, and residential villages. The district contains portions of the National Register-eligible Fort Belvoir Historic District. North of 12th Street, the development pattern is higher density, with attached houses and the 12th Street Town Center development. South of 12th Street, the development pattern is less dense, as facilities are located in the center of parcels with surrounding parking.

With redevelopment, the Town Center District would support higher-density development and would function as a community hub. As redevelopment of the area moves forward, existing buildings in the project area, such as the home and garden center, fitness center, bank, shoppette, and laundry, would be demolished or reused, as necessary. Functions in the demolished buildings would relocate to new facilities, such as those proposed for the North Post Community Support District, described in the LT 7 projects.

LT 5 projects would redevelop approximately 12.6 acres south of 12th Street and east of Gunston Road with mixed-use development to reflect the town center-style of mixed-use development present along the north side of 12th Street. The redeveloped area would feature housing over retail and office uses, new administrative uses, a new fitness center, and structured parking. Up to 400 additional personnel would be employed in the area following build-out of LT 5 projects.

LT 6 – Industrial Area District

The Industrial Area District is located between the western post boundary and Gunston Road, south of Pohick Road and north of 21st Street. The district comprises one- and two-story warehouses, outdoor storage

lots and service yards, and associated administrative offices. Most facilities are in disrepair or obsolete for current mission standards. The Industrial Area District would be redeveloped as a more-modern, -functional, and -efficient warehouse and storage district by demolishing inadequate facilities and constructing new facilities that better meet the program requirements of the tenants. The tenant requirements include indoor storage and administrative facilities, secure outdoor storage lots, motor pools, and paved surface lots that can support the turning movements of large trucks.

Projects included under LT 6 would redevelop current Industrial Area District sites located west of Gunston Road. The sites would be redeveloped to create a transitional zone of low-density warehouse and supporting administrative uses along the west side of Gunston Road to serve as a buffer between the industrial area and the non-industrial activities located to the east of Gunston Road. Redevelopment of the area would create a transition from light to heavy uses by restricting heavy industrial uses to the western edge of the industrial area. Open and landscaped areas would create buffers between industrial and non-industrial uses. The LT 6 projects would also create direct access to industrial facilities from Pohick Road. Up to 100 additional personnel would be employed in this area after build-out of LT 6 projects.

LT 6A – Lower North Post West District

LT 6A is an alternative site to LT 6 for new, low-density warehouses and supporting administrative uses that could be located in the Lower North Post West District instead of the South Post Industrial Area District. As described for LT 1, the Lower North Post District currently encompasses a mix of uses including administrative offices, reserve centers, troop barracks, motor pools, warehouses, and recreational facilities. Large facilities are spread across the district in low-density, office park-style development. Buildings are centrally located on land parcels with surrounding parking. The district has several areas ready for infill and redevelopment.

LT 7 – North Post Community Support District

The North Post Community Support District is planned for redevelopment into a regional hub of retail, office, residential, educational, and recreational uses. Redevelopment of the district would focus on walkable, mixed-use development to create a town center-style environment. Facilities would be centered around a pedestrian promenade with amenities to serve the community.

The first phase is underway with the recently-opened PX (ST 1) and the demolition of the former PX (ST Project 16). Following the completion of the proposed Commissary (ST 28), LT 7 development projects would expand to include a restaurant (ST 25), townhomes, administrative offices, retail and community-service shops, and recreation facilities. The LT 7 facilities would be built on an approximately 21.4-acre site that consists primarily of the existing Commissary and its associated surface parking lots. Approximately 3 acres of trees borders the northern edge of the site. Up to 100 additional personnel would be employed in this area after build-out of LT 7 projects.

LT 8 – Historic Core District

The Historic Core District is the oldest developed area on post and is mostly developed. The original master plan for the area organized the buildings in formal, bilateral symmetry. The district includes administrative and residential structures built in the Colonial Revival style at the turn of the 20th Century. The district contains portions of the National Register-eligible Fort Belvoir Historic District. The Gerber and Belvoir residential villages are located within the Historic Core District.

The LT 8 project would provide new structured parking and a new administrative building in the Historic Core District. The new facilities would serve an agency or agencies to be determined. The project sites are two separate parcels that collectively total approximately 4.4 acres. The parking structure would be built on an approximately 2.4-acre parcel located between 16th and 18th Streets, immediately south of Building 238. The existing parcel consists of a paved surface parking lot bordered by a small landscaped area.

The administrative building would be built on a two-acre parcel approximately 0.1 mile to the south and generally bounded by 19th Street to the north, Michie Place to the east, 20th Street to the south, and Middleton Road to the west. The parcel is occupied by Building 219 along 19th Street, Building 231 along Michie Place, and a surface parking lot adjacent to 20th Street and Middleton Road. The new administrative building would be constructed on the existing parking lot, and Building 231 would be demolished and its site converted to surface parking. It is estimated that up to 300 additional personnel would be employed at the new administrative building following its completion.

LT 9 – Fort Belvoir North Area District

Existing development in the Fort Belvoir North Area District is comprised of a large-tenant campus for NGA facilities. The campus required a generous land parcel to accommodate a large building program and parking for support staff and visitors. The tenant mission also dictated specialized requirements that result in iconographic architecture and site design unique to the agency. Because of its missions, NGA operates its own security fence and entry gates.

Under LT 9, a secure administrative campus to accommodate up to 7,500 personnel would be built on an approximately 84-acre parcel on the east side of FBNA, between GEOINT Drive and Heller Road. Approximately half of the parcel is cleared and level, having been used as a construction lay-down and parking area during the building of the NGA facilities. Much of the remainder of the parcel was used in the past for heavy vehicle exercises and is covered with tracks or grass. Thin woods fringe the southern part of the site.

The NGA facilities are modern, iconographic administrative and infrastructure-support buildings, forming a self-supporting office complex. Future development on the undeveloped parcel would follow suit with a self-sustaining, secure office complex with the same development intensity and character as the NGA complex. The LT 9 project development could have one large tenant or several smaller tenants.

LT 10 – Defense Logistics Agency/Intelligence and Security Command District (EIS Alternative 3)

Like the Fort Belvoir North Area District, the DLA/INSCOM District comprises large tenant campuses for tenants with specialized missions that result in iconographic architecture and site design unique to the agencies. The facilities are centrally located on the campus parcel, with adjacent structured parking. DLA and INSCOM each operate their own security fence and entry gates.

Under EIS Alternative 3 (described below), a new DLA administrative center and two parking structures (ST 40 and 52) and INSCOM's expansion and renovation projects (ST 19, 26, 33, and 46) would be delayed from the short-term to the long-term.

LT 10A – Defense Logistics Agency/Intelligence and Security Command District (EIS Alternative 2)

As described for LT 10, the DLA/INSCOM District comprises large tenant campuses for tenants with specialized missions that result in iconographic architecture and site design unique to the agencies. The facilities are centrally located on the campus parcel, with adjacent structured parking. DLA and INSCOM each operate their own security fence and entry gates. The INSCOM campus would be redeveloped in four phases in the short term to accommodate new missions, and additional personnel and students (see ST 19, 26, 33, and 46).

2.1.5.2 Long-Term Transportation Projects

Table 2-5 includes the long-term transportation (LTT) projects that would be built from 2018 to 2030 and would support future growth on the installation. Figure 2-11 depicts the long-term transportation projects.

LTT 1 – John J. Kingman Gate

This project would add a truck inspection lane and area to the John J. Kingman Gate east of the intersection of John J. Kingman Road and the Fairfax County Parkway. This would reduce traffic backups onto the Parkway.

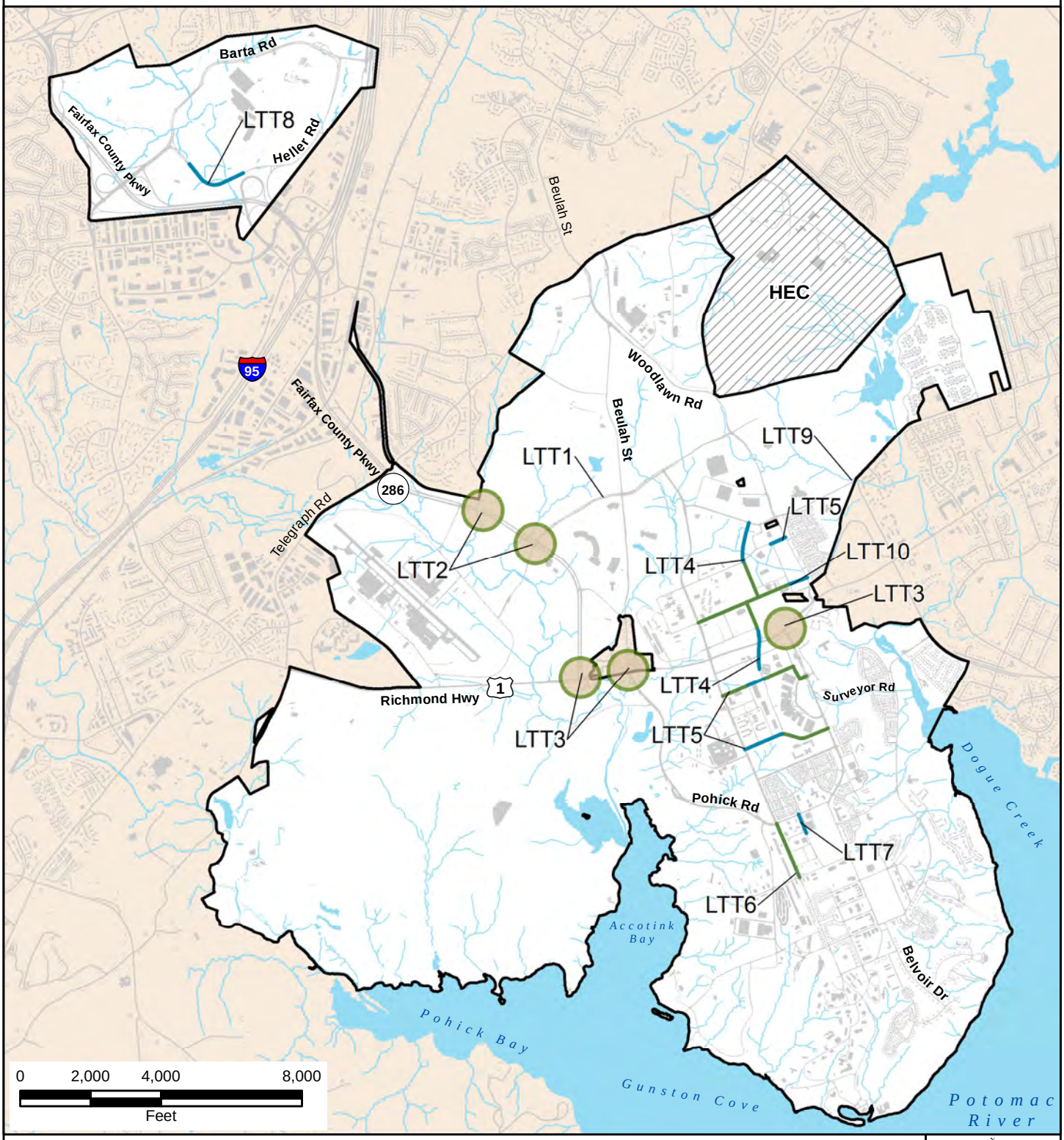
Table 2-5
Long-Term (2018-2030) Transportation Projects

Project # on Map	Project Name	Disturbed Area (acres)	Impervious Surface (acres)	Status/Comments
LTT 1	John J. Kingman Gate	0.1	0.1	Improve Kingman Gate by adding lanes.
LTT 2	Fairfax County Parkway/John J. Kingman Road Intersections & NMUSA Entrance	6.3	4.8	Grade-separate intersections along Fairfax County Parkway at John J. Kingman Road and the NMUSA entrance.
LTT 3	US Route 1 intersections with Fairfax County Parkway, Pohick Road, and Belvoir Road	TBD	TBD	Monitor intersections along US Route 1 at Fairfax County Parkway, Pohick Road, and Belvoir Road to determine need for future improvements.
LTT 4	US Route 1 Overpass	0.8	0.6	Construct US Route 1 overpass and a two-lane road connecting 1st Street and Gorgas Road.
LTT 5	Internal cross streets	3.1	1.7	Add internal cross streets (Abbott Road, 3rd Street, and 6th Street).
LTT 6	Gunston Road from 12th Street to 16th Street	3.4	0.6	Extend four-lane widening of Gunston Road from 12th Street to 16th Street.
LTT 7	13th Street Improvements	0.3	0	Convert 13th Street to two-way traffic and connect to 12th Street as part of the future Town Center redevelopment.
LTT 8	Heller Road	2.9	1.9	Complete the Heller Road loop at FBNA.
LTT 9	Meeres Gate	0.5	0.4	Potentially open Meeres Gate (subject to long-term security and mission requirements that are to be determined).
LTT 10	Goethals Road	0.4	0.3	Widen Goethals Road to four lanes and extend to Woodlawn Road.
TOTALS	**LTT Transportation Improvements**	**17.8**	**10.4**	

LTT 2 – Fairfax County Parkway/John J. Kingman Road Intersections and NMUSA Entrance

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 (one of the roadways going over or under the other) 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). The respective roles of the two agencies in this project are specified in a Memoramdum of Agreement executed in August 2011.

Proposed Long-Term Transportation Improvements



Legend

- Long Term Improved Road
- Long-Term Intersection Improvement
- Long Term New Road

Fort Belvoir RPMP EIS

Figure 2-11

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LTT 3 – US Route 1 Intersections with Fairfax County Parkway, Pohick Road, and Belvoir Road

Following the widening of US Route 1, this project would monitor traffic flows at the US Route 1 intersections with the Fairfax County Parkway, Pohick Road, and Belvoir Road. If traffic backs up on the Parkway, Pohick, or Belvoir roads, intersection improvements would be implemented to reduce delays. Such improvements could include adding turning lanes, extending the length of existing turning lanes, or re-striping existing turning lanes to add an additional lane.

LTT 4 – US Route 1 Overpass

Adding a second overpass over US Route 1, a RPMP transportation goal, would improve the connections between North Post and South Post and spread the traffic that now is concentrated on Gunston Road to two overpasses. This project would likely have a southern terminus on 1st Street on South Post, cross Route 1 following the alignment of Constitution Road, then proceed on a new alignment to Meeres Road in the vicinity of the PX and Commissary.

LTT 5 – Abbott Road, 3rd Street, 6th Street

To meet the RPMP goal of improving the street grid on post, this project would extend three internal cross streets—Abbott Road on North Post, and 3rd Street and 6th Street on South Post – to connect with north-south roads. Abbott Road would extend a short distance east to connect with Woodlawn Road. On South Post, 3rd Street and 6th Street, which currently only serve the 1400 Administrative Area, would connect to Gunston Road on the west and Belvoir Road on the east to offer more routes for traffic to move east and west in this part of the post.

LTT 6 – Gunston Road from 12th Street to 16th Street

Gunston Road, which along with Belvoir Road serves as one of the primary roads on South Post, was recently widened from two lanes to four lanes from 12th Street north. To match this alignment, LTT 6 would widen Gunston Road to four lanes between 12th and 16th Streets.

LTT 7– 13th Street Improvements

Proposed improvements related to the future Town Center redevelopment include converting 13th Street from one-way to two-way traffic and adding a connection to 12th Street.

LTT 8 – Heller Road Loop

On the FBNA, this project would complete a section of Heller Road, allowing it to form a loop road with Barta Road around existing and future FBNA facilities.

LTT 9 – Meeres Gate

Meeres Gate, located where Old Mill Road currently meets the alignment of Mulligan Road (under construction on North Post—see ST 4), could potentially be opened all day, subject to long-term security and mission requirements to be determined.

LTT 10 – Goethals Road

To improve east-west connections on North Post and improve the street grid, Goethals Road would be widened to four lanes and extended east to Woodlawn Road.

2.2 ALTERNATIVES

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]).

Fort Belvoir considered the following criteria in identifying a reasonable range of alternatives to implement the Proposed Action. The range of alternatives considered in this EIS must:

- Meet the project purpose and need.
- Minimize environmental impacts.
- Recognize the possibility of reductions in budgets and personnel that might delay or cancel projects.
- Ensure access to the FBNA is sufficient to accommodate future development.

The result is three alternatives to implement the RPMP that vary by when projects are implemented, the total number of the installation workforce by 2017 and 2030, and whether the future transportation system provides adequate access to support major development on the FBNA. Evaluating the environmental and socioeconomic impacts of this range of alternatives would yield information on the sensitivity of resources to factors such as workforce levels in 2017 and 2030.

In keeping with NEPA and CEQ requirements, the No Action Alternative is also evaluated. For purposes of this EIS, the No Action Alternative assumes no further development takes place. While not realistic, this assumption allows the No Action Alternative to serve as a baseline against which to evaluate the impacts of the other alternatives.

Table 2-6 summarizes the alternatives, which are described below. The net workforce increases are measured from the post's September 2011 workforce of approximately 39,000.

Table 2-6
EIS Alternatives

Alternative	Short-Term Projects	Long-Term Projects	2017 Post Workforce (Increase from Sept 2011)	2030 Post Workforce (Increase from Sept 2011)
No Action Alternative	None	None	No increase	No increase
Alternative 1 Full Implementation – The Preferred Alternative	All Implemented	All Implemented	44,000 (+5,000)	56,000 (+17,000)
Alternative 2 Modified Long-Term	ST 40 and 52 deferred to LT	LT 9 on FBNA not implemented	43,000 (+4,000)	50,000 (+11,000)
Alternative 3 Modified Short-Term	Many ST projects deferred to LT	Most ST and all LT projects implemented	40,000 (+1,000)	55,000 (+16,000)

Preferred Alternative

Alternative 1 is the Army's Preferred Alternative because it would implement all elements of the proposed RPMP update within the proposed timeframe. Alternative 2 would not implement any long-term projects on the FBNA, resulting in 6,000 fewer workers on Fort Belvoir by 2030. Alternative 3 would delay implementation of many short-term projects until the long term, resulting in about 1,000 fewer workers than Alternative 1 by 2030 and more construction in the 2018 to 2030 period.

Alternatives Considered but Eliminated from Further Consideration

The RPMP update that forms the basis for the Proposed Action in this EIS is the result of more than a decade of discussions about how best to use areas of Fort Belvoir to accommodate growth – where to change the land use, where to place new development, where to intensify existing development, and which areas to preserve. Evolving thinking among planners about clustering development, minimizing impervious surfaces, and reducing single-occupant vehicle use informed the discussions and resulted in DoD's 2012 United Facilities Criteria for Installation Master Planning.

During the master plan process for implementing BRAC 2005, which led to an amendment to the 1993 master plan, a number of alternative ways to develop Fort Belvoir were considered. This process is documented in the BRAC EIS (US Army, 2007a). Some of these alternative approaches to development carried over into the current, post-BRAC master planning process and were analyzed further. Ultimately, they were discarded for the reasons given below. The most substantial plan elements that were evaluated and eliminated from further analysis during the current master plan development process included:

- Davison Army Airfield (DAAF). Deactivate the airfield and develop the DAAF area. This was eliminated because it was determined that the airfield remains important for military air travel to and from the National Capital Region.
- 300 Area. Explore more intensive Professional/Institutional uses in the 300 Area, which has scattered, older buildings and is located on the southern tip of South Post among ravines draining into the Potomac River. It was determined that infrastructure was limited and would be expensive to build, and there were security concerns about locating personnel and secure activities close to the river.
- Tompkins Basin. Tompkins Basin, located on South Post on Accotink Bay is used for recreational activities. Replacing Recreational uses with Residential uses was considered, but it was rejected as inefficient in favor of locating new housing in the North Post Town Center area to encourage clustering of different land uses, walkability, and to make the area livelier after hours. Retaining Tompkins Basin for indoor and outdoor recreation also is in keeping with its location on Accotink Bay.
- McRee Barracks. Relocating McRee Barracks from lower North Post to a proposed Troop Village Area in the 1400 Area west of Gunston Road on South Post was considered. However, McRee Barracks went through major renovation, and moving no longer made sense.
- Southwest Area. The Southwest Area is mostly forested and is used for training and, to some extent, for recreation. Its northern boundary lies along US Route 1, so it has the potential for good road access. Through the years, various kinds of development, including public/private development, have been considered, but the lack of infrastructure, continuing regional need for training areas, presence of former landfills and former/operational training ranges, and presence of the Fort Belvoir Forest and Wildlife Corridor (FWC) and the Accotink Bay Wildlife Refuge have rendered development impractical.

2.2.1 No Action Alternative

As described above, to serve as a baseline for evaluating the impacts of the action alternatives, the No Action Alternative assumes no further development would take place on Fort Belvoir. The RPMP Update, including the short-term and long-term projects, would not be implemented.

2.2.2 Alternative 1 – Full Implementation – The Preferred Alternative

Alternative 1 assumes that all parts of the RPMP would be approved and implemented, including the proposed short-term and long-term projects in the IVDP, the IPS, and the *Fort Belvoir Transportation Management Plan*. The proposed short- and long-term projects are described under the Proposed Action (Section 2. 1). Full implementation would result in a total post workforce of 44,000 by 2017 and 56,000 by 2030. Figure 2-12 illustrates the Alternative 1 short- and long-term projects.

2.2.3 Alternative 2 – Modified Long-Term

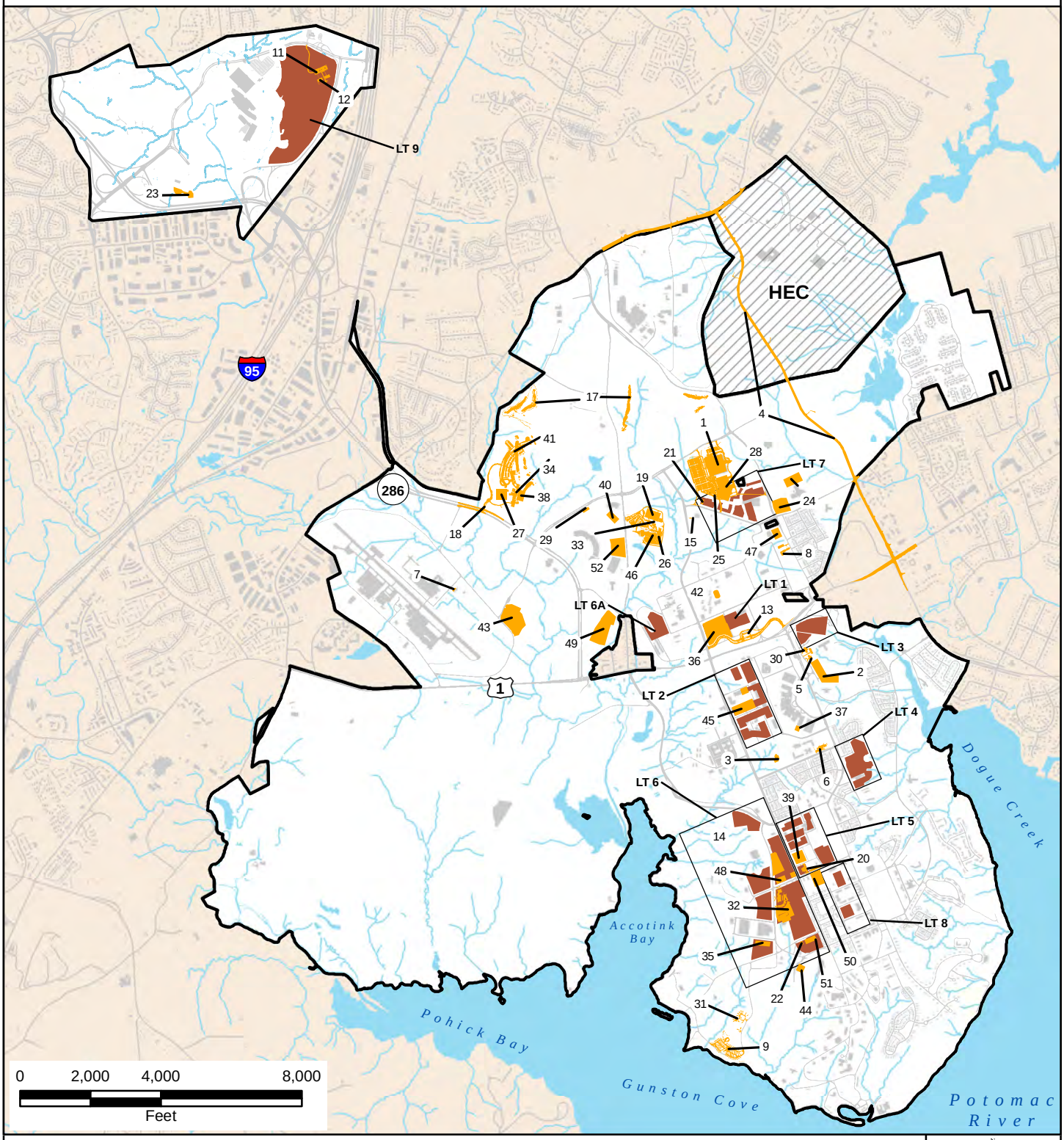
Alternative 2 assumes full implementation except that there would be no long-term development project on the FBNA (LT 9, a secure campus for 7,500 personnel). Figure 2-13 illustrates the Alternative 2 short- and long-term projects. Assuming no major ST or LT development project on the FBNA allows a comparison with the impacts on traffic of the proposed LT 9 project. The 2005 BRAC planning process at Fort Belvoir initially assigned two major projects to the FBNA (then known as the Engineer Proving Ground, or EPG): the headquarters for the NGA and the Washington Headquarters Service. At the time, the EPG was an undeveloped, largely-wooded site used until 1988 by the US Army Corps of Engineers for training and weapons proving.

Alternative 2 also assumes that two projects would be deferred from the short term into the long term, ST 40, two new parking garages on the existing DLA parking lot, which would free up space on the parking lot to build ST 52, a new 267,000-square foot administrative center for DLA. Deferring ST 52 would delay the arrival of 1,000 new personnel from the short term to the long term.

During the 2005 Fort Belvoir BRAC EIS process, transportation agencies expressed concern about the poor road access to the FBNA and that even with coming transportation improvements, access might not be adequate to support two major development projects on the site. As a result, while the NGA settled on FBNA, the Washington Headquarters Service moved to a new building on I-395 in Alexandria, Virginia – the Mark Center. In the intervening years, access to the FBNA has improved considerably with the completion of the adjacent Fairfax County Parkway, which is a major thoroughfare through Fairfax County and connects to I-95.

Another project that enhanced access is the high-occupancy vehicle (HOV) access ramp from I-95 to the FBNA , recently completed. Further, I-95 is being widened to 11 lanes, including high-occupancy toll and regular HOV lanes with completion scheduled for 2017. LTT 8 would complete the Heller Road Loop on the FBNA, easing movements around the site. Therefore, the Army developed this alternative to allow comparison of the impact of proposed future development on Main Post but with no development on the FBNA versus development on both the FBNA and Main Post (Alternatives 1 and 3).

Alternative 1 - Full Implementation - The Preferred Alternative



Legend

- Short-Term Project Sites (Construction FY 2012 - 2017)
- Long-Term Project Sites (Construction FY 2018 - 2030)

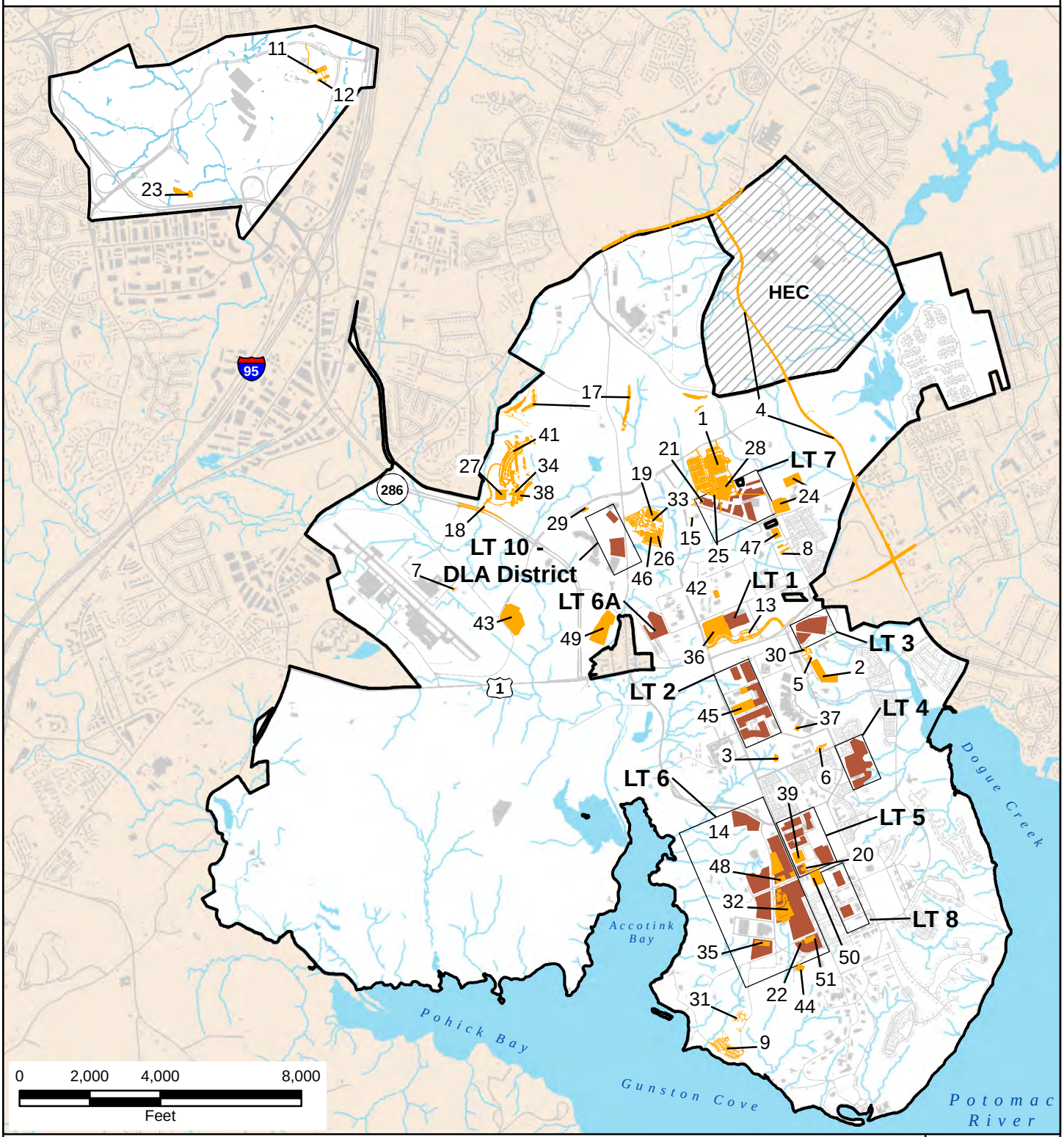
Fort Belvoir RPMP EIS

Figure 2-12

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Alternative 2 - Modified Long-Term



Legend

- Short-Term Project Sites (Construction FY 2012 - 2017)
- Long-Term Project Sites (Construction FY 2018 - 2030)

Fort Belvoir RPMP EIS

Figure 2-13

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2.2.4 Alternative 3 – Modified Short-Term

Alternative 3 assumes almost full implementation of the master plan except that implementation of the majority of short-term projects would be delayed from the short-term (2012-2017) to the long-term (2018-2030) and some projects would have fewer personnel than under Alternative 1. Figure 2-14 illustrates the Alternative 3 short- and long-term projects.

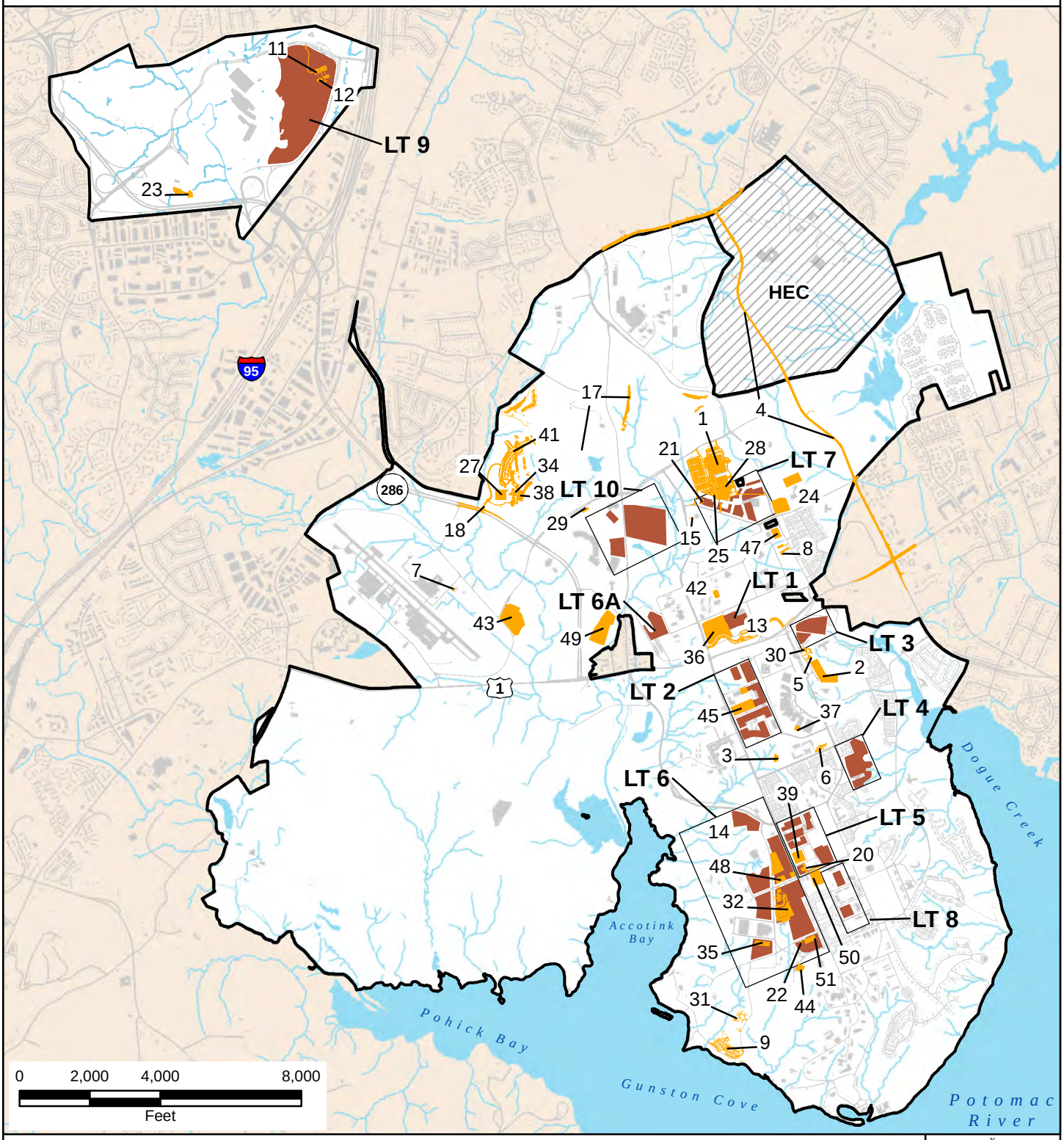
Major projects delayed would include:

- INSCOM expansion (ST 19, 26, 33, and 46)
- 249th Battalion HQ (ST 32)
- 29th Infantry HQ (ST 36)
- Medical office building (ST 37)
- DLA parking garage and administrative center projects (ST 40 and 52)
- OSEG Training Compound (ST 43)
- Secure administrative facility (ST 45)
- 911th Engineering Company Operations Complex (ST 49)

Projects delayed until 2018 or later would still be implemented. Implementing this alternative would result in approximately 40,000 personnel by 2017 and 55,000 by 2030. The delayed INSCOM and DLA projects form development alternative LT 10.

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Alternative 3 - Modified Short-Term



Legend

- Short-Term Project Sites (Construction FY 2012 - 2017)
- Long-Term Project Sites (Construction FY 2018 - 2030)

Fort Belvoir RPMP EIS

Figure 2-14

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3 Affected Environment & Environmental Consequences



INTRODUCTION

This chapter describes the existing conditions of the resources that may be affected by the Proposed Action and assesses the environmental consequences of implementing the EIS alternatives on these resources. The resources listed below were affirmed during the Public Scoping process (Section 1.4.2) as the ones for which impacts need to be evaluated as a result of implementing the Proposed Action. The chapter is organized by potentially affected resources:

3.1 Land Use and Plans

3.2 Socioeconomics

3.3 Cultural Resources

3.4 Transportation and Traffic

3.5 Air Quality

3.6 Noise

3.7 Geology, Topography and Soils

3.8 Water Resources

3.9 Biological Resources

3.10 Utilities

3.11 Hazardous Substances and Potentially Contaminated Sites

3.12 Energy Use and Sustainability

NEPA and the CEQ's regulations implementing NEPA (40 CFR Part 1502.15) mandate that the EIS "shall succinctly describe the environment of the area(s) to be affected or created by the alternatives under consideration." Depending on the resource considered, the potentially affected environment for this EIS may be limited to part or all of Fort Belvoir; may extend off-post to Fairfax County, Prince William County, and the Potomac River; or may encompass the Washington, DC Metropolitan Area.

In response to NEPA and CEQ's implementing regulations (40 CFR Part 1501.16), the environmental consequences of implementing each of the alternatives is analyzed in this chapter following the description of affected environment for each resource. Potential mitigation measures are also considered, where relevant.

For the purposes of this EIS, the terms "impacts" and "effects" are used interchangeably; they are synonymous. Impacts can be described as having several distinct attributes. For each resource or built system analyzed in this EIS, a threshold level of significance is defined. 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.

40 CFR 1508.27 Significantly

"Significantly" as used in NEPA requires considerations of both context and intensity:

(a) Context. This means that the significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality. Significance varies with the setting of the proposed action. For instance, in the case of a site-specific action, significance would usually depend upon the effects in the locale rather than in the world as a whole. Both short and long-term effects are relevant.

(b) Intensity. This refers to the severity of impact. Responsible officials must bear in mind that more than one agency may make decisions about partial aspects of a major action. The following should be considered in evaluating intensity:

(1) Impacts that may be both beneficial and adverse. A significant effect may exist even if the federal agency believes that on balance the effect will be beneficial.

(2) The degree to which the proposed action affects public health or safety.

(3) Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.

(4) The degree to which the effects on the quality of the human environment are likely to be highly controversial.

(5) The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.

(6) The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.

(7) Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.

(8) The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources.

(9) The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973.

(10) Whether the action threatens a violation of federal, state, or local law or requirements imposed for the protection of the environment.

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 normal variability and do not appreciably affect the extent or value of the resource or built system. Adverse impacts are easily absorbed without mitigation or 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.

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3.1 LAND USE AND PLANS

The first part of this section describes the physical use of land on and around Fort Belvoir, the installation's spatial relationships with the surrounding community, and planning documents that guide development on Fort Belvoir, in adjacent areas of Fairfax County, in the National Capital Region, and in the coastal zone of Virginia. The second part of this section evaluates the consequences of implementing the proposed master plan on land use and plans for Fort Belvoir, nearby areas of Fairfax County, the National Capital Region, and the coastal zone of Virginia.

Thresholds of Significance

The following thresholds were used to determine the significance of an impact in the land use impact analysis:

- A new land use is introduced that is incompatible with and prevents the continuation of one or more existing adjacent on- or off-post land uses.
- A new land use is introduced where existing on- or off-post adjacent land uses would likely be incompatible with the new use and may make its long-term operation untenable.
- A new land use is introduced that substantially prevents the fulfillment of the goals, objectives, or policies of an existing on- or off-post planning document that are applicable to that particular parcel or area.

3.1.1 Affected Environment

The affected environment described in this section includes the land use and plans for Fort Belvoir, Fairfax County, the National Capital Region, and the Virginia coastal zone that may be enhanced or adversely affected by proposed actions at Fort Belvoir carried out as part of the implementation of the master plan update.

3.1.1.1 Regional Geographic Setting and Location

Fort Belvoir is located in Fairfax County, Virginia, which is part of the National Capital Region.[1] The National Capital Region includes Washington, DC and other jurisdictions that are either directly adjacent to or within a short distance (20 to 25 miles) of the District of Columbia (Figure 1-1). Development within the region varies from Washington's dense, urban downtown to the moderately-dense, suburban-style development found along major transportation corridors and in the outlying suburbs. Notable environmental features within the region include the Anacostia and Potomac Rivers, and numerous streams, parks, refuges, and other natural areas are interspersed among the region's developed areas. Region-wide planning initiatives are primarily guided by the National Capital Planning Commission (NCPC), which has oversight over all federal development, and the Metropolitan Washington Council of Governments (MWCOG), which is largely responsible for transportation, environmental, and socioeconomic forecasting and planning.

[1] As defined in the National Capital Planning Act, as set forth at 40 U.S.C. §§8701 et seq., the National Capital Region comprises:

- The District of Columbia;
- Montgomery and Prince Georges Counties in Maryland;
- Arlington, Fairfax, Loudoun, and Prince William Counties in Virginia; and
- All cities in Maryland or Virginia in the geographic area bounded by the outer boundaries of the combined area of the counties listed in B and C.

Fairfax County is the most populous jurisdiction in the National Capital Region. The county covers approximately 400 square miles and is home to about 1.1 million people. Mostly suburban in character, the county combines residential developments of various densities with major employment and commercial centers. It is bordered by other jurisdictions that are similarly developed (Montgomery and Prince George's Counties in Maryland), more intensely developed (Arlington County and the City of Alexandria in Virginia), or that have portions that have become more developed over the last several decades as the Washington, DC metropolitan area has expanded (Prince William and Loudoun Counties in Virginia).

Fort Belvoir occupies about 8,500 acres, or 13.3 square miles, in southeastern Fairfax County, approximately 16 miles south of Washington, DC. For ease of discussion and reference, Fort Belvoir is divided into five sub-areas as shown in Figure 1-2: North Post (which is further subdivided into Upper North Post and Lower North Post), South Post, Southwest Area, DAAF, and FBNA. Each sub-area is generally characterized by distinctive functions, visual character, and physiography, and is further described in Section 3.1.3. Collectively, North Post, South Post, Southwest Area, and DAAF make up Fort Belvoir's Main Post, while FBNA is a non-contiguous property located northwest of Main Post. Accotink Village is an enclave of privately-owned land completely surrounded by Fort Belvoir; it is under the jurisdiction of Fairfax County and is discussed in greater detail in Section 3.1.1.4.

Two remotely-located parcels fall under the purview of Fort Belvoir but are not included in the Fort Belvoir RPMP update or evaluated in this EIS: the Mark Center in the City of Alexandria, Virginia, which was acquired by Fort Belvoir in 2008 and has been developed to full capacity for the Washington Headquarters Service; and Rivanna Station, located near Charlottesville, Virginia, approximately 80 miles southwest of Fort Belvoir. Additionally, the 579-acre HEC, which borders the northeastern corner of North Post, is administered by the US Army Corps of Engineers and is not addressed in the RPMP update or this EIS.

3.1.1.2 Fort Belvoir Existing Land Use

Existing Land Use Designations

Current land use designations used at Fort Belvoir are based on a system adopted by the Army in 2007 that classifies land uses into seven categories as shown in Figure 2-1. The current land use categories reflect the predominant use of a particular area, provide flexibility in siting facilities, and encourage mixed-use development. The Army's land use categories are also sufficiently broad to include facilities that are not necessarily reflective of the predominant land use but also do not cause substantial incompatibility issues with surrounding land uses (i.e., Professional/Institutional uses in an area designated as Community). With some exceptions, actual land uses on post generally match the designations; notable inconsistencies are included in the discussions of Fort Belvoir's sub-areas following this section. Existing land use categories are described in Table 3.1-1.

Existing land use at Fort Belvoir is a function of the post's history, geography, needs, and responsibilities as an installation supporting more than 160 elements of the Army and DoD. Since 1993, development at Fort Belvoir has been guided by the land use plan defined in the Long Range Component of the 1993 RPMP, as amended in 2002 and 2007.

Approximately 65 percent of Fort Belvoir is undeveloped and extensive areas are forested, particularly in the Southwest Area (US Army, 2014b). Developed areas are found in all three of the major Post subdivisions (South Post, North Post, and the FBNA). However, the density of development is uneven. South Post is the most densely developed area. Environmentally sensitive areas and constraints to development on Fort Belvoir are discussed in the Future Development Constraints section.

Table 3.1-1
Fort Belvoir Land Use Designations

Designation	Description
Professional/ Institutional	This category includes non-tactical organizations including military schools, headquarters, major commands, and non-industrial research, development, test, and evaluation facilities. Portions of Fort Belvoir with this designation include the entirety of FBNA, large portions of North Post, areas along the central north-south axis of South Post, and a small area on the eastern side of DAAF.
Community	This designation encourages a mix of uses and includes religious, family support, personnel and professional services, medical, retail, commercial, and recreational facilities. Areas classified as Community are found throughout North and South Posts and the eastern portion of the Southwest Area.
Residential	This land use provides space for family housing and senior unaccompanied personnel housing. It also includes family services and may have other neighborhood services associated with the community land use cluster included in the area. Residential areas on Fort Belvoir are comprised of 2,106 homes collectively occupying 577 acres in 12 villages primarily situated along the southeast and east edges of North Post and South Post.
Troop	This classification organizes the facilities of related organizations that facilitate operational readiness, support operations security for deployable units, and improve circulation and movement of Soldiers and trainees among sleeping, eating, and training facilities. The majority of land in this category is concentrated on Lower North Post, although some isolated troop facilities are located in other areas of the installation.
Industrial	This category groups production, maintenance, depot and storage, and other activities that generate significant amounts of heavy vehicle traffic, loud outdoor equipment operations, noise, smoke, steam, or pollutants that must be processed on the site. The majority of land designated as Industrial is located on South Post, with a smaller area on Lower North Post.
Ranges and Training	This land use encompasses approximately two-thirds of the Southwest Area, and includes closed or former live fire ranges, non-live fire ranges, and special training areas such as confidence courses, drivers' training, and land navigation (Active and closed ranges and training areas at Fort Belvoir are shown in Figure 3.11-2, Ranges and Training Areas).
Airfield	This category encompasses the majority of DAAF and 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.

North Post

North Post covers approximately 2,250 acres and is generally bounded by Telegraph Road to the north, Huntley Meadows Park to the east, US Route 1 to the south, and Fairfax County Parkway to the west. The predominant land use classification is Community, which makes up approximately 1,154 of the acres on North Post, with Professional/Institutional uses comprising about 737 acres. The remainder of North Post includes land classified as Residential (259 acres), Industrial (59 acres), and Troop (46 acres).

John J. Kingman Road, which crosses North Post in an east-west direction from DAAF between Santjer Road and Woodlawn Road, serves as an informal dividing line between Upper North Post and Lower North Post. Largely due to environmental and topographical constraints, Upper North Post is less developed than Lower North Post, and land use is categorized as either Community or Professional/Institutional. The 36-hole North Post Golf Course represents the sole Community use on Upper North Post, while the Defense Aerospace Data Facility East is the only Professional/Institutional use located there. As a facility with a more industrial nature and purpose, the Salvage and Surplus Property facility, located immediately south of Telegraph Road and west of Beulah Street, represents a land use inconsistency on Upper North Post within the Community area.

The nature and intensity of development on Lower North Post is similar to South Post and is predominantly characterized by Community, Professional/Institutional, and Residential uses. Troop and Industrial areas are

also located there, but to a lesser extent. Community uses on Lower North Post include the Commissary, the PX, and Class VI facility (Shoppette), which are all located just south of John J. Kingman Road between Gunston and Woodlawn Roads. Areas designated as Professional/Institutional primarily reflect the presence of large tenant organizations that occupy fenced and secured compounds on the North Post, including DLA, the Defense Threat Reduction Agency, and INSCOM. However, these areas also include such tenants as OCAR, the Army National Guard Reserve Center, and the District of Columbia National Guard Resource Training Center, which occupy much smaller developed footprints.

The Troop area is concentrated on North Post between Abbott and Goethals Roads and consists primarily of McRee Barracks, but also includes a fitness center and some administrative uses. Industrial uses encompass the area immediately north of Route 1 between Accotink Village and Gunston Road. Residential areas are represented by Lewis Village, north of Route 1 and east of Woodlawn Road, and Woodlawn Village, which is located on the eastern edge of North Post south of HEC.

Development on Upper North Post is clustered and of moderate to low density. Developable areas on Upper North Post are not contiguous due to the presence of numerous environmental constraints, and are generally developed individually as cohesive units both functionally and visually. In contrast, Lower North Post is more densely developed, largely due to the relatively unconstrained nature of the area. The more intensely developed character of Lower North Post reflects development patterns on South Post and serves as a transition between the two sides of the installation.

Principal environmental features on North Post consist of two protected areas, the Jackson Miles Abbott Wetland Refuge and the Fort Belvoir Forest and Wildlife Corridor (FWC) (see Figure 3.9-1). The Jackson Miles Abbott Wetland Refuge consists of approximately 234 acres and isolates Woodlawn Village from the rest of North Post. The FWC comprises about 404 acres and centrally bisects North Post. It forms a semi-circle around the DLA facility and includes a portion of the Jackson Miles Abbott Wetland Refuge. These environmentally-sensitive areas are discussed in greater detail in Section 3.9 (Biological Resources).

South Post

South Post is located south of US Route 1 and occupies approximately 2,550 acres on a peninsula extending into the Potomac River between Gunston Cove and Accotink Bay (to the west) and Dogue Creek (to the east). South Post is the most intensively-developed part of Fort Belvoir and land uses tend to be more diverse than in the installation's other sub-areas. Areas designated as Residential and Community occupy approximately 982 acres and 759 acres, respectively, making up the majority of South Post's acreage. Professional/Institutional uses comprise about 499 acres, while Industrial uses occupy about 310 acres.

The densest area of development forms a core along South Post's primary north-south axis, extending from US Route 1 in the north to the shoreline of the Potomac River, and is bounded to the east and west by Belvoir and Gunston Roads, respectively. The predominant uses within this core are Professional/Institutional and Community, with two smaller areas of Residential. Professional/Institutional uses within the core area include the FBCH, Fort Belvoir Garrison Headquarters, Defense Acquisition University, and research and development activities within the 300 Area. Residential areas in the core include Vernondale and Gerber Villages. Community uses in this area are represented by retail businesses comprising the Town Center on 12th Street between Gunston and Middleton Roads; the automotive service center/gas station and Specker Field House, both along the south side of 12th Street; and the historic Parade Ground adjacent to the Garrison Headquarters facility.

Two notable inconsistencies between actual and designated land use are located in areas designated as Community within the core area. The Warrior-in-Transition barracks represents a Troop use in the Community area immediately south of the FBCH. Further to the south, the Vehicle Maintenance Shop along the south side of 16th Street and just east of Gunston Road is an Industrial use located in the Community area that also includes the South Post Town Center area along 12th Street. The Vehicle Maintenance Shop's site

backs up to single-family homes along the north side of 18th Street that are included in a Residential land use area as well as in the Fort Belvoir Historic District.

Outside the core area, the South Post is characterized by a range of more-widely-spaced facilities. Approximately 850 acres along most of South Post's eastern boundary are designated as Residential and include Belvoir, Gerber, Fairfax, Dogue Creek, and River Villages and Jadwin Loop, as well as the Officers' Club and the Gerber Hall Community Center. Land along South Post's western shore is classified as Community, and is largely forested and undeveloped. This area contains such uses as the Tompkins Basin outdoor recreation area, at the end of Warren Road on a small point of land extending into Accotink Bay; a fishing pier, to the south of the Tompkins Basin area; and a pair of baseball fields, just west of Gunston Road. The Eleanor U. Kennedy Homeless Shelter, located just south of US Route 1 next to the Tulley Gate entrance, represents an additional Community use on South Post. The shelter is leased to Fairfax County and provides temporary housing for homeless persons (US Army, 2014b).

Industrial land on South Post is comprised of approximately 310 contiguous acres along the western side of Gunston Road. The portion of this area north of Pohick Road includes Fort Belvoir's Public Works facility and an assortment of storage warehouses. Several long, low, linear warehouse structures, which were built along the railroad spur that once served Fort Belvoir, are located south of Pohick Road between Gunston and Theote Roads. Portions of these structures are still used for storage, although some have been converted to office and administrative uses. Other specific facilities in the Industrial area include a recreational vehicle storage lot, located at the southeast corner of the Theote Road-16th Street intersection; the storage warehouse for the proposed NMUSA, located along the west side of Theote Road and north of Warren Road; and the offices of the Criminal Investigation Division Command, along Warren Road between Theote and Gunston Roads.

Protected environmental areas on South Post include a portion of the Accotink Bay Wildlife Refuge, which overlays much of the Community area north of Tompkins Basin, as well as the southwestern edge of the Industrial area; and the T-17 refuge, which straddles the boundary between the Community and Professional/Institutional areas at the southern end of the South Post peninsula. The southwestern edge of the Industrial area is also overlain by a small portion of the Accotink Bay Wildlife Refuge.

Fort Belvoir North Area

FBNA, formerly known as the Engineer Proving Ground (EPG), is an 800-acre noncontiguous portion of the installation located about 1.5 miles northwest of Main Post. The property is bounded on the east by I-95, by commercial properties to the south, and by residential properties on the west and north sides. Accotink Creek traverses FBNA from north to south and divides the property into two nearly-equal, broad, level terraces.

FBNA was acquired in the early 1940s for the testing of a wide range of engineering equipment and supplies, including methods and equipment for the deployment, detection, and neutralization of landmines. FBNA was under the jurisdiction of the Army Research, Development, and Engineering Command and has undergone extensive environmental remediation since the discontinuation of testing activities and the return of the property to Fort Belvoir in 1988.

Land use on the entirety of FBNA is classified as Professional/Institutional. As part of the BRAC realignment, NGA consolidated and moved to FBNA. NGA occupies approximately 62 acres between Accotink Creek and I-95. Other facilities on FBNA include an emergency services center (fire station), located in the northeastern corner of the property north of Barta Road, and a remote inspection facility.

Davison Army Airfield

DAAF is located west of North Post. The airfield accommodates five operational flying units within the Washington/National Capital Region Military District and a training unit of the District of Columbia Air

National Guard. An average of 200 aircraft take off and land daily in fulfillment of the airfield's mission of transporting passengers and freight for the Army and DoD to, from, and within the National Capital Region (McCullum, pers. comm., September 11, 2013).

DAAF is located within an 800-acre property that is bounded by Fairfax County Parkway to the north and east and US Route 1 to the south. Telegraph Road partially forms its western boundary, with the remainder comprised of commercial, light industrial, and residential areas. The majority of this area, about 690 acres, is designated as Airfields land use, and is the only part of Fort Belvoir where this designation occurs. Approximately 350 of those acres are devoted to the structures, paved surfaces, and cleared areas associated with the airfield's operations. Primary structures supporting airfield operations include the 5,500-by-80-foot runway, which is oriented in a northwest-to-southeast direction; a parallel 4,900-foot taxiway; a 450-by-40-foot helipad as well as six aircraft hangars, a control tower, and several low-rise buildings housing administrative and support functions. Most of the remainder of the Airfields land use area is forested, and Accotink Creek traverses the property just north of and roughly parallel to the main runway. The Fort Belvoir FWC overlays a substantial portion of the forested land, including part of Accotink Creek, between the airfield operations area and the Fairfax County Parkway.

An area designated as Professional/Institutional is confined to the east side of the property along Fairfax County Parkway and reflects the presence of the Mosby Reserve Center. Developed areas associated with the Mosby Reserve Center comprise approximately 15 acres; the rest of the Professional/Institutional land consists of forest cover, the majority of which is overlain by the FWC.

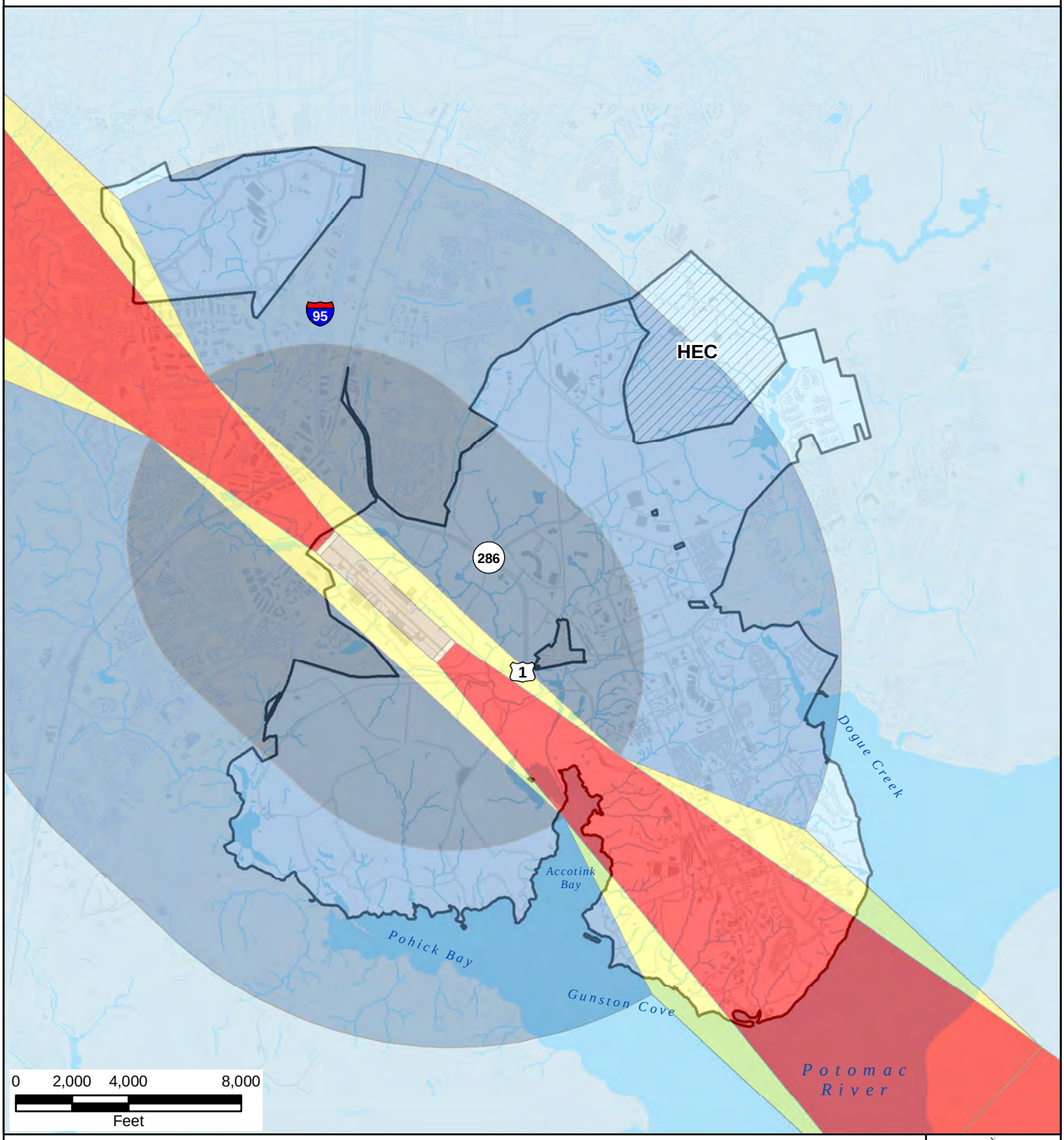
Two- and three-dimensional safety zones are defined around runways and taxiways at all airports and airfields, including those at DAAF, to minimize the potential for accidents during take-off and landing operations. These zones are to remain clear of objects, such as buildings, that could cause or be affected by an accident. Figure 3.1-1 illustrates airspace restrictions associated with DAAF. The footprint of the safety zones associated with the airfield extends well beyond the airfield itself. The safety zones constrain the presence and height of potential developments in parts of the surrounding land, including the North Post, Southwest Area, and FBNA. Building height restrictions are governed by guidelines and regulations relating to the identification and construction of obstructions within airspace, as set forth in the Federal Aviation Regulations Part 77, Objects Affecting Navigable Airspace.

Building restrictions within the conical surface depicted in Figure 3.1-1 begin at the 150-foot level above the runway at the boundary with the inner horizontal surface and extend outward at a slope of 20:1 (horizontal: vertical) for a distance of 7,000 feet to an elevation of 500 feet above the airfield. Most of the remaining portion of Main Post (with the exception of the extreme northeast and southeast sections) and FBNA fall within the 150- to 500-foot building height restriction within the conical surface. Portions of the Mount Vernon, Rose Hill, Springfield, Pohick, and Lower Potomac planning districts also fall within portions of the conical surface height restriction boundary.

Southwest Area

The Southwest Area encompasses approximately 2,100 acres south of US Route 1 and west of South Post, and is the least-developed and most-heavily-forested part of Fort Belvoir. This part of the installation is served with little or no infrastructure, and few buildings or structures are present. The north-central portion of the area formerly served as an open burning/open detonation area, and former landfills are found in the northern portion of the area. Most of the Accotink Bay Wildlife Refuge and a portion of Fort Belvoir's FWC are contained within the Southwest Area. Overall, the Southwest Area bears little functional and visual relationship to the rest of Main Post.

Davison Army Air Field Airspace Restrictions



Legend

- Primary Surface
- Clear Zone Surface
- Approach-Departure Clearance Surface
- Transitional Surface
- Inner Horizontal Surface (150')
- Conical Surface
- Outer Horizontal Surface (500')

Fort Belvoir RPMP EIS

Figure 3.1-1

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The western two-thirds of the Southwest Area, or about 1,423 acres, is designated as Training land use and is utilized for outdoor training, such as small unit maneuvers and orienteering. Boarding stables for the US Army 3rd Infantry Regiment, which furnishes and handles the horses used in burial ceremonies at Arlington National Cemetery and other events, are also located in this area. The remainder of the Southwest Area is classified as Community, which is contiguous with the Community area along the western boundary of South Post. Depending on wildlife management needs, hunting for whitetail deer is permitted on a limited basis on the Southwest Area's Community land during hunting season.

Future Development Constraints

Approximately 5,525 acres, or about 65 percent, of Fort Belvoir is undeveloped. However, numerous land use constraints are found throughout the post, which limits the land area that is actually available for future development. The spatial relationship of developable and constrained land within the various land use areas on the post is illustrated in Figure 3.1-2. It should be noted that, although areas identified as unsuitable for development are designated as part of the dominant land use category that surrounds them, the constraints and use restrictions associated with those areas remain in effect; the lack of a specific land use designation for them does not reduce environmental areas or increase developable areas (US Army, 2014b).

Such constraints are listed below and discussed in greater detail in relevant sections of this EIS:

- Environmental (Sections 3.7, Geology, Topography, and Soils; 3.8, Water Resources; and 3.9, Biological Resources):
  - Wildlife refuges, habitat protection, restoration, and conservation areas
  - Resource Protection Areas (RPAs) and floodplains
  - Wetlands and riparian areas
  - Stream restoration and wetland mitigation areas
  - Reforestation mitigation areas
  - Steep slopes (considered to be slopes greater than 15 percent)
- Historic, prehistoric, and cultural sites, districts, and viewsheds (Section 3.3, Cultural Resources)
- Ranges and training areas
- Solid waste management units (Section 3.11, Hazardous Substances and Potentially Contaminated Sites)
- Hazardous waste management units (Section 3.11)
- Petroleum storage areas and petroleum release sites (Section 3.11)
- Land use controls (e.g., physical, legal, or administrative mechanisms that place restrictions on the use of, or limit access to, real property where environmental restoration activities have occurred to prevent exposure to chemicals above permissible levels (US Army, 2014b)
- Land use encumbrances (e.g., land leases, public utility easements, right of access agreements, and outparcels)
- Airfield safety zones (Section 3.1.3.1.5)

The amount of acreage by land use category suitable for development throughout Fort Belvoir is presented in Table 3.1-2.

Table 3.1-2
Constrained and Developable Acreage on Fort Belvoir

Land Use Category	Existing Land Use Acreage		
	Total	Constrained	Developable
Professional/ Institutional	2,113	863	1,250
Residential	1,240	655	585
Troop	46	0	46
Community	2,569	1,626	943
Range/ Training	1,463	1,003	460
Airfield	690	472	218
Industrial	378	95	284
TOTAL	8,500	4,714	3,786
TOTAL PERCENTAGES	100	55	45
MAIN POST TOTAL	7,696	4,421	3,275
FBNA TOTAL	804	293	511
Source: Atkins, 2015.			

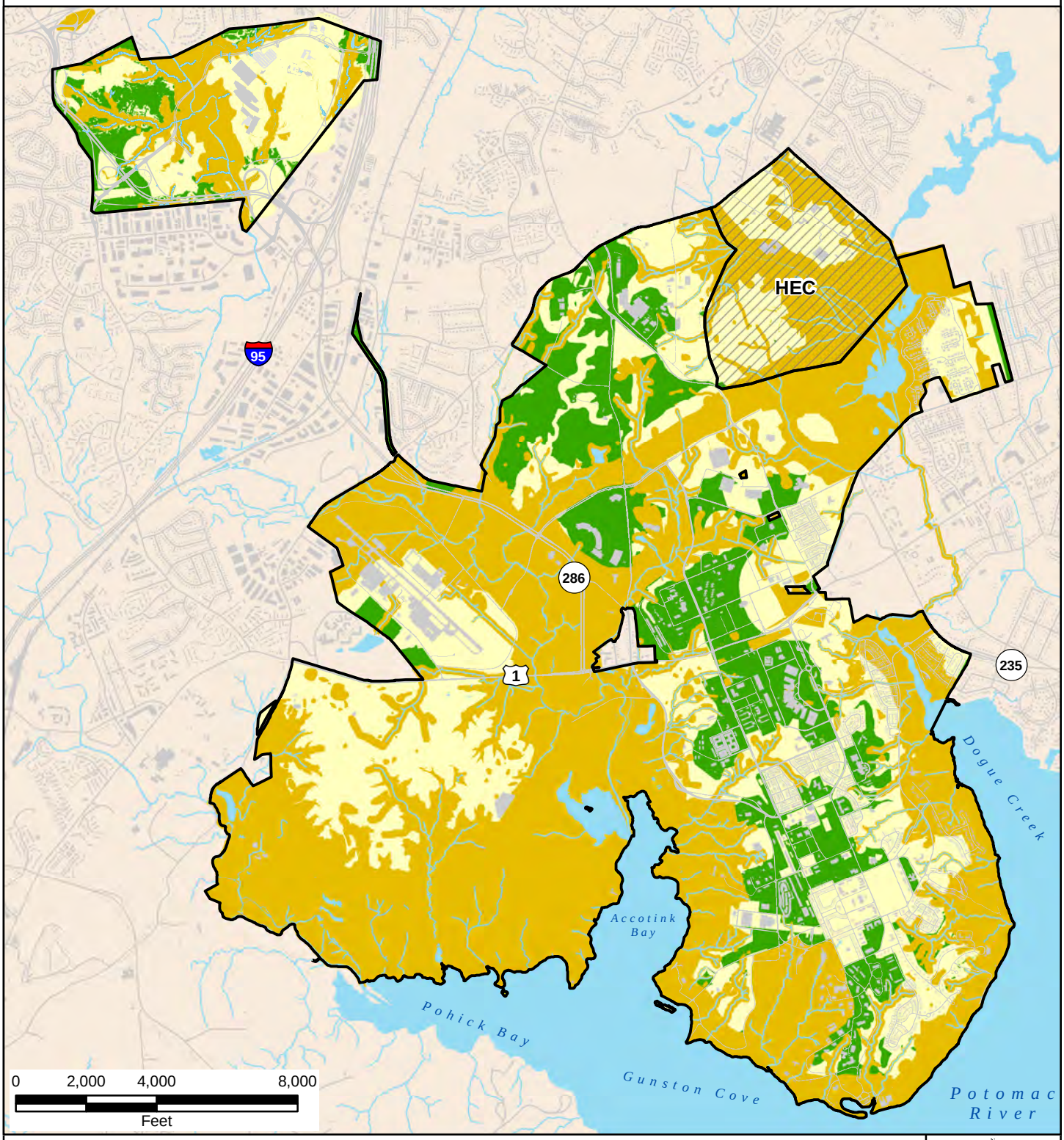
Developable land has no or minimal use restrictions, as the overlay in Figure 3.1-2 shows, and comprises both undeveloped and developed land. Thus, for a substantial amount of acreage identified as suitable for development on Fort Belvoir, development would actually be redevelopment (i.e., construction in previously-disturbed or currently developed areas). Generally, future development is expected to be concentrated in the areas designated as "Most Suitable for Development" shown in Figure 3.1-2, as construction would be less costly, faster, and more convenient (US Army, 2014b).

Antiterrorism and Force Protection

Fort Belvoir is one of the premier military garrisons in the Army, hosting a broad array of critical intelligence, training, and headquarters services. Antiterrorism and Force Protection (AT/FP) measures protect these vital services and resources, including personnel, information, and infrastructure from terrorist attack. AT/FP is considered mission critical and inviolable. AT/FP encompasses four principles: physical security, command and control security, personal security, and law enforcement operations (US Army, 2007a). AT/FP regulates public safety, access control, visitor/delivery centers, line-of-sight, mandatory setback minimum distances for facilities, and compatibility with adjacent uses/operations, particularly as they relate to transportation and infrastructure. Army regulations establish setback and construction requirements on the basis of risk and vulnerabilities of resources and operations in question. Some tenant agencies develop their own AT/FP plans within the scope of Army requirements. Fort Belvoir has developed an AT/FP plan and program designed to meet regulatory guidance (US Army, 2007a).

In terms of land use, AT/FP is addressed by considering the siting and design of new facilities or agencies in relation to their particular needs. Implementation of AT/FP measures is most effective and least disruptive when they are considered from the beginning of the planning process.

Fort Belvoir Development Constraints



Legend

- Least Suitable for Development
- Moderately Suitable for Development
- Most Suitable for Development

Fort Belvoir RPMP EIS

Figure 3.1-2

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3.1.1.3 Surrounding Land Use

Fort Belvoir is located in a part of Fairfax County that is rich in natural and cultural resources. As shown in Figure 3.1-3, land uses around the installation are predominantly designated as Residential and Recreation but also include a mixture of Industrial, Retail, and Government/Institution uses. The following paragraphs briefly describe off-post land uses in relation to the installation's subareas.

North Post

Neighborhoods of single-family housing, townhouses, and apartments, as well as community-serving uses such as the Hayfield Secondary School and the Hayfield Plaza Shopping Center, are located along Telegraph Road between the Fairfax County Parkway and Hayfield Road. South of Telegraph Road, HEC and Huntley Meadows Park border the northeastern corner of North Post. The Quaker Society of Friends Meeting House and Woodlawn, a National Trust Historic Site that also includes one of three Virginia homes designed by Frank Lloyd Wright, are located southeast of North Post at the US Route 1-Old Mill Road intersection. Fairfax County Parkway forms the western border of North Post and separates it from DAAF.

South Post

Across Dogue Creek to the east of South Post, neighborhoods of low-density, single-family homes are located along the north and south sides of the Mount Vernon Memorial Highway. The Mount Vernon Estate, a national historical landmark, lies farther to the east beyond these neighborhoods, while Mount Zephyr Park, Grist Mill Park, and George Washington Grist Mill State Park are all located along the north side of Mount Vernon Memorial Highway between the estate and US Route 1. Small commercial uses consisting of convenience stores, fast food and auto service uses, and hotels are concentrated on the southeast corner of the US Route 1/Mount Vernon Memorial Highway intersection. To the west, South Post is separated from the Southwest Area by Accotink Creek and Accotink Bay, while Gunston Cove and the Potomac River form the installation's southern boundary.

FBNA

FBNA is bounded by Fairfax County Parkway to the west and south, and to the north by single-family homes, townhomes, and Hooes Road Park. Commercial and light-industrial uses occupy a wedge of private land between FBNA's eastern boundary and I-95, although this area is increasingly converting to office use to capitalize on its proximity to Fort Belvoir. Additional light-industrial uses are concentrated beyond Fairfax County Parkway to the south.

DAAF

DAAF is bounded by Fairfax County Parkway to the north and east and US Route 1 to the south. Its western border is partially formed by Telegraph Road, with the remainder comprised of commercial, light-industrial, and residential uses. Fort Belvoir's North Post is located to the east beyond Fairfax County Parkway, and the Southwest Area lies to the south across US Route 1.

Southwest Area

With the exception of a residential area on the northeastern corner of the US Route 1-Telegraph Road intersection, the Southwest Area is bounded by other Fort Belvoir uses to its north (DAAF) and east (South Post). Fairfax County's Noman M. Cole Jr. Pollution Control Plant is located between US Route 1 and the Southwest Area's western boundary, while Pohick Bay Golf Course and the Pohick Bay Regional Park are located to the south on the otherwise sparsely-developed Mason Neck.

3.1.1.4 Relevant Plans and Studies

Fairfax County Comprehensive Plan

The Fairfax County Comprehensive Plan (Fairfax County Department of Planning & Zoning, 2012a) reflects the planning strategies intended to control the growth that is anticipated to occur in the county, and consists of the Policy Plan, four area plans, the Plan map, and the Transportation Plan map. The Policy Plan contains goals, objectives, and policies relating to eight functional elements: land use, transportation, housing, the environment, heritage resources, public facilities, human services, and parks and recreation. The goals, objectives, and policies guide planning and development review by describing future development patterns in Fairfax County and protecting natural and cultural resources for present and future generations (Fairfax County, 2011a).

The countywide element, contained in the Policy Plan, offers a broad statement of county policy to guide decisions toward enhancing the built and natural environment. The area plans give more site-specific guidance, from the planning district down to the community planning sector level. As a federal facility, Fort Belvoir is not bound by the plan. However, the Army strives to ensure that, to the greatest extent possible, its actions are compatible with it.

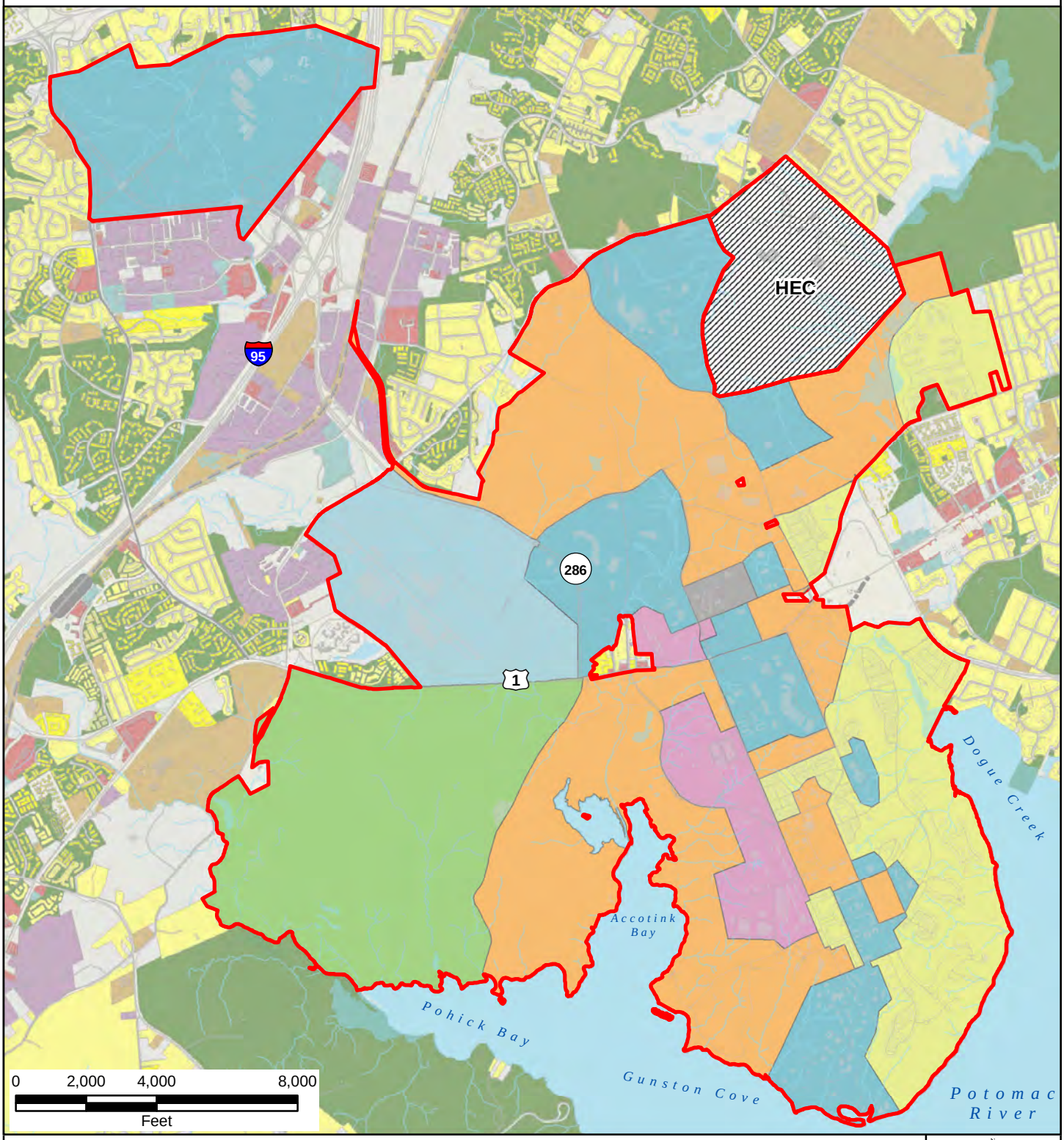
With respect to the land use functional element, the county has adopted both a specific land use countywide goal and related goals to provide land use development guidance, as follows:

- **Land Use:** maintain quality of life, coordinate public and private development, provide adequate public services and facilities, implement sound environmental practices, follow growth criteria and standards, and achieve economic goals
- **Transportation:** balance land use with transportation infrastructure by developing rapid rail, commuter rail, expanded bus service, reduced dependency on automobiles, and sidewalks and trails
- **Open Space:** support conservation of plants, animals, and natural land areas, including small open spaces within already-developed areas
- **Revitalization:** encourage and facilitate commercial and residential revitalization to prevent or eliminate deterioration
- **Private Sector Facilities:** develop commercial and industrial facilities to meet needs for goods, services, and employment, with special attention to small and minority businesses
- **Employment Opportunities:** maintain a strong economy and varied employment opportunities

For the purposes of land use planning, Fairfax County has subdivided its lands into 14 planning districts. As shown in Figure 3.1-4, Fort Belvoir's Main Post is located within the northeastern corner of the Lower Potomac Planning District, and is adjacent to three other planning districts: Springfield, Rose Hill, and Mount Vernon. FBNA is centrally located in the Springfield Planning District, and its western boundary borders the Pohick Planning District. Planning initiatives documented in the Fairfax County Comprehensive Plan for each of these areas are generally reflective of the six county-wide goals listed above. The following subsections summarize the planning initiatives and objectives most relevant to the activities included in the proposed action for each of those planning districts.

The Comprehensive Plan also directly addresses other specific areas and neighborhoods with special or unique characteristics where growth and change should be managed. Such an area with relevance to Fort Belvoir is Accotink Village, which is an enclave within Main Post, immediately north of US Route 1 along Backlick Road. Although the enclave is not considered a formal planning district, it is located within the Lower Potomac Planning District. A discussion of existing conditions and future planning initiatives for Accotink Village is provided below.

Fairfax County Land Use



Legend

On-Post Land Use

- Airfield
- Community
- Industrial
- Professional / Institutional
- Residential
- Training
- Troop

Off-Post Land Use

- Government/Institution
- Industrial
- Low-Density Single Family Housing
- High-Density Housing
- Office
- Recreation / Green Space
- Retail
- Vacant

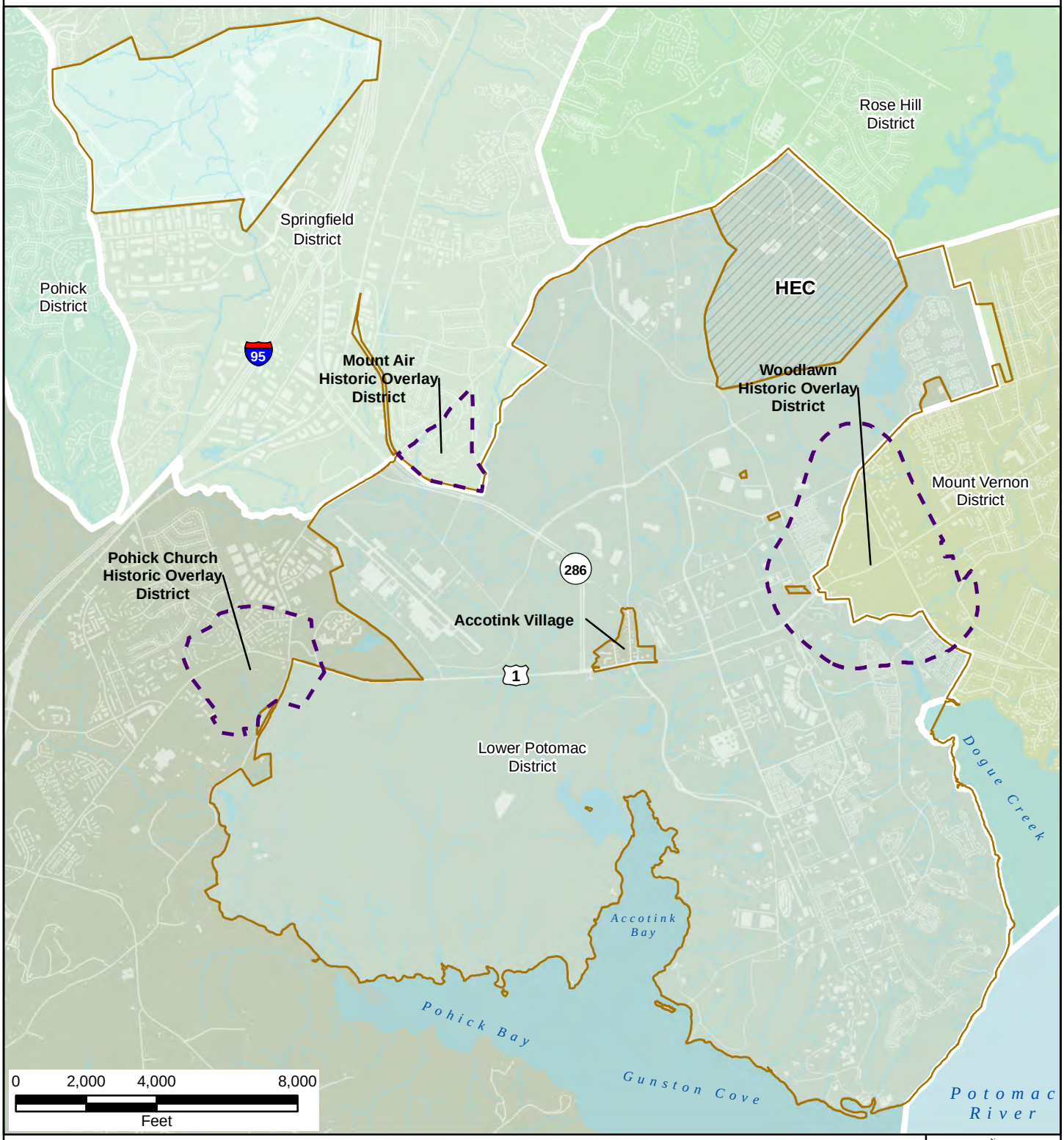
Fort Belvoir RPMP EIS

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Figure 3.1-3

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Fairfax County Planning Districts



Legend

- Fairfax County Historic Overlay District
- **Fairfax County Planning Districts**
- Lower Potomac District
- Mount Vernon District
- Pohick District
- Rose Hill District
- Springfield District

Figure 3.1-4

Fort Belvoir RPMP EIS

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Additionally, it should be noted that Fairfax County Historic Overlay Districts have been created for the purpose of promoting the general welfare, education, and recreational pleasure of the public through the perpetuation of those general areas or individual structures and premises that have been officially designated by the Board of Supervisors as having historic, architectural, archaeological, or cultural significance.

Lower Potomac Planning District

This district has a wide range of land uses and development densities. The highest concentration of uses and densities is focused around the transportation corridor formed by I-95, US Route 1, and various rail lines. Beyond these areas, the character of the district's land uses becomes predominantly suburban and rural. The majority of projected growth and development will be directed along the I-95/US Route 1 corridor to create suburban centers of activity. Areas of low-density residential should maintain their stable character, thereby aiding in preserving sensitive natural habitat and agricultural resources. Planning objectives for the Lower Potomac Planning District include:

- Preserve stable residential areas through infill development of a character and intensity or density 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.
- Identify, preserve and promote awareness of heritage resources through research, survey and community involvement.
- Provide adequate buffering and screening and appropriate transitional land uses between residential areas and non-residential uses.

Springfield Planning District

This district is defined primarily by its commercial areas and residential neighborhoods. Areas of concentrated retail and office activities occur along the I-95 corridor and rail right-of-ways. Future commercial development will be focused in areas where it currently exists, with an emphasis on revitalization and redevelopment toward higher densities and transit-oriented growth. Notable focus areas include the FBNA and the I-95 Corridor Industrial Area. Outside of the more urban areas, the residential neighborhoods should retain their suburban character as a means of protecting stable areas and offering opportunities for environmental preservation. Planning objectives for this District include:

- Ensure that any future development of the 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 non-residential development.
- Protect wetlands and Environmental Quality Corridors (EQCs).
- Provide opportunities for affordable housing near mass transit facilities and transportation corridors in the vicinity of the I-95 Corridor Industrial Area and the FBNA for persons with low and moderate incomes.

Mount Vernon Planning District

This district is characterized by a dichotomy of low-density housing and parklands to the east, and high concentrations of uses and densities along US Route 1 to the west. Future plans hope to capitalize on the US Route 1 corridor by balancing residential and commercial growth with improved multi-modal transportation systems. Areas to the east will retain their current character to protect stable communities and valuable natural resources. Objectives guiding land use planning in the Mount Vernon Planning District include:

- Preserve stable residential neighborhoods through appropriate infill development which is compatible in use, type, and intensity with surrounding uses.
- Limit commercial encroachment into stable residential neighborhoods and establish well-defined edges between commercial and residential uses.
- Establish well-defined buffers, particularly for existing residential development adjacent to high-density/intensity corridors, with appropriate pedestrian access between commercial and residential areas.
- Establish an appropriate mix of land uses and intensities in the Community Business Centers along Richmond Highway and provide transitions to adjacent Suburban Neighborhoods.
- Improve and upgrade existing commercial development within the Community Business Centers along the Richmond Highway Corridor to serve as the focus of office building, hotel, and other commercial development that encourages the growth of professional employment opportunities and promotes tourism and related activities.
- Encourage the provision of pedestrian and bicycle facilities to include trails, sidewalks and crosswalks.
- Improve the public's perception and enjoyment of the environmental and heritage resources of the Mount Vernon area.
- Identify, preserve, and promote awareness of heritage resources through research, survey and community involvement.
- Protect environmentally-sensitive areas including wetlands, EQCs, and undeveloped areas within RPAs and floodplains.
- Encourage the conservation of existing urban forest assets.
- Encourage the use of low impact development (LID) practices in development and redevelopment projects.
- Encourage reduction in the amount of imperviousness.

Rose Hill Planning District

This district is substantially developed with suburban residential neighborhoods. The Kingstowne development represents the highest concentration of commercial development with a mix of retail, office, and high-density residential. Future plans aim to protect existing stable residential areas and focus growth in the commercial business centers such as Kingstowne. Planning objectives for the Rose Hill Planning District include:

- Preserve stable residential neighborhoods with appropriate and compatible infill development.
- Achieve development which is sensitive to environmental constraints and opportunities, especially the need to plan, design, and construct uses recognizing the presence of marine clays and slope failure areas.

- Protect Huntley Meadows Park.
- Identify, preserve, and promote awareness of heritage resources through research, survey and community involvement.
- Protect wetlands and EQCs in the district.

Pohick Planning District

This district is characterized by low-density residential neighborhoods with supporting commercial and institutional uses. Planning strategies will maintain the current character and emphasize low densities, particularly in watershed areas where best management practices (BMPs) and stormwater management facilities will help preserve water quality. The Pohick Planning District's planning objectives include:

- Protect the Occoquan Reservoir and South Run watersheds.
- Preserve stable residential areas through infill development of a character and intensity/density that is compatible with existing residential areas.
- Identify, preserve and promote awareness of heritage resources through research, survey and community involvement.
- Protect the Pohick Creek watershed and its tributaries, the Sideburn and Rabbit Branches.
- Preserve the existing semi-rural, treed suburban character of residential areas in the Pohick watershed.

Accotink Village

Accotink Village is an approximately 27-acre enclave of privately-owned land that is entirely surrounded by Fort Belvoir. Existing uses include about a dozen single-family homes, a Buddhist temple, and a church, all located on Backlick Road, as well as multi-family residential units and commercial uses (e.g., gas station, fast food restaurant, convenience store, and various shops) adjacent to US Route 1.

With respect to future development, residential and neighborhood-serving retail uses, similar to the ones currently located there, are recommended for Accotink Village. However, the Comprehensive Plan also provides an option for higher-density redevelopment of the area to create a "walkable community that provides a mix of residential use, neighborhood-serving retail uses, and limited office use linked through open spaces and sidewalks" (Fairfax County, 2011b). Under this option, higher-density commercial and residential uses would be located near US Route 1, with use densities gradually tapering moving north along Backlick Road. Specific details of redevelopment for Accotink Village are summarized in Table 3.1-3.

Comprehensive Plan for the National Capital Region

The *Comprehensive Plan for the National Capital Region* (National Capital Planning Commission, 2004; National Capital Planning Commission, 2012) provides a policy framework to manage federal operations and activities within the Washington DC metropolitan area. It is prepared and implemented by NCPC. The commission has review authority concerning Fort Belvoir's master plan. This authority helps to ensure that the post is compliant and consistent with the over-arching planning principles mandated by NCPC in its efforts to maintain and improve the quality of life for the region.

Metropolitan Washington Council of Governments

Region Forward (Greater Washington 2050 Coalition, 2010), approved by the Board of Governors of MWCOG in 2010, is a vision for making the National Capital Region more accessible, sustainable, prosperous, and livable. It was developed by the Greater Washington 2050 Coalition, a group of public, private, and civic leaders created by the council in 2008 to help the region meet future challenges like

accommodating two million more people by 2050, maintaining aging infrastructure, growing more sustainably, and including all residents in future prosperity. MWCOG has also established a group called the Region Forward Coalition, which will use Region Forward to measure progress, prioritize needs, and jumpstart projects that will help meet the council's 2050 vision. The Region Forward plan will help to guide development on and off Fort Belvoir as the region's population increases.

Prince William County Comprehensive Plan

Prince William County is located south of Fort Belvoir along the I-95 corridor. The county's comprehensive plan (Prince William County, 2012) seeks to better manage and direct future growth, particularly along the I-95 and US Route 1 corridors. Major objectives are to build quality communities, reverse job/housing imbalances, create jobs, provide a diverse choice of housing opportunities, and enhance the environment. The plan encourages future growth to be concentrated in mixed-use centers with multi-modal transit opportunities. Centers should be compact, walkable, transit friendly, and foster a sense of place. Locations identified for concentrated growth include North Woodbridge, Potomac Center, and the Triangle Area. Planning studies of these areas include a mix of uses such as retail, office, and residential; higher densities; and integrated multi-modal transit options.

Coastal Zone Management Program

The Coastal Zone Management Act of 1972 (16 USC § 1451, et seq., as amended) provides assistance to the states, in cooperation with federal and local agencies, for developing land and water use programs in coastal zones. Section 307(c)(1) of the Coastal Zone Management Act Reauthorization Amendment stipulates that federal projects that affect land uses, water uses, or coastal resources of a state's coastal zone must be consistent to the maximum extent practicable with the enforceable policies of that state's federally-approved coastal management plan.

The Commonwealth of Virginia has developed and implemented a federally-approved Coastal Resources Management Program that brings together a series of laws and policies pertaining to the protection of the state's coastal zone. These laws and policies regulate tidal and non-tidal wetlands, fisheries, subaqueous lands, dunes, point source air pollution, point source water pollution, non-point source water pollution, shoreline sanitation, and coastal lands.

Virginia's coastal zone includes all of Fairfax County, including Fort Belvoir. Therefore, federal actions at Fort Belvoir are subject to federal consistency requirements.

Table 3.1-3
Current and Future Off-Post Development

Project Number	Project Name	Acreage	Development Size[1]	Development Type	Description
1	**Patriot Ridge**	15	978,000	Office	Project currently under construction adjacent to FBNA along the west side of Backlick Road, just north of Fairfax County Parkway. Site plan consists of four high-rise office buildings designed to meet government security standards, and two parking garages. The first building, totaling 240,000 square feet, was completed in 2011 and includes retail space.
2	**Springfield Mall**	80	2.1 million	Retail	Planned redevelopment of existing indoor mall as mixed-use town center.
			6.0 million	Hotel, office, and residential	
3	**Springfield Connectivity Study**	800	Not Available (N/A)	N/A	Study provides area-wide guidance for urban design, streetscape, and place-making concepts. Portions of the Springfield community business center north and south of Old Keene Mill Road are recommended for redevelopment as an urban village and commuter parking facility, respectively. Rezoning for the Springfield Metro Center Industrial Park parcels as a mixed-use zoning district was approved in May 2012. The General Services Administration (GSA) Warehouse Framework Plan was adopted as a component of this study. It includes a concept plan for the GSA facility located adjacent to the Franconia-Springfield Metro Center. The plan calls for the redevelopment of the warehouse use to a higher-intensity multimodal, transit-oriented development.
4	**Loisdale Road Special Study**	120	1.83 million	Industrial	Study includes options for vehicle sales, service centers, and office use with conditions. Fairfax County Board of Supervisors approved rezoning two parcels from R-1 to C-8 to allow for development of 200,000 square feet of office.
5	**Accotink Village**	27	(up to) 55,000	Retail	Redevelopment option for the enclave of privately-owned land surrounded by Fort Belvoir and administered by Fairfax County would also include up to 470 multi-family units with some single-family attached housing. Future redevelopment would require right-of-way dedication to support the planned widening of US Route 1 to six lanes.
			470 units	Residential	
			(up to) 16,000	Office	
6	**Laurel Hill, Lorton-South Route 1 Subunit B2 and Lorton Corner**	3,200	N/A	Mixed-use	This plan includes land use recommendations for the redevelopment of the old federal prison site and expansion of INOVA medical facilities in Lorton.
7	**Metro Park**	37	1.3 million	Office	Eight office buildings would be built as part of project.

Table 3.1-3
Current and Future Off-Post Development
(Continued)

Project Number	Project Name	Acreage	Development Size[1]	Development Type	Description
8	**Kingstowne Town Center**	150	30,000	Retail	This 150-acre, mixed-use development is part of the larger 1200-acre planned community of Kingstowne. The last 5-acre parcel of the Town Center is currently in the planning stages. The original plans included 1,200,000 square feet of office space and 30,000 square feet of retail. The latest plans (January 2015) include 60,000 square feet of retail and 750 residential units.
			750 units	Residential	
9	**Belvoir Business Park**	N/A	N/A	Commercial, office, and industrial	A major Federal Express distribution facility is currently located in this development. A portion of the site is also planned for office and/or industrial uses.
10	**Hilltop Village Center**	33	150,000	Grocery	The site for this project is located at the intersection of Beulah Street and Telegraph Road, and was rezoned in 2008. The development would include 953 parking spaces and is planned as an integrated mixed-use development.
			94,000	Specialty retail	
			100,000	Office	
11	**Northern Virginia Industrial Park**	69	N/A	Mixed-use	A Fairfax County Comprehensive Plan Amendment allows the project site on Telegraph Road to become a mix of office, hotel, retail, civic, and light industrial uses. The County Board of Supervisors also amended the Transportation Plan to show Telegraph Road planned for six lanes (formerly four lanes) from Richmond Highway to Fairfax County Parkway.

Notes:
1. Approximate. Square feet unless otherwise noted.

The Virginia Department of Environmental Quality (VDEQ) serves as the lead agency for Virginia's networked coastal program. Coastal consistency review for this project was coordinated with the NEPA review process. The Federal Coastal Consistency Determination for implementing the proposed RPMP and short-term projects is in Chapter 6 of this EIS.

3.1.1.5 Current and Future Development near Fort Belvoir

The Fairfax County Board of Supervisors approved 14 landowner nominations to amend the Comprehensive Plan as part of their 2008 Annual Plan Review cycle. Three changes to the Plan allow for rezoning from industrial to higher-intensity office use. Of the 14 adopted changes, seven are in the vicinity of FBNA and the GSA warehouse facility. Generally, these Comprehensive Plan Amendments allow for a zoning change from industrial land use to office use with options for the development of hotel or retail uses. When completed, the land use changes will result in more intensive development with concentrated employment centers that will replace existing low-density office and warehouse uses with higher-density office and commercial uses.

In addition to the 2008 Annual Plan Review Plan Amendments described above, the board adopted 11 Authorized Plan Amendments and Special Studies. The content of these initiatives is summarized in Table 3.1-3, and their locations are illustrated in Figure 3.1-5 (Current and Future Off-Post Development). The projects described collectively represent a minimum of 12.5 million square feet of commercial, residential, and industrial development that would occur on more than 4,500 acres.

3.1.2 Environmental Consequences of the No Action Alternative

Impacts on land use can occur when the implementation of a project creates an inconsistency between the actual use of the land and the underlying land use designation, or when a project is incompatible with adjacent or surrounding land uses (i.e., siting an industrial facility in a residential area). Land use impacts may also occur when the implementation of a project conflicts with or prevents the implementation of the goals, objectives and policies of relevant planning documents, studies, and/or nearby, unrelated development projects.

3.1.2.1 Fort Belvoir Land Use

Impacts on land use under the No Action Alternative would remain less than significant. The RPMP, including the IVDP and the IPS, would not be adopted, and land use designations adopted under the 1993 land use plan, as amended in 2002 and revised in 2007, would remain in effect. None of the short-term or long-term projects, including short-term and long-term transportation projects, would be implemented (projects currently under construction would be completed), and the existing land use inconsistencies described in Section 3.1.1.2 would not be corrected.

The Army Master Planning Technical Manual (US Army, 2010n) allows flexibility for siting family support, personnel, professional, and medical services facilities in Community areas while restricting maintenance, depot, and storage facilities and activities generating significant amounts of heavy vehicle traffic to Industrial areas. Although the location of Troop-oriented uses such as ST 3, ST 6, and the Warrior-in-Transition Barracks and the Industrial use of the Vehicle Maintenance Shop in Community areas is not ideal, the underlying land use designation would not preclude the operation of those facilities in their current locations. The operation of the Troop facilities would be generally complementary to adjacent and surrounding land uses, and would not create land use incompatibilities with them. Similarly, the continued operation of the Motor Pool at its existing site – which it has occupied for years – would not generate new land use incompatibilities, nor would it prohibit the continued operation or future development of adjacent and nearby Community and Residential uses.

3.1.2.2 Surrounding Area Land Use and Relevant Plans and Studies

The implementation of the No Action Alternative would have no effects on surrounding land use and relevant plans and studies because none of the proposed projects would be constructed.

3.1.2.3 Current and Future Development near Fort Belvoir

None of the proposed projects would be implemented under the No Action Alternative. This would have no effect on current and future development projects near Fort Belvoir.

3.1.3 Environmental Consequences of Alternative 1 – Full Implementation – The Preferred Alternative

3.1.3.1 Fort Belvoir Land Use and Plans

The implementation of Alternative 1 would have no significant adverse impacts and some beneficial impacts on land use and plans at Fort Belvoir.

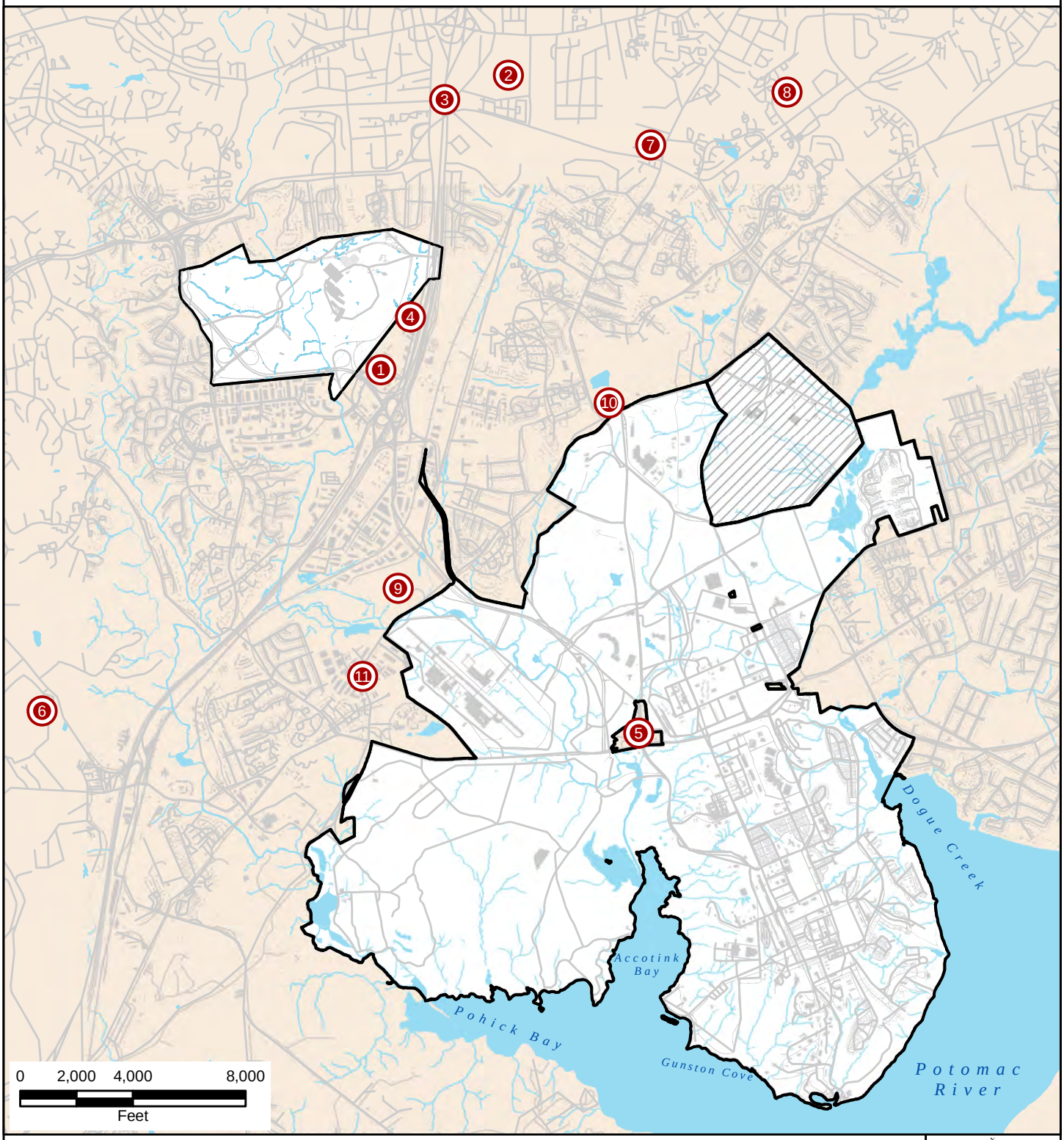
Alternative 1 includes the approval and implementation of all parts of the RPMP update and the implementation of the short-term and long-term projects described in Sections 2.1.4-2.1.5. The Proposed Land Use Plan for Fort Belvoir, illustrated in Figure 2-2, would be implemented under Alternative 1, and would reflect the following land use changes:

- A new Professional/Institutional development area approximately 171 acres in size would be established adjacent to the South Post core development area.
- The acreage of Industrial uses on South Post would be reduced by approximately 55 percent. To compensate for this reduction, future Industrial facilities built on South Post would be constructed more efficiently, thereby maximizing the remaining Industrial land available for development.
- On North Post, the Industrial land use to the west of Gunston Road would be consolidated, and the 5-acre Industrial area to the east of Gunston Road would be transferred to the Professional/ Institutional land use category.
- The Community land use along the north side of 9th Street between Belvoir and Gunston Roads on South Post would be re-designated as Troop to reflect the presence of ST 3, NICoE; ST 6, USO Family Center; and the Warrior-in-Transition Barracks.

The implementation of the RPMP, including the IVDP and the IPS, would: correct the inconsistencies between actual and underlying land uses on South Post described in Section 3.1.1.2; reclassify the land use designations of targeted areas on Lower North Post and South Post to encourage the development of needed Professional/Institutional facilities while consolidating Industrial facilities; and focus future development primarily in areas of the installation that have been previously developed and are currently served by existing transportation and utility infrastructure.

To further guide the proposed development, the Site Planning Standards would divide the post into 20 planning districts sharing similar physical characteristics and/or development patterns. Regulating plans would be implemented for areas where substantial redevelopment or growth is anticipated (US Army, 2014b). The proposed planning districts and areas for which regulating plans would be implemented are illustrated in Figure 3.1-6. The individual regulating plans would govern horizontal and vertical development patterns that would accommodate the type of growth that is anticipated to result from the full implementation of Alternative 1.

Current and Future Off-Post Development



1 Current or Future Development Location (associated with numbers in Table 3.1-3)

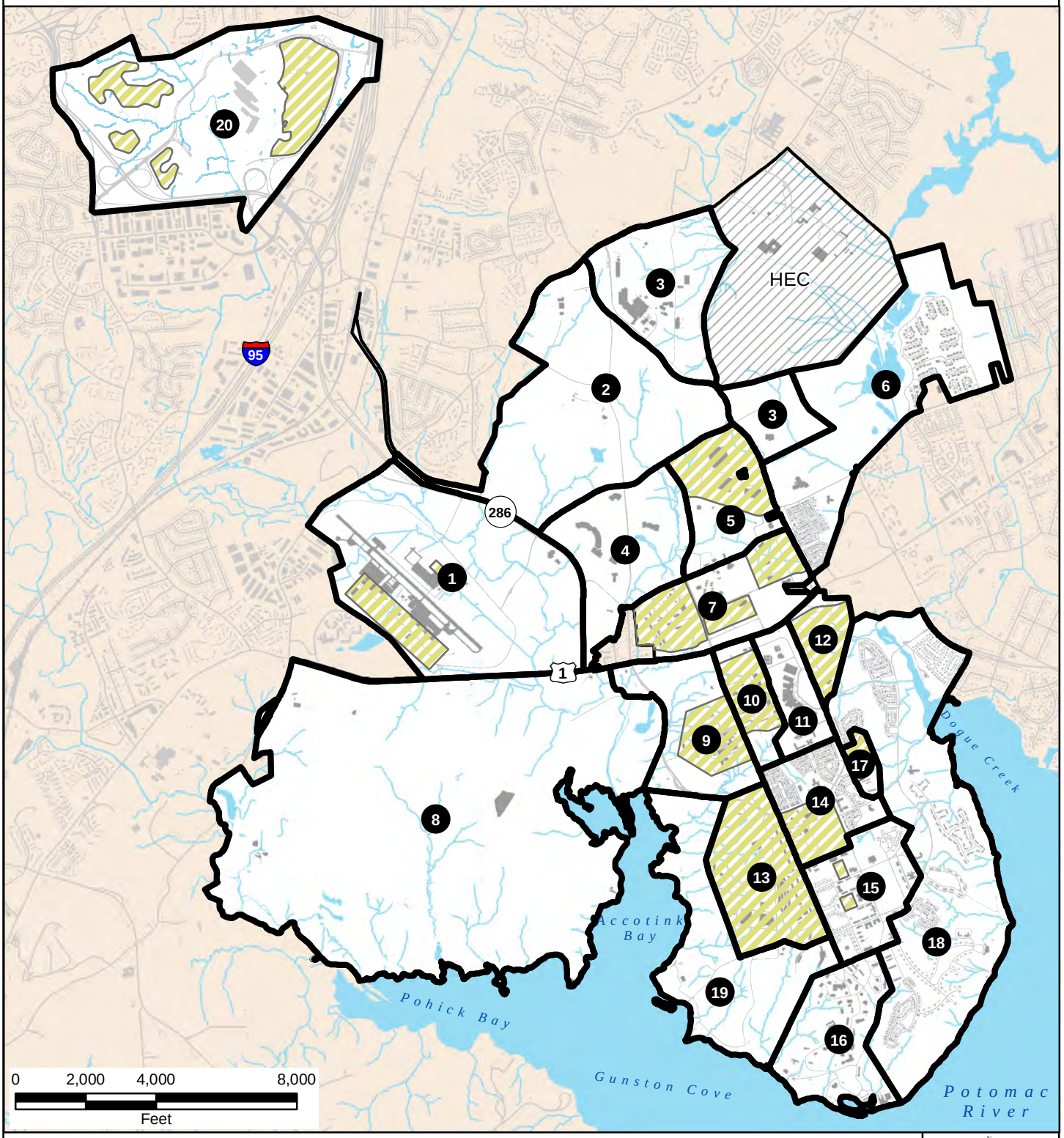
Fort Belvoir RPMP EIS

Figure 3.1-5

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Fort Belvoir Planning Districts and Regulating Plan Areas



Legend

- Regulating Plan Areas
- Planning District Boundaries
- 1 - DAAF District
- 2 - Golf Course / NMUSA
- 3 - Intelligence District
- 4 - DLA INSCOM District
- 5 - NP Community Support
- 6 - North Residential District
- 7 - Lower North Post District
- 8 - Southwest District
- 9 - 1400 West District
- 10 - 1400 East District
- 11 - Medical District
- 12 - SP Community Support
- 13 - Industrial Area District
- 14 - Town Center District
- 15 - Historic Core District
- 16 - 300 Area District
- 17 - Admin Campus District
- 18 - Community Activities District
- 19 - Recreation District
- 20 - FBNA District

Fort Belvoir RPMP EIS

Figure 3.1-6

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These initiatives would support Fort Belvoir's changing mission requirements while providing a densely-developed core of office, commercial, service, recreation and residential uses that maximize the installation's developable land resources. The intensification of uses on available land would promote walkability and support a mixture of transportation modes including automobile, public transit and shuttle services, and bicycling. Therefore, the implementation of the RPMP would have beneficial effects on land use on Fort Belvoir.

The proposed short-term projects would further support Fort Belvoir's current and future mission requirements by replacing outdated facilities, consolidating existing facilities, clustering similar types of development, and/or meeting unmet demand with new functions and services on the post. Many of the short-term projects would contribute to enhancing the quality of life of military personnel, their dependents, civilian personnel, and visitors at Fort Belvoir.

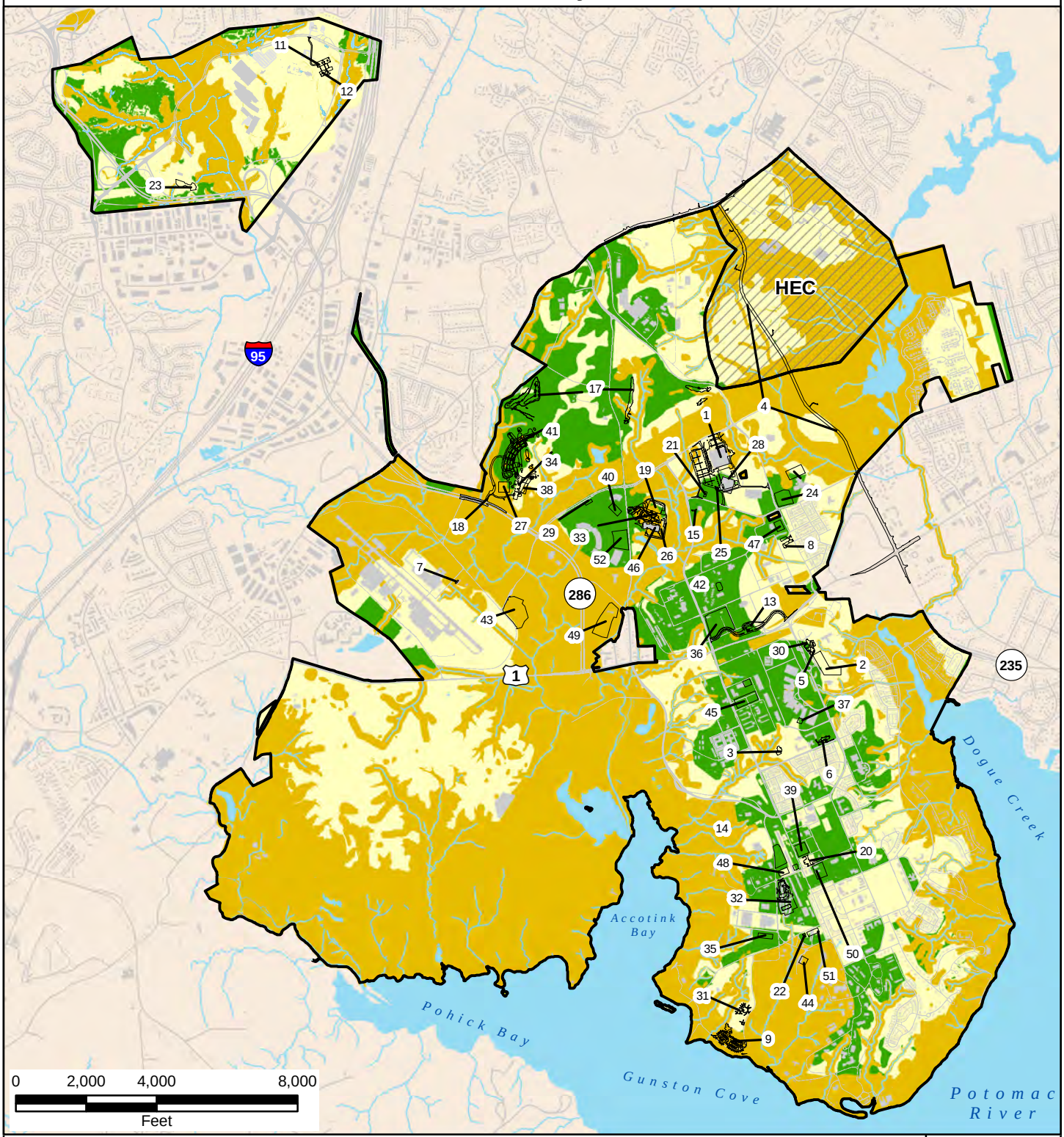
As shown in Figure 3.1-7, the short-term projects were sited, as much as possible given other relevant considerations, within "Most Suitable for Development" areas as defined in the RPMP (see Figure 3.1-2). Exceptions are listed in Table 3.1-4, along with a brief description of the constraints that justified the classification of the area as either "Moderately Suitable for Development" or "Least Suitable for Development." Where applicable, impacts associated with the identified constraints would be avoided or mitigated as documented elsewhere in this EIS.

Table 3.1-4
Project Footprints Outside "Most Suitable for Development" Areas

Project #	Project Name	Acres within "Moderately Suitable for Development" Area (Percent of Total Footprint)	Acres within "Least Suitable for Development" Area (Percent of Total Footprint)	Constraint Types/Comments
ST 1	Army & Air Force Exchange Service (AAFES) Post Exchange (PX)	13.4 (78%)	4 (21%)	The site footprint is located within PIF habitat and overlaps with a non-National-Register-eligible archaeological site. The project included minor encroachments to wetlands and RPA. A permit was obtained and minor mitigation was performed.
ST 2	Privatized Army Lodging (PAL) East of Belvoir Road Circle	5.2 (100%)	0 (0%)	The site footprint is located within PIF habitat and includes a small section of steep slopes.
ST 3	National Intrepid Center of Excellence (NICoE)	0.6 (100%)	0 (0%)	The site footprint is located within PIF habitat.
ST 4	Mulligan Road Phase II	6.5 (19%)	10.5 (30%)	A portion of the site footprint is located within areas designated as wetlands and RPA, PIF habitat, and ranges and training areas. The site also contains steep slopes.
ST 5	Fisher House 1	0.6 (86%)	0 (0%)	A portion of the site footprint is located within PIF habitat.
ST 6	USO Wounded Warrior and Family Center	0.1 (12%)	0 (0%)	Previously developed site.
ST 7	Expansion of DAAF Fire Station	0 (0%)	0.1 (100%)	The site footprint is located in a floodplain and close to an RPA and Solid Waste Management Units; however, it is a previously disturbed site.

Project #	Project Name	Acres within "Moderately Suitable for Development" Area (Percent of Total Footprint)	Acres within "Least Suitable for Development" Area (Percent of Total Footprint)	Constraint Types/Comments
ST 8	Child Development Center 144	0.7 (75%)	0 (0%)	The site footprint is located within a previous mitigation site with viewshed restrictions.
ST 9	Family Travel Camp Phase 1	0 (0%)	4.5 (100%)	Slight encroachment in RPA, located within a floodplain and PIF habitat. Also located on top of an ineligible archaeological site. However, the site has been previously developed.
ST 11	Child Development Center 1	2.4 (100%)	0 (0%)	The site is located within PIF habitat and in an area with Land Use Controls.
ST 12	Child Development Center 2	0.3 (100%)	0 (0%)	The site is located within PIF habitat and in an area with Land Use Controls.
ST 13	Access Road & Control Point - Lieber Gate	2.1 (36%)	0.5 (9%)	A portion of the site is located in an area with potential petroleum contamination and within an ineligible archaeological site. A portion of the site also includes viewshed restrictions.
ST 16	PX Demolition	1.1 (33%)	0 (0%)	A portion of the site is located within PIF habitat.
ST 17	36-Hole Golf Course Reconfiguration	3.3 (20%)	2.1 (12%)	Portions of the site are close to streams, RPAs, and ineligible archaeological sites. All would be avoided in the final design.
ST 18	National Museum of the US Army (NMUSA) Roads and Infrastructure Improvements	0 (0%)	4.1 (95%)	The site is located within PIF habitat and near RPAs and steep slopes; however previously disturbed road beds would be used.
ST 19	US Army Intelligence and Security Command (INSCOM) Headquarters Expansion, Phase 1	0.4 (18%)	1.4 (60%)	The site includes slight encroachments to the Forest and Wildlife Corridor, PIF habitat, ineligible archaeological sites, RPAs, and a petroleum release area.
ST 20	Replacement of South Post Fire Station	0.8 (78%)	0 (0%)	Located across from the Fort Belvoir Historic District; however architecture and design match the district.
ST 23	National Geospatial-Intelligence Agency (NGA) Canine Training / Rest Facility	1.8 (100%)	0 (0%)	The site is located within PIF habitat and a former training area.
ST 24	Fairfax County School Expansion	2.1 (29%)	0 (0%)	An updated site plan no longer puts athletic fields on steep slopes or within PIF habitat. A field survey was performed and found no RPAs. Therefore, this site actually is not within "Moderately Suitable" or "Least Suitable" areas.

Fort Belvoir Development Constraints - Short Term Project Sites



Legend

- Least Suitable for Development
- Moderately Suitable for Development
- Most Suitable for Development
- Short-Term Project Sites (Construction FY 2012 - 2017)

Fort Belvoir RPMP EIS

Figure 3.1-7

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Table 3.1-4
Project Footprints Outside "Most Suitable for Development" Areas (Continued)

Project #	Project Name	Acres within "Moderately Suitable for Development" Area (Percent of Total Footprint)	Acres within "Least Suitable for Development" Area (Percent of Total Footprint)	Constraint Types/Comments
ST 26	INSCOM HQ Expansion, Phase 2	0.2 (16%)	1.3 (84%)	The site includes slight encroachments to the Forest and Wildlife Corridor, PIF habitat, ineligible archaeological sites, RPAs, and a petroleum release area.
ST 27	NMUSA, Phase 1	0 (0%)	1.7 (84%)	A portion of the site is located within PIF habitat, close to ineligible archaeological sites, and contains steep slopes.
ST 28	Main Post Commissary	5.7 (47%)	0.3 (3%)	Sited on top of previous PX.
ST 30	Fisher House 2	0.3 (57%)	0 (0%)	A portion of the site footprint is located within PIF habitat.
ST 31	Family Travel Camp, Phase 2	0.9 (95%)	0.05 (5%)	The site is located within PIF habitat.
ST 33	INSCOM HQ Expansion, Phase 3	0.7 (9%)	6 (73%)	The site includes slight encroachments to the Forest and Wildlife Corridor, PIF habitat, ineligible archaeological sites, RPAs, and a petroleum release area.
ST 34	NMUSA, Phase 2	0.7 (75%)	0 (0%)	A portion of the site is located within PIF habitat, close to ineligible archaeological sites, and contains steep slopes.
ST 36	29th Infantry HQ	0.7 (7%)	0 (0%)	Located close to potential petroleum release.
ST 37	Medical Office Building	0.1 (13%)	0 (0%)	A portion of the site footprint may impact a designated mitigation area for the hospital.
ST 38	NMUSA, Phase 3	0.9 (65%)	0.5 (35%)	A portion of the site is located within PIF habitat, close to ineligible archaeological sites, and contains steep slopes.
ST 39	Multipurpose Fields	0.04 (2%)	0 (0%)	A small portion of the site has viewshed restrictions.
ST 41	NMUSA, Phase 4	1.2 (12%)	1.1 (11%)	A portion of the site is located within PIF habitat, close to ineligible archaeological sites, and contains steep slopes.
ST 43	OSEG Training Compound	0.5 (5%)	8.5 (95%)	The site is located within PIF habitat and a former training area.
ST 44	Baseball Field Replacement	0 (0%)	0.9 (100%)	The site is located within an area designated as habitat for species of concern. However, this project is not anticipated to impact hydrology that supports the Northern Virginia Well Amphipod.
ST 46	INSCOM HQ Expansion, Phase 4	0 (0%)	1.7 (97%)	The site includes slight encroachments to the Forest and Wildlife Corridor, PIF habitat, ineligible archaeological sites, RPAs, and a petroleum release area.
ST 48	INSCOM Controlled Humidity Warehouse	1.1 (70%)	0 (0%)	A portion of this site is located in an area with contaminated soil.

Project #	Project Name	Acres within "Moderately Suitable for Development" Area (Percent of Total Footprint)	Acres within "Least Suitable for Development" Area (Percent of Total Footprint)	Constraint Types/Comments
ST 49	911th Engineering Company Operations Complex	0 (0%)	8.5 (100%)	The site footprint is located within an area designated as potential wood turtle habitat.
ST 50	Vehicle Maintenance Shop	0.5 (16%)	0 (0%)	Located near the Fort Belvoir Historic District and an SWMU.
ST 51	Information Systems Facility for the Network Enterprise Center (NEC)	1 (90%)	0 (0%)	A portion of the site footprint is located within a former training range.

The majority of the short-term projects would be built in areas where the underlying land use designation is consistent with, and the character of the surrounding land uses is similar to, the proposed projects.

Two projects of an Industrial character–ST 50, Vehicle Maintenance Shop and ST 51, Information Systems Facility for NEC – would be built on sites designated as Industrial under the Future Land Use Plan but located adjacent to Residential areas in the Fort Belvoir Historic District. ST 50 represents an upgrade and modernization of the existing Vehicle Maintenance Shop, which has existed on the site for several years, and would not generate additional traffic or increase or expand operations at the facility beyond current levels. Further, traffic would continue to enter the facility from 16th Street and would not directly pass through adjacent Residential areas to reach the new facility. As outlined in the *Army Master Planning Technical Manual* (US Army, 2010n), information systems facilities are conditional uses in Residential districts and allowed uses in Industrial areas. The character of operations at ST 51 would not generate substantial volumes of traffic, nor would they generate activities that would be noxious to adjacent Residential land uses. Neither ST 50 nor ST 51 would preclude the continued use of or future development on adjacent Residential parcels. None of the other proposed short-term projects would create land use inconsistencies or incompatibilities on or adjacent to the project sites. For these reasons, implementation of the short-term projects would have beneficial impacts on Fort Belvoir's land use by clustering compatible development, redeveloping previously-disturbed sites, and avoiding environmentally-sensitive areas.

In the short term, the proposed projects would have adverse effects on land use as the project sites become active construction sites to varying degrees, depending on the scale of each project. Construction activities occurring on the project sites, such as earthmoving operations, demolition, and material and equipment storage, would generally not conform to the sites' underlying land use designation and would have the potential to cause disruption and annoyance to adjacent uses. However, such effects would last only for the duration of each project's construction period and would cease as each new, upgraded, or expanded facility becomes operational. The implementation of the projects over five years and their distribution on sites throughout Fort Belvoir would further minimize the effects on nearby land uses. Therefore, adverse construction-related effects on land use resulting from each project would be less than significant.

The long-term projects included under the proposed action would focus similar types of development – Professional/Institutional, Community, and Industrial – in appropriate areas of North Post, South Post, and FBNA. Because they are broadly defined, the footprints of all the proposed long-term projects include areas that were identified in the RPMP as being "Moderately Suitable for Development" or "Least Suitable for Development" (Figure 3.1-8). The constraints underlying these designations are similar to those briefly described in Table 3.1-4 for the proposed short-term projects and include PIF habitat, ineligible archaeological sites, contaminated areas, and viewshed. When more detailed impacts analyses are conducted

for individual projects as project planning and design continues, potential impacts would be identified and avoided or mitigated, as applicable. Development would be in accordance with the Future Land Use Plan and the objectives outlined in the Framework Development Plan and it would support Fort Belvoir's future mission needs. Therefore, as proposed under the RPMP, the long-term projects included under Alternative 1 would have beneficial impacts on land use on Fort Belvoir.

3.1.3.2 Surrounding Area Land Use and Relevant Plans and Studies

The implementation of Alternative 1 would have no significant adverse impacts and some beneficial impacts on the land use and relevant plans and studies of surrounding areas.

The majority of the actions included under Alternative 1, including the implementation of the RPMP, the IVDP and the IPS, and the short-term and long-term projects, would occur within the boundaries of Fort Belvoir. Actions occurring on the post under Alternative 1 would avoid or minimize encroachment on adjacent public and private land uses by focusing development primarily on previously-disturbed areas in the interior uplands of Fort Belvoir.

The planning and design of short-term projects that would occur closest to Fort Belvoir's boundaries – the NMUSA projects (ST 17, 36-Hole Golf Course Reconfiguration; ST 18, NMUSA Roads and Infrastructure; ST 27, NMUSA and its subsequent phases, ST 34, 38, and 41; and associated projects); and ST 49, 911th Engineering Company Operations Complex – would incorporate site design measures to minimize or eliminate visual and noise intrusions on nearby off-post land uses (including Accotink Village in the case of ST 49). Projects on North and South Posts that would be sited near US Route 1 would be designed so as not to encroach upon or hinder the widening of that roadway, which is currently underway. Two short-term projects – ST 4/STT 1, Mulligan Road, and STT 7, Walker Gate Improvements – would extend beyond Fort Belvoir's boundaries; however, both projects would be constructed on land owned by Fort Belvoir as well as portions of existing public rights-of-way. None of the projects included under Alternative 1 would require the acquisition of private property; change the designation of off-post land uses; or create land use inconsistencies or incompatibilities with land uses in Fairfax County. Therefore, Alternative 1 would have no effect on off-post land uses.

As described for on-post projects in the previous section, construction activities associated with the two off-post projects have the potential to be a nuisance to adjacent land uses while the project sites are active construction sites. The severity of the nuisance would vary throughout the life of the projects; however, the project sites would return to pre-construction conditions upon completion of the construction phase of each project. Thus, adverse construction-related effects on off-post land uses would be less than significant. The implementation of Alternative 1 would support, rather than conflict with or prevent the fulfillment of, the county-wide and planning district-level land use planning goals presented in the Fairfax County Comprehensive Plan and summarized in Section 3.1.1.4. The following paragraphs restate the land use planning goals presented in the Fairfax County Comprehensive Plan and provide an assessment of how Alternative 1 would be compatible with each of them.

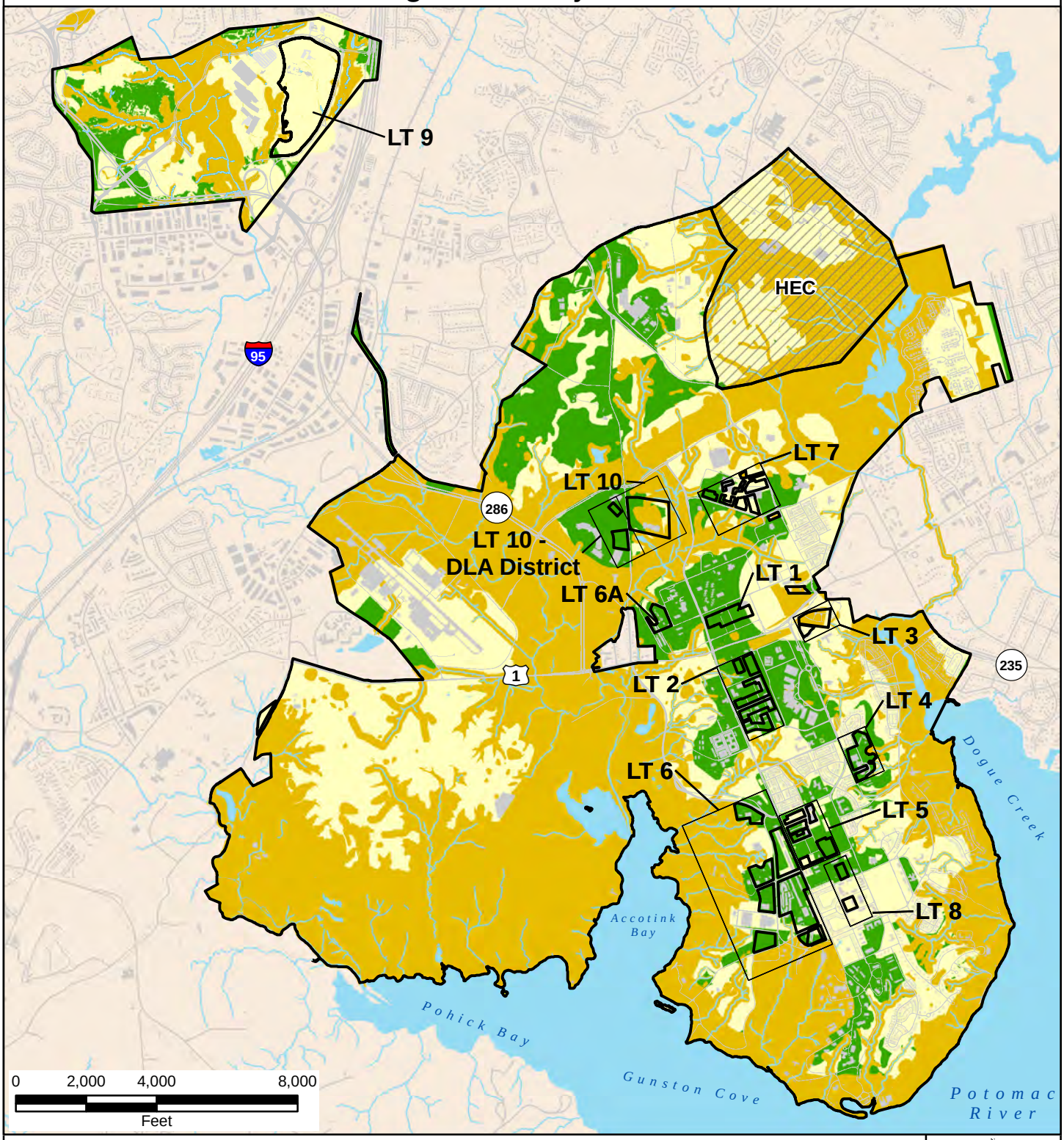
- **Land Use:** maintain quality of life, coordinate public and private development, provide adequate public services and facilities, implement sound environmental practices, follow growth criteria and standards, and achieve economic goals
  - Alternative 1 was developed to be consistent with the guidelines established by the Framework Development Plan, which incorporates the master plan vision, the assessment of the Fort Belvoir site and environs, and the land use plan (see Section 2.1.3). These guidelines are consistent with the Land Use goal stated above. Therefore, Alternative 1 is compatible with the Land Use goal.
- **Transportation:** balance land use with transportation infrastructure by developing rapid rail, commuter rail, expanded bus service, reduced dependency on automobiles, and sidewalks and trails

  - Future growth and development under Alternative 1 would be intensified in previously-disturbed areas of Fort Belvoir, increasing densities and supporting alternate modes of transit such as bus, walking, and bicycling. In addition, a *Transportation Management Plan* (TMP) has been developed as part of the RPMP that details ways Fort Belvoir can accommodate the growth that would result from the implementation of Alternative 1. The TMP includes infrastructure improvements as well as transportation management measures to reduce single-occupant vehicle use and support transit, pedestrian, and bicycle mobility. Implementation of Alternative 1 would be compatible with the above goal.

- **Open Space:** support conservation of plants, animals, and natural land areas, including small open spaces within already-developed areas
  - As mentioned above, development and redevelopment projects included under Alternative 1 would be focused in previously-disturbed upland areas of Fort Belvoir so as to avoid environmentally-sensitive areas. Regulating plans that would be implemented for areas of Fort Belvoir where substantial redevelopment and/or growth is anticipated would include provisions for green and open space. Thus, Alternative 1 would be compatible with this goal.
- **Revitalization:** encourage and facilitate commercial and residential revitalization to prevent or eliminate deterioration
  - Alternative 1 would guide Fort Belvoir's development through 2030 in a manner that would support both its ability to fulfill its mission and its role as a dynamic and vibrant residential and employment center in Fairfax County.
- **Private Sector Facilities:** develop commercial and industrial facilities to meet needs for goods, services, and employment, with special attention to small and minority businesses
  - This goal is not applicable to Fort Belvoir, a federal facility.
- **Employment Opportunities:** maintain a strong economy and varied employment opportunities
  - As noted above, the proposed land use plan would enhance Fort Belvoir's ability to fulfill its mission and thus help it remain a strong employment center in Fairfax County.

The fulfillment of the Fairfax County goals described above would further support the goals of MWCOG's *Region Forward* plan and the *Prince William County Comprehensive Plan* as summarized in Section 3.1.1.4. Review and approval of the proposed RPMP by NCPC would ensure that it is consistent with NCPC's planning initiatives and does not significantly adversely affect the federal interest in the National Capital Region. Therefore, Alternative 1 would have beneficial impacts on relevant plans and studies for areas around Fort Belvoir.

Fort Belvoir Development Constraints - Long Term Project Sites



Legend

- Least Suitable for Development
- Moderately Suitable for Development
- Most Suitable for Development
- Long-Term Project Sites (Construction FY 2018 - 2030)

Fort Belvoir RPMP EIS

Figure 3.1-8

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3.1.3.3 Current and Future Development near Fort Belvoir

Alternative 1 would have no significant adverse impacts and some beneficial impacts on current and future development near Fort Belvoir. The implementation of Alternative 1 would not prevent the implementation of or conflict with the objectives of the 11 projects described in Section 3.1.1.5. As described above, the implementation of Alternative 1 would not require the acquisition of additionally publicly- or privately-owned land; would not create inconsistencies or incompatibilities with adjacent off-post land uses; and would not change off-post land use designations. Thus, land use planning and development in Fairfax County would continue independently of and unencumbered by development projects at Fort Belvoir. Generally, the two transportation projects that extend off-post would enhance the access of travelers to the development sites.

3.1.4 Environmental Consequences of Alternative 2 – Modified Long-Term

3.1.4.1 Fort Belvoir Land Use

Similar to Alternative 1, adverse impacts on Fort Belvoir land use resulting from Alternative 2 would be less than significant, with some beneficial impacts. There would be less than significant adverse impacts on land use during the construction phase of each project, although these impacts would be somewhat less on FBNA because LT 9, a secure administrative campus for up to 7,500 personnel, would not be constructed. By not developing LT 9 on FBNA, Fort Belvoir would make slightly less-than-optimal use of land available within its boundaries for development. However, as with Alternative 1, future land use and development would be guided by the RPMP, and all projects other than LT 9 would be implemented. This would maintain almost the same level of development intensity, particularly on Main Post, as under Alternative 1, and would maximize the majority of land available for development on the installation while avoiding environmentally-sensitive areas. The FBNA land that would have been otherwise developed as LT 9 under Alternative 1 would be maintained as open space. Overall, long-term direct and indirect impacts on land use resulting from the implementation of Alternative 2 would remain beneficial.

3.1.4.2 Surrounding Area Land Use and Relevant Plans and Studies

Effects on land uses in the area surrounding Fort Belvoir would be the same as those described under Alternative 1. The implementation of Alternative 2 would have no adverse impacts on off-post land uses, and would have beneficial impacts on relevant plans and studies for areas around Fort Belvoir.

3.1.4.3 Current and Future Development near Fort Belvoir

Effects on current and future development projects under Alternative 2 would be the same as those described for Alternative 1.

3.1.5 Environmental Consequences of Alternative 3 – Modified Short-Term

3.1.5.1 Fort Belvoir Land Use

Land use impacts resulting from Alternative 3 would be the same as those described for Alternative 1, except that the majority of impacts would occur in the 2018-2030 timeframe rather than between 2012 and 2017. Impacts resulting from the short-term transportation projects would be the same as those described under Alternative 1 and would occur in the 2012-2017 timeframe.

3.1.5.2 Surrounding Area Land Use and Relevant Plans and Studies

Impacts on surrounding area land uses and relevant plans and studies under Alternative 3 would be the same as those described under Alternative 1.

3.1.5.3 Current and Future Development near Fort Belvoir

The effects on current and future development projects under Alternative 3 would be the same as those described under Alternative 1.

3.1.6 Proposed Mitigation and Protective Measures

3.1.6.1 Fort Belvoir Land Use

No mitigation measures would be necessary for on-post land uses.

3.1.6.2 Surrounding Area Land Use and Relevant Plans and Studies

No mitigation or protective measures would be necessary for surrounding area land use and relevant plans and studies.

3.1.7 Comparison of Alternatives

The effects on land use potentially resulting from the implementation of the No Action and three action alternatives as presented above are summarized in Table 3.1-5.

Table 3.1-5
Summary of Land Use Impacts by Alternative

Environmental Consequence	No Action Alternative	Alternative 1 – Full Implementation – The Preferred Alternative	Alternative 2 – Modified Long-Term	Alternative 3 – Modified Short-Term
Short-Term Projects				
Fort Belvoir Land Use	Less than significant adverse effects	Beneficial effects	Beneficial effects	Beneficial effects
Surrounding Area Land Use	No effect	No effect	No effect	No effect
Relevant Plans and Studies	No effect	Beneficial effects	Beneficial effects	Beneficial effects
Current and Future Development near Fort Belvoir	No effect	Beneficial effects	Beneficial effects	Beneficial effects
Long-Term Projects				
Fort Belvoir Land Use	No effect	Beneficial effects	Beneficial effects	Beneficial effects
Surrounding Area Land Use	No effect	No effect	No effect	No effect
Relevant Plans and Studies	No effect	Beneficial effects	Beneficial effects	Beneficial effects
Current and Future Development near Fort Belvoir	No effect	Beneficial effects	Beneficial effects	Beneficial effects

3.2 SOCIOECONOMICS

3.2.1 Introduction

The socioeconomic region of influence (ROI) is the geographic area that would be most affected by adopting and implementing the proposed update of Fort Belvoir's RPMP and is selected as the basis on which economic and social impacts of the proposed action are analyzed. The criteria used to determine the ROI are the residency distribution of Fort Belvoir employees, the commuting patterns (distances and times), and the location of businesses providing goods and services to Fort Belvoir, its personnel, and their dependents.

Fort Belvoir is in Fairfax County, Virginia, part of the National Capital Region, and Fort Belvoir functions as a military administrative support center for the region. The National Capital Region comprises the District of Columbia; Arlington, Fairfax, Loudoun, and Prince William Counties in Virginia; Prince Georges and Montgomery Counties in Maryland; and all cities and towns included within the outer boundaries of the foregoing counties (32 CFR §70.3). The federal government is the core of the region, providing jobs and procuring goods and services throughout the area. This explains the high degree of economic and social integration of Washington, DC and the adjacent communities. Employees at Fort Belvoir and other federal agencies that would relocate to Fort Belvoir reside throughout the National Capital Region. On the basis of these conditions, the ROI for the socioeconomic environment comprises the following counties and cities:

- Arlington, Fairfax, Loudoun, Prince William, and Stafford Counties, and the Cities of Alexandria, Fairfax, Falls Church, Manassas, and Manassas Park in Virginia
- Calvert, Charles, Frederick, Montgomery, and Prince George's Counties in Maryland
- Washington, DC

The ROI, depicted in Figure 3.2-1, encompasses a large land area of approximately 4,000 square miles (MWCOG, 2013). The counties comprising the ROI for the 2007 Fort Belvoir BRAC EIS (US Army, 2007a) are the same counties in this EIS' ROI.

3.2.1.1 Economic Impact Analysis Methodology

For all action alternatives and short-term and long-term projects, economic impacts were evaluated for both the initial change in the economy by the proposed action – in other words, the new money spent by the installation, the new people employed, and the visitors' spending in the local economy – as well as the impacts of those changes on the overall economy of the ROI. These effects are known as direct, indirect, and induced impacts and are assessed using Regional Input-Output Modeling (RIMS) II multipliers, developed by the US Department of Commerce, Bureau of Economic Analysis. RIMS II multipliers are used to enable a fairly accurate analysis without difficult and costly survey-taking. While the advantages outweigh the disadvantages, there are limitations of using any multipliers, which are described in Appendix B, Economic Impacts. Additional details regarding the economic impact analysis methodology also are presented in Appendix B.

RIMS II is an "input-output" model, which measures how money flows through an area through the sales and purchases that businesses and households make. It measures what comes in (through purchases that businesses and households make that come from outside of the area, or "imports") and what goes out (through sales of goods and services, or "exports").

The economic impact analysis examined the following impacts:

- Economic impacts of construction – Include the impact of expenditures on construction materials and on earnings of construction workers and professional service providers during the construction period.
- Operations – As it is assumed that most new jobs at Fort Belvoir would be relocated from elsewhere in the ROI, impacts of these employees were not considered. However, operations at the NMUSA would be new to the ROI and the projected operating costs for the NMUSA would impact the economy on an annual basis. Additionally, on-post retail and food and beverage sales would positively impact the economy.
- Visitors – The analysis considers the spending of NMUSA patrons. These impacts would occur repeatedly on an annual basis and extend beyond the NMUSA site to the community. The museum would have the potential to act as a visitor attraction, which would draw new customers to the ROI, who in turn would spend at other locations. Visitor data from the Virginia Tourism Corporation were used to estimate visitor spending in several categories and to determine where visitors would travel from, how long they would stay in the ROI, the number of visitors per traveler group, and other characteristics. Because some visitors would come from within the ROI and some visitors would add the museum to their itinerary for a visit to the Washington, DC area, the analysis estimated what spending occurs as a result of the museum.

New spending from construction projects at Fort Belvoir would create sales for businesses (also called "output"), new jobs, and wages. The economic impact analysis considered what would happen at Fort Belvoir (called "initial change" in economic impact studies), as well as how those changes would create other changes throughout the ROI. The new spending at Fort Belvoir, for example by visitors to NMUSA, (called "final demand" in economic impact studies) would ripple through the economy, creating direct, indirect, and induced impacts. These are defined as:

- Direct – The first level of impacts after what happens at Fort Belvoir. For example, if a NMUSA visitor buys a t-shirt at the museum shop, direct impacts would include the sales, jobs, and wages of the t-shirt supplier that sold the shirt to the store.
- Indirect – The impacts to the industries that support the direct impact businesses. Continuing the t-shirt example, indirect impacts would be the sales, employees, and wages of textile manufacturers, cotton producers, trucking companies for shipping of the goods, etc.
- Induced – The impacts of household spending of employees' from the jobs in the direct and indirect impacts above. In the t-shirt example, indirect impacts would include the museum shop cashier's purchases for groceries and gasoline, for example.

3.2.1.2 Population, Housing, and School-aged Children Analysis Methodology

Implementation of the proposed short-term and long-term projects would generate net increases in the workforce on Fort Belvoir. Most of the affected personnel would be federal civilian and contractor employees already residing in the National Capital Region, whose jobs would be transferred to Fort Belvoir. These jobs would be shifted from one location to another within the National Capital Region and, therefore, would not result in a change in ROI employment.

Based on the home zip code data collected for the Fort Belvoir 2011 commuter survey, an estimated 88.5 percent of Fort Belvoir employees live within the ROI (Table 3.2-3). Some of the affected personnel might change their home residence within the ROI to improve their commute to Fort Belvoir. The employees that would be affected would not be *required* to move. An employee's decision to move could depend on factors such as the location of a spouse's place of employment, changing a child's school district, or the time it takes to commute. Whether an employee might decide to move also would be constrained by available housing and influenced by the cost of housing and household income.

Socioeconomic Region of Influence

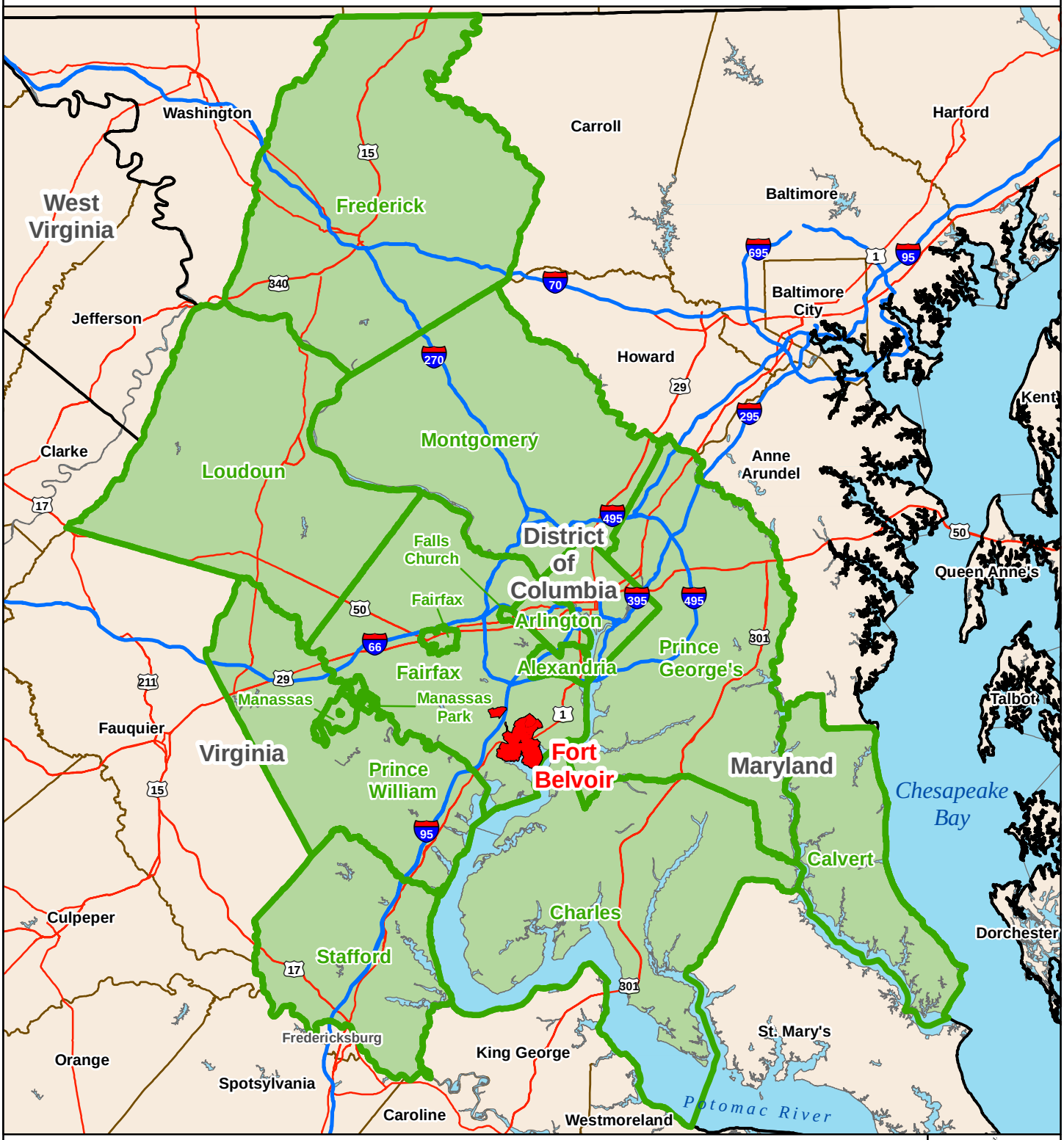


Figure 3-2.1

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Based on the findings of a survey of Fort Belvoir, Washington Headquarters Service, and NGA employees (the Washington Headquarters Service and NGA were proposed to be moved to Fort Belvoir as part of the 2005 BRAC action), the 2007 BRAC EIS (US Army, 2007a) estimated that about 50 percent of the existing Washington Headquarters Service, other DoD, and NGA employees might change their home residence because their jobs would be transferred to Fort Belvoir from other locations in the region. The analysis in this EIS of the potential effects of the redistribution of personnel within the ROI likewise assumes that half of the affected personnel may choose to move and half may choose to stay in their current residence, based on the following:

- A change in workplace location that may only be 10 or 15 miles can add substantially to commuting time because the metropolitan region is often rated worst nationally for traffic congestion in national congestion surveys (Halsey, 2013). Also, Fort Belvoir is located in the very congested I-95/US 1 corridor and is not served by high-speed transit services.
- Whereas new employees who live distant from Fort Belvoir may tend to favor residential locations close to Fort Belvoir, existing DoD and other federal employees who stay with their current agencies may not be inclined to move.
- Employees who are new to DoD or federal employment, or work for private-sector employers may be less compelled to move, because they would have applied for and taken the jobs having considered the job location and the resulting commutes.
- On the Virginia side of the Potomac River there is a large pool of DoD and other federal workers who can move from one nearby agency to another without changing their residence.
- As many DoD and other federal workers live along Northern Virginia's I-95 corridor south of Fort Belvoir, because of the relative cost of housing, Fort Belvoir could be closer to home than their present jobs.

To characterize the relocation of new Fort Belvoir personnel throughout the region, for this analysis it was assumed that the affected personnel that do choose to move would relocate their residences to those geographies (cities or counties) within the ROI that at the time of the 2011 Fort Belvoir commuter survey had the largest shares of Fort Belvoir personnel. Many of the employees would relocate to the Northern Virginia I-95 corridor, including Fairfax, Prince William, and Stafford Counties. Further, it was assumed that there would be available housing in these areas. Those ROI geographies with the lowest shares would lose affected personnel, as the personnel would relocate to geographies with higher shares of Fort Belvoir personnel. Although based on the commuter survey an estimated 11.5 percent of Fort Belvoir employees live outside the ROI, all new personnel were assumed to relocate within the ROI. That is, as those affected personnel who choose to move would do so to improve their commute to Fort Belvoir, they would not move to locations outside the ROI, with longer commuting distances and times.

The population shift likely would occur over many years, as employees and their families decide whether to relocate relative to their new place of employment. However, for this analysis, it is assumed that all employees who choose to move (i.e., half of the affected personnel) would relocate between 2011 (the baseline year) and 2017, when the last of the short-term projects would be constructed. For the long-term projects, it is assumed that all employees who choose to move would relocate between 2018 and 2030.

Demographic characteristics from the US Census Bureau 2011 American Community Survey 5-year estimates and the MWCOG employment, population, and household forecasts for the ROI counties, cities, and the District of Columbia were used to estimate the potential relocations within the region. The projected relocations for each geography were compared to the MWCOG forecasts to illustrate the scale of the potential departure or influx of households, personnel and their family members, and school-aged children relative to the anticipated growth in each community. These projections are estimates of the *potential* population change that could occur under the proposed action. As many of the new Fort Belvoir employees, notably those with short commutes to the installation, would choose to stay in their current homes, the

projections likely indicate the maximum numbers of people that may relocate and, as such, are conservative estimates for the purpose of determining impacts.

Analysis Methodology

To analyze the potential effects of the redistribution of personnel within the ROI on the cities and counties within the region, the following stepwise methodology was employed:

Step 1. Because of the assumption that 50 percent of new employees would move their place of residence over time, the net increase in Belvoir personnel was multiplied by 0.5 to estimate the number of employees who may choose to relocate within the ROI.

Step 2. The employees who may choose to relocate were redistributed within the ROI to estimate the maximum potential departure or influx of personnel by geography (city or county), with some geographies losing and some geographies gaining based on the current distribution of Belvoir employees.

Step 3. US Census Bureau data and MWCOG forecasts were used to estimate the maximum potential departure or influx of family members and school-age children by community associated with the potential loss or gain of personnel.

Step 4. The potential departure or influx of households, personnel and their family members, and school-aged children was compared to the MWCOG growth forecasts for each city and county to illustrate the scale of the potential loss or gain relative to the anticipated growth in each geography.

The methodology and assumptions specified above and briefly outlined in the accompanying text box were used to determine the redistribution of personnel and their families within the ROI under each alternative. The resulting redistribution is a possible scenario of what would happen, based on what is known about current Fort Belvoir personnel, DoD and other federal agencies in the region, and the region itself. What actually does happen would depend in part upon the current location of the personnel and agencies that move to Fort Belvoir; however, as the potential personnel and agencies are unknown, their current whereabouts in the region are unknown.

3.2.1.3 Thresholds of Significance

For the socioeconomic impact analysis, an impact is deemed significant if it exceeds the following, applicable thresholds of significance:

- Economic Activity and Sociological Environment – The effect is judged to fall substantially outside the normal range of ROI variation or to exceed the ability of the ROI communities to accommodate the change; i.e., the departure or influx of households, personnel and their families, or school-aged children correspond to more than half of the forecasted growth in the community.
- Environmental Justice – The action would result in disproportionately high and adverse human health or environmental effects on minority populations and low-income populations.
- Protection of Children – The action would result in disproportionate environmental health or safety risks to children.

3.2.2 Affected Environment

This section describes the contribution of Fort Belvoir to the economy and social conditions in the ROI. The socioeconomic indicators used for this study include regional economic activity, population, housing, services, shopping and service establishments, and recreation. These indicators characterize the ROI. The baseline year for socioeconomic data presented here is 2010, the year of the most recent decennial census in the United States. Where 2010 data are not available, the most recent data available are presented. Data from earlier years and projections beyond 2010 also are provided, as appropriate, to illustrate trends.

3.2.2.1 Economic Activity

Employment and Industry

In 2012, the Fort Belvoir installation supported a workforce of approximately 39,000, of whom about 60 percent were DoD civilians, 30 percent contractors, and 10 percent active duty military or reservists on duty (US Army, 2014c). Fort Belvoir is home to 26 DoD agencies, 2 Army major command headquarters and elements of 10 others, 19 agencies of the Department of the Army, 8 elements of the US Army Reserve and the Army National Guard, a US Navy construction battalion, a US Marine Corps detachment, a US Air Force activity, and a Department of the Treasury agency (US Army, 2012i).

Based on US Bureau of Economic Analysis data for 2009, the ROI supports a working population of more than 3.6 million (Table 3.2-1). The number of jobs in the ROI increased by about 111,300 between 2005 and 2009. The largest employment sectors in the ROI are the government and government enterprises sector, which accounts for 20.2 percent of total ROI employment, and the professional, scientific, and technical services sector, which accounts for 15.8 percent of total employment. Federal civilians and military together account for 12.2 percent of employment, or approximately 448,680 jobs. State and local government accounts for 7.4 percent of employment, or about 269,439 jobs. While direct federal government jobs in the Washington metropolitan region have fallen from about 22 percent of total employment in 1980, sharp increases in federal government contracting has more than offset this decline in direct employment and helped push up ROI wages, home prices, and cost-of-living (McMillion, 2006).

Employment forecasts by MWCOG estimate that ROI employment will increase by nearly 937,000 jobs, or 29.8 percent between 2010 and 2030 (Table 3.2-2). The greatest increases in the number of jobs are forecast for Fairfax County, Washington, DC, Montgomery County, and Loudoun County. The jurisdictions projected to have the highest percentage growth are Loudoun County, Prince William County, the City of Falls Church, and Stafford County.

In 2010, the ROI annual unemployment rate was 6.3 percent, or about 182,000 persons unemployed (US Bureau of Labor Statistics, 2012b). The presence of the federal government provides some stability to the ROI during periods of economic recession, resulting in lower unemployment than may be experienced in other regions or on a national level. For the period 2008 through 2010, the ROI annual unemployment rate averaged 5.4 percent (US Bureau of Labor Statistics, 2012b), compared to the national average annual rate of 8.2 percent (US Bureau of Labor Statistics, 2012a). Within the ROI, during the 2008-2010 period unemployment rates were lowest in Arlington, Loudoun, and Fairfax Counties, and in Alexandria City (US Bureau of Labor Statistics, 2012b). Unemployment rates were highest in Washington, DC, the Cities of Manassas and Falls Church, and Prince George's County.

Income

The ROI had a per capita personal income of approximately $58,449 in 2009, which was about 49 percent higher than the national average of $39,357 (US Bureau of Economic Analysis, 2014, Regional Economic Accounts CA1-3). The ROI 2009 per capita personal income reflects a decrease of approximately 2.4 percent from 2008, compared to a national decrease of 3.7 percent. During the three years since 2009, the ROI per capital personal income has increased to $62,964, rising at an average annual rate of approximately 2.5 percent. The 2003-2012 average annual growth rate of the ROI per capital personal income was 3.4 percent. The national average annual per capita personal income growth rate for the same ten-year time period was 3.3 percent.

The George Mason University Center for Regional Analysis forecasts that per capital personal income in the Washington metropolitan area will increase from approximately $48,000 in 2010 to about $68,000 in 2030 (Fuller and Harpel, 2009). The metropolitan area is defined as the Washington metropolitan statistical area by the US Census and comprises the counties and cities of the ROI, as well as Clarke, Fauquier, Spotsylvania, and Warren Counties and the City of Fredericksburg in Virginia.

Table 3.2-1
ROI Employment by Industry

Industry	Year 2005	Year 2009	Change 2005-2009	
			Number	Percent
Farm Employment	6,101	5,962	-139	-2.3
Nonfarm Employment	3,545,346	3,656,786	111,440	3.1
Private Employment	2,840,275	2,917,036	76,761	2.7
Forestry, Fishing, and Related Activities	618D	1,617D	999	161.7
Mining	423D	4,599D	4,176	987.2
Utilities	6,499D	6,052D	-447	-6.9
Construction	213,698D	176,126D	-37,572	-17.6
Manufacturing	44,516D	52,110D	7,594	17.1
Wholesale Trade	67,463D	61,949D	-5,514	-8.2
Retail Trade	298,813	242,389D	-56,424	-18.9
Transportation and Warehousing	65,050D	53,738D	-11,312	-17.4
Information	111,045D	96,723D	-14,322	-12.9
Finance and Insurance	131,435	138,189D	6,754	5.1
Real Estate, Rental & Leasing	159,131	167,041	7,910	5.0
Professional, Scientific & Technical Services	517,971D	577,169D	59,198	11.4
Mgt of Companies & Enterprises	36,291D	37,352D	1,061	2.9
Admin & Waste Mgt Services	225,373D	225,167	-206	-0.1
Educational Services	99,932D	116,105	16,173	16.2
Health Care & Social Assistance	250,089D	294,465	44,376	17.7
Arts, Entertainment & Recreation	47,890D	72,552D	24,662	51.5
Accommodation & Food Services	170,307D	211,367D	41,060	24.1
Other Services Except Public Administration	241,331	250,349	9,018	3.7
Government and Government Enterprises	705,071	739,750	34,679	4.9
Federal, Civilian	356,806	377,460	20,654	5.8
Military	75,821	71,220	-4,601	-6.1
State and Local	272,444	291,070	18,626	6.8
State Government	36,096D	37,594D	1,498	4.2
Local Government	215,997D	231,845D	15,848	7.3
TOTAL	3,551,447	3,662,748	111,301	3.1

Note: D indicates that employment for some counties or cities in the ROI was not reported to avoid disclosure of confidential information, but the estimates are included in the totals.

Source: US Bureau of Economic Analysis, 2012b, Regional Economic Accounts CA25N.

Table 3.2-2
ROI Employment Forecasts

Geography	Year 2010	Year 2020	Year 2030	Change 2010-2030	
				Number	Percent
Virginia					
Arlington County	223,264	276,281	303,044	79,780	35.7
Fairfax County	622,877	720,902	813,060	190,183	30.5
City of Fairfax	20,382	21,877	23,683	3,301	16.2
City of Falls Church	11,400	14,300	17,600	6,200	54.4
Loudoun County	145,292	197,577	251,675	106,383	73.2
Prince William County	115,410	155,277	195,905	80,495	69.7
City of Manassas	23,633	26,220	29,234	5,601	23.7
City of Manassas Park	4,536	4,718	4,908	372	8.2
Stafford County	46,664	58,399	70,170	23,506	50.4
City of Alexandria	102,895	116,812	149,552	46,657	45.3
Maryland					
Calvert County	35,200	44,501	47,206	12,006	34.1
Charles County	62,199	71,695	77,499	15,300	24.6
Frederick County	98,695	103,862	109,755	11,060	11.2
Montgomery County	510,277	564,419	635,257	124,980	24.5
Prince George's County	342,588	377,879	427,514	84,926	24.8
Washington, DC	783,460	865,726	929,641	146,181	18.7
TOTAL	3,148,772	3,620,445	4,085,703	936,931	29.8

Source: MWCOG, 2013.

Population

In November 2011, Fort Belvoir completed an online commuter survey for all personnel, with approximately 5,880 respondents or approximately 14.9 percent of workers at Main Post and FBNA. Based on the zip code data collected, an estimated 88.5 percent of Fort Belvoir employees live within the ROI (Table 3.2-3). Employees are most likely to live in Fairfax County, Prince William County, the City of Alexandria, Stafford County, Prince George's County, and Loudoun County. Despite the recent influx of employees due to the implementation of the 2005 BRAC recommendations, the residential distribution of Fort Belvoir personnel remains consistent with historical trends for the post (US Army, 2014a).

Table 3.2-4 presents population statistics for the ROI. Fort Belvoir is in a densely-populated and robust region. ROI population density is about 1,300 persons per square mile (MWCOG, 2013); substantially higher than the approximately 90 persons per square mile population density of the US Census Bureau, 2012e). In 2010, the ROI population was approximately 5.3 million (Table 3.2-4), a 15.9 percent increase over the 2000 population of about 4.5 million (MWCOG, 2005). On-going population suburbanization was evident from the 2010 Census, as between 2000 and 2010 the Washington metropolitan area experienced rapid growth in the outer suburban jurisdictions (George Mason University Center for Regional Analysis, 2011). Loudoun County was among the ten fastest-growing counties in the nation between 2000 and 2010, having gained approximately 142,700 people and having experienced population growth of 84.1 percent (Mackun and Wilson, 2011).

The MWCOG forecasts strong population growth through 2030 (Table 3.2-4). The population of Fairfax County is forecast to increase by about 184,000 persons or 17.0 percent between 2010 and 2030, and the population of Montgomery County is forecast to increase by 181,000 persons or 18.6 percent. Fort Belvoir is in Northern Virginia's I-95 corridor, which includes Fairfax, Prince William, and Stafford Counties, and the Cities of Fairfax, Falls Church, Manassas, and Manassas Park. The corridor is forecast to increase its population by about 443,000 persons or 26.1 percent by 2030.

Table 3.2-3
Residential Distribution of Fort Belvoir Employees
Based on 2011 Commuter Survey

Geography	Respondents	Percent
Virginia		
Arlington County	209	3.6
Fairfax County	1,326	22.5
City of Fairfax	190	3.2
City of Falls Church	72	1.2
Loudoun County	253	4.3
Prince William County	1,040	17.7
City of Manassas	153	2.6
City of Manassas Park	37	0.6
Stafford County	292	5.0
City of Alexandria	777	13.2
Maryland		
Calvert County	20	0.3
Charles County	101	1.7
Frederick County	64	1.1
Montgomery County	248	4.2
Prince George's County	266	4.5
Washington, DC	157	2.7
Within ROI	5,205	88.5
Outside ROI	677	11.5
Total	5,882	100.0
Source: US Army, 2013c.		

Table 3.2-4
ROI Population Forecasts

Geography	Year 2010	Year 2020	Year 2030	Change 2010-2030	
				Number	Percent
Virginia					
Arlington County	207,627	236,083	258,757	51,130	24.6
Fairfax County	1,081,731	1,153,431	1,265,625	183,894	17.0
City of Fairfax	22,737	25,964	26,908	4,171	18.3
City of Falls Church	12,332	14,211	16,411	4,079	33.1
Loudoun County	312,310	405,241	464,421	152,111	48.7
Prince William County	402,000	494,068	561,137	159,137	39.6
City of Manassas	37,821	41,578	44,560	6,739	17.8
City of Manassas Park	14,273	15,864	15,864	1,591	11.1
Stafford County	128,950	169,774	212,671	83,721	64.9
City of Alexandria	139,958	158,102	174,030	34,072	24.3
Maryland					
Calvert County	91,748	100,450	105,099	13,351	14.6
Charles County	144,594	175,953	202,552	57,958	40.1
Frederick County	233,383	254,816	293,136	59,753	25.6
Montgomery County	972,603	1,067,030	1,153,912	181,309	18.6
Prince George's County	863,420	899,712	950,030	86,610	10.0
Washington, DC	601,720	676,323	722,760	121,040	20.1
TOTAL	5,267,207	5,888,600	6,467,873	1,200,666	22.8
Source: MWCOG, 2013.					

3.2.2.2 Sociological Environment

Housing

On-Post Housing

Family housing on Fort Belvoir currently comprises 2,106 units, housing approximately 7,500 residents or about 3.5 people per household (US Army, 2014a). The housing units are in villages located primarily on the east side of South Post, with the exception of Lewis and Woodlawn Villages, which are along the east edge of North Post. Fort Belvoir has permanent-party barracks space on North Post at McRee Barracks for 800 personnel in non-emergency conditions, with a maximum capacity of 1,200 in support of national emergency or disaster. On South Post Bennett Barracks has a capacity of 140 personnel and houses trainees. Also on South Post, Doss and Vaccaro Halls, with a combined capacity of 288 personnel, provide warrior-in-transition unaccompanied personnel housing. In addition, Fort Belvoir provides transient lodging facilities for visitors and new arrivals in several buildings on the east side of South Post. Currently, there are 526 transient lodging rooms, suites, and apartments on Fort Belvoir, as well as 12 distinguished visitors' quarters in the Officers' Club.

Off-Post Housing

Table 3.2-5 shows data on recent trends in housing in the ROI. In the region as a whole, the number of housing units increased by 298,000 units or 16.6 percent between 2000 and 2010. The largest numbers of housing units were built in Fairfax, Loudoun, Montgomery, and Prince William Counties, which together accounted for 59.2 percent (approximately 176,200 housing units) of the increase in the ROI. Loudoun County experienced the highest growth rate (76.1 percent) between 2000 and 2010, followed by the City of Manassas Park and then Stafford and Prince William Counties.

Table 3.2-5
Housing Units

Geography	Year 2000	Year 2010	Change 2000-2010	
			Number	Percent
Virginia				
Arlington County	90,426	105,404	14,978	16.6
Fairfax County	359,411	407,998	48,587	13.5
City of Fairfax	8,204	8,680	476	5.8
City of Falls Church	4,725	5,489	764	16.2
Loudoun County	62,160	109,442	47,282	76.1
Prince William County	98,052	137,115	39,063	39.8
City of Manassas	12,114	13,123	1,009	8.3
City of Manassas Park	3,365	4,904	1,539	45.7
Stafford County	31,405	43,978	12,573	40.0
City of Alexandria	64,251	72,376	8,125	12.6
Maryland				
Calvert County	27,576	33,780	6,204	22.5
Charles County	43,903	54,963	11,060	25.2
Frederick County	73,017	90,136	17,119	23.4
Montgomery County	334,632	375,905	41,273	12.3
Prince George's County	302,378	328,182	25,804	8.5
Washington, DC	274,845	296,719	21,874	8.0
TOTAL	1,790,464	2,088,194	297,730	16.6

Sources: US Census Bureau, 2012b, DP-1 Profile of General Demographic Characteristics 2000; 2012c, QT-H1 General Housing Characteristics 2010.

In 2010, there were about 2,088,000 housing units in the ROI. Table 3.2-6 presents the occupancy status of ROI housing units in 2010. Throughout the ROI, the percentage of the total housing units occupied ranged from 89.9 percent in Washington, DC to 96.2 percent in the City of Fairfax. Of the approximately 128,000 vacant housing units in the ROI in 2010, about 48,550 (37.9 percent) were available to rent and about 23,350 (18.2 percent) were for sale. The largest percentage of vacant housing units available for rent or for sale was in Washington, DC, where approximately 17,320 units were available in 2010, representing 24.1 percent of the total available units in the ROI. Large numbers of available vacant units also occurred in Prince George's, Montgomery, and Fairfax Counties, which together had approximately 34,170 available units or 47.5 percent of the ROI's total vacant units available for rent or for sale.

Table 3.2-6
Housing Occupancy Status

Geography	Total Housing Units	Occupied	Vacant			
			Total	For Rent	For Sale	Other
Virginia						
Arlington County	105,404	98,050	7,354	3,164	609	3,581
Fairfax County	407,998	391,627	16,371	6,497	3,091	6,783
City of Fairfax	8,680	8,347	333	115	79	139
City of Falls Church	5,489	5,101	388	109	122	157
Loudoun County	109,442	104,583	4,859	1,162	1,400	2,297
Prince William County	137,115	130,785	6,330	2,102	1,526	2,702
City of Manassas	13,123	12,527	596	274	112	210
City of Manassas Park	4,904	4,507	397	205	82	110
Stafford County	43,978	41,769	2,209	585	559	1,065
City of Alexandria	72,376	68,082	4,294	2,200	449	1,645
Maryland						
Calvert County	33,780	30,873	2,907	392	469	2,046
Charles County	54,963	51,214	3,749	1,030	977	1,742
Frederick County	90,136	84,800	5,336	1,485	1,204	2,647
Montgomery County	375,905	357,086	18,819	6,592	3,648	8,579
Prince George's County	328,182	304,042	24,140	9,246	5,095	9,799
Washington, DC	296,719	266,707	30,012	13,393	3,930	12,689
TOTAL	2,088,194	1,960,100	128,094	48,551	23,352	56,191

Source: US Census Bureau, 2012c, QT-H1 General Housing Characteristics 2010.

The median value of owner-occupied housing in the ROI substantially exceeds the median value of housing in the nation, in 2006-2010 ranging from more than 60 percent higher than the national median ($188,400) in the City of Manassas Park to over 240 percent higher in the City of Falls Church (US Census Bureau, 2012a, DP04 Selected Housing Characteristics 2010 5-year estimates). Ten jurisdictions in the ROI – seven in Virginia, two in Maryland, and Washington, DC – had median housing values at least twice the national median value. In 2006-2010, the six highest median owner-occupied housing unit values in the ROI were in Virginia, as were the two lowest median values (Table 3.2-7). Similarly, median gross rents in the ROI exceed the 2006-2010 median gross rent for the nation as a whole ($841), ranging between more than 25 percent higher than the national median in Washington, DC and over 80 percent higher in Loudoun County. In 2006-2010, the five highest median gross rents in the ROI were in Virginia and the four lowest median rents were in Washington, DC and Maryland (Table 3.2-7).

Table 3.2-7
Median Value and Rent

Geography	Owner-Occupied Units	Median Value	Occupied Units Paying Rent	Median Gross Rent
Virginia				
Arlington County	43,168	571,700	47,719	1,519
Fairfax County	274,448	507,800	104,165	1,492
City of Fairfax	6,148	488,900	2,349	1,484
City of Falls Church	3,006	641,900	1,608	1,453
Loudoun County	77,022	495,000	17,525	1,531
Prince William County	93,372	377,700	30,595	1,338
City of Manassas	8,003	325,800	3,652	1,232
City of Manassas Park	2,993	303,400	1,168	1,344
Stafford County	31,502	355,300	8,244	1,280
City of Alexandria	29,103	486,800	33,955	1,330
Maryland				
Calvert County	25,754	392,900	4,185	1,204
Charles County	40,454	355,800	8,600	1,307
Frederick County	64,112	349,500	18,226	1,133
Montgomery County	244,815	482,900	104,743	1,417
Prince George's County	194,047	327,600	105,425	1,140
Washington, DC	111,879	443,300	141,442	1,063

Source: US Census Bureau, 2012a, DP04 Selected Housing Characteristics 2010 5-year estimates.

The number of construction permits authorized in the Washington metropolitan area for new, privately-owned housing units declined dramatically – 10.2 to 38.9 percent – each year between 2005 and 2009, overall from 36,776 units authorized in 2005 to 12,329 units in 2009 (MWCOG, 2010). The number of homes sold in the metropolitan area also dropped precipitously. Net home sales declined 44.4 percent from 113,544 in 2005 to 63,080 units sold in 2008, although sales rebounded 11.5 percent in 2009 (MWCOG, 2010).

Table 3.2-8 shows the number of construction permits authorized for new, privately-owned housing units and the net home sales in the ROI in 2009. The number of construction permits authorized was highest in Loudoun, Prince William, and Prince George's Counties. Fairfax County had the most homes sold, followed by Montgomery, Prince William, and Prince George's Counties. In 2009, both the number of permits issued and net home sales were lowest in the Cities of Falls Church, Fairfax, Manassas, and Manassas Park.

Table 3.2-8
Housing Units Authorized and Net Home Sales 2009

Geography	Housing Units Authorized		Net Home Sales	
	Number	Percent of ROI	Number	Percent of ROI
Virginia				
Arlington County	614	5.4	2,656	4.0
Fairfax County	769	6.7	15,298	23.0
City of Fairfax	14	0.1	294	0.4
City of Falls Church	12	0.1	167	0.3
Loudoun County	2,154	18.8	5,407	8.1
Prince William County	2,099	18.3	8,743	13.2
City of Manassas	40	0.3	861	1.3
City of Manassas Park	0	0.0	434	0.7
Stafford County	459	4.0	1,835	2.8
City of Alexandria	236	2.1	1,989	3.0
Maryland				
Calvert County	260	2.3	921	1.4
Charles County	714	6.2	1,379	2.1
Frederick County	839	7.3	2,565	3.9
Montgomery County	862	7.5	10,371	15.6
Prince George's County	1,259	11.0	7,029	10.6
Washington, DC	1,126	9.8	6,438	9.7
TOTAL	11,457	100.0	66,387	100.0

Source: MWCOG, 2010.

Despite the declines in housing permit authorizations and net home sales in the Washington metropolitan area noted above, the demand for housing in the metropolitan area is forecast to grow through 2030 (Fuller, 2009, 2010; Fuller and Harpel, 2009). The growth in demand is expected to be driven by the economy's projected job requirements over the 2010-2030 period. As discussed in Section 3.2.1.1, based on MWCOG forecasts (MWCOG, 2013), employment in the ROI is expected to grow by approximately 937,000 jobs during that time period (Table 3.2-2).

Law Enforcement, Fire Protection, and Medical Services

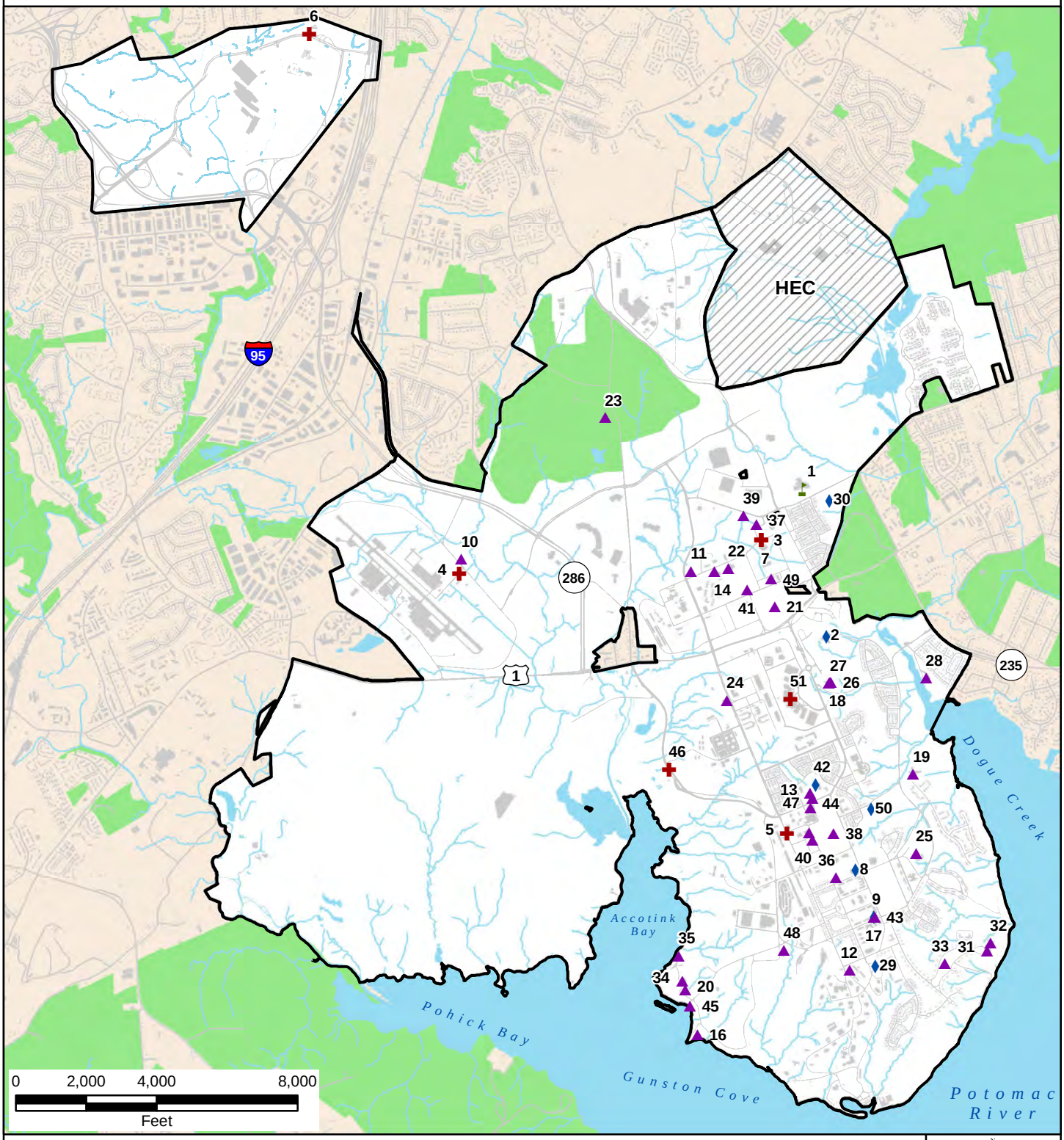
On-Post Services

Figure 3.2-2 shows the location of on-post community facilities by number; Table 3.2-9 lists the facilities, which are keyed to the numbers on Figure 3.2-2. All professional law enforcement, access control, fire, and emergency services on the installation are provided by the Fort Belvoir Directorate of Emergency Services. The 212th Military Police Detachment provides law enforcement and public safety services for the installation. These services include overseeing physical security and essential community law enforcement operations including traffic, canine, and investigation operations.

Table 3.2-9
On-Post Community Facilities

Map ID	Community Facility Name	Type of Service
1	Fort Belvoir Elementary School	Schools
2	JoAnn Blanks Child Development Center	Family Support and Social Services
3	Law Enforcement Center	Law Enforcement, Fire Protection, and Medical Services
4	Station 466 - DAAF	Law Enforcement, Fire Protection, and Medical Services
5	Station 465 - South Post	Law Enforcement, Fire Protection, and Medical Services
6	Station 464 - North Area	Law Enforcement, Fire Protection, and Medical Services
7	Station 463 - North Post	Law Enforcement, Fire Protection, and Medical Services
8	Army Community Service	Family Support and Social Services
9	DFMWR Advertising and Sponsorship	Shops, Services, and Recreation
10	Anderson Park	Shops, Services, and Recreation
11	Amphitheater	Shops, Services, and Recreation
12	Benyaurd Indoor Pool	Shops, Services, and Recreation
13	Body Shop Fitness Center	Shops, Services, and Recreation
14	Better Opportunities for Single Soldiers (BOSS) Center	Shops, Services, and Recreation
15	Bowling Center & Vortex Grill	Shops, Services, and Recreation
16	Castle Park	Shops, Services, and Recreation
17	Civilian Employee Fund Council	Family Support and Social Services
18	Community Center	Shops, Services, and Recreation
19	Child, Youth and School Services	Family Support and Social Services
20	Fenced Dog Park	Shops, Services, and Recreation
21	Fremont Field	Shops, Services, and Recreation
22	Graves Fitness Center	Shops, Services, and Recreation
23	Golf Club	Shops, Services, and Recreation
24	Kawamura Arts & Crafts Center	Shops, Services, and Recreation
25	InterContinental Hotel Group - Army Lodging	Shops, Services, and Recreation
26	The Lounge at The Community Center	Shops, Services, and Recreation
27	Leisure Travel Services	Shops, Services, and Recreation
28	Marina	Shops, Services, and Recreation
29	Non-Appropriated Funds Human Resources and Civilian Personnel Advisory Center	Family Support and Social Services
30	North Post Child Development Center	Family Support and Social Services
31	Officers' Club	Shops, Services, and Recreation
32	Connolly Pool Complex at the Officers' Club	Shops, Services, and Recreation
33	Officers' Club Tennis Courts	Shops, Services, and Recreation
34	Outdoor Recreation Center	Shops, Services, and Recreation
35	Outdoor Archery Range	Shops, Services, and Recreation

Fort Belvoir On-Post Community Facilities



Legend

- Family Support and Social Services
- Law Enforcement, Fire Protection, and Medical Services
- Schools
- Shops, Services, and Recreation
- Parklands

Fort Belvoir RPMP EIS

Figure 3.2-2

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Table 3.2-9
On-Post Community Facilities (Continued)

Map ID	Community Facility Name	Type of Service
36	Outdoor Pool 1	Shops, Services, and Recreation
37	Outdoor Pool 3	Shops, Services, and Recreation
38	Pullen Field	Shops, Services, and Recreation
39	Self-Service Car Wash	Shops, Services, and Recreation
40	Skatepark	Shops, Services, and Recreation
41	Soldier Statesman Park	Shops, Services, and Recreation
42	South Post Child Development Center	Family Support and Social Services
43	Special Events/CDR	Shops, Services, and Recreation
44	Specker Field House	Shops, Services, and Recreation
45	Tompkins Basin	Shops, Services, and Recreation
46	Tulley Gate	Law Enforcement, Fire Protection, and Medical Services
47	Van Noy Library	Shops, Services, and Recreation
48	Vet-Center	Shops, Services, and Recreation
49	Wells Field House	Shops, Services, and Recreation
50	Youth Services	Family Support and Social Services
51	Fort Belvoir Community Hospital (FBCH	Law Enforcement, Fire Protection, and Medical Services
Source: US Army, 2012j.		

Fire response operations are currently located in four fire stations and one fire prevention office on Fort Belvoir: Station 463, Abbott Road, North Post; Station 464, Barta Road, FBNA; Station 465 and the Fire Prevention Office, Gunston Road, South Post; and Station 466, Gavin Road, DAAF. Whenever fire apparatus is dispatched, at least four personnel who are trained as emergency medical technicians are included. Most of the response vehicles are staffed with an Advanced Life Support provider, allowing emergency medical technicians to provide the same life-saving measures on the site of the emergency as the medical unit which responds from FBCH or Fairfax County's emergency medical response system.

The average response time for Fort Belvoir's fire and medical emergency services is currently in compliance with DoD Instruction 6055.6, which states that on-post response times must be within 7 minutes of the initiation of the call for 90 percent of the incidents called in. As a result of the increase in personnel on the post from implementation of the 2005 BRAC actions, the average response times of both fire and medical emergency services have slightly increased over the past 5 years due to the increase in demand and increase in traffic on-post. In order to address the increase in personnel and buildings, Fort Belvoir has implemented the following response solutions, which have allowed for a faster response time than would have been the case: an Emergency Services Center on North Post was constructed and a dedicated staff was assigned to it, civilian dispatchers were hired, and a computer aided dispatching program was purchased to assist in processing calls (Monroe, pers. comm., October 16, 2013).

When medical emergencies occur on or near the post, military personnel and their dependents are usually taken to FBCH, while civilians are taken to local hospitals (see *Off-Post Services* below for a list of off-post hospitals near Fort Belvoir). However all transport decisions are based on the nature of the emergency, because different hospitals have specialized services geared towards different types of emergencies. Emergency 911 calls on and near the post are directed through Fairfax County's Department of Public Safety Communications and then transferred to Fort Belvoir's Emergency Services Center to be dispatched.

Off post assets only respond to on-post emergencies when all Fort Belvoir units are committed to other calls.

Medical services on post are provided by the FBCH, which operates under the Joint-Task Force National Capital Region Medical Command, based at the Walter Reed Military Medical Center in Bethesda, Maryland. The FBCH replaced the aging DeWitt Army Community Hospital as a result of the BRAC 2005 actions and provides medical services to active duty military, reservists, veterans, and their dependents on post and throughout the region. The hospital includes more than 1.2 million square feet and 120 inpatient rooms. Services and medical treatments featured at the FBCH include: an intensive care unit, state-of-the-art operating rooms, a cancer care center, a center for the treatment of musculoskeletal disorders, and a full range of primary care services, along with medical and surgical subspecialties.

Dental services are available at Logan Dental Clinic located on South Post for active duty service members. The dental clinic offers routine treatment, exams, and cleanings along with dental emergency services. After-normal hours dental emergencies are treated at the FBCH oral maxillofacial/dental clinic. Dental services for family members and other-than-active-duty military members covered under TRICARE, the military health and dental insurance program, are not available at Logan Dental Clinic.

Off-Post Services

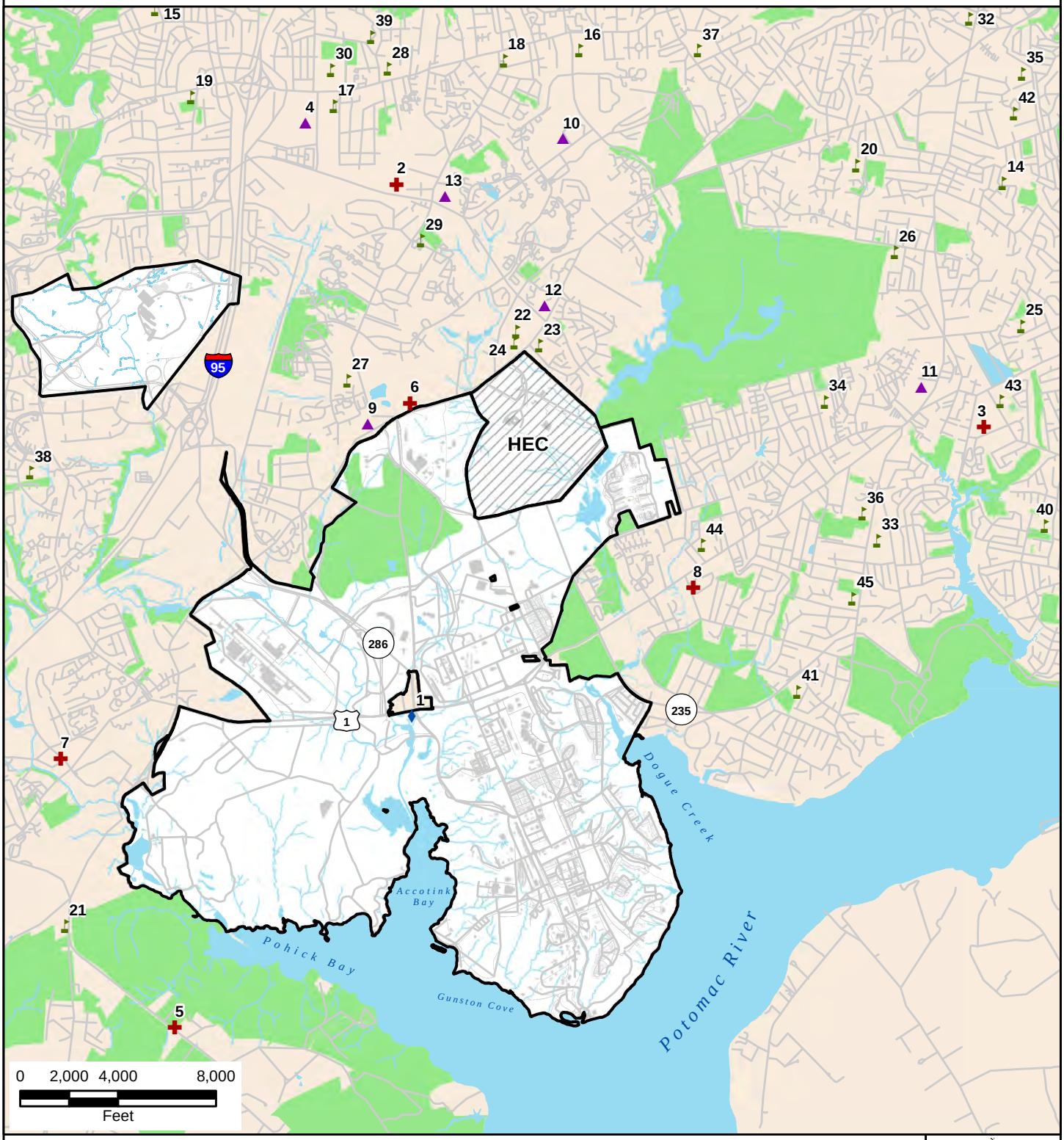
Fire and rescue departments, with 138 fire and emergency service locations within the Northern Virginia region, provide cooperative emergency services through a memorandum of agreement (MOA) known as the Northern Virginia Emergency Service Mutual Response Agreement. This agreement sets standardized response protocols and operational procedures for the fire, rescue, and emergency medical service agencies for the Northern Virginia jurisdictions that are signatories to this agreement. Fort Belvoir is among the signatories to this agreement, which includes: the counties of Arlington, Fairfax, Fauquier, Loudoun, Prince William and Stafford; the cities of Fairfax, Manassas, Alexandria, and Manassas Park; the Metropolitan Washington Airports Authority; and, US Army Base Fort Myer and Marine Corps Base Quantico (Northern Virginia Regional Commission, 2009).

Each signatory benefits by receiving seamless assistance from the most appropriate response resources available, regardless of the jurisdictional boundary lines. Specifically, Fort Belvoir has the operational ability and organizational authority to both provide and receive emergency service assistance among the signatory localities. As defined in the Northern Virginia Emergency Services Mutual Response Agreement, emergency services include fire suppression, emergency medical, hazardous material, technical rescue, and other related types of emergency services.

There are four Fairfax County Fire and Rescue Department stations within a one-mile radius of the installation perimeter: Station 424 on Lukens Lane, Station 437 on Telegraph Road, Station 419 in Lorton, and Station 420 on Gunston Road, as seen with other off-post community facilities in Figure 3.2-3 and in the associated Table 3.2-10. These stations are among the stations that would respond when needed or requested under the agreement. The average response time of fire stations in Fairfax County in FY 2012 was within 9 minutes of the initial call 85 percent of the time (Fairfax County Fire and Rescue Department, 2012).

Law enforcement within the ROI is provided by city, county and state police departments. There are more than 13,300 law enforcement employees in the ROI (US Department of Justice, September 2012). The Fairfax County Police Department's jurisdiction on Fort Belvoir is limited to any state or county-owned highway or property through the installation or to close pursuit of a felon off a state highway onto the installation. Additionally, they have concurrent jurisdiction with Fort Belvoir law enforcement officers at the Eleanor Kennedy Homeless Shelter on US Route 1 and the Fort Belvoir Elementary School (Fairfax County Police Department, 2013).

Off-Post Community Facilities



Legend

- Family Support and Social Services
- Law, Fire, Medical Services
- Schools
- Shops, Services, and Recreation
- Parklands

Fort Belvoir RPMP EIS

Figure 3.2-3

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Table 3.2-10
Off-Post Community Facilities

Map ID	Community Facility Name	Type of Service
1	Eleanor Kennedy Shelter	Family Support and Social Services
2	Inova Emergency Care Center - Franconia/Springfield (HealthPlex)	Law, Fire, Medical Services
3	Inova Mount Vernon Hospital	Law, Fire, Medical Services
4	Springfield Mall	Shops, Services, and Recreation
5	Gunston Fire Station	Law, Fire, Medical Services
6	Kingstowne Fire Station	Law, Fire, Medical Services
7	Lorton Fire Station	Law, Fire, Medical Services
8	Woodlawn Fire Station	Law, Fire, Medical Services
9	Landsdowne Center	Shops, Services, and Recreation
10	Kingstowne Town Center	Shops, Services, and Recreation
11	Hybla Valley Shopping Center	Shops, Services, and Recreation
12	Hayfield Plaza Shopping Center	Shops, Services, and Recreation
13	Festival at Manchester Lakes Shopping Center	Shops, Services, and Recreation
14	Bucknell Elementary School	Schools
15	Crestwood Elementary School	Schools
16	Edison High School	Schools
17	Forestdale Elementary School	Schools
18	Franconia Elementary School	Schools
19	Garfield Elementary School	Schools
20	Groveton Elementary School	Schools
21	Gunston Elementary School	Schools
22	Hayfield High School	Schools
23	Hayfield Elementary School	Schools
24	Hayfield Middle School	Schools
25	Hollin Meadows Elementary School	Schools
26	Hybla Valley Elementary School	Schools
27	Island Creek Elementary School	Schools
28	Key Middle School	Schools
29	Lane Elementary School	Schools
30	Lee High School	Schools
31	Lorton Station Elementary School	Schools
32	Mount Eagle Elementary School	Schools
33	Mount Vernon High School	Schools
34	Mount Vernon Woods Elementary School	Schools
35	Quander Road Education Center	Schools
36	Riverside Elementary School	Schools
37	Rose Hill Elementary School	Schools
38	Saratoga Elementary School	Schools
39	Springfield Estates Elementary School	Schools
40	Stratford Landing Elementary School	Schools

Map ID	Community Facility Name	Type of Service
41	Washington Mill Elementary School	Schools
42	West Potomac High School	Schools
43	Whitman Middle School	Schools
44	Woodlawn Elementary School	Schools
45	Woodley Hills Elementary School	Schools

The ROI is served by more than 35 medical facilities, including hospitals and medical centers, along with numerous specialty care facilities (American Hospital Directory, 2013). The closest civilian hospital to Fort Belvoir is the INOVA Mount Vernon Hospital, which is approximately five miles northeast of the installation. Also in the area is the INOVA Healthplex, approximately two miles north of the installation, which is an outpatient facility that offers a 24-hour emergency care center.

Schools

The US Department of Education provides financial assistance to school districts that contain federally-owned lands within their jurisdiction through the Federal Impact Aid program. These local school districts face a unique issue of loss of property tax revenue due to the presence of tax-exempt federal property, such as Indian lands, military installations, low-rent housing properties, and other federal properties. The payments under this program, known as Basic Support Payments (Section 8003[b]), are provided to school districts that educate federally connected children (US Department of Education, 2008). Fairfax County receives approximately $3,000,000 per year through this federal program to finance current expenditures and potentially also capital expenditures throughout the school district (Fairfax County Public Schools, 2013d). DoD also contributes by building schools, such as the Fort Belvoir Elementary School.

School-aged children living on Fort Belvoir are students of the Fairfax County Public School system. There are a total of 242 schools and centers in the Fairfax County Public School system, including elementary, middle, and high schools, along with alternative schools and special education centers. The current projected enrollment within these schools for the 2013-2014 school year is 184,625 students. This accounts for the largest enrollment within a school system in Virginia and the 11th largest within the US (Fairfax County Public Schools, 2013a). The growth in enrollment between the 2012-2013 and 2013-2014 school years was estimated to be 2.1 percent.

Enrollment is expected to continue to grow over the next ten years. In order to address the increase in enrollment, the Fairfax County Public School system is continuously implementing capital projects, including the construction of new schools and renovations to and the maintenance of infrastructure for existing schools (Fairfax County, 2013a).

According to the US Census, approximately 90.2 percent of the estimated 2,287 children in grades kindergarten through 12 living on Fort Belvoir attend public schools (US Census Bureau, 2011). This percentage is higher than that for the ROI, where an estimated 86.6 percent of the children enrolled in kindergarten through grade 12 attend public schools (US Census Bureau, 2013a, S1401 School Enrollment). Table 3.2-11 summarizes the estimated public school enrollment in the ROI for the years 2007 through 2011.

Table 3.2-11
Estimated Public School Enrollment

Geography	Nursery and Preschool	Kindergarten	Grades 1 to 4	Grades 5 to 8	Grades 9 to 12	Kindergarten to Grade 12
Virginia						
Arlington County	1,130	1,762	6,067	4,819	5,900	18,541
Fairfax County	5,109	11,399	47,772	48,815	55,218	163,295
City of Fairfax	121	178	701	845	1,119	2,842
City of Falls Church	74	238	550	526	667	1,981
Loudoun County	2,480	4,855	19,277	17,278	16,769	58,173
Prince William County	2,298	5,446	23,006	21,697	23,185	73,371
City of Manassas	326	484	1,943	2,429	2,153	7,012
City of Manassas Park	105	235	1,022	694	761	2,712
Stafford County	938	1,868	7,078	8,327	8,994	26,269
City of Alexandria	984	1,291	3,797	2,637	3,437	11,156
Maryland						
Calvert County	792	1,167	4,998	5,049	5,832	17,040
Charles County	1,224	1,508	7,523	7,643	8,926	25,613
Frederick County	1,383	3,261	10,877	12,192	13,375	39,712
Montgomery County	5,106	11,199	40,060	41,347	46,833	139,448
Prince George's County	7,678	9,794	34,731	38,176	43,589	126,246
Washington, DC	6,309	4,799	17,392	16,744	20,660	59,572
TOTAL	36,055	59,483	226,795	229,217	257,417	772,982

Source: US Census Bureau, 2013a, S1401 School Enrollment 2011 American Community Survey 5-year estimates.

The only school on post is the Fort Belvoir Elementary School, enrolling students in kindergarten through 6th grade. Total enrollment at Fort Belvoir Elementary was 1,112 students in September 2013 (Fairfax County Public Schools, 2013e). The Fairfax County School system reported the maximum program capacity of the school as 1,106 students. However, a functional adequacy study performed in 2011 determined that the calculated maximum capacity was 1,254 students, which includes classrooms in the current building plus portable classrooms (Office of Secretary of Defense, 2011).

As of September 2013, a total of 409 on-post elementary school students attend one of twelve off-post Fairfax County public school facilities. The four schools in the area that house the majority of the off-post Fort Belvoir elementary school students are, as of September 2013, Woodlawn, Riverside, Lane, and Fort Hunt. According to Fairfax County Public School's September 2013 enrollment data along with FCPS Capital Improvement Plan for Fiscal Years 2013-2017, Woodlawn Elementary School is the only one of these four schools that is currently over the building program capacity, approximately by 23 percent. Riverside, Fort Hunt, and Lane are under the building program capacity by approximately 5 percent, 6 percent, and 7 percent, respectively (Fairfax County Public Schools, 2011). All middle school students living on Fort Belvoir attend Walt Whitman Middle School, which is in Fairfax County Public Schools Cluster 4. High school students living on the installation in grades 9-12 attend Mount Vernon High School. As of September 2013, enrollment at Walt Whitman Middle School was 973 students and at Mount Vernon High School, 1,969 students. According to Fairfax County Public School's September 2013 enrollment data,

both of these schools are approximately 20 percent under the building program capacity. All six of these off-post schools are within five miles of the installation, with bus transportation provided for students to the schools (Fairfax County Public Schools, 2013a).

School-aged children of Fort Belvoir personnel who do not live on post attend the school district within the attendance area in which they reside. There are over 1,200 public schools and 600 private schools within the 16 school districts in the ROI. Total enrollment within these public school systems is 775,976 students. The median student to teacher ratio in the ROI is 16.2:1, which is higher than the US average ratio from the most current reporting in 2010 of 15.5:1 (Institute of Education Services, 2012). Some counties within the ROI are experiencing continued population growth, forcing schools to operate at or above maximum capacity.

Family Support and Social Services

The Army's Family and Morale, Welfare, and Recreation (MWR) program exists to provide active-duty, reserve, and guard military personnel, their families, civilian employees, and military retirees with quality-of-life support and leisure services. These services contribute to enhancing the quality-of-life on the installation, which lends itself to military recruitment and retention. MWR services are not financed by Congress through taxpayer dollars but instead are financed through nonappropriated funds, meaning that the revenue collected from the purchase of MWR services then finances the services. By providing services on-post, MWR's programs also help to avoid overuse of similar services off-post.

The Army Community Service consists of more than 15 programs that promote successful Army living, such as Warriors-in-Transition, which provides resources to wounded warriors and their families; the Employment Readiness Program, which helps to assist and prepare individuals with finding employment; and the Mobilization and Deployment Readiness Program, which provides support to those facing deployment.

Short-term projects under the proposed action that have been constructed and are a part of the family support and social services provided on post include ST 5 – Fisher House 1, opened in May 2012 and ST 6 – the USO Wounded Warrior and Family Center, opened in February 2013. The Fisher House offers free- or low-cost lodging to veterans and military families receiving treatment at military medical centers. The USO facility offers programs, community services and recreational spaces for wounded, ill, and injured service members and their families and caregivers.

MWR provides child care, youth developmental programs, and recreation and socialization opportunities for children 4 weeks to 19 years old through Fort Belvoir's Child, Youth and School Services. Eligibility for services is restricted to active duty military personnel, DoD civilian personnel, reservists on active duty for more than 72 hours, and DoD contractors working on Fort Belvoir. There are currently three child development centers on post that offer full-time, hourly, and before- and after-school services for children six weeks to five years old. The North Post Child Development Center's capacity is approximately 200 full-day and 60 part-day openings. The South Post Child Development Center's capacity is approximately 190 full-day and 25 hourly openings. The JoAnn Blanks Child Development Center is located on South Post and is the newest of the three centers. This facility opened in June of 2012 in support of BRAC 2005 personnel increases and was designed for approximately 330 children. For those who do not meet the eligibility requirements or choose to use off-post services, there are many day care facilities and in-home child care options throughout the ROI to choose from.

Fort Belvoir's Markham School Age Center provides before- and after-school care and programs to children in kindergarten through sixth grade. The programs available follow the Fairfax County Public Schools schedule, and transportation to and from Fort Belvoir Elementary School is provided. The Youth Center offers programs for middle and high school students after school, on Saturdays, and during the summer. Additionally, MWR provides assistance to children transitioning between schools through the School Liaison Office.

Individuals and families seeking assistance and in need of temporary housing, financial assistance, protection from abuse or neglect, or assistance due to disabilities have a number of resources available both on post and within the ROI. Programs within Fort Belvoir's Army Community Service help to connect individuals with the proper resources. Additional social services provided directly through Fort Belvoir's MWR program include the Army Emergency Relief, which is an emergency financial assistance organization; the Family Advocacy Program, which provides assistance and support against violence and abuse; and the Exceptional Family Member Program, which coordinates activities and provides support to families with special needs and disabilities. Social and human services are provided from the federal, state, and local levels within the ROI. Virginia, Maryland, and the District of Columbia operate departments at the county or city level. Social and human services offered include child and adult protective services, housing support, financial assistance, day care for children and adults, and food stamps, along with support for those needing special health care or disability needs, domestic violence counseling, or substance abuse counseling.

Shops, Services, and Recreation

On-Post Services

A multitude of shops, services, and recreation opportunities are available on post and within the ROI. The Army and Air Force Exchange Service (AAFES) operate stores, restaurants and service facilities through non-appropriated funds on Fort Belvoir. Revenue collected from AAFES-operated facilities assist in paying facility operating costs and also funding MWR programs. The east coast's largest PX, recently opened on post and listed in Table 2-2 as ST 1, is a short-term project associated with the RPMP update. The 270,000-square foot complex houses a main store, food court, home and garden center, concessions, and satellite pharmacy under one roof (The Exchange, Fort Belvoir website, 2013). The Fort Belvoir Commissary, the on-post grocery store, is funded with appropriated dollars and is operated by the Defense Commissary Agency. Other on-post facilities operated by AAFES include: fast food restaurants, including Starbucks, Burger King, Dunkin Donuts, Subway, and Church's Chicken; a Class VI Shoppette and gas station; and service establishments, such as a barber shop, spa, and laundromat/dry cleaners. In terms of available food service establishments, many that are available on post are inside the PX and are fast food establishments. There are few sit-down style restaurants available on post. Exceptions are the Officer's Club dining room and the Golf Club restaurant, which has lunch buffets. For Soldiers stationed on post, a dining facility is open three hours a day, one hour for each meal.



Figure 3.2-4. The Main Post Exchange (PX; ST Project 1) opened in June 2013.

Beyond the AAFES-operated facilities, there are other service establishments on post that provide conveniences, such as banks, five religious centers or places of worship, post & shipping services, a veterinary clinic, and a self-help center.

MWR provides recreation and leisure opportunities and activities for those eligible, including active-duty military personnel, their family and guests, reservists, retired military, DoD civilian employees, contractors, and their families (US Army, 2011j). Outdoor and indoor recreational facilities are provided, along with scheduled special events on post and trips off post. All revenue collected from these services and facilities funds the continuous operation of MWR programs.

Many opportunities for outdoor recreation exist on Fort Belvoir. There are three pools available on post: the North Post outdoor pool, which is open from Memorial Day to Labor Day and is across from the Commissary; the Benyaurd indoor pool, which is open year-round and is located on South Post; and the Officers' Club pool at the Connolly Pool Complex on South Post, which is available to members only and is open from Memorial Day to Labor Day. The Fort Belvoir Golf Club, located on North Post, has a 36-hole championship golf course.



Figure 3.2-5. Fort Belvoir Golf Course

Fort Belvoir features three parks on post: Anderson Park, on North Post near DAAF; Soldier Statesmen Park, on North Post near the Goethals-Constitution Road intersection; and Castle Park, on the Accotink Bay on South Post, known as the Tompkins Basin recreational area. Castle Park offers pavilion rentals, a horseshoe pit, volleyball court, outdoor grills, and picnic tables. Also available near Castle Park is a fenced dog park. There are numerous playgrounds, playing fields, and athletic fields available on post, including Fremont Field (North Post), Pullen Field (South Post), Specker Field House (South Post), and a skatepark (South Post, next to Pullen Field).

Hunting, archery, and fishing are permitted and available within the undeveloped areas on post, such as the Accotink Bay Wildlife Refuge and the Jackson Miles Abbott Wetlands Refuge, which also offer wildlife viewing, nature hiking, miles of maintained trails utilized by walkers, runners, and cyclists, and environmental education programs. Additionally, hunter education courses and archery ranges are provided by MWR in the Tompkins Basin recreational area. Non-motorized boat launching is authorized at Tompkins Basin, with canoes and kayaks available for rent. The newest outdoor recreation facility available on Fort Belvoir is the first phase of the Family Travel Camp, ST 9, which opened in May 2013 in the Tompkins Basin area. On the eastern side of the installation near Mount Vernon Road, the marina offers dry- and wet-docking facilities, a boat ramp, and boat storage, with motorized boat access to the Potomac River.

Other recreation facilities on post include the Officer's Club and the club's publicly accessible buffet, the Potomac Room, the community center, a single Soldiers center, a bowling alley and grill, a movie theater, an arts and crafts center, two fitness centers, and the Van Noy Library. The community center often hosts special events and parties, classes and lessons, organizes group outings, offers discounted event, leisure and travel tickets, and features a game room, lounge and deli.

Off-Post Services

Ample shops, services, and recreation opportunities exist within the ROI. The National Capital Region is a tourist center that offers a wide variety and selection of things to see and do, within a relatively short distance. Washington, DC is home of the Smithsonian Institute and its many free museums, along with historic monuments, memorials, and buildings. There are many shopping opportunities in the form of standalone stores, plazas, and malls located in the ROI. Potomac Mills Mall, located 13 miles south on I-95 in Woodbridge, is Virginia's largest outlet mall. Tysons Corner Center, located approximately 20 miles north of Fort Belvoir, is Virginia's largest enclosed shopping mall. The closest shopping mall to Fort Belvoir — Springfield Mall — is currently undergoing major redevelopment to become a town center, including retail, commercial and residential development. There are several major performing arts centers within the ROI, including Wolftrap Foundation for the Performing Arts in Fairfax County, Virginia and the John F. Kennedy Center for the Performing Arts in the District of Columbia. The Potomac River is a source for many counties within the ROI for recreation, including boating, fishing, boat tours, and kayaking. The District of Columbia plays host to a number of professional sports games, including home games for

football, basketball, hockey, baseball, and soccer teams. Various services are readily available throughout the ROI, including financial, real estate, automotive, travel, beauty and personal care, post and shipping, and pet care, to name a few. Over two dozen places of worship lie within a one-mile radius of the installation's boundary.

Hundreds of federal-, state-, regional-, and local-level managed parklands are available for use within the ROI, offering outdoor recreation such as hiking, biking, walking and running trails, recreation centers and programs, pools, golf courses, tennis courts, playgrounds, and athletic fields. There are public campgrounds within the ROI, with tent, recreational vehicle, and cabin camping. Andrews Air Force Base FamCamp was the only active military campground that served the ROI before the construction of Fort Belvoir's Family Travel Camp (ST 9).

As identified in the 2011 commuter survey discussed previously, the largest proportion of those living off post and commuting to Fort Belvoir live in Fairfax County. On-post personnel and residents may also use Fairfax County facilities. In 2011, Fairfax County Park Authority published a comprehensive park system plan for 2010-2020. In this plan, a countywide park facility needs analysis was performed for 2010 and 2020, and these analyses are shown in Table 3.2-12.

Table 3.2-12
County-Wide Park Facility Needs Analysis for 2010 and 2020

Park Facility Type	2010 Public Inventory	Adopted Service Level Standard	Needed in 2010 to Meet Standard	2010 (Deficit)/ Surplus	Needed in 2020 to Meet Standard	2020 Deficit/ Surplus
Rectangle Fields	350	1 field / 2,700 people	401	(51)	416	(66)
Adult Baseball Fields	54	1 field / 24,000 people	45	9	47	7
Adult Softball Fields	36	1 field / 22,000 people	49	(14)	51	(16)
Youth Baseball Fields	161	1 field / 7,200 people	150	11	156	5
Youth Softball Fields	146	1 field / 8,800 people	123	22	128	18
Multi-use Courts	278	1 court / 2,100 people	516	(238)	534	(256)
Playgrounds	382	1 playground / 2,800 people	387	5	401	(9)
Nature Centers (square feet)	20,964	0.04 sq. feet per person	43,320	(22,356)	44,896	(23,932)
Reservable Picnic Areas	76	1 picnic area / 12,000 people	90	(14)	94	(18)
RECenters (square feet)	956,044	1.1 sq. feet per person	1,191,300	(235,256)	1,234,640	(278,596)
Neighborhood Dog Parks	8	1 facility / 86,000 people	13	(5)	13	(5)
Countywide Dog Parks	0	1 facility / 400,000 people	3	(3)	3	(3)
Neighborhood Skate Parks	2	1 facility / 106,000 people	10	(8)	11	(9)

Park Facility Type	2010 Public Inventory	Adopted Service Level Standard	Needed in 2010 to Meet Standard	2010 (Deficit)/ Surplus	Needed in 2020 to Meet Standard	2020 Deficit/ Surplus
Countywide Skate Parks	2	1 facility / 210,000 people	5	(3)	5	(3)
Golf (number of holes)	486	1 hole / 3,200 people	338	148	351	135
Indoor Gyms (square feet)	1,318,941	2.8 sq. feet per person	3,032,400	(1,713,459)	3,142,720	(1,823,779)
Outdoor Family Aquatics	2	1 facility / 570,000 people	2	0	2	0
Horticulture/ Garden Parks	5	1 facility / 350,000 people	3	2	3	2
Equestrian Facilities	2	1 facility / 595,000 people	2	0	2	0
Waterfront Parks	14	1 facility / 90,000 people	12	2	12	2

Note: Facility deficits are indicated by parentheses: (8).
Source: Fairfax County Park Authority, 2011.

Out of the 20 types of park facilities analyzed, 11 were indicated as having a deficit in service level in 2010, and 12 were predicted to have a deficit in service level in 2020. This analysis assumed that no additional facilities would be developed and that there would be a population growth of 12 percent over that time span, from 1,056,422 to 1,179,547 people. A service level for a facility is met if 100 percent or more of a demand for a facility is supplied. Any service level defined as below 100 percent indicates that there is a current or projected service level deficit for that facility within the county. The Fairfax County park facility types that indicate the largest 2020 projected service level deficits are: countywide and neighborhood skate parks, projected to meet only 37 percent and 19 percent of the demand, respectively; indoor gyms, projected to meet 42 percent of demand; and countywide dog parks, with demand not currently met or projected to be met at all. Park facility types that currently exceed and are also projected to exceed service levels include horticulture/garden parks, with a 2020 projected service level of 156 percent; golf, projected to meet 139 percent of demand; and adult baseball fields, projected to meet115 percent of demand.

3.2.2.3 Environmental Justice

Environmental justice addresses the race, ethnicity, and poverty status of populations within the ROI. On February 11, 1994, President Clinton issued Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. The order is designed to focus the attention of federal agencies on the human health and environmental conditions in minority and low-income communities. Environmental justice analyses are performed to identify potential disproportionately high and adverse effects from proposed actions on minority and low-income communities and to identify alternatives that might mitigate these effects.

To identify potential environmental justice areas, data were collected on minority and low-income populations for census tracts and block groups in the Fort Belvoir affected area, dependent on current availability of applicable data at the census tract and block group levels. The affected area comprises the census tracts and block groups that correspond to the Main Post and the FBNA, and the census tracts and block groups that are contiguous with the boundaries of those two areas. Census tracts are small, relatively permanent statistical subdivisions of a county designed to be relatively homogeneous units with respect to population characteristics, economic status, and living conditions at the time of establishment (US Census Bureau, 2012d). Block groups are subdivisions of census tracts.

Minority Populations

Minority populations should be identified for environmental justice analyses where either the minority population of the affected area exceeds 50 percent or the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis (Council on Environmental Quality [CEQ], 1997). The minority population recorded in the 2010 Census for Virginia is 35.0 percent (Table 3.2-13), substantially below and more conservative than the alternative 50 percent threshold. Thus, for the purpose of this environmental justice analysis, block groups with minority populations exceeding the state level are classified as minority populations. Numbers for Fairfax County are provided for information.

Table 3.2-13 lists the block groups and the minority population percentages for the Fort Belvoir affected area. Figure 3.2-6 depicts the minority population block groups in the affected area. Of the 26 block groups in the Fort Belvoir affected area, 19, or nearly three-quarters, had a higher percentage of minority residents than the minority population recorded for the state. Thirteen had a higher percentage of minority residents than the minority population recorded for Fairfax County.

Low-Income Populations

As recent, applicable data at the block group level were not available, census tract-level data were used to identify low-income populations in the Fort Belvoir affected area. Table 3.2-14 lists the census tracts in the affected area. The percentage of the population living below the Census-defined poverty level was used to define the low-income populations. Applying a methodology analogous to that noted above for identifying minority populations, low-income populations are identified where the percentage of the population for whom poverty was determined is greater than the low-income population percentage for the state. The number for Fairfax County is provided for information. The low-income population recorded in the 2006-2010 American Community Survey for Virginia is 10.3 percent (Table 3.2-14) and 5.2 percent for Fairfax County. As this low-income population percentage for Virginia is substantially below and more conservative than the alternative 50 percent threshold, for the purpose of this environmental justice analysis, census tracts with low-income populations exceeding the state level are classified as low-income populations.

Table 3.2-14 presents the low-income population percentages for the census tracts in the Fort Belvoir affected area, and Figure 3.2-7 depicts the low-income population census tracts in the affected area. Of the 17 census tracts in the Fort Belvoir affected area, only 1 had a higher percentage of low-income residents than the low-income population recorded for the state. Census tract 4328 is located contiguous to the FBNA, along its southern boundary, and had a percentage of low-income residents that exceeded the percentage for the state by over 8 percentage points.

Table 3.2-13
Minority Populations

Block Group	Minority Population	Percent Minority
Main Post		
4162-1	696	33.4
4162-2	**1,520**	**47.5**
4219-1	**323**	**54.3**
4219-2	**516**	**40.2**
4219-3	**218**	**64.5**
Contiguous to Main Post		
4161-1	546	21.5
4161-2	154	12.8
4163-1	111	12.4
4211.03-1	**358**	**46.1**
4211.03-2	**1,010**	**42.2**
4211.03-4	416	34.0
4212-1	413	21.4
4213-2	**695**	**42.7**
4217.02-1	**820**	**58.8**
4218-1	**1,373**	**69.9**
4218-2	**2,177**	**83.5**
4218-3	**809**	**62.8**
4220-1	**1,907**	**55.5**
4221.02-1	**1,215**	**69.5**
FBNA		
9801-1	2	20.0
Contiguous to FBNA		
4210.02-3	**1,346**	**71.5**
4315-2	**1,132**	**36.1**
4316-1	**1,713**	**35.7**
4316-2	**896**	**65.7**
4327.01-1	**1,263**	**39.3**
4328-1	**1,193**	**53.2**
Fairfax County	491,104	45.4
Virginia	2,814,574	35.0

Note: Bold values indicate percentages of minority populations higher than for Virginia as a whole.

Source: US Census Bureau, 2012c, P9 Hispanic or Latino, and Not Hispanic or Latino by Race 2010.

Block Groups with Environmental Justice Minority Populations

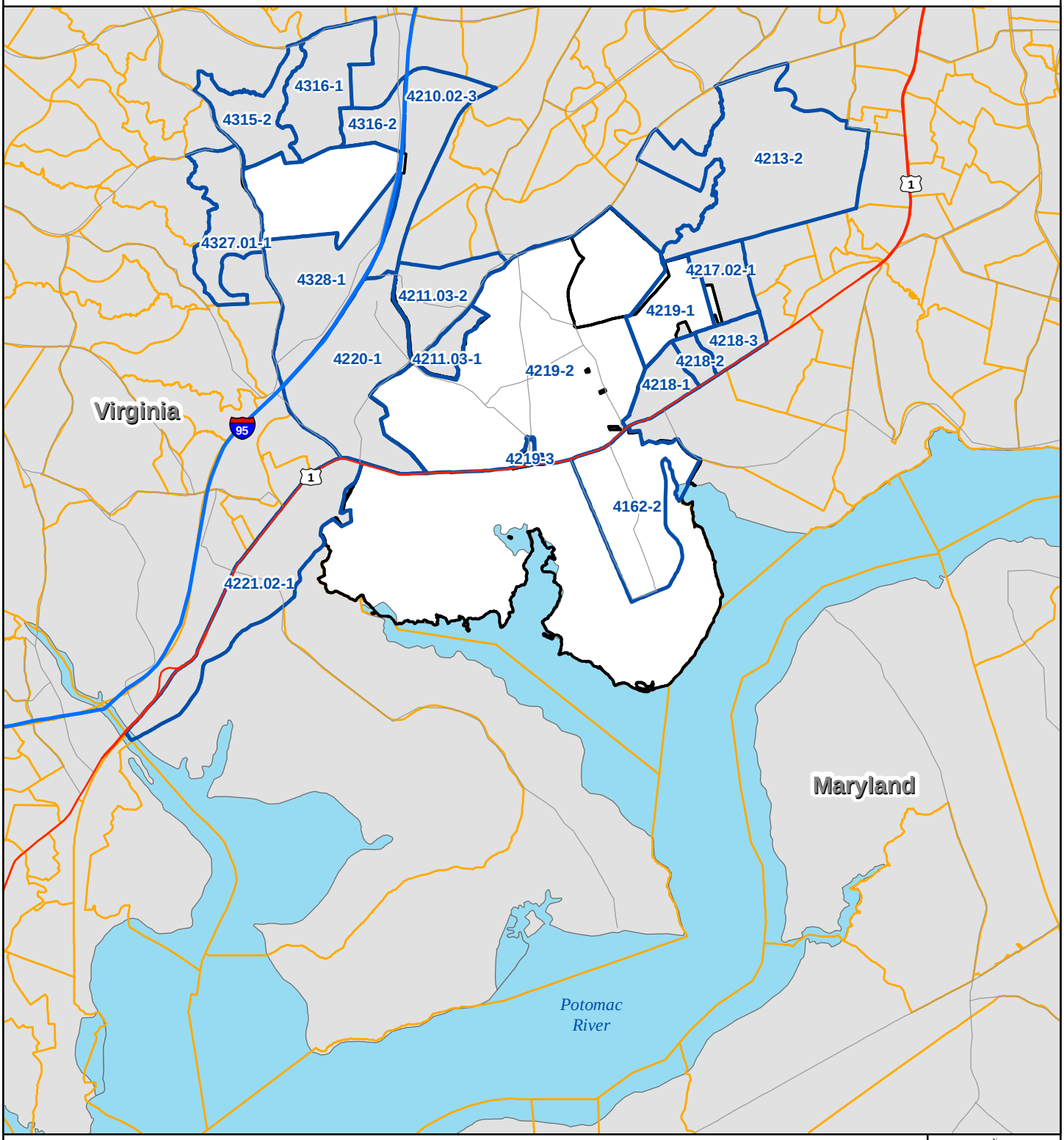
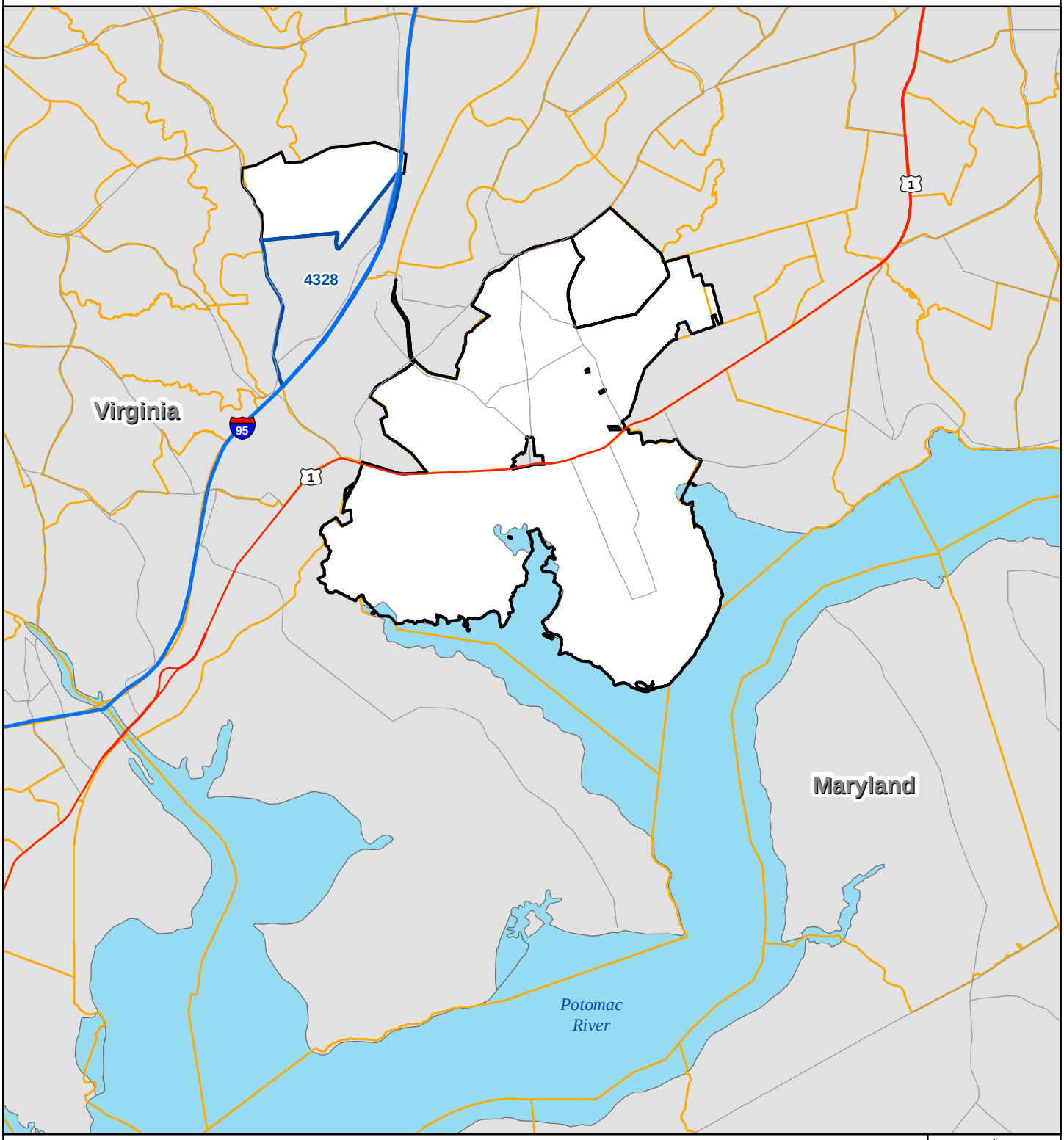


Figure 3.2-6

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Census Tracts with Environmental Justice Low-Income Populations



Census Tract

Low-Income Census Tract

Installation Boundary

0 4,000 8,000 16,000

Feet

Fort Belvoir RPMP EIS

Figure 3.2-7

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Table 3.2-14
Low-Income Populations

Census Tract	Percent Low Income
Main Post	
4162	2.1
4219	7.3
Contiguous to Main Post	
4161	3.7
4163	2.7
4211.03	1.5
4212	0
4213	2.2
4217.02	4.3
4218	9.3
4220	3.9
4221.02	3.8
FBNA	
9801	NC
Contiguous to FBNA	
4210.02	4.9
4315	6.1
4316	4.9
4327.01	2.4
4328	**18.7**
Fairfax County	5.2
Virginia	10.3

Notes: NC indicates that either no sample observations or too few sample observations were available to compute an estimate.

Bold values indicate percentages of low-income populations higher than for Virginia as a whole.

Source: US Census Bureau, 2012a, DP03 Selected Economic Characteristics 2010 American Community Survey 5-year estimates.

3.2.2.4 Protection of Children

On April 21, 1997, President Clinton issued EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*. This EO directs each federal agency to ensure that its policies, programs, activities, and standards address disproportionate environmental health or safety risks to children that may result from the agency's actions. EO 13045 recognizes that a growing body of scientific knowledge demonstrates that children may suffer disproportionately from environmental health and safety risks. These risks arise because:

- Children's neurological, immunological, digestive, and other bodily systems are still developing

- Children eat more food, drink more fluids, and breathe more air in proportion to their bodyweight than adults
- Children's size and weight may diminish their protection from standard safety features
- Children's behavior patterns make them more susceptible to accidents because they are less able to protect themselves

Therefore, to the extent permitted by law, appropriate and consistent with the agency's mission, the President directed each federal agency to 1) make it a high priority to identify and assess environmental health risks and safety risks that might disproportionately affect children, and 2) ensure that the agency's policies, programs, and standards address disproportionate environmental health risks or safety risks to children. Examples of risks to children include increased traffic volumes and industrial- or production-oriented activities that would generate substances or pollutants that children could come into contact with and ingest.

Within the Fort Belvoir affected area, Census 2010 data on children (defined as persons under 18 years of age) were examined at the block group level to identify any concentrations of minors. Table 3.2-15 presents the children population percentages for the block groups in the affected area and Figure 3.2-8 depicts the concentration of children block groups. A concentration of children as used here means a concentration that is higher than that of the state. Thus, block groups with children population percentages that exceed 23.2 percent are classified as concentrations of children. Of the 26 block groups in the Fort Belvoir affected area, 17, or over two-thirds, had a higher percentage of children than the state. Data for Fairfax County are provided for information.

Historically, children have been present at Fort Belvoir as residents and visitors (e.g., living in family housing, attending schools, using recreational facilities). The Army has taken precautions for their safety by a number of means, including using fencing, limiting access to certain areas, and providing adult supervision.

3.2.3 Environmental Consequences of the No Action Alternative

3.2.3.1 Economic Activity

Implementation of the No Action Alternative would not impact economic activity in the ROI. Under the No Action Alternative, the workforce on Fort Belvoir would continue to be approximately 39,000, the September 2011 workforce following full implementation of the BRAC 2005 recommendations. The changes in population and economic activity that would occur under the proposed action would not occur under the No Action Alternative.

3.2.3.2 Sociological Environment

Implementation of the No Action Alternative would not impact the sociological environment. No new housing facilities would be constructed on Fort Belvoir under the No Action Alternative. Barracks space and the number of family housing units and transient lodging units would not change from the current levels. The housing supply and public services (e.g., schools, police, fire, medical, and social services) would continue to respond to market demand.

Block Groups with Concentrations of Children

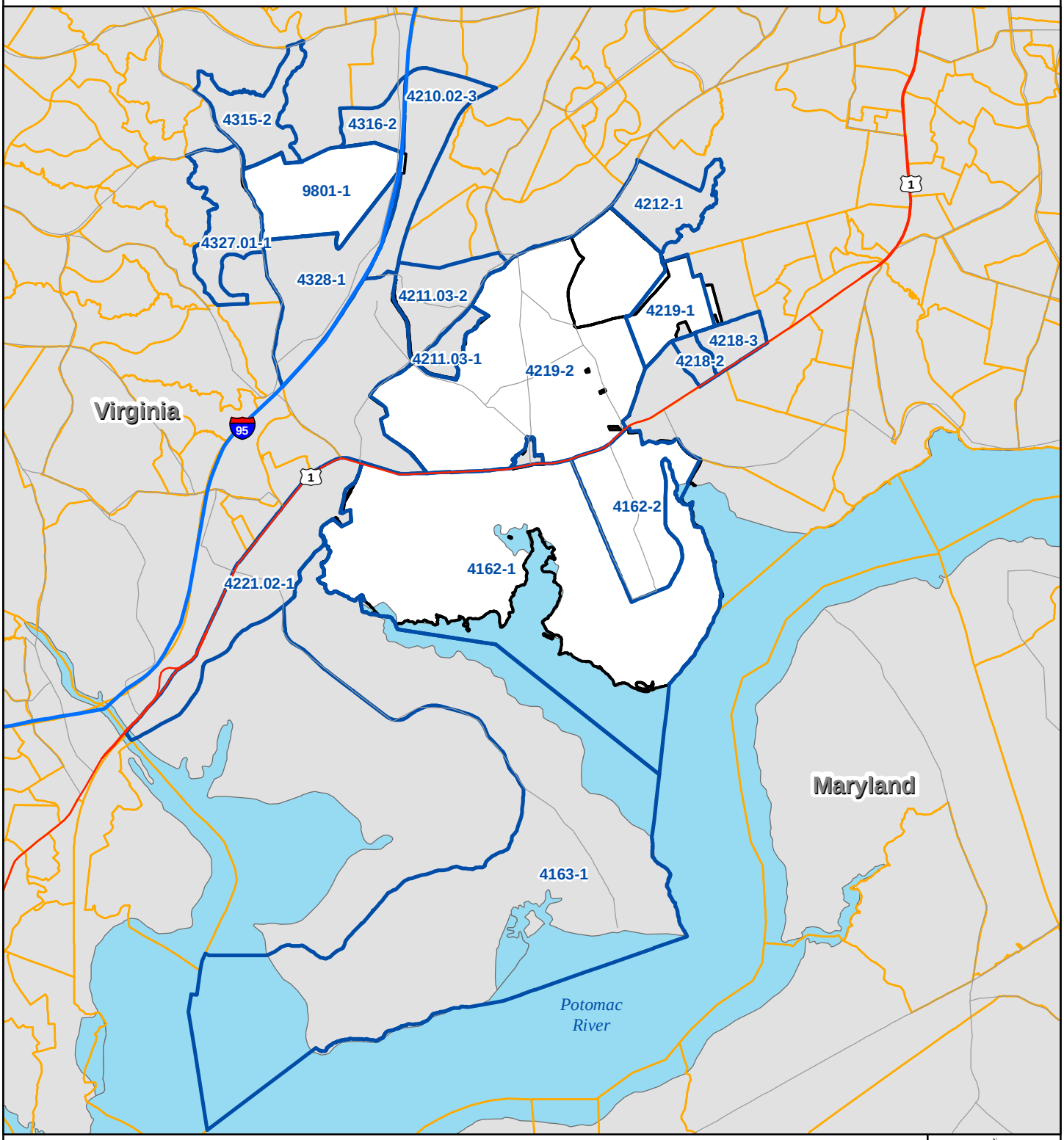


Figure 3.2-8

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Table 3.2-15
Concentrations of Children

Block Group	Children Under 18 Population	Percent Children
Main Post		
4162-1	**952**	**45.7**
4162-2	**1,484**	**46.4**
4219-1	**265**	**44.5**
4219-2	**476**	**37.1**
4219-3	57	16.9
Contiguous to Main Post		
4161-1	585	23.1
4161-2	236	19.7
4163-1	**216**	**24.2**
4211.03-1	**222**	**28.6**
4211.03-2	**682**	**28.5**
4211.03-4	261	21.3
4212-1	**486**	**25.2**
4213-2	356	21.9
4217.02-1	**298**	**21.4**
4218-1	450	22.9
4218-2	**671**	**25.7**
4218-3	**306**	**23.7**
4220-1	769	22.4
4221.02-1	**492**	**28.1**
FBNA		
9801-1	**6**	**60.0**
Contiguous to FBNA		
4210.02-3	**522**	**27.7**
4315-2	**774**	**24.7**
4316-1	678	14.1
4316-2	**331**	**24.3**
4327.01-1	**770**	**24.0**
4328-1	**642**	**28.6**
Fairfax County	262,648	24.2
Virginia	1,853,677	23.2

Note: Bold values indicate percentages of children higher than for Virginia as a whole.
Source: US Census Bureau, 2012c, P12 Sex by Age 2010.

3.2.3.3 Environmental Justice and Protection of Children

Assessments of environmental justice and protection of children are intertwined with other environmental topics. In particular, traffic, air emissions, noise emissions, and water discharges from the proposed action may affect the quality of transportation, air, the acoustic environment, and water resources in communities surrounding Fort Belvoir. The effects of implementation of the RPMP and the short- and long-term projects on traffic are addressed in Section 3.4 and the effects on water quality are addressed in Section 3.8. The effects of air emissions are addressed in Section 3.5 and the effects of noise are addressed in Section 3.6.

Based on the analyses presented in this EIS on traffic, air quality, noise, and water resources associated with the No Action Alternative, the following conclusions are presented in regard to human health and environmental effects to minority populations, low-income communities, and concentrations of children:

- Traffic – Under the No Action Alternative, despite no further development on Fort Belvoir, traffic levels and congestion in the area would continue to increase because of population and employment growth in Fairfax County and the region. New transportation facilities under construction and programmed for the future would offset much of the increase in traffic congestion near Fort Belvoir. Future increases in background traffic levels and congestion would not result in disproportionately high and adverse human health or environmental effects on minority or low-income populations, or pose disproportionate environmental health or safety risks to children.
- Air Quality – The No Action Alternative would result in no effect to air quality, as no construction, changes in traffic, or changes in operations at Fort Belvoir would occur. Ambient air quality trends and planning would remain as described for the affected environment. No Action Alternative air emissions would not result in disproportionately high and adverse human health or environmental effects on minority or low-income populations, or pose disproportionate environmental health or safety risks to children.
- Noise – The No Action Alternative would result in no impact to the existing noise environment, as no construction, changes in traffic, or changes in operations at Fort Belvoir would occur. The ambient noise environment would remain as described for the affected environment. No Action Alternative noise would not result in disproportionately high and adverse human health or environmental effects on minority or low-income populations, or pose disproportionate environmental health or safety risks to children.
- Water Quality – The No Action Alternative would cause no effect on the quality of the surface waters that flow within or through Fort Belvoir; however, it would forego the opportunity to use the permitting process to correct ongoing watershed and water quality problems caused by past development practices. The No Action Alternative would not result in disproportionately high and adverse human health or environmental effects on minority or low-income populations, or pose disproportionate environmental health or safety risks to children.

The No Action Alternative would not alter existing conditions in the environmental justice and protection of children in the affected area. Therefore, no disproportionately high and adverse human health or environmental effects on minority populations and low-income populations would occur. Implementation of the No Action Alternative would not pose disproportionate environmental health or safety risks to children. The No Action Alternative would have no impact on minority and low-income populations, or on children.

3.2.4 Environmental Consequences of Alternative 1 – Full Implementation – The Preferred Alternative

3.2.4.1 Alternative 1 Impacts on Economic Activity

Short-Term Projects

Alternative 1 Short-Term Project Impacts on Employment and Income

The Alternative 1 short-term facility projects and short-term transportation projects would construct new work space for the incoming personnel, general support facilities to meet the needs of the Fort Belvoir working population, and transportation improvements to support the short-term projects. Fort Belvoir would construct approximately 3.5 million square feet of new building space between 2012 and 2017, as well as transportation and other facility improvements. The construction expenditures would result in one-time increases in ROI economic output, employment, and earnings. The ongoing operations of the NMUSA and the spending of museum patrons would create ongoing annual impacts.

The Alternative 1 short-term projects would cost an estimated $1.4 billion to complete. This amount is divided into hard costs (70 percent) and soft costs (30 percent). Construction would have a total economic impact of $2.3 billion in the ROI, supporting a total of 13,485 jobs and earnings of $610 million (Table 3.2-16).

Table 3.2-16
Economic Impacts of Alternative 1 Short-Term Projects

	Output	Earnings	Jobs
	Million $	Million $	Number
Construction Period Impacts			
2012-2017	2,284	610	13,485
Total One-Time Impacts	2,284	610	13,485
Ongoing Impacts			
Museum Operations	23	4	165
Museum Visitor Spending	103	22	962
Total Annual Impacts	126	26	1,127
Note: Total annual impacts reflect a typical estimated NMUSA operating year once the museum is open. Museum Visitor Spending includes direct, indirect, and induced spending.			

The current ROI construction labor force might not be sufficient to fill the jobs, although the construction industry is projected to grow. Employment growth is beneficial to an economy, and expansion of the industry base confers economic benefits on the region. Socioeconomic concerns would materialize if expansion occurs in a short time frame or if other aspects of the economy also undergo a rapid expansion during the same time period. Possible labor shortages could occur, resulting in a rise in labor costs and ultimately a rise in overall construction costs. However, the market would respond to a shortage with new workers entering the construction industry from other industries or new workers coming from outside the region to fill available jobs.

On an annual basis, NMUSA would create an estimated 165 jobs with $4.4 million in earnings and $23.0 million in output. In addition, visitors to the NMUSA would support a total of $102.9 million in output, and 962 jobs and $22.0 million in earnings. These ongoing impacts would result in an estimated annual impact of $126 million in output, and 1,127 jobs and $26 million in earnings.

Both construction and operation effects from the short-term projects would be beneficial, providing regional economic benefits from construction spending and labor, as well as from long-term positive effects on employment and income in the region. Implementation of the Alternative 1 short-term projects would individually and cumulatively have beneficial impacts on employment and income.

Alternative 1 Short-Term Project Impacts on Population

Implementation of the Alternative 1 short-term projects would generate a net increase of an estimated 4,755 people in the workforce on Fort Belvoir. Table 3.2-17 shows the population changes projected for the period between 2012 and 2017, based on MWCOG forecasts. The table also presents the projected redistribution of National Capital Region employees and their family members on the basis of the distribution of current Fort Belvoir employees, consistent with the analysis methodology defined above.

Implementation of the Alternative 1 short-term projects could result in the redistribution within the ROI of a maximum of approximately 6,330 persons, comprising new Fort Belvoir employees and their family members. Fairfax County could receive the largest share of the relocated population – possibly as many as about 2,160 persons, corresponding to approximately 5.2 percent of the county's anticipated growth from 2011 through 2017 (Table 3.2-17). However, the five cities in Virginia – Fairfax, Falls Church, Manassas, Manassas Park, and Alexandria – may host the largest influx of redistributed employees and their families measured as proportions of forecasted growth for each city. Among these cities, the largest influx may occur in the City of Fairfax, to which about 310 people may relocate, corresponding to approximately 13.5 percent of the total population growth forecasted for the city. Most of the employees and their family members may relocate from the five ROI counties in Maryland, with a large number relocating also from Loudoun County, Virginia. The largest loss, measured as a proportion of the forecasted population growth, could occur in Prince George's County, Maryland, from which about 1,520 people may depart, comparable to approximately 7.0 percent of the county's forecasted growth.

The potential population relocation associated with the Alternative 1 short-term projects would indirectly contribute to, but not significantly increase, job and population growth in the receiving cities and counties in the ROI. The capacity of the communities to accommodate this economic and population growth would depend on many factors, including the degree to which local infrastructure – including roads, environmental management systems, and public services – are enhanced to meet the demand of the additional population. The local economies likely would respond to new demands by increasing the labor force and the supply of goods and services and housing. As described previously, the ROI is an economically robust region that has experienced strong growth in the past 10 years and, on the basis of current population and employment projections, is anticipated to continue to grow. Growth is largely beneficial to the economy; however, labor, material, and housing shortages could result if expansion occurs too rapidly or if increases in infrastructure investment, including housing, lag behind employment and population growth.

Implementation of the Alternative 1 short-term projects would individually and cumulatively have less than significant adverse impacts on population. The impact intensity potentially would be greatest for those communities, such as the Cities of Fairfax, Falls Church, Manassas, Manassas Park, and Alexandria, where the number of incoming Fort Belvoir families could equate to comparatively high proportions of future growth. However, even the maximum projected influx of Fort Belvoir personnel and their families into the receiving counties and cities of the ROI would be within normal fluctuations and is not expected to exceed the ability of the respective communities to accommodate the growth.

Table 3.2-17
2011-2017 Redistribution of Employees and Family Members

	2011-2017 MWCOG Projected Population Change	2017 Redistributed Persons		
		Alternative 1	Alternative 2	Alternative 3
Virginia				
Arlington County	17,486	0	0	0
Fairfax County	42,530	2,161	1,706	565
City of Fairfax	2,070	310	245	81
City of Falls Church	1,063	117	93	31
Loudoun County	56,354	-1,445	-1,141	-378
Prince William County	56,974	1,695	1,338	443
City of Manassas	2,027	249	197	65
City of Manassas Park	637	60	48	16
Stafford County	24,504	476	376	124
City of Alexandria	10,680	1,266	1,000	331
Maryland				
Calvert County	5,382	-114	-90	-30
Charles County	18,745	-577	-456	-151
Frederick County	11,522	-366	-289	-96
Montgomery County	56,745	-1,416	-1,119	-370
Prince George's County	21,700	-1,519	-1,200	-397
Washington, DC	50,702	-897	-708	-235
TOTAL	379,121	0	0	0

Sources: MWCOG, 2013; Dowling, pers. comm., January 3, 2012.

Long-Term Projects

Alternative 1 Long-Term Project Impacts on Employment and Income

The Alternative 1 long-term projects and long-term transportation projects would construct approximately 2.4 million square feet of additional new building space between 2018 and 2030, as well as transportation and other facility improvements. The long-term projects have an estimated construction cost of $583 million. Spending on construction would have a one-time impact of $956 million in output, supporting 5,644 jobs and $255 million in earnings (Table 3.2-18). On an ongoing, annual basis, the NMUSA would result in an estimated impact of $126 million in output, and 1,127 jobs and $26 million in earnings.

Both construction and operation effects from the long-term projects would be beneficial. Implementation of the Alternative 1 long-term projects would individually and cumulatively have beneficial impacts on employment and income.

Table 3.2-18
Economic Impacts of Alternative 1 Long-Term Projects

	Output	Earnings	Jobs
	Million $	Million $	Number
Construction Period Impacts			
2018-2030	956	255	5,644
Total One-Time Impacts	956	255	5,644
Ongoing Impacts			
Museum Operations	23	4	165
Museum Visitor Spending	103	22	962
Total Annual Impacts	126	26	1,127

Note: Total annual impacts reflect a typical estimated NMUSA operating year once the museum is open. Museum Visitor Spending includes direct, indirect, and induced spending.

Alternative 1 Long-Term Project Impacts on Population

Implementation of the Alternative 1 long-term projects would generate a net increase of an estimated 12,030 people in the workforce on Fort Belvoir, in addition to those added by the short-term projects. As the vast majority of these personnel would already reside in the National Capital Region, these jobs would be shifted from one location to another within the region and, therefore, would not result in a change in ROI employment. Table 3.2-19 shows the population changes projected for the period between 2017 and 2030, based on MWCOG forecasts, and the projected maximum potential redistribution of National Capital Region employees on the basis of the distribution of current Fort Belvoir employees.

Implementation of the Alternative 1 long-term projects could result in the redistribution of a maximum of approximately 6,020 persons. Fairfax County could receive the largest share of the relocated population – possibly as many as 5,390 persons, corresponding to approximately 4.0 percent of the county's anticipated growth. As noted for the short-term projects, the Cities of Fairfax, Falls Church, Manassas, Manassas Park, and Alexandria may host the largest influx of redistributed Fort Belvoir employees and their families measured as proportions of forecasted growth for each city. Among these, the largest influx may occur in the City of Fairfax, to which as many as about 770 people may relocate, equivalent to approximately 45.2 percent of the city's forecasted population growth. Most of the employees and their family members may relocate from Loudoun County in Virginia, and from Calvert, Charles, Frederick, Montgomery, and Prince George's Counties in Maryland.

Implementation of the Alternative 1 long-term projects would individually and cumulatively have less than significant adverse impacts on population. The impact intensity potentially would be greatest for those communities where the number of incoming Fort Belvoir families could equate to comparatively high proportions of future growth.

Table 3.2-19
2030 Redistribution of Employees and Family Members

	2017-2030 Population Change	2030 Redistributed Persons		
		Alternative 1	Alternative 2	Alternative 3
Virginia				
Arlington County	30,593	0	0	0
Fairfax County	134,439	5,393	3,084	6,355
City of Fairfax	1,711	773	442	911
City of Falls Church	2,860	293	167	345
Loudoun County	86,166	-3,607	-2,063	-4,250
Prince William County	92,090	4,230	2,419	4,985
City of Manassas	4,450	622	356	733
City of Manassas Park	955	150	86	177
Stafford County	55,130	1,188	679	1,400
City of Alexandria	21,681	3,160	1,807	3,724
Maryland				
Calvert County	7,019	-285	-163	-336
Charles County	36,112	-1,440	-823	-1,697
Frederick County	46,757	-912	-522	-1,075
Montgomery County	115,077	-3,535	-2,022	-4,166
Prince George's County	61,318	-3,792	-2,169	-4,468
Washington, DC	59,908	-2,238	-1,280	-2,637
TOTAL	756,264	0	0	0
Sources: MWCOG, 2013; Dowling, pers. comm., January 3, 2012.				

3.2.4.2 Alternative 1 Impacts on Sociological Environment

Short-Term Projects

Alternative 1 Short-Term Project Impacts on Housing

Four Alternative 1 short-term projects would have long-term, minor beneficial effects on housing on post. ST 42 would construct unaccompanied enlisted personnel barracks, ST 5 and 30 would construct two Fisher Houses for military families receiving care at the FBCH, and ST 2 would construct a privatized, 141-room Army lodging facility. The new facilities would provide housing accommodations close to installation services, such as healthcare, shopping, and recreational facilities.

As discussed above, implementation of the Alternative 1 short-term projects would generate a net increase of an estimated 4,755 people in the workforce on Fort Belvoir. The vast majority of these personnel would be federal civilian and contractor employees already residing in the National Capital Region. These jobs would be shifted from one location to another within the National Capital Region and, therefore, would not result in a change in ROI employment. Assuming that 50 percent of new employees on the installation may relocate their residences within the ROI on the basis of the current distribution of Fort Belvoir employee residences, shown in Table 3.2-3, and that there would be available housing in these areas, approximately

2,380 personnel may change their residence within the ROI because their job would be transferred to Fort Belvoir. These personnel would not be required to move; however, if they do choose to relocate within the National Capital Region, there should be sufficient housing available.

Providing each employee represents one household, under Alternative 1, about 2,380 households may relocate within the ROI. As many of the new Fort Belvoir employees, notably those with short commutes to the installation, would choose to stay in their current homes, this number likely indicates the maximum number of households that may relocate and, as such, is a conservative estimate. As shown in Table 3.2-6, in 2010 there were approximately 2,088,000 housing units in the ROI, of which about 128,000 were vacant, with 48,550 available to rent and 23,350 for sale. The households that may relocate within the ROI would need a supply of housing in the receiving communities equivalent to approximately 3.3 percent of the housing units available for rent or for sale in 2010; however, the relocating households would vacate an equivalent number of housing units in the communities they leave.

As shown in Table 3.2-20, potentially a maximum of about 810 households may relocate to Fairfax County and about 640 may relocate to Prince William County.

Table 3.2-20
2011-2017 Redistribution of Households

	2011-2017 Households Change	2017 Redistributed Households		
		Alternative 1	Alternative 2	Alternative 3
Virginia				
Arlington County	8,721	0	0	0
Fairfax County	15,590	811	641	212
City of Fairfax	861	116	92	30
City of Falls Church	599	44	35	12
Loudoun County	18,702	-543	-428	-142
Prince William County	20,392	636	502	166
City of Manassas	903	94	74	24
City of Manassas Park	212	23	18	6
Stafford County	9,467	179	141	47
City of Alexandria	5,209	475	375	124
Maryland				
Calvert County	2,493	-43	-34	-11
Charles County	7,971	-217	-171	-57
Frederick County	4,171	-137	-108	-36
Montgomery County	20,968	-532	-420	-139
Prince George's County	20,674	-570	-450	-149
Washington, DC	20,927	-337	-266	-88
TOTAL	157,858	0	0	0

Sources: MWCOG, 2013; Dowling, pers. comm., January 3, 2012.

The numbers of households for Fairfax County and Prince William County are forecast to increase between 2011 and 2017 by approximately 15,600 and 20,400 units, respectively. Therefore, the relocating households would correspond to only small proportions of the anticipated household growth in the two counties – at most about 5.2 percent of the growth in Fairfax County and 3.1 percent of the growth in Prince William County. The Cities of Fairfax, Falls Church, Manassas, Manassas Park, and Alexandria potentially may receive the largest influx of redistributed Fort Belvoir households measured as proportions of forecasted growth for each city. The largest influx may occur in the City of Fairfax, to which a maximum of about 120 households may relocate, equivalent to an estimated 13.5 percent of the city's forecasted household growth.

As previously discussed, the local economies likely would respond to new demands by increasing the labor force and the supply of goods and services, and housing. The production of new residential housing is directly related to the availability and cost of the land, public infrastructure requirements, and impact, permit, and other fees to local governments (Old Dominion University, 2005). With the construction of new, permitted housing developments, the local government commits to contributing to the public infrastructure to support the population, and the homeowner commits to supporting these services through the payment of taxes.

Implementation of the Alternative 1 short-term projects would individually and cumulatively have beneficial impacts on housing on Fort Belvoir. The projects would individually and cumulatively have less than significant adverse impacts on housing in the region. The impact intensity potentially would be greatest for those communities, such as the Cities of Fairfax, Falls Church, Manassas, Manassas Park, and Alexandria, where the number of incoming Fort Belvoir households could equate to comparatively high proportions of future growth.

Alternative 1 Short-Term Project Impacts on Law Enforcement, Fire Protection, and Medical Services

Under implementation of Alternative 1, four new short-term projects would be constructed that would benefit law enforcement, fire protection, and medical services on post by increasing and expanding existing services and providing new services:

- ST 3 – National Intrepid Center of Excellence (NICoE)
- ST 7 – Expansion of DAAF Fire Station
- ST 20 – Replacement of South Post Fire Station
- ST 37 – Medical Office Building

Overall, the implementation of these short-term projects would result in positive impacts on post by addressing current and future needs related to law enforcement, fire protection, and medical services. The implementation of ST 3 would provide military members and their families with access to support and treatment of traumatic brain injuries and psychological health conditions through a unique and specialized clinical care model. Implementation of ST 7 and ST 20 would address additional fire protection response for new facilities and incoming personnel due to implementation of Alternative 1. ST 37 would provide additional space for hospital personnel.

As shown in Table 3.2-20, implementation of Alternative 1 short-term projects may result in a maximum potential increase of about 540 households in Fairfax County, or approximately 3.4 percent of the county's anticipated growth. This anticipated increase in households would be spread throughout the county, and the impact on any one particular emergency response service would be negligible. The increase in the number of households in Fairfax County would be addressed by the standards set out in Fairfax County's 2013 Comprehensive Plan for Public Facilities (Fairfax County, 2013a). The five cities in Virginia in the ROI – Fairfax, Falls Church, Manassas, Manassas Park, and Alexandria – may host the largest influx of

redistributed households measured as proportions of forecasted growth for each city. Among these cities, the largest influx may occur in the City of Fairfax, to which as many as 80 households may relocate, equivalent to an estimated 8.9 percent of the city's total household growth.

Implementation of the Alternative 1 short-term projects would individually and cumulatively have beneficial impacts on law enforcement, fire protection, and emergency services on Fort Belvoir. The projects would individually and cumulatively have less than significant adverse impacts on these services in the region. The impact intensity potentially would be greatest for those communities, such as the Cities of Fairfax, Falls Church, Manassas, Manassas Park, and Alexandria, where the number of incoming Fort Belvoir households could equate to comparatively high proportions of future growth, putting a higher degree of stress on existing emergency response services.

Alternative 1 Short-Term Project Impacts on Schools

Fairfax County School System elementary schools that previously included in their school population children who live on Fort Belvoir would experience beneficial impacts with the implementation of ST 24, construction of a new Fairfax County elementary school on Fort Belvoir. The construction of this new school would address current and future capacity deficits experienced by the twelve Fairfax County public school facilities that currently receive elementary school students from Fort Belvoir by allowing a majority of the 409 elementary school-aged children living on Fort Belvoir not already enrolled in the Fort Belvoir Elementary School into the newly constructed school. Although some of the students living on post and currently going to school off post may not return to school on-post because of programs that are only available at the off post school, the new on-post school would still provide relief by accommodating new students who otherwise would have had to attend off-post schools. The current capacity deficit at Fort Belvoir Elementary school would also be addressed by balancing out the student population between the existing elementary school and the proposed elementary school.

As discussed in Section 3.2.4.1, it is assumed that the vast majority of the personnel moving to Fort Belvoir under the proposed short-term projects would already be residing within the National Capital Region, with many only shifting jobs, and some also moving residences within the region. The projected redistribution of employees and their families in the short term under Alternative 1, based on the findings of the 2011 commuter survey and extrapolation of MWCOG forecasts, would result in redistribution of school-aged children. Within the ROI, any school district may see an increase in enrollment through 2017 attributable to short-term project implementation. The projected redistribution of school-aged children under each action alternative is presented in Table 3.2-21. These projections are estimates of the *potential* enrollment change that could occur under the proposed action. As many of the new Fort Belvoir employees would choose to stay in their current homes, the values shown in Table 3.2-21 likely indicate the maximum numbers of school-age children that may relocate and, as such, are conservative estimates.

Implementation of the Alternative 1 short-term projects could result in an increase of a maximum of approximately 310 school-aged children in Fairfax County public schools and 300 school-aged children in Prince William County; compared with overall forecasted increases in school-aged children enrolled in public schools in those counties between 2011 and 2017 of about 6,150 children and 10,160 children, respectively. The potential increase attributable to implementation of Alternative 1 short-term projects would equate to only a small portion of the overall projected increase over this time period; at most approximately 5.1 percent of that increase in Fairfax County and 3.0 percent of that increase in Prince William County. The Cities of Fairfax, Falls Church, Manassas, Manassas Park, and Alexandria potentially may receive the largest influx of redistributed Fort Belvoir school-aged children measured as proportions of forecasted increase for each city. The largest influx may occur in the City of Fairfax, to which as many as about 40 school-aged children in public schools may relocate, equivalent to approximately 15.0 percent of the overall increase in school-aged children in public schools. Most of the school-aged children may relocate from Loudoun County in Virginia, and from the five ROI counties in Maryland. The largest loss, measured as a proportion of the forecasted increase in school-aged children in public schools, could occur in

Prince George's County, Maryland, from which about 210 school-aged children may depart, comparable to approximately 5.0 percent of the county's forecasted increase.

Table 3.2-21
2011-2017 Redistribution of School-Aged Children in Public Schools

	2011-2017 School-Aged Children Change	2017 Redistributed School-Aged Children		
		Alternative 1	Alternative 2	Alternative 3
Virginia				
Arlington County	1,495	0	0	0
Fairfax County	6,151	312	247	82
City of Fairfax	245	37	29	10
City of Falls Church	170	19	15	5
Loudoun County	10,347	-265	-210	-69
Prince William County	10,165	302	239	79
City of Manassas	363	45	35	12
City of Manassas Park	115	11	9	3
Stafford County	4,854	94	74	25
City of Alexandria	822	97	77	25
Maryland				
Calvert County	1,836	-22	-17	-6
Charles County	3,617	-100	-79	-26
Frederick County	2,427	-61	-48	-16
Montgomery County	11,055	-198	-156	-52
Prince George's County	4,249	-214	-169	-56
Washington, DC	6,326	-82	-65	-22
TOTAL	53,768	0	0	0

Sources: MWCOG, 2013; Dowling, pers. comm., January 3, 2012; US Census Bureau, 2013a, B09001 Population Under 18 Years By Age and S1401 School Enrollment 2011; American Community Survey 5-year estimates.

Implementation of the Alternative 1 short-term projects would individually and cumulatively have beneficial impacts on schools on and near Fort Belvoir. The projects would individually and cumulatively have less than significant adverse impacts on schools in the region. The impact intensity potentially may be greatest for those communities, such as the City of Fairfax, where the number of incoming Fort Belvoir households and school-aged children could equate to comparatively high proportions of future growth. However, even the maximum projected influx of school-aged children in the counties and cities of the ROI would be within normal fluctuations and are not expected to exceed the ability of the respective school districts to accommodate the growth.

Alternative 1 Short-Term Project Impacts on Family Support and Social Services

Of the 52 short-term projects proposed under Alternative 1, 6 of them address current and future projected needs related to supporting and providing social services for military families. These short-term projects are:

- ST 5 – Fisher House 1

- ST 6 – USO Wounded Warrior and Family Center
- ST 8 – Child Development Center 144
- ST 11 – Child Development Center 1 – FBNA
- ST 12 – Child Development Center 2 – FBNA
- ST 30 – Fisher House 2

Full implementation of Alternative 1 would benefit on-post family support and social services by meeting currently unmet needs and by providing for future needs.

The two Fisher Houses and the USO Wounded Warrior and Family Center are specialized to meet the needs and issues faced by the military and their families. The implementation of these short-term projects would result in short- and long-term minor beneficial impacts on family support and social services for military members and families both on post and within the ROI, providing additional support that generally is not found through state or local social and human service offerings that generally are directed towards the civilian population. Family support and social services within the ROI provided locally, such as on a state- or county-level, including child and adult protective services, housing support, financial assistance, assistance with disabilities and domestic violence, or substance abuse counseling, could experience local increases in demand due to the potential redistribution of families. These increases in demand would have negligible short- and long-term negative impacts on the ability of existing family support and social services in the ROI to efficiently and effectively address all requests and needs.

The increase in the supply of childcare services would serve the increased workforce on the post. This would help to alleviate excessive demand for childcare facilities off-post in areas where Fort Belvoir workers are most likely to live. The result would be negligible benefits to childcare services in the areas where Fort Belvoir workers live.

Implementation of the Alternative 1 short-term projects would individually and cumulatively have beneficial impacts on family support and social services on Fort Belvoir. The projects would individually and cumulatively have less than significant adverse impacts along with beneficial impacts on family support and social services in the ROI.

Alternative 1 Short-Term Project Impacts on Shops, Services, and Recreation

The establishment of shops, services, and recreation on post in the short-term under Alternative 1 would result in positive impacts, providing convenience and additional options for existing and potential future personnel. Construction of the following 14 short-term projects under Alternative 1 would add to the available shopping opportunities, services, and recreation activities available on post:

- ST 1 – Main PX
- ST 2 – PAL
- ST 9 – Family Travel Camp, Phase 1
- ST 15 – AAFES Car Wash
- ST 17 – 36-Hole Golf Course Reconfiguration
- ST 21 – AAFES Car Care Center
- ST 22 – Pet Care Center
- ST 25 – Name Brand Casual Dining Restaurant (Old Chicago)
- ST 28 – Main Post Commissary
- ST 31 – Family Travel Camp, Phase 2
- ST 39 – Multipurpose Fields
- ST 44 – Baseball Field Replacement
- ST 47 – Religious Education Center

The Main PX, AAFES Car Wash, AAFES Car Center, Main Post Commissary, and Name Brand Casual Restaurant would be located in the North Post Community Center area, helping to further define a town center and offering a cluster of services in one location. The addition of these shops, services, and recreation

activities would supply needed services close to where people on Fort Belvoir work and live. Fort Belvoir workers and residents, being able to readily access these services would be able to drive less and spend less time securing the services, which would be beneficial for energy use, air quality, traffic congestion, and personal/family time.

The establishment of these new facilities may draw business from similar businesses in the ROI, potentially having negative impacts on those businesses. With the exception of the PX and the Commissary, however, the scale of these new facilities services is small and not likely to have an impact on any one of the many similar businesses in the ROI. However, because the new PX is the largest AAFES PX in the country, with expanded offerings and services, it may draw customers from other PXs in the ROI and even from non-military retailers in the ROI, particularly discount stores near Fort Belvoir or near the places workers live. The proposed Commissary may also draw sales from competing commissaries and grocery stores but would not represent as much of an expansion in size and services as the new PX – it would be more like the scale of the current Commissary. Initially, sales may be captured from other stores because of the novelty factor, but an initial novelty spike in business likely would not last long. Many of the 39,000 workers and all of the 7,500 residents on Fort Belvoir qualify to use the PX and Commissary because they are active, reserve, or retired military or their dependents. Therefore, while other PXs and commissaries in the ROI and other stores may lose sales to the new stores, the sizeable number of workers and residents at Fort Belvoir who can shop there as well as the sheer size of the ROI's inventory of similar types of stores suggests that adverse impacts on other stores are likely to be less than significant, even for nearby stores on US Route 1.

The new Family Travel Camp, Phase 1 (ST 9), while providing a new recreational lodging facility for active military, retirees, reservists, and dependents close to Washington DC attractions, also has the potential to compete with other campgrounds near Fort Belvoir (such as Pohick Bay Regional Park) or along the I-95 corridor (Prince William Forest Park in Prince William County, several private campgrounds, and Lunga Park at Marine Corps Base Quantico when it reopens), However, these other parks have many amenities as part of the campgrounds, such as vegetation between campsites, swimming pools, and stores, that the Family Travel Camp does not have. Compared to other military campgrounds, such as the Family Camp at Joint Base Andrews Naval Air Facility, the price per night of $40-$50 is up to three times the $16/night cost at Andrews, so it is unlikely to compete with the facility at Andrews. The adverse business impact of the Family Travel Camp on other competing campgrounds, therefore, would be less than significant.

The proposed PAL facility (ST 2), basically a hotel for military visitors to the post, is intended to meet the demand for temporary, on-post lodging for military visitors on temporary duty, undergoing a permanent change in station, and unofficial travelers. When the demand cannot be accommodated on post, Soldiers receive a certificate of non-availability, allowing them to stay at market sector lodging facilities. Fort Belvoir's lodging demand is driven by the large amount of training that takes place on post and fluctuates through the year (US Army, 2012b). An EA was prepared in 2010 (US Army, 2010j) for the overarching program to privatize temporary lodging on Fort Belvoir with a goal of leveraging scarce funds to renovate, and thereby upgrade the housing stock. Some existing facilities would be demolished; overall, the PAL program would result in 95 additional new rooms above the temporary housing stock on post (US Army, 2013a). According to the EA for the facility prepared in 2012, the lodging project to be undertaken by Staybridge Suites would have long-term minor beneficial impacts to on-post lodging by providing convenient, quality lodging equal to that of lodging in the market sector, but at government per diem rates. It would be particularly beneficial because it would be conveniently located near the FBCH, so family members visiting patients could stay within walking distance of the hospital (US Army, 2012b). However, the new facility and the additional temporary housing stock may have less than significant adverse effects on nearby motels by attracting customers who would otherwise be staying off-post because they could not be accommodated on-post.

The potential population relocation associated with the Alternative 1 short-term projects would indirectly contribute to, but not significantly increase, demand for recreation facilities in the receiving cities and counties in the ROI. As an example of this, the 2020 projected deficits and surpluses of county-wide park

facilities shown for Fairfax County in Table 3.2-12 assumes an increase in population of over 123,000 people between 2010 and 2020. The MWCOG projection used in the analysis of this EIS assumes an increase in population of 71,700 over the same timeframe. The number of incoming people in receiving cities and counties associated with Alternative 1 short-term project implementation would equate to only a small portion of the overall projected increase over this time period and would not significantly alter the projections shown in Table 3.2-12. In fact, since the Fairfax County Park Authority needs-assessment assumes a higher rate of population growth than that currently projected by the MWCOG, the actual recreational facilities needs may be lower.

Implementation of the Alternative 1 short-term projects would individually and cumulatively have beneficial effects on shops, services, and recreation on Fort Belvoir, which would help to reduce vehicle trips that those living and working on Fort Belvoir might otherwise need to take to reach services. For the ROI, implementation of the projects would individually and cumulatively have less than significant adverse impacts by potentially reducing business for shops and services in the region by drawing customers away. Implementation of the projects would individually and cumulatively have less than significant adverse impacts by potentially increasing demand on some recreational facilities that already have a deficit in service level within the incoming and receiving counties in the ROI.

Long-Term Projects

Alternative 1 Long-Term Project Impacts on Housing

Under Alternative 1, implementation of the long-term projects may result in as many as about 6,020 households' relocating within the ROI from 2017 through 2030. A maximum of approximately 2,050 households potentially may relocate to Fairfax County, and about 1,610 may relocate to Prince William County (Table 3.2-22), equivalent to about 3.6 percent of the anticipated household growth in Fairfax County and 4.6 percent of the growth in Prince William County. Measured as proportions of forecasted growth for the city, the largest influx could occur in the City of Fairfax, to which about 290 households may relocate, equating to an estimated 48.0 percent of the city's total household growth.

Implementation of the Alternative 1 long-term projects would individually and cumulatively have less than significant adverse impacts on housing in the region. The impact intensity potentially would be greatest for those communities where the number of incoming Fort Belvoir households could equate to comparatively high proportions of future growth.

Alternative 1 Long-Term Project Impacts on Law Enforcement, Fire Protection, and Medical Services

Implementation of the long-term projects under Alternative 1 would result in 12,030 additional personnel relocating to Fort Belvoir between 2018 and 2030. Increases in the number of buildings, personnel, and traffic on post would result in increased requests for services and the potential for delays in service response time. By replacing old buildings with new ones, however, the risk of fires would decline overall.

As the proposed new facilities come on line and demand increases, Fort Belvoir's law enforcement, fire protection, and medical services would monitor emergency response times and adjust service levels to minimize increases in response times on post. Coupled with the construction of new emergency response facilities as part of implementing the RPMP, impacts on law enforcement, fire protection, and medical emergency services on post are expected to balance out to no effect.

As shown in Table 3.2-22 and discussed above, implementation of Alternative 1 long-term projects could result in an increase of about 2,050 households in Fairfax County, equivalent to approximately 3.6 percent of the county's anticipated household growth. This projected increase in households would be spread throughout the county and the impact on any one particular emergency response service would be negligible. Increase in the number of households in Fairfax County would be addressed by the standards set

out in Fairfax County's 2013 Comprehensive Plan for Public Facilities (Fairfax County, 2013b). The Cities of Fairfax, Falls Church, Manassas, Manassas Park, and Alexandria could host the largest influx of redistributed households measured as proportions of forecasted growth for each city. Among these cities, the largest influx would occur in the City of Fairfax, to which about 290 households may relocate, equating to an estimated 48.0 percent of the city's total household growth.

Table 3.2-22
2030 Redistribution of Households

	2017-2030 Households Change	2030 Redistributed Households		
		Alternative 1	Alternative 2	Alternative 3
Virginia				
Arlington County	13,083	0	0	0
Fairfax County	57,456	2,052	1,174	2,418
City of Fairfax	612	294	168	346
City of Falls Church	1,620	111	64	131
Loudoun County	30,911	-1,372	-785	-1,617
Prince William County	35,017	1,609	920	1,896
City of Manassas	2,137	237	135	279
City of Manassas Park	317	57	33	67
Stafford County	20,550	452	258	532
City of Alexandria	10,542	1,202	688	1,417
Maryland				
Calvert County	3,358	-108	-62	-128
Charles County	15,611	-548	-313	-646
Frederick County	18,092	-347	-199	-409
Montgomery County	49,471	-1,345	-769	-1,585
Prince George's County	31,298	-1,443	-825	-1,700
Washington, DC	26,436	-852	-487	-1,003
TOTAL	316,511	0	0	0

Sources: MWCOG, 2013; Dowling, pers. comm., January 3, 2012.

Implementation of the Alternative 1 long-term projects would individually and cumulatively add personnel but also new law enforcement, fire protection, and emergency services on Fort Belvoir, and monitoring to ensure that response times would not decline, so the net effect on post would be no impact. The projects would individually and cumulatively have less than significant adverse impacts on these services in the region. The impact intensity may be greatest for those communities such as the cities of Fairfax, Falls Church, Manassas, Manassas Park, and Alexandria, where the number of incoming Fort Belvoir households could represent a comparatively high proportion of the future growth, putting more stress on existing emergency response services. These increases would be spread out over a number of years, however.

Alternative 1 Long-Term Project Impacts on Schools

The projected maximum potential redistribution of school-aged children due to long-term project implementation under Alternative 1 is shown in Table 3.2-23. With implementation of Alternative 1 long-

term projects, a maximum of approximately 780 school-aged children enrolled in public schools in Fairfax County and 760 school-aged children in Prince William County may be redistributed between 2018 and 2030; with total county anticipated increases in school-aged children within that same timeframe of about 19,440 children and 16,430 children, respectively. The increase attributable to implementation of Alternative 1 long-term projects would equate to only a small portion of the overall increase over this time period; approximately 4.0 percent of the increase in Fairfax County and 4.6 percent of the increase in Prince William County. The Cities of Fairfax, Falls Church, Manassas, Manassas Park, and Alexandria potentially would receive the largest influx of redistributed Fort Belvoir school-aged children measured as proportions of forecasted increase for each city. The largest influx may occur in the City of Fairfax, to which as many as about 90 school-aged children may relocate, equivalent to approximately 45.2 percent of the overall increase in school-aged children enrolled in public schools. The largest loss, measured as a proportion of the forecasted increase in school-aged children in public schools, could occur in Prince George's County, Maryland, from which about 530 school-aged children may depart, comparable to approximately 6.2 percent of the county's forecasted increase.

Table 3.2-23
2018-2030 Redistribution of School-Aged Children in Public Schools

	2018-2030 School-Aged Children Change	2030 Redistributed School-Aged Children		
		Alternative 1	Alternative 2	Alternative 3
Virginia				
Arlington County	2,615	0	0	0
Fairfax County	19,442	780	446	919
City of Fairfax	203	92	52	108
City of Falls Church	456	47	27	55
Loudoun County	15,821	-662	-379	-780
Prince William County	16,431	755	432	889
City of Manassas	797	112	64	131
City of Manassas Park	173	27	16	32
Stafford County	10,922	235	135	277
City of Alexandria	1,669	243	139	287
Maryland				
Calvert County	1,322	-54	-31	-63
Charles County	6,240	-249	-142	-293
Frederick County	7,743	-151	-86	-178
Montgomery County	16,083	-494	-283	-582
Prince George's County	8,635	-534	-305	-629
Washington, DC	5,501	-206	-118	-242
TOTAL	107,257	0	0	0

Sources: MWCOG, 2013; Dowling, pers. comm., January 3, 2012; US Census Bureau, 2013a, B09001 Population Under 18 Years By Age and S1401 School Enrollment 2011 American Community Survey 5-year estimates.

Implementation of the Alternative 1 long-term projects would individually and cumulatively have less than significant adverse impacts on schools in the region. The impact intensity of potentially adding new students would be greatest for those communities, such as the City of Fairfax, where the number of incoming Fort Belvoir households could equate to comparatively high proportions of future growth.

Alternative 1 Long-Term Project Impacts on Family Support and Social Services

Implementation of the long-term projects under Alternative 1 would result in an increase of 12,030 personnel working at Fort Belvoir between 2018 and 2030. Through time this increase in personnel could overtax existing family support and social services as well as the new facilities that would come online by 2017. However, implementation of short-term family support and social service projects would mean that by 2018, at the beginning of the long-term period, the supply of services would be good. As the years go on, overcrowded facilities and services could lead to a decreased ability of each applicable service to effectively and efficiently address all needs. To avoid overuse, Fort Belvoir would monitor service levels and plan for new facilities, such as day care centers, as the need arises. Assuming that Fort Belvoir monitors the supply of and demand for family support and social services and acts to add facilities as needed, then there would be no effect on these services as the result of the proposed action.

Alternative 1 Long-Term Project Impacts on Shops, Services, and Recreation

Impacts on shops, services, and recreation facilities would be similar to those discussed under family support and social services. The increase in personnel proposed under Alternative 1 as the result of implementing long-term projects but with no new shops, services, and recreational facilities currently planned for the 2018-2030 period, could result in overuse of existing shops, services, and recreational facilities on post. Overcrowded facilities and services could lead to a decreased ability of each applicable service to effectively and efficiently address all customers and patrons. However, Fort Belvoir would continue to monitor the adequacy of the supply of shops, services, and recreational facilities as the workforce grows, and would plan for new facilities as needed. There may be less than significant adverse effects on the supply of shops, services, and recreational facilities on post if planning for and funding of new facilities does not keep pace with the influx of new personnel. If the demands of the proposed new workforce exceed the supply of shops, services, and recreational facilities on post, then ROI shops, services, and recreational facilities would garner beneficial impacts from more business.

3.2.4.3 Alternative 1 Impacts on Environmental Justice and the Protection of Children

Short-Term Projects

Based on the analyses presented in this EIS on traffic, air quality, noise, and water resources associated with the Alternative 1 short-term projects, including the short-term transportation projects, the following conclusions are presented in regard to human health and environmental effects to minority populations, low-income communities, and concentrations of children:

- Transportation and Traffic – New transportation facilities that are in design or under construction on and adjacent to Fort Belvoir (widening of US Route 1, Mulligan Road, Lieber Gate, I-95 HOV ramp to FBNA) would mitigate most traffic effects of the short-term projects. However, the short-term projects would significantly adversely increase delays, with a consequent decline in levels of service from D to E at two intersections – one public and one on Fort Belvoir. Fort Belvoir would mitigate the effects on the Fairfax County Parkway and John J. Kingman Road intersection on Fort Belvoir by adding turning lanes and improving the traffic signals. For the adversely affected Lorton Road at US Route 1 intersection, Fort Belvoir would coordinate with the Virginia Department of Transportation (VDOT) and the Fairfax County Department of Transportation (FCDOT) on solutions. Implementing Fort Belvoir's Transportation Management Plan (TMP), part of the RPMP,

would lead to increases in transit, ridesharing, bicycle, and pedestrian use, and decreases in single-occupant vehicle use (SOV), which would improve traffic conditions on and near Fort Belvoir in the short term.

Because Fort Belvoir would mitigate Alternative 1 negative impacts on traffic on the installation, coordinate with FCDOT and VDOT to monitor public roads, work with them on solutions, and strive to increase the use of non-automobile commuting modes, short-term increases in traffic levels and congestion would not result in disproportionately high and adverse human health or environmental effects on minority or low-income populations, or pose disproportionate environmental health or safety risks to children.

- Air Quality – The short-term projects would have less than significant adverse effects due to generating airborne dust and other pollutants during construction. After construction, less than significant adverse effects would result from commuting activities and introducing new stationary sources of pollutants, such as back-up generators and boilers. The short-term transportation projects would have less than significant adverse effects. Increases in emissions would be minor. There would be no permanent sources of air emissions associated with the short-term transportation projects, which would be specifically designed to relieve congestion and reduce the number of vehicle miles traveled (VMT) on the roadways near Fort Belvoir. Over time, small changes in traffic patterns on and off post would have beneficial effects to air quality both regionally and locally. In addition, traffic management approaches outlined in the RPMP TMP (US Army, 2014c) would reduce any mobile emissions associated with the proposed activities.

  Alternative 1 short-term project air emissions would not result in disproportionately high and adverse human health or environmental effects on minority or low-income populations, or pose disproportionate environmental health or safety risks to children.

- Noise – In the short and long term, less than significant adverse effects on noise levels would be expected from the short-term projects. The short-term effects would result from the use of heavy equipment at the construction and demolition sites. The long-term effects would be from the addition of stationary sources of noise such as standby generators. There would be minute, unnoticeable changes in background noise due to the consolidation of industrial areas on post, and changes in traffic patterns on and near the installation.

  Alternative 1 short-term project noise would not result in disproportionately high and adverse human health or environmental effects on minority or low-income populations, or pose disproportionate environmental health or safety risks to children.

- Water Quality – Implementation of the short-term projects would cause short-term impacts, such as erosion and sedimentation downstream during construction while soils are exposed. Implementation would have less than significant adverse effects on the water quality of Fort Belvoir's surface waters and waters downstream.

  Alternative 1 short-term project effects on water quality would not result in disproportionately high and adverse human health or environmental effects on minority or low-income populations, or pose disproportionate environmental health or safety risks to children.

The effects of implementing the short-term projects would ripple throughout the environmental justice and protection of children affected area, and would not be appreciably more severe or greater in magnitude in minority or low-income communities, or communities with high concentrations of children. Therefore, no disproportionately high and adverse human health or environmental effects on minority populations and low-income populations would occur. Implementation of short-term projects would not pose disproportionate environmental health or safety risks to children. The Alternative 1 short-term projects would have no impacts on minority and low-income populations, or on children.

Long-Term Projects

The following conclusions are presented in regard to human health and environmental effects to minority populations, low-income communities, and concentrations of children associated with the Alternative 1 long-term projects:

- Transportation and Traffic – The long-term projects would have significant adverse effects on some roadway segments on and near Fort Belvoir by 2030, degrading levels of service from D to E and F. Fort Belvoir would improve the affected Fort Belvoir roadways and intersections and would coordinate with VDOT and FCDOT to monitor long-term effects on public roads. Notably, Fort Belvoir is committed to grade-separating the Fairfax County Parkway and John J. Kingman Road intersection and the NMUSA entrance road. Implementing Fort Belvoir's TMP, part of the RPMP, would lead to increases in transit, ridesharing, bicycle, and pedestrian use, and decreases in SOV use, which would improve traffic conditions on and near Fort Belvoir in the long term.

  Because Fort Belvoir would mitigate Alternative 1 negative impacts on traffic on the installation, coordinate with FCDOT and VDOT to monitor public roads, work with them on solutions, and strive to increase the use of non-automobile commuting modes, long-term increases in traffic levels and congestion would not result in disproportionately high and adverse human health or environmental effects on minority or low-income populations, or pose disproportionate environmental health or safety risks to children.

- Air Quality – The long-term projects would have less than significant adverse effects similar to the effects of short-term projects. As with the short-term transportation projects, the long-term transportation projects would have less than significant adverse effects, and increases in emissions would be relatively small. There would be no permanent sources of air emissions associated with the long-term transportation projects, which would be specifically designed to relieve congestion and reduce the number of VMT on the roadways near Fort Belvoir. Small changes in traffic patterns on and off post would have beneficial effects to air quality both regionally and locally.

  Alternative 1 long-term project air emissions would not result in disproportionately high and adverse human health or environmental effects on minority or low-income populations, or pose disproportionate environmental health or safety risks to children.

- Noise – In the short and long term, less than significant adverse effects on noise levels would be expected from the long-term projects. The short-term effects would result from the use of heavy equipment at the construction and demolition sites. The long-term effects would be from the addition of stationary sources of noise such as standby generators. There would be minute, unnoticeable changes in background noise due to the consolidation of industrial areas on post, and changes in traffic patterns on and near the installation.

  Alternative 1 long-term project noise would not result in disproportionately high and adverse human health or environmental effects on minority or low-income populations, or pose disproportionate environmental health or safety risks to children.

- Water Quality – Implementation of the long-term projects would cause less than significant adverse effects on the water quality of Fort Belvoir's surface waters and waters downstream.

  Alternative 1 long-term project effects on water quality would not result in disproportionately high and adverse human health or environmental effects on minority or low-income populations, or pose disproportionate environmental health or safety risks to children.

The effects of implementing the long-term projects would ripple throughout the affected area, and would not be appreciably more severe or greater in magnitude in minority or low-income communities, or communities with high concentrations of children. Therefore, no disproportionately high and adverse human health or environmental effects on minority populations and low-income populations would occur.

Implementation of short-term projects would not pose disproportionate environmental health or safety risks to children. The Alternative 1 long-term projects would have no impacts on minority and low-income populations, or on children.

3.2.5 Environmental Consequences of Alternative 2 – Modified Long-Term

3.2.5.1 Alternative 2 Economic Activity

Short-Term Projects

Alternative 2 Short-Term Project Impacts on Employment and Income

The Alternative 2 short-term projects and short-term transportation projects would construct approximately 2.5 million square feet of additional new building space between 2012 and 2017, as well as transportation and other facility improvements. The construction expenditures would result in one-time increases in ROI economic output, employment, and earnings. The ongoing operations of the NMUSA would create ongoing annual impacts.

The Alternative 2 short-term projects would cost an estimated $1.3 billion to complete. This amount is divided into hard costs (70 percent) and soft costs (30 percent). Construction would have a total economic impact of $2.2 billion in the ROI, supporting a total of 12,916 jobs and earnings of $584 million (Table 3.2-24).

Table 3.2-24
Economic Impacts of Alternative 2 Short-Term Projects

	Output	Earnings	Jobs
	Million $	Million $	Number
Construction Period Impacts			
2012-2017	2,188	584	12,916
Total One-Time Impacts	2,188	584	12,916
Ongoing Impacts			
Museum Operations	23	4	165
Museum Visitor Spending	103	22	962
Total Annual Impacts	126	26	1,127
Note: Total annual impacts reflect a typical estimated NMUSA operating year once the museum is open. Museum Visitor Spending includes direct, indirect, and induced spending.			

Both construction and operation effects from the short-term projects would be beneficial, providing regional economic benefits from construction spending and labor, as well as from long-term positive effects on employment and income in the region. Implementation of the Alternative 2 short-term projects would individually and cumulatively have beneficial impacts on employment and income.

Like Alternative 1, on an annual basis, NMUSA operations would create an estimated 165 jobs with $4.4 million in earnings and $23.0 million in output. In addition, visitors to NMUSA would support a total of $102.9 million in output, 962 jobs, and $22.0 million in earnings. These ongoing impacts would result in an estimated annual impact of $126 million in output, 1,127 jobs, and $26 million in earnings.

Alternative 2 Short-Term Project Impacts on Population

Implementation of the Alternative 2 short-term projects would generate a net increase of an estimated 3,755 people in the workforce on Fort Belvoir. As the vast majority of these personnel would already reside in the National Capital Region, these jobs would be shifted from one location to another within the region and, therefore, would not result in a change in ROI employment.

Table 3.2-17 shows the population changes projected for the period between 2017 and 2030, based on MWCOG forecasts, and the projected maximum potential redistribution of National Capital Region employees on the basis of the distribution of the current Fort Belvoir employees. The MWCOG population forecasts account for full implementation of all Fort Belvoir RPMP short-term and long-term projects, as would occur under Alternative 1 only. Therefore, for Alternative 2 the forecasts were adjusted for partial implementation of the short-term projects by subtracting from the forecasts the difference between the number of employees and family members that may relocate in response to full implementation under Alternative 1 and those that may relocate in response to partial implementation under Alternative 2. The MWCOG forecasts also account for indirect and induced employment generated by full implementation of the short-term and long-term projects. However, the forecasts were not adjusted to dissociate regional population growth due to indirect or induced employment generated by direct employment on Fort Belvoir from that generated by changes in employment throughout the region.

Implementation of the Alternative 2 short-term projects may result in the redistribution of a maximum of approximately 5,000 persons, comprising new Fort Belvoir employees and their families. Fairfax County could receive the largest share of the relocated population, potentially as many as 1,710 persons (Table 3.2-17), corresponding to approximately 4.1 percent of the county's anticipated growth. The Cities of Fairfax, Falls Church, Manassas, Manassas Park, and Alexandria may host the largest influx of redistributed Fort Belvoir employees and their families measured as proportions of forecasted growth for each city. Among these cities, the largest influx may occur in the City of Fairfax, to which as many as 240 people may relocate, equivalent to approximately 12.2 percent of the city's total population growth.

Implementation of the Alternative 2 short-term projects would individually and cumulatively have less than significant adverse impacts on population. The impact intensity potentially would be greatest for those communities, such as the Cities of Fairfax, Falls Church, Manassas, Manassas Park, and Alexandria, where the number of incoming Fort Belvoir families could equate to comparatively high proportions of future growth.

Alternative 2 Long-Term Projects

Alternative 2 Long-Term Project Impacts on Employment and Income

The Alternative 2 long-term projects and long-term transportation projects would construct approximately 1.4 million square feet of additional new building space between 2018 and 2030, as well as transportation and other facility improvements. The long-term projects have an estimated construction cost of $548 million. Spending on construction would have a one-time impact of $898 million in output, supporting 5,304 jobs and $240 million in earnings (Table 3.2-25). On an ongoing, annual basis, the NMUSA would result in an estimated impact of $126 million in output, and 1,127 jobs and $26 million in earnings.

Both construction and operation effects from the long-term projects would be beneficial. Implementation of the Alternative 2 long-term projects would individually and cumulatively have beneficial impacts on employment and income.

Alternative 2 Long-Term Project Impacts on Population

Implementation of the Alternative 2 long-term projects would generate a net increase of an estimated 6,880 people in the workforce on Fort Belvoir, in addition to those added by the short-term projects. As the vast

majority of these personnel would already reside in the National Capital Region, these jobs would be shifted from one location to another within the region and, therefore, would not result in a change in ROI employment. Table 3.2-19 shows the population changes projected for the period between 2017 and 2030, based on MWCOG forecasts, and the projected maximum potential redistribution of National Capital Region employees on the basis of the distribution of the current Fort Belvoir employees. As the MWCOG population forecasts account for full implementation of all Fort Belvoir RPMP short-term and long-term projects, for Alternative 2 the forecasts were adjusted by subtracting from the forecasts the difference between the number of employees and family members that may relocate under Alternative 1 and those that may relocate under Alternative 2.

Table 3.2-25
Economic Impacts of Alternative 2 Long-Term Projects

	Output	Earnings	Jobs
	Million $	Million $	Number
Construction Period Impacts			
2018-2030	898	240	5,304
Total One-Time Impacts	898	240	5,304
Ongoing Impacts			
Museum Operations	23	4	165
Museum Visitor Spending	103	22	962
Total Annual Impacts	126	26	1,127
Note: Total annual impacts reflect a typical estimated NMUSA operating year once the museum is open. Museum Visitor Spending includes direct, indirect, and induced spending.			

Implementation of the Alternative 2 long-term projects could result in the redistribution of an estimated maximum of approximately 9,040 persons, comprising new Fort Belvoir employees and their families. Fairfax County could receive the largest share of the relocated population, possibly as many as about 3,080 persons, which is equivalent to approximately 2.3 percent of the county's anticipated growth. As noted for the short-term projects, the Cities of Fairfax, Falls Church, Manassas, Manassas Park, and Alexandria may host the largest influx of redistributed Fort Belvoir employees and their families measured as proportions of forecasted growth for each city. Among these, the largest influx may occur in the City of Fairfax, to which as many as about 440 people may relocate, equivalent to approximately 30.6 percent of the city's forecasted population growth.

Implementation of the Alternative 2 long-term projects would individually and cumulatively have less than significant impacts on population. The impact intensity potentially would be greatest for those communities where the number of incoming Fort Belvoir families could equate to comparatively high proportions of future growth.

3.2.5.2 Alternative 2 Sociological Environment

Short-Term Projects

Alternative 2 Short-Term Project Impacts on Housing

Under Alternative 2, ST 42 would construct unaccompanied enlisted personnel barracks, ST 5 and 30 would construct two Fisher Houses for military families receiving care at the FBCH, and ST 2 would construct a privatized, 141-room Army lodging facility. These short-term projects would provide housing

accommodations close to installation services, such as healthcare, shopping, and recreational facilities, and would have long-term, minor beneficial effects on housing on post.

Implementation of the Alternative 2 short-term projects would generate a net increase of an estimated 3,755 people in the workforce on Fort Belvoir from 2011 through 2017. Approximately 1,880 personnel may change their residence within the ROI because their job would be transferred to the post. Assuming each employee represents one household, about that number of households may relocate within the ROI. As shown in Table 3.2-6, in 2010 there were approximately 48,550 vacant housing units available to rent and 23,350 units for sale in the ROI. The households that may relocate within the ROI would need a supply of housing in the receiving communities equivalent to approximately 2.6 percent of the housing units available for rent or for sale in 2010; however, the relocating households would vacate an equivalent number of housing units in the communities they leave.

Potentially, a maximum of about 640 households may relocate to Fairfax County and about 500 may relocate to Prince William County (Table 3.2-20), corresponding to about 4.2 percent of the anticipated household growth in Fairfax County and 2.5 percent of the growth in Prince William County. The Cities of Fairfax, Falls Church, Manassas, Manassas Park, and Alexandria potentially may receive the largest influx of redistributed Fort Belvoir households measured as proportions of forecasted growth for each city. The largest influx could occur in the City of Fairfax, to which a maximum of about 90 households may relocate, equivalent to an estimated 11.0 percent of the city's forecasted household growth.

Implementation of the Alternative 2 short-term projects would individually and cumulatively have beneficial impacts on housing on Fort Belvoir. The projects would individually and cumulatively have less than significant adverse impacts on housing in the region. The impact intensity potentially would be greatest for those communities, such as the Cities of Fairfax, Falls Church, Manassas, Manassas Park, and Alexandria, where the number of incoming Fort Belvoir households could equate to comparatively high proportions of future growth.

Alternative 2 Short-Term Project Impacts on Law Enforcement, Fire Protection, and Medical Services

Like Alternative 1, Alternative 2 includes four short-term projects that would benefit law enforcement, fire protection, and medical services on post: ST 3, ST 7, ST 20, and ST 37. As shown in Table 3.2-20 and discussed above, implementation of Alternative 2 short-term projects may result in a maximum potential increase of about 640 households in Fairfax County, corresponding to approximately 4.2 percent of the county's anticipated household growth. This anticipated increase in households would be spread throughout the county and the impact on any one particular emergency response service would be negligible. Increase in the number of households in Fairfax County would be addressed by the standards set out in Fairfax County's 2013 Comprehensive Plan for Public Facilities (Fairfax County, 2013b). The five cities in Virginia – Fairfax, Falls Church, Manassas, Manassas Park, and Alexandria – may host the largest influx of redistributed households measured as proportions of forecasted growth for each city. Among these cities, the largest influx may occur in the City of Fairfax, to which as many as about 90 households may relocate, equivalent to an estimated 11.0 percent of the city's forecasted household growth.

Implementation of the Alternative 2 short-term projects would individually and cumulatively have beneficial impacts on law enforcement, fire protection, and emergency services on Fort Belvoir. The projects would individually and cumulatively have less than significant adverse impacts on these services in the region. The impact intensity potentially would be greatest for those communities, such as the Cities of Fairfax, Falls Church, Manassas, Manassas Park, and Alexandria, where the number of incoming Fort Belvoir households could equate to comparatively high proportions of future growth, putting a higher degree of stress on existing emergency response services.

Alternative 2 Short-Term Project Impacts on Schools

The impacts of implementing short-term projects on schools under Alternative 2 would be similar to the impacts of Alternative 1 but would result in fewer personnel and fewer school-aged children. A new elementary school would be built on Fort Belvoir, which would result in the move of a majority of the 409 children living on Fort Belvoir but attending Fairfax County elementary schools off post to the new school. This would relieve crowding in the Fairfax County schools the Fort Belvoir children now attend.

Implementation of Alternative 2 short-term projects and the consequent expansion of the workforce on Fort Belvoir could result in an increase of a maximum of approximately 250 school-aged children in public schools in Fairfax County and 300 school-aged children in Prince William County; with overall forecasted increases in school-aged children in public schools in those counties between 2011 and 2017 of about 6,150 children and 10,160 children, respectively (Table 3.2-21). The potential increase attributable to implementation of Alternative 2 short-term projects would equate to only a small portion of the overall projected increase over this time period; at most approximately 4.1 percent of that increase in Fairfax County and 2.4 percent of that increase in Prince William County. The Cities of Fairfax, Falls Church, Manassas, Manassas Park, and Alexandria potentially may receive the largest influx of redistributed Fort Belvoir school-aged children measured as proportions of forecasted increase for each city. The largest influx may occur in the City of Fairfax, to which as many as about 30 school-aged children may relocate, equivalent to approximately 12.2 percent of the overall increase in school-aged children in public schools. Most of the school-aged children may relocate from Loudoun County in Virginia, and from the five ROI counties in Maryland. The largest loss, measured as a proportion of the forecasted increase in school-aged children in public schools, could occur in Prince George's County, Maryland, from which about 170 school-aged children may depart, comparable to approximately 3.9 percent of the county's forecasted increase.

Implementation of the Alternative 2 short-term projects would individually and cumulatively have beneficial impacts on schools on and near Fort Belvoir. The projects would individually and cumulatively have less than significant adverse impacts on schools in the region. The impact intensity potentially would be greatest for those communities, such as the City of Fairfax, where the number of incoming Fort Belvoir households could equate to comparatively high proportions of future growth. However, even the maximum projected influx of school-aged children in the counties and cities of the ROI would be within normal fluctuations and are not expected to exceed the ability of the respective school districts to accommodate the growth.

Alternative 2 Short-Term Project Impacts on Family Support and Social Services

As described under Alternative 1, six ST projects would be built to support military families and provide social services: two Fisher Houses (ST 5 and ST 30); the USO (ST 6); and three child development centers (ST 8, ST 11, and ST 12). As described under Alternative 1, full implementation of Alternative 2 would provide short- and long-term minor beneficial impacts to on-post family support and social services by supplying services for which there is currently demand.

Implementation of the Alternative 2 short-term projects would individually and cumulatively have beneficial impacts on family support and social services on Fort Belvoir. The projects would individually and cumulatively have less than significant adverse impacts along with beneficial impacts on family support and social services in the ROI.

Alternative 2 Short-Term Project Impacts on Shops, Services, and Recreation

Under Alternative 2, approximately 1,000 fewer personnel would be added to the Fort Belvoir workforce but all 13 of the proposed short-term projects in this category would be built, as compared to Alternative 1. Therefore, the supply of services would expand but there would be fewer workers to demand these services, compared to Alternative 1.

Implementation of the Alternative 2 short-term projects would individually and cumulatively have beneficial impacts on the supply of shops, services, and recreation on Fort Belvoir. For the ROI, the projects would individually and cumulatively have less than significant adverse impacts on shops, services, and recreation in the region by potentially drawing some business away.

Long-Term Projects

Alternative 2 Long-Term Project Impacts on Housing

Under Alternative 2, implementation of the long-term projects may result in as many as 3,440 households relocating within the ROI from 2017 through 2030. A maximum of approximately 1,170 households potentially may relocate to Fairfax County and about 920 may relocate to Prince William County (Table 3.2-22), equivalent to about 2.0 percent of the anticipated household growth in Fairfax County and 2.7 percent of the growth in Prince William County. Measured as a proportion of forecasted growth for the city, the largest influx could occur in the City of Fairfax, to which about 180 households may relocate, equating to an estimated 32.9 percent of the city's forecasted household growth.

Implementation of the Alternative 2 long-term projects would individually and cumulatively have less than significant adverse impacts on housing in the region. The impact intensity potentially would be greatest for those communities where the number of incoming Fort Belvoir households could equate to comparatively high proportions of future growth.

Alternative 2 Long-Term Project Impacts on Law Enforcement, Fire Protection, and Medical Services

Implementation of the long-term projects under Alternative 2 would result in 6,880 additional personnel relocated to Fort Belvoir between 2018 and 2030. This increase in personnel and facilities would increase the demand for law enforcement, fire protection, and medical emergency services. The replacement of old buildings with new ones would offset the demand for fire protection services to some extent as fires occur less frequently in newer buildings. Increased personnel would result in increased requests for service and the potential for increased traffic volume could create delays in service response time. However, Fort Belvoir's law enforcement, fire protection, and emergency services would monitor their response times, and adjust their services and identify new facilities as needed.

As shown in Table 3.2-22 and discussed above, implementation of Alternative 2 long-term projects may result in an increase of about 1,170 households in Fairfax County, corresponding to approximately 2.0 percent of the county's anticipated growth. This projected increase in households would be spread throughout the county and the impact on any one particular emergency response service would be negligible. Increase in the number of households in Fairfax County would be addressed by the standards set out in Fairfax County's 2013 Comprehensive Plan for Public Facilities (Fairfax County, 2013b). The five cities in Virginia—Fairfax, Falls Church, Manassas, Manassas Park, and Alexandria—could host the largest influx of redistributed households measured as proportions of forecasted growth for each city. Among these cities, the largest influx may occur in the City of Fairfax, to which about 180 households could relocate, equating to an estimated 32.9 percent of the city's total household growth.

Implementation of the Alternative 2 long-term projects would individually and cumulatively have no impact on law enforcement, fire protection, and emergency services on Fort Belvoir. By continuing to monitor response times, Fort Belvoir would strive to maintain response times at current levels, which would result in no net effects on these services. The projects would individually and cumulatively have less than significant adverse impacts on these services in the region. The impact intensity potentially would be greatest for those communities, such as the Cities of Fairfax, Falls Church, Manassas, Manassas Park, and Alexandria, where the number of incoming Fort Belvoir households could equate to comparatively high proportions of future growth, putting a higher degree of stress on existing emergency response services.

Alternative 2 Long-Term Project Impacts on Schools

Implementation of Alternative 2 long-term projects could result in the relocation of school-aged children within the ROI between 2018 and 2030. A maximum of approximately 450 school-aged children in public schools in Fairfax County and 430 school-aged children in Prince William County may be redistributed due to this implementation; with total county anticipated increases in school-aged children in public schools within that same timeframe of about 19,440 children and 16,430 children, respectively (Table 3.2-22). The increase attributable to implementation of Alternative 2 long-term projects would correspond to only a small portion of the overall increase over this time period; approximately 2.3 percent of that increase in Fairfax County and 2.7 percent of that increase in Prince William County. The Cities of Fairfax, Falls Church, Manassas, Manassas Park, and Alexandria potentially could receive the largest influx of redistributed Fort Belvoir school-aged children measured as proportions of the forecasted increase for each city. The largest influx may occur in the City of Fairfax, to which as many as about 50 school-aged children may relocate, equivalent to approximately 30.6 percent of the overall increase in school-aged children in public schools.

Implementation of the Alternative 2 long-term projects would individually and cumulatively have less than significant adverse impacts on schools in the region. The impact intensity potentially would be greatest for those communities, such as the City of Fairfax, where the number of incoming Fort Belvoir households could equate to comparatively high proportions of future growth.

Alternative 2 Long-Term Project Impacts on Family Support and Social Services

Implementation of the long-term projects under Alternative 2 would result in the addition of 6,880 personnel to Fort Belvoir between 2018 and 2030. Though fewer long-term personnel than for Alternatives 1 and 3, the impacts would be similar but of less intensity. Fewer people would place demands on the same supply of services. As with Alternative 1, to avoid overuse, Fort Belvoir would monitor service levels and plan for new facilities, such as day care centers, as the need arises. Assuming that Fort Belvoir monitors the supply of and demand for family support and social services and acts to add facilities and services as needed, then there would be no effect on their services as the result of the proposed action.

Alternative 2 Long-Term Project Impacts on Shops, Services, and Recreation

Impacts on shops, services, and recreation facilities would result in impacts similar to those discussed under family support and social services. The increase in personnel proposed under Alternative 2 due to the implementation of long-term projects could result in less than significant adverse impacts due to increased demand on existing shops, services, and recreation on post. Overcrowded facilities and services could lead to a decreased ability of each applicable service to effectively and efficiently address all customers and patrons. Additional project-level analyses would be conducted as the planning and design of each long-term project becomes more defined to determine both potential on-post impacts and impacts within the ROI. Any potential deficits in shopping options, services, or recreation facilities on post caused by increased demand could be avoided during the planning and design process by the inclusion of forecasting and consideration of additional personnel due to implementation of the long-term projects.

3.2.5.3 Alternative 2 Impacts on Environmental Justice and the Protection of Children

Short-Term Projects

Based on the analyses presented in this EIS on traffic, air quality, noise, and water resources associated with the Alternative 2 short-term projects, including the short-term transportation projects, the following conclusions are presented in regard to human health and environmental effects to minority populations, low-income communities, and concentrations of children:

- Transportation and Traffic – New transportation facilities that are in design or under construction on and adjacent to Fort Belvoir (widening of US Route 1, Mulligan Road, Lieber Gate, I-95 HOV ramp to FBNA) would mitigate most traffic effects of the short-term projects. However, the short-term projects would significantly adversely increase delays, with a consequent decline in levels of service from D to E at two intersections – one public and one on Fort Belvoir. Fort Belvoir would mitigate the effects on the Fairfax County Parkway and John J. Kingman Road intersection on Fort Belvoir by adding turning lanes and improving the traffic signals. For the adversely affected Lorton Road at US Route 1 intersection, Fort Belvoir would coordinate with VDOT and FCDOT on solutions. Implementing Fort Belvoir's Transportation Management Plan (TMP), part of the RPMP, would lead to increases in transit, ridesharing, bicycle, and pedestrian use, and decreases in single-occupant vehicle use (SOV), which would improve traffic conditions on and near Fort Belvoir in the short term.

  Because Fort Belvoir would mitigate Alternative 2's negative impacts on traffic on the installation, coordinate with FCDOT and VDOT to monitor public roads, work with them on solutions, and strive to increase the use of non-automobile commuting modes, short-term increases in traffic levels and congestion would not result in disproportionately high and adverse human health or environmental effects on minority or low-income populations, or pose disproportionate environmental health or safety risks to children.

- Air Quality – The short-term projects would have less than significant adverse effects due to generating airborne dust and other pollutants during construction. After construction, less than significant adverse effects would result from commuting activities and introducing new stationary sources of pollutants. The short-term transportation projects would have less than significant adverse effects; increases in emissions would be minor. There would be no permanent sources of air emissions associated with the short-term transportation projects, which would be specifically designed to relieve congestion and reduce the number of VMT on the roadways near Fort Belvoir. Small changes in traffic patterns on and off post would have beneficial effects to air quality both regionally and locally, and traffic management approaches outlined in the RPMP TMP (US Army, 2013c in progress) would reduce any mobile emissions associated with the proposed activities.

  Alternative 2 short-term project air emissions would not result in disproportionately high and adverse human health or environmental effects on minority or low-income populations, or pose disproportionate environmental health or safety risks to children.

- Noise – The short-term projects would result in less than significant adverse effects during construction from the use of heavy equipment at the construction and demolition sites, and less than significant adverse effects after construction from the addition of stationary sources of noise. There would be minute, unnoticeable changes in background noise due to the consolidation of industrial areas on post, and changes in traffic patterns on and near the installation.

  Alternative 2 short-term project noise would not result in disproportionately high and adverse human health or environmental effects on minority or low-income populations, or pose disproportionate environmental health or safety risks to children.

- Water Quality – Implementation of the short-term projects would cause short-term impacts, such as erosion and sedimentation downstream during construction while soils are exposed. Implementation would have less than significant adverse effects on the water quality of Fort Belvoir's surface waters and waters downstream.

  Alternative 2 short-term project effects on water quality would not result in disproportionately high and adverse human health or environmental effects on minority or low-income populations, or pose disproportionate environmental health or safety risks to children.

The effects of implementing the short-term projects would ripple throughout the environmental justice and protection of children affected area, and would not be appreciably more sever or greater in magnitude in minority or low-income communities, or communities with high concentrations of children. Therefore, no disproportionately high and adverse human health or environmental effects on minority populations and low-income populations would occur. Implementation of short-term projects would not pose disproportionate environmental health or safety risks to children. The Alternative 2 short-term projects would have no impacts on minority and low-income populations, or on children.

Long-Term Projects

The following conclusions are presented in regard to human health and environmental effects to minority populations, low-income communities, and concentrations of children associated with the Alternative 2 long-term projects:

- Transportation and Traffic – The long-term projects would have significant adverse effects on some roadway segments on and near Fort Belvoir by 2030, degrading levels of service from D to E and F. Fort Belvoir would improve the affected Fort Belvoir roadways and intersections and would coordinate with VDOT and FCDOT to monitor long-term effects on public roads. Notably, Fort Belvoir is committed to grade-separating the Fairfax County Parkway and John J. Kingman Road intersection and the NMUSA entrance road. Implementing Fort Belvoir's Transportation Management Plan (TMP), part of the RPMP, would lead to increases in transit, ridesharing, bicycle, and pedestrian use, and decreases in single-occupant vehicle use (SOV), which would improve traffic conditions on and near Fort Belvoir in the long term.

  Because Fort Belvoir would mitigate Alternative 2's negative impacts on traffic on the installation, coordinate with FCDOT and VDOT to monitor public roads, work with them on solutions, and strive to increase the use of non-automobile commuting modes, long-term increases in traffic levels and congestion would not result in disproportionately high and adverse human health or environmental effects on minority or low-income populations, or pose disproportionate environmental health or safety risks to children.

- Air Quality – The long-term projects would have less than significant adverse effects similar to the effects of short-term projects. The long-term transportation projects would have less than significant adverse effects and increases in emissions would be relatively small. There would be no permanent sources of air emissions associated with the long-term transportation projects, which would be specifically designed to relieve congestion and reduce the number of VMT on the roadways near Fort Belvoir. Small changes in traffic patterns on and off post would have beneficial effects to air quality both regionally and locally.

  Alternative 2 long-term project air emissions would not result in disproportionately high and adverse human health or environmental effects on minority or low-income populations, or pose disproportionate environmental health or safety risks to children.

- Noise – The long-term projects would result in less than significant adverse effects during construction from the use of heavy equipment at the construction and demolition sites, and less than significant adverse effects after construction from the addition of stationary sources of noise. There would be minute, unnoticeable changes in background noise due to the consolidation of industrial areas on post, and changes in traffic patterns on and near the installation.

  Alternative 2 long-term project noise would not result in disproportionately high and adverse human health or environmental effects on minority or low-income populations, or pose disproportionate environmental health or safety risks to children.

- Water Quality – Implementation of the long-term projects would cause less than significant adverse effects on the water quality of Fort Belvoir's surface waters and waters downstream.

Alternative 2 long-term project effects on water quality would not result in disproportionately high and adverse human health or environmental effects on minority or low-income populations, or pose disproportionate environmental health or safety risks to children.

The effects of implementing the long-term projects would ripple throughout the affected area, and would not be appreciably more sever or greater in magnitude in minority or low-income communities, or communities with high concentrations of children. Therefore, no disproportionately high and adverse human health or environmental effects on minority populations and low-income populations would occur. Implementation of short-term projects would not pose disproportionate environmental health or safety risks to children. The Alternative 2 long-term projects would have no impacts on minority and low-income populations, or on children.

3.2.6 Environmental Consequences of Alternative 3 – Modified Short-Term

3.2.6.1 Alternative 3 Impacts on Economic Activity

Short-Term Projects

Alternative 3 Short-Term Project Impacts on Employment and Income

The Alternative 3 short-term projects and short-term transportation projects would construct approximately 1.1 million square feet of additional new building space between 2012 and 2017, as well as transportation and other facility improvements. The construction expenditures would result in one-time increases in ROI economic output, employment, and earnings. The ongoing operations of the newly-constructed projects would create ongoing annual impacts.

The Alternative 3 short-term projects would cost an estimated $665 million to complete. This amount is divided into hard costs (70 percent) and soft costs (30 percent). Construction would have a total economic impact of $1.1 billion in the ROI, supporting a total of 6,431 jobs and earnings of $291 million (Table 3.2-26).

Table 3.2-26
Economic Impacts of Alternative 3 Short-Term Projects

	Output	Earnings	Jobs
	Million $	Million $	Number
Construction Period Impacts			
2012-2017	1,089	291	6,431
Total One-Time Impacts	1,089	291	6,431
Ongoing Impacts			
Museum Operations	23	4	165
Museum Visitor Spending	103	22	962
Total Annual Impacts	126	26	1,127
Note: Total annual impacts reflect a typical estimated NMUSA operating year once the museum is open.			

As under Alternatives 1 and 2, NMUSA operations would create an estimate 165 jobs with $4.4 million in earnings and $23.0 million in output. In addition, visitors to the NMUSA would support a total of $102.9

million in output, and 962 jobs and $22.0 million in earnings. These ongoing impacts would result in an estimated annual impact of $126 million in output, 1,127 jobs, and $26 million in earnings.

Both construction and operation effects from the short-term projects would be beneficial, providing regional economic benefits from construction spending and labor, as well as from long-term positive effects on employment and income in the region. Implementation of the Alternative 3 short-term projects would individually and cumulatively have beneficial impacts on employment and income.

Alternative 3 Short-Term Project Impacts on Population

Implementation of the Alternative 3 short-term projects would generate a net increase of an estimated 1,243 people in the workforce on Fort Belvoir. As the vast majority of these personnel would already reside in the National Capital Region, these jobs would be shifted from one location to another within the region and, therefore, would not result in a change in ROI employment.

Table 3.2-17 shows the population changes projected for the period between 2017 and 2030, based on MWCOG forecasts, and the projected maximum potential redistribution of National Capital Region employees on the basis of the distribution of the current Fort Belvoir employees. The MWCOG population forecasts account for full implementation of all Fort Belvoir RPMP short-term and long-term projects, as would occur under Alternative 1 only. Therefore, for Alternative 3 the forecasts were adjusted for partial implementation of the short-term projects by subtracting from the forecasts the difference between the number of employees and family members that may relocate in response to full implementation under Alternative 1 and those that may relocate in response to partial implementation under Alternative 3. The MWCOG forecasts also account for indirect and induced employment generated by full implementation of the short-term and long-term projects. However, the forecasts were not adjusted to dissociate regional population growth due to indirect or induced employment generated by direct employment on Fort Belvoir from that generated by changes in employment throughout the region.

Implementation of the Alternative 3 short-term projects could result in the redistribution of a maximum of approximately 1,660 persons, comprising new Fort Belvoir employees and their families. Fairfax County may receive the largest share of the relocated population, potentially as many as about 570 persons (Table 3.2-17), corresponding to approximately 1.4 percent of the county's anticipated growth. The Cities of Fairfax, Falls Church, Manassas, Manassas Park, and Alexandria could host the largest influx of redistributed Fort Belvoir employees and their families measured as proportions of forecasted growth for each city. Among these cities, the largest influx may occur in the City of Fairfax, to which as many as about 80 people could relocate, equivalent to approximately 4.4 percent of the city's total population growth.

Implementation of the Alternative 3 short-term projects would individually and cumulatively have less than significant adverse impacts on population. The impact intensity potentially would be greatest for those communities, such as the Cities of Fairfax, Falls Church, Manassas, Manassas Park, and Alexandria, where the number of incoming Fort Belvoir families could equate to comparatively high proportions of future growth.

Long-Term Projects

Alternative 3 Long-Term Project Impacts on Employment and Income

The Alternative 3 long-term projects and long-term transportation projects would construct approximately 3.4 million square feet of additional new building space between 2018 and 2030, as well as transportation and other facility improvements. The long-term projects have an estimated construction cost of $1.3 billion. Spending on construction would have a one-time impact of $2.2 billion in output, supporting 12,698 jobs and $574 million in earnings (Table 3.2-27). On an ongoing, annual basis, the NMUSA would result in an estimated impact of $126 million in output, and 1,127 jobs and $26 million in earnings.

Both construction and operation effects from the long-term projects would be beneficial. Implementation of the Alternative 2 long-term projects would individually and cumulatively have beneficial impacts on employment and income

Table 3.2-27
Economic Impacts of Alternative 3 Long-Term Projects

	Output	Earnings	Jobs
	Million $	Million $	Number
Construction Period Impacts			
2018-2030	2,151	574	12,698
Total One-Time Impacts	2,151	574	12,698
Ongoing Impacts			
Museum Operations	23	4	165
Museum Visitor Spending	103	22	962
Total Annual Impacts	126	26	1,127
Note: Total annual impacts reflect a typical estimated NMUSA operating year once the museum is open.			

Alternative 3 Long-Term Project Impacts on Population

Implementation of the Alternative 3 long-term projects would generate a net increase of an estimated 14,176 people in the workforce on Fort Belvoir, in addition to those added by the short-term projects. As the vast majority of these personnel would already reside in the National Capital Region, these jobs would be shifted from one location to another within the region and, therefore, would not result in a change in ROI employment. Table 3.2-19 shows the population changes projected for the period between 2017 and 2030, based on MWCOG forecasts, and the projected redistribution of National Capital Region employees on the basis of the distribution of the current Fort Belvoir employees. As the MWCOG population forecasts account for full implementation of all Fort Belvoir RPMP short-term and long-term projects, for Alternative 3 the forecasts were adjusted by subtracting from the forecasts the difference between the number of employees and family members that may relocate under Alternative 1 and those that may relocate under Alternative 3.

Implementation of the Alternative 3 long-term projects could result in the redistribution of an estimated maximum of approximately 18,630 persons, comprising new Fort Belvoir employees and their families. Fairfax County could receive the largest share of the relocated population, possibly as many as about 6,360 persons (Table 3.2-19), which is equivalent to approximately 4.6 percent of the county's anticipated growth. As noted for the short-term projects, the Cities of Fairfax, Falls Church, Manassas, Manassas Park, and Alexandria may host the largest influx of redistributed Fort Belvoir employees and their families measured as proportions of forecasted growth for each city. Among these, the largest influx may occur in the City of Fairfax, to which as many as about 910 people may relocate, corresponding to approximately 43.8 percent of the city's forecasted population growth.

Implementation of the Alternative 3 long-term projects would individually and cumulatively have less than significant adverse impacts on population. The impact intensity potentially would be greatest for those communities where the number of incoming Fort Belvoir families could equate to comparatively high proportions of future growth.

3.2.6.2 Alternative 3 Sociological Environment

Short-Term Projects

Alternative 3 Short-Term Project Impacts on Housing

ST 42 would construct unaccompanied enlisted personnel barracks, ST 5 would construct a Fisher House for military families receiving care at the FBCH, and ST 2 would construct a privatized, 141-room Army lodging facility. (ST 30, which would construct a second Fisher House, would be deferred to the long term under Alternative 3.) These short-term projects would provide housing accommodations in close proximity to installation services, such as healthcare, shopping, and recreational facilities, and would have long-term, minor beneficial effects on housing on post.

Implementation of the Alternative 3 short-term projects would generate a net increase of an estimated 1,243 people in the workforce on Fort Belvoir from 2011 through 2017. Approximately 620 personnel may change their residence within the ROI because their job would be transferred to the post. Assuming each employee represents one household, about that number of households may relocate within the ROI. In 2010, there were approximately 48,550 vacant housing units available to rent and 23,350 units for sale in the ROI (Table 3.2-6). The households that would relocate within the ROI would need a supply of housing equivalent to approximately 0.9 percent of the housing units available for rent or for sale in 2010; however, the relocating households would vacate an equivalent number of housing units in the communities they leave.

Potentially, a maximum of about 210 households may relocate to Fairfax County and about 170 may relocate to Prince William County (Table 3.2-20), corresponding to about 1.4 percent of the anticipated household growth in Fairfax County and 0.8 percent of the growth in Prince William County. The Cities of Fairfax, Falls Church, Manassas, Manassas Park, and Alexandria potentially may receive the largest influx of redistributed Fort Belvoir households measured as proportions of forecasted growth for each city. The largest influx could occur in the City of Fairfax, to which a maximum of about 30 households may relocate, equivalent to an estimated 3.9 percent of the city's forecasted household growth.

Implementation of the Alternative 3 short-term projects would individually and cumulatively have beneficial impacts on housing on Fort Belvoir. The projects would individually and cumulatively have less than significant adverse impacts on housing in the region. The impact intensity potentially would be greatest for those communities, such as the Cities of Fairfax, Falls Church, Manassas, Manassas Park, and Alexandria, where the number of incoming Fort Belvoir households could equate to comparatively high proportions of future growth.

Alternative 3 Short-Term Project Impacts on Law Enforcement, Fire Protection, and Medical Services

Under implementation of Alternative 3, no new short-term projects directly related to law enforcement, fire protection, and medical services would be constructed. The increase in the workforce would also be small relative to the other two alternatives – approximately 1,200. Increased demand for fire protection services would be offset by fewer incidents as new buildings replace old buildings, requiring fewer fire calls. Overall, while the existing services would need to meet some increase in demand, there is likely to be no effect on Fort Belvoir's emergency services and less than significant effects on regional services.

As shown in Table 3.2-20 and discussed above, implementation of Alternative 3 short-term projects may result in a maximum potential increase of about 210 households in Fairfax County, corresponding to approximately 1.4 percent of the county's anticipated household growth. This anticipated increase in households would be spread throughout the county and the impact on any one particular emergency response service would be negligible. Increase in the number of households in Fairfax County would be addressed by the standards set out in Fairfax County's 2013 Comprehensive Plan for Public Facilities

(Fairfax County, 2013b). The five cities in Virginia – Fairfax, Falls Church, Manassas, Manassas Park, and Alexandria – may host the largest influx of redistributed households measured as proportions of forecasted growth for each city. Among these cities, the largest influx may occur in the City of Fairfax, to which as many as about 30 households may relocate, equivalent to an estimated 3.9 percent of the city's forecasted household growth.

Implementation of the Alternative 3 short-term projects would have no effect on law enforcement, fire protection, and emergency services on Fort Belvoir and less than significant effects on regional services. The impact intensity potentially would be greatest for those communities, such as the Cities of Fairfax, Falls Church, Manassas, Manassas Park, and Alexandria, where the number of incoming Fort Belvoir households could equate to comparatively high proportions of future growth, putting a higher degree of stress on existing emergency response services.

Alternative 3 Short-Term Project Impacts on Schools

The impacts of implementing short-term projects on schools under Alternative 3 would be similar to the impacts of Alternatives 1 and 2 but would result in far fewer personnel and far fewer school-aged children. A new elementary school would be built on Fort Belvoir, relieving crowding in the Fairfax County schools a majority of the 409 Fort Belvoir children now attend.

Implementation of Alternative 3 short-term projects could result in an increase of a maximum of approximately 80 school-aged children in public schools in Fairfax County and 80 school-aged children in Prince William County; with overall forecasted increases in school-aged children in public schools in those counties between 2011 and 2017 of about 6,150 children and 10,160 children, respectively (Table 3.2-21). The potential increase attributable to implementation of Alternative 3 short-term projects would equate to only a small proportion of the overall projected increase over this time period; at most approximately 1.4 percent of that increase in Fairfax County and 0.8 percent of that increase in Prince William County. The Cities of Fairfax, Falls Church, Manassas, Manassas Park, and Alexandria potentially may receive the largest influx of redistributed Fort Belvoir school-aged children measured as proportions of forecasted increase for each city. The largest influx may occur in the City of Fairfax, to which as many as about 10 school-aged children may relocate, equivalent to approximately 4.4 percent of the overall increase in school-aged children in public schools. Most of the school-aged children may relocate from Loudoun County in Virginia, and from the five ROI counties in Maryland. The largest loss, measured as a proportion of the forecasted increase in school-aged children in public schools, could occur in Prince George's County, Maryland, from which about 60 school-aged children may depart, comparable to approximately 1.3 percent of the county's forecasted increase.

Implementation of the Alternative 3 short-term projects would individually and cumulatively have beneficial impacts on schools on and near Fort Belvoir. The projects would individually and cumulatively have less than significant adverse impacts on schools in the region. The maximum projected influx of school-aged children in the counties and cities of the ROI would be within normal fluctuations and are not expected to exceed the ability of the respective school districts to accommodate the growth.

Alternative 3 Short-Term Project Impacts on Family Support and Social Services

Implementation of two short-term projects proposed under Alternative 3 would address current and future projected specialized needs related to supporting military families and providing social services by implementing ST 5, Fisher House 1 and ST 6, the USO Family Center. These positive impacts are described for Alternatives 1 and 2. However, unlike under Alternatives 1 and 2, the three child development centers that offer child care would not be built until the long term. Any impacts on day care and other service providers off-post would be muted because the number of new personnel would be only an estimate 1,243, compared to an estimated 4,755 for Alternative 1 and 3,755 for Alternative 2.

Implementation of the Alternative 3 short-term projects would individually and cumulatively have beneficial impacts on family support and social services on Fort Belvoir and less than significant adverse effects on family support and social services in the ROI.

Alternative 3 Short-Term Impacts on Shops, Services, and Recreation

As compared with Alternatives 1 and 2, under Alternative 3, far fewer new personnel would come to Fort Belvoir, and only 4 of the 14 short-term shops, services, and recreation projects would be built in the short-term. The remainder would be built in the long term. The four projects that would be built include ST 1, the PX; ST 2, PAL; ST 28, the Commissary; and ST 47, the Religious Education Center. None the less, these new facilities would provide convenience and additional options for existing and potential future personnel on Fort Belvoir. By being able to readily access these services, personnel would be able to drive less and spend less time securing services, which would be beneficial for energy use, air quality, traffic congestion, and personal/family time.

As discussed under Alternative 1, these new facilities, particularly the PX, Commissary, and PAL, may draw business from similar businesses in the ROI, potentially having adverse impacts on those businesses. Implementation of the Alternative 3 short-term projects would individually and cumulatively have beneficial impacts on shops, services, and recreation on Fort Belvoir. The projects would individually and cumulatively have less than significant adverse impacts on shops, services, and recreation in the region.

Long-Term Projects

Alternative 3 Long-Term Impacts on Housing

Implementation of the long-term projects may result in as many as 7,090 households' relocating within the ROI from 2017 through 2030. A maximum of approximately 2,420 households potentially may relocate to Fairfax County and about 1,900 may relocate to Prince William County (Table 3.2-22), equivalent to about 4.1 percent of the anticipated household growth in Fairfax County and 5.3 percent of the growth in Prince William County. Measured as proportions of forecasted growth for the city, the largest influx could occur in the City of Fairfax, to which about 350 households may relocate, equating to an estimated 46.2 percent of the city's forecasted household growth.

Implementation of the Alternative 3 long-term projects would individually and cumulatively have less than significant adverse impacts on housing in the region. The impact intensity potentially would be greatest for those communities where the number of incoming Fort Belvoir households could equate to comparatively high proportions of future growth.

Alternative 3 Long-Term Impacts on Law Enforcement, Fire Protection, and Medical Services

Implementation of the long-term projects under Alternative 3 would result in 15,742 additional personnel relocated to Fort Belvoir between 2018 and 2030. This increase in personnel and facilities, the most for the 2018-2030 period among the three build alternatives, would increase the demand for law enforcement, fire protection, and medical emergency services. The replacement of old buildings with new ones would offset the demand for fire protection services to some extent as fires occur less frequently in newer buildings. Increased personnel would result in increased requests for service and the potential for increased traffic volume could create delays in service response time. However, Fort Belvoir's law enforcement, fire protection, and emergency services would monitor their response times, and adjust their services and identify new facilities as needed.

As shown in Table 3.2-22 and discussed above, implementation of Alternative 3 long-term projects may result in an increase of about 2,420 households in Fairfax County, corresponding to approximately 4.1 percent of the county's anticipated growth. This projected increase in households would be spread throughout the county, and the impact on any one particular emergency response service would be

negligible. Increase in the number of households in Fairfax County would be addressed by the standards set out in Fairfax County's 2013 Comprehensive Plan for Public Facilities (Fairfax County, 2013b). The five cities in Virginia – Fairfax, Falls Church, Manassas, Manassas Park, and Alexandria – could host the largest influx of redistributed households measured as proportions of forecasted growth for each city. Among these cities, the largest influx may occur in the City of Fairfax, to which about 350 households could relocate, equating to an estimated 46.2 percent of the city's total household growth.

With monitoring to ensure that response times remain the same as at present and the planning of new facilities as needed, implementation of the Alternative 3 long-term projects would individually and cumulatively have no effect on impacts on law enforcement, fire protection, and emergency services on Fort Belvoir. The projects would individually and cumulatively have less than significant adverse impacts on these services in the region. The impact intensity potentially would be minor for those communities, such as the Cities of Fairfax, Falls Church, Manassas, Manassas Park, and Alexandria, where the number of incoming Fort Belvoir households could equate to comparatively high proportions of future growth, putting a higher degree of stress on existing emergency response services.

Alternative 3 Long-Term Impacts on Schools

Implementation of Alternative 3 long-term projects could result in the relocation of school-aged children within the ROI between 2018 and 2030. A maximum of approximately 920 school-aged children in public schools in Fairfax County and 890 school-aged children in Prince William County may be redistributed due to this implementation; with total county anticipated increases in school-aged children in public schools within that same timeframe of about 19,440 children and 16,430 children, respectively (Table 3.2-22). The increase attributable to implementation of Alternative 3 long-term projects would correspond to only a small portion of the overall increase over this time period; approximately 4.6 percent of that increase in Fairfax County and 5.3 percent of that increase in Prince William County. The Cities of Fairfax, Falls Church, Manassas, Manassas Park, and Alexandria potentially could receive the largest influx of redistributed Fort Belvoir school-aged children measured as proportions of the forecasted increase for each city. The largest influx may occur in the City of Fairfax, to which as many as about 110 school-aged children may relocate, equivalent to approximately 43.8 percent of the overall increase in school-aged children in public schools.

Implementation of the Alternative 3 long-term projects would individually and cumulatively have less than significant adverse impacts on schools in the region. The impact intensity potentially would be greatest for those communities, such as the City of Fairfax, where the number of incoming Fort Belvoir households could equate to comparatively high proportions of future growth.

Alternative 3 Long-Term Impacts on Family Support and Social Services

Under Alternative 3, ST 30, Fisher House II, would be built in the long term. The project would construct a Fisher House for military families receiving care at the FBCH and would have long-term beneficial effects on military family support and social services on post.

Implementation of the long-term projects under Alternative 3 would result in 15,742 additional personnel at Fort Belvoir between 2018 and 2030, the most of any of the three alternatives for this period. This increase in personnel could result in increased demand for existing family support and social services on post. Overcrowded facilities and services could lead to a decreased ability of each applicable service to effectively and efficiently address all needs. Fort Belvoir would monitor the effect of the increased demand on services and plan for new facilities or provide new services as needed. Assuming that Fort Belvoir monitors the supply of and demand for family support and social services and acts to add facilities and services as needed, then there would be no effect on their services as the result of the proposed action.

Alternative 3 Long-Term Impacts on Shops, Services, and Recreation

Impacts on shops, services, and recreation facilities would result in impacts similar to those discussed under family support and social services. The increase in personnel proposed under Alternative 3 but with no new shops, services, and recreational facilities currently planned for 2018-2030 period, could result in overuse of existing shops, services, and recreational facilities on post. Overcrowded facilities and services could lead to a decreased ability of each applicable service to effectively and efficiently address all customers and patrons and less than significant adverse effects on the services. If the demands of the proposed new workforce exceeds the supply of shops services, and recreational facilities on post, then ROI shops, services, and recreational facilities would garner beneficial impacts from more business.

3.2.6.3 Alternative 3 Impacts on Environmental Justice and Protection of Children

Short-Term Projects

Based on the analyses presented in this EIS on traffic, air quality, noise, and water resources associated with the Alternative 3 short-term projects, including the short-term transportation projects, the following conclusions are presented in regard to human health and environmental effects to minority populations, low-income communities, and concentrations of children:

- Transportation and Traffic – New transportation facilities that are in design or under construction on and adjacent to Fort Belvoir (widening of US Route 1, Mulligan Road, Lieber Gate, I-95 HOV ramp to FBNA) would mitigate most traffic effects of the short-term projects. However, the short-term projects would significantly adversely increase delays, with a consequent decline in levels of service from D to E at two intersections – one public and one on Fort Belvoir. Fort Belvoir would mitigate the effects on the Fairfax County Parkway and John J. Kingman Road intersection on Fort Belvoir by adding turning lanes and improving the traffic signals. For the adversely affected Lorton Road at US Route 1 intersection, Fort Belvoir would coordinate with VDOT and FCDOT on solutions. Implementing Fort Belvoir's TMP, part of the RPMP, would lead to increases in transit, ridesharing, bicycle, and pedestrian use, and decreases in SOV use, which would improve traffic conditions on and near Fort Belvoir in the short term.

  Because Fort Belvoir would mitigate Alternative 3's negative impacts on traffic on the installation, coordinate with FCDOT and VDOT to monitor public roads, work with them on solutions, and strive to increase the use of non-automobile commuting modes, short-term increases in traffic levels and congestion would not result in disproportionately high and adverse human health or environmental effects on minority or low-income populations, or pose disproportionate environmental health or safety risks to children.

- Air Quality – The short-term projects would have less than significant adverse effects due to generating airborne dust and other pollutants during construction. During construction, less than significant adverse effects would result from commuting activities and introducing new stationary sources of pollutants. The short-term transportation projects would have less than significant adverse effects; increases in emissions would be minor. There would be no permanent sources of air emissions associated with the short-term transportation projects, which would be specifically designed to relieve congestion and reduce the number of VMT on the roadways near Fort Belvoir. Small changes in traffic patterns on and off post would have beneficial effects to air quality both regionally and locally, and traffic management approaches outlined in the RPMP TMP (US Army, 2014c) would reduce any mobile emissions associated with the proposed activities.

  Alternative 3 short-term project air emissions would not result in disproportionately high and adverse human health or environmental effects on minority or low-income populations, or pose disproportionate environmental health or safety risks to children.

- Noise – The short-term projects would result in less than significant adverse effects during construction from the use of heavy equipment at the construction and demolition sites, and less than significant adverse effects after construction from the addition of stationary sources of noise. There would be minute, unnoticeable changes in background noise due to the consolidation of industrial areas on post, and changes in traffic patterns on and near the installation.

  Alternative 3 short-term project noise would not result in disproportionately high and adverse human health or environmental effects on minority or low-income populations, or pose disproportionate environmental health or safety risks to children.

- Water Quality – Implementation of the short-term projects would cause short-term impacts, such as erosion and sedimentation downstream during construction while soils are exposed. Implementation would have less than significant adverse effects on the water quality of Fort Belvoir's surface waters and waters downstream.

  Alternative 3 short-term project effects on water quality would not result in disproportionately high and adverse human health or environmental effects on minority or low-income populations, or pose disproportionate environmental health or safety risks to children.

The effects of implementing the short-term projects would ripple throughout the environmental justice and protection of children affected area, and would not be appreciably more sever or greater in magnitude in minority or low-income communities, or communities with high concentrations of children. Therefore, no disproportionately high and adverse human health or environmental effects on minority populations and low-income populations would occur. Implementation of short-term projects would not pose disproportionate environmental health or safety risks to children. The Alternative 3 short-term projects would have no impacts on minority and low-income populations, or on children.

Long-Term Projects

The following conclusions are presented in regard to human health and environmental effects to minority populations, low-income communities, and concentrations of children associated with the Alternative 3 long-term projects:

- Transportation and Traffic – The long-term projects would have significant adverse effects on some roadway segments on and near Fort Belvoir by 2030, degrading levels of service from D to E and F. Fort Belvoir would improve the affected Fort Belvoir roadways and intersections and would coordinate with VDOT and FCDOT to monitor long-term effects on public roads. Notably, Fort Belvoir is committed to grade-separating the Fairfax County Parkway and John J. Kingman Road intersection and the NMUSA entrance road. Implementing Fort Belvoir's TMP, part of the RPMP, would lead to increases in transit, ridesharing, bicycle, and pedestrian use, and decreases in SOV use, which would improve traffic conditions on and near Fort Belvoir in the long term.

  Because Fort Belvoir would mitigate Alternative 3's negative impacts on traffic on the installation, coordinate with FCDOT and VDOT to monitor public roads, work with them on solutions, and strive to increase the use of non-automobile commuting modes, long-term increases in traffic levels and congestion would not result in disproportionately high and adverse human health or environmental effects on minority or low-income populations, or pose disproportionate environmental health or safety risks to children.

- Air Quality – The long-term projects would have less than significant adverse effects similar to the effects of short-term projects. The long-term transportation projects would have less than significant adverse effects and increases in emissions would be relatively small. There would be no permanent sources of air emissions associated with the long-term transportation projects, which would be specifically designed to relieve congestion and reduce the number of VMT on the roadways near

Fort Belvoir. Small changes in traffic patterns on and off post would have beneficial effects to air quality both regionally and locally.

Alternative 3 long-term project air emissions would not result in disproportionately high and adverse human health or environmental effects on minority or low-income populations, or pose disproportionate environmental health or safety risks to children.

- Noise – The long-term projects would result in less than significant adverse effects during construction from the use of heavy equipment at the construction and demolition sites, and less than significant adverse effects after construction from the addition of stationary sources of noise. There would be minute, unnoticeable changes in background noise due to the consolidation of industrial areas on post, and changes in traffic patterns on and near the installation.

  Alternative 3 long-term project noise would not result in disproportionately high and adverse human health or environmental effects on minority or low-income populations, or pose disproportionate environmental health or safety risks to children.

- Water Quality – Implementation of the long-term projects would cause less than significant adverse effects on the water quality of Fort Belvoir's surface waters and waters downstream.

  Alternative 3 long-term project effects on water quality would not result in disproportionately high and adverse human health or environmental effects on minority or low-income populations, or pose disproportionate environmental health or safety risks to children.

The effects of implementing the long-term projects would ripple throughout the affected area, and would not be appreciably more sever or greater in magnitude in minority or low-income communities, or communities with high concentrations of children. Therefore, no disproportionately high and adverse human health or environmental effects on minority populations and low-income populations would occur. Implementation of short-term projects would not pose disproportionate environmental health or safety risks to children. The Alternative 3 long-term projects would have no impacts on minority and low-income populations, or on children.

3.2.7 Proposed Mitigation Measures

Fort Belvoir would take the following actions to minimize impacts on community resources in the future:

- Fort Belvoir would monitor response times for law enforcement, fire protection, and medical services on the installation through 2030 to ensure that as new projects are completed and the workforce grows, response times do not decline. If they do start to decline actions may be taken to adjust services, add personnel, or expand or build facilities.
- Fort Belvoir would monitor family support and social services on the installation to make accommodations that may include expanding existing services or offering new ones.

3.2.8 Comparison of Alternatives

Table 3.2-28 summarizes the socioeconomic effects that potentially would result from the implementation of the No Action Alternative and the three action alternatives.

Table 3.2-28
Summary of Socioeconomic Impacts by Alternative

Environmental Consequence	No Action Alternative	Alternative 1 – Full Implementation – The Preferred Alternative	Alternative 2 – Modified Long-Term	Alternative 3 – Modified Short-Term
Short-Term Projects				
Short-term increased employment and income from construction spending and labor	No effect	Beneficial	Beneficial	Beneficial
Ongoing increased employment and income from NMUSA operations	No effect	Beneficial	Beneficial	Beneficial
Population relocation in the ROI	No effect	Less than significant adverse	Less than significant adverse	Less than significant adverse
Improved housing facilities on post	No effect	Beneficial	Beneficial	Beneficial
Increased housing demand off post	No effect	Less than significant adverse	Less than significant adverse	Less than significant adverse
Improved law enforcement, fire protection, and emergency services on post	No effect	Beneficial	Beneficial	No Effect
Increased demand for law enforcement, fire protection, and emergency services off post	No effect	Less than significant adverse	Less than significant adverse	Less than significant adverse
Increased school capacity on and near post	No effect	Beneficial	Beneficial	Beneficial
Relocation of school children in the ROI	No effect	Less than significant adverse	Less than significant adverse	Less than significant adverse
Improved family support and social services on post	No effect	Beneficial	Beneficial	Beneficial
Increased demand for family support and social services off post	No effect	Less than significant adverse / Beneficial	Less than significant adverse / Beneficial	Less than significant adverse / Beneficial
Improved provision of shops, services, and recreation on post	No effect	Beneficial	Beneficial	Beneficial
Reduced business for shops, services, and recreation off post	No effect	Less than significant adverse	Less than significant adverse	Less than significant adverse
Disproportionately high and adverse effects on minority or low-income populations	No effect	No effect	No effect	No effect
Disproportionate environmental health or safety risks to children	No effect	No effect	No effect	No effect

Environmental Consequence	No Action Alternative	Alternative 1 – Full Implementation – The Preferred Alternative	Alternative 2 – Modified Long-Term	Alternative 3 – Modified Short-Term
Long-Term Projects				
Short-term increased employment and income from construction spending and labor	No effect	Beneficial	Beneficial	Beneficial
Ongoing increased employment and income from NMUSA operations	No effect	Beneficial	Beneficial	Beneficial
Population relocation in the ROI	No effect	Less than significant adverse	Less than significant adverse	Less than significant adverse
Improved housing facilities on post	No effect	No effect	No effect	No effect
Increased housing demand off post	No effect	Less than significant adverse	Less than significant adverse	Less than significant adverse
Improved law enforcement, fire protection, and emergency services on post	No effect	No effect	No effect	No effect
Increased demand for law enforcement, fire protection, and emergency services off post	No effect	Less than significant adverse	Less than significant adverse	Less than significant adverse
Increased school capacity on and near post	No effect	No effect	No effect	No effect
Relocation of school children in the ROI	No effect	Less than significant adverse	Less than significant adverse	Less than significant adverse
Improved family support and social services on post	No effect	No effect	No effect	No effect
Increased demand for family support and social services off post	No effect	No effect	No effect	No effect
Improved provision of shops, services, and recreation on post	No effect	No effect	No effect	No effect
Reduced business for shops, services, and recreation off post	No Effect	No Effect	No Effect	No Effect
Disproportionately high and adverse effects on minority or low-income populations	No Effect	No Effect	No Effect	No Effect
Disproportionate environmental health or safety risks to children	No Effect	No Effect	No Effect	No Effect

3.3 HISTORIC AND CULTURAL RESOURCES

This Section considers the potential for the proposed update of Fort Belvoir's RPMP to affect historic and cultural resources. Historic and cultural resources include both archaeological and historic architectural resources as defined in the National Historic Preservation Act (NHPA) of 1966, as amended, namely any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in the National Register of Historic Places (NRHP), including artifacts, records, and material remains related to such a property or resource. Such resources include those listed in the NRHP or Virginia Landmarks Register; resources determined eligible for listing in the NRHP or the Virginia Landmarks Register by the Virginia Department of Historic Resources (DHR), which serves as the Virginia State Historic Preservation Officer (SHPO); historic sites designated or under consideration for designation by the Fairfax County History Commission; National Historic Landmarks (NHL); and previously unidentified resources that meet or may meet NRHP eligibility requirements.

Thresholds of Significance

For the purposes of this EIS, an adverse effect under Section 106 amounts to an adverse impact under NEPA. Adverse effects that are minimized or mitigated under Section 106, e.g., through the execution of a Memorandum of Agreement (MOA) or Programmatic Agreement (PA), are generally considered to result in less than significant adverse impacts under NEPA except in cases where even with mitigation, the property loses its historic integrity. No adverse effect under Section 106 amounts to no impact under NEPA.

3.3.1 Affected Environment

3.3.1.1 Regulatory Framework

Numerous laws and regulations require federal agencies to consider the effects of a proposed project on historic resources. These laws and regulations stipulate a process for compliance, define the responsibilities of the federal agency proposing the action, and prescribe the relationships between involved agencies (i.e., SHPO and the Advisory Council on Historic Preservation). The primary law governing the treatment of historic architectural resources is the NHPA of 1966, as amended (16 USC 470), which addresses the protection of historic resources.

Under Section 106 of NHPA – codified as 36 CFR Part 800-Protection of Historic Properties – prior to the execution of an undertaking involving federal property and funding, the federal agency – in this case, the Department of the Army (US Army) – is required to consider the undertaking's impacts on any building, structure, site, object, or district within the Area of Potential Effect (APE) that is listed in or eligible for listing in the NRHP. These regulations provide specific criteria for identifying effects on historic properties. Effects on cultural resources listed in, or eligible for listing in, the NRHP are evaluated with regard to the Criteria of Adverse Effect set forth in 36 CFR 800.5(a)(1) (Table 3.3-1).

Regarding US Army regulations, Army Regulation 200-1, *Environmental Quality, Environmental Protection and Enhancement* delineates the US Army's policy for managing cultural resources to meet legal compliance requirements while supporting its military mission. Both federal and Army laws and regulations have been taken into consideration in the preparation of this report.

3.3.1.2 Background Information

Fort Belvoir has a robust cultural resources program. A summary of key items essential to evaluating the impact of the RPMP update and the short- and long-term projects is provided below.

Table 3-3.1
Section 106 of NHPA Criteria of Adverse Effects

Criteria of an Adverse Effect
"An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the NRHP in a manner that would diminish the integrity of the property's location, setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of an historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the NRHP. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative" (36 CFR 800.5[a][1]).
Examples of Adverse Effects
Adverse effects on historic properties include, but are not limited to: 1. Physical destruction of or damage to all or part of the property; 2. Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation, and provision of handicapped access, that is not consistent with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (36 CFR Part 68) and applicable guidelines; 3. Removal of the property from its historic location; 4. Change of the character of the property's use or physical features within the property's setting that contribute to its historic significance; 5. Introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features; 6. Neglect of a property which causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization; 7. Transfer, lease, or sale of property out of Federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance" (36 CFR 800.5[a][2]).

Integrated Cultural Resources Management Plan

Fort Belvoir's Integrated Cultural Resources Management Plan (ICRMP) was updated in early 2014 in compliance with DoD Instruction 4715.16 and Army Regulation 200-1. The regulation requires that installations prepare plans, to be updated every 5 years, to assist them in appropriately managing and maintaining archaeological and historic architectural resources (US Army, 2014e). The ICRMP establishes management strategies and standard operating procedures to assist Fort Belvoir in complying with federal laws and regulations concerning cultural resources management. The standards set forth procedures for dealing with archaeological and historic architectural resources largely based on Section 106 of the NHPA and other federal laws and regulations protecting cultural resources.

The goals of the ICRMP include the following:

- Continue to be a good steward of cultural resources at Fort Belvoir.
- Plan adequately for the identification and evaluation of cultural resources in compliance with federal legislation, AR 200-1, and Department of the Army Pamphlet 200-1. In particular, a high-priority goal (within one to three years) of the ICRMP is the evaluation of previously unevaluated buildings and other facilities as they reach the National Register 50-year threshold.
- Integrate provisions for cultural resources in planning documents undertaken or administered by other activities as they are revised.
- Ensure that cultural resources management activities take other environmental disciplines, such as natural resources management, into account.

- Preserve and maintain historic buildings and structures in accordance with the Secretary of the Interior's Standards for the Treatment of Historic Properties, the Design Guidelines for DoD Historic Buildings and Districts, and Department of the Army Pamphlet 200-1. Preservation and rehabilitation are the most appropriate treatment options for historic resources at Fort Belvoir.
- Increase awareness and understanding of the significance of cultural resources at Fort Belvoir.
- Ensure that the mitigation stipulations of existing and future memorandums of agreement and programmatic agreements are carried out in full within the timeframe established in the documents.

Section 106 Consultation for Implementation of Fort Belvoir Real Property Master Plan (2013)

Fort Belvoir initiated the consultation process in accordance with Section 106 of NHPA for the Fort Belvoir RPMP in 2008 by notifying DHR, and in 2010, by notifying several consulting parties.

In 2012, Fort Belvoir reinitiated the Section 106 consultation process, which had been dormant for two years. To date, the agencies, organizations, and individuals listed below have agreed to participate in the Section 106 consultation process for this project as consulting parties:

- Advisory Council on Historic Preservation
- Virginia State Historic Preservation Office
- Maryland State Historic Preservation Office
- Tribal Historic Preservation Office of the Catawba Indian Nation
- Fairfax County
- Alexandria Monthly Meeting of the Religious Society of Friends
- National Trust for Historic Preservation
- Woodlawn & Frank Lloyd Wright's Pope-Leighey House
- Ms. Martha Catlin, an interested party
- Mount Vernon Ladies Association
- Council of Virginia Archaeologists
- National Capital Planning Commission
- National Park Service, George Washington Memorial Parkway Headquarters
- Gunston Hall
- Gum Springs Historical Society

Six meetings were held with consulting parties in 2012 and 2013:

- March 26, 2012
- May 14, 2012
- June 20, 2012
- September 10, 2012
- October 19, 2012
- April 15, 2013

The purpose of the meetings has been to review cultural resources issues in relation to the Fort Belvoir RPMP update. This consultation effort has led to the development of a Maintenance, Operations and Development (MOD) PA, which establishes streamlined procedures for the management of historic properties on lands covered by the RPMP (Main Post and North Area), in accordance with 36 CFR 800.14(b)(3). The PA is currently under review by the consulting parties. It specifies measures for avoiding, minimizing, or mitigating possible adverse effects from projects proposed for implementation within the area covered by the RPMP, including, but not limited to, the projects listed in the RPMP. The PA incorporates the Historic Preservation Restrictions defined in the RPMP's IVDP component. A copy is included in Appendix C.

3.3.1.3 Prehistoric and Historic Context

The importance or significance of a historic property can be explained only when it is evaluated within its prehistoric or historic context. Contexts are those patterns or trends in history by which a specific resource is understood and its meaning (and ultimately its significance) within prehistory and history is made clear (National Park Service, 1997). The following section describes the major patterns of prehistory and history for Fort Belvoir and its vicinity.

Early History

The Fort Belvoir region was first settled about 11,500 years ago. At that time, the climate was significantly colder and the coast of North America lay nearly 160 miles further east than it is today. The Fort Belvoir peninsula was a high upland and the Potomac River a small stream. Many archeological sites have been identified at Fort Belvoir that provide insight into the prehistory of southeastern Fairfax County. Projectile points, ceramics and other artifacts found in Fairfax County represent over 8,000 years of human occupation in the region.

Seventeenth Century

After England's establishment of the Virginia colony, English settlers began arriving to claim large tracts of land for agrarian use. This period of history marked the beginning of large plantations. By 1690, all waterfront property that today is included within Fort Belvoir had been patented and subdivided.

Eighteenth Century

During the 1730s, Colonel William Fairfax purchased 2,200 acres of land, much of which is now within Fort Belvoir, and built the Belvoir plantation. The name Belvoir is derived from the French and means "beautiful to see." By 1750, navigable rivers like the Potomac were the main commercial arteries of the Virginia colony. At this time, four large homes were located in the area: George Mason's Gunston Hall, Colonel Dennis McCarty's Cedar Grove, William Fairfax's Belvoir, and Lawrence Washington's Mount Vernon. George William Fairfax, son of William Fairfax, left Belvoir for England in 1773 to reclaim ancestral lands. Without a household to maintain the plantation, it fell into gradual decline and was never re-occupied. The Belvoir mansion burned in 1783 and its ruins were further demolished by British cannon fire during the War of 1812's Battle of the White House.

Nineteenth Century

Construction of the Woodlawn Plantation began in 1800. The plantation house was built upon land given by George Washington to his step-granddaughter, Eleanor Custis, and his nephew Major Lawrence Lewis as a wedding present. The house was designed in the Georgian/Federal style by Dr. William Thornton, architect of the US Capitol, and was completed in 1805.

Soil exhaustion and inheritance eventually prompted the sale and sub-division of many of the large eighteenth- and early nineteenth-century plantations in the Fort Belvoir area. Former plantation land was

bought by many settlers from northern states and the ruins of Belvoir mansion became surrounded by land divided into small agricultural parcels.

Among the new arrivals to the area were members of the Society of Friends (Quakers) from New Jersey and Pennsylvania, who purchased the Woodlawn Mansion and surrounding lands. They divided and sold the land as small farms to other like-minded Quakers, Baptists and free blacks. By 1850 the Quakers and Baptists had created a thriving agricultural community at Woodlawn and a commercial center at Accotink.

In order to establish a system of agriculture that was not based on slave labor, the Quakers and Baptists engaged in timber harvesting and preparation of land for farms, gardens, and orchards. This progressive community helped foster land ownership among the growing population of free black residents whose families had resided in the surrounding area for many years before the arrival of the Quakers. The established African-American community remained in the Woodlawn neighborhood until the expansion of Fort Belvoir at the beginning of World Wars I and II.

Woodlawn residents, including many Quaker and African American families, were displaced when their properties were either purchased by the Army, or taken by eminent domain. Some of the Woodlawn neighborhood's African American families moved to Gum Springs, a historically black community just north of Mount Vernon. The Woodlawn Methodist Church was relocated to Gum Springs, along with most of its congregation. The church's burial ground remains, an inholding within Fort Belvoir, and continues as an active cemetery. The Woodlawn Quaker Meetinghouse and the Woodlawn Baptist Church are still active places of worship in the area today.

In addition to the Quakers, the Otterback family utilized the land for timber farming and established the White House fishery along the Potomac River. During the Civil War, the presence of both Union and Confederate forces in southeastern Fairfax, disrupted the lives of the area's residents and devastated much of the area's farm and timber land. Both Pohick Church and the Woodlawn Quaker Meetinghouse were occupied by soldiers during the conflict.

Despite the disruption, many of the families that had moved to the region before the war remained, and both the black and the white communities developed strong social and cultural institutions in the post-Civil War years.

1917-1918: Establishment of Camp A. A. Humphreys

In 1912, the Engineer School began conducting training exercises on government-owned parcels, located near and on Fort Belvoir. America's entry into World War I in April 1917 led to a wave of military construction. Construction of the temporary cantonment known as Camp A.A. Humphreys began in January 1918. Fourteen farms on the peninsula between Accotink and Pohick Creeks were transformed into target ranges; two large parcels along Dogue Creek were taken through government condemnation proceedings; and a 3,300-acre parcel that today comprises most of the North Post and DAAF was purchased by 1918.

Transportation systems and utilities were also improved. Previously, the most direct access to the Belvoir Peninsula had been by boat down the Potomac River from Washington, D.C. The unpaved Washington-Richmond Highway (US Route 1) was surfaced with concrete in 1918 and a plank road was constructed that linked the camp to the Washington-Richmond Highway. Standard gauge and narrow gauge railways followed.

To accommodate the 20,000 men anticipated at the camp, plans called for the construction of 790 temporary wood-frame buildings. Within only four months of the start of construction, Camp A.A. Humphreys was in full swing. Several schools operated here during World War I, including the Army Gas School and the School of Military Mining. At war's end in November 1918, the Camp became a demobilization center where troops were prepared for their return to civilian life.

Inter-War Period: 1919-1939

Camp A.A. Humphreys remained active after the war and continued to expand. By 1919, the camp had grown from its original 1,500 acres to approximately 6,000 acres, and the Engineer School was officially relocated here from the Washington Barracks. Camp A.A. Humphreys was designated a permanent post in 1922 and renamed Fort Humphreys. In 1926, the Army initiated an ambitious, nation-wide building program. Many of Fort Belvoir's most important buildings were constructed as a result of this program. These included officer and non-commissioned officer (NCO) housing, barracks, administrative buildings, and a hospital – all designed in a Colonial Revival style.

The elaborate new layout for Fort Humphreys called for separate functional areas united in a formal plan. Administrative and instructional buildings were arranged along one side of the parade ground, with the barracks, theater, gymnasium, PX, and post office in two squares on the opposite side of the parade ground. NCO housing was arranged in two blocks behind the barracks area, while the officers' housing was placed along a picturesque, curving road in a park-like setting. Warehouses and support buildings were located at the edge of the new Post in this plan. This plan still exists today.

In 1935, the name of the installation was changed from Fort Humphreys to Fort Belvoir. It is said that the name change occurred after President Franklin D. Roosevelt's visit to neighboring Gunston Hall. Louis Hertle, the owner of Gunston Hall, spoke of the vibrant history of the area, which inspired the President to initiate the new name of the Post in honor of the historic Fairfax estate.

World War II Period: 1940-1945

During World War II, Fort Belvoir expanded; an additional 3,000 acres north of US Route 1 were acquired to make room for the new Engineer Replacement Training Center (ERTC). At the height of World War II, the ERTC turned out 5,000 trained engineer soldiers per month. The massive influx of inductees at Fort Belvoir prompted another wave of temporary construction. Housing was constructed for approximately 24,000 enlisted men and officers. Like the temporary structures built during World War I, the World War II-era, wood-frame buildings were designed to be simple and inexpensive to construct.

The Engineer Board, responsible for the Corps' research and development activities, also grew during the war years. The Engineer Board conducted most of its testing and development at EPG, 807 acres acquired in 1940. The EPG is now known as the FBNA.

Post-World War II: 1946-1988

After World War II, training became less needed and Fort Belvoir's mission began to shift more toward research, development and testing. Perhaps no structure on the Post illustrates Fort Belvoir's research and development phase more than the SM-1 (Stationary, Medium Power, First Prototype) nuclear power plant. The SM-1 Plant, the first national nuclear training facility for military personnel, became operational in 1957 and remained in operation until its decommissioning in 1973.

The innovative initiatives pursued at Fort Belvoir during the post-war period were also illustrated in its residential architecture. In 1948, the well-known architectural firm of Albert Kahn & Associates designed and oversaw construction of the Thermo-Con House. This full-scale prototype exemplified a methodology for low-cost, mass-produced housing. Prospective Army residents, however, rejected the design concept, and no additional structures were built.

Fort Belvoir's mission began to expand in other directions between 1950 and 1980, when the post began playing host to a variety of organizations. These included the DeWitt Hospital, the Defense Systems Management College, and the Defense Mapping School. In 1988, due to a shortage of land for training at Fort Belvoir, the Engineer School relocated to Fort Leonard Wood, Missouri. Testing and training operations at the FBNA ended. Although Fort Belvoir's role as an engineer training center diminished, the

Post continued to fulfill an important and valuable role - providing essential administrative and basic operations support to its mission partner organizations.

BRAC: 1989-Present

Beginning in 1989, Fort Belvoir, like many other DoD installations, was subject to a series of the new Base Realignment and Closure (BRAC) legislations. There were four BRAC legislations from 1989-1995, resulting in a number of large agencies, such as DLA, relocating to new facilities on Fort Belvoir.

Following the terrorist attacks on 11 September 2001, Fort Belvoir initiated new security requirements for access onto the post. A number of agencies in locally leased facilities also began to move to Fort Belvoir for security purposes, among them the Defense Threat Reduction Agency and the Army Materiel Command.

In 2005, the fifth BRAC action and first since 1995, directed the largest BRAC net population gain of any DoD installation to Fort Belvoir. This action almost doubled the size of the garrison.

Implementation of BRAC 2005 on Fort Belvoir involved constructing more than $4 billion in projects. This is the largest BRAC military construction program in history. It included construction of FBCH and the MDA on Main Post; the NGA on FBNA; two large office buildings at the Mark Center in Alexandria for the Washington Headquarters Services; the Joint-Use Intelligence Analysis Facility at Rivanna Station in Charlottesville, Virginia; and a host of associated infrastructure improvements on- and off-post. These improvements included the construction of the final section of the Fairfax County Parkway along the southern border of FBNA. Renovations to existing buildings to accommodate approximately 3,000 incoming personnel working in leased office space in the National Capital Region were another major accomplishment of the BRAC program.

Today, Fort Belvoir continues its historic transformation, expanding its role as a strategic sustaining base for America’s armed forces worldwide. To carry out this mission effectively, Fort Belvoir has evolved from a traditional military post to a more broadly based community. In many ways it currently functions like a small city, with its own ordinances, land use plan, building codes, utilities, public parks, and academic institutions.

3.3.1.4 Areas of Potential Effect

Section 106 of the NHPA requires federal agencies to define and document an APE for the undertaking in consultation with the SHPO. According to 36 CFR 800.16(d), 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, if such exist. The APE is influenced by the scale and nature of the undertaking, and may be different for different kinds of effects caused by the undertaking.

In conjunction with the MOD PA, three APEs have been defined for projects to be implemented on the land covered by the RPMP (Main Post and FBNA). The three APEs include all areas where projects may directly or indirectly affect cultural resources and they account for the different ways resources could be affected: by ground disturbance (Land Disturbance APE); changes in the surrounding landscape or viewsheds (Visual APE); and noise (Auditory APE). Figure 3.3-1 illustrates the three APEs.

Land Disturbance APE

The Land Disturbance APE is defined as all lands covered by the Fort Belvoir RPMP, including Fort Belvoir Main Post (North Post, South Post, Southwest Area, and DAAF), and FBNA. Although portions of Fort Belvoir lands (shoreline and areas adjacent to the installation boundary) are unlikely to be developed, the range of activities undertaken by Fort Belvoir means that all of the lands managed by Fort Belvoir are subject to possible disturbance. Undertakings that may result in land disturbance that are not related to development include, but are not limited to, shoreline stabilization, former range testing activities, stream stabilization, installation of security fencing, etc.

Visual APE

The Visual APE is broadly defined as the distance from which an undertaking would be visible. A number of factors influence the Visual APE including the nature of the undertaking, terrain, vegetation and surrounding development. The Visual APE has been developed based on observations of existing structures and conditions at Fort Belvoir, review of the *Woodlawn Historic District Viewshed Study*, site visits, and analysis of street views in person and through Google Maps.

The visual APE is defined as an area extending one-half mile from the outer edge of the Developable Areas of Fort Belvoir, as defined and illustrated in Figure 4.8 – Framework Plan in the RPMP IVDP (US Army, 2014a). These developable parcels consist of both currently undeveloped land and land that is already developed. In instances where the edge of the developable area is within one half mile of major body of water (e.g., Gunston Cove, Potomac River), the width of the water body is excluded from the measurement calculation used to define the APE. Where the Visual APE continues over water for more than a mile and strikes landfall in a densely vegetated area, the limit of the APE will be met at the shoreline.

This APE is also based on the assumption that future development on Fort Belvoir will consist of structures that do not exceed ninety feet in height (roughly the equivalent of a six-story building with fifteen-foot floor to ceiling heights).

Auditory APE

The auditory APE is defined as one-half mile from the outer edge of all property covered by the Fort Belvoir RPMP, including Fort Belvoir Main Post (North Post, South Post, Southwest Area and DAAF), and FBNA. This definition is based on the assumption that the loudest common noise generated on lands managed by Fort Belvoir is noise related to construction. Noise monitoring that occurred during the construction of the FBCH indicated that construction noise was not generally audible beyond one-half mile from the source of the noise.

Area of Potential Effect Justification

The APE is based on the following assumptions:

1. Fort Belvoir will continue its current mission to provide a secure, safe operating environment for numerous missions and function, including providing:
    - Administrative, logistics and operations support for regional and worldwide military missions
    - A creative learning environment for students of US Army and DoD schools
    - Military support for a variety of National Capital Region contingency missions
    - Regional housing for active duty military families
    - Quality of life support for the military community that includes health and recreation
    - Environmental and cultural resources stewardship in concert with mission support
    - This mission is fulfilled primarily through the provision of administrative space as well as medical, recreational and housing facilities

Area of Potential Effect



Legend

- Land Disturbance Area of Potential Effect
- Visual Area of Potential Effect
- Auditory Area of Potential Effect

Fort Belvoir RPMP EIS

Figure 3.3-1

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2. Training activities at Fort Belvoir lands are limited to activities that generate low noise levels, including:
    - Mapping
    - Wayfinding – orienteering
    - Classroom training
    - Horse riding and animal handling training
    - Emergency rescue operation training
3. Training activities in the Southwest Area may also include the following activities and will follow the restrictions identified in Table 2.1 in the RPMP IVDP:
    - Vehicle movement training
    - Blank fire training from 5.56 mm to75 mm
4. Improvised explosive device simulator training
5. New training activities in the Southwest Area that deviate from those defined above or will occur in areas inconsistent with their designated land use shall require additional consultation through the agreement document.
6. Future development of Fort Belvoir Main Post will consist primarily of high density low-rise development (1 to 6 stories).
7. Areas on Fort Belvoir Main Post adjacent to the shoreline have been categorized as areas of "limited development" due to environmental constraints; as such these areas are unlikely to be developed. Undertakings occurring within these areas will be limited to maintenance and repair activities and upgrades to existing facilities.
8. Development within 148 feet of the installation boundary will be limited to roads and infrastructure because of antiterrorism and force protection standards.

3.3.1.5 Archaeological Resources

For the purposes of this section, archaeological resources consist of the buried remnants of past human activities, both prehistoric and historic, that can yield information on patterns of economic, social, and cultural development at the local, regional, or national level. The visual or auditory impacts of projects at Fort Belvoir have no or minimal potential to affect buried archaeological resources. On the other hand, ground-disturbing activities associated with the construction, demolition, or renovation of buildings and facilities may result in the disturbance or destruction of archaeological resources if no measures are taken to identify and protect such resources. Therefore, the archaeological APE is the same as the Land Disturbance APE defined above.

Fort Belvoir's archaeological resources have been investigated since the 1920s. The main steps in developing the current knowledge and understanding of Fort Belvoir's archaeological resources have included:

- **Belvoir Manor Ruins and Fairfax Gravesite Investigations**. Investigation of William Fairfax's 18th-century plantation, Belvoir Manor, began in the 1930s, although early work was often conducted with little or no scientific control. The site was recorded with the state as Site 44FX0004 (Belvoir Manor Ruins and Fairfax Gravesite) in 1963 and was listed in the NRHP in 1973. Further surveys were completed in 1976, 1990, 1993, and 1994.
- **Early Project-related Reconnaissance Surveys**. Until the first systematic installation-wide survey in 1984 (see below), archaeological investigations at Fort Belvoir proceeded mostly on a case-by-

case basis in support of projects by the US Army, VDOT, or county agencies. Examples include the investigations associated with a family housing project (1977), railroad spur construction (1977), and the Springfield bypass project (1982-83).

- **Systematic Investigations.** Systematic investigations began in earnest with the completion in 1984 of a survey of 1,400 acres that identified 34 sites and 18 isolated artifacts. Subsequent large-scale systematic studies included:
  - Development of a disturbance map (1988) identifying the portions of the installation previously disturbed and with low potential to contain archaeological resources.
  - Reconnaissance of the Fort Belvoir shoreline (1988), which identified 45 new sites and reassessed 12.
  - Phase I survey of 262 acres (Aerospace Data Facility – East, formerly known as Defense Communications Electronics Evaluation and Test Agency [DCEETA] site), which identified 14 new sites and reassessed 3 (1988).
  - Phase I survey of 120 acres at HEC (1989).
  - Phase I survey of the entire installation (1994), which added 166 sites to the Fort Belvoir inventory of archaeological sites. DHR concurred that after this survey, Phase I archaeological investigations at Fort Belvoir were complete (DHR File 92-2348-F).
- **Phase II Investigations and Reassessments**. Since the 1990s, archaeological investigations at Fort Belvoir have consisted predominantly of project-related Phase II surveys to assess the NRHP eligibility of known sites within the projects' areas of potential effects, along with some Phase I reassessments of previously identified sites or surveyed areas, generally undertaken in compliance with Section 106.
- **Creation and maintenance of a GIS planning layer.** Currently, the GIS archaeology layer (being updated) maps 303 archaeological sites.

As a result of this extensive work, 303 archaeological sites have been identified at Fort Belvoir (all within the Main Post; no sites are present on FBNA), of which one (Belvoir Manor Ruins and Fairfax Gravesite, Site 44FX0004) is listed in the NRHP; 12 have been determined eligible for listing; 140 have been determined ineligible; and 150 require further study with regard to their eligibility.

Fort Belvoir's 303 known archaeological sites are all located within the land-disturbance APE, which includes the entirety of the Main Post as well as FBNA. A review of the GIS archaeology layer shows that only a small number of sites are within or close to the disturbance areas associated with the projects comprising the proposed action (because of the sensitive nature of this information, this EIS does not include a map showing the location of the archaeological sites).

Table 3.3-2 lists the known archaeological sites located within or near the short-term and long-term projects. One eligible site and seven sites requiring further study are included (highlighted). A brief description of these eight sites is provided below. The rest have been determined non-eligible.

Table 3.3-2
Archaeological Sites near Short-Term and Long-Term Projects

Site	Project	NRHP Status of Site[1]
44FX0035	ST 18 (NMUSA Road and Infrastructure); LTT 2	Further Study Needed
44FX0458	ST 49	Not eligible (DHR, 7/2/93)
44FX0459	STT 2	Not eligible (DHR, 3/10/06)
44FX0461	ST 4 (Mulligan Road Phase II); STT 1	Further Study Needed
44FX620	ST 17 (36-Hole Golf Course Reconfiguration)	Not eligible (DHR, 1/28/93)
44FX0624	LT 6	Not eligible (DHR, 7/26/93)
44FX0663	ST 18 (NMUSA Road and Infrastructure)	Not eligible (DHR, 3/10/10)
44FX0672	ST 41 (NMUSA Phase 4)	Not eligible (DHR, 6/27/07)
44FX0668	ST 17 (36-Hole Golf Course Reconfiguration)	Not eligible
44FX0673	ST 38 (NMUSA Phase 3); LTT 2	Not eligible (DHR, 6/27/07)
44FX0674	ST 27 (NMUSA Phase 1); LTT 2	Not eligible (DHR, 7/26/93)
44FX0675	ST 41 (NMUSA Phase 4)	Not eligible (DHR, 6/27/07)
44FX0676	ST 41 (NMUSA Phase 4)	Not eligible (DHR, 6/27/07)
44FX0683	ST 41 (NMUSA Phase 4)	Not eligible (DHR, 6/27/07)
44FX1095	ST 19, 26, 33, & 46 (INSCOM HQ Expansion); LT10	Not eligible (DHR, 5/30/06)
44FX1208	LT 7	Eligible (Concurrence from DHR pending)
44FX1210	ST 47 (Religious Education Center)	Further Study Needed
44FX1275	ST 19, 26, 33, & 46 (INSCOM HQ Expansion); LT 10	Not eligible (DHR, 7/20/05)
44FX1329	ST 9 (Family Travel Camp Phase 1)	Not eligible (DHR, 9/18/91)
44FX1495	ST 17 (36-Hole Golf Course Reconfiguration)	Not eligible (DHR, 4/22/93)
44FX1496	ST 17 (36-Hole Golf Course Reconfiguration)	Not eligible (DHR, 7/14/94)
44FX1501	ST 9 (Family Travel Camp Phase 1)	Not eligible
44FX1504	LT 6	Not eligible (DHR, 7/14/94)
44FX1587	ST 17 (36-Hole Golf Course Reconfiguration)	Not eligible
44FX1588	ST 17 (36-Hole Golf Course Reconfiguration)	Not eligible
44FX1589	ST 1 (Main PX)	Further Study Needed
44FX1678	ST 17 (36-Hole Golf Course Reconfiguration)	Not eligible
44FX1715	ST 9 (Family Travel Camp Phase 1)	Not eligible (DHR, 7/26/93)
44FX1784	ST 41 (NMUSA Phase 4)	Not eligible (DHR, 6/27/07)
44FX1810	ST 49 (911th Engineering Company Operations Complex)	Further Study Needed
44FX1811	LTT 3	Not eligible (DHR, 8/30/12)
44FX1813	ST 1 (Main PX)	Not eligible (DHR, 7/14.94)
44FX1814	ST 1 (Main PX)	Not eligible (DHR, 7/26/93)

Site	Project	NRHP Status of Site[1]
44FX1815	ST 1(Main PX)	Not eligible (DHR, 7/26/93)
44FX1816	ST 1 (Main PX); LT 7	Not eligible (DHR, 7/14/94)
44FX1896	LTT 5	Not eligible (DHR, 7/26/93)
44FX1897	LT 2; LTT 5	Not eligible (DHR, 7/26/93)
44FX1905	ST 13 (Access Road & Control Point – Lieber Gate); ST 36 (29th Infantry HQ); STT 3	Not eligible (DHR, 4/1/11)
44FX1918	LT3	Not eligible (DHR, 6/27/07)
44FX1936	LTT 3	Further Study Needed.
44FX1939	LTT 2	Not eligible (DHR, 7/14/94)
44FX1948	LT 4	Further Study Needed.
44FX1950	ST 4 (Mulligan Road Phase II); STT 1	Not eligible (DHR, 7/26/93)
1. Not eligible (DHR, xx/xx/xx) = Site determined not eligible for the NRHP; DHR concurred on xx/xx/xx		

- 44FX0035 – This prehistoric site, initially reported in 1976, yielded numerous projectile points. In 1982, the northern portion of the site was investigated in conjunction with the planning of the Fairfax County Parkway, yielding some scattered prehistoric artifacts, suggesting activities peripheral to the more sustained occupation of the central part of the site, to the south. That part was not surveyed, being outside the right-of-way of the planned facility and unaffected by it. Therefore, it remains a candidate for further study.
- 44FX0461 – This is a multiple component historic archaeological site consisting of a domestic agricultural occupation (farmstead) and military occupation (trenches representing rifle pits). This site was documented in the 1993 Phase I survey of the entire post. No further surveys appear to have been conducted since.
- 44FX1208 – This site consists of an abandoned 19th-century cemetery (Lacey's Hill Cemetery) with 22 unmarked graves still in place. The site also has a prehistoric component and earth feature in the unplowed portion of the cemetery. The site was last surveyed in 2002 and was recommended eligible then. However, to date, concurrence from DHR has not been obtained (Fort Belvoir, 2010a). Although it is within the boundary of Fort Belvoir, this site is not government property.
- 444FX1210 – This site consists of a late 19th- early 20th-century cemetery (Woodlawn United Methodist Cemetery) with approximately 150 marked and unmarked burials. Like 44FX1208, this site is within Fort Belvoir but is not owned by the federal government. This site was last investigated in 1997. The survey was insufficient to determine its eligibility.
- 44FX1589 – This is the site of a 19th-century domestic structure. It was documented in the 1993 Phase I survey of the entire post. No further surveys appear to have been conducted since.
- 44FX1810 - This is a prehistoric site first surveyed in 1810. The site is within the APE for the US Route 1 Improvement Project and an eligibility determination may be performed as part of the Section 106 compliance with that project.
- 44FX1936 – This site was first recorded in 1992 as a Native American camp site and 18th- to 19th-century domestic site. Reconsideration in 2002 found the site partially disturbed.
- 44FX1948 – This site was first recorded in 1992. It yielded some prehistoric flakes as well as brick remnants and a rifle pit possibly associated with the War of 1812 or the Civil War.

3.3.1.6 Historic Architectural Resources

Multiple historic architectural resources with federal, state, and local designations are known to be located within the three APEs. Table 3.3-3 lists these resources, which are described below. Figure 3.3-2 shows the location of each resource. Historic resources over fifty years old in the APE that are either designated as an NHL, listed in the NRHP, or determined eligible for listing in the NRHP by the Virginia SHPO (DHR) are protected under Section 106. State- and locally designated resources, such as those listed in the Virginia Landmarks Register and the Fairfax County Inventory of Historic Sites may potentially be determined eligible for listing in the NRHP by the Virginia SHPO. Therefore, they are also included in Table 3.3-3.

Table 3.3-3
Historic Architectural Resources within and near Fort Belvoir, Virginia

Resource Name	Location	Designation Status	DHR/Fairfax County Tax Parcel Number
Land Disturbance APE[1]			
Fort Belvoir Historic District (FBHD)	South Post	NRHP-Eligible District; Virginia Landmarks Register; Fairfax County Historic Site	DHR # 029-0209 Fairfax County Tax Parcel # 109-1,2,3,4
Amphitheater (Facility No. 2287)	North Post	NRHP-Eligible structure; contributes to NRHP-eligible FBMRR multiple property listing	DHR # 029-0386
Fort Belvoir Military Railroad (FBMRR)	North and South Posts	NRHP-Eligible multiple property listing	DHR # 029-5648, # 029-5424, # 029-5010, #029-5436, and # 029-5034
Camp A.A. Humphreys Pump Station and Filter Building	South Post	NRHP-Eligible; Virginia Landmarks Register; Fairfax County Historic Site	DHR # 029-0096
US Army Package Power Reactor Multiple Property	South Post	NRHP-Eligible; Virginia Landmarks Register; Fairfax County Historic Site	DHR # 029-0193
Thermo-Con House	South Post	NRHP-Eligible; Virginia Landmarks Register; Fairfax County Historic Site	DHR # 029-5001
Visual APE[1, 2]			
Virginia Properties			
Woodlawn Historic District: DHR # 029-5181			
Woodlawn	East of North Post, at junction of US Route 1 and VA 235, Alexandria, Fairfax County, VA	• NHL • NRHP-Listed • Contributes to Woodlawn Historic District • Virginia Landmarks Register • Individual Fairfax County Historic Site within Fairfax County Woodlawn Historic Overlay District	DHR # 029-0056 DHR # 029-5181 (Historic District) Fairfax County Tax Parcel # 109-2 ((1)) 4

Resource Name	Location	Designation Status	DHR/Fairfax County Tax Parcel Number
Pope-Leighey House	On grounds of Woodlawn (see above)	• NRHP-Listed • Virginia Landmarks Register • Contributes to NRHP-Eligible Woodlawn Historic District • Individual Fairfax County Historic Site within Fairfax County Woodlawn Historic Overlay District	DHR # 029-0058 DHR # 029-5181 (Historic District) Fairfax County Tax Parcel # 109-2 ((1)) 4
George Washington's Distillery and Grist Mill	East of South Post, on east side of VA 235 Alexandria, Fairfax County, VA	• NRHP-Listed • Virginia Landmarks Register • Contributes to NRHP-Eligible Woodlawn Historic District • Individual Fairfax County Historic Site within Fairfax County Woodlawn Historic Overlay District	DHR # 029-0330 DHR # 029-5181 (Historic District) Fairfax County Tax Parcel # 109-2 ((1)) 28
Woodlawn Quaker Meetinghouse	Surrounded by South Post, at southwestern corner of Woodlawn Road and Lambert Road, Fort Belvoir, Fairfax County, VA	• NRHP-Listed • Virginia Landmarks Register • Contributes to NRHP-Eligible Woodlawn Historic District • Individual Fairfax County Historic Site within Fairfax County Woodlawn Historic Overlay District	DHR # 029-0172 Site 44FX1211 (Burial Ground) DHR # 029-5181 (Historic District) Fairfax County Tax Parcel # 109-2 ((1)) 38
Woodlawn Baptist Church & Cemetery	East of South Post, on southeastern corner of Woodlawn Road and Richmond Highway, Alexandria, Fairfax County, VA	• Cemetery contributes to NRHP-Eligible Woodlawn Historic District • Demolished church was an individual Fairfax County Historic Site within Fairfax County Woodlawn Historic Overlay District	DHR # 029-0070 Site 44FX1212 (Cemetery) DHR # 029-5181 (Historic District) Fairfax County Tax Parcel # 109-2 ((1)) 1
Sharpe Stable Complex	East of South Post, on southern side of US Route 1, Alexandria, Fairfax County, VA	Contributes to NRHP-Eligible Woodlawn Historic District	DHR # 029-5181-0005 DHR # 029-5181 (Historic District)

Resource Name	Location	Designation Status	DHR/Fairfax County Tax Parcel Number
Grand View (Jacob Troth House)	On grounds of Woodlawn (see above)	• Contributes to NRHP-Eligible Woodlawn Historic District • Individual Fairfax County Historic Site within Fairfax County Woodlawn Historic Overlay District	DHR # 029-0062 DHR # 029-5181 (Historic District) Fairfax County Tax Parcel # 109-2 ((1)) 3, 4
Otis Tufton Mason House	8907 Richmond highway, on grounds of Woodlawn (see above)	• Contributes to NRHP-Eligible Woodlawn Historic District • Individual Fairfax County Historic Site within Fairfax County Woodlawn Historic Overlay District	DHR # 029-5181-0006 DHR # 020-5181 (Historic District) Fairfax County Tax Parcel # 100-1 ((1)) 25
Other Historic Properties			
Pohick Church & Cemetery	West of Fort Belvoir Southwest Area at junction of US Route 1 and Old Colchester Road, Lorton, Fairfax County, VA	• NRHP-Listed • Virginia Landmarks Register • Fairfax County Pohick Church Historic Overlay District	DHR # 029-0046 Fairfax County Tax Parcel # 108-1 ((1)) 27
Accotink United Methodist Church	9041 Backlick Road, Fort Belvoir, Fairfax County, VA	• Fairfax County Historic Site	Fairfax County Tax Parcel #109-1 ((1)) 25
Old Colchester Road	Fairfax County, VA	• NRHP-Eligible	DHR # 029-0953
Carlby	4509 Carlby Lane, Alexandria, Fairfax County, VA	• Fairfax County Historic Site	DHR # 029-0087 Fairfax County Tax Parcel # 110-3 ((1)) 10
LaGrange Site & Marders Family Cemetery	9501 Old Colchester Road, Fairfax County, VA	• Fairfax County Historic Site	DHR # 029-0121 Fairfax County Tax Parcel # 108-3 ((1)) 21
Overlook Farm	10711 Gunston Road, Fairfax County, VA	• Fairfax County Historic Site	DHR # 029-0161 Fairfax County Tax Parcel # 119-1 ((1)) 2
Mount Air House Site and Grounds	North of North Post, bound to the north by Telegraph Road, to the south by Military Road and Fort Belvoir, and to the east by Accotink Road, Fairfax County, VA	• Fairfax County Mount Air Historic District Overlay • National Register-eligible archaeological site	DHR # 029-0136 Site 44FX2277 Fairfax County Tax Parcel # 099-4 ((9)) A

Resource Name	Location	Designation Status	DHR/Fairfax County Tax Parcel Number
Gunston Hall	10709 Gunston Road Mason Neck, Fairfax County, VA	• NHL • NRHP-Listed • Virginia Landmarks Register • Fairfax County Historic Site	DHR # 029-0050 Fairfax County Tax Parcel #119-1 ((1)) 1
Maryland Properties			
Elsmere	Northwest side of River Road, southwest of junction of River Road and MD Route 227, Charles County	• Maryland Inventory of Historic Properties	CH-106
Greenweich Boundary Markers	Vicinity of Marshall Hall, Charles County, MD	• Maryland Inventory of Historic Properties	CH-165
Greenway	Southeast side of River Road, southwest of junction of River Road and MD Route 227, Charles County, MD	• Maryland Inventory of Historic Properties	CH-107
Marshall Hall	At terminus of MD Route 227, Charles County, MD	• NRHP-Listed • Maryland Inventory of Historic Properties	CH-54
Piscataway Park	Bryan Point Road, Accokeek, Charles and Prince Georges County, MD	• NRHP-Listed • Maryland Inventory of Historic Properties	PG: 83-12 CH-668
Fort Washington	13351 Fort Washington Road, Fort Washington, Prince Georges County, MD	• NRHP-Listed • Maryland Inventory of Historic Properties	PG: 80-16

[1]Historic properties located in the Land Disturbance and Visual APEs are also located in the Auditory APE.

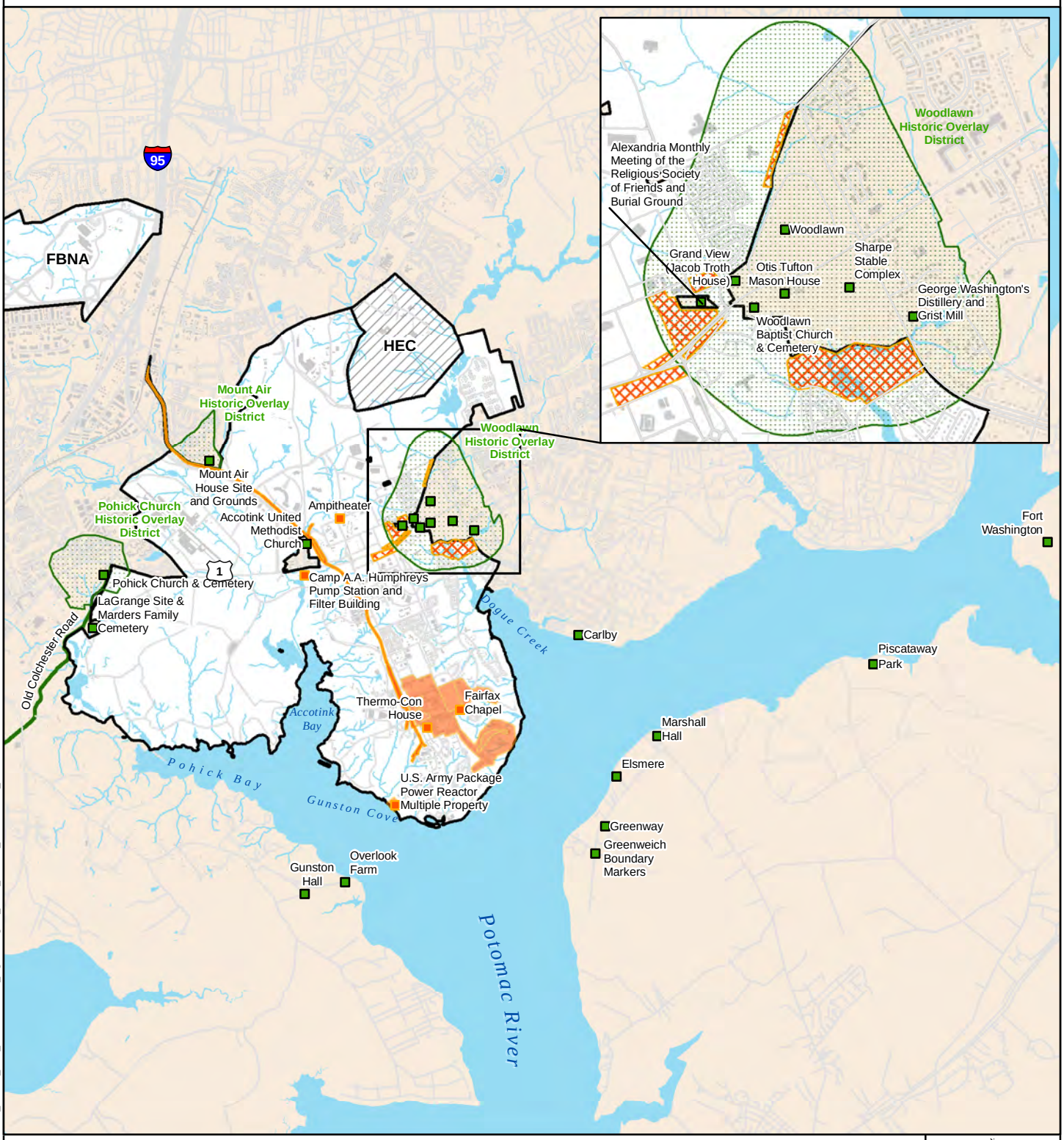
[2]Historic properties are only located within the Visual APE for Fort Belvoir Main Post. There are no historic properties associated with the Visual APE for FBNA.

Land Disturbance APE

Fort Belvoir Historic District

The NRHP-eligible Fort Belvoir Historic District (FBHD) is also listed in the Virginia Landmarks Register and considered a Fairfax County-designated historic resource. Following surveys in 1983 and in 1996, a NRHP nomination form was prepared describing the district as encompassing 196 contributing and 11 non-contributing buildings. The district also includes the Parade Ground and it forms the administrative and residential core of the South Post. Fort Belvoir conducted survey updates in 2000, 2002, and 2004, which resulted in the identification of 272 contributing and 13 non-contributing resources.

Fort Belvoir Historic Architectural Resources



Fort Belvoir Military Railroad

Fort Belvoir Historic District

Woodlawn Viewshed Protection Areas (BRAC PA)

On-Post Historic Architectural Resource

Off-Post Historic Architectural Resource

Fairfax County Historic Overlay District

Old Colchester Road

Fort Belvoir RPMP EIS

Figure 3.3-2

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In 2010, FBHD was entirely resurveyed and a revised NRHP Nomination form was prepared. As part of this effort, the district boundary was modified to include 213 contributing residential, administrative, educational, community support, and infrastructure buildings, structures, and sites. Fort Belvoir is considering formally listing the district, contingent upon approval from the US Army and approval of the nomination form by DHR. The FBHD encompasses approximately 269 acres that have been occupied by the US Army since 1915. It approximately extends from 16th Street to the north; Gaillard Road and Jadwin Loop to the east; 21st Street and Fairfax Drive to the south; and Middleton Road to the west. The period of significance is 1921 to 1953 and contributing resources reflect the three main periods of development: Camp Humphreys (1915 to 1922), Fort Humphreys (1922 to 1935), and Fort Belvoir (1935 to the present).

In general, the architectural character of the district is defined by the Colonial Revival style applied to standardized plans developed by the US Army's Quartermaster Corps. The plan of the overall district reflects elements of the Garden City and City Beautiful urban design movements that were popular during the late-19th and early-20th centuries. The historic district is arranged by administrative and residential function, and includes formal and symmetrical design in the administration, and troop, noncommissioned officer housing areas; and suburban, picturesque design in the senior officer family housing neighborhood. Hierarchy in rank and function is represented in the plan, scale, and mass of the buildings. Industrial and support functions generally are located on the periphery of the historic district. The monumental administrative buildings and barracks fronting the Parade Ground and the senior officer housing in Belvoir Village exhibit a greater degree of architectural elaboration than other buildings in the district. The historic district also includes rare examples of prefabricated housing constructed during the early 1920s. The overall plan includes several open spaces, including the Parade Ground and the parks in Belvoir Village, Jadwin Loop Village, and Gerber Village, which are significant landscape features of the historic district (Peeler & Crosby, 2010).

Amphitheater (Facility No. 2287)

In 2009, the Amphitheater (Facility No. 2287) was surveyed and recommended NRHP-eligible. It is a semicircular grass and concrete structure built into a gently sloping, grassy hillside located at the intersection of Abbot and Gunston roads on North Post. Construction began just two days after the attack on Pearl Harbor on December 7, 1941. It was built as an outdoor classroom for military training and education, as well as a site for military ceremonies and entertainment. It directly served Fort Belvoir's mission to educate and train US Army engineer troops during World War II, and continued to do so during the Cold War era. It has retained a moderate to high level of integrity of location, workmanship, design, materials, setting, association, and feeling (Louis Berger Group, Inc., April 2009).

Fort Belvoir Military Railroad

In 2006, elements of the Fort Belvoir Military Railroad (FBMRR) were surveyed and recommended NRHP-eligible as part of a multiple property listing (John Milner Associates, Inc, 2006). In 2011, a DHR Reconnaissance Level Survey Form was prepared to evaluate the FBMRR track bed, which was similarly recommended NRHP-eligible (Manning, 2011). The construction of the railroad began in 1918 as two separate spur tracks allowing the military base to connect to existing steam and electric rail lines and providing access to and from Washington, DC. During World War II, a major construction campaign took place at Fort Belvoir. The rail system was upgraded at that time using the latest technology in engineering. Eligible elements of the FBMRR include the track bed, three railroad bridges (Facility Nos. 1433, 2298, and 2486) and a railroad coal trestle (Facility No. 7332). The last train departed in September of 1993 (Daniel, pers. comm., March 6, 2014). The tracks were removed intermittently from 1993 to the early 2000s, with some sections of track abandoned in place (Daniel, pers. comm., March 6, 2014).

A draft NRHP nomination form has been prepared in accordance with the 2011 MOA drafted between Fort Belvoir and DHR to mitigate adverse effects from the construction of NMUSA (US Army, 2011d).

Camp A.A. Humphreys Pump Station and Filter Building

Camp A.A. Humphreys Pump Station and Filter Building was initially surveyed in 1983. It appears to have been determined NRHP-eligible following the survey. A NRHP nomination form was prepared in 1988, and revised in 1992 and 1996. It was listed in the Virginia Landmarks Register in 1996 and in the Fairfax County Inventory of Historic Sites in 2006.

Located on South Post west of Pohick Road, the Pump Station and Filter Building (Building 1400) was constructed in 1918. It is one of the few remaining vestiges of Camp A.A. Humphreys. The Colonial-Revival-style complex is significant under Criterion A for illustrating the development of support facilities during World War I and for technological advances in the purification of drinking water. The Pump Station (Building 1424) was added in 1936 (Engel et al., 1988, revised 1992). In 1970, the complex ceased operation and all large mechanical equipment was removed. In 1986, the building was renovated in accordance with the Secretary of Interior's Standards for Rehabilitation and in consultation with DHR and the Advisory Council for Historic Preservation for use as the Eleanor U. Kennedy Homeless Shelter (Gilmore, 1996).

US Army Package Power Reactor Multiple Property

The US Army Package Power Reactor, or SM-1, was initially surveyed in 1992. It was listed in the Virginia Landmarks Register and determined to be an exceptionally significant NRHP-eligible resource in 1996. It is also listed in the Fairfax County Inventory of Historic Sites. The SM-1 compound is located along Gunston Cove on South Post. It occupies a 30-acre fenced area. It consists of Building 372 (or Plant SM-1), the nuclear power generating station, and support structures, including a sewage pump station (Building 7350 [formerly Building 350]) and an emergency siren (Friedlander et al., 1992). (Other buildings once part of the property have been demolished). Subsequent surveys of the 300 Area identified two additional resources associated with SM-1: Buildings 371 and 380. Both are general educational/administration facilities (Blixt, pers. comm., January 22, 2008).

Built in 1957, Plant SM-1 was the US Army's first prototype nuclear power generating plant and represents an important step in the use of atomic power. It was the first water-pressurized reactor to be brought on-line in the US. Its location at Fort Belvoir is consistent with the installation's role as the Army's research and development center. Plant SM-1 was jointly developed by the Atomic Energy Commission and DoD as an air-transportable power plant for remote military bases. The plant served as a national nuclear training facility for military personnel (Friedlander et al., 1992).

Thermo-Con House

A NRHP nomination form was prepared for the Thermo-Con House (Building 172) in 1997. The property was listed in the Fairfax County Inventory of Historic Sites around the same time. The Thermo-Con House is distinguished from the surrounding residential development by its restrained International Style design. The two-story, flat-roofed concrete structure is located in a wooded section of the residential district on South Post, at the corner of 21st Street and Gunston Road. It was designed by the renowned Detroit architectural firm of Albert Kahn and Associates, Inc. The building was determined to possess exceptional significance under Criterion C for its unique method of construction. Made of chemically-treated concrete, it illustrates an innovative method of construction for low-cost, mass-produced housing, and is the only structure of its kind built by the Army Corps of Engineers (Harnsberger et al., 1997).

Visual APE

Virginia Properties

Woodlawn Historic District. The Woodlawn Historic District is comprised of multiple resources that have federal, state, and local designations. The NRHP-eligible district is described first, followed by the local historic district.

NRHP-Eligible Woodlawn Historic District. In 2001, the Virginia SHPO determined the Woodlawn Historic District NRHP-eligible. As part of this determination, Woodlawn, the Pope-Leighey House, George Washington Distillery and Grist Mill, Grand View (the caretaker's house at Woodlawn), the Woodlawn Quaker Meetinghouse, and Woodlawn Stables were identified as contributing resources to the district (Kilpatrick, pers. comm., December 20, 2001).

In 2012, the Federal Highway Administration (FHWA) recommended revisions to the Woodlawn Historic District as part of its Section 106 compliance obligations for the US Route 1 Improvement Project. As a result, the Virginia SHPO concurred that the Woodlawn Historic District is now comprised of the resources noted above, in addition to the Woodlawn Baptist Church & Cemetery and the Otis Tufton Mason House. Furthermore, George Washington's Grist Mill is now comprised of George Washington's Distillery and Grist Mill, and Woodlawn Stables are now known as the Sharpe Stable Complex. The boundary of the NRHP-eligible district was also expanded in 2012 to include the Woodlawn Baptist Church & Cemetery, and the National Trust for Historic Preservation's land that forms part of Woodlawn on both sides of US Route 1 (Holma, pers. comm., August 30, 2012).

Woodlawn was designed by Dr. William Thornton, the first Architect of the US Capitol. Constructed from 1800 to 1805, it was home to Major Lawrence Lewis and Eleanor (Nelly) Parke Custis, the nephew and foster granddaughter of George Washington, who gave the property to the couple as a wedding gift. The main plantation house is a grand brick building that integrates Federal and Georgian features in its design. Woodlawn holds multiple designations. In addition to being NRHP-listed, it is an NHL, it is is listed in the Virginia Landmarks Register, and it has been designated a Fairfax County Historic Site. The National Trust for Historic Preservation owns Woodlawn, and operates it as a house museum (US Army, 2005b).

The Pope-Leighey House was designed in 1942 by Frank Lloyd Wright and moved to the Woodlawn property in 1964. The Pope-Leighey House is good example of a Wright-designed Usonian house, is listed in the NRHP and Virginia Landmarks Register, and has been designated a Fairfax County Historic Site. Like Woodlawn, the Pope-Leighey House is owned by the National Trust for Historic Preservation and is open to the public for tours (US Army, 2005b).

The historic district also includes George Washington's Distillery and Grist Mill, an 18th-century mill reconstructed in 1932 that is open to the public as part of George Washington's Mount Vernon Estate and Gardens (US Army, 2005b). The mill is listed in the NRHP and the Virginia Landmarks Register, and has been designated a Fairfax County Historic Site.

Grand View, home of Jacob M. and Ann Walton Troth, was built in 1859, and aptly named for the beautiful view it commands of Woodlawn and the Potomac River. It is one of the oldest surviving Quaker Houses in the region. At the turn of the 20th century, Sally Troth Anthony operated a general merchandise store at Grand View. The house is a modest farm home, typical of the period and area, with brick foundations and weatherboard siding. It has a Greek Revival-style entrance and a simple bay window to the south. The chimney on the south wing is capped with a brick Gothic-style arch (Historic American Buildings Survey, 2013).

In addition, the district includes the Woodlawn Quaker Meetinghouse. It consists of a circa 1853 wood frame, clapboard meeting house with a mid-20th-century frame, clapboard addition; historic detached wood frame clapboard horse shed; and historic burial ground. The buildings sit on land that was historically part of Woodland Plantation. The Quakers purchased the property in 1846 and built the religious building prior to

the outbreak of the Civil War. Currently, the meeting house, horse shed and burial ground are surrounded by the Fort Belvoir installation. The Woodlawn Quaker Meetinghouse is also listed in the NRHP and the Virginia Landmarks Register and has been designated a Fairfax County Historic Site (US Army, 2005b).

The district also includes the Sharpe Stable Complex and the Woodlawn Baptist Church & Cemetery. The stable complex is comprised of the Dairy, Corncrib, Stable, and individually NRHP-eligible Bank Barn. The circa-1872 Woodlawn Baptist Church was a frame building, 29 feet by 44 feet, two bays wide, and three bays deep, sheathed in wood siding and stucco. In 1900 and 1940, additions were constructed. In 1969, a wing with a north-south axis was added to the church. The original church and 1940's education wing were demolished to build the new sanctuary. Ground was broken in April 1996 and by April 1997, the new sanctuary was finally completed. The Woodlawn Baptist Church (demolished church) & Cemetery is a designated a Fairfax County Historic Site (US Army, 2005b).

The Otis Tufton Mason House is also located in the district. It was constructed circa 1850 and was expanded in 1873. Owned by the National Trust for Historic Preservation, it is a two-story frame house that is three bays wide with an ell addition. A porch was also constructed in 1893. The house formed part of an active farmstead until farming ceased on the property in the 1920s. John Mason, Otis' father, purchased a portion of Woodlawn in 1850, and the property remained in the Mason family until 1902. Otis Tufton Mason, a renowned anthropologist, served as head of the Columbian College Preparatory School in Washington, DC and was the first curator of Ethnology at the Smithsonian Institute. The Otis Tufton Mason House is a designated Fairfax County Historic Site (US Army, 2005b).

Fairfax County Woodlawn Historic Overlay District. The Woodlawn Historic District is also protected by a local Fairfax County Historic Overlay District. The Fairfax County Woodlawn Historic Overlay District consists of five named historic properties and two named contributing properties. The historic properties include Woodlawn, the Pope-Leighey House, George Washington's Grist Mill, Woodlawn Quaker Meetinghouse, Woodlawn Baptist Church & Cemetery. The contributing properties include Grand View and the Otis Tufton Mason House. The overlay district boundary was established in 1971. Although the Sharpe Stable Complex is situated within the overlay district boundary, it is not a named or contributing property within the historic overlay district (Fairfax County Department of Planning and Zoning [DP&Z], 2009a).

The irregularly-shaped Fairfax County overlay district core boundary follows the contiguous parcel lines of the Woodlawn property, Woodlawn Quaker Meetinghouse, Woodlawn Baptist Church & Cemetery, and George Washington's Distillery and Grist Mill. It largely coincides with the NRHP-eligible Woodlawn Historic District. The district viewshed boundary extends approximately 6,800 feet north to south, and approximately 4,800 feet east to west from the Woodlawn property, and includes the Woodlawn Quaker Meetinghouse, Sharpe Stable Complex, and the George Washington's Distillery and Grist Mill. The viewshed boundary is overlaid atop a portion of Fort Belvoir's North and South Posts (Fairfax County DP&Z, 2004).

Woodlawn Historic District Viewshed. In 2009, the Woodlawn Historic District Viewshed Study was prepared in accordance with the BRAC 2005 PA (John Milner Associates, Inc., 2009b). The study noted that it was not intended to provide a definitive NRHP eligibility and significance statement of the Woodlawn Historic District because more research and analysis were needed to fully define the resource. The purpose of the study was to examine the scope of the viewshed from the district, and determine the extent to which construction at Fort Belvoir may impact the viewshed. There were three primary components:

- Identification of short- and long-range projects at Fort Belvoir within the Woodlawn Historic District Viewshed

- Identification and evaluation of Woodlawn Historic District Viewshed, and determination of which portions of the viewshed contribute to historic significance and integrity of both the district and the individually eligible properties within it
- Development of recommendations to avoid adverse visual effects to the Woodlawn Historic District Viewshed via a balloon test

The study identified the Woodlawn Historic District cultural landscape which consists of open spaces (recreational fields, pasture, etc.), edged by moderate to dense woodlands, interspersed with small, rural-scale and denser development areas (i.e., Woodlawn Quaker Meetinghouse and horse shed; Woodlawn and gardens; Grand View and outbuildings). The contributing viewshed consists of views from Woodlawn to the Potomac River, and views consistent with the contributing cultural landscape. These views are those that contribute to the significance of the district, and were present during its period of significance. These views and viewshed elements are as follows:

- Views of Parade Ground extending to tree line at Constitution Road to west and tree line on southern side of US Route 1
- Wooded area to west and north of Woodlawn Quaker Meetinghouse
- Views towards wooded area to north of Lampert Road
- Views of baseball field at Gray's Hill terminating at wooded area to south
- Tree line along Mansfield Road

The Woodlawn Historic District viewshed is comprised of two planes of view: a horizontal plane and a vertical plane. The horizontal plane extends from the district along the ground surface, until it reaches a barrier; such a barrier would be a solid tree line or modern development. The vertical plane of the district is the area visible from the district above this barrier in the horizontal plane. For example, the vertical includes the view above the treeline from Woodlawn to the Potomac River. This vertical plane component of the viewshed is not a set distance from the district; it varies with the topography, vegetation, intervening development, among other factors (John Milner Associates, Inc., 2009b).

Woodlawn Viewshed Protection Areas. In addition to the Woodlawn Historic District Viewshed Study, Fort Belvoir has identified five areas within the Woodlawn Historic District that should be retained as open space to protect the setting, feeling, and association of the district in accordance with the BRAC 2005 PA. These areas appear in Figure 3.3-2 as the Woodlawn Viewshed Protection Areas. As indicated in the PA, the land is subject to the following stipulations:

- Land designated as open space can include recreational fields, wooded areas, grassed areas other than recreation fields, stormwater management facilities, provided that landscape screening be installed, and infrastructure such as roads and utilities.
- Permanent development shall be limited to small buildings and structures which support utilities, security requirements, or outdoor recreation.
- Where any new construction, unrelated to BRAC, is proposed that may infringe upon designated open space, Fort Belvoir shall commit to developing strategies to avoid or minimize all adverse effects in conjunction with consulting parties; strategies may include designation of alternative open spaces within the affected viewshed, creation of natural viewshed buffers, or development of a comprehensive history of Fort Belvoir during the 19th century (US Army, 2008c).

Pohick Church Historic Overlay District. This brick, Palladian-style church, listed in the NRHP and the Virginia Landmarks Register, was constructed between 1762 to1772, with the first use of the church in the latter year. Both George Mason and George Washington had pews and attended services at Pohick Church. Pohick Church also anchors the Fairfax County Pohick Church Historic Overlay District. The district core boundary was established in 1970, and follows the 39.5-acre church property boundary, flanked by US

Route 1 to the north, Old Colchester Road to the east, and adjacent parcels to the south and west. The irregularly-shaped district viewshed boundary extends over 3,000 feet north to south from the church, and over 3,500 feet east to west. The western portion of the viewshed boundary extends into the Southwest Area of Fort Belvoir (Fairfax County DP&Z, 2009b).

Accotink United Methodist Church. Accotink United Methodist Church was built in 1880, and is a one-and-a-half-story, end-gable, rectangular, frame, drop siding-clad building with a hipped-roof enclosed porch that supports a two-story bell tower. The roof is sheathed in asphalt shingles. The church features six-over-six double-hung sash, and the primary entrance is comprised of double cross-and-bible six-panel wood doors. It served as one of the institutional and cultural centers for Euro-American residents in the Village of Accotink (US Army, 2006a). Accotink United Methodist Church is designated as a Fairfax County Historic Site (Fairfax County DP&Z, 2012c).

Old Colchester Road. Old Colchester Road was originally a road leading to the seaport of Colchester, Virginia, which was on the banks of the Occoquan River near the Potomac River. Silt filled up the Occoquan River, making Colchester untenable as a seaport. Alexandria, Virginia became the major seaport in the area, taking the place of Colchester. The result was that Old Colchester Road between the Occoquan River and Richmond Highway (US Route 1) became a minor road, and much later was incorporated into State Route 611. Old Colchester Road is NRHP-eligible.

Carlby. Carlby was initially constructed circa 1750 in Sussex County, Virginia, and moved to its present location in 1947. It is a five-bay-wide, two-story, hipped-roof, Georgian-style residence with chimneys located at each end. The brick foundation is laid in Flemish bond. The kitchen and smoke house are attached as wings. The residence was originally known as the Booth House before its purchase and relocation by the Porter family in the 1940s. It is significant for its association with the historic preservation movement in Fairfax County and for its architecture; it is a designated Fairfax County Historic Site (Fairfax County DP&Z, 1992).

La Grange Site & Marders Family Cemetery. The 28-acre site and cemetery was owned by Robert Boggess and his descendants until 1996. The house (now demolished) was built in 1867 on the site of a former residence and inn erected circa 1740-1744. It is a designated Fairfax County Historic Site (Fairfax County DP&Z, 1996).

Overlook Farm. Historically known as Benvenue, Overlook Farm is surrounded by publicly-accessible land, including adjacent Gunston Hall. The 59.3-acre parcel that now comprises Overlook Farm was part of Gunston Hall until the mid-19th century. The present house at Overlook Farm appears to have been constructed in 1873. The landscaping around the house shown on a 1937 aerial is largely the same as that in recent aerial photographs. With the exception of the formal, walled gardens, the landscape of Overlook Farm appears to be largely naturalistic, with large swaths of open space bounded by wooded areas. The main vista on the property is from the house looking east towards the Potomac River. This is the visual focus of the two-story porch on the house's east elevation. Aerial photographs from 1953, 1968, and recent times show little change in the landscape of Overlook Farm since 1937. A tennis court was added in a wooded area west of the house in the mid-1980s, but few other changes are apparent. (John Milner Associates, 2009). Overlook Farm is a designated Fairfax County Historic Site (Fairfax County DP&Z, 2012c).

Mount Air House Site and Grounds Historic Overlay District. Mount Air occupies a hilltop overlooking Accotink Creek. The manor property dates to the 18th century, when the first house was constructed. During the early-19th century, a second house was constructed on the property. A third manor house was built in the Greek Revival style circa 1830, with additions constructed between 1859 and 1914. In the 20th century, the property was reduced from over 100 acres to 25 acres. A portion of the property to the south was acquired by Fort Belvoir. The circa-1830 house was destroyed by fire in 1992. Outbuildings, landscaped grounds, and burial grounds remain. In addition, Site 44FX2277 is a NRHP-eligible archaeological site located at Mount Air (US Army, 2010m).

In 1969, Mount Air was designated a Fairfax County Historic Site (Village of Mount Air, 2012). The Mount Air Historic Overlay District was established by Fairfax County in 1984. The district follows the irregularly-shaped tax parcel boundary immediately northwest of Fort Belvoir's North Post (Daniel, 2009). The viewshed boundary extends over roughly 2,500 feet north to south from Mount Air, and roughly 2,500 feet east to west. It extends into the Southwest Area of Fort Belvoir. Although a significant amount of new housing has been constructed within the historic overlay boundary in recent years, the boundary has not changed (Fairfax County DP&Z, 2009c).

Gunston Hall. Gunston Hall was once the center of a 5,500-acre tobacco and corn plantation. Its owner, George Mason IV (1725 to 1792), was a fourth-generation Virginian who became a senior statesman and one of the era's most influential figures. As author of the Virginia Declaration of Rights, Mason was among the first to call for such fundamental American liberties as religious toleration and freedom of the press. Thomas Jefferson once referred to Mason as "a man of the first order of wisdom."

Mason's home, constructed between 1755 and 1759, is an outstanding example of Georgian architecture. The elaborate carvings of the interior, designed by indentured servant William Buckland, are among the finest creations of artisans working in Colonial Virginia. Mason's garden, south of the mansion, features the original configuration of gravel pathways, a 250-year old boxwood allée, massive earthen terraces, and vistas of the Deer Park leading to the Potomac River and Maryland shore beyond.

Gunston Hall is a National Historic Landmark owned by the Commonwealth of Virginia, and administered by a Board of Regents appointed from The National Society of The Colonial Dames of America (Gunston Hall, no date). It is also listed in the NRHP and Virginia Landmarks Register, and is a Fairfax County Historic Site.

Maryland Properties

Elsemere. This frame residence was constructed circa 1900 on land that was once part of the vast Marshall Hall estate. It is a five-bay, two-story, late-19th-century farmhouse with a two-story rear addition. The residence is situated to facilitate sweeping views of the Potomac River, and is accessed by a cedar-lined drive. There is evidence to suggest that Elsemere may have been constructed as a summer house, or as a prototype for the homes the promoters of the Marshall Hall Summer Resort hoped would be built (Riviore, 1980a). Elsmere is listed in the Maryland Inventory of Historic Properties.

Greenweich Boundary Markers. The Greenweich Boundary Markers are believed to date no later than a 1735 resurvey and division of the original 17th-century Greenweich tract, acquired by Captain Randolph Brandt. The location of two stones has been established, and three others are believed to be extant. Two of three are noted in a 1946 survey as submerged in the Potomac River (Riviore, 1978). The Greenweich Boundary Markers are listed in the Maryland Inventory of Historic Properties.

Greenway. Built in 1895, Greenway is a two-story, L-plan, Queen Anne-style residence with a porch and two rear additions. The origin of the name Greenway is believed to trace back to the name Greenweich, a 17th-century land grant to Captain Randolph Brandt, upon which the residence is located. Between circa 1934 and 1971, the property was briefly combined with Elsemere. In 1971, it was acquired by William Thorne, independent of Elsemere (Riviore, 1980b). Greenway is listed in the Maryland Inventory of Historic Properties.

Marshall Hall. Marshall Hall was initially constructed circa 1725 as a two-story, side-gable, Flemish-bond brick residence (Riviore, 1975). It was the largest dwelling to date from before 1740 to be documented in southern Maryland. The primary façade faced the Potomac River, and featured architectural details such as double-ogee arch-window heads. In 1976, the National Park Service purchased the residence to restore it. At that time, it retained many original details, and was used as a benchmark to measure the development of local architectural design. In 1981, the residence was largely gutted by an arson fire, leaving only the brick walls standing. The walls were stabilized and fenced off. In 2003, the residence suffered another accident

when a semi-truck drove through the center of the residence, effectively demolishing the central third of the building (Riviore, 1975, updated 2003). Marshall Hall is listed in the NRHP and the Maryland Inventory of Historic Properties.

Piscataway Park. Piscataway Park consists of over 4,000 acres of parkland, including three cultural resources as follows:

- Marshall Hall
- NHL Accokeek Creek Site – archaeological site that has yielded evidence of prehistoric occupation through 5,500 years
- National Colonial Farm – farm complex largely constructed in 20th century that interprets agricultural practices of the late-18th century

Piscataway Park is primarily significant for its role in maintaining the historic vista across the Potomac River from Mount Vernon, George Washington's home. The park preserves the approximate character of the landscape as seen from Washington's estate, and thereby safeguards a vital and historic cultural landscape (Goeldner and Mackintosh, 1979). The park is listed in the NRHP and the Maryland Inventory of Historic Properties.

Fort Washington. Fort Washington is an enclosed masonry fortification entered by a drawbridge across a moat. The fort site encompasses 341 acres, was selected in 1794 by George Washington, constructed in 1808, and destroyed during the War of 1812. By 1824, the fort was reconstructed. In addition to the fort, the property includes an entrance gate (1922); PX Building (1906); Non-Commissioned Officer's Quarters (1903 to 1906); Commandant's House (1821); and Sargeant's House (1821) (Nickels and Korzan, 1985). Fort Washington is listed in the NRHP and the Maryland Inventory of Historic Properties.

3.3.2 Environmental Consequences of the No Action Alternative

3.3.2.1 Archaeological Resources

Short-Term Projects

Because short-term projects would not be implemented, the No Action Alternative would have no effect on archaeological resources at Fort Belvoir.

Long-Term Projects

Because long-term projects would not be implemented, the No Action Alternative would have no effect on archaeological resources at Fort Belvoir.

3.3.2.2 Historic Architectural Resources

Under the No Action Alternative, the short-term and long-term projects would not be implemented.

RPMP IPS

The RPMP IPS would not be applicable under the No Action Alternative because no short-term or long-term projects would be implemented.

Short-Term Projects

Because short-term projects would not be implemented, the No Action Alternative would have no effect on historic architectural resources at Fort Belvoir.

Long-Term Projects

Because long-term projects would not be implemented, the No Action Alternative would have no effect on historic architectural resources at Fort Belvoir.

3.3.3 Environmental Consequences of Alternative 1 – Full Implementation – The Preferred Alternative

3.3.3.1 Archaeological Resources

Short-Term Projects

NEPA and Section 106 review have been completed or are underway for 35 of the 52 short-term projects considered in this EIS. Table 3.3-4 provides a list of these projects along with the results of the Section 106 review. An analysis of the potential effects of the remaining 17 short-term projects on archaeological resources is provided below.

ST 14 – Regional Stormwater Management Facility

ST 14 is located on South Post, in a disturbed area with no known archaeological sites nearby and minimal potential to contain unknown resources. Thus, the implementation of this project is not expected to affect archaeological resources. Section 106 review for this project would be completed prior to the start of construction in accordance with 36 CFR 800 or the terms of the MOD PA if the PA has been executed.

ST 25 – Name Brand Casual Dining Restaurant

This project's footprint is within the footprint of ST 1 and ST 28 (PX/Commissary expansion). NEPA and Section 106 evaluation have been completed for ST 1 and ST 28 (see Table 3.3-4). No effects to archaeological resources were found for these projects. Therefore, ST 25 is not anticipated to have such effects either. Section 106 review for ST 25 would be completed prior to the start of construction in accordance with 36 CFR 800 or according to the terms of the MOD PA if the PA has been executed.

ST 32 – 249th Battalion HQ

ST 32 is located on South Post, in a disturbed area with no known archaeological sites nearby and minimal potential to contain unknown sites. Thus, the implementation of this project is not expected to affect archaeological resources. Section 106 review for this project would be completed prior to the start of construction in accordance with 36 CFR 800 or according with the terms of the MOD PA if the PA has been executed.

ST 35 – Retail Fuel Point

ST 35 is located on South Post, in a wooded area containing no known archaeological sites (Daniel, pers. comm., December 9, 2013). The closest known sites are 44FX1503 and 44FX0624, neither of which is NRHP-eligible. The project site is located on the edge of the developed central area of the South Post. Thus, the implementation of this project is not expected to affect archaeological resources. Section 106 review for this project (ongoing at the time of writing [Daniel, pers. comm., December 9, 2013]) would be completed prior to the start of construction in accordance with 36 CFR 800.

ST 36 – 29th Infantry HQ

ST 36 is located on North Post, just north of the proposed new Lieber Gate (ST 13). The project site is disturbed, being occupied by facilities associated with the US Army Protective Services Battalion and

almost entirely paved. It contains no known archaeological sites, nor is it likely to contain any unknown archaeological resources because of previous disturbance. The nearest known site is 44FX1905, a non-eligible site that would not be affected by the project. Thus, the implementation of this project is not anticipated to affect archaeological resources. Section 106 review for this project would be completed prior to the start of construction in accordance with 36 CFR 800 or with the terms of the MOD PA if the PA has been executed.

ST 37 – Medical Office Building

ST 37 is located on South Post. It would be an addition to the FBCH. The project site is in an area that was disturbed by the construction of the hospital and is not likely to contain any archaeological resources. Thus, the implementation of this project is not expected to affect archaeological resources. Section 106 review for this project would be completed prior to the start of construction in accordance with 36 CFR 800 or with the terms of the MOD PA if the PA has been executed.

ST 39 – Multipurpose Fields

ST 39 is located on South Post, in a disturbed area with no known archaeological sites nearby and minimal potential to contain unknown sites. The implementation of this project is not anticipated to affect any archaeological resources. Section 106 review for ST 39 would be completed prior to the start of construction in accordance with 36 CFR 800 or with the terms of the MOD PA if the PA has been executed.

ST 40 – DLA Parking Garage

ST 40 is located on North Post, in the DLA compound, a disturbed area containing no known archaeological resources. The implementation of this project is not anticipated to affect any archaeological resources. Section 106 review for this project would be completed prior to the start of construction in accordance with 36 CFR 800 or with the terms of the MOD PA if the PA has been executed.

ST 42 – Unaccompanied Enlisted Personnel Barracks

ST 42 is located on North Post, within an area containing no recorded archaeological sites. The project site is currently occupied by tennis courts and has minimal potential to contain unknown resources due to previous disturbance. Therefore, ST 42 is not expected to affect any archaeological resources. Section 106 review for this project would be completed prior to the start of construction in accordance with 36 CFR 800 or with the terms of the MOD PA if the PA has been executed.

Table 3.3-4
Short-Term Projects and Short-Term Transportation Projects with Completed Environmental and Historic Preservation Review Process

Project # on Map and Project Name	Status/Comments	Environmental Review	Impacts to Cultural Resources	Adverse Effects Mitigation
Short-Term Projects				
FY 2012				
ST 1 Post Exchange (PX)	The new PX, completed in 2013, consolidates three existing facilities. Existing PX has been demolished (ST 16).	2010 EA for New Commissary, Exchange and Future Mixed Used Development FNSI	No adverse effect to eligible or potentially eligible archeological resources provided protective fencing during construction and a 50-foot buffer surrounding Lacey's Hill Cemetery (44FX1208) be constructed to protect the cemetery from construction activities. The vegetated buffer would be permanent and would also provide a vegetated screen of the development from the cemetery; Site 44FX1589 would be fenced and avoided during construction.	NA
ST 2 Privatized Army Lodging (PAL) – East of Belvoir Road	Under terms of the PAL agreement, a new, 141-room transient lodging facility is being built near Pence Gate.	2012 EA for Alternate Implementation of PAL FNSI	No adverse effects to two archaeological sites in the general vicinity of the project: 44FX1917 and 44FX 1918. No adverse effects to architectural resources under the terms of the 2001 PAL PA, as amended in 2012.	In 2012, the 2011 PAL PA was amended to include a variety of mitigation measures to ensure that the proposed project does not result in permanent or significant adverse effects on the visual resources and aesthetic qualities of the Woodlawn Historic Overlay District.
ST 3 National Intrepid Center of Excellence	A treatment center for traumatic brain injuries and post-traumatic stress disorders, completed in 2013.	2012 REC	No resources affected	NA

Project # on Map and Project Name	Status/Comments	Environmental Review	Impacts to Cultural Resources	Adverse Effects Mitigation
ST 4 Mulligan Road Phase II	Mulligan Road between Telegraph Road and US Route 1 plus associated work to Telegraph Road, Old Mill Road, and US Route 1. Completion of construction expected in mid-2014.	2006 EA for Richmond Road (US Route 1)/Telegraph Road (VA Route 611) Connector FNSI	Adverse effect on four architectural resources, including: • Woodlawn (direct effect caused by miscellaneous improvements to property along US Route 1 and Old Mill Road; transfer of 2.5 acres to the National Trust for Historic Preservation). • Woodlawn Historic District (direct effect – see Woodlawn above).1 • Pope-Leighey House (indirect visual effect caused by miscellaneous improvements to Woodlawn property along Old Mill Road). Potential adverse effects on three archaeological sites, including: • 44FX1146 at Woodlawn. • 44FX0461 at Fort Belvoir. • 44FX1944 at HEC.	MOA included stipulations regarding mitigating several aspects of the project, including: • Intersection and driveway improvements. • Trail connections. • 2.5-acre land transfer from Fort Belvoir to VDOT to the National Trust for Historic Preservation, owners of Woodlawn. • Signage. • Construction phasing. • Archaeological surveys of the three sites that may be potentially adversely affected.
ST 5 Fisher House 1	Completed single-story brick residential facility with 12 bedrooms/suites. Provides a temporary residence and support facility for service men and women and their families receiving care at FBCH.	2011 REC	No resources affected	NA
ST 6 USO Family Center	Recently-opened recreational/community support facility for recovering Soldiers and their Families.	2011 REC	No resources affected	NA
ST 7 Expansion of DAAF Fire Station	Currently under construction, project expands the existing fire station to accommodate a third fire company.	2010 REC	No resources affected	NA

Project # on Map and Project Name	Status/Comments	Environmental Review	Impacts to Cultural Resources	Adverse Effects Mitigation
ST 8 Child Development Center 144	Completed child development center for 144 children located near a family housing area. Provides care for children of active duty and authorized civilian personnel.	2011 REC	No resources affected	NA
ST 9 Family Travel Camp Phase 1	Completed family travel camp in the Tompkins Basin area. Phase 1 builds spaces for recreational vehicles and camping support buildings. Family travel camp would serve active-duty military, their families, military retirees, and eligible civilians.	2010 EA for the Directorate of Family and Morale, Welfare and Recreation Travel Camp	No adverse effect on Overlook Farm. Effects assessment concluded that construction will have no adverse effect on Overlook Farm; it will not alter the characteristic-defining views and vistas from Overlook Farm that help qualify it for listing in the NRHP and Virginia Landmarks Register. No eligible or potentially eligible archaeological site within the APE. No adverse effect to archaeological resources.	NA
ST 10 Water and Wastewater Utility System Upgrades	Provides for repair/replacement of aging infrastructure.	2013 Draft EA for Water/Wastewater Utility Upgrade	Adverse effect on WST 188, a contributing resource to the NRHP-eligible FBHD, and adverse effect on historic viewshed of FBHD. Impacts to NRHP-listed Belvoir Plantation site and unevaluated sites from the replacement of the force main would be avoided by horizontal drilling, rerouting pipes, relining existing pipe *in situ*, or by other means.	Adverse effect to WST 188 and FBHD would be minimized and compensated through mitigation measures agreed upon in a MOA that will be prepared. Measures to avoid or mitigate potential impacts to archaeological sites would be developed through Section 106 consultation.
ST 11 Child Development Center	Currently under construction, two child development centers (CDCs), each with a capacity of 124 children adjacent to one another to provide child care for military personnel and eligible civilians.	2007 BRAC EIS ROD	No resources affected	NA
ST 12 Child Development Center	See above.	2007 BRAC EIS ROD	No resources affected	NA

Project # on Map and Project Name	Status/Comments	Environmental Review	Impacts to Cultural Resources	Adverse Effects Mitigation
ST 13 Access Road & Control Point – Lieber Gate	Construct a new access control point for traffic accessing North Post from US Route 1. Replaces old Lieber Gate, which was closed after the 9/11 terrorist attacks.	2007 BRAC EIS ROD	Potential adverse effect (indirect visual) on Woodlawn Quaker Meetinghouse from new construction.	2008 PA included stipulation to prepare a study to delineate the Woodlawn Historic District Viewshed that would include contributing resources, including the Alexandria Monthly Meeting House and Burial Ground.
ST 15 Army & Air Force Exchange Service Car Wash	Build a car wash facility for privately-owned vehicles adjacent to a Class VI store.	2011 REC	No resources affected	NA
ST 16 PX Demolition	The old PX was recently demolished following completion of the new PX (see ST 1).	See ST 1	See ST 1	See ST 1
ST 17 36-Hole Golf Course Reconfiguration	Reconfigure six of the Fort Belvoir golf course's 36 holes to accommodate construction of the NMUSA (see projects 18, 27, 34, 38, and 41).	2010 EA for NMUSA FNSI	No adverse effects. Seven archaeological sites are within the APE but all have been found ineligible for listing in the NRHP.	See ST 18
ST 18 NMUSA Roads and Infrastructure	Extend roads and utilities infrastructure and build parking lots to serve the future NMUSA facilities (see ST 17, 27, 34, 38, and 41).	2010 EA for NMUSA FNSI	No adverse effects to archaeological resources. Eight archaeological sites are within the APE but all have been found ineligible for listing in the NRHP. Adverse effect to NRHP-eligible FBMRR bed.	2011 MOA included the following stipulations to mitigate the adverse effect: • Preparation of FBMRR Property evaluation. • Integration of FBMRR into museum landscape design. • Installation of historic marker concerning the history FBMRR.

Project # on Map and Project Name	Status/Comments	Environmental Review	Impacts to Cultural Resources	Adverse Effects Mitigation
ST 19 INSCOM HQ Expansion, Phase 1	Currently under construction, the first of four phases (also see projects 26, 33, and 46) to expand INSCOM's HQ facilities. The first phase includes a 1,400-space parking garage, utility building, partial reconfiguration of parking lots, and site work.	2012 EA for Expansion of US Army's INSCOM HQ Facilities FNSI	No resources affected. Archaeological sites 44FX1095 and 44FX1275 are located in the APE but have been determined to be not eligible for listing in the NRHP.	NA
ST 20 Replacement of South Post Fire Station	Currently under construction, new fire station for two fire companies near site of existing station. Existing station would be repurposed as a 911 center.	2011 REC	No adverse effect on FBHD, including contributing Buildings 191, 1156, 1157, and 1158.	NA
ST 21 Army & Air Force Exchange Service Car Care Center	Build a car maintenance facility with 10 service bays.	2011 REC	No resources affected	NA
ST 22 Pet Care Center	Build a pet care center to provide pet care and kennel boarding for the pets of military personnel, their families, and eligible civilians.	2013 REC	No resources affected	NA
ST 23 National Geospatial-Intelligence Agency Canine Training / Rest Facility	Build a canine training and rest facility with an administrative area, kennels with dog runs, and a canine exercise area for NGA guard dogs.	2012 REC	No resources affected	NA
ST 24 Fairfax County School Expansion	New elementary school to accommodate up to 800 students next to the existing Fort Belvoir Elementary School.	2014 EA for Fort Belvoir Elementary School Expansion FNSI	No resources affected	NA

Project # on Map and Project Name	Status/Comments	Environmental Review	Impacts to Cultural Resources	Adverse Effects Mitigation
ST 26 INSCOM HQ Expansion Phase 2	Continue expansion of INSCOM facilities (see also ST 19, 26, and 46).	See ST 19	See ST 19	See ST 19
ST 27 NMUSA Phase 1	Build a national museum to showcase the history and artifacts of the US Army (see also ST Projects 17, 18, 34, 38 and 41).	See ST 17	See ST 17 Museum would be located near Mount Air, a Fairfax County Historic Site that includes Site 44FX1277, a NRHP-eligible archaeological site. Mount Air also includes outbuildings, landscaped grounds, and burial grounds. Archaeological site, outbuildings, and grounds at Mount Air would not be impacted by noise or visual changes associated with project implementation.	See ST 17
ST 28 Main Post Commissary	Provide a new, larger Commissary for use by military personnel, their families, area retirees, and eligible civilians.	See ST 1	See ST 1	See ST 1
ST 29 DLA Visitor Control Center	Provide a standard DoD visitor control center for employees and visitors accessing DLA.	2012 REC	No resources affected	NA
ST 30 Fisher House 2	Construct a second Fisher House adjacent to Fisher House 1 (ST 5). The two houses would share the same purpose, design, and parking lot.	See ST 5	See ST 5	See ST 5
ST 31 Family Travel Camp Phase 2	Car camping sites and cabins added to family travel camp described under ST 9.	See ST 9	See ST 9	See ST 9
FY 2015				
ST 33 INSCOM HQ Expansion Phase 3	Continue expansion of INSCOM facilities (see also Projects 19, 26, and 46).	See ST 19	See ST 19	See ST 19
ST 34 NMUSA Phase 2	Continue construction of NMUSA facilities (see also Projects 17, 18, 27, 38, and 41).	See ST 18	See ST 18	See ST 18

Project # on Map and Project Name	Status/Comments	Environmental Review	Impacts to Cultural Resources	Adverse Effects Mitigation
FY 2016				
ST 38 NMUSA Phase 3	Continue construction of NMUSA facilities (see also ST 17, 18, 27, 34, and 41).	See ST 18	See ST 18	See ST 18
FY 2017				
ST 41 NMUSA Phase 4	Build final phase of NMUSA project (see also Projects 17, 18, 27, 34, 38).	See ST 18	See ST 18	See ST 18
ST 43 OSEG Training Compound	Build a permanent compound for OSEG training and operations to replace temporary facilities on North Post.	2014 EA to Construct Skills Training Facility FNSI	No resources affected	NA
ST 46 INSCOM HQ Expansion Phase 4	Construct final phase of INSCOM expansion (see also Projects 19, 26, and 33).	See ST 19	See ST 19	See ST 19
Short-Term Transportation Projects				
STT 1 Mulligan Road, Phase 2a	See ST 4	See ST 4	See ST 4	See ST 4
STT 2 Telegraph Road Widening (Mulligan Road, Phase 2b)	See ST 4	See ST 4	See ST 4	See ST 4
STT 3 Lieber Gate Access Road and Control Point	See ST 13	See ST 13	See ST 13	See ST 13

ST 44 – Baseball Field Replacement

ST 44 is located on South Post, within a previously disturbed area containing no recorded archaeological sites. The nearest known sites (44FX812 and 44FX1504) have been determined not to be eligible and would not be disturbed. Therefore, ST 44 is not anticipated to affect archaeological resources. Section 106 review for this project would be completed prior to the start of construction in accordance with 36 CFR 800 or with the terms of the MOD PA if the PA has been executed.

ST 45 – Secure Administrative Facility

ST 45 is located on South Post. The project site consists of two parcels, neither of which contains known archaeological resources. The larger parcel, on the north side of 5th Street, consists mostly of a paved parking lot and Chapek Road; the smaller parcel consists of maintained lawn. The parcels are immediately adjacent to two existing buildings (1456 and 1458) used by the Army Materiel Command. Due to disturbance from the construction of the existing buildings, lots, and roadways, the entire area between 5th and 3rd Street and between Gunston Road and Chapek Road, including the two components of the project site, has minimal potential to contain unknown archaeological resources. Therefore, ST 45 is not expected to affect any archaeological resources. Section 106 review for ST 45 would be completed prior to the start of construction in accordance with 36 CFR 800 or with the terms of the MOD PA if the PA has been executed.

ST 47 – Religious Education Center

ST 47 is located on North Post, just across Parke Road from the Woodlawn United Methodist Cemetery (44FX1210), on a parcel currently occupied by maintained lawns with a few scattered trees and overhead utility lines. 44FX1210 is the only recorded archaeological site in the vicinity of ST 47. Although the project site is currently vacant, historic maps (1946, 1976) show that it was once occupied by multiple facilities, the construction then demolition of which would have caused substantial disturbance. Therefore, the potential for the site to contain unknown archaeological resources is minimal. Site 44FX1210 is fenced and visually well-defined. Precautions would be taken not to infringe upon the site during construction of the proposed facility. Additionally, the function of this new facility as a religious education center would generally be consistent with the cemetery. Thus, ST 47 is not anticipated to affect archaeological resources. Section 106 review for ST 47 would be completed prior to the start of construction in accordance with 36 CFR 800 or with the terms of the MOD PA if the PA has been executed.

ST 48 – INSCOM Controlled Humidity Warehouse

ST 48 is located on South Post, in an area previously disturbed containing no recorded archaeological resources and with minimal potential to contain unrecorded ones. The project site consists of two separate areas on a previously-developed parcel currently consisting mostly of pavement and parts of Buildings 1144 and 1145. This project would not be anticipated to affect archaeological resources. Section 106 review for this project would be completed prior to the start of construction in accordance with 36 CFR 800 or with the terms of the MOD PA if the PA has been executed.

ST 49 – 911th Engineering Company Operations Complex

ST 49 is located on North Post, on a parcel to the northwest of Accotink Village. Most of the site is currently occupied by two buildings (2476 and 2477) and surrounding parking lots. To the south of this compound, there is a large cleared area, parts of which appear to have been used for the storage of equipment or vehicles. Wooded areas separate the clearing from Route 1 to the south, the Fairfax County Parkway to the west, and Accotink Village to the east.

Two recorded archaeological sites are located within these wooded areas: 44FX0458, a historic/military site that was determined not to be NRHP-eligible in 1993; and 44FX1810, a prehistoric site that is scheduled for

Phase II evaluation under the PA executed in 2012 to address the potential effects of the US Route 1 Improvements Project. Depending on the results of this evaluation, there is the potential for archaeological resources to be affected by this project if the area of disturbance extends beyond the portion of the site currently occupied by buildings and pavements and into Site 44FX1810. In compliance with Section 106, prior to the beginning of construction, Fort Belvoir would review the potential adverse effects of this project on historic properties consistent with 36 CFR 800 or the procedures defined in the MOD PA if the PA has been executed. As part of this effort, Fort Belvoir would review the extent of the anticipated area of disturbance. If Site 44FX 1810 has been found eligible, it would be avoided if possible. If the site cannot be avoided, mitigation measures would be developed and an MOA prepared to address this adverse effect.

ST 50 – Vehicle Maintenance Shop

ST 50 is located on South Post, on a site currently occupied by Buildings 187 and 189. There are no recorded archaeological sites in the vicinity and the project site has been disturbed by the construction of the existing buildings. Thus, this project is not anticipated to affect archaeological resources. Section 106 review for ST 50 would be completed prior to the start of construction in accordance with 36 CFR 800 or with the terms of the MOD PA if the PA has been executed.

ST 51 – Information Systems Facility for the Network Enterprise Center

ST 51 is located on South Post, on a site previously developed with pavement and two buildings, now demolished. The site contains no known archaeological resources and, due to previous disturbance, has minimal potential to contain unknown ones. Thus, this project has minimal potential to affect archaeological resources and no adverse effects are anticipated. Section 106 review for this project would be completed prior to the start of construction in accordance with 36 CFR 800 or with the terms of the MOD PA if the PA has been executed.

ST 52 – DLA HQ Building

ST 52 is located on North Post, within the DLA HQ compound, a disturbed area containing no recorded archaeological sites and with minimal potential to contain undiscovered resources. Thus, ST 52 has minimal potential to affect archaeological resources. Section 106 review for this project would be completed prior to the start of construction in accordance with 36 CFR 800 or with the terms of the MOD PA, if the PA has been executed.

Short-Term Transportation Projects

NEPA and Section 106 documentation has been completed or is underway for three of the seven short-term transportation projects. Table 3.3-4 provides a list of these projects and a summary of the Section 106 review. An analysis of the potential impacts of the remaining four short-term transportation projects on archaeological resources is provided below.

STT 4 – John J. Kingman Road/Fairfax County Parkway Intersection Improvements

The intersection of John J. Kingman Road and the Fairfax County Parkway is located on North Post. There are no recorded archaeological sites in the immediate vicinity of the intersection. The closest known site, 44FX1939, was determined non-eligible in 1994. Thus, this project is not anticipated to affect known resources. The potential for undiscovered resources being present in the project area is limited due to past disturbance from the construction of the parkway and existing intersection. However, the extent of the disturbance associated with STT 4, and whether it would affect land not previously disturbed, cannot be determined at this time. Because this project involves modifications to a state road, it is anticipated that VDOT would be the lead agency for planning and execution, including compliance with applicable Section 106 requirements, in cooperation with Fort Belvoir. Working with VDOT, Fort Belvoir would review the

extent of the affected area and determine whether additional surveying is required. If potentially affected resources are identified, they would be avoided if possible. If avoidance is not possible, the NRHP-eligibility of the resources would be determined. If the resources are found to be eligible and would be adversely affected by the project, an MOA would be prepared to define appropriate minimization and mitigation measures.

STT 5 – Transit Hub

Under this project, a transit hub would be established at one of two possible sites: near Pence Gate off Belvoir Road; or at 12th Street and Gunston Road. Neither potential site includes, or is adjacent to, recorded archaeological sites. Both sites are next to existing roadways and facilities, the construction of which would have caused extensive disturbance. Therefore, the potential for either location to contain unknown resources is minimal and no adverse effects on archaeological resources are anticipated. In compliance with Section 106, as planning for this project proceeds and the extent of the associated ground-disturbing activities is defined, Fort Belvoir would review the potential for adverse effects to archaeological resources consistent with the procedures in 36 CFR 800 or in the MOD PA if the PA has been executed.

STT 6 – On-Post Intersection and Road Improvements

The character of the proposed improvements is not yet defined, as it would depend on yet-to-be-determined transportation impacts and needs arising from other projects. In general, however, it can be assumed that many of the improvements would consist of new traffic signals, adjustment to existing signals, or other actions involving no ground disturbance. If the addition of new lanes or widening of existing lanes is involved, some disturbance would occur. In each case, Fort Belvoir would review the project and ensure that it complies with Section 106 in accordance with 36 CFR 800 or the terms of the MOD PA if the PA has been executed.

STT 7 – Walker Gate Improvements

The improvements proposed under STT 7 consist of a new left-turn lane to facilitate access to the installation from northbound Mount Vernon Memorial Highway. This may require disturbing a strip of Fort Belvoir land along the western side of the highway. There are no recorded archaeological sites in this area of Fort Belvoir. As planning for this project proceeds, Fort Belvoir would review the extent of the affected area and determine whether additional surveying is required. Because this project involves modifications to a state road, it is anticipated that VDOT would be the lead agency for planning and execution, including compliance with applicable Section 106 requirements, in cooperation with Fort Belvoir. If potentially affected resources are identified, they would be avoided if possible. If avoidance is not possible, the NRHP-eligibility of the resources would be determined. If the resources are found to be eligible and would be adversely affected by the project, an MOA would be prepared to define appropriate minimization and mitigation measures.

Long-Term Projects

LT 1 – Lower North Post District

Under this long-term project, redevelopment would occur within an area on the North Post bounded by Goethals Road, Constitution Road, Meade Road, and Gunston Road. This area is partly developed with pavement and buildings (including the recently completed OCAR facility). It contains no recorded archaeological sites. While some parts of the LT 1 project area are currently open and undeveloped, a review of historic maps (1946, 1976) indicates that the entire block was once occupied by facilities. The construction and demolition of those facilities, along with the construction of the existing ones, would have resulted in substantial ground disturbance. Thus, the potential for the project area to contain unknown archaeological resources is minimal and no effects on such resources are expected. In compliance with

Section 106, as planning proceeds for the various individual projects associated with LT 1, Fort Belvoir would review the potential effects of those projects on historic properties consistent with 36 CFR 800 or the terms of the MOD PA if the PA has been executed.

LT 2 – 1400 East District

The projects included under LT 2 would redevelop a portion of the 1400 East District on South Post as a secure administrative campus. The project area is bounded by 1st Street, the FBCH campus, 6th Street, and Gunston Road. It is currently occupied by Army Materiel Command relocatable buildings, administrative and office buildings located east of Gunston Road between 5th and 6th Streets, and surface parking areas associated with those facilities. The developed portions of the area have been heavily disturbed and have no potential to contain archaeological resources. A small undeveloped corner of the project area contains two recorded archaeological sites: 44FX1896 and 44FX1897. Both sites have been determined ineligible for listing in the NRHP. While implementation of LT 2 may result in the destruction of these sites, this would not constitute an adverse effect under Section 106. In compliance with Section 106, as planning proceeds for the various individual projects associated with LT 2, Fort Belvoir would review the potential effects of those projects on historic properties in accordance with the regulations in 36 CFR 800 or the terms of the MOD PA if the PA has been executed.

LT 3 – South Post Community Support District

Projects under LT 3 would develop an area on South Post east of Belvoir Road and just south of US Route 1. The site was formerly the Gray's Hill Housing area, since demolished, and the park-like site is currently covered with grass and scattered trees. The site is adjacent to one recorded archaeological site, 44FX1918, which was determined ineligible for listing in the NRHP when the area was being considered as a potential site for the US Army Museum. This site would be avoided as much as possible. However, if implementation of LT 3 were to result in its partial or total destruction, this would not constitute an adverse effect under Section 106. Due to previous disturbance, the rest of the site has no to minimal potential to contain undiscovered archaeological resources. In compliance with Section 106, as planning for the LT 3 project proceeds, Fort Belvoir would review the potential effects of those projects on historic properties consistent with 36 CFR 800 or the terms of the MOD PA if the PA has been executed.

LT 4 – Administrative Campus District

LT 4 would redevelop the site of the former DeWitt Army Community Hospital on South Post to create a high-density administrative campus. Previous development has resulted in substantial ground disturbance and the project area does not contain any recorded archaeological sites, nor is it likely to contain undiscovered archaeological resources. One recorded site – 44FX1948 – is located immediately to the east of the project area. The NRHP eligibility of this site has not been determined. Based on its location, it is unlikely that implementation of LT 4 would affect it. Fort Belvoir would take precautions – e.g., marking or fencing – to ensure, as needed, that the site is not disturbed during construction. In compliance with Section 106, as planning for this project proceeds, Fort Belvoir would review its potential effects on historic properties in accordance with 36 CFR 800 or the terms of the MOD PA if the PA has been executed. If it is determined that Site 44FX1948 may be affected, a Phase II survey would be conducted to determine its NRHP-eligibility; as appropriate, avoidance, minimization, or mitigation measures would be defined and implemented.

LT 5 – Town Center District

The project area for LT 5 is located within the most densely developed portion of Fort Belvoir, which has undergone substantial disturbance from the construction of the existing facilities and buildings or their predecessors. There are no recorded archaeological sites within this area and no significant potential for undiscovered ones. Therefore, implementation of LT 5 is not anticipated to affect archaeological resources.

In compliance with Section 106, as planning for the projects included in LT 5 proceed, Fort Belvoir would review them in accordance with 36 CFR 80 or the terms of the MOD PA, if the PA has been executed.

LT 6 – Industrial Area District

This project involves the redevelopment of the industrial area west of Gunston Road, south of Pohick Road, and north of 21st Street. The area where the LT 6 projects would be built is largely developed and past ground-disturbance has been extensive. To the south and west, however, the project area borders undeveloped, wooded land that extends towards the shoreline. The shoreline area is rich in archaeological sites but these sites are well away from the LT 6 project area, with no potential to be affected. Two inland sites are close to parcels that could be developed under this project, however: 44FX1504 and 44FX0624. Both sites have been determined ineligible for listing in the NRHP. These sites would be avoided as much as possible. If unavoidable, their potential disturbance would not constitute an adverse effect under Section 106. Additionally, consistent with Section 106, as planning proceeds for the various individual projects associated with LT 6, Fort Belvoir would review the potential effects of those projects on historic properties, including archaeological sites, in accordance with 36 CFR 800 or the terms of the MOD PA if the PA has been executed.

LT 6A – Lower North Post West District

The site of LT 6A is almost entirely occupied by various structures and facilities. It contains no recorded archaeological sites and, due to previous disturbance, has minimal potential to contain undiscovered archaeological resources. Thus, the implementation of LT 6 is not anticipated to affect archaeological resources. In compliance with Section 106, as planning proceeds for the implementation of LT 6A, Fort Belvoir would review the potential effects of those projects on historic properties in accordance with the regulations in 36 CFR 800 or the terms of the MOD PA if the PA has been executed.

LT 7 – North Post Community Support District

This project would redevelop a site that consists primarily of the existing Commissary and associated parking lot. Most of the area, therefore, has been disturbed and contains no known archaeological resources, and the proposed redevelopment has no significant potential to affect archaeological resources. A partial exception pertains to the northern edge of the project site, which includes a small wooded area and one recorded archaeological site, 44FX1208 (Lacey's Hill Cemetery). (This area was within the APE defined for the replacement of the PX and Commissary [ST 1; see table 3.3-4] and no archaeological resources other than 44FX1208 were identified within it.) In compliance with Section 106, as planning for the LT 7 projects proceeds, Fort Belvoir would review the potential effects of those projects on historic properties, including 44FX1208, in accordance with 36 CFR 800 or the terms of the MOD PA if the PA has been executed. No adverse effects to 44FX1208 are anticipated. At a minimum, the site would be avoided and the same protective measures defined for ST 1 would be applied for LT 7 projects (maintenance of a vegetated buffer around the site and protective fencing during nearby construction activities).

LT 8 – Historic Core District

Under this project, two parcels in the historic core of Fort Belvoir would be redeveloped. The parcels are in a part of Fort Belvoir that has been densely developed and disturbed. There are no recorded archaeological sites in or near the project sites. Both sites are already developed and there is no potential for unknown archaeological resources to be present. Thus, implementation of LT 8 is not expected to affect archaeological resources. In compliance with Section 106, as planning for LT 8 proceeds, Fort Belvoir would review the project in accordance with the procedures in 36 CFR 800 or the MOD PA if the PA has been executed.

LT 9 – Fort Belvoir North Area District

There are no archaeological sites in the Fort Belvoir North Area District. Therefore, LT 9 has no potential to affect archaeological resources.

Long-Term Transportation Projects

LTT 1 – John J. Kingman-Gate

There are no recorded archaeological sites along John J. Kingman Road east of the Fairfax County Parkway, and the proposed improvements to the John J. Kingman Gate are not anticipated to affect any archaeological resources. In compliance with Section 106, as planning for LTT1 proceeds, Fort Belvoir would review the project in accordance with 36 CFR 800 or the terms of the MOD PA if the PA has been executed.

LTT2 – Fairfax County Parkway/John J. Kingman Road Intersections and NMUSA Entrance

This project would grade-separate the John J. Kingman and NMUSA entrance intersections with the Fairfax County Parkway. There are no recorded archaeological sites in the immediate vicinity of the project area. The closest known sites to the intersection of the parkway and John J. Kingman Road are 44FX1939 and 44FX0035. 44FX1939 was determined non-eligible in 1994. The status of 44FX0035 has not been determined. Although the site is located some distance from the affected intersection, depending on the size of the area of disturbance, effects are possible. Because of previous disturbance from constructing the parkway, the potential for adverse effects appears limited. However, further study to determine the exact boundary of the site may be needed. Additionally, as in the case of STT 4, although the potential for undiscovered resources being present in the project area is limited due to past disturbance from the construction of the parkway and existing intersection, the extent of the disturbance associated with LTT 2 and whether it would affect land not previously disturbed cannot be determined at this time. Because this project involves modifications to a state road, it is anticipated that VDOT would be the lead agency for planning and execution, including compliance with applicable Section 106 requirements, in cooperation with Fort Belvoir. Working with VDOT, Fort Belvoir would review the extent of the affected area and determine whether additional surveying is required. If potentially affected resources are identified, they would be avoided if possible. If avoidance is not possible, the NRHP-eligibility of the resources would be determined. If the resources are found to be eligible and would be adversely affected by the project, an MOA would be prepared to define appropriate minimization and mitigation measures.

LTT 3 – US Route 1 Intersections with Fairfax County Parkway, Pohick Road, and Belvoir Road

This project would provide for potential further improvements to the referenced intersections following the widening of US Route 1. There are two recorded archaeological sites along Route 1 in the vicinity of the project intersections: 44FX1811 and 44FX1936. Both sites were included in the Section 106 review conducted in conjunction with the Route 1 Improvements Project. As part of this process, 44FX1811 was found to be ineligible for listing in the NRHP and Site 44FX1936 was slated for further study to determine its eligibility status in the PA executed in 2012 for that project. The PA also stipulated that supplementary archaeological surveying should be conducted in the parts of the project's APE not yet surveyed in order to identify any unknown archaeological resources. Because of the limited scope of the improvements proposed under LTT 3, it is unlikely that this project would result in additional effects to those of the ongoing Route 1 project. However, as planning proceeds, Fort Belvoir would work with VDOT and the FHWA to review and address the potential effects of the proposed improvements on archaeological resources in accordance with Section 106.

LTT 4 – US Route 1 Overpass

The proposed overpass would connect on South Post to 1st Street and to Constitution Road on North Post, with a connection to Meeres Road. Thus, two new roadway segments would be constructed. Although the precise alignments have not yet been defined, the general areas they would traverse do not contain any recorded archaeological sites. In compliance with Section 106, as planning proceeds for this project, Fort Belvoir would review its potential effects in accordance with the regulations in 36 CFR 800 or the terms of the MOD PA if the PA has been executed. Fort Belvoir would conduct any needed additional survey work to evaluate the project's potential effects to archaeological resources. If it is determined that NRHP-eligible resources would be adversely affected, an MOA would be executed to address this adverse effect.

LTT 5 – Abbot Road, 3rd Street, 6th Street

Under this project, the three referenced east-west roads would be extended to connect to nearby north-south roads. Abbot Road would be connected to Woodlawn Road along an alignment running between the sites for projects ST 47 and ST 8. This area does not contain any recorded archaeological sites and although it is currently open, historic maps show that it was once occupied by multiple facilities, making the potential for undiscovered resources minimal. Sixth Street would be extended to Gunston Road through an area that is currently mostly wooded. There are no recorded archaeological sites nearby. Third Street would be extended east to connect to Belvoir Road through what is now a large parking lot. In compliance with Section 106, as planning proceeds for each component of this project, Fort Belvoir would review its potential effects on historic properties, including archaeological resources, in accordance with the procedures in 36 CFR 800 or the MOD PA if the PA has been executed. The extension of Abbot Road and 3rd Street has no significant potential to affect archaeological resources. The extension of 6th Street might affect such resources if any are present within the alignment, although the likelihood is low given previous surveys and the generally disturbed character of the surrounding area. If adverse effects are identified, they would be addressed through an MOA.

LTT 6 – Gunston Road from 12th Street to 16th Street

This project consists of widening Gunston Road from two to four lanes between 12th Street and 16th Street on South Post. This segment of Gunston Road traverses the oldest and most densely developed part of the installation and prior disturbance has made the presence of archaeological resources unlikely. In compliance with Section 106, as planning for this project moves forward, Fort Belvoir would review its potential effects on historic properties, including archaeological resources, per the procedures in 36 CFR 800 or the MOD PA if the PA has been executed. No adverse effects on archaeological resources are anticipated.

LTT 7 – Middleton Road

This project would extend Middleton Road, on South Post, to 12th Street through the site of the South Post Town Center District garden center, to be demolished. The affected area consists entirely of disturbed land and does not contain any recorded archaeological site or has any potential to contain unrecorded ones. Thus, this project is not expected to affect any archaeological resources. Section 106 review for this project would be completed prior to the start of construction in accordance with the procedures in 36 CFR 800 or the MOD PA if the PA has been executed.

LTT 8 – Heller Road Loop

This project would take place at FBNA, an area that was surveyed and does not contain archaeological sites. Thus, it would not affect archaeological resources. No adverse effects are anticipated.

LTT9 – Meeres Gate

This project would potentially reopen Meeres Gate as an access point to Fort Belvoir. Reopening Meeres Gate has no potential to affect any known or unknown archaeological sites. There would be no effects on archaeological resources.

LTT 10 – Goethals Road

This project would extend Goethals Road on North Post to Woodlawn Road. The new road segment would run through a wooded parcel traversed by linear utility cuts, which was once occupied by multiple facilities as evidenced by historic maps (1943, 1976). Thus, the area contains no recorded archaeological sites and has no significant potential to contain unrecorded ones. Site 44FX1211 (Woodlawn Friend's Cemetery) is located a short distance to the south, but it would remain separated from the road by dense trees. In compliance with Section 106, as planning for this project proceeds, Fort Belvoir would review its potential effects on historic properties, including archaeological sites, in accordance with the procedures in 36 CFR 800 or the MOD PA if the PA has been executed. No adverse effects on archaeological resources are anticipated.

Conclusion – Alternative 1 Effects on Archaeological Resources

Most of the projects included in the proposed action under Alternative 1 would not, or are not anticipated to adversely affect, archaeological resources. If, as each project planning proceeds, further review under Section 106 indicates that adverse effects are unavoidable, these adverse effects would be mitigated through the development of an MOA among Fort Belvoir, the Virginia SHPO, and other consulting parties, as appropriate. Therefore, under NEPA, the proposed action under Alternative 1 would have less than significant adverse effects on archaeological resources, with mitigation. For those projects requiring it, mitigation measures would be developed on a case-by-case basis by Fort Belvoir in consultation with the Virginia SHPO and other consulting parties, as appropriate, as part of the Section 106 review for the project.

3.3.3.2 Historic Architectural Resources

Short-Term Projects

NEPA and Section 106 review have been completed or are underway for 35 of the 52 short-term projects to be implemented in the next few years. Table 3.3-4 provides a list of these projects and the results of Section 106 review. An assessment of the potential effects of the remaining 17 short-term projects on historic architectural resources is provided below.

ST 14 – Regional Stormwater Management Facility

ST 14 is located on South Post in the Land Disturbance APE. It is within a portion of the NRHP-eligible FBMRR property (which appears to be defunct in this area; however this may change as the draft NRHP nomination form for the railroad is finalized), and approximately 300 feet northwest of the FBHD. ST 14 is within the RPMP IVDP's Industrial Area Preservation District (13). Historic preservation visual restrictions there require that new construction adjacent to the historic district conform to the RPMP IPS, which limit building heights to 260 feet above sea level. The RPMP IPS describe the Regulating Plan that applies to the Industrial Area District. In particular, buildings in that area should accommodate warehouse/flex space and/or administrative functions with utilitarian, simple design character; stormwater management systems may also be developed within this zone.

In compliance with Section 106, prior to the beginning of construction, Fort Belvoir would review ST 14 in accordance with 36 CFR 800 or the MOD PA if the PA has been executed. The review would determine both the direct effects the project would have on the FBMRR property (based on formal identification and evaluation of contributing and non-contributing elements of the FBMRR in the final NRHP nomination

form) and the indirect effects it would have on the FBHD. As development of the stormwater management facility would proceed in accordance with the RPMP IVDP and the RPMP IPS, ST 14 is not expected to result in adverse effects on the FBMRR property or the FBHD.

ST 25 – Name Brand Casual Dining Restaurant

This project's footprint is within the footprint of ST 1 and ST 28 (PX/Commissary expansion). NEPA and Section 106 evaluation have been completed for ST 1 and ST 28 (see Table 3.3-4). No effects to architectural resources were found for these projects. Therefore, ST 25 is not anticipated to have such effects either. Section 106 review for ST 25 would be completed prior to the start of construction in accordance with 36 CFR 800 or according to the terms of the MOD PA if the PA has been executed.

ST 32 – 249th Battalion HQ

ST 32 is located on South Post in the Land Disturbance APE. It lies immediately west of a portion of the NRHP-eligible FBMRR (status of contributing and non-contributing elements to be determined in the final NRHP nomination form), east of which the NRHP-eligible FBHD is located. ST32 is within the RPMP IVDP's Industrial Area Preservation District (13). The Regulating Plan for the Industrial Area District is described in the RPMP IPS. Historic preservation restrictions and planning standards for this area are the same as described for ST 14. In addition to new construction, ST 32 would require the removal of three buildings yet to be identified because the Facilities Reduction Program mandates demolition when replacing certain types of facilities.

In compliance with Section 106, prior to the beginning of demolition and construction operations, Fort Belvoir would evaluate the potential effects of ST 32 in accordance with 36 CFR 800 or the MOD PA if the PA has been executed. New construction may be within the viewshed of the FBMRR and the FBHD. However, provided that it conforms to the RPMP IVDP and IPS, as applicable, no adverse effects to the FBMRR and the FBHD are anticipated. Before making a decision as to which buildings to demolish, the NRHP status of the candidate buildings would be determined. Fort Belvoir would avoid selecting eligible buildings for demolition. However, if demolishing eligible building is unavoidable, measures to mitigate the resulting adverse effect would be specified in an MOA.

ST 35 – Retail Fuel Point

ST 35 is located on South Post in the Land Disturbance APE. There are no historic architectural resources in its immediate vicinity. The closest historic architectural resources are the NRHP-eligible FBMRR, approximately 900 feet to the east, and the NRHP-eligible FBHD, approximately 1,000 feet to the east. ST 35 is within the RPMP IVDP Industrial Area Preservation District (13). The Regulating Plan for this district is described in the RPMP IPS. Historic preservation restrictions and planning standards for this area are those summarized above under ST 14.

In compliance with Section 106, prior to the beginning of construction, the potential effects of the project on historic architectural resources would be considered in accordance with 36 CFR 800 or the MOD PA if the PA has been executed. It can be noted that ST 35 falls under the list of exemptions included in the draft MOD PA. Exempt actions are those for which the PA specifies a streamlined review process because they have no potential to result in adverse effects to architectural resources. ST 35 would not take place near a listed or eligible historic district, adjacent to an individual historic property, or within the viewshed of adjacent historic properties. In addition, new construction would proceed in accordance with the RPMP IVDP and RPMP IPS. On this basis, ST 35 is not expected to result in any adverse effects to historic architectural resources.

ST 36 – 29th Infantry HQ

ST 36 is located on North Post in the Land Disturbance APE. There are no historical architectural resources in its immediate vicinity. The closest historic architectural resources are the NRHP-eligible Amphitheater, roughly 1,400 feet to the north, and the NRHP-eligible FBMRR, approximately 1,400 feet to the west. In addition, ST 36 lies approximately 1,400 feet to the west of the NRHP-eligible/Fairfax County Woodlawn Historic Overlay District.

ST 36 is within the RPMP IVDP's Lower North Post Preservation District (7). The plan specifies the following restriction with respect to the potential visual impacts of new development in that area: new building must not exceed 190 feet above sea level in height. With respect to potential auditory impacts, no weekend construction should occur within a half mile of the Woodlawn Quaker Meetinghouse or Woodlawn United Methodist Cemetery. The plan also indicates that land use in the area should be Professional/Institutional.

The RPMP IPS Regulating Plan for the Lower North Post Central area, where ST 36 is located, specifies that buildings in that area are part of a development pattern that is intended to create a denser grouping of activities. Administrative buildings and parking garages/decks are envisioned.

In addition to new construction, ST 36 involves the removal of Building 1906, constructed in 1981. When ST 36 is implemented (scheduled for FY 2016), Building 1906 will be less than 50 years old and not eligible for listing in the NRHP.

In compliance with Section 106, prior to the beginning of demolition and construction operations, the potential effects of ST 36 on historic architectural resources would be considered in accordance with 36 CFR 800 or the MOD PA if the PA has been executed. It can be noted that ST 36 falls under the list of exemptions included in the draft MOD PA, a category of actions for which the PA specifies a streamlined review process because they have no potential to result in adverse effects to architectural resources. ST 36 would not take place near a listed or eligible historic district, adjacent to an individual historic property, or within the viewshed of adjacent historic properties. In addition, new construction would proceed in accordance with the RPMP IVDP and IPS. Therefore, it is not anticipated that ST 36 would result in adverse effects to historic architectural resources.

ST 37 – Medical Office Building

ST 37 is located on South Post in the Land Disturbance APE. There are no historic architectural resources in its vicinity. The closest historic architectural resources are approximately 1,600 feet away: the NRHP-eligible FBMRR to the west and the NRHP-eligible/Fairfax County Woodlawn Historic Overlay District to the northeast. ST 37 is within the RPMP IVDP Medical Preservation District (11). In this district, the plan's historic preservation visual restrictions indicate that building height should not exceed 220 feet above sea level. In terms of auditory restrictions, the plan indicates that development should be consistent with the land use plan, which calls for Professional/Institutional uses. With regard to historic preservation land use restrictions, the plan indicates that vegetative screening should be retained to the greatest extent possible.

According to the RPMP IPS, the Medical District is comprised of modern buildings. Future development associated with or adjacent to these facilities should match the architectural style, detailing, and materials and colors of the existing facilities to create a cohesive visual canvas.

In compliance with Section 106, prior to the beginning of construction, Fort Belvoir would consider the potential effects of ST 37 on historic architectural resources consistent with the procedures in 36 CFR 800 or the MOD PA if the PA has been executed. It can be noted that ST 37 falls under the list of exemptions included in the draft MOD PA, a category of actions for which the PA specifies a streamlined review process because they have no potential to result in adverse effects to architectural resources. ST 37 would not take place near a listed or eligible historic district, adjacent to an individual historic property, or within the viewshed of adjacent historic properties. In addition, new construction would proceed in accordance

with the RPMP IVDP and IPS. Therefore, ST 37 is not expected to result in adverse effects to historic architectural resources.

ST 39 – Multipurpose Fields

ST 39 is located on South Post in the Land Disturbance APE. The project site lies immediately north of the NRHP-eligible FBHD, approximately 300 feet west of the NRHP-eligible FBMRR (which appears to be defunct in this area; however this may change as the draft NRHP nomination form for the railroad is finalized), and within the RPMP IVDP's Town Center Preservation District (14). In terms of historic preservation visual restrictions, the plan indicates that new construction adjacent to the historic district should conform to the RMPM IPS and be compatible in size and massing to the adjacent historic district. With regard to auditory and land use restrictions, the plan indicates that development should be consistent with the land use plan, which calls for Community uses. According to the RPMP IPS Town Center Regulating Plan, areas reserved for open space within this district are mainly for recreation facilities, pedestrian outdoor space, tree preservation, and building setbacks.

In compliance with Section 106, Fort Belvoir would review ST 39 prior to project implementation and determine its potential effects on the FBHD and FBMRR (based on formal identification and evaluation of contributing and non-contributing elements of the FBMRR in the final NRHP nomination form) in accordance with 36 CFR 800 or the MOD PA, if the PA has been executed. Because the site of ST 39 lies immediately north of the FBHD boundary, it is anticipated that it may have an indirect effect on the district's viewshed. Nevertheless, because the project would be designed in accordance with the RPMP IVDP and IPS, no adverse effects on the district are anticipated. No adverse effects on the FBMRR are anticipated either, as the railroad does not appear to be extant in this area. (Even if this finding is changed when the nomination form is finalized, viewsheds are not likely to be a component of this industrial site's integrity and the construction of recreational fields is not likely to have adverse visual effects.)

ST 40 – DLA Parking Garage

ST 40 is located on North Post in the Land Disturbance APE. It is far-removed from any existing historic architectural resources (the closest one is the NRHP-eligible FBMRR, more than 2,000 feet to the southwest). It is within the RPMP IVDP's DLA/INSCOM Preservation District (4). In this district, new construction should conform to airfield height restrictions and be consistent with the land use plan, which calls for Professional/Institutional uses. Per the RPMP IPS, new development in the DLA/INSCOM District should match existing development.

Prior to construction, Fort Belvoir would review this project in compliance with Section 106 and consistent with either 36 CFR 800 or the provisions of the MOD PA, if the PA has been executed. It should be noted that ST 40 falls under the list of exemptions included in the draft MOD PA, a category of actions for which the PA specifies a streamlined review process because they have no potential to result in adverse effects to architectural resources. ST 40 would not take place near a listed or eligible historic district, adjacent to an individual historic property, or within the viewshed of adjacent historic properties. New construction would proceed in accordance with the RPMP IVDP and IPS. Therefore, ST 40 is not anticipated to result in adverse effects on historic architectural resources.

ST 42 – Unaccompanied Enlisted Personnel Barracks

ST 42 is located on North Post in the Land Disturbance APE. The project site lies approximately 700 feet southeast of the NRHP-eligible Amphitheater, approximately 2,000 feet west of the NRHP-eligible FBMRR, and slightly less than one half mile east of the NRHP-eligible/Fairfax County Woodlawn Historic Overlay District. It is within the RPMP IVDP's Lower North Post Preservation District (7) and subject to the RPMP IPS Lower North Post Central Area Regulating Plan. Historic preservation restrictions and planning standards for this area are the same as for ST 36.

While the removal of existing tennis courts and the new construction associated with ST 42 may be noticeable from the Amphitheater, they are not likely to be visible from the FBMRR and Woodlawn Historic District. Before the beginning of construction, in compliance with Section 106, Fort Belvoir would review the potential effects of ST 42 on these resources consistent with the regulations at 36 CFR 800 or the terms of the MOD PA if the PA has been executed. Provided that new construction proceeds in accordance with the RPMP IVDP and IPS, no adverse effects on the Amphitheater, FBMRR, or the Woodlawn Historic District are anticipated.

ST 44 – Baseball Field Replacement

ST 44 is located on South Post in the Land Disturbance APE, approximately 750 feet west of the NRHP-eligible FBHD, Thermo-Con House, and FBMRR. It is within the RPMP IVDP's Recreation Preservation District (19). In terms of historic preservation visual restrictions, the plan's guidance for construction of buildings is not relevant to the construction of baseball fields. With regard to auditory and land use restrictions, the plan indicates that development should be consistent the future land use in the area, i.e., Community land use. Per the RPMP IPS, the area is characterized by active and passive recreational uses.

In compliance with Section 106, Fort Belvoir would review the potential effects of ST 44 on the FBHD, Thermo-Con House, and FBMRR before construction begins. The review would be conducted in accordance with the regulations at 36 CFR 800 or the terms of the MOD PA if the PA has been executed. Because ST 44 is located approximately 750 feet west of these resources, it has the potential to have indirect visual effects. However, it is anticipated that compliance with the relevant restrictions and guidelines of the RPMP IVDP and IPS would ensure that ST 44 results in no adverse effects on architectural resources.

ST 45 – Secure Administrative Facility

ST 45 is located on South Post in the Land Disturbance APE. The closest historic architectural resource is the NRHP-eligible FBMRR, approximately 500 feet to the west. ST 45 is within the RPMP IVDP's 1400 East Preservation District (10). With regard to historic preservation visual restrictions, building heights in this area are limited to 180 feet above sea level east of Gunston Road. In terms of auditory and land use restrictions, the plan indicates that vegetative screening should be retained to the greatest extent possible and future development should conform to Professional/Institutional land uses.

The RPMP IPS Regulating Plan for the 1400 Area East District specifies that buildings constructed in this area should be part of an overall urban composition creating a consistent visual theme. Administrative buildings and parking garages/decks are envisioned.

Before construction begins, Fort Belvoir would review the potential effects of ST 45 on the FBMRR in compliance with Section 106 in accordance with 36 CFR 800 or the MOD PA if the PA has been executed. While the project may be visible from the railroad, it is unlikely to adversely affect it, as the FBMRR is an industrial resource the significance of which is not likely dependent on viewsheds. It should be noted that this could change based on the final NRHP nomination form prepared for the FBMRR. Additionally, the project would comply with the RPMP IVDP and IPS guidance. On this basis, no adverse effects are anticipated.

ST 47 – Religious Education Center

ST 47 is located on North Post in the Land Disturbance APE. It is adjacent to the northern boundary of the Fairfax County Woodlawn Historic Overlay District and possibly the NRHP-eligible Woodlawn Historic District, whose boundary is yet to be defined. It is within the RPMP IVDP North Post Community Support Preservation District (5). In terms of historic preservation visual restrictions, building heights in that area should not exceed 230 feet above sea level. With regard to auditory and land use restrictions, the plan indicates that development should be consistent with Community land use. For the North Post Community

Support District, the RPMP IPS specifies simple, straightforward, and contextual architecture that is evocative of Fort Belvoir's historic core.

In compliance with Section 106, prior to project implementation, Fort Belvoir would assess the potential effects of ST 47 on the Woodlawn Historic District in accordance with 36 CFR 800 or the MOD PA if the PA has been executed. Because ST 47 would be adjacent to the northern boundary of the district, indirect effects are possible. However, as the proposed religious education center would be designed in accordance with the specifications and guidelines in the RPMP IVDP and IPS, no adverse effects on the Woodlawn Historic District are anticipated.

ST 48 – INSCOM Controlled Humidity Warehouse

ST 48 is located on South Post in the Land Disturbance APE. Based on the historic alignment of the FBMRR, ST 48 is within a portion of this resource. According to aerial views, the railroad appears to be defunct in this area (however, this may change as the NRHP nomination form is finalized). ST 48 also is adjacent to the western side of the NRHP-eligible FBHD. It is within the RPMP IVDP Industrial Area Preservation District (13). The Industrial Area Regulating Plan is described in the RPMP IPS. Historic preservation restrictions and planning standards for this area are those described for ST 14.

In compliance with Section 106, Fort Belvoir would review ST 48 prior to implementation to assess the project's potential effects on historic architectural resources in accordance with 36 CFR 800 or the MOD PA if the PA has been executed. Specifically, the review would determine both the nature of any direct effects on the FBMRR and indirect effects on the FBHD. As indicated above, the railroad may be defunct in this area. The warehouse would be designed in accordance with the applicable specifications and guidance in the RPMP IVDP and IPS and adverse visual effects are unlikely. Buildings 1144 and 1145 are currently standing on the ST 48 site and would have to be removed. However, neither building is NRHP-eligible. Therefore, ST 48 is not anticipated to result in adverse effects on historic architectural resources. (If, as the nomination form for the FBMRR is finalized, the railroad is found to be extant and contributing to the NRHP-eligible FBMRR in this area and direct impacts to the site cannot be avoided, Fort Belvoir would work with the Virginia SHPO and other consulting parties, as appropriate, to mitigate this adverse effect. The agreed-upon mitigation measures would be specified in a MOA.)

ST 49 – 911th Engineering Company Operations Complex

ST 49 is located on North Post in the Land Disturbance APE. It lies approximately 100 feet west of the Fairfax County-designated Accotink United Methodist Church; approximately 1,200 feet northwest of the NRHP-eligible Camp A.A. Humphreys Pump Station & Filter Building; and approximately 250 feet south of the NRHP-eligible FBMRR. It is within the RPMP IVDP DLA/INSCOM Preservation District (4). Historic preservation restrictions and planning standards for this area are those described for ST 40.

Prior to construction, Fort Belvoir would review ST 49 in compliance with Section 106 and according to the regulations at 36 CFR 800 or the terms of the MOD PA if the PA has been executed. The review would determine the project's effects, if any, on Accotink United Methodist Church, Camp A.A. Humphreys Pump Station & Filter Building, and the FBMRR. Because of its proximity to the church and railroad, ST 49 may have indirect effects on the viewshed associated with these resources (it is unlikely that ST 49 would be visible from the pump station). Development of the operations complex would proceed in accordance with the RPMP IVDP and IPS, however, and adverse visual effects are not anticipated.

As part of the project, Buildings 2476 and 2477 would be demolished. The potential effects of this demolition would be assessed during the Section 106 review. Building 2476, constructed in 1963, is 50 years old but has not been evaluated for NRHP-eligibility. The status of Building 2477 is undetermined at the time of writing. As part of the Section 106 review, Fort Belvoir would ascertain the status of both buildings. If either building is NRHP-eligible, demolition would constitute an adverse effect. Fort Belvoir would then either modify the project to avoid demolishing the building or buildings; or it would develop

mitigation measures in consultation with the Virginia SHPO and other consulting parties, as appropriate. The agreed-upon measures would be specified in an MOA.

ST 50 – Vehicle Maintenance Shop Modernization

ST 50 is located on South Post in the Land Disturbance APE. It is within the NRHP-eligible FBHD and the RPMP IVDP Historic Core Preservation District (15). In this area, maintenance, repair, and additions to historic properties should conform to the *Secretary of Interior's Standards* and the *Design Guidelines for DoD Historic Buildings and District*. The plan also indicates that development should be consistent with the future land use plan, which calls for Industrial uses. Per the RPMP IPS Historic Core Regulating Plan, buildings in this area are part of a historic development that has unique architectural character. Future buildings must maintain the district's integrity, with uniform street setbacks and height, form, and massing that match those of the existing structures.

Buildings 187 and 189, contributing buildings to the NRHP-eligible FBHD, currently occupy part of the site for ST 50. If possible at all, Fort Belvoir would retain those two buildings in their current condition. However, if necessary to implement the project, the buildings may be demolished. Up to nine additional buildings may also be demolished as part of the project. Exactly how many, if any, and which buildings would be demolished has not yet been determined. When plans are firmed up, further NEPA documentation would be done for this project.

In compliance with Section 106, prior to implementing the project, Fort Belvoir would evaluate its potential effects in accordance with the procedures specified in 36 CFR 800 or the MOD PA if the PA has been executed. New construction would be designed in accordance with the guidelines and restrictions defined in the RPMP IVDP and IPS and, as a result, no indirect adverse effects on the historic district are anticipated. However, the demolition of eligible buildings, if it occurs, would constitute an adverse effect. Fort Belvoir would work with the Virginia SHPO and other consulting parties, as appropriate, to mitigate this adverse effect. The agreed-upon measures would be specified in an MOA.

ST 51 – Information Systems Facility for the Network Enterprise Center

ST 51 is located on South Post in the Land Disturbance APE. It overlaps with a portion of the NRHP-eligible FBMRR, which, however, appears to be defunct in this area (this may change after the NRHP nomination form is finalized) and it lies just west of the NRHP-eligible FBHD and NRHP-eligible Thermo-Con House. ST 51 is in the RPMP IVDP Industrial Area Preservation District (13) and the RPMP IPS Industrial Area Regulating Plan zone. Applicable restrictions are the same as those described for ST 14.

In compliance with Section 106, Fort Belvoir would review the project prior to implementation in accordance with the procedures at 36 CFR 800 or the terms of the MOD PA if the PA has been executed. The review would determine whether the project would have a direct adverse effect on the FBMRR and indirect adverse effects on the FBHD and Thermo-Con House. As indicated above, the railroad appears to be defunct in this area. In addition, it is anticipated that development of the enterprise center would proceed in accordance with the RPMP IVDP and IPS. On this basis, ST 51 is not anticipated to result in adverse effects on the FBMRR, FBHD, or Thermo-Con House. (If the FBMRR is found to be extant and contributing to the NRHP-eligible FBMRR in this area and it is determined that the project would have an adverse effect on it, Fort Belvoir would either amend the project to avoid this adverse effect or work with the Virginia SHPO and appropriate consulting parties to develop mitigation measures and execute an MOA.)

ST 52 – DLA HQ Building

ST 52 is located on North Post in the Land Disturbance APE. There are no historic architectural resources in its vicinity. The closest resource is the NRHP-eligible FBMRR, which is approximately 1,500 feet east, far-removed from the project. It is situated in the RPMP IVDP DLA/INSCOM Preservation District (4) and the

DLA/INSCOM District as described in the RPMP IPS. Historic preservation restrictions and planning standards for this area are the same as for ST 40.

Before construction begins, in compliance with Section 106, Fort Belvoir would review the potential effects of ST 52 on historic architectural resources consistent with the regulations at 36 CFR 800 or the terms of the MOD PA if the PA has been executed. It should be noted that ST 52 would be considered an exempt undertaking in the PA. Exempt undertakings are those with no potential to affect historic properties; the PA streamlines the Section 106 review for such projects. In addition, project design would proceed in accordance with the relevant guidance and specifications contained in the RPMP IVDP and IPS. On this basis, no adverse effects are anticipated.

Short-Term Transportation Projects

NEPA documentation and Section 106 review have been completed or is underway for three of the seven short-term transportation projects. Table 3.3-4 provides a list of these projects and the conclusions of Section 106 review. An analysis of the potential effects of the remaining four short-term transportation projects on historic architectural resources is provided below.

STT 4 – John J. Kingman Road/Fairfax County Parkway Intersection Improvements

STT 4 is located on North Post in the Land Disturbance APE. It bisects a portion of the NRHP-eligible FBMRR. The status of the railroad in this area is not known (a draft NRHP nomination form is being prepared to identify contributing and non-contributing elements of the resource). The RPMP IVDP identifies John J. Kingman Road as a Primary Roadway. The plan provides for the preservation of the network grid of streets to ensure the efficiency of existing roads. According to the RPMP IPS, John J. Kingman Road is classified as a Primary Roadway I: Parkway, and possesses scenic qualities. The planning standards provide design guidance for intersections based on roadway type.

Prior to project implementation, Fort Belvoir would review STT 4 in compliance with Section 106. The project's potential effects would be evaluated consistent with the regulations at 36 CFR 800 or the terms of the MOD PA if the PA has been executed. It is anticipated that the proposed intersection improvements would be designed in accordance with RPMP IVDP and IPS, minimizing any effects on the FBMRR. STT 4 is not expected to result in adverse effects to the railroad. (If the NRHP nomination form determines the railroad to be a contributing element in this area, and it is determined that the project would have an adverse effect on it, Fort Belvoir would either amend the project to avoid this adverse effect or work with the Virginia SHPO and appropriate consulting parties to develop mitigation measures and execute an MOA.)

STT 5 – Transit Hub

STT 5 is located on South Post in the Land Disturbance APE. Two alternative locations have been proposed for this project: Pence Gate off Belvoir Road or 12th Street and Gunston Road. The potential impacts of each alternative on historic architectural resources are assessed below.

Pence Gate off Belvoir Road. The Pence Gate site is located along the western edge of the Fairfax County Woodlawn Historic Overlay District and possibly the NRHP-eligible Woodlawn Historic District, whose boundary is yet-to-be-mapped. The closest contributing resource within the district to STT 5 is the Woodlawn Baptist Church & Cemetery, to the northeast. The Woodlawn Viewshed Protection Area on the south side of US Route 1 is located northwest of STT 5.

The Pence Gate location is within the RPMP IVDP South Post Community Support Preservation District (12). Historic preservation visual restrictions in this area specify that building heights should not exceed 180 feet above sea level. Auditory restrictions call for no weekend construction within one half-mile of the Woodlawn Quaker Meetinghouse. Land use restrictions consist of no development between US Route 1 and Casey Road, just north of the proposed transit hub; additionally, vegetative screening should be preserved to

the greatest extent possible. Finally, development should be consistent with the future land use plan for the area, which calls for Community land uses. The RPMP IPS South Post Community Support District Regulating Plan applies to the Pence Gate location. In this area, buildings should be uniform and include civic, commercial, administrative, and parking garages/decks.

Prior to construction, Fort Belvoir would review the project in compliance with Section 106 and consistent with the regulations at 36 CFR 800 or the terms of the MOD PA if the PA has been executed. Fort Belvoir would work with the Virginia SHPO and other consulting parties, as appropriate, to determine whether the project would affect the Woodlawn Historic District. While it is anticipated that STT 5 would have a direct effect on the district, it is likely that this effect would not be adverse provided the proposed transit hub is designed and constructed in accordance with the RPMP IVDP and avoids encroaching upon the Woodlawn Viewshed Protection Area.

12th Street and Gunston Road. The 12th Street and Gunston Road site is located just east of the NRHP-eligible FBMRR and approximately 1,200 feet north of the NRHP-eligible FBHD. The site is within the Town Center Preservation District (14) and subject to the Town Center Regulating Plan described in the RPMP IPS. Historic preservation restrictions and planning standards for this area are those described for ST 39. According to the RPMP IPS, projects in this area should be designed in a manner that maintains a consistent urban appearance and relates to adjacent counterparts in terms of height, form, and massing. Buildings should include mixed-use, commercial, civic, administrative, residential, and parking garages/decks.

Prior to construction, Fort Belvoir would review the project in compliance with Section 106 and consistent with the regulations at 36 CFR 800 or the terms of the MOD PA if the PA has been executed. Fort Belvoir would work with the Virginia SHPO and other consulting parties, as appropriate, to determine whether the project would have indirect visual effects on the FBMRR. (Given the distance between STT 5 and the FBHD, it is not likely that it would be visible from the district.) Provided the proposed transit hub is designed and constructed in accordance with the RPMP IVDP and IPS, no adverse effects are anticipated.

STT 6 – On-Post Intersection and Road Improvements

The character of the improvements to be implemented under STT 6 is not yet defined, as it would depend on yet-to-be-determined transportation impacts and needs arising from other projects. In general, however, it can be assumed that the improvements would consist of new traffic signals, adjustment to existing signals, or addition of turn lanes at entries and intersections on North and South Post.

Prior to implementation, Fort Belvoir would review this project in compliance with Section 106. Potential effects would be evaluated in accordance with 36 CFR 800 or the terms of the MOD PA if the PA has been implemented. Due to the likely character of the proposed improvements, adverse effects to historic architectural resources are not anticipated.

STT 7 – Walker Gate Improvements

STT 7 is located on South Post in the Land Disturbance APE. It is situated within the Fairfax County Woodlawn Historic Overlay District and likely in the NRHP-eligible Woodlawn Historic District, although this district is yet to be mapped. The closest contributing resource to STT 7 is the George Washington's Distillery and Grist Mill. Walker Gate is also partially within the Woodlawn Viewshed Protection Area, located on the north side of Mount Vernon Road.

STT 7 is in the RPMP IVDP Community Activities Preservation District (18). In terms of historic preservation visual restrictions, new construction adjacent to the historic district should conform to RPMP IPS and be compatible in size and massing with the district. Development should be consistent with the future land use plan for this area, which calls for Residential land uses.

In compliance with Section 106, Fort Belvoir would review STT 7 prior to project implementation in accordance with 36 CFR 800 or the MOD PA if the PA has been executed. It is anticipated that the project would have a direct effect on the Woodlawn Historic District and the Woodlawn Viewshed Protection Area. However, the proposed gate improvements would be designed and constructed in accordance with the RPMP IVDP and IPS and as such, this effect is not expected to be adverse. The gate improvements would not involve the construction of structures exceeding the 150-foot height threshold established for the Woodlawn Viewshed Protection Areas in the *Woodlawn Historic District Viewshed Study*; therefore, no adverse visual effects are anticipated.

Long-Term Projects

LT 1 – Lower North Post District

LT 1 is located on North Post in the Land Disturbance APE. The closest historic architectural resource is the NRHP-eligible/Fairfax County Woodlawn Historic Overlay District, approximately 700 feet to the east. The NRHP-eligible Amphitheater is located roughly 1,300 feet to the north. LT 1 is in the RPMP IVDP Lower North Post Preservation District (7). According to the RPMP IPS, the area is covered by the LT 1 Lower North Post Central Area Regulating Plan. Historic preservation restrictions and planning standards for this area are the same as described for ST 36.

Construction and demolition activities associated with LT 1 would be reviewed by Fort Belvoir in compliance with Section 106 prior to project implementation. Their potential effects on historic architectural resources would be evaluated in accordance with 36 CFR 800 or the terms of the MOD PA if the PA has been executed. New construction may be visible from the Woodlawn Historic District; given the distance, it is less likely to be visible from the Amphitheater. Provided that the new buildings and structures are designed in conformity with the RPMP IVDP and IPS, as applicable, adverse effects to the Woodlawn Historic District and Amphitheater are not likely.

However, it should be noted that some of the buildings in the vicinity of LT 1 may reach the 50-year threshold by the time the project is ready for implementation. As part of the Section 106 review, Fort Belvoir would review all buildings with the potential to be directly or indirectly affected by the project to determine their age and, if they are older than 50 years, their NRHP status. If potentially affected buildings are found eligible, Fort Belvoir would avoid, minimize, or mitigate potential adverse effects. If mitigation is required, it would be specified in an MOA.

LT 2 – 1400 East District

LT 2 is located on South Post in the Land Disturbance APE. The closest architectural resource is the NRHP-eligible FBMRR, approximately 250 feet to the west. LT 2 is in the RPMP IVDP 1400 East Preservation District (10). According to the RPMP IPS, LT 2 is covered by the 1400 Area East Regulating Plan. Historic preservation restrictions and planning standards for this area are those described for ST 45.

Construction and demolition activities associated with LT 2 would be reviewed by Fort Belvoir in compliance with Section 106 prior to project implementation. Their potential effects on historic architectural resources would be evaluated in accordance with 36 CFR 800 or the terms of the MOD PA if the PA has been executed. It is unlikely that the construction associated with LT 2 would have an adverse visual effect on FBMRR, as the railroad is an industrial resource whose significance is not likely linked to a viewshed. It should be noted that this could change based on the final NRHP nomination form prepared for the FBMRR. The risk of visual effects would be further reduced by adherence to RPMP IVDP and IPS.

However, buildings that could potentially be directly or indirectly affected by the implementation of LT 2 may have reached 50 years of age when the project is ready for implementation. As part of the Section 106 review, Fort Belvoir would review all buildings with the potential to be directly or indirectly affected by the project to determine their age and, if they are older than 50 years, their NRHP status. If potentially affected

buildings are found eligible, Fort Belvoir would avoid, minimize, or mitigate potential adverse effects. If mitigation is required, it would be specified in an MOA.

LT 3 – South Post Community Support District

LT 3 is located on South Post in the Land Disturbance APE. It lies within the Fairfax County Woodlawn Historic Overlay District and likely the NRHP-eligible Woodlawn Historic District, although this district is yet-to-be mapped. LT 3 is closest to two contributing resources within the district: Woodlawn Baptist Church & Cemetery and Woodlawn Quaker Meetinghouse. It is also situated immediately south of the Woodlawn Viewshed Protection Area on the south side of US Route 1.

LT 3 is within the RPMP IVDP South Post Community Support Preservation District (12) and covered by the RPMP IPS South Post Community Support Regulating Plan. Historic preservation restrictions and planning standards for this area are those described for STT 5 (Pence Gate).

Construction and demolition activities associated with LT 3 would be reviewed by Fort Belvoir in compliance with Section 106 prior to project implementation. Their potential effects on historic architectural resources would be evaluated in accordance with 36 CFR 800 or the terms of the MOD PA if the PA has been executed. It is anticipated that the project would have a direct effect on the Woodlawn Historic District and Woodlawn Viewshed Protection Area. However, this effect would not likely be adverse if the project is designed and constructed in accordance with the RPMP IVDP. Regarding the Woodlawn Viewshed Protection Area, it is anticipated that LT 3 would have no adverse visual effect provided it stays below the 150-foot high threshold established for the area described in the *Woodlawn Historic District Viewshed Study*.

As for the other long-term projects, it should be noted that some of the buildings in the vicinity of LT 3 may reach the 50-year threshold by the time the project is ready for implementation. As part of the Section 106 review, Fort Belvoir would review all buildings with the potential to be directly or indirectly affected by the project to determine their age and, if they are older than 50 years, their NRHP status. If potentially affected buildings are found eligible, Fort Belvoir would avoid, minimize, or mitigate potential adverse effects. If mitigation is required, it would be specified in an MOA.

LT 4 – Administrative Campus District

LT 4 is located on South Post in the Land Disturbance APE. It is far removed from historic architectural resources, lying roughly 1,500 feet northeast of the NRHP-eligible FBHD. LT 4 is in the Preservation District designated Administrative District (17) in the RPMP IVDP. In terms of historic preservation visual restrictions, new construction in this area should not exceed 210 feet above sea level. In terms of historic preservation auditory and land use restrictions, the plan indicates that development should be consistent with the Administrative Campus District land use called for in this area. LT 4 is covered by the RPMP IPS Administrative Campus Regulating Plan. Under the plan, buildings in this area are part of a development pattern that is intended to create a denser grouping of activities with administrative, parking garages/decks, and mixed-use buildings. Height restrictions and viewshed protections are active in this district for historic preservation purposes.

Construction and demolition activities associated with LT 4 would be reviewed by Fort Belvoir in compliance with Section 106 prior to project implementation. Their potential effects on historic architectural resources would be evaluated in accordance with 36 CFR 800 or the terms of the MOD PA if the PA has been executed. LT 4 is not likely to affect the FBHD due to distance. As such, if the MOD PA has been executed, a streamlined review process may be appropriate, as LT 4 would qualify as an “exempt” project under Attachment H of the PA as a project that would not take place near a listed or eligible historic district, adjacent to an individual historic property, or within the viewshed of adjacent historic properties. Any risk of adverse effects would be further reduced by adhering to the applicable guidelines from the RPMP IVDP and IPS. Thus, no adverse effects are anticipated.

However, buildings that could potentially be directly or indirectly affected by the implementation of LT 4 may have reached 50 years of age when the project is ready for implementation. As part of the Section 106 review, Fort Belvoir would review all buildings with the potential to be directly or indirectly affected by the project to determine their age and, if they are older than 50 years, their NRHP status. If potentially affected buildings are found eligible, Fort Belvoir would avoid, minimize, or mitigate potential adverse effects. If mitigation is required, it would be specified in an MOA.

LT 5 – Town Center District

LT 5 is located on South Post in the Land Disturbance APE. It is within the northernmost portion of the NRHP-eligible FBHD and adjacent to the east of the NRHP-eligible FBMRR. The site lies in the RPMP IVDP Town Center Preservation District (14) and the RPMP IPS Town Center Regulating Plan zone. Historic preservation restrictions and planning standards for this area are those described for ST 39. Buildings should be uniform and include mixed-use, commercial, civic, administrative, residential, and parking garages/decks.

Construction and demolition activities associated with LT 5 would be reviewed by Fort Belvoir in compliance with Section 106 prior to project implementation. Their potential effects on historic architectural resources would be evaluated in accordance with 36 CFR 800 or the terms of the MOD PA if the PA has been executed. New construction associated with LT 5 may have an effect on the FBHD, as the project site partially overlaps with the district. However, this effect is not likely to be adverse if the project complies with the applicable guidelines and restrictions stated in the RPMP IVDP and IPS. Additionally, LT 5 is unlikely to visually affect the nearby FBMRR because the railroad is an industrial resource whose significance is not likely linked to a viewshed. It should be noted that this could change based on the final NRHP nomination form prepared for the FBMRR. Nonetheless, adverse effects are not expected to these resources.

As for the other long-term projects, implementation of LT 5 may directly or indirectly affect nearby existing buildings, some of which are eligible (e.g., Buildings 1156, 1157, and 1158) and some of which may have reached the 50-year threshold by the time the project is ready for construction. In the latter case, as part of the Section 106 review, Fort Belvoir would evaluate the NRHP status of the buildings. Fort Belvoir would avoid demolishing eligible buildings and would work to avoid or minimize indirect effects as much as possible. If direct or indirect adverse effects are unavoidable, mitigation measures would be developed in consultation with the SHPO and other consulting parties, as appropriate, and an MOA would be executed.

LT 6 – Industrial Area District

LT 6 is located on South Post in the Land Disturbance APE. It overlaps a portion of the NRHP-eligible FBMRR, which is defunct in this area (however, this may change as the draft NRHP nomination form for the railroad is finalized). It is also just west of the NRHP-eligible FBHD and just northwest of the NRHP-eligible Thermo-Con House. It is in the RPMP IVDP Industrial Area Preservation District (13) and subject to the Industrial Area Regulating Plan described in the RPMP IPS. Historic preservation restrictions and planning standards for this area are the same as described for ST 14.

Prior to the implementation of LT 6, Fort Belvoir would review the project in compliance with Section 106 and in accordance with the regulations at 36 CFR 800 or the terms of the MOD PA if the PA has been executed. The review would determine the direct effects the project would have on the FBMRR, and indirect effects on the FBHD and the Thermo-Con House. As indicated above, the railroad is defunct in this area so effects are not anticipated. However, this may change when contributing and non-contributing elements of the FBMRR are identified in the NRHP nomination form. The development of LT 6 would proceed in accordance with the applicable guidelines and restrictions defined in the RPMP IVDP and IPS, and consequently, is not expected to have adverse effects on the FBHD or Thermo-con House.

By the time LT 6 is ready for implementation, some nearby buildings may have aged into potential NRHP eligibility (50 years or older). If so, as part of the Section 106 review process, Fort Belvoir would determine whether these buildings are indeed eligible. If so, Fort Belvoir would avoid, minimize, or mitigate adverse effects. If adverse effects are unavoidable, mitigation measures would be specified in an MOA.

LT 6A – Lower North Post West District

LT 6A is located on North Post in the Land Disturbance APE. It overlaps with a part of the NRHP-eligible FBMRR. The status of the railroad in this area is unknown (it will be determined when the NRHP nomination form is finalized). LT 6A is also located over 400 feet east of the Fairfax County-designated Accotink Methodist Church, approximately 1,200 feet northeast of the NRHP-eligible Camp A.A. Humphreys Pump Station and Filter Building, and approximately 1,200 feet west of the NRHP-eligible Amphitheater. It lies in the RPMP IVDP Lower North Post Preservation District (7). Applicable historic preservation restrictions are those described for ST 36. LT 6A is also located in the RPMP IPS Lower North Post West Regulating Plan zone. Buildings in this area will have a very specific utilitarian or operational mission function, including warehouse/flex space, administrative, and parking garage/deck buildings. Consequently, building size, form, and mass will very likely vary.

Prior to the implementation of LT 6A, Fort Belvoir would review the project in compliance with Section 106 and in accordance with the regulations at 36 CFR 800 or the terms of the MOD PA if the PA has been executed. Potential effects on the FBMRR, Accotink Methodist Church, Camp A.A. Humphreys Pump and Filter Building, and the Amphitheater would be considered. With regard to the FBMRR, if the resource is extant in this area and LT 6A results in the unavoidable removal of parts of it, this would result in an adverse effect requiring mitigation. Fort Belvoir would work with the Virginia SHPO and other consulting parties, as appropriate to develop an MOA. Visual effects also are anticipated as LT 6A may be visible from Accotink Methodist Church; given the distance to the pump house and amphitheater, visual effects these two resources are not likely. In any case, development within the Industrial Area District, including LT 6A, would proceed in accordance with the RPMP IVDP and IPS, and would be anticipated to result in no adverse visual effects.

In addition, any buildings to be demolished in conjunction with LT 6A or that could be otherwise directly or indirectly affected by the project may reach 50 years old prior to project implementation. Therefore, as part of the Section 106 review process, Fort Belvoir would verify the age of potentially affected buildings and determine the NRHP eligibility of those older than 50 years. If eligible buildings are present, Fort Belvoir would avoid, minimize, or mitigate any adverse effects. If adverse effects are unavoidable, mitigation measures would be specified in an MOA.

LT 7 – North Post Community Support District

LT 7 is located on North Post in the Land Disturbance APE. It is approximately 500 feet west of the NRHP-eligible/Fairfax County Woodlawn Historic Overlay District. It lies in the Preservation District designated North Post Community Support (5) in the RPMP IVDP. Historic preservation restrictions are described under ST 47. LT 7 is also located in the RPMP IPS North Post Community Support District Regulating Plan zone. Buildings in this area are part of an overall development plan and comprise a variety of functional prototypes. These include commercial, mixed-use, civic, administrative, residential, and parking garage/deck building types that will create a uniform visual appearance. The PX and Commissary would be removed and replaced as part of ST 1 and ST 28, respectively. Afterward, development in the district under LT 7 would expand to include a new mixed-use retail and housing area.

Prior to the implementation of LT 7, Fort Belvoir would review the project in compliance with Section 106 and in accordance with the regulations at 36 CFR 800 or the terms of the MOD PA if the PA has been executed. It is anticipated that implementation of LT 7 would have an indirect effect on the Woodlawn

Historic District. Nevertheless, development of North Post Community Support District in accordance with the RPMP IVDP and IPS would be anticipated to prevent this effect from being adverse.

As with the other long-term projects, buildings potentially affected by LT 7 may reach 50 years of age by the time the project is implemented. Therefore, as part of the Section 106 review process, Fort Belvoir would verify the age of potentially affected buildings and determine the NRHP eligibility of those older than 50 years. If eligible buildings are present, Fort Belvoir would avoid, minimize, or mitigate any adverse effects. If adverse effects are unavoidable, mitigation measures would be specified in an MOA.

LT 8 – Historic Core District

LT 8 is located on South Post in the Land Disturbance APE. It is within the NRHP-eligible FBHD, the RPMP IVDP Historic Core Preservation District (15), and the RPMP IPS Historic Core Regulating Plan zone. Historic preservation restrictions and planning standards for this area are described under ST 50.

As part of LT 8, a new parking structure and administrative building would be constructed within the FBHD. The parking structure would be a paved parking lot located south of non-contributing Building 238 and southwest of contributing Building 40. A new administrative building would also be constructed east of contributing Building 184 and west of non-contributing Building 231. To accommodate the new building, non-contributing Building 231 would be removed and replaced with parking.

Prior to the implementation of LT 8, Fort Belvoir would review the project in compliance with Section 106 and in accordance with the regulations at 36 CFR 800 or the terms of the MOD PA if the PA has been executed. Fort Belvoir would work with the Virginia SHPO and other consulting parties, as appropriate, to determine the potential effects of LT 8 on the FBHD. It is anticipated that LT 8 would have a direct effect on the historic district because new construction would occur within the district and a non-contributing building would be removed. As part of the review process, Fort Belvoir would review whether the project conforms to the applicable historic preservation restrictions articulated in the RPMP IVDP. Anticipated compliance with the restrictions and the RPMP IPS, including Appendix B – Technical Design Guidelines – Historic Preservation would ensure no adverse effects on the FBHD.

LT 9 – Fort Belvoir North Area District

LT 9 is located on the FBNA, and no historic architectural resources have been identified in this area. Therefore, no effects to such resources are anticipated. Prior to project implementation, Fort Belvoir would further review the project in compliance with Section 106 and in accordance with the regulations at 36 CFR 800 or the terms of the MOD PA if the PA has been executed. If by the time the project is ready for implementation, nearby resources have reached 50 years of age and could potentially be affected, Fort Belvoir would determine the NRHP eligibility of those resources. If they are found eligible, Fort Belvoir would avoid, minimize, or mitigate any adverse effects. If adverse effects are unavoidable, mitigation measures would be specified in an MOA.

Long-Term Transportation Projects

LTT 1 – John J. Kingman Gate

LTT 1 is located on North Post in the Land Disturbance APE. It is far-removed from historic architectural resources (the closest historic architectural resource is the NRHP-eligible FBMRR, over 2,000 feet to the west). Therefore, no effects to such resources are anticipated. Prior to project implementation, Fort Belvoir would further review the project in compliance with Section 106 and in accordance with the regulations at 36 CFR 800 or the terms of the MOD PA if the PA has been executed. If by the time the project is ready for implementation, any nearby resources have reached 50 years of age and could potentially be affected, Fort Belvoir would determine the NRHP eligibility of those resources. If they are found eligible, Fort Belvoir

would avoid, minimize, or mitigate any adverse effects. If adverse effects are unavoidable, mitigation measures would be specified in an MOA.

LTT 2 – Fairfax County Parkway/John J. Kingman Road Intersections and NMUSA Entrance

LTT 2 is located on North Post in the Land Disturbance APE. Two resources, the Fairfax County Mount Air Historic Overlay District and the NRHP-eligible FBMRR are located just north of the proposed improvement areas. John J. Kingman Road is identified as a Primary Roadway and Primary Roadway I: Parkway in the RPMP IVDP and IPS, respectively. The Fairfax County Parkway is considered a Regional Roadway in the RPMP IVDP.

Prior to the implementation of LTT 2, Fort Belvoir would review the project in compliance with Section 106 and in accordance with the regulations at 36 CFR 800 or the terms of the MOD PA if the PA has been executed. Potential effects on the Mount Air Historic Overlay District and FBMRR would be assessed. It is anticipated that the project would have an indirect effect on both resources. However, if the work proceeds in accordance with the RPMP IVDP and IPS, adverse effects are not likely.

If by the time the project is ready for implementation, any nearby resources have reached 50 years of age and could potentially be affected, Fort Belvoir would determine the NRHP eligibility of those resources. If they are found eligible, Fort Belvoir would avoid, minimize, or mitigate any adverse effects. If adverse effects are unavoidable, mitigation measures would be specified in an MOA.

LTT 3 – US Route 1 Intersections with Fairfax County Parkway, Pohick Road, and Belvoir Road

LTT 3 is located along US Route 1 between North and South Posts in the Land Disturbance APE. Three resources are located in the vicinity of LTT 3: the NRHP-eligible Camp A.A. Humphreys Pump Station and Filter Building, between the US Route 1 and Fairfax County Parkway intersection; the Fairfax County-designated Accotink United Methodist Church, north of the Pohick Road/ US Route 1 intersection; and the NRHP-eligible/Fairfax County Woodlawn Historic Overlay District/Woodlawn Viewshed Protection Area, the western edge of which is adjacent to the US Route 1 and Belvoir Road intersection.

In the RPMP IVDP, Pohick Road and Belvoir Road are classified as Primary Roadways while US Route 1 and Fairfax County Parkway are classified as a Regional Roadways. The RPMP IPS provide design guidance for intersections based on roadway type. According to the planning standards, Pohick Road is classified as a Primary Roadway I: Parkway and Belvoir Road is classified as a Primary Roadway II: Boulevard. Boulevards are interior post roads that serve as principal connectors between destination points and between North and South Post.

Prior to the implementation of LTT 3, Fort Belvoir would review the project in compliance with Section 106 and in accordance with the regulations at 36 CFR 800 or the terms of the MOD PA if the PA has been executed. Potential effects on the Camp A.A. Humphreys Pump Station and Filter Building, the Accotink United Methodist Church, the Woodlawn Historic District, and the Woodlawn Viewshed Protection Area would be evaluated. It is anticipated that the project would have an indirect effect on the pump station and the church and direct effect on the Woodlawn Historic District. Nevertheless, as work proceeds in accordance with the RPMP IVDP and IPS and any improvements would remain below the 150-foot height threshold established for Woodlawn Viewshed Protection Areas in the *Woodlawn Historic District Viewshed Study*, it is anticipated that effects would not be adverse.

If by the time the project is ready for implementation, any nearby resources have reached 50 years of age and could potentially be affected, Fort Belvoir would determine the NRHP eligibility of those resources. If they are found eligible, Fort Belvoir would avoid, minimize, or mitigate any adverse effects. If adverse effects are unavoidable, mitigation measures would be specified in an MOA.

LTT 4 – US Route 1 Overpass

LTT 4 is located between North and South Post in the Land Disturbance APE. The proposed connection between North and South Post over US Route 1 along the Constitution Road alignment would bisect the Woodlawn Viewshed Protection Area outside the NRHP-eligible/Fairfax County Woodlawn Historic Overlay District. The proposed Gorgas Road connection is located just west of the NRHP-eligible/Fairfax County Woodlawn Historic Overlay District and approximately 1,500 feet west of the NRHP-eligible Amphitheater. In the RPMP IVDP, US Route 1 is classified as a Regional Roadway, Constitution Road does not have a formal road classification, and Gorgas Road is classified as Primary Roadway. The RPMP IPS provide design guidelines for road types. Both new roads would be classified as a Primary Roadway II: Boulevard as defined in the standards.

Prior to the implementation of LTT 4, Fort Belvoir would review the project in compliance with Section 106 and in accordance with the regulations at 36 CFR 800 or the terms of the MOD PA if the PA has been executed. Working with the Virginia SHPO and other consulting parties, as appropriate, Fort Belvoir would evaluate the potential effects of the project on the Woodlawn Viewshed Protection Area and the Woodlawn Historic District. It is anticipated that the viewshed protection area would be directly affected by the proposed US Route 1 overpass. The risk of adverse effect would be reduced if new construction remains below the 150-foot height threshold defined in the *Woodlawn Historic Viewshed Study*. However, an adverse effect remains possible and additional viewshed studies and evaluation would be conducted as needed as the project moves forward. The proposed Gorgas Road connection also may have an indirect visual effect on the Woodlawn Historic District. Given the distance, the Amphitheater is not expected to be affected. Finally, if by the time the project is ready for implementation, potentially affected resources have reached the 50-year threshold for potential NRHP eligibility, Fort Belvoir would determine the historic status of those resources and address any potential adverse effects those found to be eligible. Any unavoidable adverse effects would be mitigated and the measures agreed-upon by Fort Belvoir, the SHPO, and the other consulting parties would be specified in an MOA.

LTT 5 – Abbot Road, 3rd Street, 6th Street

LTT 5 is located on North Post (Abbot Road) and South Post (3rd Street and 6th Street). The proposed extension of Abbot Road is located along the western edge of the NRHP-eligible/Fairfax County Woodlawn Historic Overlay District. The proposed extension of 3rd and 6th Streets is located just east of the NRHP-eligible FBMRR. Abbot Road, 3rd Street, and 6th Street do not have formal road classifications in the RPMP IVDP. In the RPMP IPS, the three proposed road extensions would be classified as Secondary Road I: Avenue. Avenues are secondary roads providing east-west connectivity through the Urban Core. The planning standards provide design guidelines for road types.

Prior to the implementation of LTT 5, Fort Belvoir would review the project in compliance with Section 106 and in accordance with the regulations at 36 CFR 800 or the terms of the MOD PA if the PA has been executed. Potential effects on the Woodlawn Historic District and FBMRR would be assessed. It is anticipated that the project would have an indirect effect on both resources. However, the work would proceed in accordance with the RPMP IVDP and IPS and, as a result, no adverse effects are expected.

If by the time LTT 5 is ready for implementation, any nearby resources have reached 50 years of age and could potentially be affected, Fort Belvoir would determine the NRHP eligibility of those resources. If they are found eligible, Fort Belvoir would avoid, minimize, or mitigate any adverse effects. If adverse effects are unavoidable, mitigation measures would be specified in an MOA.

LTT 6 – Gunston Road from 12th Street to 16th Street

LTT 6 is located on South Post in the Land Disturbance APE. Two historic architectural resources are located in the vicinity of LTT 6: the NRHP-eligible FBHD and NRHP-eligible FBMRR. The proposed widening of Gunston Road would occur at the northwest corner of the FBHD, where Gunston Road

intersects with 16th Street along the edge of the RPMP IVDP Historic Core district (15). FBMRR is located just west of the proposed road widening. In the RPMP IVDP, Gunston Road is classified as a Primary Roadway. In the RPMP IPS, it is classified as Primary Roadway II: Boulevard. The planning standards provide design guidelines for road types.

Prior to the implementation of LTT 6, Fort Belvoir would review the project in compliance with Section 106 and in accordance with the regulations at 36 CFR 800 or the terms of the MOD PA if the PA has been executed. Working with the Virginia SHPO and other consulting parties, as appropriate, Fort Belvoir would assess the potential effects of the project on the FBHD and FBMRR. The proposed road widening would occur within the historic district and Fort Belvoir would determine whether the project conforms to the applicable historic preservation restrictions. It is anticipated that conformance with the rules for development in the Historic Core in accordance with the RPMP IVDP and IPS, including Appendix B – Technical Design Guidelines – Historic Preservation, would ensure that no adverse effects occur. Regarding the FBMRR, located west of LTT 6, it is unlikely that the proposed road widening would have an indirect impact on the railroad as it is an industrial resource whose significance is not likely linked to a viewshed.

If by the time LTT 6 is ready for implementation, any nearby resources have reached 50 years of age and could potentially be affected, Fort Belvoir would determine the NRHP eligibility of those resources. If they are found eligible, Fort Belvoir would avoid, minimize, or mitigate any adverse effects. If adverse effects are unavoidable, mitigation measures would be specified in an MOA.

LTT 7 – Middleton Road

LTT 7 is located on South Post in the Land Disturbance APE. The NRHP-eligible FBHD is located approximately 800 feet south of the proposed road extension. The RPMP IVDP does not specify a formal road classification for Middleton Road. According to the RPMP IPS, the Middleton Road extension would be classified as a Tertiary Road. Tertiary roads provide access to individual facilities, parking, and service areas. They are designed to handle low speed, low volumes of traffic, with one lane in each direction. The planning standards provide design guidelines for each road types.

Prior to the implementation of LTT 7, Fort Belvoir would review the project in compliance with Section 106 and in accordance with the regulations at 36 CFR 800 or the terms of the MOD PA if the PA has been executed. Located 800 feet to the north, implementation of LTT 7 may have an indirect visual effect on the district. Nevertheless, it is anticipated that road work would proceed in accordance with the RPMP IVDP and IPS. Therefore, it anticipated that LTT 7 would result in no adverse effect on the FBHD.

If by the time LTT 7 is ready for implementation, any nearby resources have reached 50 years of age and could potentially be affected, Fort Belvoir would determine the NRHP eligibility of those resources. If they are found eligible, Fort Belvoir would avoid, minimize, or mitigate any adverse effects. If adverse effects are unavoidable, mitigation measures would be specified in an MOA.

LTT 8 – Heller Road Loop

LTT 8 is located on the FBNA in the Land Disturbance APE. No historic architectural resources have been identified at FBNA. Therefore, no effects to such resources are anticipated. Prior to project implementation, Fort Belvoir would further review the project in compliance with Section 106 and in accordance with the regulations at 36 CFR 800 or the terms of the MOD PA if the PA has been executed. If by the time the project is ready for implementation, nearby resources have reached 50 years of age and could potentially be affected, Fort Belvoir would determine the NRHP eligibility of those resources. If they are found eligible, Fort Belvoir would avoid, minimize, or mitigate any adverse effects. If adverse effects are unavoidable, mitigation measures would be specified in an MOA.

LTT 9 – Meeres Gate

LTT 9 is located on North Post in the Land Disturbance APE. It lies within the NRHP-eligible Fairfax County Woodlawn Historic Overlay District at the northern tip of the Fairfax County district core boundary, which may coincide with the yet-to-be mapped NRHP district boundary. The closest contributing resource within the district to LTT 9 is the Pope-Leighey House. LTT 9 also sits north of the Woodlawn Viewshed Protection Area along Mulligan Road/Old Mill Road.

LTT 9 is located in the North Residential Preservation District (6). Historic preservation visual restrictions require that buildings there be no taller than 230 feet above sea level. Historic preservation auditory and land use restrictions require that development conform to the future land use plan, which calls for Residential land use south of Meeres Road and Community land use north of Meeres Road. According to the RPMP IPS, LTT 9 located in the North Residential District. Development in this area is overseen by the Residential Communities Initiative.

Prior to the implementation of LTT 9, Fort Belvoir would review the project in compliance with Section 106 and in accordance with the regulations at 36 CFR 800 or the terms of the MOD PA if the PA has been executed. Potential effects on the Woodlawn Historic District and the Woodlawn Viewshed Protection Area would be assessed. While the project may indirectly affect the Woodlawn Historic District, conformance with the RPMP IVDP, and the avoidance of any construction exceeding 150 feet in height (the threshold defined in the *Woodlawn Historic Viewshed Study*.) would be anticipated to prevent adverse effects from occurring.

If by the time LTT 9 is ready for implementation, any nearby resources have reached 50 years of age and could potentially be affected, Fort Belvoir would determine the NRHP eligibility of those resources. If they are found eligible, Fort Belvoir would avoid, minimize, or mitigate any adverse effects. If adverse effects are unavoidable, mitigation measures would be specified in an MOA.

LTT 10 – Goethals Road

LTT 10 is located on North Post in the Land Disturbance APE. It is located within the NRHP-eligible/Fairfax County Woodlawn Historic Overlay District, north of the district core boundary that may also coincide with the yet-to-be mapped NRHP district boundary. The closest contributing resource in the district to LTT 10 is the Woodlawn Quaker Meetinghouse. In addition, Goethals Road forms the northern boundary of the Woodlawn Viewshed Protection Area.

In the RMP IDP, Goethals Road is not assigned to a formal road class. The proposed extension to Woodlawn Road would be classified as Secondary Road II: Street in the RPMP IPS. Streets serve as connectors between primary and tertiary roads and typically connect primary roads to abutting properties. The planning standards provide design guidance for intersections based on roadway type.

Prior to the implementation of LTT 9, Fort Belvoir would review the project in compliance with Section 106 and in accordance with the regulations at 36 CFR 800 or the terms of the MOD PA if the PA has been executed. The proposed road extension may have an indirect effect on the Woodlawn Historic District. Nevertheless, it is anticipated that project work would proceed in accordance with the RPMP IVDP, IPS and the MOD PA. Therefore, it is anticipated that LTT 10 would ultimately result in no adverse effect on the Woodlawn Historic District. It is also anticipated that viewshed protection may be impacted by the proposed extension of Goethals Road. However, because it is anticipated that road widening would not be of a height that would enter the viewshed (i.e., stays below the 150-foot high threshold), there would be no adverse visual effects to the district as indicated in the *Woodlawn Historic Viewshed Study*.

If by the time LTT 10 is ready for implementation, any nearby resources have reached 50 years of age and could potentially be affected, Fort Belvoir would determine the NRHP eligibility of those resources. If they are found eligible, Fort Belvoir would avoid, minimize, or mitigate any adverse effects. If adverse effects are unavoidable, mitigation measures would be specified in an MOA.

Conclusion – Alternative 1 Effects on Historic Architectural Resources

Most of the projects included in the proposed action under Alternative 1 would not, or are not anticipated to adversely affect, historic architectural resources. If, as each project planning proceeds, further review under Section 106 indicates that adverse effects are unavoidable, these adverse effects would be mitigated through the development of an MOA among Fort Belvoir, the Virginia SHPO, and other consulting parties, as appropriate. Therefore, under NEPA, the proposed action under Alternative 1 would have less than significant adverse effect on historic architectural resources, with mitigation. For those projects requiring it, mitigation measures would be developed on a case-by-case basis by Fort Belvoir in consultation with the Virginia SHPO and other consulting parties, as appropriate, as part of the Section 106 review for the project.

3.3.4 Environmental Consequences of Alternative 2 – Modified Long-Term

Under Alternative 2, LT 9 at FBNA would not be implemented and two short-term projects (ST 40 and ST 52) would be deferred to the long term, becoming LT 10A.

3.3.4.1 Archaeological Resources

Effects to archaeological resources do not depend on the project timeframe; therefore, the effects of LT 10A would be the same as those of ST 40 and ST 52. LT 9 had no potential to affect archaeological resources. Therefore, the impacts of Alternative 2 on archaeological resources would be the same as those of Alternative 1.

3.3.4.2 Historic Architectural Resources

Similarly, deferring ST 40 and ST 52 to long term would not change the effects of these projects on historic architectural resources. However, it should be noted that because the projects would be implemented farther in the future, it is possible that yet-to-be identified buildings may reach 50 years old prior to project implementation. Therefore, as part of the Section 106 review for these projects, Fort Belvoir would have to determine whether such buildings are present, determine their eligibility, and, if they are found to be eligible, evaluate the potential effects of the projects on those buildings. If adverse effects are unavoidable, they would be mitigated through the development of an MOA. Overall, the impacts of Alternative 2 would be the same as those of Alternative 1.

3.3.5 Environmental Consequences of Alternative 3 – Modified Short-Term

Under Alternative 3, a number of short-term projects would be deferred to long term, including: INSCOM Expansion (ST 19, 26, 33, and 46), the 249th Battalion HQ (ST 32), the 29th Infantry HQ (ST 36), a medical office building (ST 37), the DLA parking garage and administrative center projects (ST 40 and 52), and the OSEG Training Compound (ST 43), a secure administrative facility (ST 45), and the 911th Engineering Company Operations Complex (ST 49).

3.3.5.1 Archaeological Resources

As noted for Alternative 2, effects to archaeological resources do not depend on the project timeframe. Since, therefore, the same projects would be implemented under Alternative 3 as under Alternative 1, though on a different schedule, impacts to archaeological resources would be the same under both alternatives.

3.3.5.2 Historic Architectural Resources

Deferring the short-term projects listed above to the long term would not change the effects of these projects on historic architectural resources. However, it should be noted that because the projects would be implemented farther in the future, it is possible that yet-to-be identified buildings may reach 50 years old prior to project implementation. Therefore, as part of the Section 106 review for these projects, Fort Belvoir would have to determine whether such buildings are present, determine their eligibility, and, if they are found to be eligible, evaluate the potential effects of the projects on those buildings. If adverse effects are unavoidable, they would be mitigated through the development of an MOA. Overall, the impacts of Alternative 3 would be the same as those of Alternative 1.

3.3.6 Proposed Mitigation and Protective Measures

For all projects involving ground disturbance, Fort Belvoir's policy on the inadvertent discovery of archaeological resources would apply. This policy is as follows: if the entity performing the excavation believes that an unanticipated discovery has been made, they will immediately stop work in the area of discovery and notify the Fort Belvoir CRM. In the case of the discovery of human remains, the Fort Belvoir Police Department will also be contacted. The entity will ensure that no unauthorized personnel have access to the site and no further damage is done to the discovery until Fort Belvoir has complied with 36 CFR 800.13(b) and any other legal requirements including existing agreement documents. Within 24 hours, if possible, the CRM will examine the location of the discovery, accompanied by the Project Manager and any other appropriate staff. Failure to report such finds will be interpreted as a violation of federal law and the willful destruction of archaeological properties on federal land.

The majority of the projects included in the proposed action are anticipated to have no adverse effects on historic architectural resources. Several are far from such resources and outside any associated viewshed. Others would take place in the vicinity of historic architectural resources and have the potential to impact resources. However, through compliance with the guidelines specified in the RPMP IVDP and IPS, it is anticipated that most adverse effects would be avoided. Some of the projects have the potential to result in adverse effects. In those cases, Fort Belvoir, in consultation with the Virginia SHPO and other consulting parties, as appropriate, would develop mitigation measures and execute MOAs. The exact character of the mitigation measures would be determined on a case-by-case basis.

3.3.7 Comparison of Alternatives

With regard to cultural resources, the difference between the alternatives is minor. The main difference pertains to architectural resources, as delaying short-term projects under Alternative 2 and 3 may result in more resources being potentially affected, as existing structures age and reach the 50-year threshold for potential eligibility to the NRHP. Thus, under these alternatives, additional resources may have to be considered than under Alternative 1. This is particularly the case with Alternative 3, where multiple short-term projects would be deferred to the long term.

Impacts on historic and cultural resources resulting from the No Action and three action alternatives evaluated in this EIS are summarized in Table 3.3-5.

Table 3.3-5
Summary of Cultural Resources Impacts by Alternative

Environmental Consequence	No Action Alternative	Alternative 1 – Full Implementation- The Preferred Alternative	Alternative 2 – Modified Long-Term	Alternative 3 – Modified Short-Term
Short-Term Projects				
Effects on Historical Architectural and Archaeological Resources	No effect	No significant adverse effects, with mitigation	No significant adverse effects, with mitigation	No significant adverse effects, with mitigation
Long-Term Projects				
Effects on Historical Architectural and Archaeological Resources	No effect	No significant adverse effects, with mitigation	No significant adverse effects, with mitigation	No significant adverse effects, with mitigation

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3.4 TRANSPORTATION AND TRAFFIC

Thresholds of Significance

Traffic

In the short term, traffic impacts would be significant if study area intersection or merge, weave, or diverge roadway ramp 2017 commuting morning and afternoon peak hour levels-of-service (LOS) deteriorated to LOS E or F (LOSs are described in Section 3.4.2.2) under Alternatives 1, 2, or 3 as compared to No Action Alternative (No-Build) conditions. (Throughout this section, "No-Build" and "No Action" are used interchangeably to refer to conditions under the No Action Alternative.)

In the long term (2018-2030), traffic impacts would be significant if the traffic commuting morning and afternoon peak hour volume-to-roadway capacity ratio (volume-to-capacity or V/C ratio) of roadway sections in the study area degraded to the extent that the roadway segment is near capacity (LOS E) or over capacity (LOS F) as the result of implementing the RPMP.

Transit Service, Ridesharing, Bicycle and Pedestrian Use

In the short term and the long term, impacts on transit service, ridesharing, bicycle, and pedestrian commuting travel to Fort Belvoir would be significant if such use declined from its current proportion of commuting trips to Fort Belvoir.

3.4.1 Existing Conditions

Fort Belvoir is located in Fairfax County, Virginia, 18 miles southwest of Washington, D.C. Fairfax County is the most populated jurisdiction in the National Capital Region and is expected to continue to grow according to Fairfax County and MWCOG forecasts (see Section 3.2.2.1). With over 39,000 workers, Fort Belvoir is one of the largest employers in the county and therefore is also one of the major traffic generators. In addition to commuters, Fort Belvoir's services for active and retired military personnel and their dependents – 90,000 of whom live within a 40-mile radius of the post – attract non-commuting trips during the day. The PX, Commissary, the Fort Belvoir Community Hospital (FBCH) and other services draw many visitors. In addition, approximately 9,300 people live on the garrison, about 7,500 of them in family housing and the remainder in barracks and transient lodging (see Section 3.2.2.2).

On post, workers are most heavily concentrated on North Post and South Post (see Figure 1-5 for Fort Belvoir's areas). Approximately 15,600 personnel work on South Post, which is accessed by Pence Gate and Tulley Gate from US Route 1 and from Walker Gate from the Mount Vernon Memorial Highway (Figure 3.4-1). Approximately 13,900 personnel work on North Post (not including Humphreys Engineer Center – HEC – personnel), which can be accessed directly from Telegraph Road (Telegraph Gate) and the Fairfax County Parkway (John. J. Kingman Gate) and indirectly from US Route 1 (Meeres Gate, which only operates outbound in the afternoon peak period). DAAF, accessed through Farrar Gate from the Fairfax County Parkway, has about 1,250 personnel. The FBNA, with approximately 8,600 personnel, has access control points (ACPs) on Barta Road, connecting to the Fairfax County Parkway and Backlick Road and on Heller Road from I-95.

3.4.1.1 Regional Roadway Network

Fort Belvoir is located in a rapidly growing suburban area with a heavily congested regional transportation system. Moving personnel on and off the garrison every day will become increasingly challenging as regional traffic substantially increases over the next two decades. The Fairfax County population is expected to increase 17 percent from 2010 to 2030, and Prince William County's population, just to the south of Fort

Belvoir, is projected to increase by 40 percent (Table 3.2-4; MWCOG, 2013). These increases will contribute significant impacts to the part of the regional transportation system that serves Fort Belvoir and will affect those who work, live, and visit Belvoir.

Both Main Post and FBNA are well-served by their proximity to the regional roadway network (see Figure 3.4-2); however, a number of these highways and roads currently operate above design capacity, particularly during the morning and afternoon peak commuting periods. Congestion on these facilities is a daily occurrence.

Major Highways Serving Fort Belvoir

Interstate 95

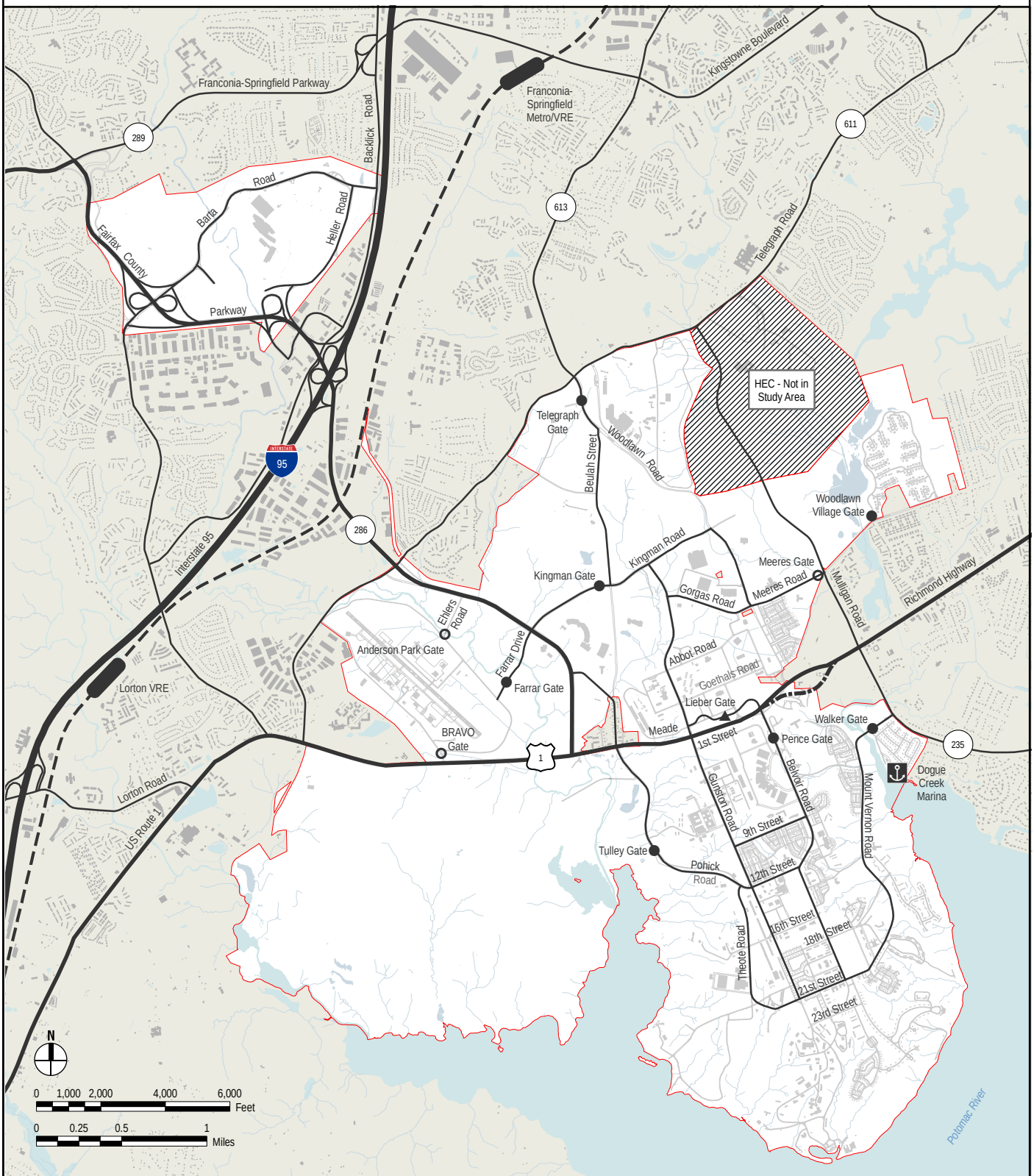
I-95 serves region-wide commuter traffic from predominately-residential counties to the south to major employment centers in Washington, DC and Arlington County. It also serves as the main highway carrying through traffic along the eastern seaboard. It is located northwest of Main Post and south-southeast of FBNA. A dedicated ramp from I-95 south provides direct access into FBNA. I-95 has reversible high occupancy vehicle (HOV) lanes in the center of the facility. I-95 is one of the busiest, most congested transportation corridors in the country and is routinely congested in the peak commute times in the direction of travel. I-95 was recently widened to four lanes in each direction, with an additional general-purpose lane between Fairfax County Parkway and Route 123 to the south. Ongoing or planned improvements that affect Fort Belvoir include:

- I-95 Express Lanes project, which is currently being implemented. This extension will construct 29 miles of HOV/Express Lanes from the Edsall Road area in Fairfax County south to Garrisonville Road in Stafford County. Carpools with three or more people, vanpools, and transit vehicles will have free access to the HOV/Express Lanes; otherwise, vehicles will be subject to dynamic tolling that will adjust rates based on real-time traffic conditions (high occupancy toll or HOT lanes).
- I-95 HOV Access to FBNA, which is currently under construction. The existing northbound HOV lane on the northbound general-purpose lanes flyover ramp, located just to the east of FBNA, will be reconfigured to allow HOV ingress into FBNA in the morning, and egress to southbound HOV and northbound general-purpose lanes in the afternoon.

Capital Beltway (I-495/I-95)

Interstate 95/495 (I-95/I-495; Capital Beltway) serves the entire Washington, DC metropolitan area and acts as a through route for those traveling to points outside the region. The portion of the Capital Beltway closest to Fort Belvoir is five lanes in each direction. Fort Belvoir connects to the Beltway via I-95, US Route 1, and the Mount Vernon Memorial Highway/George Washington Memorial Parkway. The 14-mile segment between the Springfield Interchange and the area just north of the Dulles Toll Road was widened in 2012 to add two HOV Express Lanes in each direction. Carpools with three or more people, vanpools, and transit vehicles can utilize the Express Lanes network for free; otherwise, vehicles are subject to dynamic tolling that will adjust the rates based on real-time traffic conditions (HOT lanes).

Transportation Facilities



- Access Control Point
- Future Access Control Point
- Limited Use Gate
- Rail Station
- Rail Line
- Primary Roadway
- Regional Roadway
- Interstate
- Future Route 1 Alignment

Source: US Army, 2014c

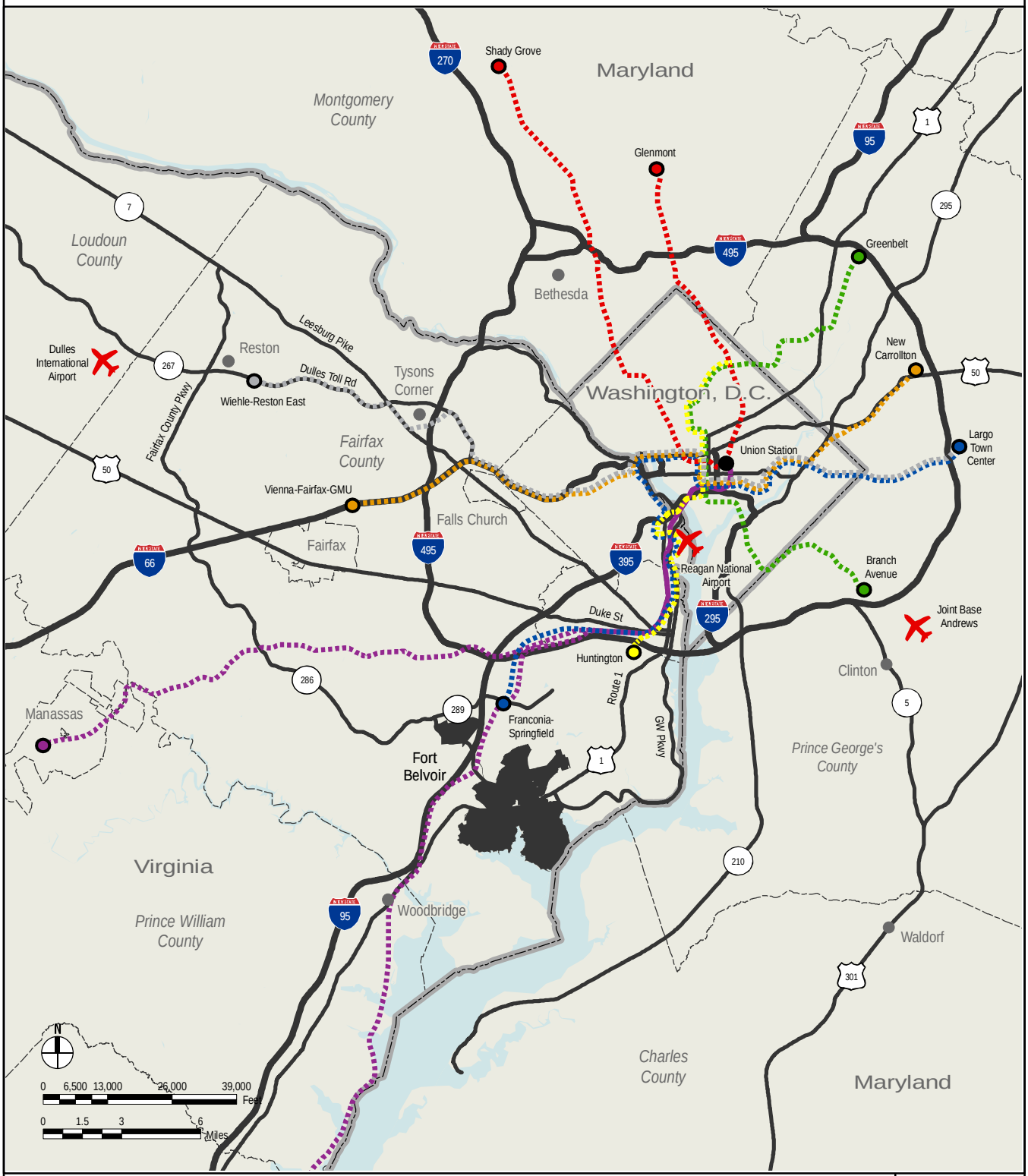
Figure 3.4-1

Fort Belvoir RPMP EIS

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Regional Transportation Facilities



Source: US Army, 2014c

Figure 3.4-2

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Principal and Minor Arterials Serving Main Post

Richmond Highway (US Route 1, Jefferson Davis Highway)

Richmond Highway/US Route 1 is a north-south principal arterial that primarily serves local trips but can serve as an alternate route to I-95 because it runs parallel to the interstate. US Route 1 physically divides Fort Belvoir Main Post and is the primary access to the installation. It is currently four lanes wide as it passes through Fort Belvoir and is often congested due to heavy demand from both regional and Fort Belvoir traffic, which limits accessibility to and from the installation. As such, initiatives are underway to add capacity and transform this arterial into a more accessible, multimodal corridor:

- US Route 1 is being widened from four to six lanes from Telegraph Road to Mount Vernon Road through Fort Belvoir with construction anticipated to start in 2014 and completion as early as mid-2017. This widening will significantly improve the level of service along US Route 1 for both Fort Belvoir and the region. Additionally, Fairfax County has plans to widen the road to six lanes through the entire corridor.
- The widening project will also provide a 5-foot-wide sidewalk, a 10-foot-wide multipurpose trail that connects to a regional trail network and on-road bicycle lanes in both directions, as well as a 32-foot median reserved for future public transit use, such as light rail or bus rapid transit.
- Fairfax County designated US Route 1 as an Enhanced Public Transit Corridor that could support viable "future transit" options. Several transit studies are ongoing to determine what future type of transit can best serve US Route 1. With dedicated transit, such as light rail or bus rapid transit, in the new center median as well as supporting facilities such as transfer centers and park-and-ride lots, US Route 1 will be transformed into a true multimodal corridor.

In order to implement these improvements and plans, the Army signed a memorandum of agreement with the Virginia Department of Transportation (VDOT) to preserve land in Fort Belvoir to accommodate all elements including the widening, transit corridor, and expanded cross-sections for turning lanes from US Route 1.

Fairfax County Parkway (Virginia Route 286)

The Fairfax County Parkway is a limited- access urban principal arterial that begins on the south at US Route 1 within Fort Belvoir and proceeds to the northwest across much of Fairfax County to terminate at Leesburg Pike (VA Route 7). The parkway through the FBNA was completed several years ago as part of BRAC-related construction. It has significantly reduced the travel time and increased accessibility between South Post, North Post, and FBNA and points northwest in Fairfax County. It serves Fort Belvoir as the main access to I-95. It is predominantly a four-lane facility.

As part of the Transportation Policy Plan (Fairfax County DP&Z, 2013) element of the Comprehensive Plan, Fairfax County has identified improvements along the entire parkway segment that serves Fort Belvoir, including widening the parkway to six lanes west of I-95, providing HOV lanes, and potentially building interchange improvements at the main intersections with US Route 1, John J. Kingman Road, Telegraph Road, I-95, and Rolling Road, subject to further study.

Mount Vernon Memorial Highway (VA Route 235) / George Washington Memorial Parkway

The two-lane Mount Vernon Memorial Highway runs to the east of the South Post and connects US Route 1 with George Washington's Mount Vernon, which is the location of the southern terminus of the George Washington Memorial Parkway (GW Parkway). The GW Parkway is a four-lane urban principal arterial parkway that runs for 25 miles along the Potomac River and provides an alternative route to Alexandria, Washington DC, and points north of Fort Belvoir. It connects to I-395, I-495, and I-66.

Telegraph Road (VA Route 611)

Telegraph Road generally parallels US Route 1 until it meets US Route 1 south of Fort Belvoir. It serves as the northern boundary of North Post. It links the City of Alexandria to residential areas of Fairfax County, including Fort Belvoir, and serves both local and commuter traffic. The southern half of this roadway is currently four lanes, while the northern half is two lanes. With the improvements associated with the construction of Mulligan Road and the Hilltop Village Center, all of Telegraph Road will be four lanes near North Post.

Beulah Street (VA Route 613)

Beulah Street is a north-south highway that links Telegraph Road and Fort Belvoir to Franconia Road. It is a four-lane highway that serves both local and commuter traffic. Several intersections operate at or above capacity during the peak periods.

Mulligan Road

Mulligan Road is a four-lane, divided highway opened to traffic in August 2014 that traverses the eastern part of North Post, linking Telegraph Road with US Route 1. Mulligan Road addresses the community's need for movement between Telegraph Road and US Route 1; public access across North Post on Beulah Street was barred after 9/11 for security reasons. The relocation of this detoured traffic to Mulligan Road will decrease the traffic volume on US Route 1, the Fairfax County Parkway, and their intersecting roadways.

Minor Arterials Serving FBNA

In addition to the major roads that serve FBNA – I-95 and the Fairfax County Parkway – three minor arterials also serve it, as may be seen on Figure 3.4-2.

Franconia-Springfield Parkway (VA Route 289)

The Franconia-Springfield Parkway is an east-west urban minor arterial highway that is six lanes wide along its entire length and includes several interchanges as well as some signalized and non-signalized intersections. It is located just north of FBNA. Potential improvements identified within the Fairfax County Transportation Plan include an interchange at Bonniemill Lane/Neuman Street to address congestion that occurs at this intersection; and longer-term, widening this parkway to provide for HOV lanes to access the HOV/Express Lanes on I-95.

Backlick Road (VA Route 617)

Virginia Route 617 (Backlick Road) parallels I-95 through Springfield and ends at the Fairfax County Parkway, where it meets Alban Road. Backlick Road is a four-lane roadway next to FBNA, and is congested through the Springfield area to the north. Currently there are no plans for major improvements; but as redevelopment occurs in Springfield, segments may be improved to provide better access and turn lanes.

Rolling Road/Pohick Road (VA Route 638)

Virginia Route 638 (named Rolling Road north of I-95 and Pohick Road south of it) serves local and commuter traffic and runs along the western border of FBNA. It runs in a northwest-southeast direction between Braddock Road and U.S Route 1. This facility is currently two lanes, but the Fairfax County Transportation Plan includes widening it to four lanes from Old Keene Mill Road to US Route 1.

3.4.1.2 Fort Belvoir Roadway Network

The existing on-post roadway network (Figure 3.4-1) provides mobility and connectivity to support the current workforce. Regional peak hour traffic where installation roads connect with public roadways creates inbound and outbound congestion during peak periods. Once inside the security gates, there is no major congestion within the installation.

As part of BRAC 2005, infrastructure throughout the post was improved, including roadway-related elements such as widenings, turn lanes, traffic signals, and a new traffic circle. These improvements increased installation roadway capacity to accommodate current and future demand. There are no new major roadway projects presently programmed except for the new Lieber Gate (ST 13/STT 3). Future construction of new buildings on post may require minor intersection/roadway improvements such as new signals, signal timing improvements, and minor intersection, and/or site access turn lane improvements. These types of site-specific roadway enhancements would increase traffic flow and site access, not capacity, and would be determined based on project type, size, location, and timing for completion. These minor internal roadway projects would be ongoing and provided as-needed for new projects.

North Post Roadway Network

Four-lane Gunston Road is the main north-south thoroughfare on North Post and the only road to bridge over US Route 1, connecting North Post to South Post. In addition to Gunston Road, vehicles enter North Post on two roads:

- John J. Kingman Road (Kingman Road) provides access from Fairfax County Parkway. As the primary access to North Post, it sees heavy inbound and outbound traffic during peak periods. The Kingman Road and Fairfax County Parkway intersection is currently an at-grade, signalized intersection. Traffic entering the gate is served by dual left turn lanes; traffic exiting the Post is served by a single dedicated right and left turn lane and a combined through/turn lane. Inside the gate, Kingman Road directly intersects with Gunston Road, the north-south spine linking North and South Posts. Kingman Road is currently four lanes west of Gunston Road but transitions to two lanes east of Gunston Road.
- Beulah Street is a north-south roadway that provides access to North Post from Telegraph Road and connects to Kingman Road. Traffic entering the gate is served by a single right or dual left turn lanes on Telegraph Road; traffic exiting the installation at the intersection of Beulah Street and Telegraph Road is served by a left turn lane, two through lanes, and a right turn lane. Beulah Street is two lanes along the North Post Golf Course and then transitions to four lanes north to Telegraph Road. South of Kingman Road, Beulah Street is two lanes and serves as an access to INSCOM before reaching a dead end.

Woodlawn, Meade, Goethals, Abbot, Gorgas, and Meeres Roads provide internal circulation within North Post from Gunston and Kingman Roads.

Davison Army Airfield Access

Farrar Drive is opposite Kingman Road at the Fairfax County Parkway intersection. This two-lane roadway provides gated access to DAAF.

South Post Roadway Network

South Post circulation is provided by two- and four-lane roadways in a grid network connecting major employment and community areas. Two roadways, Gunston Road and Belvoir Road, provide the main north-south connections, while a series of numbered roadways provide the connecting east-west grid:

- Belvoir Road is a four-lane road that connects Route 1 through the traffic circle that is located just south of Pence Gate adjacent to the FBCH; this section of roadway includes dedicated left turn and right turn lanes at the intersection of Belvoir Road and Route 1. Belvoir Road is four lanes from the traffic circle to 12th Street (with left turn lanes at the south hospital entrance and at Ninth Street) and transitions to a

two-lane road from 12th Street to 21st Street. The four-lane section of Belvoir Road includes dedicated bicycle lanes.

- 1st, 9th, 12th, 16th, 18th, 21st and 23rd Streets provide east-west movement on South Post and connect Gunston Road with Belvoir Road. Ninth Street is four lanes and includes dedicated bicycle lanes; 1st Street has been widened to 28 feet to add sidewalks.

Access to this grid network is provided via:

- Four-lane Pohick Road and Tulley Gate to the west, with dedicated on-street bicycle lanes and dedicated left and right turn lanes at the US Route 1 and Gunston Road intersections.
- Two-lane Mount Vernon Road and Walker Gate to the east, with an adjacent multi-purpose hiker/biker trail.
- Two-lane Theote Road, which intersects Pohick Road near Gunston Road and provides direct access to the industrial area and the secure administrative campus on South Post. It directly intersects 21st Street, which accesses Mount Vernon Road. This system of roads provides an outer loop-type network from Tulley Gate to Walker Gate around the Town Center on South Post.

FBNA Roadway Network

Circulation within FBNA is provided by a partial loop roadway that is comprised of Barta Road and Heller Road (see Figure 3.4-1).

- Barta Road is an east-west, four-lane divided roadway that crosses Accotink Creek and runs along the northern side of the NGA campus. It connects FBNA directly to the Fairfax County Parkway to the west and to I-95 to the east, and to one ACP at Route 617 and Heller Road (inbound only) to control and direct traffic flow.
- Heller Road is a two-lane roadway that intersects Barta Road near I-95. It runs along the eastern side of FBNA and provides access to the southern side of the NGA campus as well as to/from I-95. At this time, it is an unfinished loop road, which does not cross Accotink Creek. Project LTT 8 would complete the loop.

Fort Belvoir Access Control Points (Gates)

Fort Belvoir operates eight ACPs on a regular basis, all of which are at-grade intersections – six onto Main Post, one into Woodlawn Village, and one onto DAAF (Figure 3.4-1). FBNA access is monitored at ACPs and mission partner gates within the site. Within the Main Post boundary, mission partners operate their own gates to monitor access to their secure facilities. The majority of the gates described below operate at or above operating capacity during peak inbound (morning) periods; however, this could change in the future with the expected use of automated entry (described below). To use the non-visitor ACPs, at least one occupant of the vehicle must present valid DoD identification in order to be processed through the gate.

Access to/from Route 1

Currently, there is no direct connection from US Route 1 to North Post. Three ACPs provide access between US Route 1 and South Post:

- Tulley Gate controls entry on Pohick Road from Route 1. With four inbound processing lanes and two outbound lanes, it is the larger of two ACPs that serve traffic entering the installation directly from US Route 1. This gate is open from 5 am to 9 pm, 7 days per week. During these times, all visitors and commercial traffic entering Fort Belvoir must use this gate. Drivers must present a valid driver's license, and all occupants must provide photo identification. The Staff Sergeant John D. Linde Visitor Center is located at Tulley Gate and issues temporary passes for sponsored visitors requiring long-term access.

- Pence Gate controls entry on Belvoir Road from US Route 1 and is open 24 hours per day, 7 days per week. From 9 pm to 5 am, while Tulley Gate is closed, it processes visitors; otherwise, Pence Gate is designated for DoD-identified personnel only. It has two inbound lanes with three processing lanes, and two outbound lanes.
- Walker Gate controls entry from the Mount Vernon Memorial Highway, thus indirectly serving traffic to/from US Route 1. It is closed to visitor and commercial traffic and has one inbound and one outbound lane. This gate operates from 5 am to 9 pm, 7 days per week.

One ACP currently indirectly serves traffic via Mulligan Road/Old Mill Road to egressing vehicles only:

- Meeres Gate denies entry onto Meeres Road. To relieve congestion at other gates, it is open to outbound traffic only during the afternoon peak period to allow Lower North Post traffic to avoid congestion at the gates on South Post. This gate operates under capacity and is open to outbound traffic only 3 pm to 6 pm (closed Saturday, Sunday, and holidays).

Additionally, the Woodlawn Village housing area is located north of US Route 1 and has two dedicated gates, but is isolated from Main Post and does not serve any commuter traffic:

- Woodlawn Village Gate (front) controls entry into the Woodlawn Village housing area at its western intersection with Pole Road. This gate operates 24 hours per day, 7 days per week (holidays included).

Access to/from Fairfax County Parkway

The Fairfax County Parkway is accessed by three ACPs on North Post:

- Kingman Gate controls entry on Kingman Road for DoD-identified personnel only. This gate provides access directly to/from the Fairfax County Parkway and has two inbound and two outbound lanes. This gate operates from 5 am to 9 pm, 7 days per week.
- Telegraph Gate controls entry on Beulah Street for DoD-identified personnel only. This gate is the most direct connection to the Fairfax County Parkway via Telegraph Road and is on the most direct route to/ from the Franconia-Springfield Metrorail Station. It has two inbound lanes and one outbound lane. This gate operates from 5 am to 7 pm, Monday–Friday (closed Saturday, Sunday, and holidays).
- Farrar Gate controls entry to DAAF on Farrar Drive from the Fairfax County Parkway. It is the primary ACP for the airfield and is the only airfield gate open under normal operation. With one inbound and one outbound lane, it is open to visitor and commercial traffic. This gate operates 24 hours per day, 7 days per week (holidays included). BRAVO Gate, denying entry on Britten Drive from Route 1, and Anderson Park Gate, denying entry on Ehlers Road from Fairfax County Parkway, are both limited use gates with limited infrastructure and are only open in situations when the installation is unable to use Farrar Gate.

FBNA Access

FBNA is directly served by Fairfax County Parkway, I-95, and Backlick Road, but vehicular access to FBNA is monitored at ACPs that are located within the site along Barta Road: from the east at the Barta Road/Heller Loop intersection, and to the west off the Fairfax County Parkway. FBNA will add a fourth ACP with the completion of the FBNA Defense Access I-95 HOV Ramp. The ACPs can be closed to the public in the event of a high threat level. Barta Road is restricted to non-commercial traffic; all trucks must be processed through a separate remote inspection facility before entering FBNA.

Ongoing ACP Improvements

Traffic congestion at the ACPs can be reduced by increasing the number of vehicles that can be processed through each inspection lane. Recent work completed in conjunction with BRAC improvements provided necessary infrastructure to support automated installation entry systems at Fort Belvoir. Providing entry to

pre-approved vehicles via radio- frequency identification equipment (similar to the EZ-Pass system) can significantly reduce vehicle processing times at ACPs. This reduction in processing times can reduce the lengths of the queues that form at the gates, minimizing traffic backup. The installation of these systems at Fort Belvoir is part of an Army-wide effort. Implementation of this technology is not yet determined, but may begin by 2015.

3.4.1.3 Transit Accessibility

Background

Rail transit does not directly connect to Fort Belvoir, but buses serve the post both directly and indirectly. The Fairfax Connector Route 335 ("The Eagle"), Route 333 (Patriot Ridge-Saratoga Circulator) and Route 334 (DLA Circulator) all provide direct service to the Franconia-Springfield Transit Transfer Center. While these post-BRAC bus services represent a significant improvement, installation personnel face challenges using transit as a viable commuting option due to the fragmented nature of the services, such as multiple transfers and lack of mid-day mobility options. Regional, state, and local agencies, in addition to Fort Belvoir, recognize that the high cost of road improvements and the loss of land for roadway widening are neither desirable nor sustainable. The way forward lies in continuing to improve transit options by working closely with local and regional stakeholders; this would provide an integrated series of mobility choices that truly reflects the multimodal vision shared by the Installation and the community.

As part of that vision for the future, Fort Belvoir is reserving right-of-way from the historic Fort Belvoir Military Railroad (FBMRR) track bed for potential use to connect the post directly to rail transit (Figure 1.2; recommended Project 8 on Figure 3.4-22). The FBMRR corridor runs approximately 3.5 miles from the intersection of Pohick and Gunston Road on North Post to the Virginia Rail Express (VRE) line north of the Installation. The FBMRR is approximately 100 feet at its narrowest point connecting to the VRE, which operates within right- of-way that is controlled by the CSX freight line. Future connections have been discussed with Fairfax County Department of Transportation (FCDOT) staff, but right-of- way is complicated; one option could use Cinderbed Road, a two-lane road that runs north and ends before Franconia- Springfield Metrorail Station, as a potential connection.

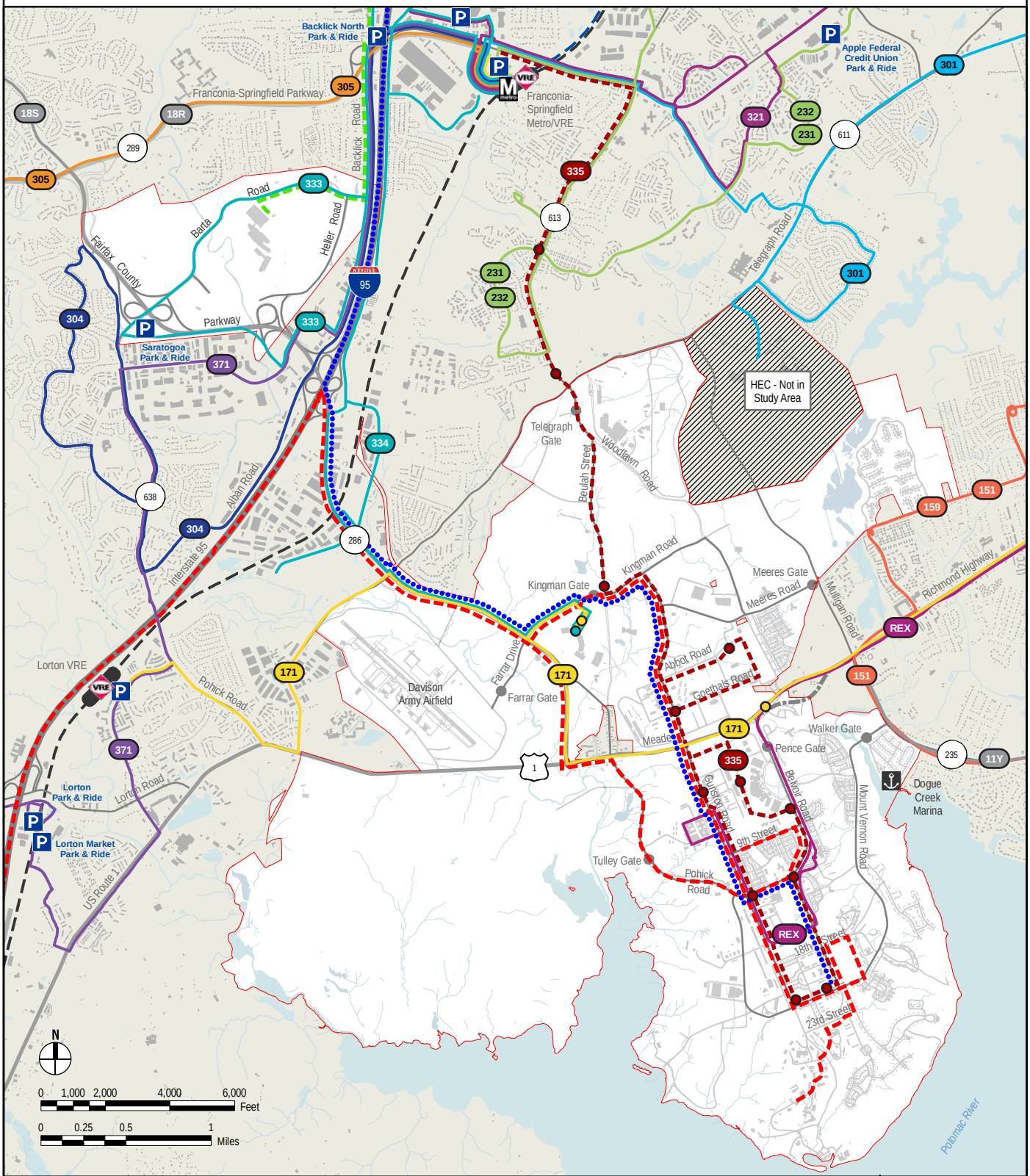
In addition, the future US Route 1 widening design includes a dedicated 32-foot wide transit corridor located in the center median strip. The US Route 1 Corridor and the historic FBMRR corridor are presently being evaluated for transit service as part of the Fairfax County Transit Network Study (FCDOT, 2014). Transit options that currently serve Fort Belvoir are described in detail below and shown on Figure 3.4-3.

Rail Transit

While there is no rail transit service directly to Fort Belvoir, both the Washington Metropolitan Area Transit Authority's (WMATA) Metrorail Blue Line and the Virginia Railway Express (VRE) Fredericksburg Line run within several miles of Main Post and FBNA (Figures 3.4-2 and 3.4-3), and buses provide access from Fort Belvoir to the stations:

- WMATA's Metrorail Blue Line terminates at the Franconia- Springfield Station, which is located approximately three miles north of Fort Belvoir. Huntington Station, the southernmost station on the Yellow Line, is located approximately seven miles northeast of the Post. Both the Blue and Yellow Lines provide service to Ronald Reagan National Airport and the Pentagon, as well as the central core area of Washington, DC, with connections to every other Metrorail line.

Transit Services



Train Station
Park and Ride Lot
VRE Rail Line
Metrorail Blue Line

Bus Service (On Post All Day)
REX 334
333 171
FBNA Shuttle

Bus Service (On Post Peak Hours Only)
335
Private Bus Company

Bus Service (On Post Mid-Day Hours Only)
Route 18 OAA Shuttle

Bus Service (Off Post All Day)
11Y 151 232 305
18R 159 301 321
18S 231 304 371

Fort Belvoir RPMP EIS

Source: US Army, 2014c

Figure 3.4-3

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- VRE's Fredericksburg Line operates between Fredericksburg and Union Station in Washington, DC from locations in Stafford County, Prince William County, Fairfax County, Alexandria, and Arlington County. Two VRE stations are located near Fort Belvoir. The Lorton Station is located approximately 1.5 miles west of Fort Belvoir, east of I-95 and south of Pohick Road. The Franconia- Springfield Station is located adjacent to WMATA's Franconia-Springfield Metrorail Station, approximately three miles north of Fort Belvoir.

Bus Transit and Shuttles

Figure 3.4-3 illustrates existing bus services in the Fort Belvoir Main Post and FBNA sections of Fairfax County. Several bus routes directly serve portions of Fort Belvoir; more operate within the vicinity of Fort Belvoir, either terminating immediately outside the boundaries of the post or passing nearby. Many recent changes to service, such as Route 335 ("The Eagle"), Route 333 (Patriot Ridge-Saratoga Circulator), and Route 334 (DLA Circulator) have been implemented as a result of the BRAC 2005 changes and Fairfax County's recommendations in their comprehensive Transit Development Plan (FCDOT, 2009). Fort Belvoir actively coordinates with Fairfax County as well as WMATA to increase ridership and provide more direct service to its personnel.

Main Post and its mission partners are currently served directly by WMATA Metrobus and Fairfax Connector routes, all but one of which connects the installation to the Franconia-Springfield Transit Center or the Lorton VRE Station. Both Main Post and FBNA are served by public bus services. The public buses operate either all day, mid-day only, or peak-hour only.

The following routes directly provide Fort Belvoir with all day service:

- Metrobus REX (Richmond Highway Express) – The route provides service between Fort Belvoir and the King Street Metrorail Station in Alexandria via Route 1. Stops inside Main Post include along Gunston Road, 12th Street, and Belvoir Road.
- Fairfax Connector Route 171 (Richmond Highway Line) – This route provides service between the Huntington Metrorail Station and the Lorton VRE Station, via Route 1 and Fairfax County Parkway through Main Post. The only installation stop is located at the DLA facility on North Post (the bus does not travel through Main Post gates).
- Fairfax Connector Route 334 (DLA Circulator) – This route provides weekday loop service between the Franconia-Springfield Metrorail Station and DLA on North Post, accessing the installation at Kingman Gate, with additional stops including the Springfield Mall park-and-ride lot and the Medical Education Campus at Northern Virginia Community College. The Connector Route 334 route and schedule were modified in October 2012 to provide more direct service to DLA.
- Fairfax Connector Route 333 (Patriot Ridge-Saratoga Circulator) – This route provides weekday loop service between Franconia-Springfield Metrorail Station and the FBNA campus with additional stops at the Saratoga Park-and-Ride lot and Patriot Ridge. The route was modified in October 2012 to provide more direct service to NGA.
- The FBNA shuttle provides service throughout the day to the Backlick Road VRE Station and the Backlick Park-and-Ride lot. The FBNA shuttle schedule is timed to complement the VRE train schedule, so the shuttle is there to meet arriving FBNA rail commuters.

The following route provides service at Fort Belvoir during mid-day only:

- Route 18 – The Office of the Administrative Assistant manages resources for the Army, including managing the mass transit benefit program and providing ground transportation within the National Capital Region. The office provides a mid-day shuttle service from Main Post to the Pentagon during the work day to allow personnel to attend meetings there.

The following routes provide service to and within Fort Belvoir during peak-hour only:

- Fairfax Connector Route 335 ("The Eagle") – This route was established in August 2011 to specifically serve the Fort Belvoir workforce and provides weekday rush-hour service between Franconia-Springfield Metrorail Station and Fort Belvoir. Currently there are 13 stops inside Main Post. "The Eagle" enters the Installation at Telegraph Gate, serves North Post, and provides service on South Post as far south as 21st Street and includes service to FBCH and the Warrior in Transition Complex. To gain more ridership, Route 335 added stops in 2012 to Graves Fitness Center on Abbot Road, the US Post Office on 21st Street, and the clinic at the old DeWitt Hospital. "The Eagle" schedule is synchronized with the arrival and departure times for Metrorail's Blue Line to minimize transfer times for connecting commuters.
- A private bus company (Rest and Ride Vans) provides service from Fredericksburg and Prince William County to the 300 Area on South Post.

Fort Belvoir has worked closely with FCDOT and local officials to track bus demand. As a result of changes in 2012 to Fairfax Connector Routes 333, 334 and 335, for example, Fairfax County reported an increase in bus commuter ridership. The increased ridership (over 10,100 riders in November 2012) is related to both the elimination of the garrison internal shuttles and external local bus stops outside the installation resulting in more direct service from major DoD employment centers to the Franconia-Springfield Transit Transfer Center.

3.4.1.4 Bicycle and Pedestrian Accessibility

On Post

Spurred by reconstruction activities associated with implementation of BRAC 2005, Fort Belvoir has a growing network of pedestrian trails, sidewalks, and dedicated bicycle lanes , (Figure 3.4-4). Belvoir, Gunston, Pohick, and Mount Vernon Roads, 9th Street on Main Post, and Heller and Barta Roads on FBNA now include both sidewalks and on-street bicycle lanes. In accordance with the RPMP Installation Planning Standards, future roadway improvements and new development would include walking trails, sidewalks, and bicycle lanes and storage facilities in order to encourage walking and biking.

Countywide Trails Plan

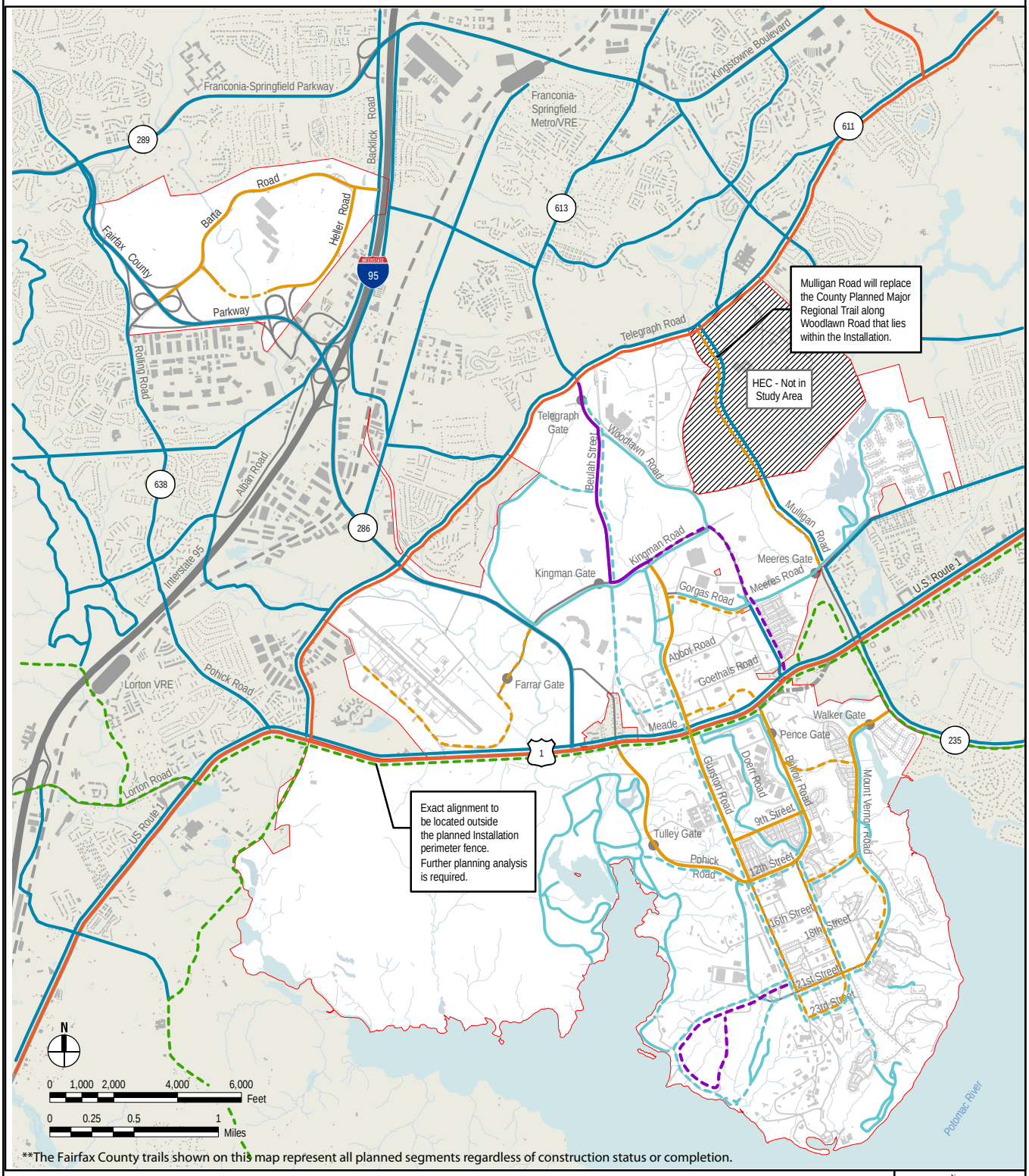
The installation's network of pedestrian and bicycle lanes would tie into a regional network of similar facilities shown on the adopted Fairfax County Trails Plan (Fairfax County DPZ, 2002). The Countywide Trails Plan is a component of the Fairfax County Comprehensive Plan and reflects both existing and planned trail segments. Connecting on-post bicycle and pedestrian facilities with off-post existing and planned facilities would further support and encourage alternative travel modes that would benefit both Fort Belvoir and the local community.

Trail Initiatives

Four trail initiatives follow the US Route 1 corridor within Fort Belvoir (Figure 3.4-4) and could tie into Fort Belvoir's trails and bike paths:

- The Potomac Heritage National Scenic Trail, one of 11 national scenic trails in the National Trails System, is a developing network of locally-managed routes between the mouth of the Potomac River and the Allegheny Highlands in western Pennsylvania. A trails egment within Fort Belvoir would connect the Main Post with other trail segments to the north and south, with an alignment dependent upon the physical security requirements of the installation and the location of the planned perimeter fence. The recently-installed sidewalks, trails, and bicycle lanes constructed as part of BRAC 2005 will connect with one or more trail segments, subject to a future agreement between the installation and the National Park Service.

Trails and Bicycle Routes and Lanes



**The Fairfax County trails shown on this map represent all planned segments regardless of construction status or completion.

- Fort Belvoir Trail (Existing)
- Fort Belvoir Trail (Future)
- Fort Belvoir On-street Bicycle Lane (Existing)
- Fort Belvoir On-street Bicycle Lane (Future)
- Fort Belvoir Shared Bicycle Lane, Sharrow (Existing)
- Fort Belvoir Shared Bicycle Lane, Sharrow (Future)
- Potomac Heritage National Scenic Trail & Washington-Rochambeau Revolutionary Route (Future)
- Fairfax County Paved Trail
- Fairfax County On-road Bicycle Route

Fort Belvoir RPMP EIS

Source: US Army, 2014c

Figure 3.4-4

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- The Washington-Rochambeau Revolutionary Route National Historic Trail also lies within the US Route 1 corridor within Fort Belvoir. The trail identifies, interprets, and celebrates the historic route travelled by Washington and Rochambeau, and the French and American alliance in the War for Independence. It encompasses more than 680 miles of land and water trails between Massachusetts and Yorktown, Virginia.
- The East Coast Greenway is a developing trail system, spanning nearly 3,000 miles between Calais, Maine and Key West, Florida, linking all the major cities of the eastern seaboard. Over 25 percent of the route has been established on safe, traffic-free paths. The route of the Greenway within Fort Belvoir would be co-aligned with the multi-use segment of the Potomac Heritage National Scenic Trail in the Route 1 corridor.
- US Bicycle Route 1, like the East Coast Greenway, is expected to stretch from the Canadian border in Maine to Key West. It is one part of a developing national network of routes within the US Bicycle Route System, which is intended to link urban, suburban, and rural areas using a variety of suitable cycling facilities. Routes are selected by state departments of transportations and cataloged by the American Association of State Highway and Transportation Officials. Before 9/11, the route was to use facilities within North Post. Alternative routes are under study.

3.4.1.5 Relevant Regional Plans and Improvements

Fairfax County Comprehensive Plan

The County has numerous initiatives to transform this area to a multimodal destination in addition to roadway improvements to increase capacity. Four of these are:

- Identification of US Route 1, the historic FBMRR and I-95 as Enhanced Public Transportation Corridors – a corridor in which major transit, such as light rail or bus rapid transit, and associated service facilities are the prime component.
- Identification of two transit transfer stations along US Route 1 to serve the EPTC network.
- Identification of two park-and-ride lot locations, the Saratoga Park and Ride lot at FBNA (now complete) and a future lot near Main Post.
- Identification of future intersection improvements along Fairfax County Parkway, US Route 1, and surrounding FBNA all require further study, but potential improvements include interchanges.

US Route 1 Improvements

The US Route 1 roadway through Main Post (Project 8 on Recommended Transportation Improvements Figure 3.4-21) would be widened from four lanes to six lanes by 2017. The expansion includes pedestrian and bicycle improvements, as well as dedicated space for future transit use (bus rapid or light rail transit).

I-95 Express Lanes

This extension to the existing HOV facilities would construct 29 miles of Express Lanes from the Edsall Road area in Fairfax County south to Garrisonville Road in Stafford County (Project 10 on Figure 3.4-21). Fort Belvoir vehicles that use I-95 would be served by this new extension. Vehicles carrying three or more people would be allowed to use the I-95 Express Lanes without charge. Others would be able to buy access to them, but tolls would fluctuate according to traffic conditions.

2010 Fairfax County Bicycle Master Plan Study, Phase II

Phase II includes the Fort Belvoir area and include provisions for on-street dedicated bicycle lanes and new pedestrian trails. Fairfax County recently added the Beulah Road Trail to its Capital Improvement Plan.

FBNA Defense Access HOV Ramp

A new ramp would carry traffic from FBNA to the I-95 Express Lanes south or to the I-95 General Purpose Lanes North (Project 7 on Figure 3.4-21). The FBNA HOV Ramp would be phased construction. Phase I improvement is currently under construction and would be completed in late 2014. This improvement allows outbound (egress only) traffic to I-95 South HOV lanes. This improvement is included in the near-term traffic analysis for FBNA. Phase II (future) would allow left turn access from the southbound HOV lanes to FBNA. This inbound ramp would require reconstruction of the existing bridge that connects to the new ramp and is presently unfunded.

SUPERNoVA Transit/Transportation Demand Management Vision Plan

Recognizing that commuting challenges connect beyond jurisdictional boundaries, the Commonwealth of Virginia has developed a Transit and Transportation Demand Management Vision Plan for the Northern Virginia area, including Fort Belvoir. The Final Vision Plan was completed in 2012 and lays out strategies for improving mobility in the short-, mid-, and long-term. The SUPERNoVA plan makes specific transit service mode recommendations for the US Route 1 corridor through Fort Belvoir for either light rail or bus rapid transit, with a recommendation to conduct an alternative analysis.

VDOT Fairfax County Parkway Interchange Improvements

Following the 2010 I-95 Improvements Environmental Assessment findings, VDOT prepared preliminary design plans for improving access at two locations on the Fairfax County Parkway for northbound I-95 and Rolling Road to help meet projected increases in future traffic demands. These improvements include a flyover ramp from northbound I-95 to northbound Fairfax County Parkway and widening the one-lane loop ramp to two lanes. VDOT selected Alternative E, which would eliminate the existing free flow right exit onto the loop by bringing the northbound right-turn lanes to a signalized intersection. This would address a safety conflict between traffic entering the loop from the northbound direction and traffic entering the loop from the southbound direction.

Fairfax County Transit Network Study

FCDOT is conducting a Countywide Transit Network Study (FCDOT, 2014 ongoing) to determine the types of transit systems needed to support its existing and future population. Based on travel patterns and demands in the County, the study will include specific recommendations for select high volume corridors. The study will describe where Metrorail should be extended, and/or where streetcar, light rail systems or bus rapid transit or other services are appropriate. Bus rapid transit could entail dedicated lanes that allow buses to move faster and with fewer stops than local routes. The study began in January 2012 and was planned to be completed in the fall of 2013, but was put on hold pending completion of the US Route 1 Multimodal study. Belvoir DPW is engaging with FCDOT to evaluate the specific type of enhanced transit facilities that would be ideally suited and recommended for the Route 1 median (reserved in the current widening plans) and possibly along the historic rail line corridor.

Virginia Railway Express (VRE) Future Plans

VRE's 2040 System Plan presently under development will identify future service and infrastructure needs.

Future VRE improvements under consideration are:

- Reverse peak/bi-directional service
- Mid-day service
- Non-traditional service delivery options, such as new alignments using highway median or abandoned rail alignments

Real-Time Rideshare Program

The Northern Virginia Regional Commission received a grant to launch a Real-Time Rideshare Program, which began at Fort Belvoir in June 2012. Commuters can use the app on their smart phones or access WeGoMil via any smartphone's web browser to reserve a rideshare space in a vehicle going to and/or from their work location. This dynamic booking system is the first to utilize technology to create changing rideshare partners and could overcome some of the negative perception of ridesharing, such as when work needs create fluctuating schedules.

The Fort Belvoir TDM Coordinator and VRE planners have discussed VRE changes that can benefit the installation's commuters. This includes platform extensions and the addition of a second platform at Lorton Station, and the addition of up to ten passenger rail cars for the Fredericksburg and Manassas Routes. VRE has indicated that they have seen a "spike" in outbound ridership service from Backlick Station to Manassas Station since BRAC 2005 TDM improvements were implemented . VRE will be engaging Fort Belvoir leadership for input to be used for its pending 2040 System Plan update.

Virginia Department of Rail and Public Transportation US Route 1 Multimodal Alternatives Analysis

The Virginia Department of Rail and Public Transportation (DRPT) conducted an alternative analysis that focused on a 15-mile portion of US Route 1 that extends from the I-95/I-495 Beltway, through Fairfax County, to Route 123 at Woodbridge in Prince William County. The purpose of the study was to clearly define the key transportation issues, establish a "needs statement," and consider a range of multimodal transportation solutions to address the needs. On October 27, 2014, the project's Executive Steering Committee endorsed the study's final recommendations, including roadway widening from four to six lanes; creation of a continuous pedestrian and bicycle facility along the corridor; and, contingent upon land density and project funding, implementation of a Bus Rapid Transit system from Huntington to Route 123 in Woodbridge, and a three-mile Yellow Line Metrorail extension from Huntington to Hybla Valley.

Virginia Department of Transportation US Bike Route 1 Study

US Bike Route 1 was established in 1982, but due to new development in Northern Virginia, VDOT is reevaluating the current routing and looking at several possible alternatives in the project study area from the 14th Street Bridge in Arlington County to the southern boundary of Prince William County.

Fairfax County Cinderbed Bikeway Grant

In October 2013, the Fairfax County Board of Supervisors approved Cinderbed Bikeway (Project 16 on Figure 3.4-22) as one of three projects to apply for a Transportation Alternative Program grant for fiscal year 2015 funding. If funding is secured, the grant would improve non-motorized access between Franconia-Springfield Metrorail and VRE rail stations and Fort Belvoir. The Cinderbed Bikeway provides three miles of shared use trail, which would connect to a southern trail system that could utilize part of the abandoned rail spur that once served Fort Belvoir.

3.4.2 Environmental Consequences of the No Action Alternative

Analysis of the impact of the Proposed Action on transportation and traffic began with the development of a process to analyze impacts, as described in Section 3.4.2.1 below. In order to develop a baseline against which to measure the impacts of the Proposed Action, the analysis assessed the state of roadways and intersections in the study area and on Fort Belvoir in 2013. Throughout the transportation impact analysis, these are called "Existing" conditions.

The transportation and traffic analysis also projected future No-build conditions for 2017 and 2030 to serve as baselines against which to compare impacts in the short term and long term, respectively. Throughout the transportation impact analysis, these are referred to as "2017 No-Build" and "2030 No-Build" conditions.

Implementing the RPMP's projects would increase the number of personnel and visitors coming to and from Fort Belvoir in the short term and the long term with potential consequences for the transportation system on and near Fort Belvoir. Transportation system impact analysis was performed to determine the impacts. For the RPMP process, the impact analysis also aimed to identify locations where transportation improvements are needed to maintain acceptable levels of service on post and to measure the effectiveness of proposed TDM actions in reducing single occupant (SOV) trips during peak commuting periods.

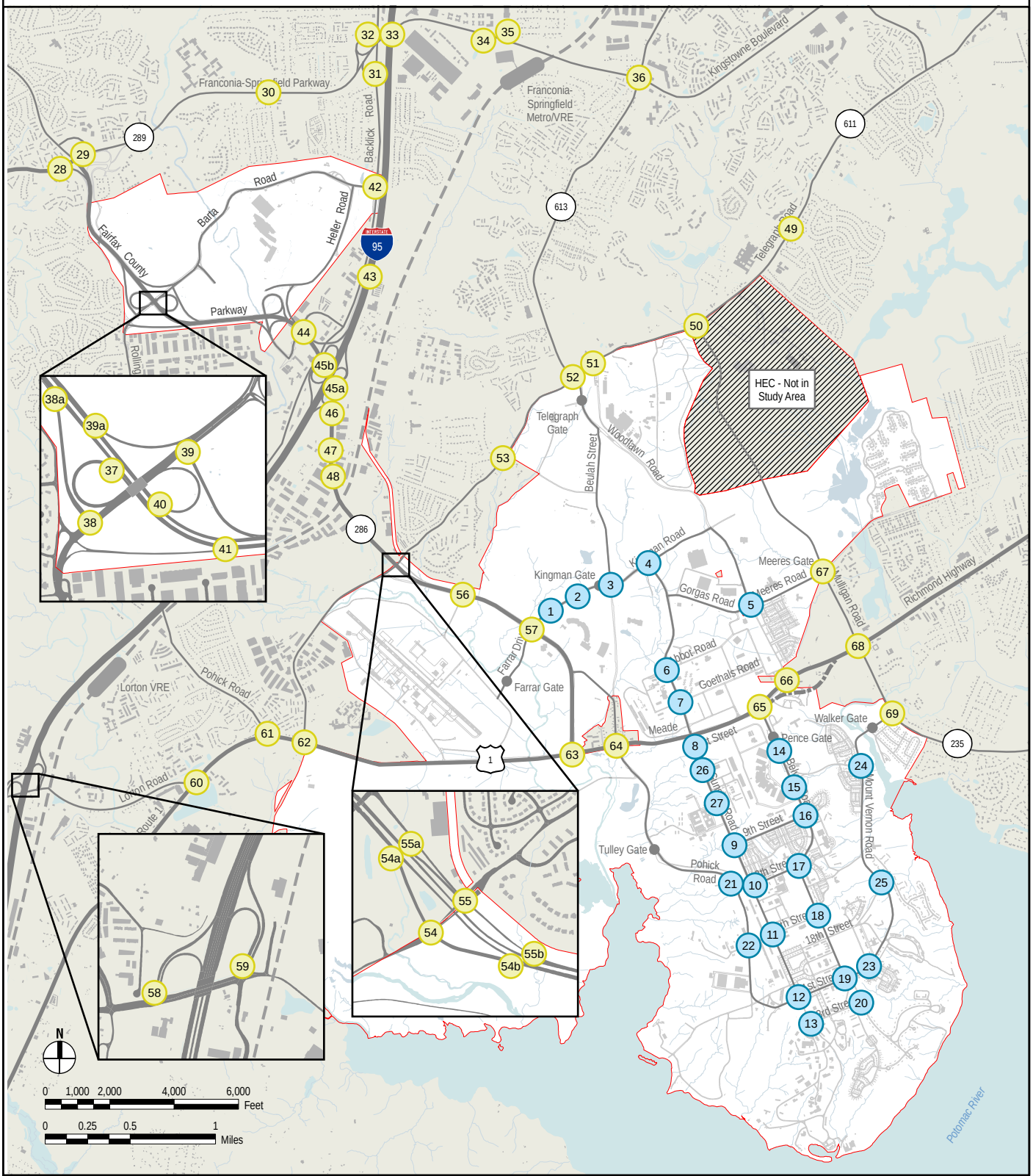
3.4.2.1 Transportation Impact Analysis Process

The analysis methods used to assess transportation system impacts are described in more detail in Appendix D. The process used was to:

1. **Form an Agency Advisory Group**. Beginning in the fall of 2012, Fort Belvoir DPW and the EIS/RPMP traffic team met with representatives of the Virginia Department of Transportation (VDOT) and Fairfax County Department of Transportation (FCDOT) to form an Agency Advisory Group (AAG). The purpose was to develop the traffic analysis scope and methodologies. This dialogue provided an open forum to discuss study objectives and refine the traffic modeling approach and methodologies with a common goal of understanding how Fort Belvoir's future growth affects the local transportation network. In all, there were four In- Progress Review meetings conducted on 1 May 2013, 12 August 2013, 24 October 2013, and 21 November 2013 to provide feedback and guidance on the development of the traffic model and the draft study findings to achieve the desired outputs. As part of this process, the AAG requested and were provided two documents, or "white papers," to clarify the traffic analysis scope and to document the key assumptions and procedures that would be used for the RPMP's Transportation Management Plan (TMP) traffic analysis and the accompanying EIS analysis. These documents include:
   - Traffic Analysis Approach, November 29, 2012, hereinafter referred to as the "Approach."
   - Applying Fort Belvoir's Transportation Management Plan to the Traffic Analysis Models, December 28, 2012.

   AAG reviewed the installation's proposed traffic analysis scope and submitted comments and written responses to the comments provided on January 31, 2013. The refinement of the traffic analysis scope as a result of AAG input formed the basis of this traffic analysis.
2. **Select a Study Area**. The study area for this project was determined with the aid and input of the AAG. The traffic survey intersection locations identified for assessment in this study are based on the combined knowledge of development and traffic flow on and around the post, as well as sites included in previous traffic studies. The study area that resulted includes 76 sites, as shown on Figure 3.4-5 and listed in Table 3.4-2. The sites are numbered from 1 to 69; however, several have "a" and "b" suffixes. In addition to intersections, some of these locations are merging areas or diverging areas or weaving areas on limited access roadways.
3. **Determine Transportation Analysis Process.** In consultation with the AAG, a decision was made to use MWCOG's National Capital Region Transportation Planning Board regional travel demand forecasting model Version 2.3.39 to estimate traffic because of it capability to estimate future conditions when there are to be major changes in the roadway network (for example, the opening of Mulligan Road in 2014 and the widening of US Route 1 through Fort Belvoir by 2017), changes in land use, new access points to I-95 (HOV ramp to FBNA), and a new access control point from US Route 1 to North Post – Lieber Gate. The model was refined to better reflect local conditions:

Study Area Traffic Survey Locations



Traffic Survey Location - Belvoir Intersection

Traffic Survey Location - Public Road Intersection

Source: US Army, 2014c

Fort Belvoir RPMP EIS

Figure 3.4-5

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- The original seven transportation analysis zones (TAZs; which include MWCOG projections of residents and jobs used by the model to estimate trips) on Fort Belvoir were redefined to 16 to increase the spatial resolution and representation of the land use activities and network detail in the study area. Figure 3.4-6 illustrates the redefined TAZs on Fort Belvoir.
- The land use forecasts used in this study reflect the latest planning estimates of jobs and residents for Fort Belvoir, Round 8.2 draft for the rest of Fairfax County, and MWCOG Round 8.1 Cooperative Forecasts for the rest of the modeling domain.
- The transportation network was revised to include new facilities that were reasonably certain to be operational by 2017 and 2030 but were not included in the regional model.

Model estimates were developed for:

- 2017 No-Build conditions (the No Action Alternative)
- 2017 Build conditions (Alternative 1 – Full Implementation –The Preferred Alternative)
- 2030 No-Build conditions (the No Action Alternative)
- 2030 Build conditions (Alternative 1 – Full Implementation – The Preferred Alternative)

4. **Review Relevant Studies**. The existing transportation system in the Fort Belvoir area has been evaluated in many previous studies. These studies investigated the existing and proposed transit network, roadway improvements, and the effect of new developments on the transit and roadway networks. They analyzed various areas in the Fort Belvoir area at different times and proposed improvements associated with the subject facility. Many of the proposed improvements are either currently under construction or in the planning stage, and various recommendations are scheduled to be implemented in the near future. The studies are listed below and described in more detail in Appendix D of this EIS and in the RPMP's TMP.

   - 2014 US Route 1 Multimodal Alternatives Analysis (DRPT, 2014)
   - 2012 Countywide Transit Network Study (FCDOT, 2014 ongoing)
   - 2012 US Route 1 Widening Study and Environmental Assessment (EA) and Appendix: Final Transportation Technical Report (USDOT-FHWA, 2006)
   - 2012 Environmental Assessment for the Expansion of US Army Intelligence and Security Command Headquarters Facilities (US Army, 2012f)
   - 2011 Environmental Assessment I-95 HOT Lanes Project (VDOT, 2011)
   - 2010 Fort Belvoir Comprehensive Traffic Engineering Study (US Army, 2010o)
   - 2010 Commissary/Post Exchange Traffic Impact Study (Civiltech, 2010)
   - 2010 Fairfax County Parkway Traffic Technical Report (FCDOT, 2010)
   - 2009 Museum Interchange Analysis - Subsequent Study at Fairfax County Parkway and Kingman Road (Gorove/Slade, 2009)
   - 2008 Museum Corridor Study (Gorove/Slade, 2008)
   - 2008 National Geospatial-Intelligence Agency Traffic Analysis (Belvoir New Vision Planners, 2008)
   - 2008 Proposed Highway Improvements, I-95 Defense Access Roads Ramps to the Engineering Proving Ground [FBNA], Fort Belvoir, Virginia, EA (USDOT, FHWA, 2008)
   - 2007 Final Environmental Impact Statement for Implementation of 2005 BRAC, Fort Belvoir (US Army, 2007a)

- 2006 Richmond Highway-Telegraph Road Connector (Mulligan Road) Fairfax County Environmental Assessment (USDOT, FHWA, 2006)

5. **Collect Existing Traffic Data**. Traffic counts were taken at the intersections and ramps shown on Figure 3.4-5. For Fort Belvoir intersections, traffic counts were performed in the field in the fall of 2011 for 2 of the 27 Fort Belvoir intersections. Counts were taken at 18 intersections in 2012 and completed in 2013 as the four-lane widening of Gunston Road became fully operational with signalized traffic lights at intersections. The widening of Gunston Road from two lanes to four lanes significantly increased the capacity of this roadway and resulted in a new distribution of traffic on roadways in the North Post, and roadways north of 12th Street on South Post. Counts for seven intersections – six of them stop-controlled (no traffic signal) – were taken from Gannett Fleming's 2010 Fort Belvoir Comprehensive Traffic Engineering Study (US Army, 2010o).

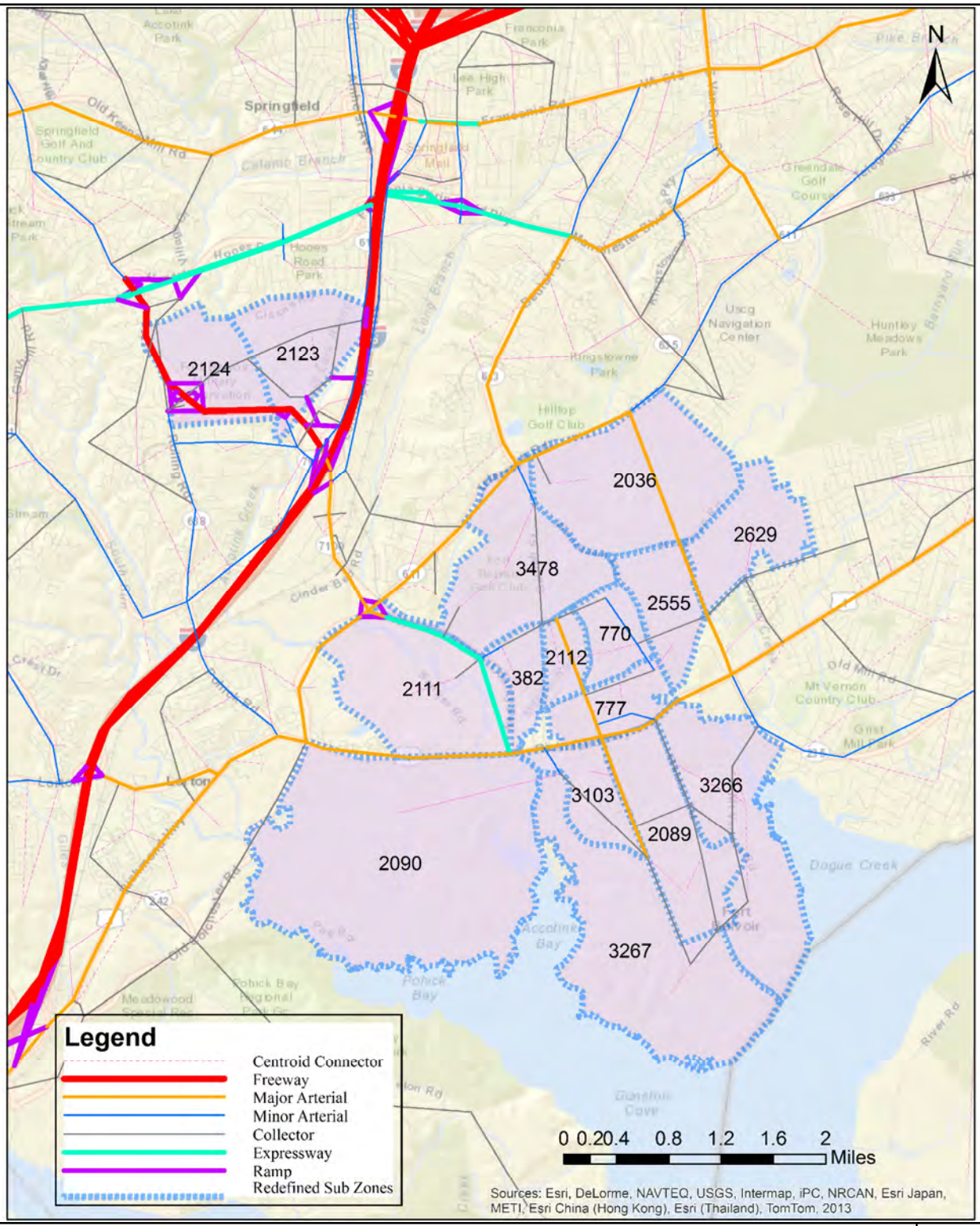
   The collection of most of the traffic data on public roads spanned a 16-month period between October 2011 and January 2013. The initial traffic turning movement counts were collected in October 2011 and January 2012 and focused on seven intersections near Main Post. A second series of count was taken in November 2012 and January 2013, including turning movement counts at 22 intersections and 19 roadway tube counts on mainlines and ramps surrounding the FBNA. An additional data set was collected in November 2013 at four intersections to address movements at three I-95 interchanges. The data for the remaining intersections, merge/diverge/weaving areas, which were not counted (or did not exist at the time of the study), were estimated using data collected at nearby locations.

   New intersection data were collected using video-based turning movement counts. Data were collected for three hours in the AM and PM peak periods on two consecutive midweek days (Tuesday, Wednesday, or Thursday). At each location, the starting time of the peak hour was determined separately for each day of data. Volume data for merge, diverge and weaving areas were collected using road tube counters that were installed for a minimum of two days. Where individual movement volumes during the peak hours were consistent on both days, the peak hour volumes shown in these tables reflect the average of these two peak hour volumes. If the volumes for an individual movement were not consistent between the peak hours, the higher of the two volumes is shown for that movement. The resulting traffic counts are listed and mapped in Section 3.4.3.2.

6. **Determine 2017 Trip Generation from Fort Belvoir**. The travel behavior characteristics of residents and non-residents on Fort Belvoir were evaluated. The residential population, which includes Family housing, Soldier barracks and privatized Army lodging, is expected to remain relatively constant, and hence the number of trips they produce is not anticipated to change significantly. The model does, however, reflect changes to residential communities by 2030, such as additional housing in the new North Post Town Center area associated with a decrease in resident population levels in places like Dogue Creek (housing in floodplains would be demolished).

   The travel behavior of future non-residents is assumed to be similar to existing non-residents. Mode choice (use car, bus, bike, etc. for trips) behavior is assumed to consider cost and travel time by different modes for different TAZs in the study areas. Route choice (access and egress distribution through available gates) for future TAZ non-residents is assumed to be made considering travel time and cost in the same way as current TAZ non-residents, but with consideration of travel time and cost changes as a result of transportation system improvements such as the US Route 1 widening and the opening of Lieber Gate and Mulligan Road by 2017.

Redefined Transportation Analysis Zones



Fort Belvoir RPMP EIS

Source: US Army, 2014c

Figure 3.4-6

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7. **Determine Site Traffic Distribution and Assignment to the Roadway Network**. Distribution from the Fort Belvoir TAZs to the gates and the distribution to the external roadway network were determined by running the regional model. The initial distribution results were presented in the AAG In-Progress Review meetings, and minor adjustments made to ensure consensus. Trip assignments on specific roadways also were reconciled at the In-Progress working sessions with the AAG. This included, for example, the assumptions on trip assignments and the distribution of traffic that would occur with the projected completion of Mulligan Road between the US Route 1 and Telegraph Road corridors.
8. **Analyze Future Conditions with Development**. The analysis and results are described in Sections 3.4.2.3, 3.4.2.4, and 3.4.2.5.
9. **Recommend Improvements**. Recommended improvements are discussed in Section 3.4.2.6.

3.4.2.2 Existing Traffic Data

Levels of Service and Delay

After existing conditions traffic count data were collected at the intersections and ramps shown in Figure 3.4-5 as described in step 7 above, they were analyzed using the Synchro 8 Traffic Signal Timing Analysis Software (Synchro Version 8) program. This program simulates the existing conditions and analyzes traffic operations at the intersections by calculating a series of parameters that describe the operational characteristics of an intersection, which include:

- The average delay per vehicle for each turning and non-turning movement, for each overall approach and for the overall intersection.
- The level of service (LOS), also for each movement, for the overall approach and for the overall intersection. Synchro 8 calculates LOS based on the Highway Capacity Manual (Transportation Research Board, 2010).
- The transportation system performance approach was based on the volume/capacity ratios defined in National Cooperative Highway Research Program Report 255 (National Cooperative Highway Research Program. 1982). This approach was determined to be acceptable by the AAG.

There are six LOS classifications, “A” (representing the best conditions) through “F” (representing the worst conditions). The range of average delay per vehicle that is associated with each LOS is shown in Table 3.4-1 for signalized and unsignalized intersections and for merge, diverge and weaving areas on highway ramps.. Unsignalized locations include stop-sign controlled intersections and traffic circles.

Delay per vehicle is the major parameter derived by the computations performed by the Synchro program. Delay is calculated for each individual movement and then summed to provide the average delay for each approach, and for the intersection as a whole. It is measured in seconds per vehicle. LOS for the intersection is taken from average value of delay at the intersection. The delay ranges associated with each LOS are shown in Table 3.4-1.

The LOS for highway ramp merge, diverge and weaving areas are based on the space available for vehicles to change lanes within these areas. As the number of vehicles in the area increases, each vehicle’s movements becomes more constrained by the vehicles nearby. The number of vehicles on a section of roadway is expressed in terms of “density” and is measured in passenger cars per mile per lane (pc/mi/ ln). Table 3.4-1 shows the range of densities associated with each LOS in highway merge, diverge and weaving areas.

Table 3.4-1
Definitions for Intersection and Ramp Levels of Service (LOS) and Average Delays

Level of Service (LOS)	Delay Signalized Intersection (seconds per vehicle)	Delay Unsignalized Intersection (seconds per vehicle)	Delay Ramp Merge, Diverge & Weaving Areas (passenger cars/mile/lane	LOS Descriptions
A	≤10	≤10	≤ 10 pc/mi/ln	**A**: Free flow. Traffic flows at or above the posted speed limit and motorists have complete mobility between lanes. The average spacing between vehicles is about 550 feet or 27 car lengths. Motorists have a high level of physical and psychological comfort. The effects of incidents or point breakdowns are easily absorbed.
B	10-20	10-15	> 10 - 20 pc/mi/ln	**B**: Reasonably free flow. LOS A speeds are maintained, maneuverability within the traffic stream is slightly restricted. The lowest average vehicle spacing is about 330 feet or 16 car lengths. Motorists still have a high level of physical and psychological comfort.
C	20-35	15-25	> 20 - 28 pc/mi/ln	**C**: Stable flow, at or near free flow. Ability to maneuver between lanes is restricted; lane changes require driver awareness. Minimum vehicle spacing is about 220 feet or 11 car lengths. Most experienced drivers are comfortable, roads remain safely below but efficiently close to capacity, and posted speed is maintained. Minor incidents may cause traffic delays to form behind the incident. This is the target LOS for some urban and most rural highways.
D	35-55	25-35	> 28 - 35 pc/mi/ln	**D**: Approaching unstable flow. Speeds slightly decrease as traffic volume slightly increase. Freedom to maneuver within the traffic stream is much more limited and driver comfort levels decrease. Vehicles are spaced about 160 feet or 8 car lengths. Minor incidents are expected to create delays. Examples are a busy shopping corridor in the middle of a weekday, or a functional urban highway during commuting hours. LOS D is the goal for urban streets during peak hours, for LOS C would require prohibitive cost and societal impact in bypass roads and lane additions.
E	55-80	35-50	> 35 pc/mi/ln	**E**: Unstable flow, operating at capacity. Flow becomes irregular and speed varies rapidly because there are virtually no usable gaps to maneuver in the traffic stream and speeds rarely reach the posted limit. Vehicle spacing is about 6 car lengths, but speeds are still at or above 50 miles/hour. Any disruption to traffic flow, such as merging ramp traffic or lane changes, will create a shock wave affecting traffic upstream. Any incident will create serious delays. Drivers' level of comfort become poor. This is a common standard in larger urban areas, where some roadway congestion is inevitable.
F	≥80	≥50	Demand > Capacity	**F**: Forced or breakdown flow. Every vehicle moves in lockstep with the vehicle in front of it, with frequent slowing required. Travel time cannot be predicted, with generally more demand than capacity. A road in a constant traffic jam is at this LOS, because LOS is an average or typical service rather than a constant state. For example, a highway might be at LOS D for the AM peak hour, but have traffic consistent with LOS C some days, LOS E or F others, and come to a halt once every few weeks.
Source: Highway Capacity Manual (Transportation Research Board, 2010).				

The traffic studies and analyses performed for this project were done in conformance with VDOT's requirements for Traffic Impact Analysis. These requirements were established in response to Chapter 527 of the 2006 Acts of the Virginia Assembly, which directs the Virginia Department of Transportation (VDOT) to promulgate regulations for Traffic Impact Analysis. The transportation process steps listed in 3.4.2.1 follow VDOT's required process.

Existing Intersection and Ramp Operational Characteristics

Existing Fort Belvoir Intersections

Figure 3.4-7 shows the existing conditions AM and PM peak hour (the morning or evening rush hour with the most traffic) operating characteristics – intersection and ramp LOSs and delays – at 27 Fort Belvoir intersections. Table 3.4-2 lists each intersection's LOS and delay, with the number of the intersection on Figure 3.4-7 keyed to the intersection numbers in the table.

On Main Post, all but one of the locations operate at LOS C or better during the AM and PM peak hours. On North Post, about half of the intersections operate at LOS B or better, and the other half operate at LOS C.

Table 3.4-2
Existing Operational Characteristics – Fort Belvoir Intersections

Intersection Number Fig 3.4-7	Intersection	AM Peak Hour		PM Peak Hour	
		LOS	Delay (seconds/ vehicle)	LOS	Delay (seconds/ vehicle)
1	John J. Kingman Road and DLA West Gate[2]	A	7.1	B	15.8
2	John J. Kingman Road and DLA East Gate	C	20.5	B	15.7
3	John J. Kingman Road and Beulah Street	C	34.8	C	28.5
4	John J. Kingman Road and Gunston Road	A	8.6	C	28.7
5	Gorgas Road and Woodlawn Road	C	23.1	C	25.1
6	Gunston Road and Abbot Road	B	10.3	B	10.4
7	Gunston Road and Goethals Road	A	7.6	A	8.4
8	Gunston Road and 1st Street	A	7.5	B	13.6
9	Gunston Road and 9th Street	A	7.4	A	7.8
10	Gunston Road and 12th Street/Pohick Road	C	20.5	C	31.4
11	Gunston Road and 16th Street	A	8.3	A	8.8
12	Gunston Road and 21st Street (SC[1])	B	10.9	B	12.5
13	Gunston Road and 23rd Street (SC)[2]	B	13.4	B	11.1
14	Belvoir Road and Traffic Circle	D	32.6	B	11.1
15	Belvoir Road and Surveyor Road	A	7.4	A	7.5
16	Belvoir Road and 9th Street	B	13.3	B	15.6
17	Belvoir Road and 12th Street	B	12.7	A	9.2
18	Belvoir Road and 16th Street (SC)	A	2.4	A	2.3
19	Belvoir Road and 21st Street (SC)	A	8.7	A	8.3
20	Belvoir Road and 23rd Street (SC)[2]	A	4.2	A	3
21	Theote Road and Pohick Road	A	4.1	B	10.6
22	Theote Road and 16th Street (SC)[2]	A	3.4	A	3.3
23	Flagler Road and 21st Street (SC)[2]	A	1.6	A	1.4
24	Mount Vernon Road and Surveyor Road (SC)[2]	A	1.5	A	1.8

Intersection Number Fig 3.4-7	Intersection	AM Peak Hour		PM Peak Hour	
		LOS	Delay (seconds/ vehicle)	LOS	Delay (seconds/ vehicle)
25	Mount Vernon Road and Gillespie Road (SC)[2]	A	8.8	A	9.1
26	Gunston Road and 3rd Street	A	6.6	A	7.2
27	Gunston Road and Jackson Loop Road North	A	4.8	A	5.8

Source: US Army, 2014a

Notes:

1. SC indicates stop-controlled (with stop signs) intersections.
2. 2009 traffic counts from the *Fort Belvoir Comprehensive Traffic Engineering Study* (US Army, 2010o).

On South Post, all intersections operate at LOS B or better with the exception of the Gunston Road at 12th Street intersection, which operates at LOS C during the AM and PM peak hours, and the Belvoir Road traffic circle near the hospital, which operates at LOS D during the AM peak hour. (The traffic circle near the hospital location was calculated to be operating at LOS D during the AM peak hour, but was observed to be operating without noticeable delays.)

The values shown in Table 3.4-2 for Fort Belvoir intersections are the overall averages of the turning movements for each intersection. While none is less than LOS D, two of the intersections have at least one approach (turning movement) with an LOS of E or F:

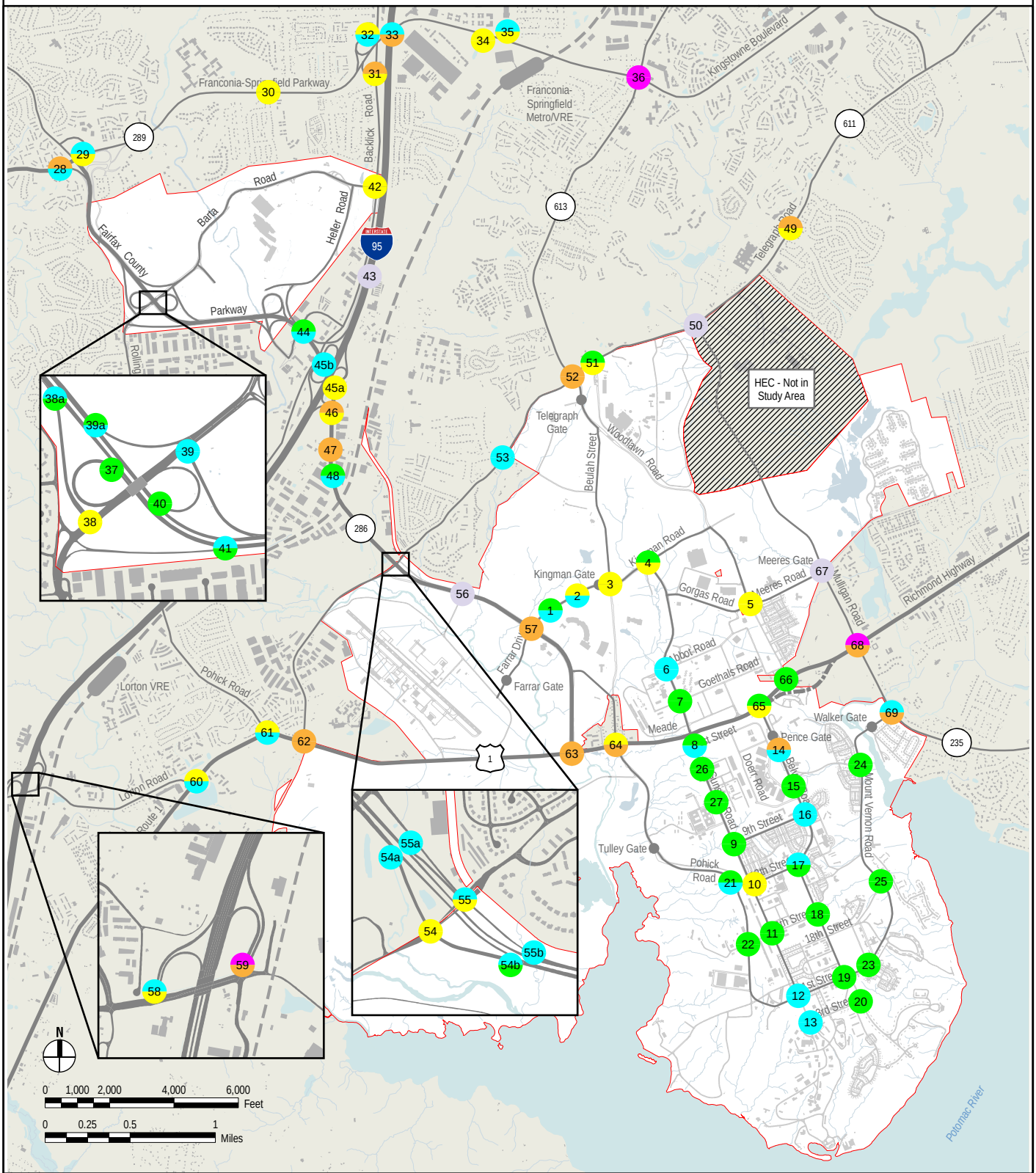
- The intersection at Gunston Road and 12th Street has an overall LOS C. However, during the PM peak hour on the eastbound through and left turn movements and westbound through movement, LOS E prevails. The overall average delay is reduced because of large volumes on the other movements.
- The intersection of Kingman Road and Beulah Street operates at a LOS C during both the AM and PM peak hours. However, in the morning, the westbound left turn movement experiences a LOS F, and in the evening, the same movement experiences a LOS E. In both peak hours, the volumes are relatively low.

Existing Public Road Intersections and Ramps

Table 3.4-3 and Figure 3.4-7 display the delays and LOSs for the 49 public road intersections and ramps under study. Findings are:

- The Beulah Street and Telegraph Road intersection operates at an overall LOS D in both the AM and PM peak hours, but several individual approaches have lower levels of service. In the AM peak hour, the northbound approach has a LOS E. The same is true for the PM peak hour.
- Most locations at the Fairfax County Parkway interchange with Telegraph Road operate at LOS C or better. The southbound right turn approach serves traffic coming from southbound Fairfax County Parkway and turning right onto westbound Telegraph Road and operates at LOS E in the PM peak hour. An HCS ramp merge analysis reveals that the four ramps at the interchange of Telegraph Road and Fairfax County Parkway all operate at a LOS C or better.
- The Fairfax County Parkway and US Route 1 intersection operates at a LOS D in both the AM and PM peak hours. However, the southbound approach experiences a LOS F and a LOS E in the morning and afternoon, respectively.

2013 Existing Levels of Service



AM Level of Service
PM Level of Service
Level of Service A
Level of Service B
Level of Service C
Level of Service D
Level of Service E
Level of Service F
No Significant Conflicting Movements

Source: US Army, 2014c

Fort Belvoir RPMP EIS

Figure 3.4-7

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Table 3.4-3
Existing Operational Characteristics – Public Intersections

Intersection Number Fig 3.4-7	Intersection	Type	AM Peak Hour		PM Peak Hour	
			LOS	Delay Metric	LOS	Delay Metric
28	Franconia-Springfield Parkway Eastbound Exit Ramp to Rolling Road	Diverge	D	31.2 pc/mi/ln[1]	B	12.7 pc/mi/ln
29	Franconia-Springfield Parkway Westbound on Ramp from Rolling Road	Merge	B	10.1 pc/mi/ln	C	27.8 pc/mi/ln
30	Franconia-Springfield Parkway and Spring Village Drive	Intersection	C	19.5 s/v[2]	C	27 s/v
31	Backlick Road at Franconia-Springfield Parkway Eastbound Ramps	Intersection	D	46.6 s/v	C	28.8 s/v
32	Backlick Road at Franconia-Springfield Parkway Westbound Ramps	Intersection	C	24.1 s/v	B	14.8 s/v
33	Franconia-Springfield Parkway and Interstate 95 HOV Ramps	Intersection	B	17.3 s/v	D	40.6 s/v
34	Frontier Drive at Franconia-Springfield Parkway Eastbound Ramps	Intersection	C	29.7 s/v	C	30.3 s/v
35	Frontier Drive at Franconia-Springfield Parkway Westbound Ramps	Intersection	B	19.5 s/v	C	20.6 s/v
36	Franconia-Springfield Parkway and Beulah Street	Intersection	E	58.8 s/v	E	67.2 s/v
37	Southbound Barta Road to Eastbound Fairfax County Parkway	Merge	A	1.1 pc/mi/ln	A	< 1.0 pc/mi/ln[4]
38	Barta Road at Fairfax County Parkway Eastbound Ramps	Intersection	C	29.9 s/v	C	24.9 s/v
38a	Fairfax County Parkway Southbound exit to Barta Road	Diverge	B	12.5 pc//mi/ln	A	6.9 pc/mi/ln
39	Barta Road at Fairfax County Parkway Westbound Ramps	Intersection	B	19.8 s/v	B	10.8 s/v
39a	Westbound Barta Road entrance to ramp to Fairfax County Parkway	Merge	A	5.9 pc/mi/ln	B	12.5 pc/mi/ln
40	Northbound Barta Road to Westbound Fairfax County Parkway	Merge	A[5]	6.1 pc/mi/ln	A[6]	10.4 pc/mi/ln
41	Northbound Barta Road to Eastbound Fairfax County Parkway	Merge	B	10.4 pc/mi/ln	A	3.6 pc/mi/ln
42	Barta Road and Backlick Road	Intersection	C	23 s/v	C	21.4 s/v
43	Interstate 95 HOV Access Ramp*	Merge	(Not available)			
44	Interstate 95 Southbound Exit Ramp to Heller Road	Weave	A	9.1 pc/mi/ln	B	14.4 pc/mi/ln
45a	Fairfax County Parkway SB/EB Weave over I-95	Weave	C	22.1 pc/mi/ln	C	21.4 pc/mi/ln
45b	Fairfax County Parkway NB/WB Weave over I-95	Weave	B	19.7 pc/mi/ln	B	14.9 pc/mi/ln

Intersection Number Fig 3.4-7	Intersection	Type	AM Peak Hour		PM Peak Hour	
			LOS	Delay Metric	LOS	Delay Metric
46	Fairfax County Parkway and Loisdale Road	Intersection	D	41.8 s/v	C	27.9 s/v
47	Fairfax County Parkway and Terminal Road	Intersection	D	38.6 s/v	D	39.5 s/v
48	Fairfax County Parkway and 750' South of Terminal Road	Intersection	A	8.2 s/v	B	11.2 s/v
49	Telegraph Road and Hayfield Road	Intersection	D	38.3 s/v	C	33.2 s/v
50	Telegraph Road and Mulligan Road	Intersection	(Waiting for Intersection Lane Data)			
51	Telegraph Road and Road B (DCEETA Entrance)	Intersection	A	3.2 s/v	C	27.2 s/v
52	Beulah Street and Telegraph Road	Intersection	D	37.8 s/v	D	36.2 s/v
53	Telegraph Road and Newington Road	Intersection	B	11.1 s/v	B	16.2 s/v
54	Telegraph Road at Fairfax County Parkway Eastbound Ramps	Intersection	C	22.7 s/v	C	29 s/v
54a	Fairfax County Parkway Southbound exit to Telegraph Road	Diverge	B	17.8 pc/mi/ln	B	12.2 pc/mi/ln
54b	Telegraph Road Southbound exit to Fairfax County Parkway	Merge	B	19.6 pc/mi/ln	A	8.8 pc/mi/ln
55	Telegraph Road at Fairfax County Parkway Westbound Ramps	Intersection	B	11.4 s/v	C	26.2 s/v
55a	Telegraph Road entrance to Fairfax County Parkway Northbound	Merge	B	11.8 pc/mi/ln	B	13.5 pc/mi/ln
55b	Fairfax County Parkway Northbound exit to Telegraph Road	Diverge	B	11 pc/mi/ln	B	16.2 pc/mi/ln
56	Fairfax County Parkway at Ehlers Road	Intersection	(Reserved for possible future NMUSA intersection)			
57	Fairfax County Parkway and John J. Kingman Road	Intersection	D	48.6 s/v4	D	47.4 s/v
58	Lorton Road and Interstate 95 Southbound Ramps	Intersection	B	14.5 s/v	C	28.1 s/v
59	Lorton Road and Interstate 95 Northbound Ramps	Intersection	E	60.5 s/v	D	38.2 s/v
60	Route 1 and Lorton Road	Intersection	C	30.4 s/v	B	15.2 s/v
61	Route 1 and Pohick Road	Intersection	C	31.1 s/v	B	13 s/v
62	Route 1 and Telegraph Road/Old Colchester Road	Intersection	D	41.2 s/v	D	36.9 s/v
63	Route 1 and Fairfax County Parkway	Intersection	D	37.5 s/v	D	37.8 s/v
64	Pohick Road and Route 1	Intersection	C	25.7 s/v	D	49 s/v
65	Belvoir Road and Route 1	Intersection	A	9.2 s/v	C	24.7 s/v
66	Woodlawn Road and Route 1	Intersection	A	2.9 s/v	A	2.5 s/v

Intersection Number Fig 3.4-7	Intersection	Type	AM Peak Hour		PM Peak Hour	
			LOS	Delay Metric	LOS	Delay Metric
67	Mulligan Road and Mill Road/Pole Road (SC)	Intersection	(Waiting for intersection lane data)			
68	Mount Vernon Memorial Highway and Route 1	Intersection	E	66.2 s/v	D	46.6 s/v
69	Mount Vernon Memorial Highway and Mount Vernon Road (SC)	Stop Sign	B	8.8 s/v	D	66.7 s/v

Source: US Army, 2014c

Notes:

1. pc/mi/ln = personal car/mile/lane (density)
2. s/v = seconds/vehicle (delay)
3. Site 37 PM: Density is negligible.
4. Site 40 AM: LOS based on segment density after merge.
5. Site 40 PM: LOS based on segment density after merge.

- The intersection of the Fairfax County Parkway at Kingman Road operates at LOS D during both the AM and PM peak hours. In the afternoon, all approaches operate at satisfactory levels of service, except for the eastbound approach, which operates at a LOS E. The AM peak experiences some lower levels of service on certain approaches. The eastbound approach to the intersection operates at LOS F, and the westbound and northbound approaches operate at a LOS E.
- Although the overall operation of the Pohick Road at US Route 1 intersection is LOS D or better, the northbound exit from the Post on Pohick Road and southbound Backlick Road operate at LOS F during the AM and PM peak hours. This LOS indicates a delay for traffic exiting Fort Belvoir.
- The fact that the overall operation of Belvoir Road at the US Route 1 intersection is C or better belies the fact that the vehicles exiting the Post from Belvoir Road experience LOS of F and E during the AM and PM peak hours respectively.
- The intersection of US Route 1 and Mount Vernon Highway is to be rebuilt as part of the Mulligan Road construction, under way at the time of analysis. The turning movements and volumes at this intersection was anticipated to be significantly altered by the opening of Mulligan Road. Synchro analysis done using current data indicates that the intersection operates at a LOS E and D in the AM and PM peak hours, respectively. In both the AM and PM peak hours, the southbound approach operates at a LOS F, and in the morning, the northbound approach also operates at a LOS F. The unusual five-leg geometry of the intersection contributes to these poor levels of service.
- This intersection of Mount Vernon Road and Mount Vernon Highway is an unsignalized “T” intersection with a STOP sign controlling the Mount Vernon Road approach. The LOS in the morning is LOS B, and the LOS in the afternoon is LOS D. In both the AM and PM peak hours, the eastbound left turn movement experiences a LOS F. Traffic leaving the post during the afternoon peak experiences a LOS F.
- The several intersections and ramps in the vicinity of the interchange of Franconia-Springfield Parkway and I-95 operate at a LOS D or better. The one exception is the intersection of Franconia-Springfield Parkway/ Manchester Boulevard and Beulah Street, which operates at an overall LOS E in both the AM and PM peak hours. Within this intersection, the southbound approach experiences a LOS F in both the AM and PM peak hours and the northbound approach experiences a LOS E and LOS F in the morning and afternoon peak hours, respectively.

- The Fairfax County Parkway and Barta Road interchange has several ramps and two intersections. All of these locations operate at a LOS C or better during both the AM and PM peak hours.
- The locations along Fairfax County Parkway to the east of I-95 all operate at a LOS D or better.
- The intersections along Telegraph Road all operate at a LOS D or better.
- The intersections along US Route 1 (with the exception of the US Route 1 and Mount Vernon Highway intersection previously discussed) all operate at a LOS D or better.

Existing Peak Hour Impacts on Public Roadways at Fort Belvoir's Gates

Examination of the peak hour traffic reveals an interesting comparison of the utilization of the intersections where internal roadways interface with the public road network. Tables 3.4-4 and 3.4-5 show the relative contribution of Fort Belvoir to the traffic flow through these interface intersections. The "% of Fort Belvoir Vehicles in the Intersections" column of each table indicates what proportion of all vehicles entering each intersection is destined for Fort Belvoir or coming out of Fort Belvoir. In the AM peak hour, these percentages range from a high of 46 percent for vehicles entering the Post at the Fairfax Parkway intersection with Kingman Road to a low of 11 percent for vehicles entering through the Mount Vernon Road at Mount Vernon Highway intersection. For the PM peak hour, these percentages range from 44 percent exiting at the Kingman Road and Fairfax County Parkway intersection to 13 percent exiting the Post through the Mount Vernon Road at Mount Vernon Highway intersection. These numbers clearly show that the majority of traffic on the public roadway system in the vicinity of Fort Belvoir is non-installation traffic.

The far right column of Tables 3.4-4 and 3.4-5 respectively indicate how the overall vehicle traffic entering and exiting Fort Belvoir is divided among the various intersections. Kingman Road is the most heavily-used entrance and exit road by a wide margin, accommodating one-third of the peak hour traffic entering and exiting Fort Belvoir. At all but one intersection most vehicles exit from the post at the same gate where they entered. The exception is the Pohick Road at US Route 1 intersection: about one third of the vehicles that enter through Tulley Gate exit through a different gate. This is probably because Tulley Gate is where visitors without a government identification and trucks enter the post.

Table 3.4-4
Comparison of Existing AM Peak Hour Entrance Volumes

Location	Entrance Intersection	Gate	Total Baseline Intersection Volume in AM Peak Hour	Total Baseline Entering Volume in AM Peak Hour	% of Fort Belvoir Vehicles in the Intersection*	% of Vehicles Entering Fort Belvoir at the Intersection
North Post	John J. Kingman Road at Fairfax County Parkway	Kingman	3,850	1,782	46%	33%
	Beulah Street at Telegraph Road	Telegraph	3,024	880	29%	16%
South Post	Pohick Road at US Route 1	Tulley	4,716	1,211	26%	23%
	Belvoir Road at US Route 1	Pence	3,920	869	22%	16%
	Mount Vernon Road at Mount Vernon Highway	Walker	1,544	612	40%	11%
Total				**5,354**		**100%**

* Excludes vehicles passing through the intersection to enter at another gate.

Table 3.4-5
Comparison of Existing PM Peak Hour Exit Volumes

Location	Gate	Exit Intersection	Total Baseline Intersection Volume in PM Peak Hour	Total Baseline Exiting Volume in PM Peak Hour	% of Fort Belvoir Vehicles in the Intersection*	% of Vehicles Exiting Fort Belvoir at the Intersection
North Post	John J. Kingman Road at Fairfax County Parkway	Kingman	3,607	1,582	44%	34%
	Beulah Street at Telegraph Road	Telegraph	3,412	805	24%	17%
South Post	Pohick Road at US Route 1	Tulley	4,064	801	20%	17%
	Belvoir Road at US Route 1	Pence	3,465	823	24%	18%
	Mount Vernon Road at Mount Vernon Highway	Walker	1,552	600	39%	13%
Total				**4,611**	--	**100%**

* Excludes vehicles passing through the intersection to enter at another gate.

Note: Meeres Road (Meeres Gate) has been excluded from this table due to ongoing construction of the Mulligan Road widening project.

3.4.2.3 2017 No-Build Traffic Forecasts

Growth in the volume of traffic on roadways near proposed new development includes both background traffic growth – increases in traffic volumes that result from other development or growth in the county or region – and the increase in traffic that would result from the proposed new development on Fort Belvoir. The study team originally assumed a 2 percent annual background growth factor for traffic not associated with Fort Belvoir. This assumption was reviewed with the AAG and it was agreed that while application of a 2 percent growth rate is reasonable for most arterials, the dynamic changes taking place in the study area made the uniform use of this growth rate unreasonable in this case. Instead, the AAG agreed that the 2017 volumes would be derived from growth factors reflecting the differences between the 2013 network model outputs and the outputs for the 2017 networks and growth scenarios. These differences would be used to derive a series of growth factors for the individual roadway links, and, where feasible, the individual intersection turning movements.

The process used to estimate the growth of traffic from existing conditions to 2017 was:

1. Travel demand in the Fort Belvoir area was estimated using the refined regional travel demand forecasting model. To measure major traffic movements, screenlines were defined around the boundary of the study area and traffic volumes at the screenlines were aggregated to measure traffic coming into and leaving the study area. Screenlines add the traffic on all roads that cross the screenline in order to give an overall picture of the amount of traffic crossing the line rather than focusing on one roadway. Figure 3.4-8 shows the screenlines defined in the Fort Belvoir area.
2. The results of the modeling in step 1 provided peak period traffic volumes for links from intersection to intersection, and at selected locations, individual intersection through and turning movements. The model estimated traffic growth factors as well as the absolute change in traffic from existing conditions traffic levels to 2017 traffic levels.
3. Traffic volumes in 2017 were then estimated using both growth model-derived general growth factors and absolute values. As was done for existing conditions, Synchro was used to estimate intersection delays and LOS, and Highway Capacity Manual software was used to estimate delays and LOS for ramps where merge, diverge and weaving takes place.

Modeled Traffic Volume No-Build Growth from 2013 to 2017

Figures 3.4-8 shows the locations of the screenlines, which represent three major directions of traffic relative to the study area: from/to the south (e.g., US Route 1), north and northeast (e.g., US Route 1, Telegraph Road, and Beulah Street), and north and northwest (e.g., Fairfax County Parkway). Interstate 95 sites were treated and analyzed separately.

Figure 3.4-9 shows the estimated growth in traffic volumes from Existing conditions to 2017 No-Build conditions at the screenlines. No-Build traffic conditions correspond to the No Action Alternative; no further development on Fort Belvoir is assumed. The findings can be summarized as follows:

- Traffic volumes are expected to grow moderately for roadways other than I-95 carrying traffic entering and exiting the study area by approximately 13 percent on a daily basis.
- I-95, a major gateway for the study area, also has moderate growth, roughly 4 percent at the north end (south of Franconia-Springfield Parkway) and around 10 percent at the south end (south of Fairfax County Parkway).
- For all locations along the screenlines, the traffic growth is expected to be 8 percent daily, 13 percent for AM peak period, and 11 percent for the PM peak period.
- As expected, there is little short-term growth at the gates under the No-Build condition.
- Traffic patterns are expected to change because of the opening of Mulligan Road. Traffic is expected to divert from the Fairfax County Parkway to Beulah Street to Mulligan Road, with an estimated traffic reduction of 20 percent.

Figure 3.4-10 shows the effects of implementing Alternative 1 at the screenline locations in the Fort Belvoir area in 2017 compared to the 2017 No-Build condition. The findings are:

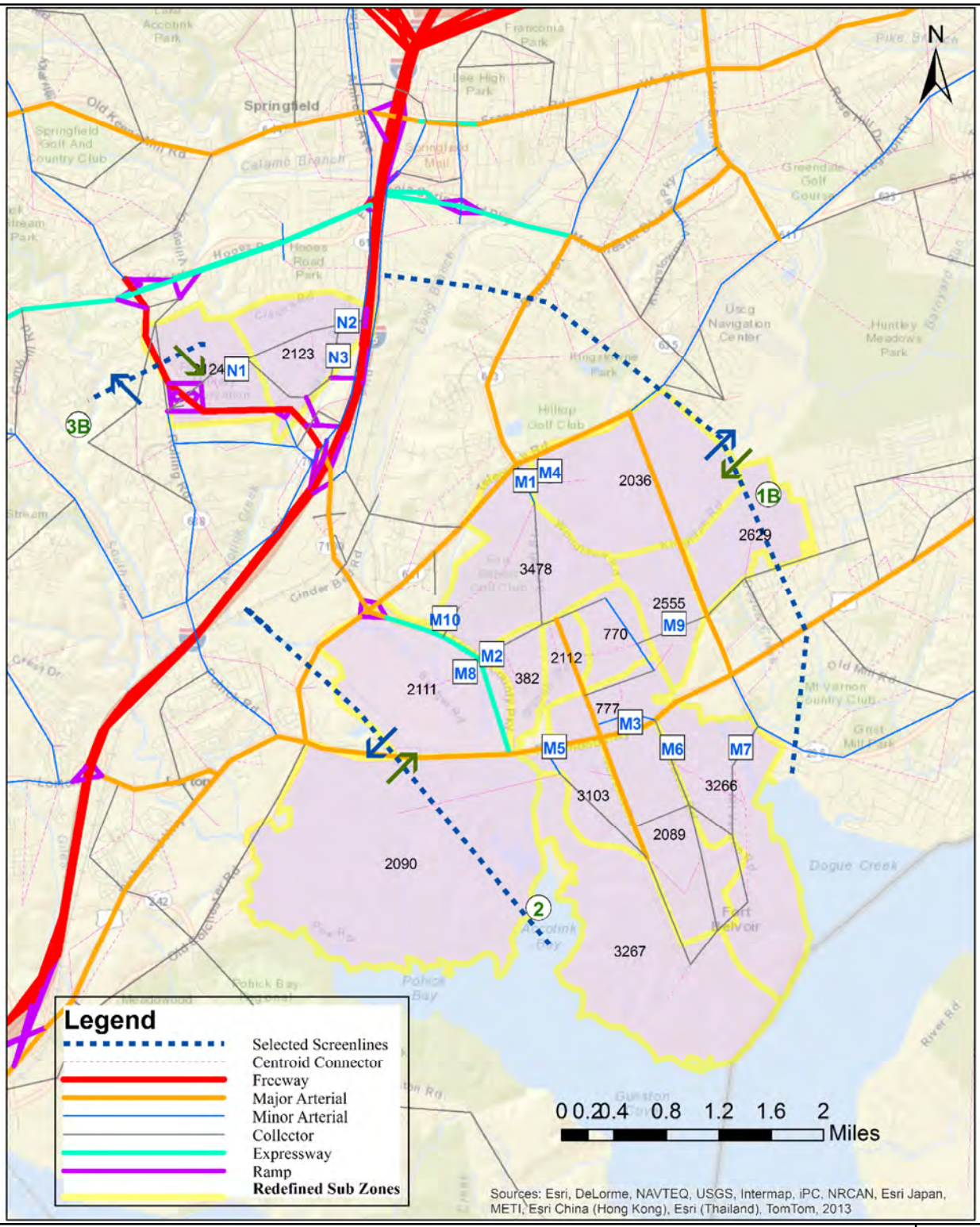
- The traffic effects of implementing Alternative 1 in 2017 are expected to be moderate at Fort Belvoir access points including all gates – an increase of 8 percent for all daily traffic over the 2017 No-Build condition: 10 percent increase on Main Post, and 0 percent at FBNA.
- The traffic effects of implementing Alternative 1 in 2017 in the general area are expected to be small, with an increase of 1 percent daily traffic at all locations in the study area screenlines, including an increase of 1-2 percent daily traffic for locations - except I-95 locations - and an increase of 0 to 1 percent daily traffic for the two I-95 locations.

2017 No-Build Intersection and Ramp Levels of Service

The LOS under the 2017 No-Build condition for the sites identified in the study area are shown in Figure 3.4-11 and Tables 3.4-6 and 3.4-7. As shown in the figure and in the tables, there are eight locations that are forecast to operate at LOS E or F.

- Site 28 AM - Fairfax County Parkway ramp from eastbound to southbound at Rolling Road
- Site 33 PM - Franconia-Springfield Parkway at HOV ramps
- Site 36 AM and PM - Franconia-Springfield Parkway at Beulah Street
- Site 49 AM and PM - Telegraph Road at Hayfield Road
- Site 50 PM - Mulligan Road at Telegraph Road
- Site 52 AM - Telegraph Road at Beulah Street
- Site 58 PM - Lorton Road at the I-95 southbound exit and entrance ramps
- Site 68 AM and PM – US Route 1 at Mulligan Road

Screenlines in Fort Belvoir Area



Source: US Army, 2014c

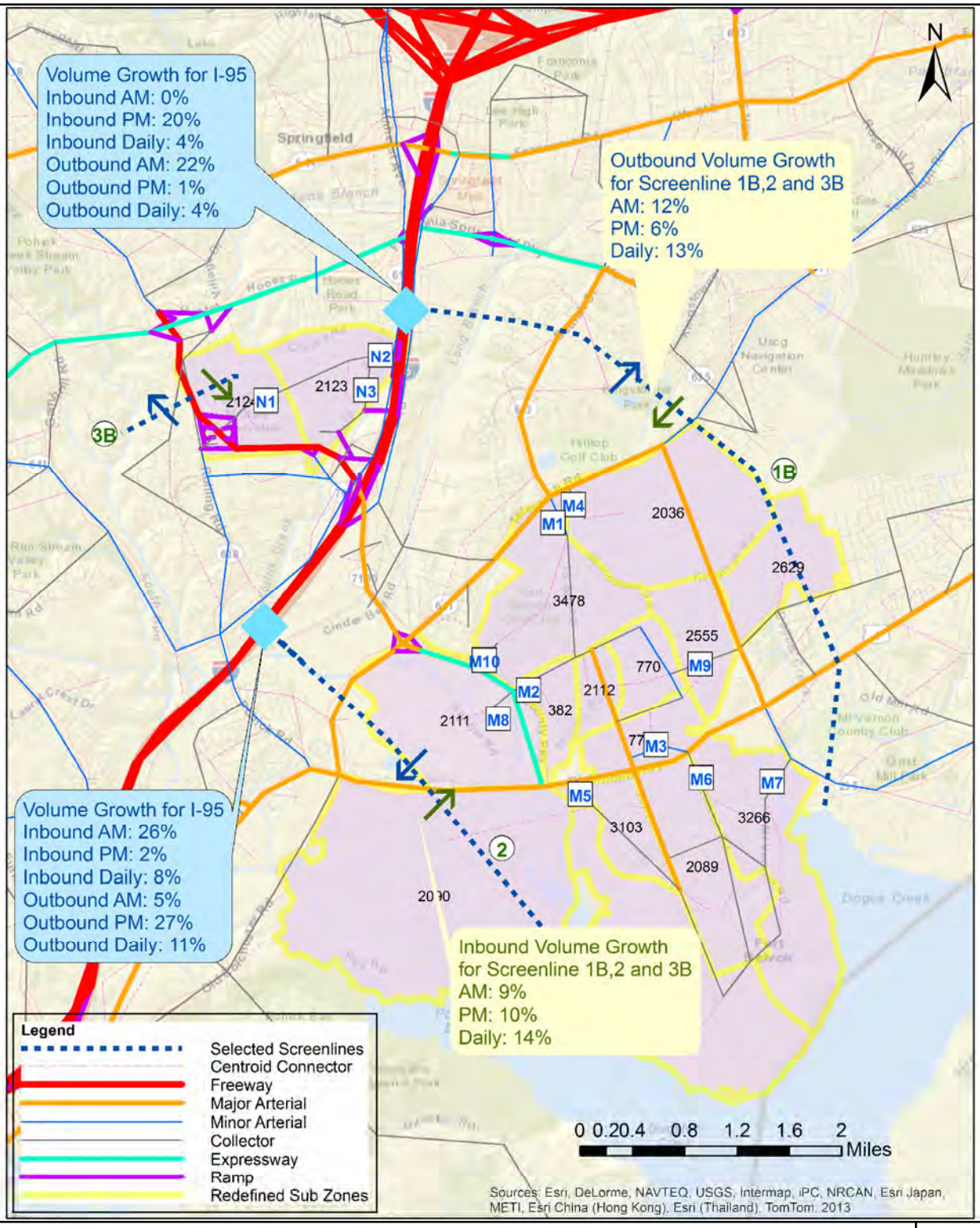
Figure 3.4-8

Fort Belvoir RPMP EIS

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Short-Term Traffic Growth at Screenlines
(2013 Existing vs. 2017 No-Build)



Source: US Army, 2014c

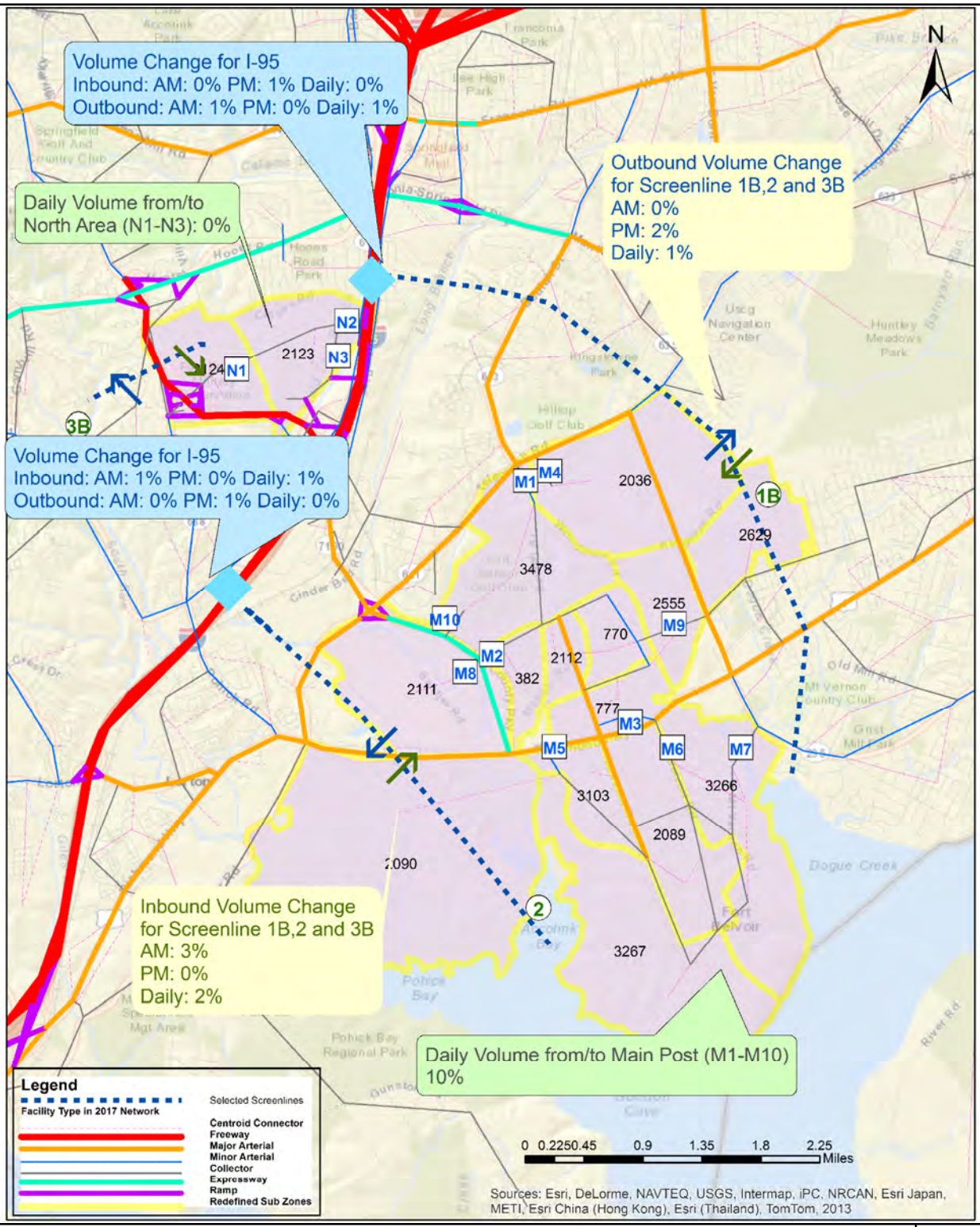
Figure 3.4-9

Fort Belvoir RPMP EIS

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Short-Term Traffic Impacts at Screenlines (2017 Alternative 1 vs. 2017 No-Build)



Source: US Army, 2014c

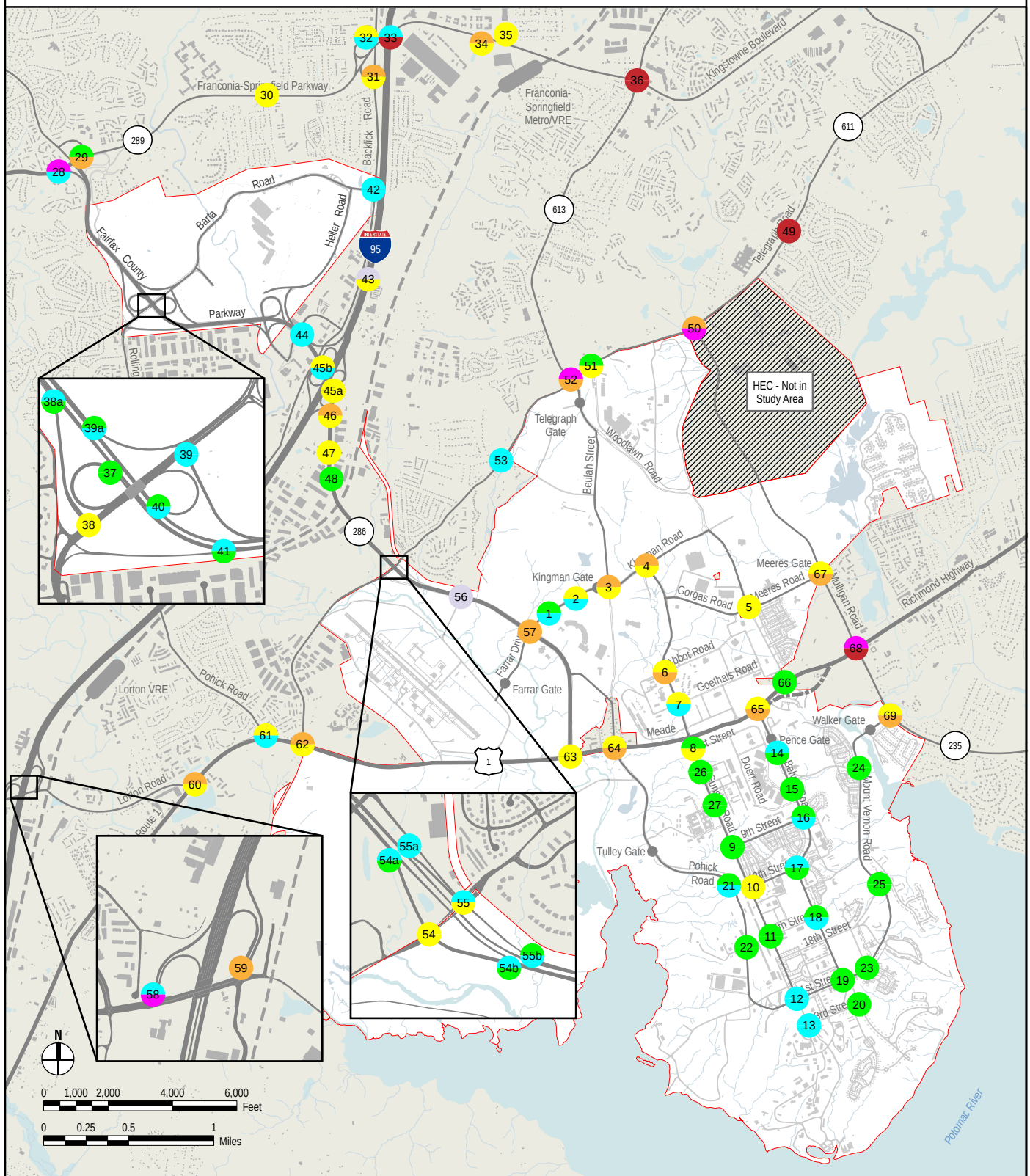
Figure 3.4-10

Fort Belvoir RPMP EIS

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2017 No-Build Level of Service



AM Level of Service
PM Level of Service
Level of Service A
Level of Service B
Level of Service C
Level of Service D
Level of Service E
Level of Service F
No Significant Conflicting Movements

Source: US Army, 2014c

Figure 3.4-11

Fort Belvoir RPMP EIS

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Table 3.4-6
2017 No-Build and Alternative 1 Operational Characteristics – Fort Belvoir Intersections

Site Number (Figure 3.4-11)	Intersection	Type	AM Peak Hour				PM Peak Hour			
			No Action		Alternative 1		No Action		Alternative 1	
			LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)
1	John J. Kingman Road and DLA West Gate	Signal	A	7.8	A	8	B	15.6	B	19.8
2	John J. Kingman Road and DLA East Gate	Signal	C	31.3	D	46.6	B	16.3	B	17.8
3	John J. Kingman Road and Beulah Street	Signal	D	43.9	D	52.8	C	32.6	D	37.7
4	John J. Kingman Road and Gunston Road	Signal	D	36.3	C	28.1	C	21.3	C	30.9
5	Gorgas Road and Woodlawn Road	Signal	C	23.8	C	22.8	C	25.3	C	33.2
6	Gunston Road and Abbot Road	Signal	C	26.9	C	22.6	D	35.7	D	35.6
7	Gunston Road and Goethals Road	Signal	C	33.9	D	37.2	B	18	B	18.7
8	Gunston Road and 1st Street	Signal	A	8.8	A	9.7	C	34.8	D	39.7
9	Gunston Road and 9th Street	Signal	A	6	A	6.2	A	7.2	A	7.3
10	Gunston Road and 12th Street/Pohick Road	Signal	C	34.3	C	34.1	C	21.8	C	25.5
11	Gunston Road and 16th Street	Signal	A	8.5	A	8.5	A	8.8	A	8.8
12	Gunston Road and 21st Street (SC)	4-way	B	11.4	B	11.7	B	12.7	B	13.8
13	Gunston Road and 23rd Street (SC)	3-way	B	13.7	B	14.5	B	10.8	B	12.3
14	Belvoir Road and Traffic Circle	Circle	B	14.8	C	15.2	A	8.6	A	9.2
15	Belvoir Road and Surveyor Road	Signal	A	7.4	A	7	A	7.5	A	7.8
16	Belvoir Road and 9th Street	Signal	A	8.1	A	8.5	B	10.1	A	9.9
17	Belvoir Road and 12th Street	Signal	B	14.6	B	15.7	A	7.2	A	8.4
18	Belvoir Road and 16th Street (SC)	2-way	A	5	A	6.2	B	10.7	C	32.5
19	Belvoir Road and 21st Street (SC)	4-way	A	9.4	A	9.7	A	9	A	9.6
20	Belvoir Road and 23rd Street (SC)	1-way	A	3.6	A	3.6	A	3.4	A	3.4
21	Theote Road and Pohick Road	Signal	A	4.1	A	4.1	B	10.4	B	10.6
22	Theote Road and 16th Street (SC)	2-way	A	3.6	A	3.6	A	3.6	A	3.6
23	Flagler Road and 21st Street (SC)	2-way	A	1.9	A	2.1	A	1.6	A	1.7
24	Mount Vernon Road and Surveyor Road (SC)	1-way	A	1.9	A	1.8	A	2.2	A	2.1

Site Number (Figure 3.4-11)	Intersection	Type	AM Peak Hour				PM Peak Hour			
			No Action		Alternative 1		No Action		Alternative 1	
			LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)
25	Mount Vernon Road and Gillespie Road (SC)	2-way	A	3.2	A	2.9	A	3.1	A	3
26	Gunston Road and 3rd Street	Signal	A	3	A	3	A	7.4	A	8.8
27	Gunston Road and Jackson Loop Road North	Signal	A	6.9	A	6.8	A	9.4	A	7.3
Source: US Army, 2014c. SC = stop controlled (with stop signs).										

Table 3.4-7
2017 No Action and Alternative 1 Operational Characteristics – Public Road Intersections

Site Number (Figure 3.4-11)	Intersection	Type	AM Peak Hour				PM Peak Hour			
			No Action		Alternative 1		No Action		Alternative 1	
			LOS	Metric[1]	LOS	Metric[1]	LOS	Metric[1]	LOS	Metric[1]
28	Franconia-Springfield Parkway Eastbound Exit Ramp to Rolling Road	Diverge	E	39.1 pc/mi/ln	E	39.7 pc/mi/ln	B	15.1 pc/mi/ln	B	15.1 pc/mi/ln
29	Franconia-Springfield Parkway Westbound on Ramp from Rolling Road	Merge	A	<1.0 pc/mi/ln[2]	A	<1.0 pc/mi/ln[2]	D	28.47 pc/mi/ln[3]	D	28.74 pc/mi/ln[3]
30	Franconia-Springfield Parkway and Spring Village Drive	Intersection	C	27.6 s/v[5]	C	28.8 s/v	C	32.7 s/v	C	32.7 s/v
31	Backlick Road at Franconia-Springfield Parkway Eastbound Ramps	Intersection	D	38.2 s/v	D	38.5 s/v	C	26.0 s/v	C	25.0 s/v
32	Backlick Road at Franconia-Springfield Parkway Westbound Ramps	Intersection	C	30.1 s/v	C	30.6 s/v	B	18.9 s/v	B	18.8 s/v
33	Franconia-Springfield Parkway and Interstate 95 HOV Ramps	Intersection	B	19.9 s/v	C	20.1 s/v	F	171.7 s/v[4]	F	178.4 s/v[4]
34	Frontier Drive at Franconia-Springfield Parkway Eastbound Ramps	Intersection	D	36.3 s/v	D	43.8 s/v	C	30.9 s/v	C	30.5 s/v
35	Frontier Drive at Franconia-Springfield Parkway Westbound Ramps	Intersection	C	30.0 s/v	C	34.3 s/v	C	20.7 s/v	C	20.4 s/v
36	Franconia-Springfield Parkway and Beulah Street	Intersection	F	141 s/v	F	137.1 s/v	F	139.6 s/v	F	140.5 s/v

Site Number (Figure 3.4-11)	Intersection	Type	AM Peak Hour				PM Peak Hour			
			No Action		Alternative 1		No Action		Alternative 1	
			LOS	Metric[1]	LOS	Metric[1]	LOS	Metric[1]	LOS	Metric[1]
37	Southbound Barta Road to Eastbound Fairfax County Parkway	Merge	A	2.2 pc/mi/ln	A	2.6 pc/mi/ln	A	<1.0 pc/mi/ln[5]	A	<1.0 pc/mi/ln[5]
38	Barta Road at Fairfax County Parkway Eastbound Ramps	Intersection	C	32.0 s/v	C	31.9 s/v	C	26.1 s/v	C	26.1 s/v
38a	Fairfax County Parkway Southbound exit to Barta Road	Diverge	B	14 pc/mi/ln	B	14.1 pc/mi/ln	A	7.0 pc/mi/ln	A	7.2 pc/mi/ln
39	Barta Road at Fairfax County Parkway Westbound Ramps	Intersection	B	14.4 s/v	B	14.4 s/v	B	11.1 s/v	B	10.6 s/v
39a	Westbound Barta Road entrance to ramp to Fairfax County Parkway	Merge	A	7.0 pc/mi/ln	A	7.0 pc/mi/ln	B	13.8 pc/mi/ln	B	13.9 pc/mi/ln
40	Northbound Barta Road to Westbound Fairfax County Parkway	Merge	A[6]	7.3 pc/mi/ln	A[6]	7.3 pc/mi/ln	B[7]	13 pc/mi/ln	B[7]	13.1 pc/mi/ln
41	Northbound Barta Road to Eastbound Fairfax County Parkway	Merge	B	12.4 pc/mi/ln	B	12.7 pc/mi/ln	A	4.8 pc/mi/ln	A	4.8 pc/mi/ln
42	Barta Road and Backlick Road	Intersection	B	17.3 s/v	B	16.4 s/v	B	17.1 s/v	B	17.1 s/v
43	Interstate 95 HOV Access Ramp*	Merge	(Not open to traffic)				C	24.1 pc/mi/ln	C	24.4 pc/mi/ln
44	Interstate 95 Southbound Exit Ramp to Heller Road	Weave	B	11.5 pc/mi/ln	B	11.6 pc/mi/ln	B	12.9 pc/mi/ln	B	12.8 pc/mi/ln
45a	Fairfax County Parkway SB/EB Weave over I-95	Weave	C	27.2 pc/mi/ln	D	28.1 pc/mi/ln	C	20.3 pc/mi/ln	C	20.3 pc/mi/ln
45b	Fairfax County Parkway NB/WB Weave over I-95	Weave	C	20.1 pc/mi/ln	B	18.6 pc/mi/ln	B	15.9 pc/mi/ln	B	15.7 pc/mi/ln
46	Fairfax County Parkway and Loisdale Road	Intersection	D	40.7 s/v	D	43.4 s/v	C	23.1 s/v	C	24.0 s/v
47	Fairfax County Parkway and Terminal Road	Intersection	C	31.4 s/v	D	35.6 s/v	C	33.5 s/v	C	34.4 s/v
48	Fairfax County Parkway and 750' South of Terminal Road	Intersection	A	7.2 s/v	A	7.4 s/v	A	9.6 s/v	A	9.7 s/v
49	Telegraph Road and Hayfield Road	Intersection	F	198.5 s/v[8]	F	196.7 s/v[8]	F	104.4 s/v[9]	F	105.6 s/v[9]
50	Telegraph Road and Mulligan Road	Intersection	D	42.8 s/v	D	46.7 s/v	E	55.7 s/v[10]	E	59.9 s/v[10]

Site Number (Figure 3.4-11)	Intersection	Type	AM Peak Hour				PM Peak Hour			
			No Action		Alternative 1		No Action		Alternative 1	
			LOS	Metric[1]	LOS	Metric[1]	LOS	Metric[1]	LOS	Metric[1]
51	Telegraph Road and Road B (DCEETA Entrance)	Intersection	A	5.3 s/v	A	5.0 s/v	C	28.7 s/v	C	28.9 s/v
52	Beulah Street and Telegraph Road	Intersection	E	59.8 s/v	E	64.6 s/v	D	39.9 s/v	D	39.2 s/v
53	Telegraph Road and Newington Road	Intersection	B	10.7 s/v	B	11.4 s/v	B	13.1 s/v	B	13.3 s/v
54	Telegraph Road at Fairfax County Parkway Eastbound Ramps	Intersection	C	21.7 s/v	C	22.6 s/v	C	20.2 s/v	C	21.3 s/v
54a	Fairfax County Parkway Southbound exit to Telegraph Road	Diverge	B	17.2 pc/mi/ln	B	18.3 pc/mi/ln	A	9.4 pc/mi/ln	A	9.8 pc/mi/ln
54b	Telegraph Road Southbound exit to Fairfax County Parkway	Merge	B	17.5 pc/mi/ln	B	18.2 pc/mi/ln	A	6.2 pc/mi/ln	A	6.8 pc/mi/ln
55	Telegraph Road at Fairfax County Parkway Westbound Ramps	Intersection	B	12.4 s/v	B	12.7 s/v	C	25.7 s/v	C	29.3 s/v
55a	Telegraph Road entrance to Fairfax County Parkway Northbound	Merge	B	12.4 pc/mi/ln	B	12.6 pc/mi/ln	B	12.8 pc/mi/ln	B	12.9 pc/mi/ln
55b	Fairfax County Parkway Northbound exit to Telegraph Road	Diverge	A	6.2 pc/mi/ln	A	6.6 pc/mi/ln	B	14 pc/mi/ln	B	15.2 pc/mi/ln
56	Fairfax County Parkway at Ehlers Road	Intersection	(Reserved for possible future NMUSA intersection)							
57	Fairfax County Pkwy & John J. Kingman Rd	Intersection	D	50.9 s/v	E	55.7 s/v[11]	D	36.3 s/v	D	39.1 s/v
58	Lorton Road and Interstate 95 Southbound Ramps	Intersection	B	14.9 s/v	B	15.4 s/v	E	56 s/v	E	55.8 s/v
59	Lorton Road and I-95 Northbound Ramps	Intersection	D	54.7 s/v	D	54.4 s/v	D	43.8 s/v	D	44.4 s/v
60	Route 1 and Lorton Road	Intersection	D	54.0 s/v	E	58.3 s/v	C	25.5 s/v	C	26.4 s/v
61	Route 1 and Pohick Road	Intersection	C	27.0 s/v	C	29.3 s/v	B	12.1 s/v	B	18.4 s/v
62	Route 1 and Telegraph Rd/Old Colchester Rd	Intersection	D	50.3 s/v	D	49.7 s/v	C	20.4 s/v	D	23.0 s/v
63	Route 1 and Fairfax County Parkway	Intersection	C	23.9 s/v	C	23.5 s/v	C	21.6 s/v	C	21.7 s/v
64	Pohick Road and Route 1	Intersection	C	36.5 s/v	C	26.3 s/v	D	49.2 s/v	D	50.1 s/v
65	Belvoir Road and Route 1	Intersection	C	29.3 s/v	C	30.9 s/v	D	37.4 s/v	D	42.3 s/v
66	Woodlawn Road and Route 1	Intersection	A	0.8 s/v	A	1.3 s/v	A	0.2 s/v	A	1.6 s/v

Site Number (Figure 3.4-11)	Intersection	Type	AM Peak Hour				PM Peak Hour			
			No Action		Alternative 1		No Action		Alternative 1	
			LOS	Metric[1]	LOS	Metric[1]	LOS	Metric[1]	LOS	Metric[1]
67	Mulligan Road and Mill Road/Pole Road (SC)	Intersection	C	27.2 s/v	C	28.5 s/v	D	47.6 s/v	D	50.4 s/v
68	Mount Vernon Memorial Highway and US Route 1	Intersection	E	72.8 s/v[12]	E	72.8 s/v[12]	F	118.2 s/v[12]	F	115.3 s/v[12]
69	Mount Vernon Memorial Highway and Mount Vernon Road (SC)	Stop Sign	C	21.6 s/v	C	25.2 s/v	D	62.2 s/v	D	84.6 s/v

Source: US Army, 2014c.

Notes:

1. pc/mi/ln = personal car/mile/lane (density); s/v = seconds/vehicle (delay)
2. Site 29 AM: Density for No Action and Short-Term (2017) Alternative 1 is negligible.
3. Site 29 PM: 2017 densities derived with VISSUM for increased accuracy.
4. Site 33 PM: Southbound right turn exiting from HOT lane more than doubles. Eastbound right and westbound left turns onto southbound HOT ramp increase by more than 150 percent.
5. Site 37 PM: Density is negligible.
6. Site 40 AM: LOS based on segment density after merge.
7. Site 40 PM: LOS based on segment density after merge.
8. Site 49 AM - Significant northbound left turn volume increase from Telegraph Road eastbound to Hayfield northbound exceeds storage.
9. Site 49 PM - Southbound right more than doubles and eastbound left increases by 75%.
10. Site 50 PM - Northbound lane assignment is not optimal.
11. Site 57 AM - The average 2017 AM queue length for the southbound left turn into Kingman Road is approximately 1225 feet.
12. Site 68 AM and PM - Synchro based on two through lanes on US Route 1.

3.4.3 Environmental Consequences of Alternative 1 – Full Implementation – The Preferred Alternative

Implementing the RPMP's projects would increase the number of personnel and visitors coming to and from Fort Belvoir in the short term and long term, with potential consequences for the transportation system on and in the vicinity of Fort Belvoir. A transportation system impact analysis was performed to determine the impacts. For the RPMP process, the impact analysis also aimed to identify locations where transportation improvements are needed to maintain acceptable LOS on post and to measure the effectiveness of proposed TDM actions in reducing single-occupant (SOV) trips during peak commuting periods.

Fully implementing the RPMP also could affect the relative attractiveness of using modes other than SOVs to commute to Fort Belvoir or to visit. These other modes include ride-sharing and vanpools, transit service, bicycles, and pedestrian travel. The RPMP's TMP focuses on ways to encourage the use of those other modes and decrease SOV trips. The impacts of implementing Alternative 1 on these modes are described below.

3.4.3.1 Alternative 1 Impacts on 2017 Traffic Levels

Alternative 1 2017 Levels of Service

The enhanced regional demand forecasting model was also modified to reflect the growth on Fort Belvoir associated with Alternative 1. These 2017 Alternative 1 volume estimates were then used as inputs to the Synchro model or Highway Capacity Manual analysis procedures. The results of these analyses are presented in Table 3.4-6, Table 3.4-7, and Figure 3.4-12.

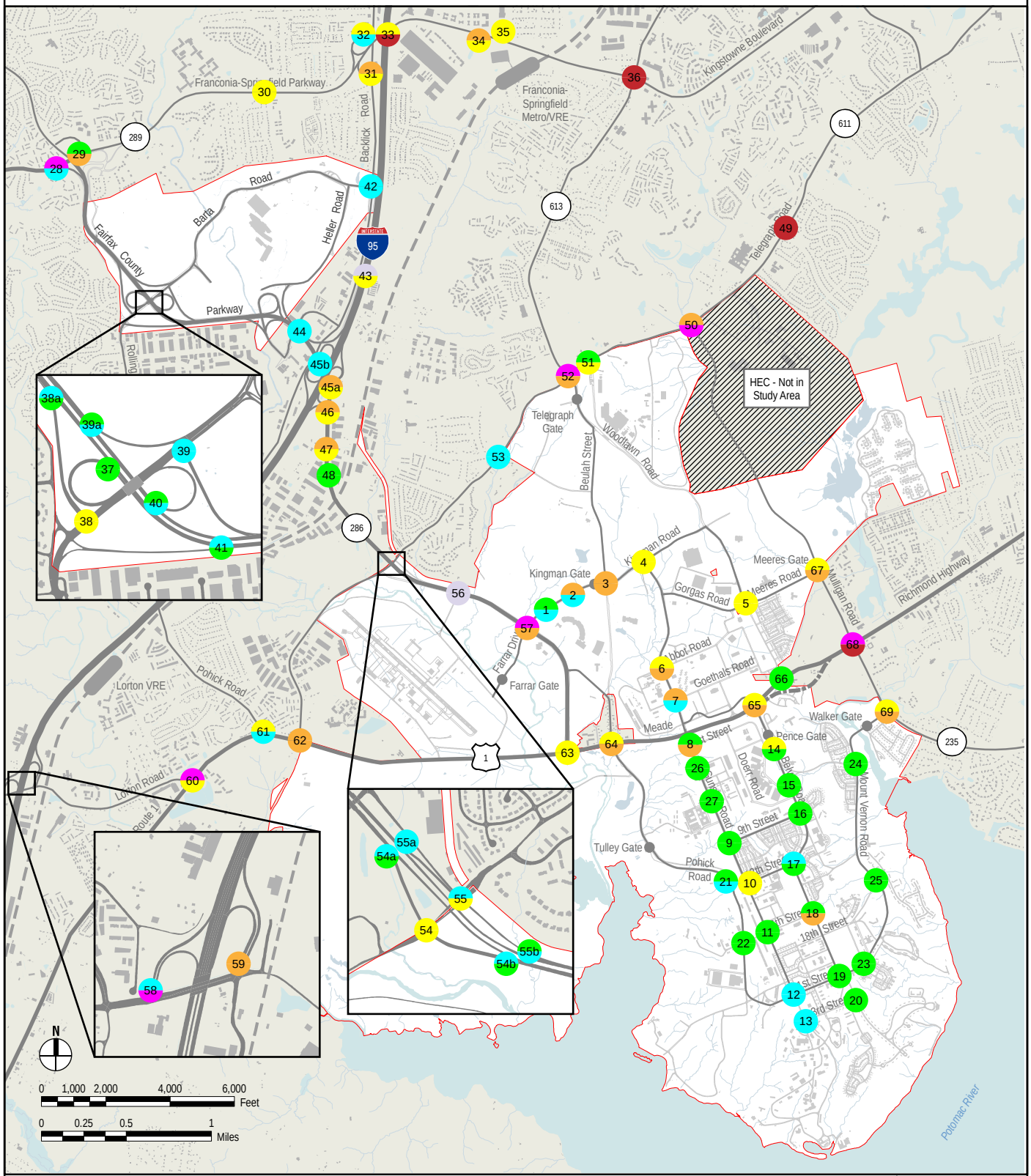
Alternative 1 2017 Impacts on Intersections within Fort Belvoir

Table 3.4-6 (2017 No-Build and 2017 Alternative 1) shows the differences among the average delays and levels of service for the intersections within Fort Belvoir under 2017 No-Build conditions (No Action Alternative) and Alternative 1. This comparison indicates that the additional vehicles under Alternative 1 would produce increased delays that result in a change in the LOS at six intersections as noted below.

- Site 2 – Kingman Road at DLA's East Gate would change its operation from LOS C to LOS D during the AM peak hour.
- Site 3 – Kingman Road at Beulah Street would change from LOS C to LOS D during the PM peak hours.
- Site 7 – Gunston Road at Goethals Road would change from LOS C to LOS D during the AM peak hour.
- Site 8 – Gunston Road at First Street would change from LOS C to LOS D during the PM peak hour.
- Site 14 – Belvoir Road and Traffic Circle would change from LOS B to LOS C during the AM peak hour.
- Site 18 – Belvoir Road at 16th Street would change from LOS B to LOS C during the PM peak hour.

In none of these cases (and nowhere on Main Post) are the intersections projected to operate at LOS E or F under Alternative 1.

2017 Alternative 1 Level of Service



AM Level of Service
PM Level of Service
Level of Service A
Level of Service B
Level of Service C
Level of Service D
Level of Service E
Level of Service F
No Significant Conflicting Movements

Source: US Army, 2014c

Fort Belvoir RPMP EIS

Figure 3.4-12

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Alternative 1 2017 Public Road Intersections

Because more trips in 2017 would be generated by Alternative 1 than the No-Build condition, the traffic volumes associated with Alternative 1 are higher than the No-Build scenario at most locations. However, the difference between these scenarios is minor in all but a few cases; most sites of interest would experience the same LOS for both scenarios (see Table 3.4-7). Five sites would experience increased volumes resulting from the change from the 2017 No-Build scenario to the 2017 Alternative 1 scenario and consequent declines in LOS: one from B to C, two from C to D, and two from D to E. These sites and LOS changes are identified in Table 3.4-8 and discussed below.

- **Site 33 AM Franconia-Springfield Parkway at I-95 HOV Ramps**: The volumes exiting and entering the southbound high occupancy toll (HOT) lane would more than double. Inspection of the Synchro output for this intersection shows that the No-Build average delay of 19.9 seconds per vehicle would increase by 0.2 seconds to 20.1 seconds per vehicle under Alternative 1. Ordinarily, a change this small would go unnoticed, but because the boundary between LOS B and LOS C is 20.0 seconds per vehicle, this change in delay results in a change in the LOS. Because LOS D or better is considered acceptable in urban areas and the HOT operator is making changes that would facilitate the lane's operation, it is recommended that future public resources be focused on improvements needed at other locations.

Table 3.4-8
Fort Belvoir Alternative 1 2017 Affected Intersections

Site Figure 3.4-12	Location	LOS Change and Delay (seconds/vehicle) or Density (pc/mi/ln)	LOS
33 AM	Franconia-Springfield Parkway at I-95 HOV Ramps	LOS B (19.9 sec/veh) to LOS C (20.1 sec/veh)	LOS D or better
45a AM	Southbound weave over I-95	LOS C (27.2 pc/mi/ln) to LOS D (28.1 pc/mi/ln)	
47 AM	Fairfax County Parkway at Terminal Road	LOS C (31.4 sec/veh) to LOS D (35.6 sec/veh)	
57 AM	Fairfax County Parkway at Kingman Road	LOS D (50.9 sec/veh) to LOS E (55.7 sec/veh)	LOS E
60 AM	Route 1 at Lorton Road	LOS D (54.0 sec/veh) to LOS E (58.3 sec/veh)	
Source: US Army, 2014c.			

- **Site 45a AM Southbound Weave over I-95**: Highway weaving sections are formed when an entrance ramp is closely followed by an exit ramp and the acceleration lane from the entrance ramp is extended and becomes the deceleration lane of the exit ramp. A tracing of the paths of vehicles entering the highway and those of vehicles exiting it in this area shows how the vehicles change lanes and how the paths weave their way across each other. The weaving analysis at Site 45a (like the analyses conducted at all merge, diverge, and weaving areas) was conducted using HCS 2010 Version 6.3, which follows the analysis procedures indicated in the Highway Capacity Manual (Transportation Research Board, 2010). During the AM peak, the southbound weaving section of the Fairfax County Parkway over I-95 is projected to have a density of 27.2 pc/mi/ln under the No Action Alternative and a density of 28.1 pc/mi/ln under Alternative 1. Although these densities differ by less than 1 car per mile per lane, they correspond to LOS C and D respectively, because the dividing point between LOS C and LOS D is 28.0 pc/mi/ln. A change this small would normally not be noticed and since LOS D or better is considered acceptable in urban areas, it is recommended that future resources be focused on improvements needed at other locations.

- **Site 47 AM Fairfax County Parkway at Terminal Road**: There are three closely-spaced intersections on the Fairfax County Parkway east of I-95: Loisdale Road (and the I-95 northbound to eastbound and Loisdale exit); Terminal Road; and the intersection 750 feet south of Terminal Road. These three intersections interrupt the progression of vehicles through this area in both directions. The additional vehicles associated with the increased trips generated by Alternative 1 as compared to No Action would result in an increased delay of about 4 seconds per vehicle at the Fairfax County Parkway at Terminal Road intersection. The change from 31.4 sec/veh (LOS C) to 35.6 sec/veh (LOS D) crosses the boundary of 35.0 sec/veh that separates these LOS categories. It is worth noting that the intersection of Fairfax County Parkway at Loisdale Road operates at LOS D under both the No Action Alternative and Alternative 1. It is recommended that the improvement of the Fairfax County Parkway at Terminal Road intersection be implemented as part of a holistic solution to the delay problems in this area of the Parkway.
- **Site 57 AM Fairfax County Parkway at John J. Kingman Road**: The implementation of Alternative 1 would result in increased delays at this intersection relative to No Action conditions. The delay per vehicle would change from 50.9 sec/veh (LOS D) to 55.7 sec/veh (LOS E). The Fairfax County Parkway is the main road leading to Fort Belvoir from the west and this intersection is the most heavily used entrance into North Post. Its importance cannot be overemphasized. The morning queues for the left turn into North Post are long and exceed the storage capacity of the left turn lanes. It is strongly recommended that these left turn bays be significantly lengthened and a third left turn lane be constructed at the intersection. As part of this construction, an additional eastbound receiving lane must be constructed on Kingman Road and this third through lane should extend to Beulah Street. This improvement should also include the construction of an additional inspection lane at the Kingman Gate.
- **Site 60 AM US Route 1 at Lorton Road**: The delay change at this intersection, although less than 10 percent, would result in a shift in the LOS. Under the No Action Alternative, the average delay per vehicle would be 54.0 sec/veh (LOS D), while under Alternative 1, it would be 58.3 sec/veh (LOS E). The boundary between these LOS values is 55 seconds per vehicle. Route 1 is the main road to Fort Belvoir from the south. A large number of vehicles from the south travel north on I-95, exit onto Lorton Road, and then turn left onto Route 1 northbound (almost no one turns right from Lorton Road to go south on Route 1.) In the short term, it is recommended that the third lane on the Lorton Road approach be converted to a left turn lane. In the long run, additional capacity improvements may be required.

Under the criteria for impact significance defined at the beginning of this section, the impacts on Site 57 and Site 60 would be significant because the LOS would degrade from D to E.

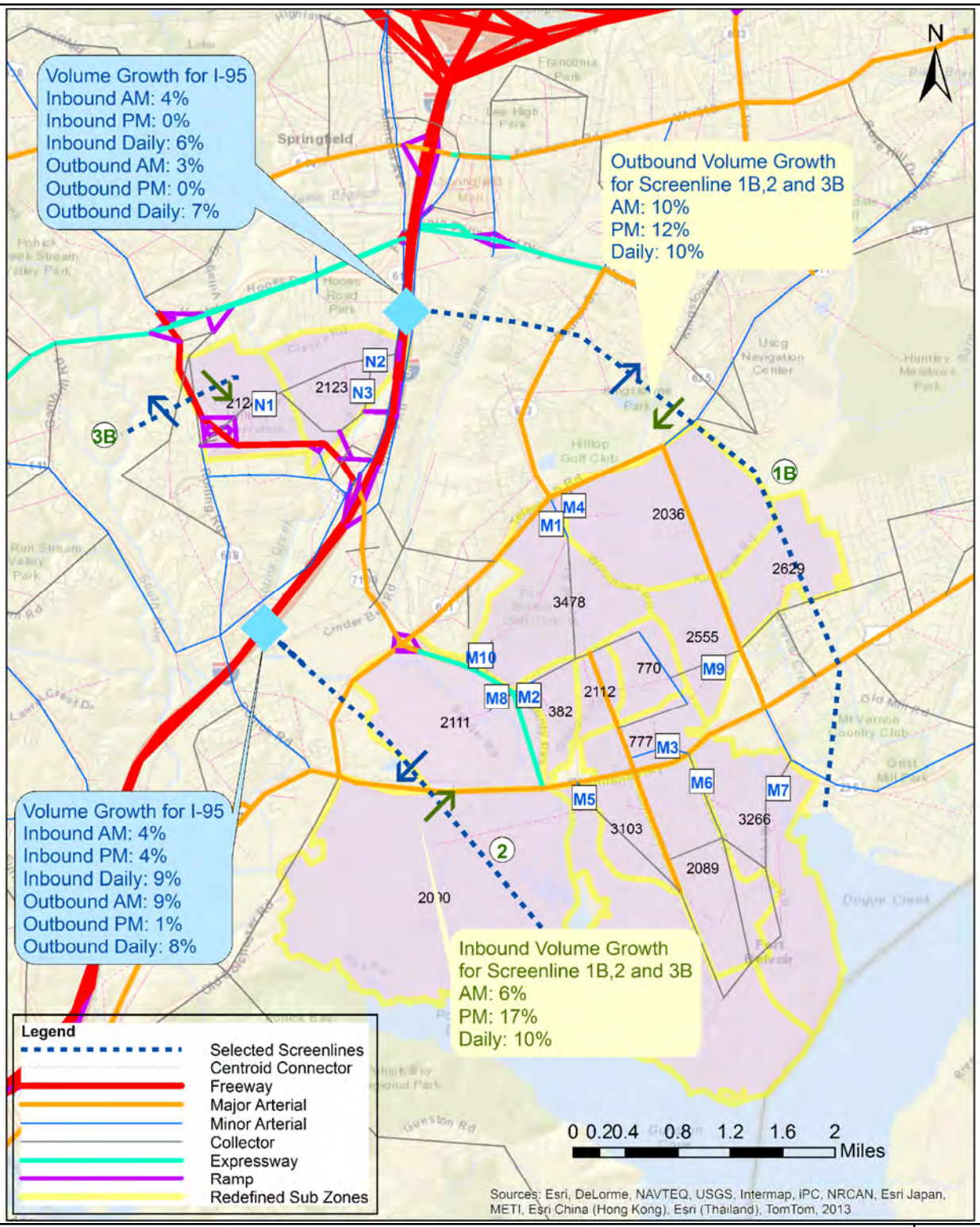
3.4.3.2 Alternative 1 Impacts on 2030 Traffic Levels

2018-2030 Alternative 1 Traffic Growth at Screenlines (2018-2030)

Figure 3.4-13 shows the long-term traffic volume growth at the screenline locations in the Fort Belvoir area under 2030 No-Build conditions. The findings are:

- Traffic volumes are expected to grow moderately for roadways other than I-95 carrying traffic entering and exiting the study area; the average daily traffic (ADT) is expected to grow by 10 percent between 2018 and 2030 (again, except for I-95).
- I-95, a major gateway for the study area, also shows moderate growth, roughly 7 percent at the north end (south of Franconia-Springfield Parkway) and around 9 percent at the south end (south of Fairfax County Parkway).
- For all locations along the screenline, the traffic growth is expected to be 7 percent daily, 4 percent for the AM peak period, and 4 percent for the PM peak period.
- As expected, there is little short-term growth at the gates under the No-Build condition.

Long-Term Traffic Impacts at Screenlines
(2017 No-Build vs. 2030 No-Build)



Source: US Army, 2014c

Figure 3.4-13

Fort Belvoir RPMP EIS

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Figure 3.4-14 shows the effects of Build Alternative 1 at the screenline locations in the Fort Belvoir area in 2030. The findings can be summarized as follows:

- The traffic increase as a result of Alternative 1 in 2030 is expected to be considerable at Fort Belvoir access points, including all gates – an increase of 29 percent for all daily traffic over the No-Build conditions: 18 percent increase on Main Post and 75 percent at FBNA.
- The traffic effects of Alternative 1 in the general area are expected to be small, with an increase of 2 percent daily traffic at all locations in the study area screenlines, including an increase of 5 to 6 percent daily traffic for non-I-95 locations and an increase of 1 percent daily traffic for the two I-95 locations.

Long-Term Roadway Volume-to-Capacity Ratios (2018-2030)

The potential effects of traffic growth under Alternative 1 were evaluated relative to the No Action Alternative (No-Build conditions) for major roadways in the study area. The long-term travel demand in the study area was evaluated in terms of estimated roadway volume/capacity (V/C) ratios for the AM and PM peak hours in 2030 under No-Build conditions (Figures 3.4-15 and 3.4-16) and under Alternative 1 (Figures 3.4-17 and 3.4-18). The V/C ratios are expressed in the figures as congestion levels that define the roadway segments as:

- Roadway segment under capacity = LOS D or better
- Roadway segment near capacity = LOS E
- Roadway segment over capacity = LOS F

The results based on the model estimates for 2030 are:

- Some roadway segments entering the study area are likely to be over capacity during the commuting rush hours in 2030 under the No Action Alternative, including US Route 1, Telegraph Road (between US Route 1 and Fairfax County Parkway, West of Hayfield Road), Fairfax County Parkway (between I-95 and Telegraph Road), and Beulah Street (close to Franconia-Springfield Parkway).
- The performance on these roadway segments under Alternative 1 in 2030 is anticipated to worsen relative to No Action conditions but would mostly remain in the same LOS categories except for a few segments that would deteriorate from near capacity (LOS E) to over capacity (LOS F), which would constitute a significant impact per the significance criteria defined at the beginning of this section:
  - In the AM on public roads, Mount Vernon Highway southbound from the intersection with US Route 1; northbound on Telegraph Road from the US Route 1 intersection; and Rolling Road south of Fullerton Road (south of FBNA). The two US Route 1 intersections are being reconfigured as part of the widening of US Route 1 and may operate differently in the future. Fort Belvoir would monitor the US Route 1 intersections as described in Section 3.4.3.4.
  - In the PM, on public roads, a few sections of I-95 ramps in the study area; southbound on US Route 1 approaching Telegraph Road; southbound on US Route 1 after the Fairfax County Parkway intersection; and northbound on Mount Vernon Highway approaching the US Route 1 interchange. All three intersections with US Route 1 are being reconfigured as part of the widening of US Route 1 and may operate differently in the future. Fort Belvoir would monitor the US Route 1 intersections as described in Section 3.4.3.4.
- On Fort Belvoir, under the 2030 No-Build conditions, there are potential roadway congestion issues for Barta Road and Heller Road on FBNA, and on Kingman Road between Fairfax County Parkway and Beulah Street on North Post.
- Alternative 1 would likely lead to worsening congestion level for some roadway segments on Fort Belvoir, including Beulah Street between Kingman Road and Telegraph Road; Kingman Road between Fairfax County Parkway and Beulah Street; and Barta Road.

- Roadways connecting the two sides of US Route 1 on Main Post area are expected to work under capacity for the AM and PM peak hours (e.g., the Gunston Road bridge crossing).

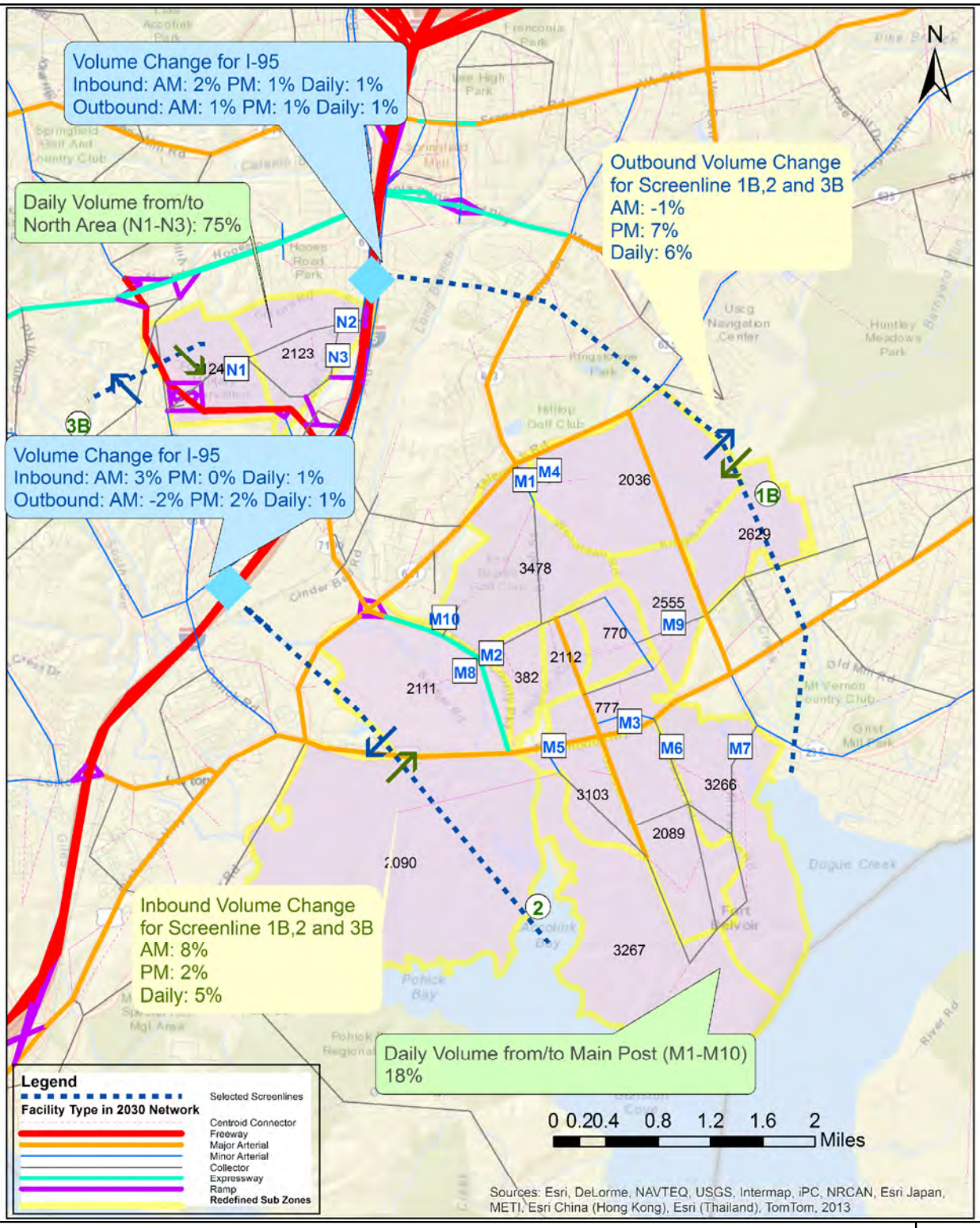
Previous studies have identified the future congestion issues and the need for improvements for major access roadways in the study area, including US Route 1, Fairfax County Parkway, and Telegraph Road. This analysis confirms the previous findings.

3.4.3.3 Alternative 1 Impacts on Transit, Ridesharing, Bicycle, and Pedestrian Use

Fully implementing the RPMP would have beneficial impacts on the use of transit services, ridesharing, and bicycle and pedestrian travel. Different elements of the RPMP combine to facilitate an increase in the use of these traveling modes and a consequent decrease in SOV use. The RPMP elements that would lead to increases in the use of transit services, ridesharing, bicycles, and walking include:

- The Installation Vision and Development Plan (IVDP), which establishes the framework for future development on the installation. By specifying clustered and mixed-use development, and redevelopment of sites currently in use, the IVDP encourages walkable areas and easier access to transit stops.
- The TMP, which:
  - Recommends numerous strategies to increase transit, ridesharing, bicycle and pedestrian use and to reduce SOV use. Fort Belvoir has undertaken many initiatives since BRAC 2005 began to improve transit access and ridesharing to the post in order to accommodate the growth in personnel that resulted, as described in Section 3.4.1.3. As a result, more transit service is available today than in 2005.
  - Recommends that Fort Belvoir continue to work with federal, state, regional, and local agencies on long-term solutions to improve transit access to the post. An example is the proposal to use the defunct FBMRR as a corridor for light rail or bus rapid transit to connect Main Post to the VRE line and eventually to the Franconia-Springfield Transit Transfer Center.
  - States future SOV use goals of: a maximum of 75 percent of SOV by 2017 or at least 25 percent of its commuting population using non-SOV travel options; and, a maximum of 60 percent of SOV by 2030 or at least 40 percent of the commuting population using non-SOV travel options. In 2013, SOV use was 85 percent.
- The Installation Planning Standards (IPS), which articulate design standards for circulation on post. As streets and roads are rebuilt and as buildings are built or rebuilt, the design standards would ensure that sidewalks and bicycle lanes are included. Bicycle lanes can then connect to the county, regional, and national-level bike trails that are planned to go through Fort Belvoir. Sidewalks encourages walking to facilities on post.

Long-Term Traffic Impacts at Screenlines (2030 Alternative 1 vs. 2030 No-Build)



Source: US Army, 2014c

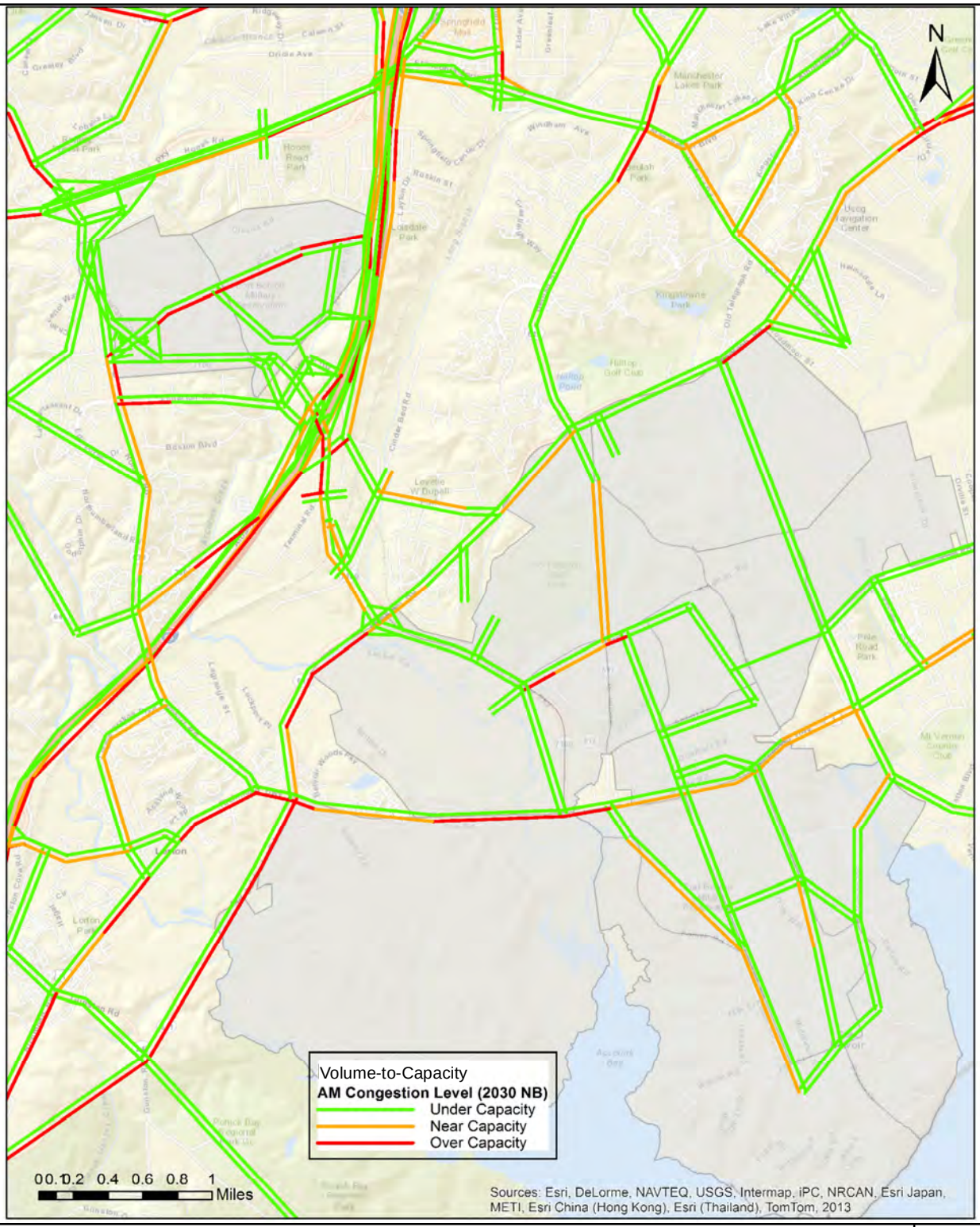
Figure 3.4-14

Fort Belvoir RPMP EIS

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2030 No-Build - AM



Fort Belvoir RPMP EIS

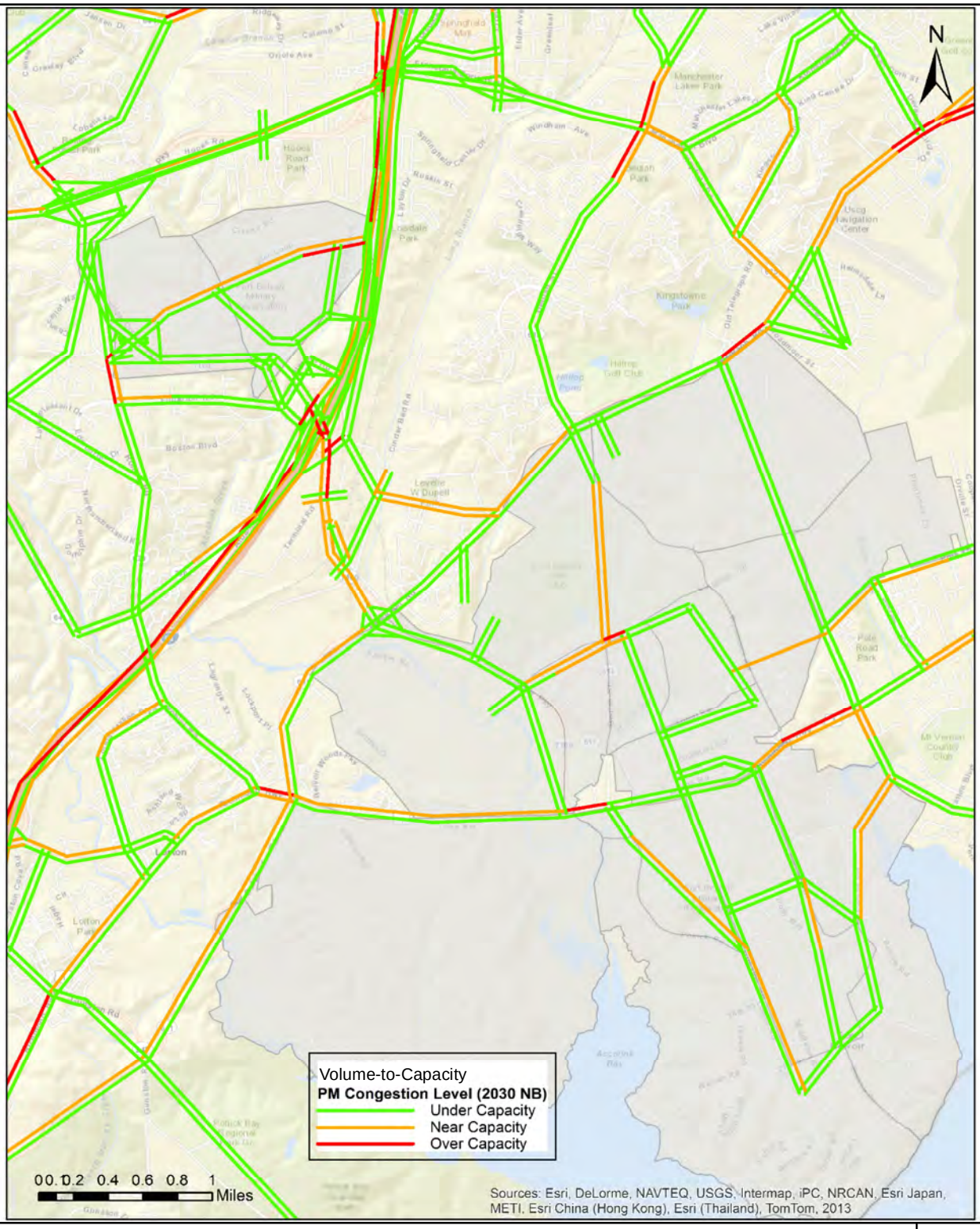
Source: US Army, 2014c

Figure 3.4-15

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2030 No-Build - PM



Fort Belvoir RPMP EIS

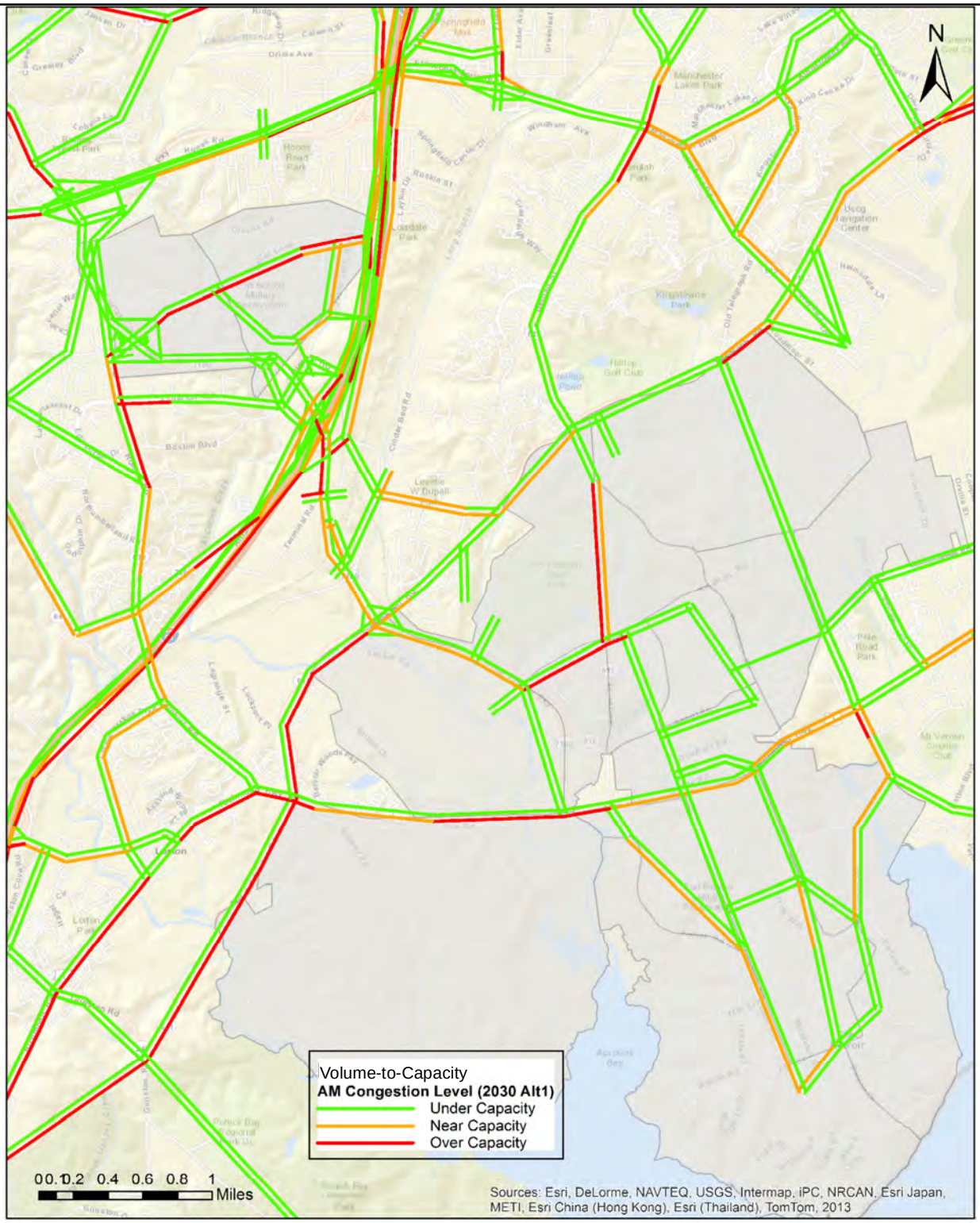
Source: US Army, 2014c

Figure 3.4-16

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2030 Alternative 1 - AM



Fort Belvoir RPMP EIS

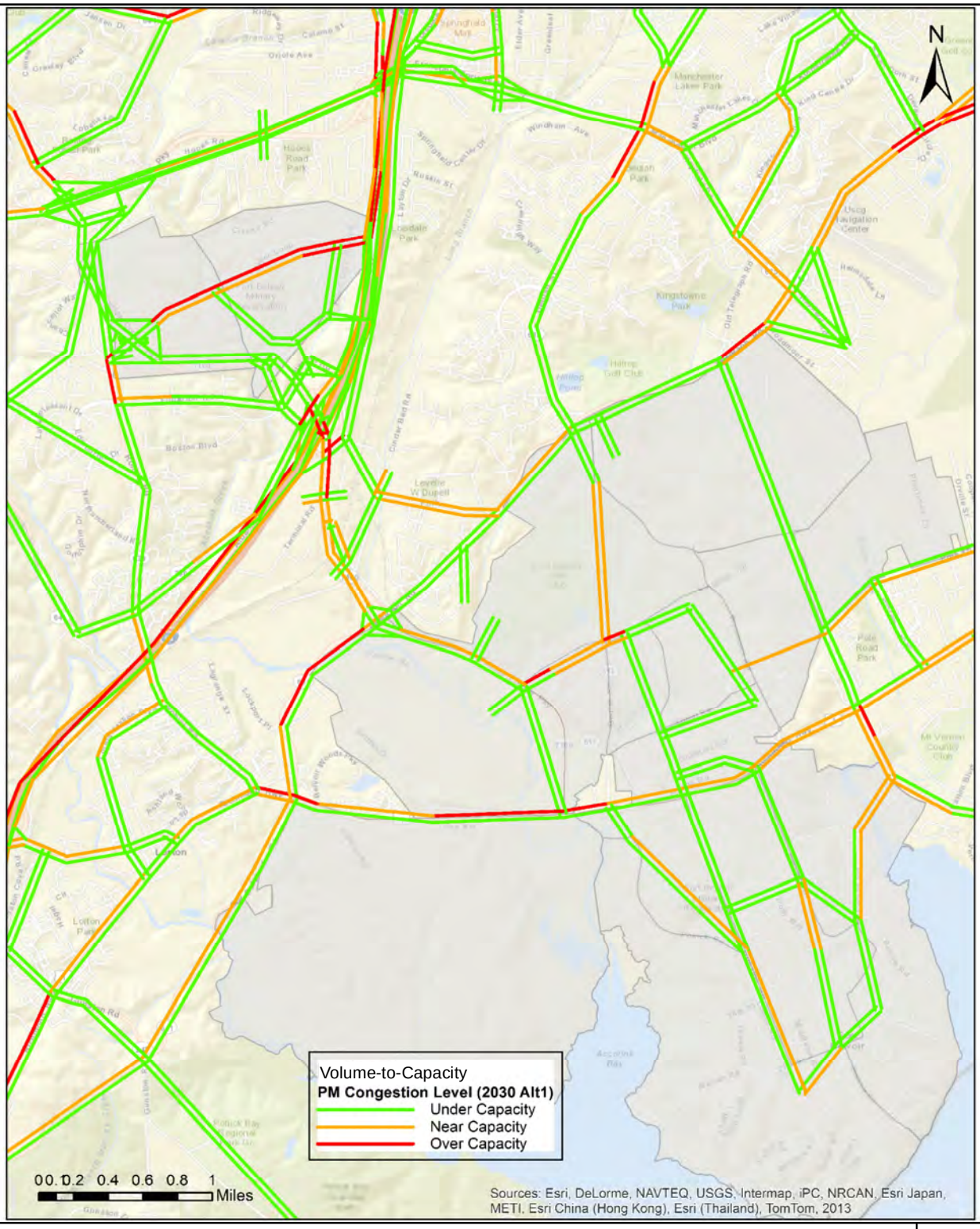
Source: US Army, 2014c

Figure 3.4-17

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2030 Alternative 1 - PM



Fort Belvoir RPMP EIS

Source: US Army, 2014c

Figure 3.4-18

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In order to investigate the effect of reducing SOV use to 60 percent by 2030, the refined 2030 model for Alternative 1 was run with an assumption of 60 percent SOV modal split for commuter trips. In addition, two intermediate SOV modal splits were tested – 65 percent and 70 percent. Figures 3.4-19 and 3.4-20 show the effect of 60 percent SOV use for the AM and PM peak hour for Alternative 1 2030 condition on V/C ratios. Findings were:

- Assuming 70 percent SOV use, the effects on estimated V/C ratios are expected to be small, with only a few roadway segments in the study area getting noticeably better, including Barta Road and Heller Road on FBNA and Pohick Road on Main Post.
- Assuming 65 percent SOV use, the effects on the estimated V/C ratios are expected to be more noticeable both on Fort Belvoir and in the larger study area, with an increased number of roadway segments in the study area getting noticeably better, including Barta Road, Rolling Road between Fullerton Road and Fairfax County Parkway, Fairfax County Parkway between Telegraph Road and Kingman Road, Beulah Street, and Pohick Road.
- Assuming 60 percent SOV use, a considerable number of roadway segments in the study area would have noticeably better estimated V/C ratios. For example, during the AM peak, Telegraph Road eastbound near US Route 1, Fairfax County Parkway southbound at Telegraph Road, and Rolling Road northbound near Fullerton Road are expected to perform at an LOS grade better; during the PM peak, Telegraph Road westbound west of Fairfax County Parkway and US Route 1 westbound west of Pohick Road are estimated to have a better LOS grade.

What this analysis shows are the possible short-term and long-term beneficial direct impacts on traffic congestion of encouraging transit, ridesharing, bicycle, and pedestrian use and discouraging SOVs. Indirect beneficial impacts would include less need to build new transportation infrastructure, less need for new vehicles and all the impacts associated with the automobile industry, better air quality, and reductions in greenhouse gases.

3.4.3.4 Alternative 1 Conclusions and Recommendations

Short-Term (2017) Traffic Analysis Summary

With the exception of two intersections, in the short term, the existing roadway network has the capacity to support the additional trips associated with the proposed action on Fort Belvoir, assuming the completion of the following improvements, which are in design, under construction, or have just opened:

- The new Mulligan Road (Recommended Projects 2 and 3 on Figure 3.4-21) would address the movement between Telegraph Road and US Route 1, which was made more circuitous when local traffic was barred from using Beulah Street after 11 September 2001. Mulligan was largely completed and opened in August 2014, but work to realign the Mulligan Road/US Route 1 intersection is ongoing. Traffic volumes are generally expected to decrease on the Fairfax County Parkway as the result of opening of Mulligan Road.
- Telegraph Road has been widened to four lanes from Mulligan Road to Beulah Road (Recommended Project 3 on Figure 3.4-21). Construction was completed in August 2014.
- Lieber Gate Access Road (Recommended Project 4 on Figure 3.4-21) would complete the four-leg intersection of US Route 1 and Belvoir Road and provide access between US Route 1 and Gunston Road. Lieber Gate is expected to significantly improve access to North Post. As one of the Proposed Action projects (ST 3/STT 13), construction is programmed to begin late in 2014.
- The US Route 1 widening from 4 lanes to 6 lanes through Fort Belvoir (Recommended Project 8 on Figure 3.4-21) would improve traffic flow along the corridor and at two entry points into Fort Belvoir at Pohick Road (access to Tulley Gate) and Belvoir Road (access to Pence Gate). Reconstruction of the

intersections with US Route 1 through Fort Belvoir should improve intersection functioning. Completion of construction is expected by 2017.

The exceptions to the capacity of the existing roadway network to support Alternative 1 traffic increases in 2017 are two intersections that would deteriorate in the AM peak from LOS D to E:

- Site 57 (Figure 3.4-12; Recommended Project 5 on Figure 3.4-21 and Project 2 on Figure 3.4-22) AM Fairfax County Parkway at John J. Kingman Road
- Site 60 (Figure 3.4-12; Recommended Project 14 on Figure 3.4-21) AM US Route 1 at Lorton Road

These two intersections are described in Section 3.4.2.3. Under the criteria for impact significance defined at the beginning of this section, the Alternative 1 impacts on these two intersections would be significant because their LOS would degrade from D to E.

Short-Term Transportation System Recommendations

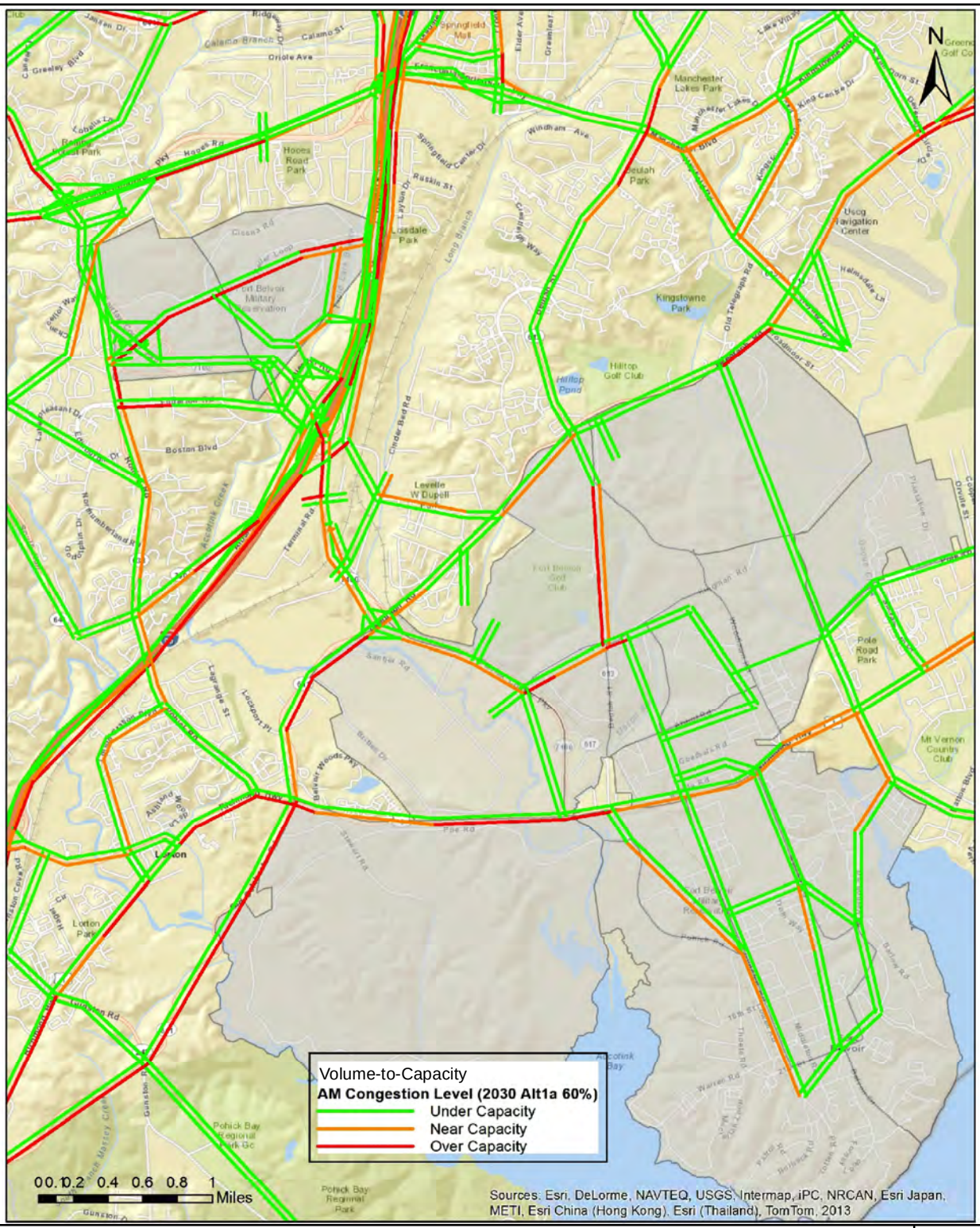
To minimize the impact of Alternative 1, Fort Belvoir would:

- Coordinate with state, regional, and local agencies on studies of improvements of:
  - Roadway facilities beyond Fort Belvoir's borders that may be affected by the increase in trips resulting from development on Fort Belvoir.
  - Transit service to and through Fort Belvoir, including the potential use of light rail or bus rapid transit on US Route 1 and on Fort Belvoir's FBMRR corridor.
  - National, state, and regional bicycle and pedestrian trails through Fort Belvoir and connecting with Fort Belvoir's trails and bikeways.
- Monitor future traffic conditions as private development projects off-post as well as Mulligan Road, the US Route 1 widening, the HOV access ramp from I-95 to FBNA, and Lieber Gate are implemented. Planned monitoring is described in more detail below.
- Consider transportation infrastructure improvements within and at Fort Belvoir's gates where Fort Belvoir connects to the regional roadway network.

Table 3.4-9 lists projects that Fort Belvoir is committed to implementing in the short term, along with recommended improvements or monitoring. This list arises from the table of short-term transportation projects (Table 2-3) in Chapter 2 that are part of the EIS's Proposed Action with three projects added because improvements may be needed, either as indicated by the traffic analysis done for the RPMP or because future traffic conditions after Mulligan Road, Lieber Gate, and the widening of US Route 1 are completed are not fully predictable. Figure 3.4-21 shows the recommended short-term transportation improvements.

Fort Belvoir manages improvement projects on its property, but federal funds for offsite projects must be requested through the Defense Access Road program. This program requires that the deterioration in LOS to the intersection be at least 50 percent due to the nearby DoD installation to qualify for funding. Fort Belvoir is not capable of initiating, funding, and executing improvement projects at off-post intersections that are owned and operated by Fairfax County or the State of Virginia. Fort Belvoir is committed to collaborating with VDOT and FCDOT on monitoring and validating existing traffic models at intersections that are adjoining the post or are off-post. On the basis of this analysis, Fort Belvoir would request funding for improvements to roads and intersections where appropriate and feasible. In addition, the Army would continue to work with area stakeholders to explore alternative federal funding options for improvements – such as those used for the US Route 1 widening – for the off-post intersections affected by Fort Belvoir's development.

Alternative 1 - 2030 AM
Assuming 60% SOV Use



Fort Belvoir RPMP EIS

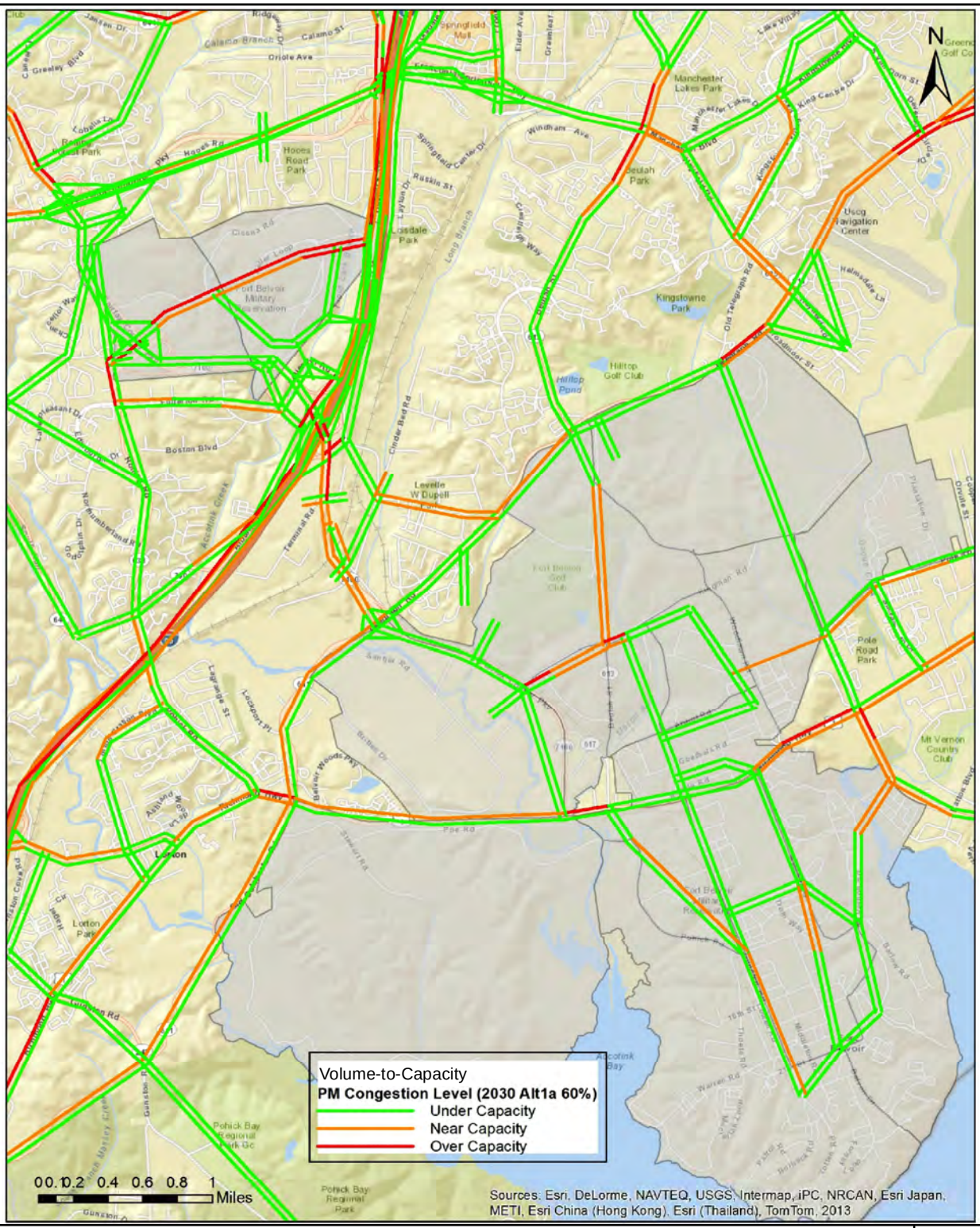
Source: US Army, 2014c

Figure 3.4-19

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Alternative 1 - 2030 PM
Assuming 60% SOV Use



Fort Belvoir RPMP EIS

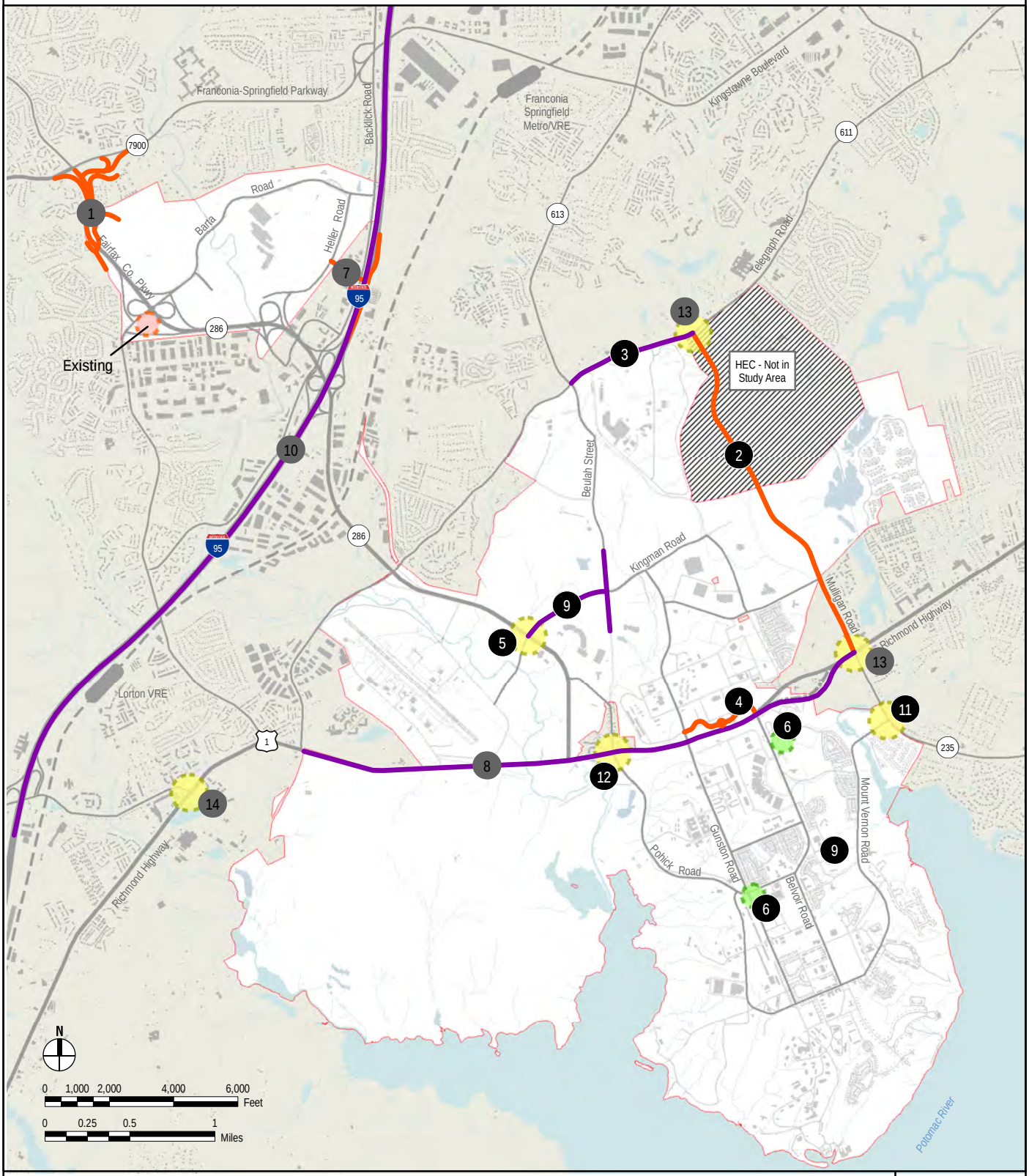
Source: US Army, 2014c

Figure 3.4-20

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Short-Term Recommended Transportation Improvements



New ACP (2017)

Intersection Improvements

Public Park and Ride Lot

Transit Transfer Center

New Road (2017)

Improved Road (2017)

2 Fort Belvoir Improvements

7 Other Agency Improvements

Source: US Army, 2014c

Fort Belvoir RPMP EIS

Figure 3.4-21

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Table 3.4-9
Proposed Short-Term (2013-2017) Transportation Improvements

Project ID on Figure 3.4-21	Project Name	Status	Description
1	Fairfax County Parkway Phase 3	Under construction	Complete Fairfax County Parkway Phase 3; Army has reserved 120 acres of right-of-way for improvements.
2 (STT 1)	Mulligan Road, Phase 2a	Complete	Complete Mulligan Road (4 lanes) from US Route 1 to Telegraph Road.
3 (STT 2)	Telegraph Road Widening (Mulligan Road, Phase 2b)	Complete	Widen Telegraph Road from 2 lanes to 4 from Beulah Street to Mulligan Road.
4 (STT 3)	Lieber Gate Access Road and Control Point	Army is committed to implementing (funded)	Construct access control point and associated access road from US Route 1.
5 (STT 4)	John J. Kingman Road/Fairfax County Parkway Intersection Improvements	Army would seek funding to implement in coordination with FCDOT and VDOT	Add and/or expand left and right turn lanes and upgrade signals as needed.
6 (STT 5)	Transit Hub	Recommended improvement	Evaluate a transit transfer center at either Pence Gate to connect the Medical District to US Route 1 or at 12th Street and Gunston Road to connect the Town Center to existing public transit services. Final location to be determined based on demand.
7	I-95 Access HOV Access Ramp to FBNA	Under construction	Build a new ramp to carry traffic from FBNA to the I-95 southbound Express Lanes. Later phase would allow acess from the southbound Express Lanes to FBNA.
8	US Route 1 Widening	Under construction	Widen US Route 1 from 4 to 6 lanes from Mount Vernon Highway through Fort Belvoir to Telegraph Road. Includes room for light rail or bus rapid transit, bicycles and pedestrians.
9 (STT 6)	On-Post Intersection and Road Improvements	Army would seek funding to implement	Evaluate on-post intersections and roads for improvements as needed (e.g., new signals, signal improvements, intersection and entry turn lanes, Kingman Road widening to PX/ Commissary) based on agency-level TMP traffic analysis results and as new projects occur and modify as needed.
10	Widen I-95	Under construction	Widen I-95 to 11 lanes, including express and HOT lanes.
11 (STT 7)	Walker Gate Improvements	Army would seek funding to implement	Improve Walker Gate & Mount Vernon Memorial Highway intersection by adding a turn lane into Fort Belvoir from the east.
12 Added as the result of traffic analysis	Pohick Road/US Route 1 Intersection Improvement	Army would coordinate with VDOT and FCDOT to study intersections and evaluate improvement options	Coordinate with VDOT and FCDOT to monitor outbound PM turning movements at Pohick Road and US Route 1 for possible extension of third northbound approach lane within Fort Belvoir after the Route 1 widening is complete.
13 Added as the result of traffic analysis	Mulligan Road Intersections with US Route 1 and Telegraph Road	Army would coordinate with VDOT and FCDOT to study intersections and evaluate improvement options	Coordinate with VDOT and FCDOT to conduct traffic counts at the Mulligan Road intersections with US Route 1 and Telegraph Road within two years of both the completion of Mulligan Road and the US Route 1 widening. If level of service D or E results, evaluate improvement options.

Project ID on Figure 3.4-21	Project Name	Status	Description
14 Added as the result of traffic analysis	Lorton Road/US Route 1 Intersection	Army would coordinate with VDOT and FCDOT to study the intersection and evaluate improvement options	Coordinate with VDOT and FCDOT to study options to improve the US Route 1 and Lorton Road intersection.
Note: Transportation improvements in colored rows would be the carried out by other agencies with Fort Belvoir support.			

Long-Term (2030) Travel Demand Analysis Results

For public roads in the study area during rush hours in 2030:

- Segments of four roadways are likely to be over capacity under No-Build conditions:
  - US Route 1
  - Telegraph Road between US Route 1 and the Fairfax County Parkway
  - Fairfax County Parkway between I-95 and Terminal Road
  - Beulah Street close to the Franconia-Springfield Parkway
- When development in 2030 on Fort Belvoir under Alternative 1 is compared to 2030 No-Build conditions (Figures 3.4-15, 3.4-16, 3.4-17 and 3.4-18), the performance of these four roadway segments would likely worsen but mostly remain in the same LOS categories.
- Modeling predicts that 2030 LOS may degrade under Alternative 1 relative to No-Build conditions on a few roadway segments that would be over capacity. Thus, these segments would be significantly adversely affected, when the significance criterion for long-term transportation system impacts is applied:
  - In the AM, Mount Vernon Highway southbound from the intersection with US Route 1; northbound on Telegraph Road from the US Route 1 intersection; and Rolling Road south of Fullerton Road (south of FBNA).
  - In the PM, several I-95 segments in the study area; southbound on US Route 1 approaching Telegraph Road; southbound on US Route 1 after the Fairfax County Parkway intersection; and northbound on Mount Vernon Highway approaching the US Route 1 interchange.

With the exception of Rolling Road and the I-95 segments, these roadway segments connect to US Route 1 intersections. These intersections are being rebuilt as part of the widening of US Route 1 and may operate differently in the future. In addition, the modeled estimates for 2030 may change in the intervening years, and more refined estimates of impact may be possible in the future. As described below, Fort Belvoir would coordinate with VDOT and FCDOT to monitor long-term future impacts on roadways and intersections in the study area.

For roads on Fort Belvoir during peak AM and PM commuting hours in 2030:

1. Two roadway segments on the installation under both 2030 No-Build and Alternative 1 conditions would experience congestion during the AM and PM peak hours: Barta Road on FBNA and Kingman Road between Fairfax County Parkway and Beulah Street.

- One additional roadway segment would experience congestion under Alternative 1 but not under No-Build conditions: Beulah Street between Kingman Road and Telegraph Road.
- Gunston Road, which connects South Post to North Post on a bridge over US Route 1, would operate below capacity in 2030.

Long-Term Transportation System Recommendations

To minimize the impact of Alternative 1 in 2030, Fort Belvoir would:

- Coordinate with state, regional, and local agencies on improvements to roadway facilities near the post, transit service to and through the post, and national/state/regional bicycle and pedestrian facilities through the post.
- Monitor future traffic conditions as described in more detail below. Roadway segments that would be over capacity under Alternative 1 but not under the No Action Alternative, and thus would be significantly adversely affected by Alternative 1, would be especially closely monitored to determine if intersection or roadway improvements are needed. Monitoring of intersections along US Route 1 through Fort Belvoir is Recommendation 3 in Table 3.4-10 and is shown on Figure 3.4-22.
- Undertake transportation infrastructure improvements within the post and at intersections that connect the post's gates with the regional roadway network.

Table 3.4-10 lists projects that Fort Belvoir is committed to implementing along with recommended projects. Figure 3.4-22 shows locations of the long-term transportation recommendations.This list arises from the table of long-term transportation projects (Table 2-5) in Chapter 2 that are part of the EIS's Proposed Action, with one project added because a need for improvement was identified as a result of the traffic analysis.

Traffic Monitoring

In both the short term and the long term, Fort Belvoir would monitor future traffic conditions on and, in coordination with VDOT and FCDOT, near Fort Belvoir in order to maintain acceptable roadway LOS and to estimate the effectiveness of the TMP program to reduce SOV trips during peak hours (recommendations to reduce Fort Belvoir's SOV use are detailed in the Fort Belvoir TMP [(US Army, 2014c]; the predicted impact of reducing SOV use from the current 85 percent to 60 percent are shown on Figures 3.4-21 and 3.4-22 and described in Section 3.4.2.5).

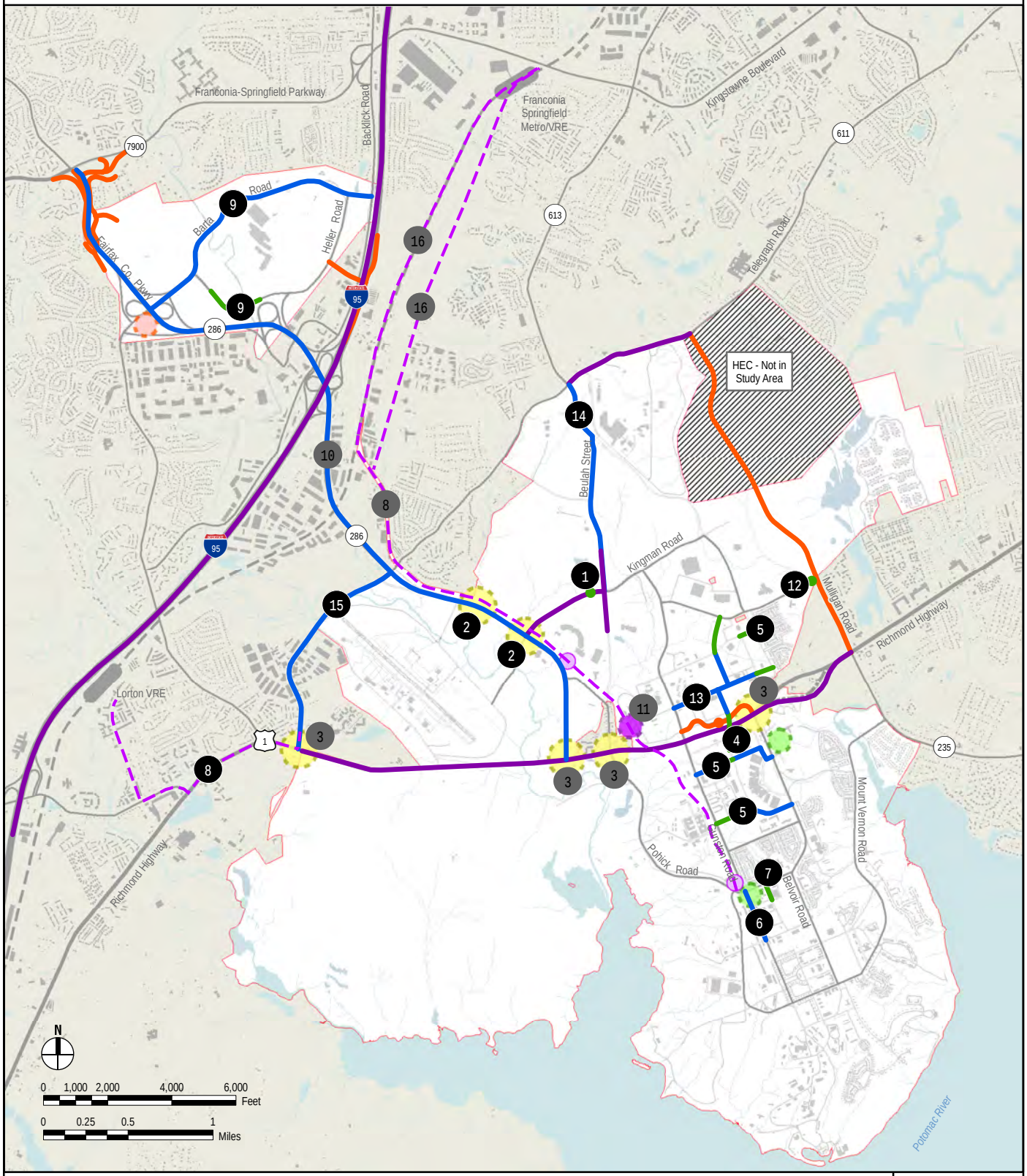
Estimates of future travel demands are based on a forecasting model and have employed reasonable methods to predict results; however, the actual future conditions may vary and may be influenced by:

- Major changes in the study area roadways that are currently under or about to be under construction.
- The opening of Lieber Gate, a new access control point to North Post from US Route 1.
- Changes in study area land use, particularly new private development projects located outside the installation near FBNA and I-95, which would bring additional traffic to the area.

Table 3.4-10
Proposed Long-Term (2018-2030) Transportation Improvements

Project ID on Figure 3.4-22	Project Name	Status	Description
1 (LTT 1)	John J. Kingman Gate	Army would seek funding to implement	Improve Kingman Gate by adding lanes.
2 (LTT 2)	Fairfax County Parkway/John J. Kingman Road Intersections & NMUSA Entrance	VDOT would be responsible for improvements to the Fairfax County Parkway/John J. Kingman Road intersection. Army would seek funding for improvements at the Fairfax County/NMUSA Entrance (Liberty Drive) intersection.	Grade-separate intersections along Fairfax County Parkway at John J. Kingman Road and the NMUSA entrance.
3 (LTT 3)	US Route 1 intersections with Fairfax County Parkway, Pohick Road, and Belvoir Road	Army would coordinate with VDOT and FCDOT to study intersections and evaluate improvement options	Coordinate with VDOT and FCDOT to monitor intersections adjacent to Fort Belvoir along US Route 1 at Fairfax County Parkway, Pohick Road, and Belvoir Road to determine need for future improvements. Specifically, study options for adding turn lanes or grade-separating intersections along US Route 1 at Fairfax County Parkway, Telegraph Road, and Belvoir Road or other necessary improvements.
4 (LTT 4)	US Route 1 Overpass	Recommended Improvement	Construct US Route 1 overpass and a two-lane road connecting 1st Street and Gorgas Road.
5 (LTT 5)	Internal cross streets	Army would seek funding to implement	Add internal cross streets (Abbot Road, 3rd Street, and 6th Street).
6 (LTT 6)	Gunston Road from 12th Street to 16th Street	Army would seek funding to implement	Extend four-lane widening of Gunston Road from 12th Street to 16th Street.
7 (LTT 7)	13th Street Improvements	Army would seek funding to implement	Convert 13th Street to two-way traffic and connect to 12th Street as part of the future Town Center redevelopment.
8	Extend and Expand Transit Service and Lower SOV Use	Recommended improvements	Engage with transit agencies and stakeholders to extend transit along US Route 1 to the Lorton VRE station. Use the defunct FBMRR for light rail or bus rapid transit from Main Post to existing VRE line. Enhance the internal shuttle bus. Achieve TMP goal of 60% SOV use.
9 (LTT 8)	Heller Road	Armywould seek funding to implement	Complete the Heller Road loop at FBNA.
10	Widen Fairfax County Parkway from Franconia-Springfield Parkway to US Route 1	Recommended improvement	Widen the Fairfax County Parkway from 4 lanes to 6 lanes from the Franconia-Springfield Parkway to US Route 1.
11	Construct Regional Transit Hub	Recommended improvement	Construct a regional transit hub along US Route 1 to support the Enhanced Transit Corridor.This is a transportation improvement identified in the Fairfax County Comprehensive Plan.
12 (LTT 9)	Meeres Gate	Recommended improvement	Potentially open Meeres Gate (subject to long-term security and mission requirements that are to be determined).

Long-Term Recommended Transportation Improvements



New ACP (2017)
New ACP (2030)
Intersection Improvements
Transit Stop
Regional Transit Hub
Public Park and Ride Lot
Transit Transfer Center
Dedicated Transit Corridor
New Road (2014 - 2017)
Improved Road (2017)
New Road (2030)
Improved Road (2030)
Fort Belvoir Improvements
Other Agency Improvements

Fort Belvoir RPMP EIS

Figure 3.4-22

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Table 3.4-10
Recommended Long-Term (2018-2030) Transportation Improvements (Continued)

Project ID on Figure 3.4-22	Project Name	Status	Description
13 (LTT 10)	Goethals Road	Recommended Improvement	Widen Goethals Road to four lanes and extend to Woodlawn Road.
14 Project added as the result of traffic analysis	Beulah Street from Kingman Road to Woodlawn Road Improvements	Army would seek funding to implement	Evaluate options to add capacity to Beulah Street from John J. Kingman Road to Woodlawn Road. This may involve redirecting existing northbound / southbound lanes to allow 2 through inbound lanes only for AM and 2 through outbound lanes for PM weekday traffic.
15	Widen Telegraph Road from US Route 1 to Fairfax County Parkway	Recommended improvement	This is consistent with Fairfax County's Transportation Plan element of the Comprehensive Plan, but does not appear in the CLRP list of 2030 improvements.
16	Transit Route to Franconia-Springfield Transit Transfer Center	Recommended improvement	Coordinate with transit agencies and shareholders to develop one of two potential alternative transit corridors from the defunct FBMRR to the Franconia-Springfield Transit Transfer Center, either parallel to CSX rail line or using Old Cinderbed Road. Included in Fairfax County's Transit Network Study.
Note: Colored rows are transportation improvements that would be carried out by other agencies with Fort Belvoir support.			

To track future changes in on-post and off-post traffic, Fort Belvoir would:

1. **Track Activities on-Post and at Selected Public Road Intersections**

   - **Project-Level Traffic Impact Analysis**. For new projects beyond 2017, the DoD agency initiating a new building construction project on Fort Belvoir would prepare a Site Traffic Impact Study in accordance with the design and construction criteria guidance in the US Army Corps of Engineers Technical Instructions (TI 800-01), which are based on project size, location, and scope. In addition, for all new projects and facilities that would result in 100 new personnel or more, a traffic assessment would be required as part of the Fort Belvoir TMP requirements for agencies. The results of the traffic assessment would be provided to the Fort Belvoir TDM coordinator to determine the impacts of additional traffic on the Fort Belvoir roadway network.
   - **Installation-wide Traffic Assessment**. Fort Belvoir would conduct an installation-wide traffic assessment every five years that would focus on key intersections and roadway links on post to determine changes in LOS. The exact timing of this assessment and the collection of peak hour turning movement counts to assess traffic volumes is to be determined by Fort Belvoir DPW Staff and the TDM Coordinator. In addition to monitoring traffic conditions to determine changes to LOS, gate counts would also be collected.

2. **Conduct Ongoing Coordination with VDOT, FCDOT, and NCPC**

   Fort Belvoir would coordinate with VDOT and FCDOT on mutually-beneficial locations for transportation improvements

Traffic Monitoring

Biannual Coordination: Intersections that may be impacted by Fort Belvoir traffic would be monitored for changes in LOS. Fort Belvoir would meet with VDOT and FCDOT twice a year to discuss traffic conditions and possible transportation improvements.

Five-year TMP Transportation Element Updates: Fort Belvoir would conduct new traffic counts, evaluate intersection LOS, assess needed roadway improvements, update the TMP, and share this information with VDOT and FCDOT.

and with transit stakeholders to improve public transit service to and from the installation. Fort Belvoir would maintain its relationship with VDOT, FCDOT, and NCPC through participation in the Fort Belvoir Real Property Planning Board meetings, which take place twice a year. Likely topics of discussion would be the results of studies, updates to the list of improvements, TMP actions and progress, and mitigation measures to be considered.

3. **Update Transportation Elements of the Fort Belvoir TMP Periodically**

   Fort Belvoir would take a proactive approach with NCPC, VDOT and FCDOT to coordinate traffic improvements and plan for regular updates of the Fort Belvoir TMP to identify future projects and related NEPA actions. A five-year cycle is recommended for updating the Fort Belvoir TMP. Each updated TMP would include five-year and ten-year development and recommended improvement horizons. The analysis contained in the report would result in recommendations for traffic signal improvements, turning lane improvements and other at-grade improvements that could be implemented in the short term. The analysis of the conditions at the ten- year horizon would identify the need for more substantial improvements in the transportation infrastructure such as interchange improvements, roadways where additional lanes are needed, and transit improvements. This proposed five- year TMP update cycle would be frequent enough to capture the ongoing identification of new and expanded missions and improvements on the post so that the meetings cited in the preceding paragraph could be continued into the future. It should also allow sufficient time for completing the funding process associated with minor short-term improvements and major long-term improvements.

3.4.4 Environmental Consequences of Alternative 2 – Modified Long-Term

3.4.4.1 Alternative 2 2017 Traffic Impacts

Because the differences between the 2017 LOS under the No Action Alternative and Alternative 1 were minor, and Alternative 1 would cause the greatest increase in personnel among the alternatives, the Alternative 2 analysis focused on the two intersections that would experience significant adverse effects under Alternative 1. At the 47 locations on public roads where LOS were determined for Alternative 1, the LOS values were the same as under the No Action Alternative at 41 locations in the AM peak hour and at 47 locations in the PM peak hour. The LOS under the No Action Alternative was better than under Alternative 1 at five locations in the AM peak hour and one location in the PM peak hour. Only two of these instances involved a transition from LOS D to LOS E:

- Site 57 (Figure 3.4-12; Recommended Project 5 on Figure 3.4-21 and Recommended Project 2 on Figure 3.4-22) AM Fairfax County Parkway at John J. Kingman Road
- Site 60 (Figure 3.4-12; Recommended Project 14 on Figure 3.4-21) AM US Route 1 at Lorton Road

Because the LOS at most locations are the same under the 2017 No-Build conditions and Alternative 1, the lower levels of Fort Belvoir development proposed for Alternative 2 and Alternative 3 in 2017 would also have the same or possibly lower LOS values at these locations.

The ability of Alternative 2 to reduce traffic congestion was assessed by using the Synchro program to determine the LOS values at the two locations where the LOS values change from LOS D under No- Build conditions to LOS E under Alternative 1. The results are as follows:

- The rounded estimates of 2017 traffic volumes for the individual movements under Alternative 2 would be the same at each intersection. The difference in the total volume passing through the intersection under No-Build condition and Alternative 1 is approximately 5 percent at Site 57 (Fairfax County Parkway at Kingman Road) and less than 2.5 percent at Site 60 (US Route 1 at Lorton Road). The total

volumes for Alternative 2 (and Alternative 3) are about two-thirds of the difference between the No-Build condition total volume and Alternative 1 total volume at Site 57, and are midway between the No-Build and Alternative 1 total volumes at Site 60. These volumes are shown in Table 3.4-11.

- At Site 57 in the AM peak hour, the LOS would remain in the LOS D range under Alternative 2 (the same as No-Build condition), but it would be only 0.5 seconds less than the LOS E boundary value. These results are shown in Table 3.4-12.
- At Site 60 in the AM peak hour, the LOS for Alternative 2 is LOS E, the same as the AM peak hour LOS for Alternative 1. The average delay per vehicle under Alternative 2 is within 2 seconds per vehicle of the average delay per vehicle under Alternative 1. This result is also shown in Table 3.4-12.

The short-term recommendations described for Alternative 1 would be the same under Alternative 2.

3.4.4.2 Alternative 2 2030 Traffic Impacts

Because there would be no long-term development on FBNA under Alternative 2, the impacts on the intersections and roadway segments near the FBNA would be the same as under 2030 No-Build conditions. The impact of Alternative 2 in 2030 on the roadways on and near Main Post would be the same as the Alternative 1 impacts.

The long-term recommendations described for Alternative 1 would be the same under Alternative 2.

3.4.4.3 Alternative 2 Impacts on Transit, Ridesharing, Bicycle, and Pedestrian Use

The impacts of implementing Alternative 2 on transit, ridesharing, bicycle, and pedestrian use would be the same as described for Alternative 1 on Main Post. Even with no long-term development on FBNA, Fort Belvoir would continue to promote transit, ridesharing, and bicycle commuting and discourage SOV use on FBNA.

The short-term and long-term recommendations described for Alternative 1 would be the same under Alternative 2.

3.4.5 Environmental Consequences of Alternative 3 – Modified Short-Term

3.4.5.1 Alternative 3 2017 Traffic Impacts

The impacts on traffic of implementing Alternative 3 are expected to be almost the same as those of implementing Alternatives 1 and 2. As may be seen in Tables 3.4-11 and 3.4-12, the Alternative 3 impacts on the two significantly affected intersections – Fairfax County Parkway at John J. Kingman Road and US Route 1 at Lorton Road – are similar to the impacts of Alternative 1, which would lead to more personnel in 2017 than Alternative 3, where much development would be delayed to the long term. As noted for Alternative 2, however, for the Fairfax County Parkway at John J. Kingman Road intersection in the AM peak hour, the LOS would remain in the D range under Alternative 3 (the same as under No-Build condition) but is only 0.5 seconds less than the LOS E boundary value.

The short-term recommendations described for Alternative 1 would be the same under Alternative 3.

3.4.5.2 Alternative 3 2030 Traffic Impacts

The long-term impacts of implementing Alternative 3 on study area traffic conditions would be the same as the impacts of Alternative 1.

The long-term recommendations applicable to Alternative 3 would be the same as those described for Alternative 1as well.

Table 3.4-11
Alternative 2 and Alternative 3 2017 Traffic Volume Analysis for Sites 57 and 60

Alternative	Northbound			Southbound			Eastbound			Westbound			Sum
	Left	**Through**	**Right**	**Left**	**Through**	**Right**	**Left**	**Through**	**Right**	**Left**	**Through**	**Right**	
Site 57 – Fairfax County Parkway at Kingman Road													
No-Build/No Action	10	700	375	1,500	675	30	0	10	10	30	0	175	3,515
Alternative 1	10	700	350	1,700	650	30	10	10	10	20	10	200	3,700
Alternative 2	10	700	350	1,625	650	30	10	10	10	30	10	200	3,635
Alternative 3	10	700	350	1,625	650	30	10	10	10	30	10	200	3,635
Site 60 – US Route 1 at Lorton Road													
No-Build/No Action	0	2,325	0	10	500	300	1,125	0	10	0	0	0	4,270
Alternative 1	0	2,350	0	10	500	325	1,175	0	10	0	0	0	4,370
Alternative 2	0	2,325	0	10	500	300	1,175	0	10	0	0	0	4,320
Alternative 3	0	2,325	0	10	500	300	1,175	0	10	0	0	0	4,320
Source: US Army, 2014c**.**													

Table 3.4-12
Alternative 2 and Alternative 3 2017 AM Peak Hour Traffic LOS and Metric Analysis for Sites 57 and 60

Site	No Action		Alternative 1		Alternative 2		Alternative 3	
	LOS	**Metric**	**LOS**	**Metric**	**LOS**	**Metric**	**LOS**	**Metric**
Site 57	D	50.9	E	55.7	D	54.5	D	54.5
Site 60	D	54	E	58.3	E	56.6	E	56.6
Source: US Army, 2014c.								

3.4.5.3 Alternative 3 Impacts on Transit, Ridesharing, Bicycle, and Pedestrian Use

The impacts of implementing Alternative 3 on transit, ridesharing, bicycle, and pedestrian use would be the same as described for Alternative 1 on Main Post.

The short-term and long-term recommendations described for Alternative 1 would be the same for Alternative 3.

3.4.6 Proposed Mitigation Measures

To ensure that the effectiveness and capacity of the transportation facilities affected by the proposed short-term and long-term development on Fort Belvoir are not degraded, the Army would pursue appropriate funding avenues for those projects in Tables 3.4-9 in the short term and 3.4-10 in the long term whose status is indicated as "Army would seek funding." These projects would be funded by the DoD and managed by Fort Belvoir DPW. If a substantial number of the short-term or long-term projects are delayed or cancelled, as for instance because of DoD cutbacks, then the installation's workforce may not increase as expected and transportation improvements may not need to be implemented in the currently proposed timeframes.

For projects with a status of "The Army would coordinate with VDOT and FCDOT to study intersections and evaluate options," federal funds for offsite projects must be certified through the Defense Access Road (DAR) program and requested through the Army POM process. This program requires that the deterioration in LOS to the intersection be at least 50 percent due to the nearby Department of Defense installation to qualify for funding. Fort Belvoir is not capable of initiating, funding, and executing improvement projects at off-post intersections that are owned and operated by Fairfax County or the State of Virginia. Fort Belvoir would collaborate with VDOT and FCDOT on monitoring and validating existing traffic models at intersections that are adjoining the post or are off-post. On the basis of this analysis, Fort Belvoir would request funding for improvements to roads and intersections where appropriate and feasible. In addition, the Army would continue to work with area stakeholders to explore alternative federal funding options for improvements – such as those used for the US Route 1 widening – for the off-post intersections affected by Fort Belvoir's development.

Since publication of the Draft EIS, the Army has been able to take a more refined view of the potential mitigation and funding sources. For further information about proposed mitigations, see Chapter 5.

3.4.7 Comparison of Alternatives

Table 3.4-13 summarizes the potential transportation system impacts of the No Action Alternative and the three action alternatives.

Table 3.4-13
Summary of Transportation and Traffic Impacts by Alternative

Environmental Consequence	No Action Alternative	Alternative 1 – Full Implementation – The Preferred Alternative	Alternative 2 – Modified Long-Term	Alternative 3 – Modified Short-Term
Short-Term Projects				
Intersection or Merge/Diverge/Weaving Area LOS Deterioration to E or F	Beneficial effects from continuing TMP implementation	Significant adverse effects on one public and one Fort Belvoir intersection	Significant adverse effects on one public and one Fort Belvoir intersection	Significant adverse effects on one public and one Fort Belvoir intersection
Transit Service, Ridesharing, Bicycle and Pedestrian Use Decline	Beneficial effects – use would increase with continuing implementation of the TMP	Beneficial effects – use would increase with continuing implementation of the TMP	Beneficial effects – use would increase with continuing implementation of the TMP	Beneficial effects – use would increase with continuing implementation of the TMP
Long-Term Projects				
Roadway Capacity Deteriorates to Near or Over Capacity	Beneficial effects from continuing TMP implementation	Significant adverse effects on some public and Fort Belvoir roadway segments	Significant adverse effects on some public and Fort Belvoir roadway segments	Significant adverse effects on some public and Fort Belvoir roadway segments
Transit Service, Ridesharing, Bicycle, and Pedestrian Use Decline	Beneficial effects – use would increase with continuing implementation of the TMP	Beneficial effects – use would increase with continuing implementation of the TMP	Beneficial effects – use would increase with continuing implementation of the TMP	Beneficial effects – use would increase with continuing implementation of the TMP

3.5 AIR QUALITY

Thresholds of Significance

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

- Air-quality impacts would be considered significant if the proposed action interferes with the region's ability to achieve the National Ambient Air Quality Standards (NAAQS) in a timely manner or leads to a violation of Fort Belvoir's Title V operating permit.
- Greenhouse gases would be considered significant if they exceed CEQ thresholds.

3.5.1 Affected Environment

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

3.5.1.1 National Ambient Air Quality Standards and Attainment Status

USEPA Region 3 and 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: particulate matter (PM_{10} [particles no larger than10 microns in diameter] and $PM_{2.5}$ [particles no larger than 2.5 microns in diameter]), sulfur dioxide (SO_2), carbon monoxide (CO), oxides of nitrogen (NO_x), ozone (O_3), and lead (Pb). 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.

Federal regulations designate air quality control regions (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 redesignated to attainment for a probationary period through implementation of maintenance plans. According to the severity of the pollution problem, O_3 and PM_{10} nonattainment areas can be categorized as marginal, moderate, serious, severe, or extreme. Fairfax County (and therefore 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, DC. The USEPA has designated Fairfax County as the following:

- Marginal nonattainment for the 2008 8-hour O_3 NAAQS
- Moderate nonattainment for the 1997 8-hour O_3 NAAQS
- Nonattainment for the 1997 $PM_{2.5}$ NAAQS
- Attainment for all other criteria pollutants (40 CFR 81.347) (USEPA, 2013a)

Notably, Fort Belvoir and all areas associated with the proposed projects are outside the Washington DC-MD-VA maintenance area for CO (MWCOG, 2004).

3.5.1.2 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 the Fairfax County Area is a nonattainment area for the 8-hour O_3 and the $PM_{2.5}$ NAAQS, the Commonwealth of Virginia, in coordination with MWCOG, was required to develop SIPs that outline the actions that would be taken to achieve the NAAQS. The current USEPA-approved regional air quality plans are the *Plan to Improve Air Quality in the Metropolitan Washington, DC-MD-VA Region: State Implementation Plan (SIP) for 8-Hour Ozone Standard* (MWCOG, 2007) and the *Plan To Improve Air Quality In the Washington, DC-MD-VA Region: State Implementation Plan (SIP) for Fine Particle ($PM_{2.5}$) Standard* (MWCOG, 2008). Within these plans, VDEQ compiles a regional emissions inventory and sets regional emissions budgets.

The 1990 amendments to the CAA require federal agencies to ensure that their actions conform to the SIP in a nonattainment area. 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 Rules (GCR) became effective January 31, 1994 and were updated in April 2010. Under Section 176(c) of CAA, the GCR became applicable one year after the O_3 and the $PM_{2.5}$ nonattainment designations became effective. Virginia has adopted the federal conformity regulations by reference (VAC § 10.1-1308). A general conformity analysis is required with respect to the 8-hour O_3 and $PM_{2.5}$ NAAQS and is provided for each EIS alternative.

3.5.1.3 Permitting Overview

VDEQ oversees programs for permitting the construction and operation of new or modified stationary sources of air emissions in Virginia. Virginia air permitting is required for many industries and facilities that emit regulated pollutants. Based on unit manufacture date, the size (potential fuel throughput) of the emission units, amount and type of pollutants emitted, and the attainment status of the source location, VDEQ sets permit rules and standards for emissions sources.

The air permitting process begins with the application for a construction permit, if necessary. Large back-up generators and boilers, and other types of stationary sources of air emissions may require permits to construct in one form or another. There are three types of construction permits available through VDEQ for the construction and operation of new 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. Thresholds requiring either an NNSR or a PSD permit for a modification to an existing major source in Fairfax County (e.g., Fort Belvoir) are outlined in Table 3.5-1.

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. 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 5 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.

Table 3.5-1
Major Modification Thresholds that Apply to Fort Belvoir

Pollutant	Major Modification Threshold (tons per year)	
	PSD	NNSR
CO	100	--
NO_x	--	40
SO_2	--	40
PM_{10}	15	--
$PM_{2.5}$	--	10
Volatile Organic Compounds (VOCs)	--	40
Note: Although the region is in attainment for SO_2, the 40 tons per year threshold applies because of the $PM_{2.5}$ non-attainment status. Source: 9 VAC 5, Chapter 80, Articles 9 and 10		

NNSR permits are legal documents that specify what construction is allowed; what emissions limits must not be exceeded; reporting, recordkeeping, and monitoring requirements; and often how the source can be operated. The NNSR permitting process typically takes 18–24 months. 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 dispersion modeling
- Acquiring emissions offsets for all contemporaneous emissions increases
- A public involvement process

Prevention of Significant Deterioration

The PSD program protects the air quality in attainment areas. PSD regulations impose limits on increases in the amount of pollutants that new major sources or new major modifications to existing sources may emit. The PSD process would apply to all pollutants for which the region is in attainment (i.e., all but O_3 and $PM_{2.5}$ for Fort Belvoir). The PSD permitting process typically takes 18–24 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 dispersion modeling
- Establishing procedures for measuring and recording emissions and/or process rates
- A public involvement process

The PSD regulations also set standards to protect Class I areas. 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. There are two Class I areas in the Commonwealth of Virginia and two in West Virginia that are within 150 miles of Fort Belvoir. The closest to Fort Belvoir include Shenandoah National Park and James

River Face, 90 to 150 miles southwest in Virginia, and Dolly Sods and Otter Creek, 120 to 135 miles west in West Virginia (USEPA, 2013c).

Minor New Source Review

In general, a Minor NSR permit would be 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 4-5 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 dispersion modeling upon request by VDEQ
- Establish procedures for measuring and recording emissions and process rates

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), which is pending renewal (VDEQ, 2013b). 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 2012 installation-wide air emissions for all significant stationary sources are tabulated below (Table 3.5-2).

Table 3.5-2
2012 Air Emissions from Significant Stationary Sources at Fort Belvoir

Criteria Pollutants	Annual Emissions (tons per year)
Volatile organic compounds (VOCs)	6.6
Nitrogen oxides (NO_x)	71.8
Sulfur dioxide (SO_2)	0.4
Carbon monoxide (CO)	34.6
Fine particulate matter (PM_{10})	3.2
Very fine particulate matter ($PM_{2.5}$)	3.2
Source: VDEQ 2012b	

New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAP)

In addition to the permitting requirements to construct and operate new or modified emissions sources, NSPS and NESHAPs set emissions control 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. For example, as of July 11, 2005, most new stationary diesel engines (such as back-up generators) are subject to NSPS. In addition, boilers constructed, modified or reconstructed after June 9, 1989 and gas combustion

turbines constructed, modified, or reconstructed after October 3, 1977 with a maximum heat input of 10 million British thermal units per hour or greater would be required to comply with NSPS. The CAA Amendments of 1990, under revisions to Section 112, required USEPA to list and promulgate NESHAPs to reduce the emissions of HAPs, such as formaldehyde, benzene, xylene, and toluene from categories of major and area sources (40 CFR Part 63).

3.5.1.4 Greenhouse Gases and Climate Change

Fairfax County, and therefore Fort Belvoir, has warm summers and cold winters. Fort Belvoir's average low temperature in the coldest month (January) is 27.3 degrees Fahrenheit. The average high temperature in the warmest month (July) is 88.3 degrees Fahrenheit. Fort Belvoir also has average annual precipitation of 39.4 inches per year. The wettest month of the year is May with an average rainfall of 3.8 inches (Idcide, 2013).

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, but increases in their concentration 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 greenhouse (or heat-trapping) gases to the atmosphere. Whether rainfall would increase or decrease remains difficult to project for specific regions (USEPA, 2013d).

EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance* outlines policies intended to ensure that federal agencies evaluate climate-change risks and vulnerabilities, and to manage the short- and long-term effects of climate change on their operations and mission (Executive Office of the President, 2009). The EO requires federal agencies such as the Army to measure, report, and reduce their GHG emissions from both their direct and indirect activities. In response to EO 13514 the DoD has set the goal to reduce Army GHG emissions by 34 percent by FY2020 (DoD, 2010). In addition, the CEQ has released guidance on when and how federal agencies should consider GHG emissions and climate change in NEPA analyses. The draft guidance includes a presumptive effects threshold of 27,563 tons per year (25,000 metric tons per year) of CO_2 equivalent emissions from a federal action (CEQ, 2010).

Permitting for GHG

Currently USEPA has promulgated regulations that require: 1) the reporting of GHG emissions annually (which Fort Belvoir carries out), 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 75,000 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.

3.5.2 Environmental Consequences of the No Action Alternative

Selecting the No Action Alternative would result in no changes to air quality. No construction, changes in traffic, or changes in operations at Fort Belvoir would be expected. Fort Belvoir's contribution to regional air quality would not change. Ambient air quality trends and planning would remain as described in Section 3.5.1.

3.5.3 Environmental Consequences of Alternative 1 – Full Implementation – The Preferred Alternative

Alternative 1 would have less than significant adverse effects on air quality with mitigation for construction and stationary source emissions (mitigation here and elsewhere in Section 3.5 refers to measures required by

law; as explained in Section 3.5.6, no additional mitigation of air quality impacts is needed or proposed). Increases in emissions would be below the GCR applicability thresholds or be included in the regional transportation conformity demonstration and would not contribute to a violation of any federal, state, or local air quality standards.

Alternative 1 could affect air quality in three ways: through airborne dust and other pollutants generated during construction; by the introduction of new stationary sources of pollutants, such as heating boilers; and through changes in vehicular traffic. A detailed analysis of potential effects from short- and long-term projects is presented in the following sections.

3.5.3.1 Impacts from Short-Term Projects

Short-term projects would have short- and long-term less than significant adverse effects. Short-term effects would be due to generating airborne dust and other pollutants during construction. Long-term effects would be from commuting activities and introducing new stationary sources of pollutants such as back-up generators and boilers. 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 3.5-3). 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 the 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-term (ST) projects were estimated for all six years of construction because the short-term projects are reasonably certain to occur within the next five years and the design of the projects are reasonably certain. Emissions have been combined throughout this discussion. Accounted for in the analysis were emissions from:

- *Construction 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 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 prevention of significant deterioration program (title I, part C of the Act) are exempt from the GCR.

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 3.5-4). Therefore, the general conformity requirements do not apply, and no formal conformity determination is required. As the emissions at the group level were less than the applicable thresholds, no single project would have emissions at the applicable threshold. Detailed methodologies for estimating air emissions and a Record of Nonapplicability (RONA) are in Appendix E.

Table 3.5-3
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 3.5-4
Annual Emissions for Short-Term Projects –Alternative 1

Activity/Source	Estimated Annual Air Emissions (tons per year)			
	NO_x	$PM_{2.5}$	SO_2	VOC
Construction Emissions (Year 1)	45.1	3.7	5.4	7.5
Construction Emissions (Year 2)	61.8	5.0	7.9	9.6
Construction Emissions (Year 3)	40.5	3.0	5.1	7.5
Construction Emissions (Year 4)	20.9	1.7	2.8	4.2
Construction Emissions (Year 5)	50.7	3.9	6.9	10.3
Construction Emissions (Year 6)	61.2	5.4	8.7	11.8
Operational Emissions Subject to the GCR	46.4	1.4	0.2	1.7
Applicability Threshold (tons per year)	100	100	100	50
Exceeds Applicability Threshold?	No	No	No	No

Notably, construction activities would be evenly spread out over a six-year period, and no individual year's construction emissions were marginal or borderline when compared to the applicability thresholds. Therefore, unless the ultimate implementation schedule were to change appreciably, annual emissions would be below the applicability threshold. In addition, small changes in facilities siting and ultimate design 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 estimated operational emissions are outlined in Table 3.5-5. Even with boiler emissions included, the overall operational emissions would be *de minimis* (of minimal importance), and effects from operational activities would be less than significant.

Table 3.5-5
Annual Operational Emissions –Alternative 1

Activity/Source	NO_x	$PM_{2.5}$	SO_2	VOC	CO_2
Short-Term Projects	46.4	1.4	0.2	1.7	17,530
Long-Term Projects	26.5	1.2	0.3	1.7	14,347
Total	72.9	2.6	0.5	3.4	31,877
Note: Includes emissions from heating, commuter activities, and standby generators.					

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 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 from other previously decommissioned sources within the region. This cap-and-trade-type system is inherent to federal and state air regulations, and leads to a forced reduction in regional emissions. Therefore, regardless of the ultimate permitting scenario, these effects would be less than significant.

Several of the facilities (e.g., INSCOM , the Secure Administrative Facility, and others) would require backup generators, and several of the facilities would require natural gas boilers for heating. Many of the proposed facilities are in early planning; therefore, an exact list of new equipment is not available at this time. Any new stationary sources of air emissions could be subject to federal and state air permitting regulations, including NNSR, PSD, NESHAP, or NSPS. Any new stationary sources of air emissions would be added to the facility's air permit.

All construction would be accomplished in full compliance with Virginia regulatory requirements, through the use of compliant practices and/or products. Within the region, these regulatory requirements include limits or restrictions related to:

- Open burning (9 VAC 5, Chapter 130)
- Visible emissions (9 VAC 5, Chapters 40-80)
- Fugitive dust/emissions (9 VAC 5, Chapters 40-90)
- Asphalt paving operations (9 VAC 5, Chapters 45-760 et seq.)
- Portable fuel containers (9 VAC 5, Chapters 45-270)
- Architectural and industrial maintenance coatings (9 VAC 5, Chapters 45-520 et seq.)
- Adhesives and Sealants (9 VAC 5, Chapters 45-620 et seq.)
- Consumer products (9 VAC 5, Chapters 45-510)

During construction, reasonable precautions would be taken to prevent fugitive dust from becoming airborne, including but not limited to:

- The use of water for control of dust during construction, the grading of roads, or the clearing of land;
- The application of asphalt or water on dirt roads, material stockpiles, and other surfaces that can give rise to airborne dusts;
- Covering open-bodied trucks that are transporting materials likely to give rise to airborne dusts; and
- The removal of earth or other material from paved streets onto which such substances have been deposited.

In addition, Fort Belvoir is located in a VOC Control area (9 VAC 5, Chapters 20-206); cutback asphalt is prohibited during the months of April through October except when use or application as a penetrating prime coat or tack is necessary.

Greenhouse Gases and Climate Change

All operational activities associated with the short-term projects would generate approximately 17,530 tons of CO_2 per year, which would be below the CEQ threshold. As with permitting for criteria pollutants, scenarios can vary based on the types and sizes of new stationary sources, timing of the projects, and the types of controls ultimately selected. Because many of the proposed facilities are in the preplanning stages, an exact list of new equipment is not available at this time. Although the PTE cannot be determined at this time, it is unlikely that PTE of GHG for any of the proposed projects would exceed the major modification thresholds under the Tailoring Rule. By using new heating systems, LEED standards, and centrally locating the facilities, the burning of fossil fuels and subsequent GHG emissions would be minimized. Overall, these effects would be less than significant.

The Army's Active Duty end-strength is slated to decline from 562,000 to 490,000 by the end of 2015, including a reduction of at least eight Brigade Combat Teams from the current total of 45. This constitutes a 13 percent reduction in personnel, and associated infrastructure use, vehicle use and training activities. This reduction in force, combined with the Army's Energy Initiatives Task Force activities and Net Zero initiatives are expected to reduce the Army's GHG emission and enable them to reach the GHG reduction goals in accordance with EO 13514. These Army-wide activities would occur during the same timeframe as and would indirectly offset any GHG emissions associated with the proposed action.

Mobile Sources

Mobile sources of concern primarily include increases in automobile use near Fort Belvoir. Emissions from vehicle use from the additional personnel were included in the general conformity applicability analysis above. The emissions would be *de minimis* (of minimal importance), and a formal conformity determination would not be required. The primary air pollutants from mobile sources are CO, NO_x, and VOCs. Lead emissions from mobile sources have declined in recent years through the increased use of unleaded gasoline, and potential SO_2 and particulate emissions from mobile sources are small compared to stationary sources, such as power plants and industrial facilities. Air quality effects from traffic are generally evaluated on two scales: regional and project level.

Regional Analysis

Regional analysis is performed for the entire AQCR by the states and the MWCOG. Potential emission increases from additional vehicle miles traveled (VMT) resulting from an action could affect regional O_3 and/or $PM_{2.5}$ levels. However, because these are problems of regional concern and subject to air transport phenomena under different weather conditions, regional effects are generally evaluated by the MWCOG

using regional airshed model(s). Regional analysis is generally not conducted on a project-specific basis and is not necessary for this EIS.

"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 BRAC action at Fort Belvoir with the addition of 22,000 personnel the modeled CO concentrations increased about 1ppm 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, 2007a). Therefore, it is expected that an increase in 4,755 personnel in the short-term would have virtually no effect on CO concentrations at nearby intersections. Fairfax County, and thus Fort Belvoir, is not a nonattainment or maintenance area for CO, and increases in traffic would have only minute changes in CO concentrations at nearby intersections. For these reasons, "hot-spot" analysis is not necessary for this EIS.

The traffic associated with Alternative 1 is not anticipated to be an air quality concern for particulate matter 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:

- 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.
- 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.
- A project that affects intersections that are at levels of service (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.
- A project otherwise considered of *air quality concern* as outlined in 40 CFR 93.123 (b)(1)(i),(ii),(iii) or (iv).

In addition, Mobile Source Air Toxics (MSATs) are a subset of the 188 air toxics defined by the CAA. The MSATs are compounds emitted from highway vehicles and non-road equipment. As with particulate matter, traffic from increases in personnel is not anticipated to be an air quality concern for MSAT because the intersections affected are primarily secondary arterial roads and changes in traffic patterns 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 arterials; therefore, such analysis is not included in this EIS (US DOT, FHWA, 2012). However, USEPA's vehicle and fuel regulations, coupled with fleets being replaced over time with newer, cleaner operating vehicles, would [over time] cause substantial reductions that, in almost all cases, would cause MSAT levels to be significantly lower than today (US DOT, FHWA , 2012).

3.5.3.2 Impacts from Short Term Transportation Projects

Short-term 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, construction of new and improvements to existing access control points, and construction of a transit

transfer center either near Pence Gate or 12th Street and Gunston Road. Construction emissions would be similar in nature and level as those outlined under the short-term projects (Section 3.5.3.1). 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-term transportation projects would be performed in full compliance with regulations outlined in Section 3.3.3.1. These effects would be less than significant.

There would be no permanent sources of air emissions associated with the short-term transportation projects. The short-term transportation projects would be specifically designed to relieve congestion and reduce the number of VMT by commuters and others using the roadways near Fort Belvoir. Small changes in traffic patterns on- and off-post would have negligible long-term effects to air quality both regionally and locally. In addition, traffic management approaches outlined in the RPMP Transportation Management Plan (TMP) would reduce any mobile emissions associated with the proposed 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.

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 transportation projects conform to SIPs. Transportation projects within the Commonwealth of Virginia must be included in a conforming transportation improvement plan (TIP).

MWCOG is responsible for developing conformity demonstrations for transportation programs within the National Capital Region. 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-term 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 naturally include the changes in vehicle patterns when developing these plans. Currently, the conforming plans are the 2012 Constrained Long Range Plan and FY 2012-2017 TIP (MWCOG, 2012). For example, the Mulligan Road project has been included in the 2005 air quality conformity determination for the region.

3.5.3.3 Impacts from Long-Term Projects

Long-term projects would have less than significant adverse effects. Similar to the effects of short-term projects (Section 3.5.3.1), short-term effects would be due to the generation of airborne dust and other pollutants during construction, and long-term effects would be from commuting activities and the introduction of new stationary sources of pollutants such as back-up generators and boilers.

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-term 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-term projects were approximated based on building square feet and duration of the projects. Under Alternative 1, the activities outlined in the long-term projects would be smaller (about 70

percent) in size and in scope as those outlined under the short-term projects, and they would be implemented over thirteen years as opposed to six. Therefore, the average annual construction emissions would be less than half of those outlined under the short-term projects. Although individual automobiles likely will be *cleaner* in the year 2030, there would be an overall increase in emissions from mobile sources from the increase in personnel. In general, the total emissions of NO_X, VOCs, $PM_{2.5}$, and SO_2 in any given year are expected to be less than the applicability thresholds (Table 3.5-6). Although additional analysis would be required at that time, the annual emissions would likely be *de minimis*, and the general conformity requirements would likely not apply. These adverse effects would be less than significant.

Table 3.5-6
Annual Emissions for Long-Term Projects –Alternative 1

Activity/Source	Estimated Annual Air Emissions (tons per year)			
	NO_X	$PM_{2.5}$	SO_2	VOC
Short-Term Projects (2012-2017)				
Construction Emissions (Annual Average)	46.7	3.8	6.1	8.5
Operational Emissions Subject to the GCR	46.4	1.4	0.2	1.7
Long-Term Projects (2018-2030)				
Construction Emissions (Annual Average)	14.9	1.2	2.0	2.7
Operational Emissions Subject to the GCR	26.5	1.2	0.3	1.7
Applicability Threshold (tons per year)	100	100	100	50
Long Term Projects Exceed Applicability Threshold?	Not Likely			
Note: Analysis under the GCR is only applicable for a five-year period, and activities outlined in the long-term projects would require additional emission estimations at the time the projects were implemented.				

Regulatory Review

Permitting requirements and best management practices (BMPs) for stationary sources of air emissions would be similar to those outlined under the short-term 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-term projects are in the preplanning stages; therefore, an exact list of new equipment is not available at this time. Although it cannot be 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 using new heating systems, LEED standards and centrally locating the facilities, the burning of fossil fuels and subsequent GHG emissions would be minimized. The DoD is continuing to implement Army-wide initiatives to reach its GHG reduction goals in accordance with EO 13514 by 2017. Overall, these effects would be minor.

Mobile Sources

Effects from mobile sources of air emissions would be similar to, although somewhat greater than, those outlined under the short-term projects. The mobile source of concern is primarily the increase of automobile and vehicular traffic near Fort Belvoir. Emissions from vehicle use from the additional 17,000 personnel would be *de minimis* (of minimal importance) (Table 3.5-7). As with the short-term transportation projects and for similar reasons:

- Regional air quality analysis is generally not conducted on a project-specific basis and is not necessary for this EIS.
- Fairfax County, and therefore Fort Belvoir, is not a nonattainment or maintenance area for CO, and increases in traffic would have only minute changes in CO concentrations at nearby intersections; therefore, "hot-spot" analysis is not necessary for this EIS.
- The traffic associated with the long-term 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 fleet being replaced over time with newer, cleaner operating vehicles, would cause substantial reductions that would cause MSAT levels to be significantly lower than today (US DOT, FHWA, 2012).

The proposed projects would constitute a minute incremental increase of air emissions in the National Capital Region. However, adverse effects from these sources would be less than significant, and not distinguishable from the existing conditions outlined in Section 3.5.1.

3.5.3.4 Impacts from Long-Term Transportation Projects

As with the short-term transportation projects, long-term 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-term projects (Section 3.5.3.1). 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-term transportation projects would be performed in full compliance with regulations outlined in Section 3.3.3.1. These effects would be minor.

There would be no permanent sources of air emissions associated with the long-term transportation projects. The long-term 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 negligible long-term effects to air quality both regionally and locally. As with the short-term transportation projects and for similar reasons, the long-term transportation projects may need to be identified in a conforming TIP and Constrained Long Range Plan prior to implementation.

3.5.4 Environmental Consequences of Alternative 2 – Modified Long-Term

Alternative 2 would have both short- and long-term less than significant adverse effects. Similar to Alterative 1, short-term effects would be due to air emissions during construction, and long-term effects would be due to introducing additional backup generators, boilers, and mobile emissions from the additional on-site personnel. Increases in emissions would be below the GCR applicability thresholds and would not contribute to a violation of any federal, state, or local air regulations.

3.5.4.1 Impacts from Short-Term Projects

Short-term projects would have short- and long-term less than significant adverse effects on air quality. These effects would be similar in nature, but somewhat less than the short-term projects outlined in Alternative 1.

General Conformity

All direct and indirect emissions from the short-term projects under Alternative 2 were estimated. The total emissions in any given year would be less than the applicability thresholds (Table 3.5-7); therefore, the general conformity requirements would not apply, and no formal conformity determination is required. Detailed methodologies for estimating air emissions and a draft RONA are in Appendix E. As with Alternative 1 and for similar reasons, the overall emissions subject to the applicability analysis under the GCR would be less than those shown herein. Small changes in schedule, design and equipment used would not substantially change these emission estimates, and would not change the determination under the GCR or the level of effects under NEPA.

Table 3.5-7
Annual Emissions for Short-Term Projects – Alternative 2

Activity/Source	Estimated Annual Air Emissions (tons per year)			
	NO_x	$PM_{2.5}$	SO_2	VOC
Construction Emissions (Year 1)	45.1	3.7	5.4	7.5
Construction Emissions (Year 2)	61.8	5.0	7.9	9.6
Construction Emissions (Year 3)	40.5	3.0	5.1	7.5
Construction Emissions (Year 4)	20.9	1.7	2.8	4.2
Construction Emissions (Year 5)	8.6	0.8	1.3	1.3
Construction Emissions (Year 6)	45.3	4.1	6.5	8.9
Operational Emissions Subject to the GCR	43.3	1.3	0.2	1.5
Applicability Threshold (tons per year)	100	100	100	50
Exceeds Applicability Threshold?	No	No	No	No

Regulatory Review

For comparative purposes operational emissions associated with Alternative 2 are outlined in Table 3.5-8. Permitting requirements and BMPs for stationary sources of air emissions would be identical to those outlined under the short-term projects for Alternative 1. 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 selected 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.

Table 3.5-8
Annual Operational Emissions – Alternative 2

Activity/Source	NO_x	$PM_{2.5}$	SO_2	VOC	CO_2
Short-Term Projects	43.3	1.3	0.2	1.5	15,938
Long-Term Projects	12.8	0.6	0.1	0.8	6,994
Total	56.1	1.8	0.3	2.3	22,932
Note: Includes emissions from heating, commuter activities, and standby generators.					

Greenhouse Gases and Climate Change

Effects would be similar in nature but somewhat less than for the short-term projects outlined in Alternative 1. As with Alternative 1 and for similar reasons, 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 using new heating systems, LEED standards and centrally locating the facilities, GHG emissions would be minimized. The DoD would continue to implement Army-wide initiatives to reduce GHG in accordance with EO 13514. Overall these effects would be minor.

Mobile Sources

Effects from mobile sources of air emissions would be similar to, although somewhat less than, those outlined under the short-term projects under Alternative 1. Emissions from vehicle use from the additional personnel would be *de minimis*, and a formal conformity determination would not be required (Table 3.5-8). As with Alternative 1 and for similar reasons, neither regional air quality analysis nor "hot-spot" analysis is necessary for this EIS, and neither particulate matter nor MSAT are anticipated to be an air quality concern. As with Alternative 1, Alternative 2 would constitute a minute incremental increase of air emissions in the National Capital Region. However, effects would be negligible, and not distinguishable from the existing conditions outlined in Section 3.5.1.

3.5.4.2 Impacts from Short-Term Transportation Projects

Short-term transportation projects would have less than significant adverse effects with mitigation for construction emissions. These effects would be identical to those outlined under Alternative 1. Increases in emissions would not contribute to a violation of any federal, state, or local air regulation. There would be no permanent sources of air emissions associated with the short-term transportation projects. The short-term transportation projects would be specifically designed to relieve congestion and reduce the number of VMT by commuters and others using the roadways near Fort Belvoir.

3.5.4.3 Impacts from Long-Term Projects

Long-term projects would have short- and long-term less than significant effects with mitigation for construction and stationary source emissions. Like the short-term projects, short-term effects would be due to the generation of airborne dust and other pollutants during construction, and long-term effects would be from commuting activities and the introduction of new stationary sources such as back-up generators and boilers. Permitting requirements and BMPs, effects from GHG, and effects from mobile sources would be identical to those outlined under the long-term projects for Alternative 1.

Analysis under the GCR is only applicable for a five-year period, and long-term projects would require an applicability determination before the projects are implemented. Under Alternative 2, the activities outlined in the long-term projects would be smaller in size and in scope (by about 50 percent) as those outlined under the short-term projects, and they would be implemented over thirteen years as opposed to six. Therefore, the average annual construction emissions would be about one quarter of those outlined under the short-term projects (Table 3.5-9). In general, the total emissions in any given year are expected to be less than the

applicability thresholds. Although additional analysis would be required before the projects are implemented, the annual emissions would be *de minimis* and the general conformity requirements would likely not apply. These effects would be adverse but less than significant.

3.5.4.4 Impacts from Long-Term Transportation Projects

Long-term transportation projects would have short-term less than significant adverse effects with mitigation for construction emissions. These effects would be identical to those outlined under Alternative 1. Increases in emissions would not contribute to a violation of any federal, state, or local air regulation.

Table 3.5-9
Annual Emissions for Short-Term and Long-Term Projects – Alterative 2

Activity/Source	Estimated Annual Air Emissions (tons per year)			
	NO_x	$PM_{2.5}$	SO_2	VOC
Short-Term Projects (2012-2017)				
Construction Emissions (Annual Average)	37.0	3.0	4.8	6.5
Operational Emissions Subject to the GCR	43.3	1.3	0.2	1.5
Long-Term Projects (2018-2030)				
Construction Emissions (Annual Average)	8.2	0.6	1.1	1.6
Operational Emissions Subject to the GCR	12.8	0.6	0.1	0.8
Applicability Threshold (tons per year)	100	100	100	50
Long Term Projects Exceed Applicability Threshold?	Not Likely			
Note: Analysis under the GCR is only applicable for a five-year period, and activities outlined in the long-term projects would require additional emission estimations at the time the projects were implemented.				

3.5.5 Environmental Consequences of Alternative 3 – Modified Short-Term

Alternative 3 would have both short- and long-term less than significant adverse effects with mitigation for construction and stationary source emissions. Similar to Alterative 1, short-term effects would be due to air emissions during construction, and long-term effects would result from the introduction of backup generators, boilers, and mobile emissions from the additional on-site personnel. Increases in emissions would be below the GCR applicability thresholds and would not contribute to a violation of any federal, state, or local air regulations.

3.5.5.1 Impacts from Short-Term Projects

Short-term projects would have short- and long-term less than significant adverse effects with mitigation for construction and stationary source emissions. These effects would be similar in nature, but because several projects would be moved to the 2018-2030 timeframe, effects would be somewhat less than for the short-term projects outlined in Alternative 1.

General Conformity

All direct and indirect emissions from the short-term projects under Alternative 3 were estimated. The total emissions in any given year would be less than the applicability thresholds (Table 3.5-10); therefore, the general conformity requirements would not apply, and no formal conformity determination is required. Detailed methodologies for estimating air emissions and a draft RONA are in Appendix E. As with

Alternative 1 and for similar reasons, the overall emissions subject to the applicability analysis under the GCR would be less than those shown herein. Small changes in schedule, design and equipment used would not substantially change these emission estimates, and would not change the determination under the GCR or the level of effects under NEPA.

Table 3.5-10
Annual Emissions for Short-Term Projects – Alternative 3

Activity/Source	Estimated Annual Air Emissions (tons per year)			
	NO_x	$PM_{2.5}$	SO_2	VOC
Construction Emissions (Year 1)	45.1	3.7	5.4	7.5
Construction Emissions (Year 2)	47.2	3.4	6.2	8.1
Construction Emissions (Year 3)	11.6	0.8	1.4	3.5
Construction Emissions (Year 4)	15.8	1.2	2.1	3.6
Construction Emissions (Year 5)	47.3	3.5	6.3	10.0
Construction Emissions (Year 6)	38.7	3.3	5.4	8.6
Operational Emissions Subject to the GCR	25.1	0.7	0.1	0.8
Applicability Threshold (tons per year)	100	100	100	50
Exceeds Applicability Threshold?	No	No	No	No

Regulatory Review

For comparative purposes, operational emissions associated with Alternative 3 are outlined in Table 3.5-11. Permitting requirements and BMPs would be identical to those outlined under the short-term projects for Alternative 1. During the final design stage and the permitting process, if equipment selected 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 adverse effects would be less than significant.

Table 3.5-11
Annual Operational Emissions – Alternative 3

Activity/Source	NO_x	$PM_{2.5}$	SO_2	VOC	CO_2
Short-Term Projects	25.1	0.7	0.1	0.8	8,584
Long-Term Projects	46.9	1.9	0.4	2.5	23,292
Total	72.0	2.6	0.5	3.3	31,876
Note: Includes emissions from heating, commuter activities, and standby generators.					

Greenhouse Gases and Climate Change

Effects would be similar in nature to but substantially less than those described for the short-term projects outlined in Alternative 1. As with Alternative 1 and for similar reasons, 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 using new heating systems, LEED standards, and centrally locating the facilities, GHG emissions would be minimized. The DoD would continue to implement Army-wide initiatives to reduce GHG in accordance with EO 13514. Overall these effects would be minor.

Mobile Sources

Effects from mobile sources of air emissions would be similar to, although substantially less than, those outlined for the short-term projects under Alternative 1. Emissions from vehicle use from the additional personnel would be *de minimis*, and a formal conformity determination would not be required (Table 3.5-12). As with Alternative 1 and for similar reasons, neither a regional air quality analysis nor a "hot-spot" analysis is necessary for this EIS; and neither particulate matter nor MSAT are anticipated to be an air quality concern. As with Alternative 1, Alternative 3 would constitute a minute incremental increase in air emissions in the National Capital Region. However, effects would be negligible, and not distinguishable from the existing conditions outlined in Section 3.5.1.

3.5.5.2 Impacts from Short-Term Transportation Projects

Short-term transportation projects would have short-term less than significant adverse effects with mitigation for construction emissions. These effects would be identical to those outlined under Alternative 1. Increases in emissions would not contribute to a violation of any federal, state, or local air regulation. There would be no permanent sources of air emissions associated with the short-term transportation projects, which would be specifically designed to relieve congestion and reduce the number of VMT on roadways near Fort Belvoir.

3.5.5.3 Impacts from Long-Term Projects

Long-term projects would have short- and long-term less than significant adverse effects with mitigation for construction and stationary source emissions. Like the short-term projects, short-term effects would be due to the generation of airborne dust and other pollutants during construction, and long-term effects would be from commuting activities and the introduction of new stationary sources of pollutants. Permitting requirements and BMPs for stationary sources, GHG emissions, and effects from mobile sources would ultimately be the same as those outlined under Alternative 1; however, several of the short-term projects, their emissions, and subsequent effects would be shifted into the 2018-2030 timeframe.

Under Alternative 3, the activities outlined in the long-term projects would be larger in size and in scope (about 250 percent) than those outlined under the short-term projects. However, they would be implemented over thirteen years as opposed to six, and the average annual construction emissions would be only slightly larger than those outlined under the short-term projects (Table 3.5-12). In general, the total emissions in any given year are expected to be less than the applicability thresholds. Although additional analysis would be required at that time, the annual emissions would be *de minimis* and the general conformity requirements would likely not apply. These effects would be minor.

3.5.5.4 Impacts from Long-Term Transportation Projects

Long-term transportation projects would have short-term less than significant adverse effects with mitigation for construction emissions. These effects would be identical to those outlined under Alternative 1. Increases in emissions would not contribute to a violation of any federal, state, or local air regulation. There would be no permanent sources of air emissions associated with the long-term transportation projects, which would be specifically designed to relieve congestion and reduce the number of VMT on roadways near Fort Belvoir.

Table 3.5-12
Annual Emissions for Long-Term Projects – Alternative 3

Activity/Source	Estimated Annual Air Emissions (tons per year)			
	NO_x	$PM_{2.5}$	SO_2	VOC
Short-Term Projects (2012-2017)				
Construction Emissions (Annual Average)	34.3	2.7	4.5	6.9
Operational Emissions Subject to the GCR	25.1	0.7	0.1	0.8
Long-Term Projects (2018-2030)				
Construction Emissions (Annual Average)	27.3	2.3	3.6	4.3
Operational Emissions Subject to the GCR	46.9	1.9	0.4	2.5
Applicability Threshold (tons per year)	100	100	100	50
Long Term Projects Exceed Applicability Threshold?	Not Likely			
Note: Analysis under the GCR is only applicable for a five-year period, and activities outlined in the long-term projects would require additional emission estimations at the time the projects were implemented.				

3.5.6 Proposed Mitigation Measures

The overall effects to air quality would be less than significant, and no mitigation measures outside those already required by law would be necessary to reduce the level of effects to less than significant. These BMPs would be required for both construction and stationary source emissions associated with all alternatives. The construction projects would be accomplished in full compliance with current and pending Virginia regulatory requirements, through the use of compliant practices and/or products. Within the region, these regulatory requirements include:

- Open burning (9 VAC 5, Chapter 130)
- Visible emissions (9 VAC 5, Chapters 40-80)
- Fugitive dust/emissions (9 VAC 5, Chapters 40-90)
- Asphalt paving operations (9 VAC 5, Chapters 45-760 et seq.)
- Portable fuel containers (9 VAC 5, Chapters 45-270)
- Architectural and industrial maintenance coatings (9 VAC 5, Chapters 45-520 et seq.)
- Adhesives and Sealants (9 VAC 5, Chapters 45-620 et seq.)
- Consumer products (9 VAC 5, Chapters 45-510)

In addition, the projects would be located in a VOC control area (9 VAC 5, Chapters 20-206); cutback asphalt would be prohibited during the months of April through October except when use or application as a penetrating prime coat or tack is necessary.

Regardless of whether stationary sources would be above or below the major modification thresholds, one or more air pollution control permits would be required for the projects. Depending on what level of permitting was required, BMPs associated with the new permitted stationary sources of emissions may include:

- BACT review for each criteria pollutant
- MACT review for regulated HAPs and designated categories
- Establish procedures for measuring and recording emissions and process rates

- Meet NSPS and NESHAP requirements
- Lowest achievable emission rate review for qualifying nonattainment pollutants
- Predictive air dispersion modeling
- Acquiring emissions offsets for all contemporaneous emissions increases
- A public involvement process.

3.5.7 Comparison of Alternatives

For all the alternatives, implementing the RPMP would be expected to have less than significant adverse effects. Regardless of the alternative, all activities associated with the RPMP that would generate emissions would be similar in magnitude and occur within the region. Variation in the siting of the new facilities on Fort Belvoir would not change the applicability of the GCR or the level of effects under NEPA. For all the Alternatives, both construction and operating permits for the new sources of air emissions would be required for some of the new sources of air emissions. For all the alternatives, implementing the RPMP would increase both the number of vehicles and the subsequent total VMT within the National Capital AQCR. However, the overall effects on local and regional air quality from these changes would be less than significant and not distinguishable from existing conditions.

Table 3.5-13
Summary of Air Quality Impacts by Alternative

Environmental Consequence	No Action Alternative	Alternative 1 – Full Implementation – The Preferred Alternative	Alternative 2 – Modified Long-Term	Alternative 3 – Modified Short-Term
Short-Term Projects				
Construction effects would exceed applicable air quality thresholds	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
Operational effects would exceed applicable air quality thresholds	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
Greenhouse Gases would exceed CEQ threshold	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects.
Mobile Sources would exceed applicable air quality thresholds	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
Construction effects would generate fugitive dust	No effect	Less than significant adverse effects with mitigation	Less than significant adverse effects with mitigation	Less than significant adverse effects with mitigation
Long-Term Projects				
Construction effects would exceed applicable air quality thresholds	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
Operational effects would exceed applicable air quality thresholds	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects

Environmental Consequence	No Action Alternative	Alternative 1 – Full Implementation – The Preferred Alternative	Alternative 2 – Modified Long-Term	Alternative 3 – Modified Short-Term
Greenhouse Gases would exceed CEQ threshold	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
Mobile Sources would exceed applicable air quality thresholds	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse
Construction effects would generate fugitive dust	No effect	Less than significant adverse effect with mitigation	Less than significant adverse effects with mitigation	Less than significant adverse effects with mitigation

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3.6 NOISE

Thresholds of Significance

Noise impacts would be significant if the proposed action created appreciable long-term noise increases in areas of incompatible land use.

3.6.1 Affected Environment

3.6.1.1 Overview and Regulatory Requirements

Sound is a physical phenomenon consisting of vibrations that travel through a medium such as air and are sensed by the human ear. Noise is defined as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise intrusive. Human response to noise varies depending on the type and characteristics of the noise distance between the noise source and the receptor, receptor sensitivity, and time of day. Noise often is generated by activities essential to a community's *quality of life*, such as construction or vehicular traffic.

Sound varies by both intensity and frequency. Sound pressure level, described in decibels (dB), is used to quantify sound intensity. The dB is a logarithmic unit that expresses the ratio of a sound pressure level to a standard reference level. Hertz (Hz) is used to quantify sound frequency. The human ear responds differently to different frequencies. "A-weighting," measured in A-weighted decibels (dBA), approximates a frequency response expressing the perception of sound by humans. Sounds encountered in daily life and their dBA levels are provided in Table 3.6-1.

Table 3.6-1
Common Sounds and Their Levels

Outdoor	Sound Level (dBA)	Indoor
Snowmobile	100	Subway Train
Tractor	90	Garbage Disposal
Noisy Restaurant	85	Blender
Downtown (Large City)	80	Ringing Telephone
Freeway Traffic	70	TV Audio
Normal Conversation	60	Sewing Machine
Rainfall	50	Refrigerator
Quiet Residential Area	40	Library
Source: Harris, 1998		

The Noise Control Act of 1972 (Public Law [PL] 92-574) directs federal agencies to comply with applicable federal, state, interstate, and local noise control regulations. The Act does not require compliance with local noise control regulations for on-post areas, but for off-post areas only, and it specifically exempts military training activities such as small arms and aircraft operations. The Fairfax County Code prohibits the creation of sound louder than 55 dB in a residential area, and 60 dB in a commercial area. In addition, it prohibits the creation of any excessive noise on any street adjacent to any school, institution of learning, court, or hospital that interferes with its function (Fairfax County Code Section 108-4-1). Sounds generated from construction and demolition activities are exempt from the Fairfax County ordinance between 7:00 am and 9:00 pm. Although the local noise ordinance only applies to noise in off-post areas, Fort Belvoir uses the time restrictions outlined in the ordinance as general guidelines for on-post construction and demolition activities.

3.6.1.2 Existing Sources of Noise

Existing sources of noise on the installation include local road traffic, aircraft overflights, rotorcraft activities, and natural noises such as the rustling of leaves and bird vocalizations. Existing background noise levels equivalent sound level ([Leq and day-night sound level [DNL]) were estimated using the techniques specified in the American National Standard Quantities and Procedures for Description and Measurement of Environmental Sound Part 3: Short-term measurements with an observer present (American National Standards Institute, 2003). Figure 3.6-1 outlines the background noise levels based on existing land use at Fort Belvoir. Except for the airfield and some light industrial areas on-post, sound levels would be comparable to quiet urban residential with some mixed commercial activities. The average daytime sound levels range between 43 and 53 dBA, with average nighttime levels between 37 and 47 dBA, and the DNL range between 50 and 55 dBA. The primary source of noise on-post is vehicle traffic. However, there are also intermittent noises including construction activities, yard maintenance activities, the testing and use of standby generators, and other non-training activities associated with an Army installation of this size and type.

3.6.1.3 The Military Noise Environment and Land Use Compatibility

The military noise environment consists primarily of three types of noise: transportation noise from aircraft and training vehicles, noise from firing at small-arms ranges, and noise from large-caliber weapons firing and demolition operations. Army Regulation 200-1 Environmental Protection and Enhancement defines recommended noise limits from Army activities for established uses of land with respect to environmental noise. Four noise zones are defined in the regulation:

Army Noise Zones

Land use planning zone (LUPZ): A contour accounting for days of higher than average operations. Noise-sensitive land uses are compatible within the LUPZ.

Noise Zone I: Relatively quiet noise environment. Acceptable for housing, schools, medical facilities, and other noise-sensitive land uses.

Noise Zone II: Moderately loud noise environment. Normally not recommended for housing, schools, medical facilities, and other noise-sensitive land uses.

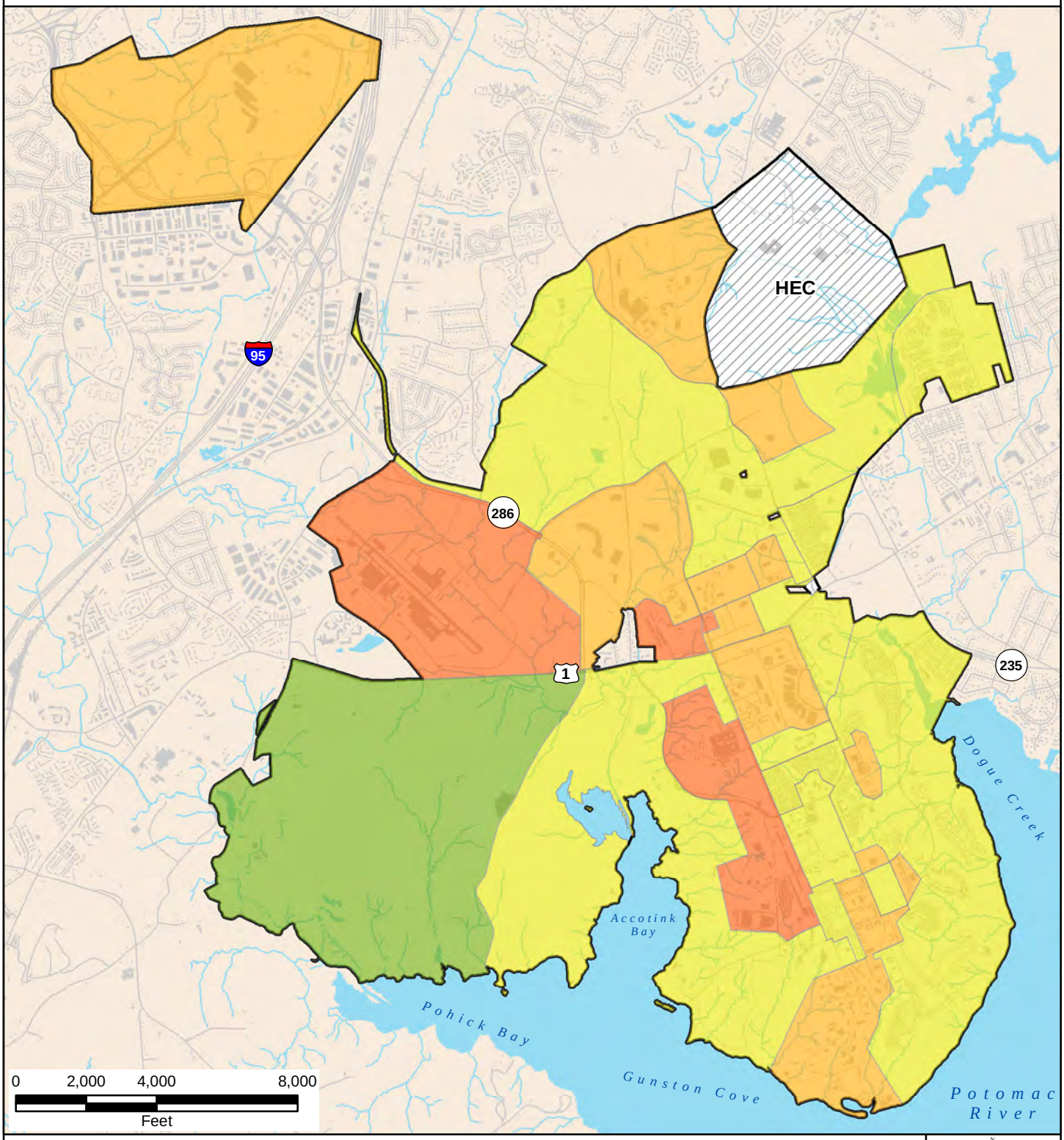
Noise Zone III: Loud noise environment. Not recommended for housing, schools, medical facilities, and other noise-sensitive land uses.

Davison Army Airfield

The Army, the Federal Aviation Administration, and other federal agencies have adopted the A-weighted Day-night Sound Level (ADNL) noise metric as the appropriate metric for estimating community annoyance from aircraft operations. ADNL is defined as the average sound energy in a 24-hour period with a 10-dB penalty added to the nighttime levels (10 pm to 7 am). ADNL is a useful descriptor for noise because (1) it averages ongoing yet intermittent noise, such as aircraft overflights, and (2) it measures total sound energy over a 24-hour period. Table 3.6-2 outlines noise limits and zones for land use planning for aircraft operations. Notably, noise zones for aircraft outlined in Table 3.6-2 are consistent with Federal Aviation Administration's compatible land use criteria (14 CFR Part 150).

DAAF is in the northwest part of Main Post. The airfield is home to the 12th Aviation Battalion under the US Army Air Operations Group Military District of Washington. Their mission is to provide high priority, scheduled and short notice air transport of passengers and cargo for the Army and DoD. DAAF has one 5,447-foot-long runway, as well as a helicopter pad area. The airfield supports operations from helicopters, military fixed-wing aircraft, military jets, and general aviation aircraft. The number and type of aircraft operations varies from day to day and month to month. Annual reported operations for DAAF were 48,327 operations in 2010, and the average number of daily operations is 192 per workday.

Existing Background Noise Levels Based on Land Use



Nighttime Leq / Daytime Leq / DNL

- 37 dBA / 43 dBA / 50 dBA
- 42 dBA / 48 dBA / 53 dBA
- 47 dBA / 53 dBA / 55 dBA
- 52 dBA / 58 dBA / 60 dBA

Fort Belvoir RPMP EIS

Figure 3.6-1

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The primary aircraft utilizing the airfield are the UH-60 Blackhawk and the Beechcraft Super King Air (BE-20). Other common aircraft utilizing the airfield include the Cessna Citation (500/560); the Short Sherpa (SH-33); the CH-46 Sea Knight; and the UH-72 Lakota (US Army Public Health Command, 2010).

Table 3.6-2
Noise Limits for Noise Zones

Noise Zone	General Level of Noise	Aircraft (ADNL) [dBA]	Recommended Uses
LUPZ	Low	60-65	Noise-sensitive land uses acceptable
I	Low	< 65	Noise-sensitive land uses acceptable
II	Moderate	65–75	Noise-sensitive land uses normally not recommended
III	High	> 75	Noise-sensitive land uses not recommended
Source: US Army, 2007d			

Figure 3.6-2 shows the existing noise contours for DAAF. Operations at DAAF do not generate noise levels above Noise Zone III (>75 dB ADNL). Noise Zone II extends beyond the northwestern installation boundary to I-95. The off-post area within Noise Zone II is "industrial" and there are no non-recommended land uses therein. The on-post area within Noise Zone II extends into an undeveloped area. The LUPZ extends 2.5 miles beyond the installation's northwestern boundary. The area within LUPZ is "industrial" to I-95, and primarily residential beyond I-95. All land uses are fully compatible within the LUPZ. Although DAAF operations do not generate Zone III noise levels (above 75 dB ADNL), the aviation activity at DAAF generates one to two noise complaints per year, primarily from low flying helicopter operations (US Army Public Health Command, 2010).

Other Training Activities

Training ranges in the southwest quadrant of Fort Belvoir are used primarily for troop maneuvers and orienteering-type activities. There is a single landing zone in this area used occasionally by helicopters to unload squads. These ranges support the National Capital Region including Fort Meade and the Reserve Officer Training Corps. Ranges have variable use through early December, but in summer months, they are 100 percent utilized. Fort Belvoir has limited live-fire training activities. A few times a year the Army fires sub-caliber rounds from the two 75-millimeter (mm) howitzers near the flagpole at the Garrison headquarters building. This is done for the Fourth of July and other holidays, as well as for Presidential visits and similar events. The Presidential Salute Battery schedule training pads in the northeast portion of the southwest training areas up to four times per year. At these times they bring M5 antitank guns and fire 75 mm howitzer blank rounds (1 pound TNT equivalent) for a few hours during the daytime (US Army, 2013e; US Army, 2013f; McMillan, pers. com. 2013; Winslett, pers. com, 2013). This is standard practice for salutes in honor of the President, visiting foreign dignitaries and official guests of the Unites States, and memorial affairs in Arlington National Cemetery. No noise complaints have resulted from these activities, which are infrequent, relatively quiet, and not sufficient to generate either Noise Zone II or III either on- or off-post. All on- and off-post activities and land uses are completely compatible with noise from this level and type of training.

3.6.2 Environmental Consequences of the No Action Alternative

Selecting the No Action Alternative would result in no impact to the existing noise environment. No construction, changes in traffic, or changes in operations at Fort Belvoir would be expected. The ambient noise environment would remain as described in Section 3.6.1.

3.6.3 Environmental Consequences of Alternative 1 – Full Implementation – The Preferred Alternative

The actual planning activities associated with the RPMP updates would not generate any noise. Therefore, updating the RPMP in and of itself would have no effect on the noise environment. Short-term increases in noise would result from the use of heavy equipment at the construction and demolition sites. Long-term effects would be from the addition of stationary sources of noise such as standby generators. Increases in traffic volumes and changes in traffic patterns would also result in localized increases in noise. Implementation and potential effects associated with the short- and long-term projects are discussed in the following sections.

3.6.3.1 Noise Impacts from Short-Term Projects

Short- and long-term less than significant adverse effects on noise levels would be expected from construction of the short-term projects; proposed mitigation measures would further reduce the noise. Short-term effects would result from the use of heavy equipment at the construction and demolition sites. Long-term effects would be from the addition of stationary sources of noise such as standby generators. There would be minute, unnoticeable changes in background noise due to the consolidation of industrial areas on post, and changes in traffic patterns on and near the installation.

Construction

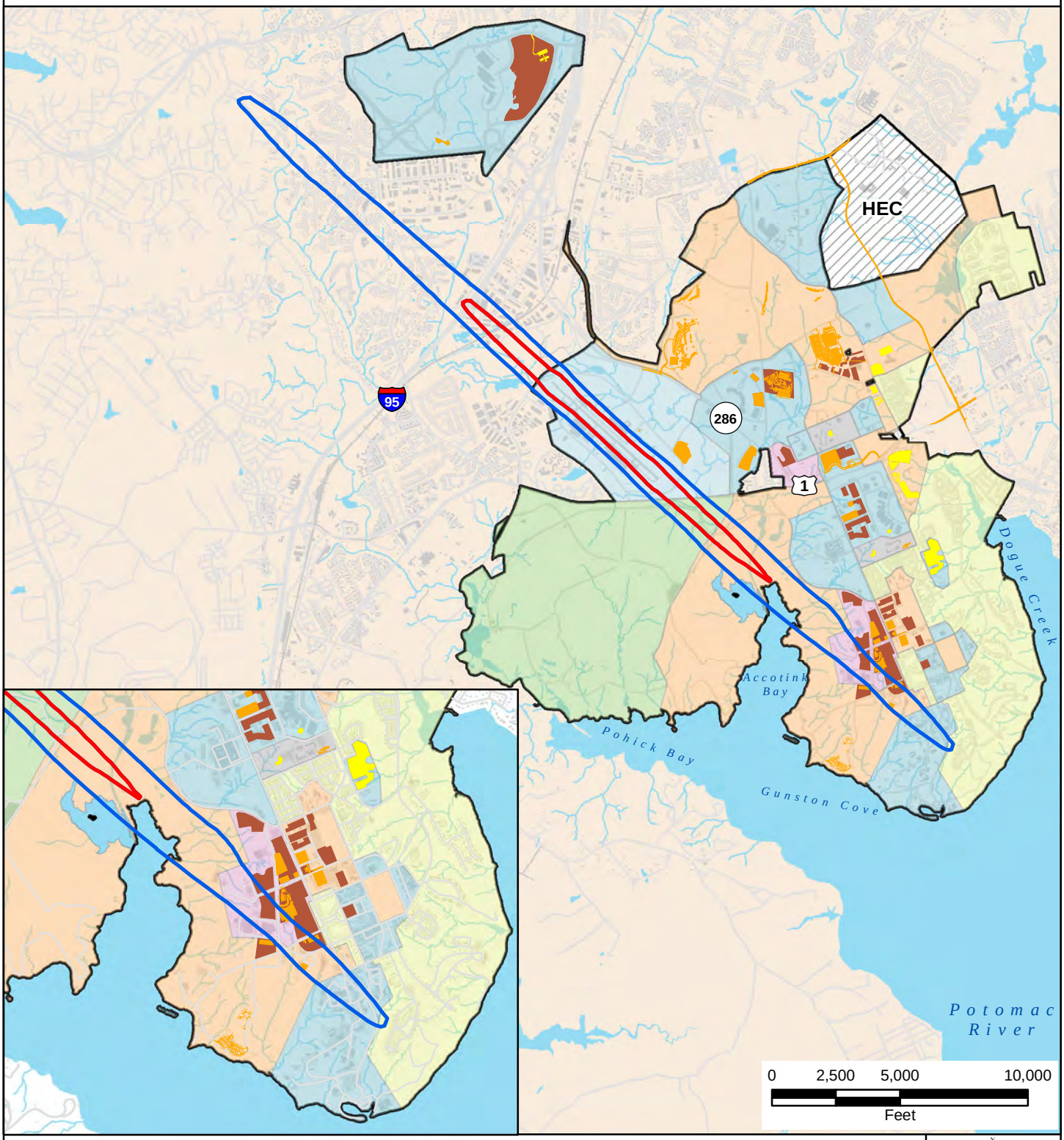
Short-term projects would include an appreciable amount of construction activities at Fort Belvoir. Individual pieces of heavy equipment typically generate noise levels of 80 to 90 dBA at a distance of 50 feet. With multiple items of equipment operating concurrently, noise levels can be relatively high at locations within several hundred feet of active construction sites. The zone of relatively high construction noise levels typically extends to distances of 400 to 800 feet from the site of major equipment operations. Locations more than 800 feet from construction sites seldom experience appreciable levels of heavy equipment noise. Table 3.6-3 presents typical noise levels (dBA at 50 feet) that USEPA has estimated for the main phases of outdoor construction.

Table 3.6-3
Noise Levels Associated With Outdoor Construction

Construction Phase	Sound Level at 50 feet [dBA]
Ground clearing	84
Excavation, grading	89
Foundations	78
Structural	85
Finishing	89
Source: USEPA, 1971	

Most of the short-term projects would be located well within the boundary of the installation with land to buffer them from off-post land uses. Thus, they would have no effect on nearby noise-sensitive areas. Some people living and working off-post would be exposed to appreciable amounts of heavy equipment noise during the period of construction for the four projects within 800 feet of the installation boundary (Table 3.6-4). This noise would end at the conclusion of the construction phase. Given the temporary nature of proposed construction activities, and the limited amount of noise that construction equipment would generate, this impact, while adverse, would be less than significant with mitigation measures.

Operational Noise Contours for Davison Army Airfield



Noise Zones
- LUPZ (60 dBA DNL)
- Zone II (65 dBA DNL)

Projects
- Projects with Noise Sensitive Components
- Short-Term Projects without Noise Sensitive Components
- Long-Term Projects without Noise Sensitive Components

Future Land Use
- Airfield
- Community
- Industrial
- Professional / Institutional
- Residential
- Training
- Troop

Fort Belvoir RPMP EIS

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Figure 3.6-2

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Table 3.6-4
Short-Term Projects within 800 Feet of the Installation Boundary

Project	Description	Level of Effect
STT 1	Mulligan Road, Phase 2a	Minor
STT 2	Mulligan Road, Phase 2b – Telegraph Road Widening	
STT 8	Intersection Improvements	
ST 27 and 41	National Museum of the United States Army (NMUSA)	

There would be no projects within 800 feet of the Woodlawn Baptist Church or the Alexandria Friends Meeting House, and it is not expected that there would be appreciable noise at these locations during construction. There would be 11 short-term projects within one-half mile of these locations (Table 3.6-5). Heavy equipment noise may be audible off-post but would be perceived as faint and/or distant at these locations during the periods of construction for these projects. These long-term effects would be adverse but less than significant with mitigation measures to further reduce noise.

Table 3.6-5
Short-Term Projects within 2,500 Feet of Friends Meeting House or Woodlawn Baptist Church

Project	Description	Distance (Feet)	Direction	Level of Effect
ST 2	PAL	2,465	South	Minor
ST 4[a] (STT 1)	Mulligan Road Phase II	2,000	East	
ST 5[a]	Fisher House 1	1,817	South	
ST 8[a]	Child Development Center 144	1,236	North	
ST 13 (STT 3)	Access Control Point Lieber Gate and Roadway	1,661	Southwest	
ST 24	Fairfax County School Expansion	2,428	North	
ST 30	Fisher House 2	1,750	South	
ST 36	29th Infantry HQ	2,181	West	
ST 42	Unaccompanied Enlisted Personnel Barracks	2,219	West	
ST 47	Religious Education Center	1,787	North	
STT 3	Lieber Gate	1,485	Southwest	
STT 5	Transit Hub	1,067	Southwest	
Note: a. Project underway or complete				

Although construction-related noise impacts would be minor, the following mitigation measures would be performed to further reduce any realized noise impacts:

- Construction would primarily occur during normal weekday business hours, and
- Construction equipment mufflers would be properly maintained and in good working order.

Construction noise would dominate the soundscape for all on-site personnel. Construction personnel, and particularly equipment operators, would don adequate personal hearing protection to limit exposure and ensure compliance with federal health and safety regulations.

Operations

Future sources of noise on the installation would be similar in nature and overall level to those currently present. Noise sources would include local road traffic, aircraft overflights, rotorcraft activities, and natural

noises such as the rustling of leaves and bird vocalizations. Figure 3.6-3 outlines the background noise levels based on future land use at Fort Belvoir. As with existing conditions, except for DAAF and some light industrial areas on-post, sound levels would be comparable to quiet urban residential with some mixed commercial activities. Similar to existing conditions, the average daytime sound levels would range between 43 and 53 dBA, with average nighttime levels between 37 and 47 dBA, The DNL would range between 50 and 55 dBA.

The overall background noise levels at the installation predominantly would remain unchanged; however, establishing new professional and institutional areas while consolidating industrial activities further from the installation boundary would reduce background noise levels on South Post. These changes would be minute and would be barely perceptible either on- or off-post. These long-term effects would be adverse but less than significant.

Standby generators would be the only operational noise source associated with Alternative 1. Table 3.6-6 outlines projects currently slated to have one or more standby generators installed. It is also possible that stand-by generators would be added to other short-and long-term projects. The proposed projects are in the preliminary design stage; therefore, a complete equipment list and associated manufacturers specifications have not been finalized. Although the generators would be enclosed, engine intakes and exhausts may be open to the outdoors, and the units may be audible to nearby noise-sensitive areas. This would be true more so at night when background noises were limited. Notably, the generators would be strictly for back-up purposes and would only operate during emergencies and for periodic testing. These long-term adverse effects would be less than significant with mitigation measures to reduce noise from the generators.

Table 3.6-6
Short-Term Projects with Standby Generators and Nearby Noise-sensitive Receptors

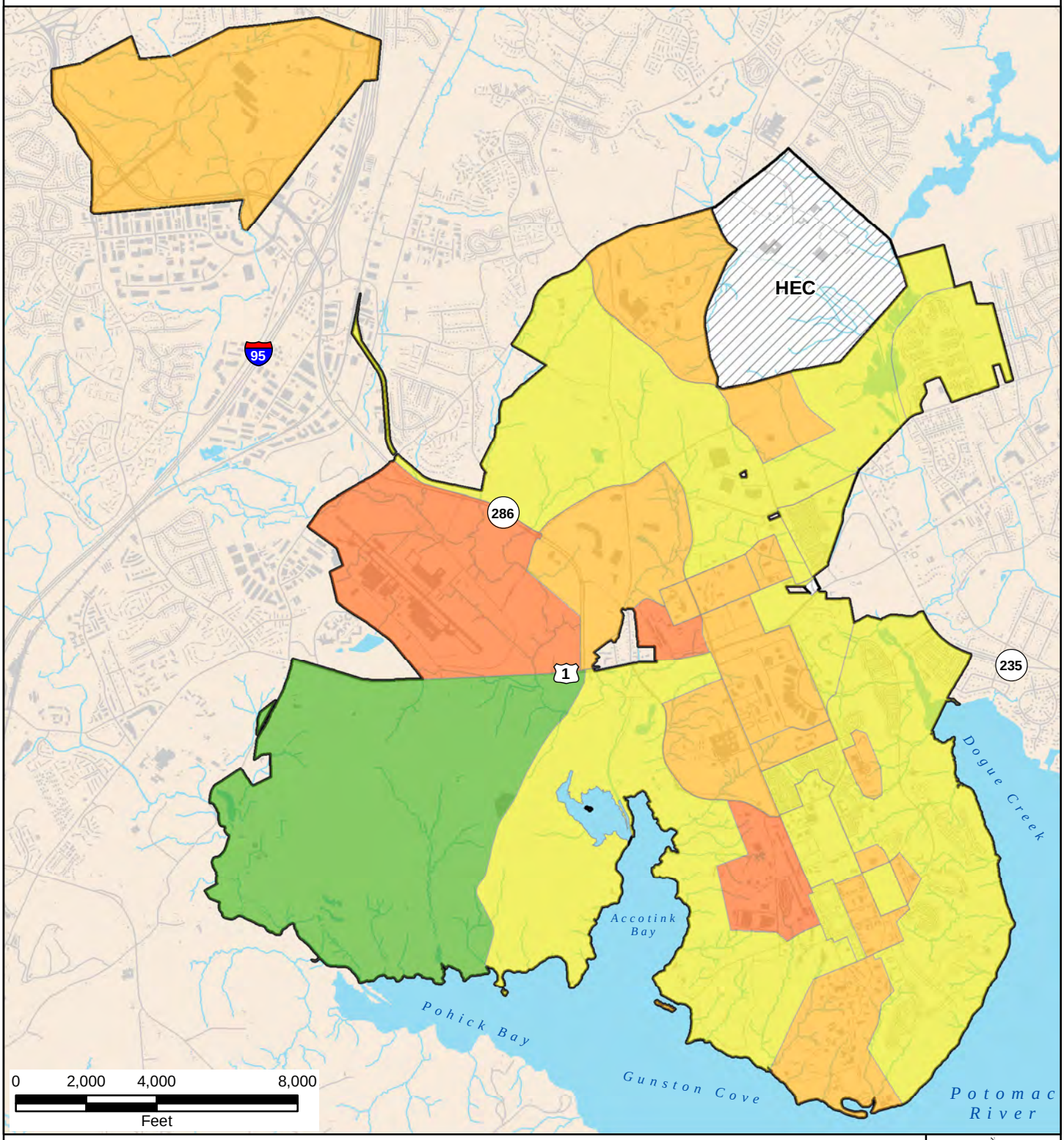
Project Number	Description	Distance [Feet]	Direction	Type	Estimated Existing Sound Levels (dBA)		
					DNL	L_{eq} (daytime)	L_{eq} (nighttime)
ST 13	Lieber Gate Access Control Point	3,020	East	Church	50	48	42
ST 19, 26 and 33	INSCOM	2,780	Southwest	Residence			
ST 20	Fire Station	800	South	Residence			
ST 32	249th Battalion HQ	633	East	Residence	60	58	52
ST 45	Secure Administrative Facility	1,100	East	Hospital	55	53	47
ST 52	DLA HQ Building	1,982	South	Residence			

No use of weaponry, demolitions, or changes in aircraft operations would occur with the implementation of Alternative 1. Therefore, no changes in the noise environment associated with these sources would be expected. An indoor firing range would be established at the OSEG training compound. There would be no outdoor live-fire small arms activities at the facility. All firing would occur indoors, and controls would be put in place to insure the noise would be inaudible outside the perimeter of the compound. Therefore, there would be no noise effects.

Traffic Noise

Increases in traffic volumes and changes in traffic patterns would have long-term adverse but less than significant effects to the noise environment. A detailed description of the effects on traffic and transportation resources is provided in Section 3.4. Because noise is measured on a logarithmic scale, two line sources of equal level (e.g. traffic lanes along a roadway) added together result in an increase of 3 dBA at all distances.

Future Background Noise Levels Based on Land Use



Nighttime Leq / Daytime Leq / DNL

- 37 dBA / 43 dBA / 50 dBA
- 42 dBA / 48 dBA / 53 dBA
- 47 dBA / 53 dBA / 55 dBA
- 52 dBA / 58 dBA / 60 dBA

Fort Belvoir RPMP EIS

Figure 3.6-3

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Therefore, a doubling in traffic volume would increase the noise level by 3 dBA. For example, traffic generating 60 dBA plus the same amount of traffic on the same roadway would yield a total noise level of 63 dBA. Notably, a 3 dBA change in noise levels would be barely perceptible to individuals with average hearing (FHWA, 2011). The proposed short-term projects would add 4,755 personnel to the installation (a 12 percent increase over the 2005 post-BRAC levels) and subsequently increase traffic both on-and off-post. The additional vehicles would constitute an incremental change in traffic volumes along roadways near the installation; however, increases would only be a small fraction of the current traffic. As with the BRAC action, which constituted a substantially larger increase in personnel, the additional personnel under Alternative 1 would amount to an increase in noise of less than 1 dBA on any existing roadway, and no perceptible change to the existing noise environment. These long-term adverse effects would be less than significant.

Lieber Gate

A noise impact assessment was performed for key noise-sensitive sites near the installation with the Lieber Gate project (ST 13) completed (US Army, 2007a). This analysis included all the personnel from the BRAC action, including those that ultimately were realigned to the Mark Center location. Estimated noise levels would not exceed the FHWA thresholds of effects for any receptors after the gate was opened and the BRAC was completed. In addition, the change in levels for an additional 22,000 personnel at the installation was estimated to be less than 1 dBA, and would not be perceptible. Overall, these long-term, adverse effects would be less than significant (US Army, 2007a).

Mulligan Road

A noise impact assessment was performed for noise-sensitive sites near the Mulligan Road Phase II project (ST 4) (FHWA, 2006a). Of the 73 individual noise-sensitive receptors along the project corridor, six were found to approach or exceed the FHWA thresholds for effects after the project was built. The increase in noise levels for the design year (2030) was less than 10 dBA for all nearby noise-sensitive receptors when compared to existing conditions. Predicted noise levels from the project at Woodlawn Plantation would be 49 dBA with the project in place, which is below the current background levels of 52 dBA. This indicates the traffic from the project would not contribute significantly to the noise environment at Woodlawn Plantation. Overall, these long-term, adverse effects would be less than significant with mitigation (USDOT, FHWA, 2006a and 2006b).

Land Use Compatibility

There would be no changes in the noise environment associated with training activities, use of weaponry, demolitions, or aircraft operations. There would be no changes in land use off-post, and all off-post activities would remain compatible with aircraft operations at DAAF. Table 3.6-7 outlines short-term projects with potentially noise-sensitive components (e.g., children, elderly, medical). Figure 3.6-2 shows the location of the DAAF land use compatibility noise contours and the short-term projects. All the short-term projects with potentially noise-sensitive components would be outside Zone II and LUPZ associated with DAAF. All the short-term projects would be fully compatible with the existing noise environment.

3.6.3.2 Noise Impacts from Long-Term Projects

Short- and long-term direct, minor, adverse effects would be expected from the long-term projects. Short-term effects would result from the use of heavy equipment at the construction and demolition sites. Long-term effects would be from the addition of stationary sources of noise such as standby generators. As with the short-term projects, there would be minute, unnoticeable changes in background noise due to changes in traffic patterns on and near the installation. Mitigation measures would be the same as those outlined under the short-term projects in Section 3.6.3.1.

Construction

As with the short-term projects, long-term projects would include an appreciable amount of construction activities at Fort Belvoir. The nature of and the overall level of effects would be similar to those outlined for the short-term projects. The vast majority of long-term projects would be well within the installation boundary, and would have no effect on nearby noise-sensitive areas. Some off-post personnel would be exposed to appreciable amounts of heavy equipment noise during the period of construction for the projects within 800 feet of the installation boundary (Table 3.6-8). This noise would end at the conclusion of the construction phase. Given the temporary nature of proposed construction activities, and the limited amount of noise that construction equipment would generate, impacts would be short-term, adverse but less than significant with mitigation measures to reduce noise.

Table 3.6-7
Short-Term Projects with Potential Noise-sensitive Components

Project	Description	Type	Distance from DAAF [Miles]
ST 2	PAL	Lodging	2.4
ST 3[a]	National Intrepid Center of Excellence	Educational	2.2
ST 5 [a] and 30	Fisher House	Medical Services	2.3
ST 8[a]	Child Development Center 144	Child Care	2.1
ST 11	Child Development Center 1	Child Care	2.9
ST 24	Fairfax County School	Educational	2.0
ST 37	Medical Office Building	Medical Services	2.2
ST 42	Unaccompanied Enlisted Personnel Barracks	Residential	1.6
ST 47	Religious Education Center	Church	2.0
Note: a. Project complete			

Table 3.6-8
Long-Term Projects within 800 Feet Of The Installation Boundary

Project	Description	Level of Effects
LT 3	South Post Community Support Route District	Minor
LT 9	Fort Belvoir North Area District	
LTT 5	Internal Cross Streets(Abbot Road, 3rd Street, and 6th Street)	
LTT 8	Heller Road	
LTT 9	Meeres Gate	
LTT 10	Goethals Road	

The only project within 800 feet of the Woodlawn Baptist Church or the Alexandria Friends Meeting House would be the Goethals Road expansion (LTT 10). It is not expected that there would be appreciable noise from any other long-term project at these locations during construction. However, there would be six long-term projects within one-half mile of these locations (Table 3.6-9). Because project construction potentially could take place over 12 years, cumulative noise impacts are likely to be limited. Heavy equipment noise may be audible, but would be perceived as faint and/or distant at these locations during the periods of construction for these projects. Noise impacts would be direct, short-term and adverse, but minor.

All long-term projects and long-term transportation projects other than the Goethals Road expansion (LTT 10) would have short-term minor adverse effects due to construction noise. Therefore, construction noise

can be excluded from detailed analysis in all future tiered NEPA documentation associated with implementing all long-term projects and long-term transportation projects other than the Goethals Road expansion. Mitigation measures such as avoiding construction on Sunday mornings and during special events may be required to reduce the level of effect to less than significant for the Goethals Road expansion project. During the preparation of NEPA documentation for the Goethals Road expansion, construction noise would be carried forward for detailed analysis with a special focus on potential effects on historical areas, primarily the Alexandria Friends Meeting House.

Table 3.6-9
Long-Term Projects Within 2,500 Feet Of Friends Meeting House or Woodlawn Baptist Church

Project	Description	Distance [Feet]	Direction	Level of Effects
LT 1	Lower North Post District	2,450	West	Minor
LT 2	1400 East District	2,395	Southwest	
LT 3	Fisher House and Recreation Center	1,100	South	
LTT 3[a]	US Route 1 Intersections Traffic Monitoring	930	Southwest	
LTT 4	Route 1 Overpass	2,311	North	
LTT 10	Goethals Road	386	North	
Note: a. Monitoring only				

Operations

With the implementation of the long-term projects, future sources of noise on the installation would be similar in nature and overall level as those currently present. Noise sources would include local road traffic, aircraft overflights, rotorcraft activities, and natural noises such as the rustling of leaves and bird vocalizations. A description of the effects associated with changes in land use at Fort Belvoir is outlined in Section 3.6.3.1.

Standby generators would be the only operational noise source associated with the long-term projects. The proposed projects are in the preliminary design stage; therefore, a list of the long-term projects that would require generators, complete equipment lists, and associated manufacturers specifications have not been finalized. Although exact details are not available, generators would be enclosed; however, engine intakes and exhausts may be open to the outdoors. As with all standby generators on post, generators associated with the long-term projects may be audible to nearby noise-sensitive areas, particularly at night. Notably, the generators would be strictly for back-up purposes and would only operate during emergencies and for periodic testing. Regardless of the ultimate size or location of any standby generators required for the long-term projects, long-term effects, while adverse, would be less than significant and mitigation measures would be used to lessen generator noise.

No use of weaponry, demolitions, or changes in aircraft operations would occur with the implementation of the long-term projects. Therefore, no changes in the noise environment associated with these sources would be expected.

Traffic Noise

As with the short-term projects and for similar reasons, increases in traffic volumes from additional personnel and changes in traffic patterns would have long-term less than significant adverse effects to the noise environment. The proposed short- and long-term projects combined would add 17,000 personnel to the installation (a 44 percent increase over 2013 levels) and subsequently increase traffic both on-and off-post. The additional vehicles would constitute an incremental change in traffic volumes along roadways near

the installation; however, increases would only be a fraction of the current traffic. As with the BRAC action which constituted a comparable increase in personnel (22,000 vs. 17,000), the additional personnel with both the short- and long-term projects would amount to an increase in noise of less than 3 dBA on any existing roadway, and no perceptible change on the existing noise environment. These long-term noise would be adverse, but less than significant.

The long-term transportation projects are in the preplanning stages. In general, improvement projects on existing transportation infrastructure would normally constitute a reduction in traffic volumes and a subsequent reduction in traffic noise. Specifically, intersection improvement projects have little effect on traffic noise; therefore, traffic noise can be excluded from detailed analysis in all future tiered NEPA documentation associated with intersection improvement projects, including the Kingman Gate improvements (LTT1) and the NMUSA entrance along Fairfax County Parkway at the Kingman Road intersection (LTT2). The addition of lanes and the establishment of new roadways may, however, have the potential for significant adverse effects. During the preparation of NEPA documentation for long-term transportation projects that include lane additions or new roadways, traffic noise would be carried forward for detailed analysis. It is likely that formal noise studies would not be required for many of these projects; however, the Army would take the required "hard look" under NEPA as the planning process progressed.

Land Use Compatibility

There would be no changes in the noise environment associated with training activities, use of weaponry, demolitions, or aircraft operations. There would be no changes in land use off-post, and all off-post activities would remain completely compatible with aircraft operations at DAAF. Two long-term projects with potential noise-sensitive components are the construction of a Fisher House as part of LT 3 and the demolition of Dewitt Army Hospital and construction of a new building as part of LT 4. Both would be outside Zone II and LUPZ associated with DAAF (Figure 3.6-2). All the long-term projects would be fully compatible with the existing noise environment.

3.6.4 Environmental Consequences of Alternative 2 – Modified Long-Term

As with Alternative 1, less than significant short- and long-term adverse effects with mitigation for construction and stationary source noise would be expected from Alternative 2. The effects from construction, operations, traffic, and changes in land use would be similar in nature and overall level as those outlined under Alternative 1. Short-term effects would result from the use of heavy equipment at the construction and demolition sites. Long-term effects would be from the addition of stationary sources of noise such as standby generators. There would be minute, unnoticeable changes in background noise due to the consolidation of industrial areas on post, and changes in traffic patterns on and near the installation. BMPs would be identical to those outlined under Alternative 1.

Construction

The effects from construction would be similar in nature and overall level as those outlined under Alternative 1. The two DLA projects that would be delayed would not be within 800 feet of a noise-sensitive area, and construction noise would have less than significant adverse effects regardless of when these projects were implemented. FBNA District project (LT 9) would not be implemented, and there would be no subsequent construction noise. Therefore, the short-term effects from construction would be somewhat less than that outlined under Alternative 1, particularly at locations near FBNA. Neither the DLA nor the FBNA projects would be within 2,500 feet of the Woodlawn Baptist Church or the Alexandria Friends Meeting House, and changes in these projects would have negligible effects at these locations. As with Alternative 1, the overall short-term effects from construction noise under Alternative 2 would be adverse and less than significant with mitigation for construction noise.

As with Alternative 1, all short- and long-term projects (including transportation projects) other than the Goethals Road expansion (LTT 10) would have short-term, less than significant adverse effects with mitigation for construction noise. Therefore, if Alternative 2 were ultimately selected, construction noise can be excluded from detailed analysis in all future tiered NEPA documentation associated with all projects other than the Goethals Road expansion. During the preparation of NEPA documentation for the Goethals Road expansion, construction noise would be carried forward for detailed analysis with a special focus on potential effects on historical areas.

Operations

With the implementation of Alternative 2, operational noise sources would be similar in nature and overall level as those outlined under Alternative 1. A description of the effects associated with changes in land use at Fort Belvoir is outlined in Section 3.6.3.1. Standby generators, the only operational noise sources associated with the projects, may be audible to nearby noise-sensitive areas; however, they would be strictly for back-up purposes and would only operate during emergencies and periodic testing. Under Alternative 2, installation of generators at the DLA facility would be postponed, and any units associated with FBNA projects would not be installed at all. No use of weaponry, demolitions, or changes in aircraft operations would occur. Therefore, no changes in the noise environment associated with these sources would be expected. Overall, these long-term, adverse effects would be less than significant with mitigation.

Traffic Noise

As with Alternative 1 and for similar reasons, increases in traffic volumes from additional personnel and changes in traffic patterns would have long-term less than significant adverse effects to the noise environment. Under Alternative 2, the proposed short- and long-term projects combined would add 16,000 personnel to the installation (a 41 percent increase over 2013 levels) and subsequently the increase in traffic would only be a fraction of the current traffic. The additional personnel with both the short- and long-term projects would amount to an increase in noise of less than 3 dBA on any existing roadway based on modeling predictions and no perceptible change on the existing noise environment. These long-term, direct noise effects would be adverse but less than significant.

As with Alternative 1, projects other than long-term transportation projects that include lane additions or new roadways would have short-term minor adverse effects due to traffic noise. During the preparation of future NEPA documentation for long-term transportation projects that include lane additions or new roadways, traffic noise would be carried forward for detailed analysis.

Land Use Compatibility

As with Alternative 1, there would be no changes in the noise environment associated with training activities, use of weaponry, demolitions, or aircraft operations. There would be no changes in land use off-post, and all off-post activities would remain completely compatible with aircraft operations at DAAF. As with Alternative 1, all short- and long-term projects with potentially noise-sensitive components would be outside Zone II and LUPZ associated with DAAF (Figure 3.6-2), and would be fully compatible with the existing noise environment.

3.6.5 Environmental Consequences of Alternative 3 – Modified Short-Term

As with Alternative 1, short- and long-term less than significant adverse effects would be expected from Alternative 3 with mitigation for construction noise and stationary source noise such as from standby generators. The effects from construction, operations, traffic, and changes in land use would be similar in nature and overall level as those outlined under Alternative 1. Short-term effects would result from the use

of heavy equipment at the construction and demolition sites. Long-term effects would be from the addition of stationary sources of noise such as standby generators. There would be minute, unnoticeable changes in background noise due to the consolidation of industrial areas on post, and changes in traffic patterns on and near the installation. Mitigation measures would be identical to those outlined under Alternative 1.

Construction

The effects from construction would be similar in nature and overall level as those outlined under Alternative 1. None of the projects that would be delayed to the long term would be within 800 feet of a noise-sensitive area, and construction noise would have negligible effects regardless of when these projects were implemented. None of the projects that would be delayed other than the 29th Infantry HQ (ST 36) would be within 2,500 feet of the Woodlawn Baptist Church or the Alexandria Friends Meeting House; nonetheless, the 29th Infantry HQ (ST 36) would not be within 800 feet of either location. Therefore, changes in the timing of these projects would have negligible effects at these locations. As with Alternative 1, the overall short-term effects from construction noise associated with Alternative 3 would be adverse but less than significant and mitigation measures would be applied.

As with Alternative 1, all projects other than the Goethals Road expansion (LTT 10) would have short-term less than significant adverse effects from construction noise but the noise would be partially mitigated. If Alternative 3 were ultimately selected, construction noise can be excluded from detailed analysis in all tiered NEPA documentation associated with all projects other than the Goethals Road expansion.

Operations

With the implementation of Alternative 3, operational noise sources would be similar in nature and overall level as those outlined under Alternative 1. A description of the effects associated with changes in land use at Fort Belvoir is outlined in Section 3.6.3.1. Standby generators, the only operational noise sources associated with the projects, may be audible to nearby noise-sensitive areas; however, they would be strictly for back-up purposes and would only operate during emergencies and periodic testing. Under Alternative 3, installation of generators to build INSCOM (ST19, 26, 33, and 46), the 249th Battalion HQ (ST 32), and the secure administrative facility (ST 45) would be postponed. No use of weaponry, demolitions, or changes in aircraft operations would occur, and no changes in the noise environment associated with these sources would be expected. Overall, these long-term adverse noise effects would be less than significant with mitigation.

Traffic Noise

As with Alternative 1 and for similar reasons, increases in traffic volumes from additional personnel and changes in traffic patterns would have long-term negligible effects to the noise environment. Under Alternative 3, all projects combined would ultimately add 17,000 personnel to the installation (a 44 percent increase over the 2005 post-BRAC levels) and subsequently increase traffic would only be a fraction of the current traffic. The additional personnel would amount to an increase in noise of less than 3 dBA on any existing roadway, and no perceptible change on the existing noise environment. These long-term, adverse effects would be less than significant.

As with Alternative 1 and for similar reasons, all projects other than long-term transportation projects that include lane additions or new roadways would have short-term minor adverse effects due to traffic noise. During the preparation of future NEPA documentation for long-term transportation projects that include lane additions or new roadways, traffic noise would be carried forward for detailed analysis.

Land Use Compatibility

As with Alternative 1, there would be no changes in the noise environment associated with training activities, use of weaponry, demolitions, or aircraft operations. There would be no changes in land use off-

post, and all off-post activities would remain completely compatible with aircraft operations at DAAF. As with Alternative 1, all short- and long-term projects with potentially noise-sensitive components would be outside Zone II and LUPZ associated with DAAF (Figure 3.6-2), and would be fully compatible with the existing noise environment.

3.6.6 Proposed Mitigation Measures

3.6.6.1 Short-Term Projects

There would be no significant impacts, so no mitigation measures would be required to reduce the level of effects for the short-term projects to less than significant. Although construction-related noise impacts would be minor, the following mitigation measures may be implemented to further reduce any realized noise impacts:

- Construction would primarily occur during normal weekday business hours,
- Construction equipment mufflers would be properly maintained and in good working order, and
- Construction personnel, and particularly equipment operators, would don adequate personal hearing protection to limit exposure and ensure compliance with federal health and safety regulations.

Although operational-related noise impacts would be minor, the following mitigation measures may be used to reduce effects on noise during operation of the proposed facilities:

- Controls would be put in place to minimize noise from the indoor small arms range at the OSEG training compound.
- All activities except those specifically exempt under the Noise Control Act of 1972 would fully comply with Fairfax County Noise Regulations.

Regardless of which short-term transportation projects are implemented, effects to the noise environment would be less than significant. Therefore, no mitigation for traffic noise would be required.

3.6.6.2 Long-Term Projects

All proposed construction and operational mitigation measures outlined under the short-term projects in Section 3.6.6.1 would apply to long-term projects. In addition:

- During the preparation of NEPA documentation for the Goethals Road expansion, construction noise would be carried forward for detailed analysis with a special focus on potential effects on historical areas, primarily the Alexandria Friends Meeting House.
- During the preparation of NEPA documentation for long-term transportation projects that include lane additions or new roadways, traffic noise may be carried forward for detailed analysis. It is likely that formal noise studies would not be required for many of these projects; however, the Army would take the required "hard look" under NEPA as the planning process progressed.

3.6.7 Comparison of Alternatives

The differences between the effects on the noise environment for the three alternatives would be small. Each of the alternatives would have short- and long-term minor adverse effects to the noise environment, and the nature and overall level effects would be similar for all three. For all the alternatives:

- Minor increases in noise would not be expected to contribute to a violation of any federal, state, or local regulations or introduce areas of incompatible land use due to noise.

- Effects due to construction noise would be temporary, minor, and would end with the construction phase of each short-and long-term project. Construction noise would not be concentrated in any one area for the long-term, and would move from site to site as construction of the projects progressed.
- Changes in noise levels for receptors adjacent to the main traffic routes and key transportation projects would not be perceptible when compared to the future conditions without the implementation of any alternative.
- There would be no change to small arms training, artillery training, or use of demolitions at Fort Belvoir. Therefore, there would be no change in noise levels from these types of activities.
- The selected sites for the new facilities would not be in areas of incompatible land use due to noise generated by air operations at DAAF.

Table 3.6-10
Summary of Noise Impacts by Alternative

Environmental Consequence	No Action Alternative	Alternative 1 – Full Implementation – The Preferred Alternative	Alternative 2 – Modified Long-Term	Alternative 3 – Modified Short-Term
Short-Term Projects				
Temporary noise increases from construction activities	No effect	Less than significant adverse effects, with mitigation	Less than significant adverse effects, with mitigation	Less than significant adverse effects, with mitigation
Long-term noise increases from operations	No effect	Less than significant adverse effects, with mitigation	Less than significant adverse effects, with mitigation	Less than significant adverse effects, with mitigation
Long-term increases in noise from traffic	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
Long-term compatibility with noise-sensitive land uses	No effect	No Effect	No Effect	No Effect
Long-Term Projects				
Temporary noise increases from construction activities	No effect	Less than significant adverse effects, with mitigation	Less than significant adverse effects, with mitigation	Less than significant adverse effects, with mitigation
Long-term noise increases from operations	No effect	Less than significant adverse effects, with mitigation	Less than significant adverse effects, with mitigation	Less than significant adverse effects, with mitigation
Long-term increases in noise from traffic	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
Long-term compatibility with noise-sensitive land uses	No effect	No effect	No effect	No effect

3.7 GEOLOGY, TOPOGRAPHY, AND SOILS

This section discusses Fort Belvoir's geology, topography, and soils, and evaluates potential effects on these resources from implementing the alternatives considered in this EIS.

Thresholds of Significance

For the evaluation of impacts, the determination of significance is based on the area of disturbance. If less than 5 percent (424 acres) of Fort Belvoir's Main Post and FBNA's surface and subsurface geological formations, topography, and soils are disturbed, than the impacts do not reach the level of significance.

3.7.1 Affected Environment

3.7.1.1 Geology

Fort Belvoir is located within Fairfax County, Virginia. The county is divided into two physiographic provinces: the Coastal Plain Physiographic Province and the Piedmont Upland Physiographic Province (Hobson, 1996). The fall line, which tends northeast to south through Virginia, crosses Fairfax County roughly along I-95 and forms the boundary between the resistant, metamorphic rocks of the Piedmont and the softer, sedimentary rocks of the Coastal Plain (Fairfax County Department of Public Works and Environmental Services [DPWES] and Northern Virginia Soil and Water Conservation District [NVSWCD], 2013).

Main Post Geology

Fort Belvoir's Main Post lies below the fall line within the high and low Coastal Plain Terrace sub-sections of the Coastal Plain, which consists of unconsolidated sand, silt, and clay underlain by residual soil and weathered crystalline rocks. There are several geologic formations associated with the Coastal Plain, including the Potomac Formation, Bacons Castle Formation, Shirley Formation, and Alluvium and Pliocene sand and gravel (Hobson, 1996). Most of the Coastal Plain deposits in the Fort Belvoir area consist of a sequence of unconsolidated sediments that belong to the Potomac Group (Hobson, 1996). The Potomac Formation outcrops along the slopes leading down to the Potomac River shoreline on the Main Post. The Potomac Group is characterized by lens-shaped deposits of inter-bedded sand, silt, clay, and gravel, primarily of non-marine origin. The Potomac Group is approximately 600 feet thick beneath most of Main Post (Law Engineering and Environmental Services, 1995, as cited in US Army, 2001a).

Fort Belvoir's uplands are underlain by sands, silts, and clays of riverine origin. Uplands underlain by sands and silts tend to be more stable than those underlain by clays. Uplands that are underlain by clayey soils form undulating and rolling hills where the dominant land-forming process is mass wasting, which includes downhill creep, landslides, slumping, and rockfalls.

Fort Belvoir's lowlands and valley bottoms are underlain with sediments deposited by moving water (US Army, 2001a). The dominant land-forming process in these lower areas is active riverine erosion and deposition during overbank flooding. Surface drainage is often poor due to the shallow water table. Drainage usually occurs as surface runoff, with runoff greatest on the steeper slopes. The extent of runoff increases with construction activity and the removal of vegetation, which in turn increases the rate of erosion and the probability of creep and slumping.

FBNA Geology

FBNA is near the Piedmont/Coastal Plain fall line (US Army Toxic and Hazardous Materials Agency, 1990, as cited in US Army, 2007a). Piedmont areas consist largely of Precambrian metamorphic and Cambrian

igneous rock formations, whereas Coastal Plain areas consist of an eastward thickening wedge of unconsolidated sediments of gravel, sand, silt, and clay from the Cretaceous to Tertiary periods. Rock formations from both provinces can be found within the boundaries of FBNA. A finger of Piedmont Upland province bedrock extends from north to south along Accotink Creek. Piedmont Upland bedrock outcrops form the bed and adjacent slopes of the creek. Most of the more gently sloping areas to the east and west of the creek consist of unconsolidated deposits from the Coastal Plain province.

3.7.1.2 Topography

Main Post Topography

The topography of Fort Belvoir's Main Post (Figure 3.7-1) is characterized by uplands and plateaus, lowlands, and steeply sloped terrain. The elevation ranges from sea level along the Potomac River to approximately 230 feet above mean sea level near the intersection of Beulah Street and Woodlawn Road in the upland area of the installation. Uplands and plateaus comprise about 40 percent of Main Post. Upland areas dominate the topography on North Post and are gently rolling to steeply sloped. The South Post and Southwest Area include nearly level plateaus. Lowlands make up about another 40 percent of Main Post. Lowland areas on Fort Belvoir are mostly associated with the floodplains of Accotink, Pohick, and Dogue creeks and the Potomac River. Additional lowland areas exist between the shoreline and the steeply sloped terrain that surrounds the two plateaus. The lowland topography is gently sloped (from about 10 percent at their upland fringes to almost zero along the active floodplains) (US Army, 2001a).

Steeply sloped (greater than 20 percent slope) terrain characterizes the remaining 20 percent of Main Post. Areas of steeply sloped terrain, ravines, and stream valleys surround the two plateaus separating them from the lowlands. Seeps and springs occur along slope faces. Fringe slopes surrounding the South Post plateau range from 20 to 90 percent. Southeast of 23rd Street, the ground plunges to approximately sea level at slopes that range from 10 to almost 90 percent along the southern edge of Fairfax Village. Near the Potomac River, unstable, steep slopes have developed as a result of weakly-cemented sedimentary substrates and wind and water erosion. Steep and highly erodible slopes are also found along the eastern and western edges of the Southwest Area plateau and in deeply cut stream channels. These slopes range from 10 to 50 percent (US Army, 2001a).

FBNA Topography

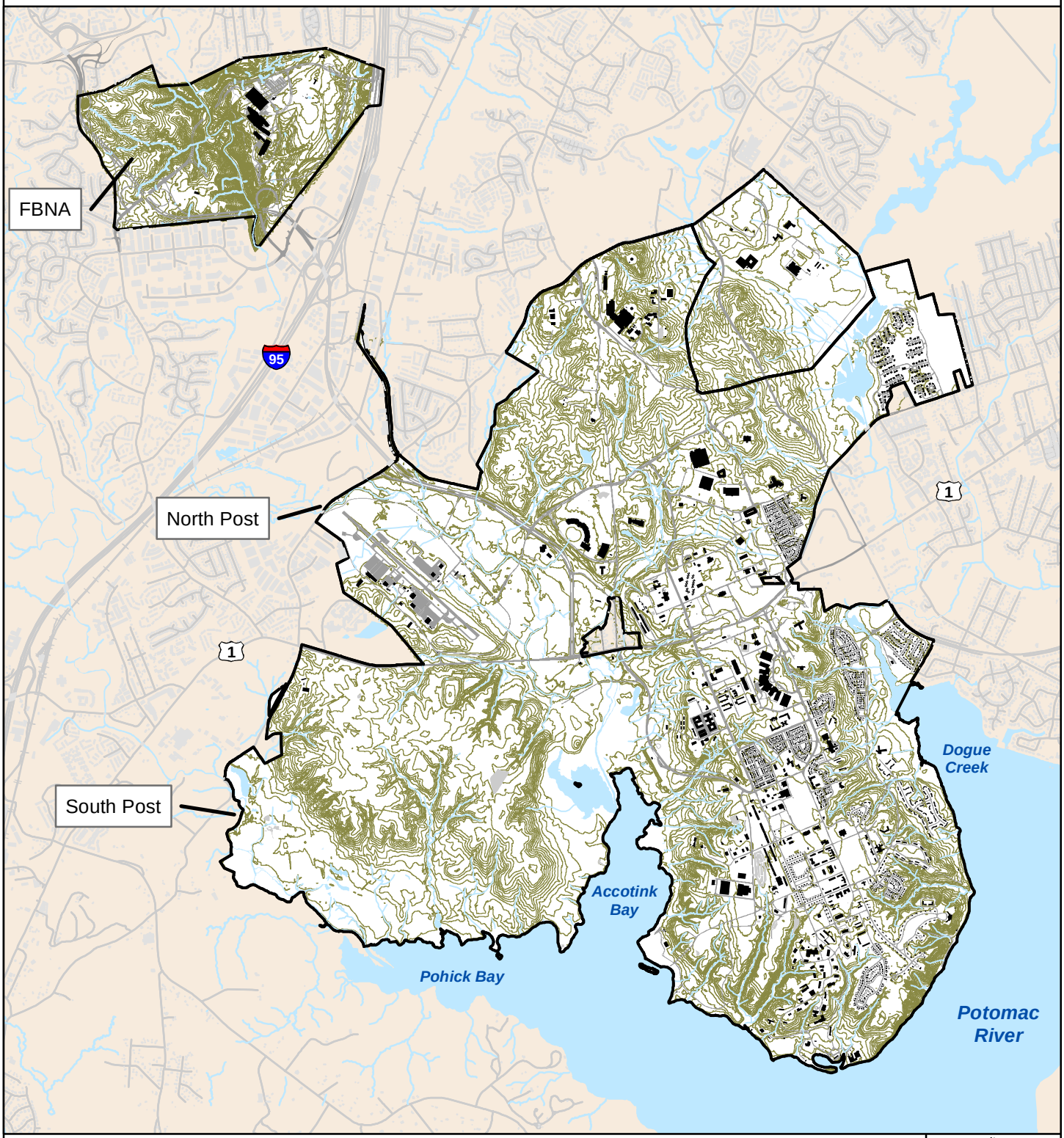
The topography of FBNA is gently rolling, except for steep slopes bordering Accotink Creek. Accotink Creek enters FBNA from the north at an elevation of approximately 120 feet above mean sea level and descends to an elevation of approximately 100 feet above mean sea level before exiting FBNA to the south. Steep slopes rise from both the eastern and western banks of Accotink Creek to an elevation of approximately 200 feet above mean sea level, forming a narrow stream valley. The grades on the slopes range between 20 and 30 percent at most locations. Areas to the east of Accotink Creek range in elevation from approximately 200 to 230 feet above mean sea level. The highest lands are situated near the northwest corner of FBNA, and elevations descend gently to the south and east (Fort Belvoir GIS, 2013).

3.7.1.3 Soils

Main Post Soils

The US Department of Agriculture's Natural Resource Conservation Service (USDA-NRCS), in cooperation with Fairfax County and the Northern Virginia, surveyed Fairfax County soils from 2002 to 2008 (USDA-NRCS, 2010). The soil survey describes and delineates 22 soil series on Fort Belvoir's Main Post. Figure 3.7-2 depicts the distribution of soils on Main Post and FBNA. Table 3.7-1 lists the soils mapped on Main Post and their suitability for construction.

Topography of Fort Belvoir



10' Contour Interval

Installation Boundary

Fort Belvoir RPMP EIS

Figure 3.7-1

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Soils of Fort Belvoir

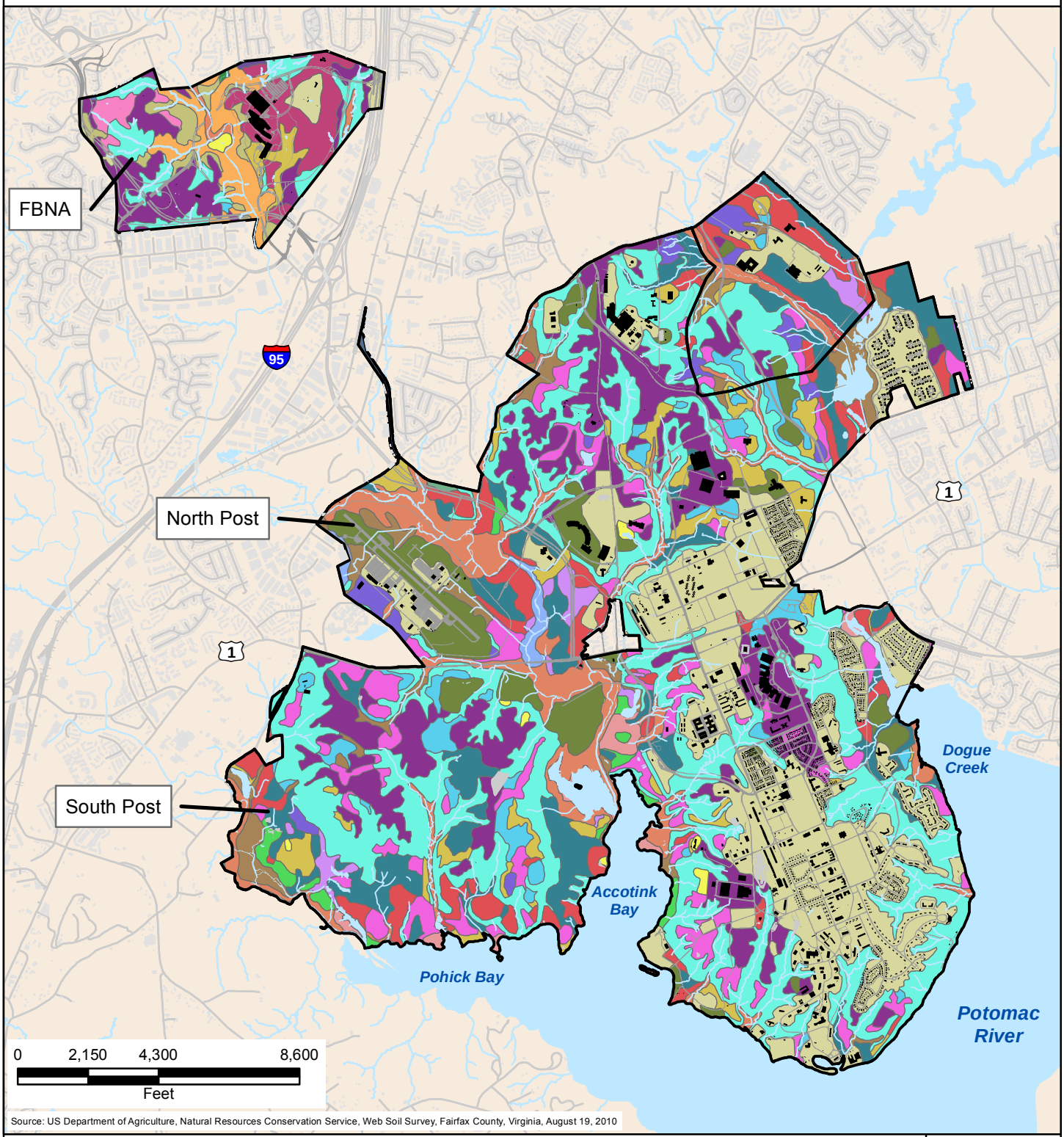


Figure 3.7-2

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Table 3.7-1
Main Post Soils

Soil Name	Soil Problem Class	Soil Drainage	Soil Erosion Potential	Foundation Support	Acres
Beltsville Silt Loam 2 – 7% slope	II	marginal	low	fair	877
Codorus and Hatboro Soils 0 – 2% slope	III	poor	low	poor	528
Codorus Silt Loam 0 – 2% slope	III	poor	low	poor	38
Downer Loamy Sand 0 – 2% slope	I	good	low	good	63
Elkton Silt Loam 0 – 2% slope	III	poor	low	poor	82
Grist Mill-Gunston Complex 0 – 2% slope	IVa	poor	low	poor	<1
Grist Mill-Mattapex Complex 0 – 7% slope	IVb	poor	low	marginal	3
Grist Mill Sandy Loam 0 – 25% slope	IVb	fair	medium	fair	417
Gunston Silt Loam 0 – 2% slope	III	poor	low	poor	657
Hatboro Silt Loam 0 – 2% slope	III	poor	low	poor	274
Honga Peat 0 – 1% slope	III	poor	NA	poor	101
Kingstowne - Sassafras- Neabsco Complex 2 – 7% slope	IVb	marginal	low	fair	6
Kingstowne Sandy Clay Loam 0 – 45% slope	IVb	fair	medium	fair	<1
Lunt - Marumsco Complex 2 – 7% slope	III	poor	medium	poor	111
Matapeake Silt Loam 2 – 7% slope	I	good	medium	good	214
Mattapex Loam 0 – 7% slope	II	poor	medium	marginal	456
Pits, Gravel	IVa	NA	NA	NA	18
Sassafras - Marumsco Complex 7 – 45% slope	III	poor	high	poor	1930
Sassafras Sandy Loam 0 – 15% slope	I	good	medium	good	277
Urban Land	IVb	NA	NA	NA	1782
Urban Land - Kingstowne Complex	IVb	fair	medium	fair	10
Water	III	NA	NA	NA	35
Woodstown Sandy Loam 2 – 7% slope	IVa	poor	medium	marginal	443
TOTAL					**8,323**

Source: USDA-NRCS, 2010; Fairfax County DPWES and NVSWCD, 2013.

Suitability of Soils for Construction

Soil problem class (see Table 3.7-1), which is defined in a *Descriptive and Interpretive Guide to Soils in Fairfax County,* refers to the "severity of problems associated with these soils and the potential difficulty of analyzing and correcting those problems."

- Problem Class I Soils are undisturbed, natural soils that typically have few characteristics that would adversely affect building foundations or surrounding land. During the preparation of building plans, a geotechnical investigation is advised but is not required.
- Problem Class II Soils are undisturbed natural soils that typically have shallow water tables or restrictive soil layers. During the preparation of building plans, a geotechnical investigation and report is strongly advised. A geotechnical report is required for buildings with more than three stories, mat foundations, deep foundations, deep excavations, sheeting and shoring, or retaining walls over six feet high.
- Problem 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. A detailed geotechnical investigation and report are required during the preparation of building plans.
- Problem Class IV Soils 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, and a geotechnical evaluation and report is mandatory. Class IVb soils are disturbed soils that were originally Class I or II soils, and a limited geotechnical investigation and letter report is required.

Soil drainage is affected by depth to seasonal high water table, permeability, landscape position, and potential for flooding. 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. A "good" rating refers to permeable soils with a seasonal water table well below the surface.

Soil erosion potential is affected by slope and the texture (grain size) of the soil, the rock content, structure, and permeability. "Low" erosion potential soils are not highly erodible except on steep unprotected cuts. "Moderate" erosion potential soils are moderately to highly erodible, depending on the slope. "High" erosion potential soils are highly erodible even on moderate slopes.

Foundation support ratings are based on empirical observations. The ratings are based on the presence or absence of unstable slopes, soft or compressible soils with low bearing values, high shrink-swell clays, high seasonal water tables, shallow bedrock, and flooding potential.

Source: Fairfax County DPWES and NVSWCD, 2013.

On Main Post, 1,792 acres are classified as Urban Land or Urban Land-Kingstowne complex soils, 18 acres as gravel pits, and 446 acres as disturbed or complexes of disturbed and native soils, for a total of 2,238 acres of soils where construction and grading have taken place. The Fairfax County Soils Guide defines Urban Land as "any large area completely covered by impervious surfaces such as asphalt, concrete or rooftop." The guide notes for disturbed soils that "When a soil is disturbed its traits, characteristics, and taxonomy are changed significantly as compared to the natural soil or soils from which it was created." Grist Mill sandy loam and Kingstowne sandy clay loam are soils disturbed by grading. The Grist Mill-Gunston, Grist Mill-Mattepex, and Kingstown- Sassafras-Neabsco complexes are intertwined or mixtures of disturbed and native soils.

NRCS' Urban Land, disturbed, and disturbed-native soil complexes shown on Figure 3.7-2 do not extend over all urbanized areas of Main Post. In part, this is because the NRCS survey was conducted from 2002-2008, while the BRAC 2005 facilities were built after 2007, such as the FBCH complex, Herryford and Vernondale Villages south of FBCH, and buildings in the industrial area. However, other long-established urbanized areas also are shown as being covered by undisturbed, native soils, notably, the old PX and Commissary buildings and parking lots and the INSCOM building on North Post. Therefore, the Urban Land and disturbed soils shown on Figure 3.7-2 do not reflect all of the developed areas currently on Main Post.

Hydric Soils

Three hydric soils occur on Main Post, covering 457 acres: Elkton silt loam, Hatboro silt loam, and Honga peat. Soils classified as "hydric" are saturated, flooded or ponded with water long enough during the growing season to develop anaerobic (oxygen-deprived) conditions in the upper soil. Hydric soils are one of three criteria used to delineate wetlands, so their presence is an indicator that wetlands may be present and should be investigated prior to development (Fairfax County DPWES and NVSWCD, 2013).

Unstable Slopes

Two soils that cover 2,041 acres of Main Post are susceptible to instability on natural slopes, and when construction is planned, slope stability analyses must be performed using acceptable engineering methods. The Lunt-Marumsco complex covers 111 acres and the Sassafras-Marumsco complex, 1,930 acres. Fill slopes on these soils should not be steeper than 5:1 and require engineering designs and compaction to ensure long-term stability (Fairfax County DPWES and NVSWCD, 2013).

Soils that May Contain Asbestos

A portion of the Codorus silt loam, Codorus and Hatboro soils, and Urban Land soils in Fairfax County is mapped on top of asbestos-containing parent material (greenstone bedrock). Excavations in the bedrock or earthmoving activities in such an environment might expose asbestos to the atmosphere, allowing the fibers to become airborne; special precautions must be used when handling materials containing asbestos as required by the US Occupational Safety and Health Administration (OSHA) (Fairfax County DPWES and NVSWCD, 2013). However, as indicated by Fairfax County in their comments on the Draft EIS, naturally-occurring asbestos is not known to be a concern anywhere on or near Fort Belvoir (see Appendix A, Comment FCSC3).

Soils Designated as Prime Farmland or Farmland of Statewide Importance

Prime farmland is land federally designated under the Farmland Protection Policy Act (7 USC 4201) as having the best combination of physical and chemical characteristics for producing food, feed, fiber, forage, oilseed, and other agricultural crops with minimum inputs of fuel, fertilizer, pesticides, and labor and without intolerable soil erosion. Other land recognized under the Farmland Protection Policy Act includes unique farmland and farmland of statewide or local importance. Unique farmland is land other than prime farmland that is federally-designated as important for production of specific high-value food and fiber crops. Farmland of statewide or local importance is land other than prime or unique farmland that is designated by state or local authorities as important for the production of food feed, fiber, forage, or oilseed crops.

Soil types on Main Post that are classified as prime farmland account for approximately 1,855 acres, comprising Beltsville silt loam, Downer loamy sand, Lunt-Marumsco complex, Matapeake silt loam, Mattapex loam, and Sassafras sandy loam, 0-7% slope. An additional 1,545 acres are classified as farmlands of statewide importance, denoted by Sassafras-Marumsco complex and Sassafras sandy loam, 7-15% slope (USDA-NRCS, 2010). While the farmland designations are based strictly on soil characteristics and do not depend on a history of current or past agricultural use, the applicability of protection of these lands under the Farmland Protection Policy Act is contingent on the adjacent land uses and history of production. For example, lands already in urban use or otherwise irreversibly committed to nonagricultural uses do not typically qualify. Former farmlands within Fort Belvoir were committed to military use long before passage of the Farmland Protection Policy Act; these lands have not been in production for over 50 years and long-standing land uses within the facility are not consistent with prime farmland or farmland of statewide importance designations. Thus, the procedural requirements of the Farmland Protection Policy Act requiring coordination with the NRCS do not apply.

FBNA Soils

FBNA soils were also surveyed by NRCS from 2002-2008 and are shown on Figure 3.7-2 and in Table 3.7-2 (USDA-NRCS, 2010). Because NRCS's soil survey of the FBNA overlapped the period during which the BRAC 2005 NGA buildings and a fire and rescue facility were being designed, mapping may not reflect the soil disturbance that occurred during construction. The soils shown may reflect the earlier Corps of Engineers activities that took place when FBNA was a proving and training ground. Urban Land is mapped on 42 acres; disturbed soils (Kingstowne sandy clay loam and Kingstowne-Sassafras complex, and gravel pits cover 171 acres.

Table 3.7-2
FBNA Soils

Soil Name	Soil Problem Class	Soil Drainage	Soil Erosion Potential	Foundation Support	Acres
Barkers Crossroads-Rhodhiss Complex 7–15% slope	IVb	good	medium	fair	<1
Beltsville Silt Loam 2–7% slope	II	marginal	low	fair	173
Codorus and Hatboro Soils 0–2% slope	III	poor	low	poor	17
Fairfax Loam 2–7% slope	I	good	medium	fair	3
Glenelg Silt Loam 7 – 15% slope	I	good	high	good	34
Kingstowne Sandy Clay Loam 0–45% slope	IVb	fair	medium	fair	155
Kingstowne-Sassafras Complex 7–15% slope	IVb	good	low	good	<1
Matapeake Silt Loam 2–7% slope	I	good	medium	good	2
Meadowville Loam 0–7% slope	II	marginal	medium	fair	2
Nathalie Gravelly Loam 2–25% slope	I	good	high	fair	65
Pits, Gravel	IVa	NA	NA	NA	6
Rhodhiss-Rock Outcrop Complex 25–45%	I	good	medium	fair	<1
Rhodhiss Sandy Loam 7–45%	I	good	medium	fair	134
Sassafras-Marumsco Complex 7–45% slope	III	poor	high	poor	135
Sassafras-Neabsco Complex 2–7% slope	II	marginal	medium	fair	<1
Sassafras Sandy Loam 0–15% slope	I	good	medium	good	36
Urban Land	IVb	NA	NA	NA	42
TOTAL					**806**

Source: USDA-NRCS, 2010; Fairfax County DPWES and NVSWCD, 2013.

Hydric Soils

No hydric soils have been identified on FBNA (USDA-NRCS, 2010; (Fairfax County DPWES and NVSWCD, 2013).

Unstable Slopes

One soil, the Sassafras-Marumsco complex, covering 135 acres of FBNA, is susceptible to instability on natural slopes, and when construction is planned, slope stability analyses must be performed using acceptable engineering methods. Fill slopes on these soils should not be steeper than 5:1 and require engineering designs and compaction to ensure long-term stability ((Fairfax County DPWES and NVSWCD, 2013).

Soils that May Contain Asbestos

As noted for Main Post, some portions of the areas mapped for Codorus and Hatboro soils, Urban Land soils, and additionally on FBNA, Glenelg silt loam, Meadowville loam, and Rhodhiss-Rock Outcrop complex are on top of asbestos-containing parent material (greenstone bedrock). However, as indicated by Fairfax County in their comments on the Draft EIS, naturally-occurring asbestos is not known to be a concern anywhere on or near Fort Belvoir (see Appendix A, Comment FCSC3).

Soils Designated as Prime Farmland or Farmland of Statewide Importance

Soils on the FBNA designated as prime farmland cover approximately 231 acres mapped in the Beltsville silt loam, Fairfax loam; Glenelg silt loam, 2-7% slope; Matapeake silt loam; Meadowville loam; Nathalie gravelly loam, 7 to 15% slope; Sassafras-Neabsco complex; and Sassafras sandy loam, 2-7% slope. Soils that have the potential to support farmland of statewide importance (Glenelg silt loam, 7-15% slope; Sassafras sandy loam, 7-15% slope; Sassafras-Marumsco complex, 7-25% slope; Nathalie gravelly loam, 7-25%l; Rhodhiss Sandy Loam, 7-25%) cover 240 acres (USDA-NRCS, 2010). As discussed above under Main Post Soils, however, because the FBNA was committed to military use long ago, the land covered by these soils does not qualify as prime farmland under the Farmland Protection Policy Act or farmland of statewide importance and, therefore, the procedural requirements of the Farmland Protection Policy Act requiring coordination with the NRCS are not applicable.

3.7.2 Environmental Consequences of the No Action Alternative

The No Action Alternative would have no impact on Fort Belvoir's topography, geology, or soils because the RPMP update and the short-term and long-term projects would not be implemented. Therefore, there would be no ground disturbance as the result of building the projects.

3.7.3 Environmental Consequences of Alternative 1 – Full Implementation – The Preferred Alternative

3.7.3.1 Geology

Implementing the short-term and long-term projects would have no effect on geological formations underlying Main Post. On Main Post, the unconsolidated sands, silts, and clays of the Potomac Group are approximately 600 feet thick. The anticipated construction work for short-term and long-term projects would not intercept the deep bedrock underlying the area and is not anticipated to significantly disturb the Potomac Group sediments above the bedrock.

On FBNA, bedrock may be encountered by excavations and could be affected by building foundations and bridge piers. In such cases, geotechnical surveys of subsurface conditions would be conducted to determine the most suitable foundations and to minimize impacts.

Implementation of the short-term and long-term projects on Main Post and FBNA would not change the geology of the area, and direct effects on geological formations are expected to be limited to the FBNA. These effects would not rise above the level of significance, which would be to disturb 5 percent or more of the geological formations/topography/soils on post. Any adverse impacts would be less than significant and mitigated if mitigation is necessary.

3.7.3.2 Topography and Soils

Short-Term Projects

As indicated in Table 2-2, implementation of the short-term facility projects on Main Post and the FBNA under Alternative 1 would result in the disturbance of about 275 acres of surface topography and soils of which about 92 acres would become impervious surface. Impervious surfaces – pavement and buildings – stop rainwater from infiltrating into the ground, increase runoff from project sites, and increase soil erosion, if not mitigated. The short-term transportation projects (Table 2-3) would disturb an additional 4 acres (the two largest transportation projects are also in the short-term facility list so are not added a second time) and create about 3 acres of impervious surface. The total area disturbed by short-term facility and transportation projects would be about 280 acres; the total area of new impervious surface would be about 92 acres. Appendix G includes “small area maps” that provide detailed views of the relationship between project sites and soil types.

Much of the construction would take place on soils identified as being Urban Land, disturbed, or disturbed-native soil complexes. The presence of these soil types indicates that the land surface was graded in the past and that construction and demolition activities may have taken place. As indicated in Table 2.2, the projects that would disturb more than five acres, listed in order of impact, include:

- The NMUSA projects (ST 17, 18, 27, 34, 38, and 41), which would disturb 84 acres of rolling land that is now part golf course and part wooded. ST 17, Reconfiguration of the Golf Course, would add 1.3 acres of impervious surface. The other five NMUSA projects would add a total of 16.7 acres of impervious surface for buildings, parking lots, and roads. The soils on this site are mainly Beltsville Silt Loam, and then, in descending order by area, Sassafras-Marumsco complex, Gunston silt loam, Woodstown sandy loam, Hatboro silt loam, Codorus and Hatboro soils, Downer loamy sand, Matapeake silt loam, Sassafras sandy loam, and Mattapex loam.
- Mulligan Road, Phase II construction (ST 4), is disturbing 32 acres of undeveloped, wooded land and existing roadways and creates 20 acres of impervious surface. The soils on this site are mainly Sassafras-Marumsco complex, and then in descending order by area, Matapeake silt loam, Woodstown sandy loam, Lunt-Marumsco complex, Beltsville silt loam, Sassafras sandy loam, Codorus and Hatboro soils, Grist Mill sandy loam, Hatboro silt loam, Urban Land, Mattapex, and Gunston silt loam.
- The Main PX (ST 1) construction, which disturbed 24.3 acres of wooded land and some previously paved areas. Net impervious surfaces totaled 16.8 acres. The soils on this site are mainly Beltsville Silt Loam, and then in descending order by area, Gunston silt loam, Sassafras-Marumsco Complex, Sassafras sandy loam, and Codorus and Hatboro soils.
- The expansion of US Army Intelligence HQ (INSCOM) (ST 19, 26, 33, 46), which would disturb 21.9 acres of land mostly covered with buildings, parking lots, and roads, and add only 4.3 acres of impervious surface. The soils on this site are mainly Urban Land , and then in descending order by area, Mattapex loam, Beltsville silt loam, Sassafras–Marumsco complex, and gravel pits.

- The new Main Post Commissary (ST 28) construction, which would disturb 19.4 acres, of which 17.2 acres are already covered by buildings or pavement, resulting in a net increase of only 2.2 acres of impervious surface. The soils on this site are mainly Beltsville silt loam, and then in descending order by area, Sassafras sandy loam, Gunston silt loam, Grist Mill sandy loam, and Urban Land.
- Construction of the 249th Battalion HQ (ST 32) would disturb 10.5 acres but result in only a 4.1-acre increase in impervious surface because much of the site is already covered with buildings and pavement. The soils on this site are mainly Urban Land with some Beltsville silt loam.
- Construction of the Family Travel Camp (ST 9) Phase I disturbed 9.6 acres of land mostly previously disturbed, plus some wooded land, and added 1.6 acres of impervious surface. Phase II (ST 31) would disturb an additional 1.3 acres of already-disturbed land, adding 0.9 acres of impervious surface. The soils on this site are mostly Urban Land, and then in descending order by area, Sassafras sandy loam, Grist Mill sandy loam, Codorus and Hatboro soils, and Sassafras–Marumsco complex.
- Construction of OSEG facilities (ST 43) would clear 9.5 acres of woods, creating 4 acres of impervious surface. The soils on this site are Gunston silt loam and Woodstown sandy loam.
- Construction of the 29th Infantry HQ (ST 36) would disturb 7.4 acres of a site already covered with pavement and buildings, resulting in no change in impervious surface. The soil on this site is all Urban Land.
- Similarly, construction of the 911th Engineering Company Operation Complex (ST 49) would disturb 6.8 acres; but the site is almost completely covered with pavement and buildings, so impervious surface would increase by only 1.0 acre. The soil on this site is almost entirely Urban Land with some Woodstown sandy loam.
- Construction of PAL (ST 2) would disturb 5.4 acres of land on a site previously disturbed for housing but now partly open and partly wooded resulting in 2.1 acres of impervious surface. A nearby parking lot would be utilized, reducing the amount of paved parking lot required. The soil on this site is mainly Urban Land with some Beltsville silt loam and Mattapex loam.

EAs under NEPA have been prepared and FNSIs signed for most of the above projects as described in Section 1.3.2 and detailed in the project descriptions in Chapter 2. The exceptions are ST 36 and ST 49, which have not progressed to the stage where NEPA documentation can be completed, and ST 43, for which an EA is underway.

Most of the short-term projects (Mulligan Road and NMUSA are notable exceptions) are located on level uplands where the topography would not be substantially altered. Nevertheless, direct effects to topography and soils would result as the land near new structures generally would be graded during construction, and cuts in adjacent portions of the landscape could increase slopes. Road and parking area construction would also result in the leveling of the topography immediately below the pavement and may result in localized increases in slopes adjacent to the pavement as the result of cut-and-fill activities. The construction of Mulligan Road (ST 4) requires cut-and-fill activity.

Soils that are classified as prime farmlands and farmlands of statewide importance occur within the project areas. However, because the lands within Fort Belvoir are in urban use or otherwise irreversibly committed to other uses, prime farmlands or farmlands of statewide importance would not be affected.

Hatboro silt loam, a hydric soil, is found on the NMUSA and Mulligan Road project sites. For both of these large projects, site conditions have been investigated, jurisdictional wetlands delineated, and geotechnical surveys performed to determine soil types present and subsurface conditions affecting design. This information was used to design the projects while minimizing impacts.

Five of the project sites discussed above include the widespread Sassafras-Marumsco complex soil, which is susceptible to instability on natural slopes, and when construction is planned, slope stability analyses must be performed using acceptable engineering methods. Engineering studies and designs are required for fill slopes on these soils (Fairfax County DPWES and NVSWCD, 2013).

Construction disturbances can affect soil resources in a number of ways. Clearing vegetation – particularly trees – on a site disturbs soils. In some cases, topsoil is stripped from an undisturbed site with native soils before the placement of impervious surfaces – pavement and buildings. Vegetation is unable to grow in the new impervious areas. Loss of surface soil and vegetation due to the placement of pavement, utilities, or building foundations presents a potential for soil erosion. However, soil erosion would be minimized by preparing soil and erosion control plans in projects and implementing them during construction (see proposed mitigation measures in Section 3.7.6) using standard construction best management practices such as silt fence and storm water control during construction. The process of excavating native soils for roadway cuts, bridge abutments, building foundations, and trenches for pipelines and power lines results in a loss of soil structure and a mixing of horizons (layers) that may have developed over hundreds or thousands of years. While the soils are often placed back into the excavated areas, the mixing of the soils results in a long-term loss of productivity because the organic matter in the upper soil horizons is mixed with infertile, often clay, subsoils that root systems cannot easily penetrate and that supply little nourishment. Ideally, topsoil is replaced over disturbed soils to support new landscape plantings after the facilities are completed.

The changes to Fort Belvoir's topography and soils under Alternative 1 would be minor. Most of the projects would be concentrated in the relatively level areas on the uplands and plateaus, and much of the area affected has been disturbed in the past. Impacts would be significant if the projects 5 percent of the land surface on Fort Belvoir. The land surface that would be disturbed represents only a small percentage of the land on Fort Belvoir – 3.3 percent – and much of the disturbance would be temporary and related to construction activities. Soil erosion would be minimized by developing and implementing soil erosion control and stormwater management plans (proposed mitigation measures are described in Section 3.7-6). Therefore, implementing all the short-term projects under Alternative 1 with mitigation would result in less than significant adverse impacts to soils and topography – considerably less than 5 percent of the geological formations/topography/soils would be disturbed.

Long-Term Projects

As indicated in Table 2-2, implementation of the long-term facility projects on Main Post and FBNA under Alternative 1 would result in disturbance of approximately 100 acres of topography of which about 33 acres would be new impervious surface. With the exception of the proposed LT 9 site for a secure administrative campus on FBNA, the other projects would redevelop sites already partially- to wholly-covered with pavement and buildings, with a result that the amount of facility impervious surface would actually decrease by about 2 acres under this alternative. Long-term transportation projects (Table 2-5) would disturb approximately 18 acres and add approximately 10 acres of impervious surface. None of these projects has been designed, so areas are approximate and subject to change. The total area disturbed by long-term facility and transportation projects would be approximately 118 acres; the total area of new impervious surface would be approximately 43 acres.

On Main Post, as is the case for the short-term projects, much of the long-term project construction would take place on soils that have been disturbed in the past. The long-term projects are mostly located on level uplands where the topography would not be substantially altered. Appendix G includes "small area maps" that provide detailed views of the relationship between project sites and soil types.

LT 9 is by far the largest long-term project. On FBNA, implementation of LT 9 would result in disturbance of approximately 42 acres of level upland topography and soils. Impervious surfaces would likely cover 35 of the 42.4 acres (the 33.3-acre total for all long-term projects is less than 35 acres because two of the long-term projects result in a net decrease in impervious surfaces). The soils in the LT 9 project area indicate that

much of the site has been disturbed: Urban Land (24 percent) and disturbed/native soil complexes (62 percent) soils cover 86 percent of the site. The soils on this site are mainly Kingstown sandy clay loam (a disturbed soil) and Urban land, and covering smaller areas, Beltsville silt loam, Sassafras-Marumsco complex, and Sassafras sandy loam.

LTT 8, which would complete a section of Heller Road on FBNA to allow it to function as a through road, would require the construction of a new bridge over Accotink Creek which would result in direct impacts to soils and topography associated with the construction of piers and footings. These effects would be permanent but localized. The site is covered by Urban Land.

Direct effects to topography would result as the land in the vicinity of buildings would generally be graded and cuts in adjacent portions of the landscape could increase slopes. Road and parking area construction would also result in the leveling of the topography immediately below the pavement and may result in localized increases in slopes adjacent to the pavement as a result of cut-and-fill activities.

As previously noted, soils that are classified as prime farmlands and farmlands of statewide importance occur within the project areas. However, soils within Fort Belvoir have previously been converted to urban use or otherwise irreversibly committed to other uses and are, therefore, incompatible with these designations.

There are no hydric soils on FBNA.

The Sassafras-Marumsco complex soil, which is susceptible to instability on natural slopes, is present on the LT 9 site, and would be dealt with during geotechnical investigations and facility engineering and design.

Like the short-term projects, long-term project topographic and soils impacts under Alternative 1 would be minor. Virtually all disturbances would be concentrated in relatively level areas on uplands and plateaus on previously disturbed sites. Most of the soils disturbed by the long-term projects would be Urban Land and disturbed/native soils, which have been disturbed in the past by earthmoving activities.

Impacts would be significant if the projects affected 5 percent of surface and subsurface geology/topography/soils on Fort Belvoir. The land surface that would be disturbed by the proposed long-term facility and transportation projects represents only a small percentage of the land on Fort Belvoir – 1.4 percent – and much of the disturbance would be temporary and related to construction activities. Soil erosion would be minimized by developing and implementing soil erosion control and stormwater management plans (proposed mitigation measures are described in Section 3.7-6). At project completion, the disturbed land surfaces not covered by buildings and pavement would be stabilized with vegetation, as described in the mitigation section. Therefore, implementing all the long-term projects under Alternative 1 with mitigation would result in less than significant adverse effects.

3.7.4 Environmental Consequences of Alternative 2 – Modified Long-Term

3.7.4.1 Geology

Implementation of the short-term and long-term projects on Main Post and FBNA would not change the geology of the area, and effects on geological formations are expected to be limited. These effects would not rise above the level of significance, which would be to disturb 5 percent of the surface and subsurface geology/topography/soils on post. Any adverse impacts would be less than significant and mitigated if mitigation is necessary.

3.7.4.2 Topography and Soils

Short-Term Projects

On Main Post and FBNA, implementation of the Alternative 2 short-term projects would have similar impacts on topography and soils as described for Alternative 1 except two projects would be deferred until the long term: ST 40 and ST 52, respectively parking garages on the DLA parking lot, and an administrative center on the same parking lot. The adverse effects on topography and soils with mitigation would be less than significant.

Long-Term Projects

The effects on topography and soils of implementing the proposed long-term projects on Main Post would be as described for Alternative 2. On Main Post, ST 40 and ST 52 would be implemented, but both are completely located on DLA's parking lot, so impacts to soils and topography would be minimal.

On FBNA, however, the largest long-term project, LT 9, would not be built. As a result, the remaining long-term projects would affect 74.6 acres of soils and topography rather than the 117 acres under Alternative 1, and the newly added impervious surface would total approximately 8 acres rather than the 43 acres under Alternative 1. Therefore, for Fort Belvoir as a whole, the long-term project impacts on topography and soils of implementing Alternative 2 would have less than significant adverse effects with mitigation but would be of less magnitude than the Alternative 1 long-term project impacts on topography and soils.

3.7.5 Environmental Consequences of Alternative 3 – Modified Short-Term

Under Alternative 3, construction of many of the short-term projects would be delayed until the long-term – until after 2017. All of the long-term projects proposed under Alternative 1 would be constructed in the 2018-2030 timeframe.

3.7.5.1 Geology

Although there would be fewer projects, implementing short-term projects under Alternative 3 would have the same effects as implementing the short-term projects under Alternative 1. Implementation of the short-term and long-term projects on Main Post and FBNA would not change the geology of the area, and effects on geological formations are expected to be limited. These effects would not rise above the level of significance for impacts to geological formations on post. Any adverse impacts would be less than significant and mitigated if mitigation is necessary.

3.7.5.2 Topography and Soils

Short-Term Projects

On Main Post and FBNA, implementation of the Alternative 3 short-term projects would have the same kinds of impacts on topography and soils as described for Alternative 1. However, the magnitude of impacts would be less and spread out into the years after 2017, as many Alternative 1 and 2 short-term facility projects would become long-term projects. Under Alternative 3, the short-term facility and transportation projects would disturb approximately 127 acres and create approximately 66 acres of new impervious surface as compared to 282 acres of disturbance and 91 acres of new impervious surface under Alternative 1. The impacts on topography and soils of implementing the Alternative 3 long-term projects would be adverse but less than significant with mitigation, like Alternatives 1 and 2, but the magnitude of the impacts on topography and soils would be less than for the other two alternatives.

Long-Term Projects

The types of effects on topography and soils of implementing the proposed long-term projects on Main Post would be as described for Alternative 1, but the magnitude of the impacts would be greater because of the shift of short-term projects to the long term. Under Alternative 3, the long-term facility and transportation projects would disturb approximately 276 acres and create approximately 71 acres of new impervious surface as compared to 117 acres of disturbance and 43 acres of new impervious surface under Alternative 1. Impacts would be adverse and less than significant with mitigation, but of greater magnitude than for the other two build alternatives.

3.7.6 Proposed Mitigation Measures

Problems associated with construction activities, like soil erosion, water pollution, flooding, stream channel damage, decreased ground water storage, slope failures, and damage to adjacent or downstream properties can be successfully minimized by implementing erosion and sediment control measures on construction sites. These measures help prevent soil movement or loss, enhance project aesthetics and eliminate appreciable damage to off-site receiving channels, property and natural resources.

The following proposed mitigation measures would be developed during facility planning and design, and implemented during construction. Implementing the mitigation measures would ensure that designs reflect individual site conditions and minimize soil and erosion-related impacts during and after construction:

1. Standard engineering practices would be followed and construction plans would be prepared in accordance with Fairfax County building codes for short-term and long-term projects under all alternatives to address construction-related issues stemming from local soil and subsurface conditions. Such practices include developing appropriate design criteria (e.g. depth and location) for placement of footings and piers in preparation for buildings, roads, bridges and foundations. Such practices also include considering soil characteristics in designing landscapes, slopes, and retaining walls.
2. In accordance with the Virginia Erosion and Sediment Control Law (9 VAC 25-840*)*, implemented by VDEQ, all proposed projects with land-disturbing construction activities (such as clearing, grading excavating, transporting and filling of land) equal to or exceeding 10,000 square feet would require the preparation and implementation of soil and erosion control plans. Such plans would include BMPs to minimize soil erosion while soils are exposed during construction.
3. In accordance with the Virginia Stormwater Program (9 VAC 25-870), all proposed projects disturbing land areas one acre or greater in size would prepare and implement stormwater pollution prevention plans.
4. Following construction, top soil would be replaced and sites would be planted with native vegetation to the maximum extent practicable.

3.7.7 Comparison of Alternatives

Impacts on geological, topographical, and soils resources resulting from the No Action and three action alternatives evaluated in this EIS are summarized in Table 3.7-3.

Table 3.7-3
Summary of Impacts on Geology, Topography and Soils by Alternative

Environmental Consequence	No Action Alternative	Alternative 1 – Full Implementation – The Preferred Alternative	Alternative 2 – Modified Long-Term	Alternative 3 – Modified Short-Term
Short-Term Projects				
Unstable soils/subsurface conditions affect integrity of new structures	No effect	No effects, with mitigation	No effects, with mitigation	No effects, with mitigation
Increased soil erosion during and after construction	No effect	Less than significant adverse effects, with mitigation	Less than significant adverse effects, with mitigation	Less than significant adverse effects, with mitigation
Long-Term Projects				
Unstable soils/subsurface conditions affect integrity of new structures	No effect	No effects, with mitigation	No effects, with mitigation	No effects, with mitigation
Increased soil erosion during and after construction	No effect	Less than significant adverse effects, with mitigation	Less than significant adverse effects, with mitigation	Less than significant adverse effects, with mitigation

3.8 WATER RESOURCES

Fort Belvoir is located along the Potomac River -- the second largest tributary to the Chesapeake Bay. The Army NEPA regulations recommend that EISs focus on those environmental resources or landscape features important to maintaining the biodiversity of not only Fort Belvoir, but also of the surrounding area. Based on 25 years of conducting NEPA and master planning processes at Fort Belvoir, and past input provided by natural resource management agencies and the public, the continued health of surface waters and their associated aquatic habitats are the environmental resources considered in this section. In accordance with the master plan Guiding Principles, the impact analysis focuses on the post's surface waters, the watersheds that contribute to those surface waters, and the aquatic habitats they support.

Thresholds of Significance

The following thresholds were used to determine the significance of an impact in the water resources impact analysis:

- Fort Belvoir Watersheds –The individual action under the RPMP would increase the overall imperviousness of the watershed , and hence the potential for unmitigated stormwater runoff, by more than one percent, or the full scope of projects under the RPMP would cumulatively increase the imperviousness of any watershed more than two percent, or would cause the watershed to cross the 10 to 20 percent impervious cover threshold associated with a degradation of stream quality (Center for Watershed Protection, 2003, as cited in US Army, 2007a).
- Surface Water Quality – The action would cause a change in the applicable standards, or significantly detract from the pollution control strategies presently in place.
- Chesapeake Bay Resource Protection Areas, Fort Belvoir Riparian Areas, and the FBNA Accotink Creek Conservation Corridor – The action would impact more than one percent of the Chesapeake Bay resource protection area (RPA) without mitigation.
- Floodplains – The action would interfere with the floodplain's function.

3.8.1 Affected Environment

This section addresses the watersheds that are partially or wholly within Fort Belvoir, the streams and ponds they support, and the current and future quality of these resources. To the extent that activities on the installation can potentially affect surface waters off Fort Belvoir, namely the near shore waters of Accotink Bay, Gunston Cove, and the Potomac River, these waters are also addressed.

3.8.1.1 Fort Belvoir Watersheds

The Main Post is bounded by Pohick Creek (which flows into Pohick Bay) to the southwest and Dogue Creek along the installation's eastern boundary. Pohick Bay and Accotink Bay join to form Gunston Cove along the southern tip of the Main Post. The FBNA is located entirely within the Accotink Creek watershed. Accotink Creek flows southward through the FBNA and the Main Post before emptying into Accotink Bay.

Surface water from Fort Belvoir drains either directly to the Potomac River or to the lower reaches of Pohick, Accotink, and Dogue creeks (Figure 3.8-1). The headwaters of these tributaries are off-post to the north and west of the Installation in Fairfax County, Virginia. The headwaters of Mason Run (a tributary to Accotink Creek) and several unnamed tributaries are located within the post boundaries. There are seven main watersheds on the post, which the Fort Belvoir staff have further subdivided into 59 subwatersheds, based on the drainage patterns established by topography and by man-made drainage infrastructure (Fort Belvoir GIS, 2006, as cited in US Army, 2007a).

The watersheds of Fort Belvoir are part of the Middle Potomac-Anacostia-Occoquan hydrologic unit, designated by the US Geological Survey in its National Watershed Boundary Dataset as hydrologic unit code 02070010. Hydrologic unit codes are used by the US Geological Survey to identify geographic areas representing all or part of a surface drainage basin, a combination of drainage basins, or a distinct hydrologic feature. Eight digit codes are used for sub-basins, which are the smallest size in the national headquarters compilation. The sub-basins can be further subdivided into 10-digit code watersheds and 12-digit code subwatersheds (Missouri Watershed Information Network, 2012). The National Watershed Boundary Dataset subwatersheds mapped within the boundary Fort Belvoir include Potomac River, Lower (PL) units PL27, PL28, PL29, PL30, and PL50.

A **Hydrologic Unit Code (HUC)** is the code used by the US Geological Survey to identify a geographic area representing all or part of a surface drainage basin, a combination of drainage basins, or a distinct hydrologic feature.

Fort Belvoir independently mapped subwatersheds to support its INRMP (US Army, 2001a). Subwatersheds mapped by Fort Belvoir generally correspond to the US Geological Survey mapping of major watersheds, but are more detailed or spatially refined with a total of 53 subwatersheds. Subwatershed 53, which encompassed the FBNA, was further subdivided into 7 subwatersheds, yielding a total of 59 subwatersheds. Because Fort Belvoir uses the subwatershed designations in the INRMP for stream condition surveys and other studies (US Army, 2001a), the information in this EIS is organized according to the Fort Belvoir subwatershed designations.

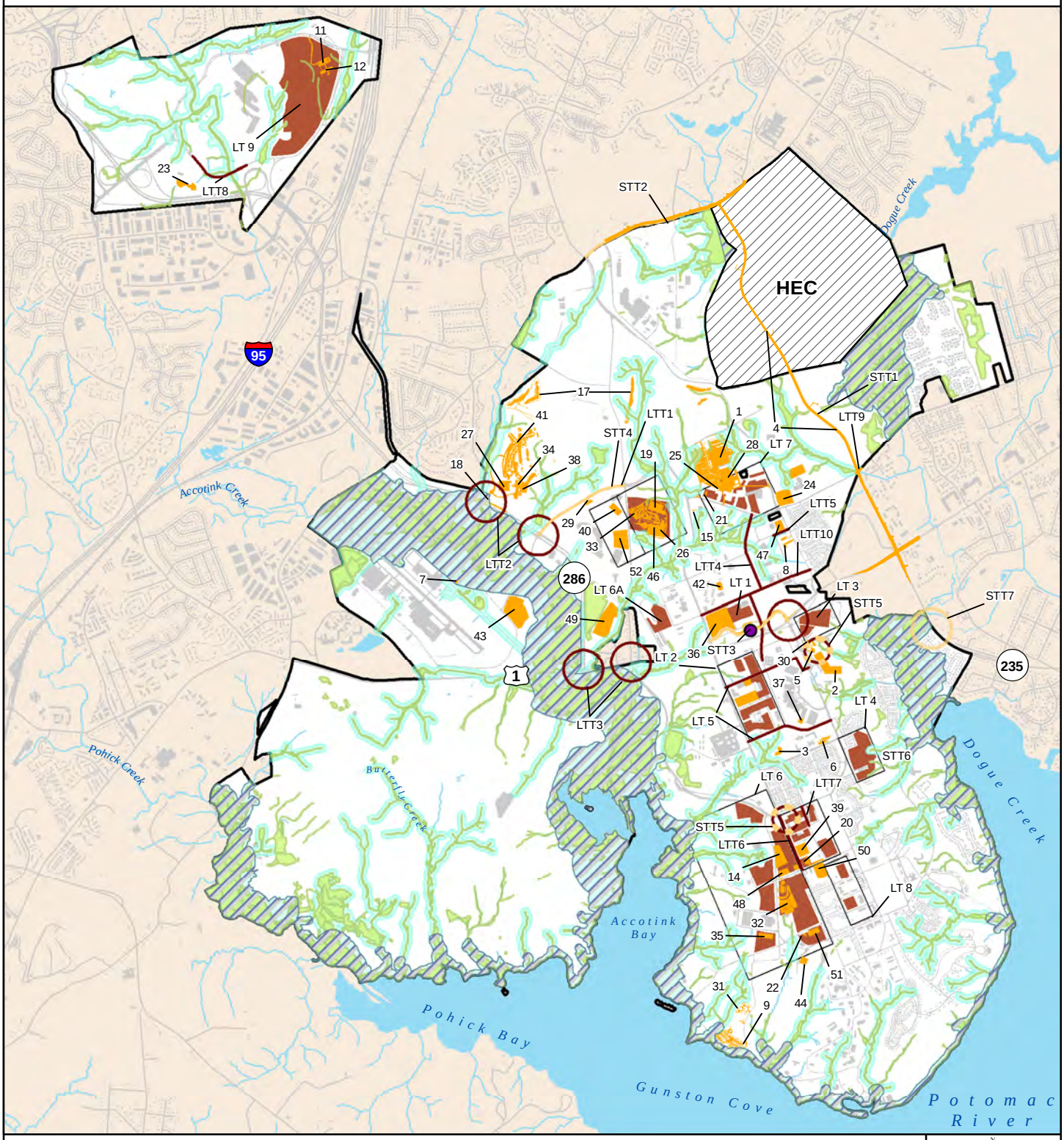
Figure 3.8-2 shows the seven primary watersheds and the 59 numbered subwatersheds. Three of the seven watersheds – Accotink Creek, Dogue Creek, and Pohick Creek – drain most of Fort Belvoir, as well as much of eastern Fairfax County. The area of Fairfax County that these three watersheds cover, particularly within the Accotink Creek watershed, is primarily urban and suburban with approximately 80 percent of the area developed north and west of the installation. The remaining four watersheds – Accotink Bay, Gunston Cove, Pohick Bay, and Potomac River – represent smaller watersheds within Fort Belvoir that drain directly to these waterbodies (US Army, 2001a). These small Fort Belvoir watersheds represent only small fractions of the total watershed areas draining to the Potomac River.

Table 3.8-1 presents summary statistics for the seven Fort Belvoir watersheds. Accotink Creek is the largest and covers approximately 48 percent of the installation, including the entirety of the FBNA (US Army, 2001a; Fort Belvoir GIS, 2006, as cited in US Army, 2007a). The Dogue Creek watershed includes approximately 20 percent, while Pohick Creek and Gunston Cove watersheds each include roughly 8 percent of the installation. The Accotink Bay and Pohick Bay watersheds each cover 7 percent. A small area of South Post drains directly to the Potomac River.

The INRMP (US Army, 2001a) and the Fort Belvoir Watershed Delineation Project Update (Landgraf, 2003 as cited in US Army, 2007a) provide additional background information on development conditions in the Fort Belvoir watersheds and subwatersheds.

In all, Fort Belvoir, including the FBNA, encompasses approximately 128 stream miles, of which approximately 28 miles are perennial and the rest are intermittent or ephemeral streams, i.e., channels that have water only during or following storm events (Fort Belvoir, 2004 as cited in US Army, 2007a). These distances are estimates and are derived from the Fort Belvoir GIS. They are based largely on aerial photo interpretation with limited field checks. The extent of streams and their flow regimes are measured and re-evaluated in the field when specific projects are planned, and when it then becomes necessary to determine wetland and Chesapeake Bay Resource Protection Area permitting requirements. Fort Belvoir uses the North Carolina Division of Water Quality "Methodology for Identification of Intermittent and Perennial Streams and their Origins," Version 4.11 (September, 2010) to determine flow regime.

Surface Waters and Associated Resources on Fort Belvoir



100-Year Floodplain
RPA Boundary
Wetlands
Short-Term Improved/New Road
Long-Term Improved/New Road
Short-Term Project Sites (Construction FY 2012 - 2017)
Long-Term Project Sites (Construction FY 2018 - 2030)

Fort Belvoir RPMP EIS

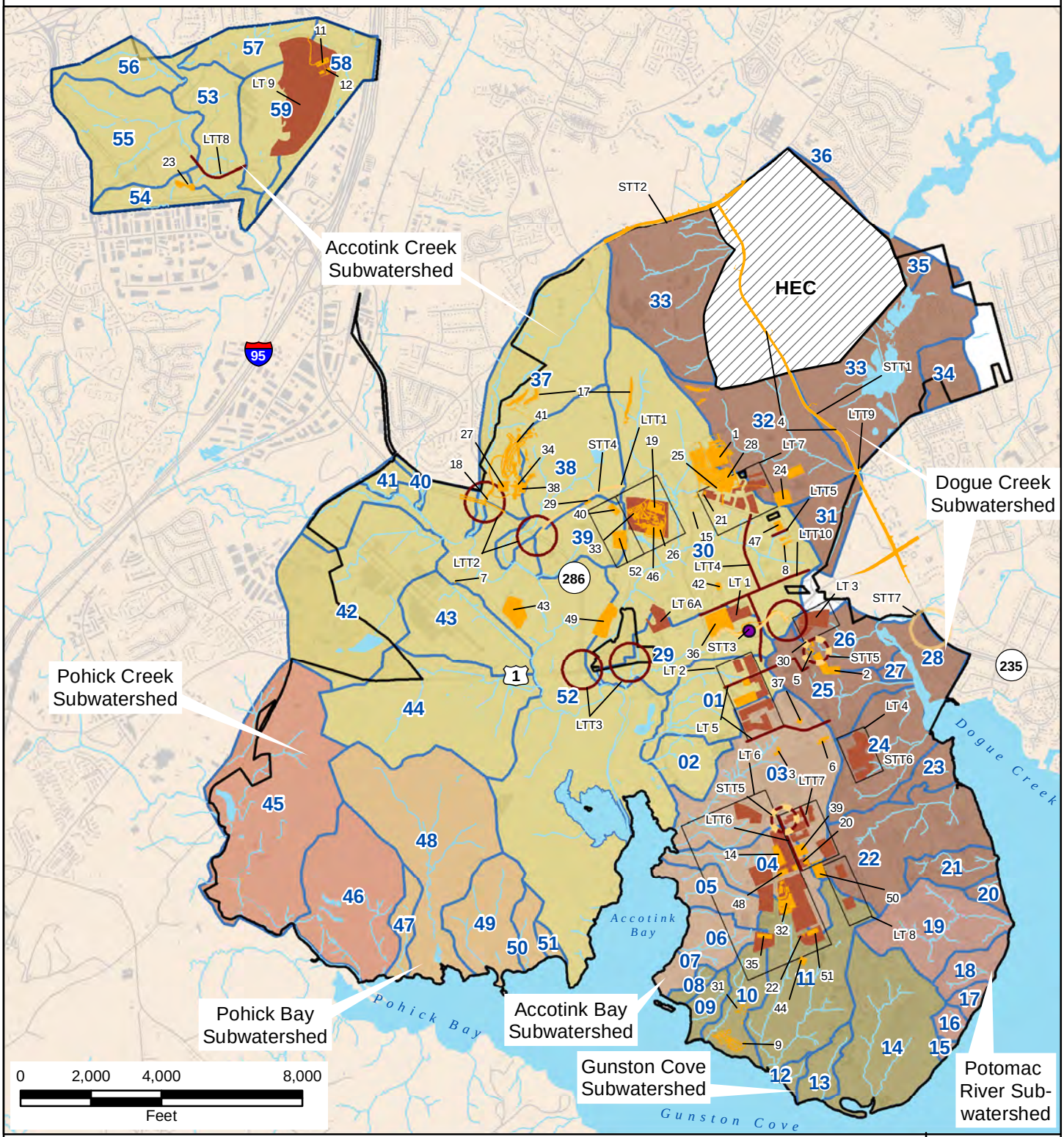
Source: Fort Belvoir GIS

Figure 3.8-1

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Fort Belvoir Subwatersheds



Source: Fort Belvoir GIS

Figure 3.8-2

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Table 3.8-1
Fort Belvoir Watersheds

Watershed	Total watershed surface area (acres)	Percentage of total watershed area within Fort Belvoir	Surface area within Fort Belvoir (acres)	Percent of Fort Belvoir Land Area	Number of subwatersheds within Fort Belvoir
Accotink Creek[a]	33,156	14	4,040	48	20
Dogue Creek	10,883	21	1,713	20	15
Pohick Creek	22,755	3	638	8	2
Gunston Cove	681	100	681	8	7
Accotink Bay	613	100	613	7	5
Pohick Bay[b]	571	100	571	7	5
Potomac River[b]	237	100	237	2	5
TOTAL			8,495	100	59

Notes:
[a.] The FBNA is located entirely within the Accotink Creek watershed.
[b] Total Potomac River watershed surface area shown represents acreage on Fort Belvoir only.
Sources: US Army, 2001a and Fort Belvoir GIS, 2006, as cited in US Army, 2007a.

Other stormwater conveyances on the installation total 44.5 miles. (Fort Belvoir, 2004 as cited in US Army, 2007a). Three manmade ponds and numerous groundwater seeps are also present on the installation (Fort Belvoir, July 2002 as cited in US Army, 2007a).

The INRMP commits Fort Belvoir to follow a watershed approach to land management that acknowledges the relationship of land use and upstream areas with downstream resources (US Army, 2001a). The Virginia Coastal Zone Management Act and Chesapeake Bay initiatives establish far-reaching, natural resources protection policies, strategies, and actions for landholders to undertake throughout the Chesapeake Bay watershed. DoD and Army are signatory agencies to the Chesapeake Bay agreements and have incorporated watershed and tributary protection strategies into the current master plan and INRMP, as well as other installation policies.

3.8.1.2 Surface Water Quality

Federal and State Mandates

The Federal Water Pollution Control Amendments of 1972 — commonly referred to as the Clean Water Act — established the basic structure for regulating discharges of pollutants into waters of the United States. The Clean Water Act contains the requirements to set water quality standards for all contaminants in surface waters. The US Environmental Protection Agency (USEPA) is the designated regulatory authority to implement pollution control programs and other requirements of the Clean Water Act. However, USEPA has delegated regulatory authority for the Clean Water Act to applicable state agencies for the implementation of pollution control programs as well as other requirements of the act. The Clean Water Act and Executive Order (EO) 12088, Federal Compliance with Pollution Control Standards, require federal facilities to comply with all substantive and procedural requirements applicable to point and nonpoint sources of pollution.

Section 438 of the Energy Independence and Security Act of 2007 (EISA) includes a provision requiring federal development projects with a footprint exceeding 5,000 square feet to include site planning, design, construction, and maintenance strategies to maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology (movement and distribution of water) on the property with regard to the

temperature, rate, volume, and duration of flow. As a federal agency, the Army must comply with these requirements.

The Chesapeake Bay Program partnership was established in 1983 as the means to restore the Chesapeake Bay, which had degraded, primarily in response to excess nutrient pollution. Since formation of the program, several written agreements have guided the partnership's pollution reduction and ecosystem restoration efforts. Program partners include the states of Delaware, Maryland, New York, Pennsylvania, Virginia and West Virginia; the District of Columbia; the Chesapeake Bay Commission, a tri-state legislative body; the US Environmental Protection Agency, representing the federal government; and participating advisory groups representing citizens, local governments, and the scientific community.

In 1988, The Virginia General Assembly enacted the Chesapeake Bay Preservation Act (CBPA) to improve water quality in the Chesapeake Bay and other waters of the state by requiring effective land management and land use planning. The act creates a cooperative partnership between state and Tidewater local governments to reduce and prevent nonpoint source pollution. The CBPA sets limits on development within the Chesapeake Bay resource protection areas (RPAs), and sets requirements for removal of nutrients from stormwater from developments in resource management areas.

EO 13508, Chesapeake Bay Protection and Restoration, issued in May 2009, calls on the federal government to lead a renewed effort to restore and protect the Chesapeake Bay. Section 502 of the EO 13508 directs the USEPA to publish "guidance for Federal land management in the Chesapeake Bay watershed describing proven, cost-effective tools and practices that reduce water pollution…." The agency issued final guidance in May 2010 to describe tools and practices that are appropriate to reduce water pollution from a variety of nonpoint sources, and restore and protect the Chesapeake Bay (USEPA, 2010). The guidance addresses nonpoint source pollution relevant to the bay, including that originating from agriculture, urban and suburban development, alteration of the hydrologic characteristics of waterbodies, decentralized wastewater treatment, forestry, and riparian streamside areas. Section 501 of the EO directs federal agencies with ten or more acres within the Chesapeake Bay watershed to implement the Section 502 guidance.

Applicable Standards

The Virginia Department of Environmental Quality (VDEQ) has established surface water quality standards (Table 3.8-2) that protect designated uses for 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. Water quality standards have the dual purposes of establishing the 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 those flowing through Fort Belvoir, are minimally assigned the uses of recreation (e.g., swimming and boating); propagation and growth of a balanced, indigenous population of aquatic life, including the 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).

Table 3.8-2
Virginia Water Quality Standards and Fish Tissue Screening Levels

Water Quality Parameter	Units	Criteria
Water temperature—Class III nontidal waters[a]	ºC	32 (instantaneous maximum)
Dissolved oxygen–Class III nontidal waters	mg/l	4.0 (instantaneous minimum); 5.0 (daily average)
Dissolved oxygen—Class II tidal waters[b]	mg/l	30 day mean > 5.5 mg/l (tidal habitats with 0-0.5 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 < 29oC Instantaneous minimum > 4.3 mg/l at temperatures > 29oC
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

Other Parameters

Parameter	Units	Aquatic life—freshwater acute	Aquatic life—freshwater chronic	Human health—public water supplies	Human health—all other surface waters
Total PCBs (water)[f]	µg/l	NA	NA	0.00064	0.000064
Total PCBs (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:

ºC = degrees Celsius; mg/l = milligrams per liter; µg/l = micrograms per liter; ppb = parts per billion; 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.

Source: 9 VAC 25-260-140

Virginia water quality standards contain general criteria statements and a wide range of numeric water quality criteria for pesticides and polychlorinated biphenyls (PCBs), volatile organic hydrocarbons, acid- and base-extractable organics, other organics, metals, pH, and inorganics, as well as conventional pollutants such as total dissolved solids. Table 3.8-2 lists numeric water quality criteria and fish tissue screening levels for constituents that are of particular interest on the basis of information contained in Virginia's 303(d) list of impaired waters for Fort Belvoir waters.

Streams on Fort Belvoir are Class III nontidal waters, while tidal receiving waters, including the Potomac River, Accotink Bay, Pohick Bay, and Gunston Cove, are designated as Class II waters. The applicable Virginia water quality criteria therefore apply to Class II and Class III waters unless otherwise specified. In addition to Virginia's water quality standards, the Army Regulation 200-1, Environmental Protection and Enhancement (US Army, 2007a), requires installations to conserve, protect, and restore surface water resources (including wetlands, estuaries, streams, lakes, and others).

Clean Water Act Section 303(d) Listing

Section 303(d) of the Clean Water Act requires states 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. Section 303(d) requires the development of Total Maximum Daily Loads (TMDLs) for waterbodies included on the 303(d) list. TMDLs target the load reductions needed to reduce the pollutants of concern (that is, the pollutants causing the impairment to the particular waterbody) for each listed waterbody.

VDEQ has developed TMDL criteria for surface waters as part of the Phase II Chesapeake Bay Watershed Implementation Plan. Virginia, DoD, and other federal agencies will work together in the joint development of a Memorandum of Understanding to meet Chesapeake Bay water quality goals and achieve the necessary reductions called for by the Bay TMDL (Virginia Department of Environmental Quality, 2013a). Table 3.8-3 shows the current status of 303(d)-listed waterbodies or segments of concern to Fort Belvoir, the reasons for listing, and the date of the initial listing.

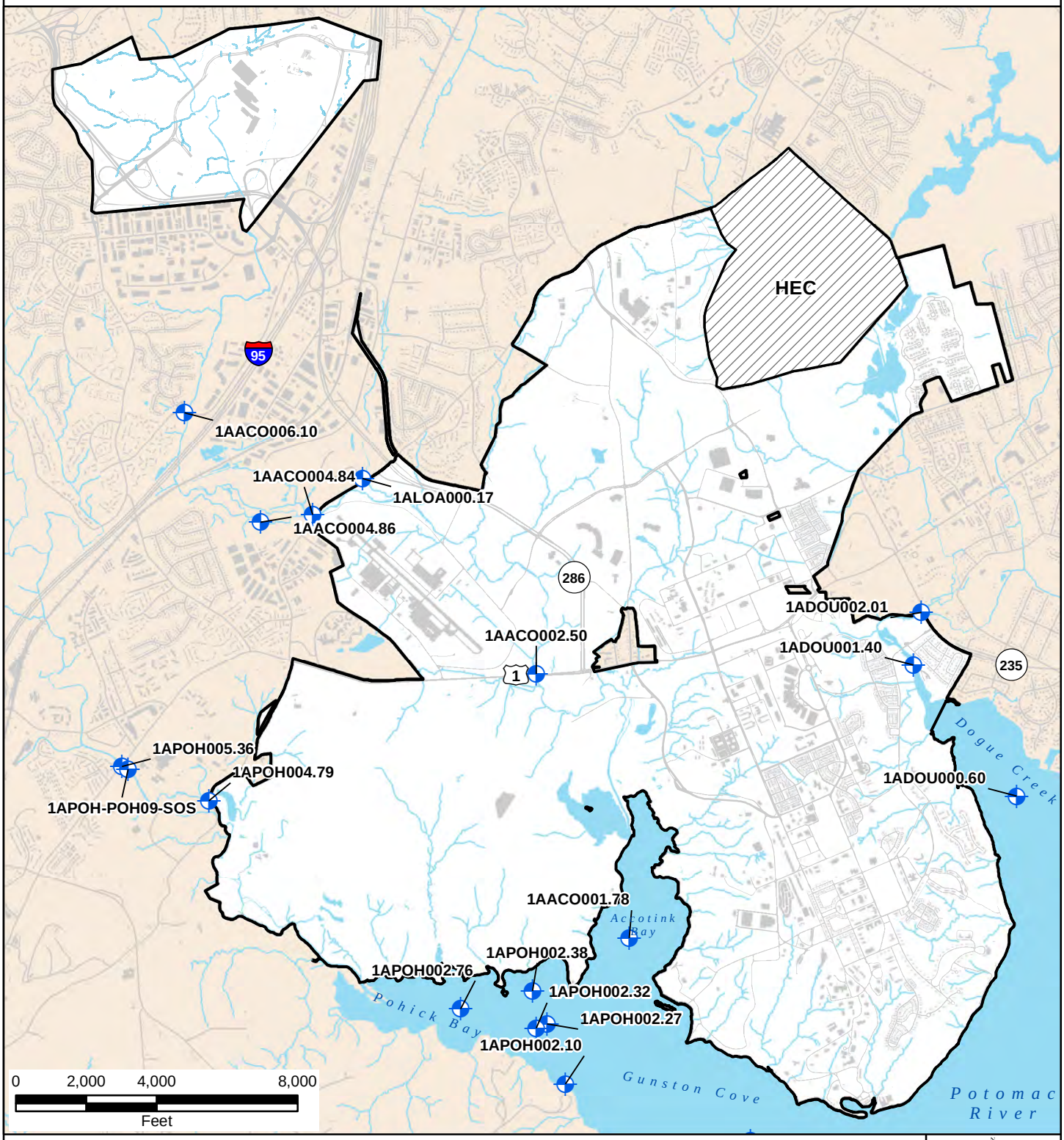
In-Stream Water Quality

Current and historical water quality data for the Fort Belvoir watersheds of Fort Belvoir are available from VDEQ, the Fairfax County Health Department data, and USEPA's Storage and Retrieval database information. In addition, as part of Fort Belvoir's baseline aquatic inventory, water samples were collected during the summer of 1998 and spring of 1999 in all survey locations of the installation's five main perennial waterways: Accotink Creek, Dogue Creek, Mason Run, and two unnamed tributaries. The water samples were analyzed for nutrients, pesticides, metals, and total petroleum hydrocarbons (US Army, 2001a).

Stormwater with its associated pollutants is often collected and conveyed by pipes, ditches, or other drainage structures to its discharge point. For this reason it **is regulated under the Clean Water Act as a point-source discharge.** In reality, it can frequently discharge to waterways as a nonpoint source (where it is allowed to sheet flow directly to a waterway without being collected and conveyed by drainage infrastructure).

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 to support the development of the 303(d) list and to monitor progress as TMDLs are developed and implemented. VDEQ monitoring stations near Fort Belvoir are shown on Figure 3.8-3. The data have generally shown reduced dissolved oxygen levels in Dogue Creek and Accotink Creek (upstream of the post). The Fort Belvoir baseline aquatic inventory sampling showed aluminum, manganese, and iron with total metal concentrations higher than the USEPA chronic aquatic life or human health criteria. Otherwise, none of the components measured were at high levels and some were not detected at all (i.e., pesticides).

Water Quality Monitoring Stations near Fort Belvoir



VDEQ Water Monitoring Stations

Fort Belvoir RPMP EIS

Figure 3.8-3

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Table 3.8-3
303(d)-Listed Waterbodies Within or Downstream of Fort Belvoir

303(d) listed waterbody	Extent	Category[a]	Use Impaired	Impairment Cause (initial list date)
Accotink Creek	Confluence of Calamo Branch downstream tidal waters of Accotink Bay 7.34 river miles	5A	Fish Consumption	PCB in Fish Tissue (2010)
Long Branch	Headwaters of Long Branch downstream to confluence with Accotink Creek. 4.41 river miles	4A	Recreation	*E. coli* (2008)
Pohick Creek	Confluence of South Run downstream to end of free-flowing waters 3.21 river miles	5A	Fish Consumption	Benzo[k]fluoranthene (2002)
	1.52 river miles	5A	Recreation	*Escherichia coli* (2006)
	Begins at the confluence with Sideburn Branch and continues downstream until the confluence with Middle Run 4.94 river miles.	5A	Recreation	*Escherichia coli* (2012)
Pohick Bay	Tidal waters of Pohick Creek, from the boundary of watershed A15, extending to river mile 1.31 in Gunston Cove. Portion of Chesapeake Bay Program segment POTTF[b] (0.61 mi^2).	5A	Aquatic life	pH (2012)
	Segment includes tidal waters of Pohick Creek, from the boundary of watershed A15, and extends until river mile 1.31 in Gunston Cove. Portion of Chesapeake Bay Program segment POTTF (Estuary 0.609 mi^2)			

Notes:

[a.] Category descriptions: Virginia Category 5A. The water quality standard is not attained. The assessment unit is impaired or threatened for one or more designated uses by a pollutant(s) and requires a TMDL (303d list).

Virginia Category 4A. Water is impaired or threatened for one or more designated uses but does not require a TMDL. A new TMDL is not necessary to address the newly identified impaired tributaries if TMDL modeling, source identification and reductions cover the entire watershed and the TMDL has been approved by EPA. These waters are primarily related to shellfish and/or recreational bacteria impairments but could include benthic impairments

[b.] POTTF refers to the Upper Potomac River segment of the Chesapeake Bay Program.

Source: VDEQ, 2012.

The USEPA human health criteria for iron (300 micrograms per liter) and manganese (50 micrograms per liter) are based upon prevention of objectionable taste and laundry staining, not upon adverse toxicological effects. The chronic aquatic criterion for aluminum (87 micrograms per liter) is based upon long-term exposures for striped bass, and is frequently exceeded in natural waters (US Army, 2001a).

Accotink Creek, at 0.8 miles upstream from Fort Belvoir, was part of the US Geological Survey National Water Quality Assessment for the Potomac River Basin from 1992 to 1996 (US Geological Survey, 1998 as cited in US Army, 2007a). The study concluded that concentrations of nutrients and pesticides in streams of the Potomac River Basin are among the highest in the nation, primarily as a result of urbanization.

Habitat condition is one of the primary factors influencing biological condition in a waterway, and the Accotink Creek site exhibited typical urban habitat degradation, including lower bank stability, increased bank erosion, and less riparian (stream bank) vegetation than less degraded sites. These conditions are still prevalent, and contributed to USEPA's development of the Accotink Creek TMDL mentioned above for benthic (stream bottom) impairments.

Pohick Creek and Dogue Creek, although not included in the National Water Quality Assessment, would be expected to have similar situations, although not as severe. Of the three main Fort Belvoir watersheds, the Dogue Creek watershed contains most of the present housing areas on Fort Belvoir and has undergone the most intensive development (Fort Belvoir, 2005b). However, the Huntley Meadows area, Jackson Miles Abbott Wetland Refuge in the upper reaches of Dogue Creek, and a chain of stormwater ponds in Pohick Creek help moderate stormwater flows and biological conditions by slowing storm flows and absorbing nutrients (US Army, 2001a).

3.8.1.3 Current Pollutant Sources

On Fort Belvoir, stormwater runoff is a major source of water pollution. Runoff is generated by precipitation falling on impervious surfaces such as pavement or buildings. It picks up sediments with attached pollutants such as nutrients, fecal matter, fertilizers, pesticides, oil and grease, and carries these pollutants to the waterway to which it drains. The percentage of impervious surface area in a watershed is related to the water quality characteristics of that watershed; the threshold where indicators of stream quality shift toward degraded water quality is around 10 to 20 percent impervious cover (Center for Watershed Protection, 2003 as cited in US Army, 2007a).

As of 2011, on Main Post, the Accotink Bay, Gunston Cove, and Accotink creek watersheds have the highest percentage of impervious surfaces, at 26, 17, and 15 percent, respectively. The Dogue Creek and Potomac River watersheds are 14 and 12 percent impervious, respectively. Because the Accotink Creek and Dogue Creek watersheds are the two largest watersheds on the installation, covering 4,040 and 1,713 acres, respectively (US Army, 2007a) they have the largest overall amount of impervious surface area. In addition, the FBNA, which drains to Accotink Creek, is now 12 percent impervious (US Army, 2014a). The waters to which these watersheds drain, therefore, are understandably the most impaired in terms of water quality.

The Pohick Creek and Pohick Bay watersheds are each less than one percent impervious. Unlike the Pohick Creek watershed, the Pohick Bay watershed originates on and is entirely contained within Fort Belvoir. Only 0.01 percent of the Pohick Bay watershed is impervious, and over 93 percent is covered by forest lands (US Army, 2001a). The Pohick Bay watershed is therefore considered an intact watershed, as shown on Figure 3.8-2.

The National Pollutant Discharge Elimination System Program under Section 402 of the Clean Water Act requires permits for the discharge of pollutants from point sources. The National Pollutant Discharge Elimination System program in Virginia (referred to as the Virginia Pollutant Discharge Elimination System or VPDES Program) is administered by VDEQ. VDEQ regulates point source dischargers such as manufacturing and wastewater treatment plants as well as discharges of stormwater from construction activities and municipal separate storm sewer systems (MS4s) through the Virginia Stormwater Management Program (VSMP).

Fort Belvoir has a municipal separate storm sewer system (MS4), the discharge from which is permitted by VPDES MS4 Stormwater Permit (No. VAR040093). All development on the Main Post, and the BRAC-related development on the FBNA is included under this MS4 permit. Fort Belvoir also has a current VPDES Industrial Stormwater General Permit (No. VAR051080 – expires on June 30, 2019) that specifically covers stormwater runoff from DAAF, and has applied for an industrial stormwater permit for other portions of the installation (Draft Permit No. VA0092771). Once the new permit is approved, it will cover the entire installation (Harback, pers. comm., June 20, 2012 and January 14, 2015).

Additional stormwater permits have been issued for the installation for stormwater discharges associated with remediation of petroleum-contaminated sites, including permits issued for remediation of the M-26 petroleum spill at FBNA (Russell, pers. comm., July 24, 2013; Fort Belvoir, 2005b; US Army, 2003, as cited in US Army, 2007a; Cremeans, pers. comm., June 20, 2012). Three of these permits are still active (VAG830286 for Building 1124 and VAG830091 for Building 3161 on the Main Post, and VAG830400 for the site of former Buildings 2209 and 2217) (Couch, pers. comm., January 24, 2012; Wallen, pers. comm., June 20, 2012).

Also of note, Fort Belvoir is 0.5 mile downstream on Pohick Creek of the Noman M. Cole, Jr. Pollution Control Plant. This facility treats approximately half of Fairfax County's domestic and commercial wastewater flow and has a treatment capacity of 54 million gallons per day (Water and Wastewater.com, 2012). The plant discharges effluent to Pohick Creek under VPDES permit number VA0025364. As a result, water quality and flow conditions in the lower reach of Pohick Creek adjacent to Fort Belvoir may be influenced by discharges from the wastewater treatment plant (US Army, 2001a).

3.8.1.4 Pollution Control Strategies

Fort Belvoir reviews all construction site plans affecting over 2,500 square feet for compliance with the state's Stormwater Management Act (by incorporating the approaches in the Virginia Stormwater Management Handbook), Erosion and Sediment Control law (by incorporating the approaches in the Virginia Erosion and Sediment Control Handbook), the Fairfax County Public Facilities Manual, and the installation's MS4 permit conditions. Fort Belvoir also must comply with the following water pollution control strategies.

Virginia Stormwater Management Program (VSMP) Permits

Construction activities affecting an acre or greater must obtain a Virginia Stormwater Management Program construction general permit and develop and implement a site specific stormwater pollution prevention plan. (VDEQ, 2014). To obtain a Virginia Stormwater Management Program permit, the project proponent must develop a Stormwater Pollution Prevention Plan based on the stormwater management measures in the approved site plan, and demonstrate how these would be maintained for the duration of the construction period, as well as who would be responsible for their maintenance.

Energy Independence and Security Act (EISA)

The USEPA Technical Guidance for Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of EISA (USEPA, 2009) sets a goal that is more rigorous than the Fairfax County and Virginia state stormwater management regulations in that it requires every technically feasible measure to maintain pre-development site hydrology by retaining rainfall onsite through evaporation/transpiration, infiltration, and re-use.

USEPA guidance indicates two options to meet Section 438 requirements:

- Retain the 95th percentile rain event, using practices that manage rainfall onsite and prevent off-site discharge from all rainfall less than or equal to the 95th percentile rain event, to the maximum extent technically feasible.
- Develop a site specific hydrologic analysis which would determine pre-developed hydrologic conditions (runoff rate, volume, duration and temperature) and match them by replicating pre-development hydrology. This would use similar methods as described above for infiltration, evapotranspiration and rainwater harvesting (US Army, 2014a).

While the application of this new guidance is for projects exceeding 5,000 square feet of disturbance (greater than the 2,500 square feet that triggers the need for a Virginia Stormwater Management Program

permit), it is likely to require larger areas devoted to stormwater management as part of each development project, and higher construction costs.

The requirements of EISA 438 have been reinforced by EO 13514, Federal Leadership in Environment, Energy, and Economic Performance, which directed federal agencies to "lead by example" to address a wide range of environmental issues, including stormwater runoff. Compliance with these requirements would essentially eliminate pollution by stormwater from any future construction projects at Fort Belvoir.

Chesapeake Bay Resource Protection Areas, Fort Belvoir Riparian Buffers, and Environmental Quality Corridor

Fort Belvoir also complies to the extent practicable with the Chesapeake Bay Local Assistance Division regulations, and recognizes Chesapeake Bay resource protection areas on the installation (Figure 3.8-1). The purpose of the resource protection area is to maintain or restore a vegetated buffer between development and tributaries to the Chesapeake Bay, with the assumption that such a buffer traps nutrients and pollutants in runoff before it reaches the Bay.

Fort Belvoir has an estimated 2,700 acres of Chesapeake Bay RPAs (US Army, 2014a). RPAs include:

- Tidal wetlands.
- Nontidal wetlands connected by surface flow and contiguous to tidal wetlands or water bodies with perennial flow.
- Tidal shores.
- Such other lands considered by the local government to meet the provisions of subsection A of this section and to be necessary to protect the quality of state waters.
- A buffer area not less than 100 feet in width located adjacent to and landward of the components listed in subdivisions 1 through 4 above, and along both sides of any water body with perennial flow. The full buffer area shall be designated as the landward component of the Resource Protection Area notwithstanding the presence of permitted uses, encroachments, and permitted vegetation clearing in compliance with Part IV (9 VAC 25-830-120 et seq.) of this chapter (9 VAC 830-80).

Fort Belvoir has also included the 100-year floodplain as part of the buffer. The buffer extends 100 feet or to the landward limits of the floodplain, whichever is greater.

Development in RPAs is restricted (with certain exceptions; for instance, redevelopment is an allowed use in RPAs) to water dependent activities, maintenance of public facilities, passive recreation, water wells, and historic preservation. Development within resource management areas must use best management practices to reduce nutrients in stormwater discharges.

The **Chesapeake Bay Preservation Ordinance** was enacted pursuant to the **Chesapeake Bay Preservation Act (CBPA**), Sections 10.1-2100, et seq., of the Code of Virginia (VAC). The CBPA sets limits on development within the Chesapeake Bay resource protection areas (RPAs), and sets requirements for removal of nutrients from stormwater from developments in resource management areas.

Fort Belvoir has also adopted a policy of protecting its intermittent streams through preservation of stream buffer areas ("riparian buffers") 35-feet wide. While riparian buffers are not subject to the Chesapeake Bay Local Assistance Division regulations, the post preserves these riparian areas as much as possible, to maintain habitat and water quality within the stream.

As a mitigation measure for the BRAC 2005 projects, Fort Belvoir, in recognition of the land conditions and sensitivity of the riparian area along Accotink Creek, followed Fairfax County's Environmental Quality Corridor delineation method, with further modification, to lay out a Conservation Corridor along Accotink Creek within the FBNA. The limits of the Conservation Corridor are based on the presence of streams,

floodplains, steep slopes, and wetlands, but the Accotink Creek Conservation Corridor is more expansive – Fort Belvoir expanded the corridor to include all the sensitive slope area, to the top of the slope.

3.8.1.5 Current Stormwater Management

The previous section outlines the state and federal requirements for managing stormwater from a perspective of protecting water quality. The Stormwater Management Act, Virginia Stormwater Management Handbook, and EISA 438 also address issues of stormwater quantity and control of discharge rates to avoid downstream flooding and channel erosion (which leads to water quality degradation) and property protection. Only about one-half of the developed areas on Fort Belvoir, including parking lots and roadways, are served by stormwater management facilities; because of the age of some of the developments, over one-half of the impervious surfaces on Fort Belvoir drain directly to streams. This unmetered flow is partially responsible for the significant erosion seen in many of the streams (Paciulli Simmons and Associates, Ltd., 2012).

As outlined in Section 3.8.1.3, stream condition surveys conducted by ENRD and the Waterways Experiment Station noted the following stormwater management problems that were contributing to the transport of sediments, nutrients, and other pollutants to downstream waters:

- Erosion and gullying downstream of storm sewer outfalls, sometimes exposing utility lines
- Deeply incised channels indicating extreme flow conditions, unstable stream banks and abnormal channel evolution
- Stormwater management facilities not designed to provide water quality control.
- Ineffective, historical stormwater mitigation strategies, such as dumping of concrete debris to remediate problem erosion sites in streams
- Inadequate design of the stormwater system for handling storm flows from large areas of impervious surfaces

Fort Belvoir has been using the construction permitting process, particularly the construction resulting from BRAC 2005, to correct some of these deficiencies, including upgrading and retrofitting inadequate stormwater management facilities for older developments that predated stormwater management regulations. Problem areas still exist, but unmanaged stormwater has been greatly reduced over pre-BRAC conditions. As of 2013, the stormwater infrastructure inventory included 196 management facilities installed on the post. These facilities include 84 detention ponds, 51 bio-retention systems and rain gardens, 22 bioretention filter boxes, 35 underground detention/infiltration structures, 3 cisterns and 1 large sand filter (Russell, pers. comm., July 24, 2013). Recent facilities constructed as part of BRAC added stormwater management facilities to improve water quality and reduce stormwater runoff quantity. Stream restoration projects (Section 3.8.1.7) also corrected some deficiencies in stormwater outfalls. The Fort Belvoir Community Hospital and road infrastructure projects have also provided design and restoration for eroded stream channels. Compliance with the MS4 permit requires tracking and reporting of maintenance for all stormwater management facilities on post to ensure that the facilities continue to function as designed (Russell, pers. comm., July 24, 2013).

3.8.1.6 Floodplains

Fort Belvoir is required under EO 11988, Floodplain Management (May 24, 1977, amended by Executive Order on January 15, 2015) to evaluate any potential effects of any action occurring in a floodplain (US Army, 2001a). The displacement of flood storage capacity through placement of fill in the floodplain can affect flooding levels up- and downstream of the fill area. Approximately 1,540 acres of the installation are within a 100-year floodplain of a waterway (Fort Belvoir GIS, 2006; FEMA, 1990, as cited in US Army,

2007a; US Army, 2014a). Notable floodplains on the installation occur along Pohick, Accotink, and Dogue Creeks and their larger tributaries, and along the Potomac River.

Figure 3.8-1 shows the 100-year floodplains on Fort Belvoir. These areas represent where flooding would occur during a flood event with a probability of once in 100-years or more frequently, based on modeling provided by the US Army Corps of Engineers and the Federal Emergency Management Agency.

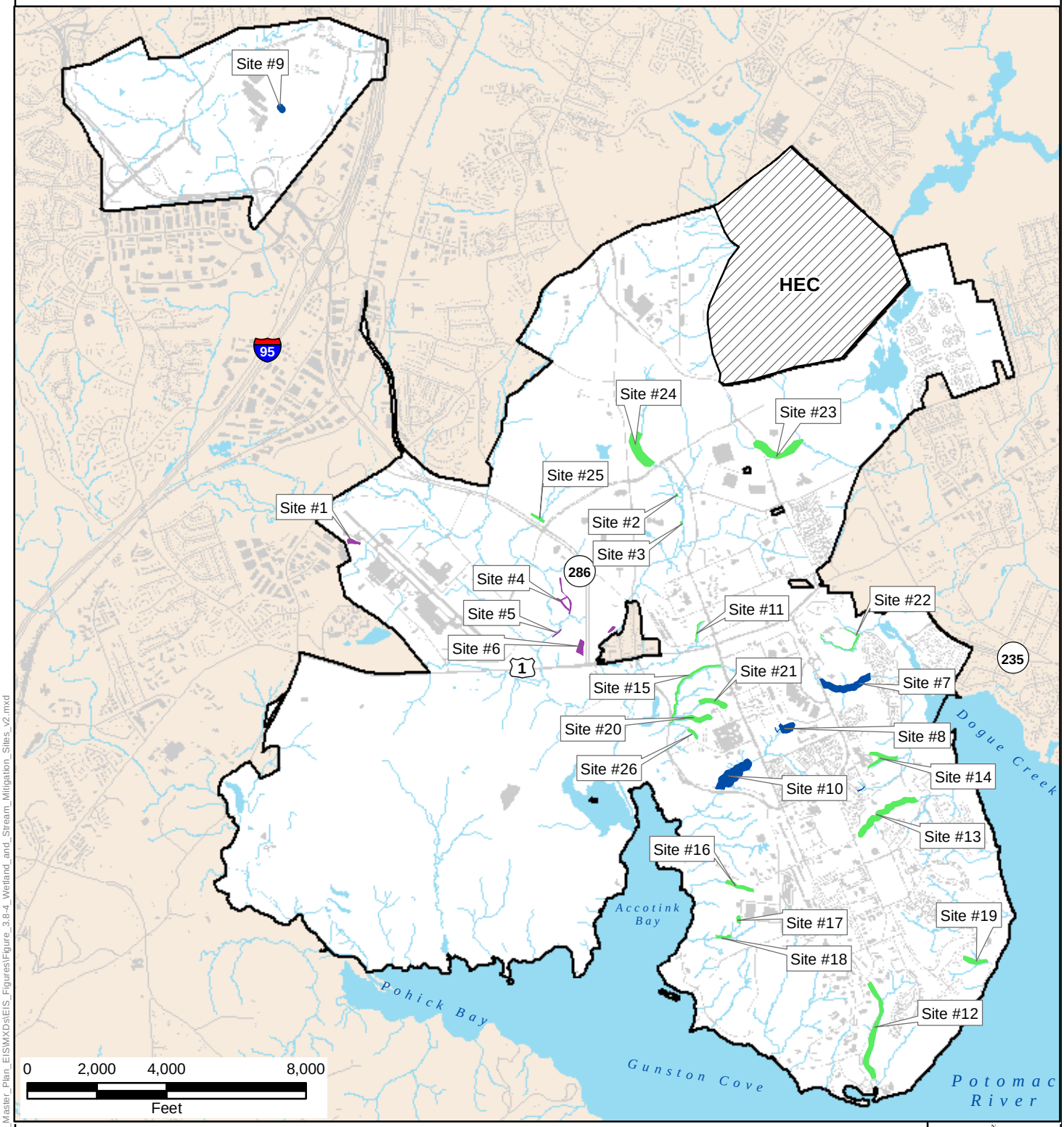
3.8.1.7 Completed and Proposed Mitigation Sites

Fort Belvoir has, or is in the process of, establishing over two dozen stream and wetland mitigation sites. These are being set aside or constructed as mitigation for NEPA actions such as the BRAC 2005 actions (US Army, 2007a), or are permit requirements for the construction of other installation programmed projects. Figure 3.8-4 shows the location and purpose of these sites (stream or wetland mitigation), which are briefly described in Table 3.8-4.

Table 3.8-4
Completed and Proposed Stream and Wetlands Mitigation Sites

Site #	Location	Description	Status
1	Davison Army Airfield	Approximately 1 acre of Palustrine Emergent (PEM) Wetland Mitigation.	Completed
2	Mason Run Crossing 3	Stream Restoration	Concept Design
3	Mason Run Crossing 4	Stream Restoration	Concept Design
4	West of Fairfax County Parkway	Approximately 1.5 acres of Palustrine Forested (PFO) Wetland Mitigation - Plantings (Sites 4, 5, and 6 were completed to offset impacts of Fairfax County Parkway construction)	Completed
5	West of Fairfax County Parkway	Approximately 1.5 acres of PFO Wetland Mitigation - Plantings (Sites 4, 5, and 6 were completed to offset impacts of Fairfax County Parkway construction)	Completed
6	Intersection of Fairfax County Parkway and US Route 1	Approximately 2 acres of constructed PFO Wetland Mitigation (Sites 4, 5, and 6 were completed to offset impacts of Fairfax County Parkway construction)	Completed
7	Surveyor Road	Stream Restoration	Completed
8	Hospital, Warrior Transition Unit, 6th St.	Stream Restoration	Completed
9	Fort Belvoir North Area	Stream Restoration	Completed
10	Herryford Village	Stream Restoration to offset BRAC Roads/Infrastructure	Completed
11	Meade Road	Severely incised stream and failing culvert outfalls. Project was designed using natural channel design, drop structures and new road culvert. Currently under construction.	Proposed
12	Totten Road	Severely incised stream with active erosion, wrong sized culverts and failing outfalls. Project is currently under design. Design would employ natural stream design, appropriate sizing of culvert crossings and new outfall structures.	Proposed

Completed and Proposed Wetland and Stream Mitigation Sites



Mitigation

Mitigation Site Status

- Stream Mitigation Site - Completed
- Stream Mitigation Site - Proposed
- Wetland Mitigation Site - Completed

- Short-Term Improved/New Road
- Long-Term Improved/New Road
- Short-Term Project Sites (Construction FY 2012 - 2017)
- Long-Term Project Sites (Construction FY 2018 - 2030)

Fort Belvoir RPMP EIS

Figure 3.8-4

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Table 3.8-4
Completed and Proposed Wetland and Stream Mitigation Sites (Continued)

Site #	Location	Description	Status
13	Gillespie and Hurley Roads	Actively incising stream. Streambanks mainly alluvial material with areas of saprolite. A design is being prepared by the US Army Corps of Engineers (USACE) to stabilize the area using natural stream design techniques at and upstream of the sewer and waterline crossings that is actively eroding. Lower portion has flows on clay and no additional work is included for this portion due to cost/benefit balance.	Proposed
14	Behind Dewitt Hospital	Stream is actively downcutting and undercutting trees. The design would employ natural stream design. The stream is currently being designed by the USACE.	Proposed
15	Between 1st and 3rd Streets	Stream is actively downcutting and headcutting. Culvert under the railroad bed is also being evaluated. The stream is currently being designed by the USACE, using natural stream channel design.	Proposed
16	Tracy Loop Pond Stream	Stream is actively headcutting toward the stormwater management pond and is actively downcutting, with undercutting of trees and substantial sedimentation of downstream reach. The stream is currently under design by the USACE. The USACE would use natural stream design techniques and provide for additional dissipation of energy.	Proposed
17	Tracy Loop South	Headcutting and erosion. The project is intended to stabilize the headwater area using natural stream design techniques to prevent further degradation downstream.	Proposed
18	Between Morrow Road and Tracy Loop	The stream has severely downcut and is actively eroding, undercutting trees at the indicated location. The stream is intended to be designed using natural stream design to restore the stream at this location, the confluence of several headwater tributaries.	Proposed
19	Patrick Beach	The stream is severely eroding and a large amount of sediment is continuously washed down toward the Potomac River. The project is intended to use natural stream design to stabilize and restore the stream. The stream is at a fairly steep slope conveying water from Belvoir Village to the Potomac River.	Proposed
20	Jackson Loop South	The upper half of the stream is actively downcutting, undercutting trees, and transporting sediment downstream. The project is intended to restore the stream using natural stream design.	Proposed
21	Jackson Loop North	This stream is intermittently downcutting and has a varying size of headcuts along the stream reach. The stream restoration is intended to address the intermittent areas of	Proposed

Site #	Location	Description	Status
		downcutting and prevent the headcuts from moving farther upstream. The project is intended to employ natural stream design and repairs only in the affected areas.	
22	Old Washington Road	The stream has severely downcut at the reach between the Child Development Center and Fisher House. The stream has a large headcut and the soils are highly erodible. The reach is intended to be designed using natural stream design techniques. A conceptual assessment was completed by the USACE in 2011 that included plunge pools, treatment at culvert outfalls, and restoration. The other stream reach adjacent to Old Washington Road requires some spot treatments and the area at the Old Washington Road was suggested to be repaired by adding wetlands and improving or removing the road crossing.	Proposed
23	Woodlawn Road	Severe erosion along the majority of the stream, undercutting mature trees and incised banks are common. The project is intended to use natural stream design to restore the stream. Also, the culvert under Woodlawn Road and the outfall need to be evaluated.	Proposed
24	Golf Course Reach of Mason Run	Upstream of J.J. Kingman Road is a large headcut that is working upstream; the stream is entrenched. The USACE evaluated this stream reach in 2011 and determined that the best solution would be to create a series of connected vernal pools and wetland pockets and relocating the stream to the center instead of building the stream up. The headcut is approximately 3,000 linear feet upstream of J.J. Kingman Road.	Proposed
25	Stream at NMUSA	A concept design was completed by the USACE for DPW and this was submitted to the NMUSA project for further design. The design includes the removal of the culvert and the old railroad bed and creation of a natural channel with wetlands pools. This project would restore the stream channel and restore access to the Forest and Wildlife Corridor for wood turtles.	Proposed
26	Sharon Lane Road	A portion of the stream is a concrete flume that abruptly ends in a natural channel that contains riprap. Past the riprap is a large headcut that is working towards the concrete flume. The stream below is deeply incised and severely eroding. The sediment is accreting downstream in the wetland area, placing large amounts of sand and silt into the wetlands and the braided stream system. The stream was evaluated by the USACE and the recommendation was to remove the concrete channel and create a natural stream bed with instream structures, using natural stream design to control the erosive forces.	Proposed

The sites represent sections of stream that have been severely degraded, where restoration measures would benefit habitat both within the identified section and downstream. They also represent wetland areas where restoration measures would improve habitat, or where wetlands could be created to benefit water quality and habitat. As projects are evaluated and wetland/waterway permit mitigation requirements identified, these mitigation requirements are matched with work that needs to be done in these restoration or development areas. Wetlands mitigation projects are legally binding agreements between the Army and the governing state and federal agencies responsible for regulating these protected resources. They are not open for development (US Army, 2014a). At this time, while some of the work has been done as the result of BRAC 2005 actions and other projects at Fort Belvoir, there is much more work to be done in terms of restoring these areas and improving habitat and water quality (Vega, pers. comm., July 24, 2013).

3.8.2 Environmental Consequences of the No Action Alternative

Implementation of the No Action Alternative would cause no effects on Fort Belvoir watersheds or the quality of the surface waters that flow within or through the installation. However, it would forego the opportunity to use the permitting process to correct ongoing watershed and water quality problems caused by past development practices, prior to the adoption of the Fairfax County and Virginia state stormwater management regulations and EISA 438.

3.8.2.1 Fort Belvoir Watersheds

Implementation of the No Action Alternative would have no effect on Fort Belvoir watersheds. However, it would obviate the need for stream and wetland mitigation projects -- much of the funding for corrective actions such as streambank and streambed stabilization comes from wetland permit mitigation requirements. Therefore, potential improvements to watersheds would not be completed as envisioned in the Proposed Action.

3.8.2.2 Surface Water Quality

The No Action Alternative would have no effect on surface water quality. However, it would defer to the future the redevelopment of existing disturbed sites in accordance with EISA 438 (federal) and the most current Virginia stormwater regulations, and therefore miss the opportunity to upgrade stormwater management on these sites. Implementation of BRAC 2005 and other recent projects have corrected some historic stormwater management deficiencies by upgrading and retrofitting developed areas that predated stormwater management regulations. The recent projects have also contributed to the stream restoration projects (Figure 3.8-4) as mitigation requirements of their approval. EISA 438 is meant to provide restoration of pre-development hydrology as much as possible when sites are redeveloped. Because most of the projects envisioned under the RPMP would be directed to the older, previously developed and disturbed areas of the installation, the new requirements and current technology and methods could do utilized and do much to correct ongoing problems. This would not happen under the No Action Alternative.

3.8.2.3 Chesapeake Bay Resource Protection Areas, Fort Belvoir Riparian Areas, and the FBNA Accotink Creek Conservation Corridor

The No Action Alternative would have no effect on Chesapeake Bay RPA riparian buffers along intermittent streams (Section 3.8.1.4).

3.8.2.4 Floodplains

The No Action Alternative would have no effect on floodplains (Section 3.8.1.6).

3.8.3 Environmental Consequences of Alternative 1 – Full Implementation – The Preferred Alternative

3.8.3.1 Fort Belvoir Watersheds

Implementation of the RPMP construction projects would physically impact Fort Belvoir watersheds by changing topography, exposing soils to erosion, and changing the capacity of these watersheds to receive rainwater via infiltration. Without mitigation, an increase in impervious surface in a watershed can lead to an increase in the amount and rate of stormwater runoff and to changes in the hydrology of the watershed and its receiving streams. The potential impacts of the proposed action on watersheds would be:

- Temporary ground disturbance and exposed soils during construction (short-term impacts).
- Long-term changes in the extent of pervious and impervious surfaces (long-term impacts).
- An increase in the amount and rate of stormwater runoff, if no mitigation measures are taken.

The threshold for significance for impacts to watersheds would be if the individual project increased the overall imperviousness of the watershed by more than one percent, and hence the potential for unmitigated stormwater runoff, or the RPMP projects cumulatively increased imperviousness more than two percent, or if the project causes the watershed to cross the 10 to 20 percent impervious cover threshold associated with a degradation of stream quality (Center for Watershed Protection, 2003, as cited in US Army, 2007a).

Short-Term Projects

Implementation of the Alternative 1 short-term projects would individually and cumulatively have short- and long-term, less than significant adverse effects on Fort Belvoir's watersheds. In no case would the short-term projects cause any of the Fort Belvoir watersheds to exceed the 10 to 20 percent imperviousness threshold associated with a shift to degraded water quality (Center for Watershed Protection, 2003, as cited in US Army, 2007a), although five (Accotink Bay, Gunston Cove, Accotink Creek, Dogue Creek and Potomac River) of the seven watersheds already exceed this threshold. Of the short-term projects, the vast majority are located in the Accotink Creek watershed. Projects ST 3, 14, 20, 32, 35, 37, 39, 48 and 59 would drain directly to Accotink Bay; projects ST 9, 22, 31, 44, and 51 would drain to Gunston Cove; and, projects ST 2, 5, 6, 14, 30 and the southeast portion of 28 would drain to Dogue Creek. In no instance would the increase in imperviousness reach, let alone exceed, one percent.

Implementation of the master plan design standards for stormwater management, which are derived from the various applicable regulatory standards and guidance such as EISA Section 438, EO 13514, the Chesapeake Bay Program and EO 13508 guidance, and the Virginia Stormwater Management Regulations, would counteract this small increase, particularly through the use of low impact design features.

Some of these projects because of their nature (e.g., ST 14, the Regional Stormwater Management Facility, and ST 44, the Replacement Ball Fields) or because of their locations on impervious surfaces (e.g., ST 48, the INSCOM Controlled Humidity Warehouse), would not result in any long-term increase in impervious surfaces. In fact, the proposed Regional Stormwater Management Facility would collect stormwater from a number of other facilities, thus improving stormwater management on upper South Post by allowing sediment to settle, improving water quality, and reducing the velocity of flows enters nearby streams.

Two projects, ST 16 (the PX Demolition) and ST 50 (the Vehicle Maintenance Shop) would actually decrease the amount of impervious surface at those locations by 3.2 and 2.3 acres respectively, and would help compensate for some of the increase in impervious surface that would result from other projects within the Accotink Creek and Accotink Bay watersheds. Cumulatively, the projects over the entire Fort Belvoir and FBNA land area would result in a net increase of impervious surface of 88.7 acres. The breakdown by watershed is shown in Table 3.8-5.

Table 3.8-5
Net Increase in Impervious Surface by Watershed – Short-term Projects[1]

Watershed	Short-Term Projects	Net Increase in Impervious Surface (acres)	Percent Change in Watershed Imperviousness	Current Watershed Imperviousness (approximate %)
Accotink Creek	1, 7, 8, 11 - 13, 15-19, 21, 23-29, 33-34, 36, 38, 40-43, 45-47, 49 and 52	57.3	0.17	15
Dogue Creek	2, 4, 5-6, and 30	24.3[2]	0.22	14
Pohick Creek		0	0	<1
Gunston Cove	9, 22, 31, 44, 51	3.0	0.44	17
Accotink Bay	3, 14, 20, 32, 35, 37, 39, 48 and 50	4.1	0.68	26
Pohick Bay		0	0	<1
Potomac River		0	0	1
Total		88.7		

Notes:
[1]Breakdown by project shown in Table 2-2.
[2] 20 acres attributable to the Mulligan Road/Telegraph Road Widening Projects

None of the projects, individually or cumulatively, would increase the imperviousness of the subwatershed by as much as one percent, nor cause a watershed to cross the threshold for degradation. In addition, all Fort Belvoir projects would compensate for any increases in imperviousness – and any stormwater generated – on site through control of both stormwater quantity and quality in accordance with EISA 438, EO 13514, the federal/state/local Chesapeake Bay Program and EO 13508, and the Virginia Chesapeake Bay Preservation Act and Virginia Stormwater Management Regulations. Stormwater best management practices (BMPs) are employed for Fort Belvoir projects to slow down stormwater to give it time to infiltrate into soils on site or to retain and release stormwater so that it enters waterbodies more slowly. During construction erosion and sedimentation control BMPs may include measures such as temporary silt fences, hay bales, temporary dams, and rapid reseeding of exposed soils to prevent erosion and slow stormwater flows. When construction is completed, BMPs may include engineered structural solutions, such as stormwater retention ponds or underground vaults or large pipes that hold rainwater and release it slowly. These solutions would collect rainwater from building roofs or sweeping across a parking lot during a storm, and slow its velocity so that it does not erode receiving streams. These measures can generally be sized large enough to not only control the discharge rate of stormwater but to actually treat the stormwater through settlement of suspended solids, excess nutrients, and other contaminants.

BMPs can also include an array of low impact development (LID) measures developed in the last two decades that mimic a site's predevelopment hydrology by using project design techniques that allow rainwater to soak into the ground, evaporate into the air, or be collected for other uses such as irrigation close to the source. Examples of LID measures include rain gardens, cisterns, vegetated buffers, grass swales, and permeable and porous pavement. LID measures can capture the first flush before excess stormwater is diverted into traditional stormwater conveyance systems (USEPA, 2013g).

Some examples of stormwater management measures planned for/being implemented as part of the short-term projects include:

- ST 19 (Phase 1 of the INSCOM headquarters expansion). The Army plans to construct a five–story parking structure (at considerably greater expense than a surface parking area) to minimize the amount of impervious surface required to meet its parking needs. The project would provide a dry stormwater detention basin BMP-compliant with the Virginia Stormwater Management Regulations

and the Fairfax County Chesapeake Bay Preservation Area regulations, and a rain garden (a LID feature) near the new parking garage, to manage both the quantity and quality of stormwater released. There are also plans to retrofit an existing stormwater (wet) pond to handle more stormwater flow. The new detention basin and rain garden would be installed during Phase 1 of the four-phased project, so that the stormwater management measures would be in place during construction of the other phases. During construction of Phase 3 of the project (ST 33), 30 percent of the new roof would be constructed as a green roof, and another 30 percent as a roof top garden. Both are LID measures meant to retain stormwater on site and reduce the amount of stormwater runoff generated by the new buildings and pavement. The overall site design would employ additional LID measures in the form of vegetated swales along roadways and parking areas where practicable.

- ST 4 (Mulligan Road Phase II). Stormwater BMPs used in the design include LID features such as vegetated swales where possible and where right-of-way was available, as well as several stormwater management ponds. An alignment along a ridge line was chosen to minimize the amount of non-roadway drainage that would have to be managed in the stormwater management facilities, which is a LID measure designed to make maximum use of the existing site hydrology (USDOT, FHWA, Eastern Federal Lands Highway Division, 2006c).
- Projects ST 1 and ST 28 (the new PX and Commissary). The design for this shared site routed stormwater from replacement pavement and buildings through separate engineered stormwater BMP facilities before being discharged into surface streams. Stormwater quantity and quality controls were provided with a structural detention system (an underground vault or large pipes with sufficient storage capacity to hold the stormwater generated by the development and release it slowly) located in the front parking bay. This ensures that the receiving streams have an "adequate outfall," in accordance with the requirements of the Virginia Stormwater Act, the Virginia Stormwater Management Program Permit regulations, and the Fairfax County Public Facilities Manual. ("Adequate outfall" is a receiving channel of sufficient size and stability that the outflow from the BMP would not erode it, causing sedimentation downstream.) (US Army, 2010a).

The net increase in impervious surface that would be caused by the short-term transportation projects is shown in Table 3.8-6. Short-term transportation projects STT 1, 2, 3, 4 would be located on the North Post and within the Accotink Creek watershed. Projects STT 1 (Mulligan Road Phase II), STT 2 (Telegraph Road Improvements) and STT 3 (Lieber Gate Access Control Point) would contribute an additional 26 acres of impervious surface, but this acreage has been counted in the 88.7 acres for short-term projects (Tables 2.2 and 3.8-4). Projects STT 5, half of 6, and 8 would be on the South Post. The STT 5 Transit Hubs would be built either in the Accotink Bay or the Dogue Creek watershed. STT 6, the (On-Post Intersection Improvements Projects), would occur at existing intersections on North Post in the Accotink Bay watershed, and on South Post in the Dogue Creek watershed.

The short-term transportation projects cumulatively (over the entire Main Post and FBNA land area) would result in a net increase of impervious surface of 3 to 4 acres, which is a fraction of a percent increase over current imperviousness and a less than significant adverse effect. This increase, broken down by watershed, is shown in Table 3.8-6.

The estimated total of 1 acre for STT 6 includes a conservative assumption that the improvements can each be designed with no more than 0.5 acre of new impervious surface. These improvements may not require anything more than new traffic signals or adjustment in the timing of the existing traffic signals. Neither action would require additional pavement. If new entry or intersection turn lanes are needed, small areas of additional pavement may be required. The 0.5 acre assumption allows an additional turn lane of up to 1,350 linear feet, assuming a 12-foot width and 4-foot shoulder, for each of these two intersections.

Table 3.8-6
Net Increase in Impervious Surface by Watershed – Short-term Transportation Projects[1,2]

Watershed	Short-Term Transportation Projects[1]	Net Increase in Impervious Surface (acres)	Percent Change in Watershed Imperviousness	Current Watershed Imperviousness (approximate %)
Accotink Creek	STT 4 and 6 (partial)	1.04 (app. 0.5 acre for STT 6)	0.003[3]	15
Dogue Creek	STT 5 (partial) , STT 6 (partial) and STT 7	1.71 (app. 0.5 acre for STT 6)	0.015[3]	14
Pohick Creek		0	0	<1
Gunston Cove		0	0	17
Accotink Bay	STT 5 (partial)	1.1	0.182[2]	26
Pohick Bay		0	0	<1
Potomac River		0	0	1
Total		3.85		

Notes:
[1] Breakdown by project shown in Table 2-3.
[2] STT 1, 2, and 3 already accounted for in Table 3.8-5.
[3] These numbers are within measurement error, but are used to demonstrate the level of magnitude of the impact.

Long-Term Projects

Implementation of Alternative 1 long -term projects would individually and cumulatively have short- and long-term, less than significant adverse effects on Fort Belvoir's watersheds. The long-term projects would individually and cumulatively cause only very minor increases in watershed imperviousness. None of the projects would increase the imperviousness of the subwatershed by more than a few tenths of a percent, or cumulatively as much as two percent. Implementation of the master plan design standards for stormwater management, and compliance with the various applicable regulatory standards would reduce the effect of this increase in imperviousness even more.

Figure 2-10 shows the potential long-term project sites. While the Army has sufficient programming information to determine building space and parking requirements, no detailed site designs have been developed to show the placement of buildings, parking facilities, stormwater management measures, or grading requirements.

The long-term project sites are split between the North Post and South Post, with one project site, LT 9, on the FBNA. Project sites for LT 1, 2, 6A, 7, and 9 are all within the Accotink Creek watershed. Project sites for LT 3, 4 and portions of 5 and 8 are in the Dogue Creek watershed. About half of the LT 5 site drains to the Accotink Bay watershed, and about one-third of the LT 8 site drains to Gunston Cove. The project site for LT 6 is largely in the Accotink Bay watershed, but the southern 10 percent drains to Gunston Cove.

Planning for the long term projects is preliminary, and the building and infrastructure needs, when identified, could very possibly encompass a smaller area than shown. The project designers would plan any projects to avoid environmental and other site constraints to the extent practicable. The estimated increase in impervious surface for these projects is therefore approximate. Compliance with the master plan design standards for stormwater, and the regulatory requirements that provide the basis for these standards, would minimize the impacts on watersheds and the runoff generated. Because of the EISA 438, EO 13514, and Chesapeake Bay Program/EO 13508 requirements, compliance would largely be through the application of low impact design measures. As a preliminary estimate, the long-term projects would

cumulatively result in a net increase of impervious surface over the entire Fort Belvoir and FBNA land area of 33.3 acres. The net increase by watershed is shown in Table 3.8-7.

Table 3.8-7
Net Increase in Impervious Surface by Watershed – Long-Term Projects[1]

Watershed	Long-Term Projects	Net Increase in Impervious Surface (acres)	Percent Change in Watershed Imperviousness	Current Watershed Imperviousness (approximate %)
Accotink Creek	LT 1, 2, 6A, 7, 9	27.7	0.084[2]	15
Dogue Creek	LT 3, 4, 5 (partial), 8 (partial)	5.6	0.051[2]	14
Pohick Creek		0	0	<1
Gunston Cove	LT 8 (partial)	0.3	0	17
Accotink Bay	LT 5 (partial) , LT 6 (partial)	-0.3	0.050[2]	26
Pohick Bay		0	0.044[2]	<1
Potomac River		0	0	1
Total		33.3		

Notes:
[1] Breakdown by project shown in Table 2-4.
[2]These numbers are within measurement error, but are used to demonstrate the level of magnitude of the impact.

The net increase in impervious surface for the long-term transportation projects is shown in Table 3.8-8. The long-term transportation projects would also be split between the North Post and South Post, with LTT 8 (Heller Road) on the FBNA. The project sites for LTT 1, 2, 3, 4, 8, and 10 are within the Accotink Creek watershed, and LTT 5 is split between the Accotink Creek and the Accotink Bay watersheds. The site for project LTT 6 is within the Accotink Bay watershed. Projects LTT 7 and 9 drain to Dogue Creek. These projects would result in an approximate cumulative net increase of impervious surfaces of 10.4 acres. This increase broken down by watershed is shown in Table 3.8-8.

Table 3.8-8
Net Increase in Impervious Surface by Watershed – Long-Term Transportation Projects[1]

Watershed	Long-Term Transportation Projects	Net Increase in Impervious Surface (acres)	Percent Change in Watershed Imperviousness	Current Watershed Imperviousness (approximate %)
Accotink Creek	LTT 1, 2, 3, 4, 5 (partial), 8, and 10	8.5	0.026[2]	15
Dogue Creek	LTT 7, 9	0.4	0.004[2]	14
Pohick Creek		0	0	<1
Gunston Cove		0	0	17
Accotink Bay	LTT 5 (partial) , LTT 6	1.5	0.248[2]	26
Pohick Bay		0	0	<1
Potomac River		0	0	1
Total		10.4		

Note:
[1] Breakdown by project shown in Table 2-5.
[2]These numbers are within measurement error, but are used to demonstrate the level of magnitude of the impact.

3.8.3.2 Surface Water Quality

Development that increases the imperviousness of watersheds generates more stormwater runoff, leading in turn to erosion of stream channels and to transport of sediment, other particulates, and dissolved nutrients to downstream surface waters. Erosion of stream channels can severely damage the channel and those features of the channel that provide habitat for fish, amphibians, aquatic insects, and other invertebrates. An excess of sediment and particulates could degrade water quality downstream; it interferes with light penetration, clogs fish and invertebrate gills, coats the bottom of streams and other waters with substrate unsuitable for most species, and leads to a decrease in dissolved oxygen in the water column. An excess of nutrients can lead to vascular plant and algae blooms which, as these die and decompose, also use up dissolved oxygen. Plants, fish and other aquatic organisms need dissolved oxygen to live.

Impacts to surface water quality would take the form of:

- Increased stormwater runoff-borne nutrients and contaminants
- Increased erosion and sedimentation due to scouring downstream of stormwater discharges
- Other contaminants in effluent discharges

However, as Fort Belvoir continues to grow and change, new construction and re-development of existing facilities would mean a continued increase in the number of stormwater management facilities to satisfy new and stricter stormwater laws and regulations (Russell, pers. comm., July 24, 2013) resulting in improvements to water quality. ST 14, the proposed Regional Stormwater Management Facility, is an example of such a project. An increase in the number of stormwater facilities would also address the worst problems in the Mason Run and Accotink Bay watersheds.

The threshold for significance for impacts to surface water quality would be if adoption of the RPMP caused a change in the applicable standards, or significantly detracted from the pollution control strategies presently in place (e.g., more than a few percent of Chesapeake Bay RPA, the ACC, riparian buffer, or floodplain).

Short-Term Projects

Implementation of Alternative 1 short-term projects would cause short-term impacts such as erosion, and sedimentation downstream during construction while soils are exposed. Strict adherence to Virginia erosion and sedimentation control standards and Virginia Stormwater Management Program permit monitoring would minimize these impacts.

Construction of the short-term projects would also cause long-term minor impacts due to changes in hydrology and increases in stormwater discharge. The analysis in Section 3.8.3.1 indicates that the greatest percentage increase in runoff, based on the increase in impervious surface, would occur in the Accotink Bay watershed. In no case would the short-term projects cause any of the Fort Belvoir watersheds to exceed the 10 to 20 percent imperviousness threshold associated with a shift to degraded water quality (Center for Watershed Protection, 2003 as cited in US Army, 2007a), although four of the seven watersheds already exceed this threshold.

The increase in runoff and its adverse effects on water quality would be minimized, and in some cases reversed from present conditions, by compliance with EISA 438, EO 13514, EO 13508, and VDEQ's requirement for adequate outfall. Use of onsite stormwater retention measures to comply with EISA 438, EO 13514, and EO 13508 would reduce the amount and rate of stormwater discharging from the site after a rainfall. The requirement for adequate outfall would ensure that receiving stream channels had adequate capacity to handle the anticipated effect of any runoff that was generated.

Application of these requirements would help the installation resolve the severe erosion issues currently affecting many of its stream channels as the result of historic development practices. These measures would help set the stage for restoration and stabilization of streams that are currently degraded by development that

occurred on the post prior to enactment of stormwater regulations. Compliance with these and other standards such as the Chesapeake Bay Resource Protection Area requirements would also support compliance with the Chesapeake Bay TMDL criteria (US Army, 2014a). For example, the Fort Belvoir Residential Communities has proposed 11 new bio-retention facilities at Woodlawn Village to improve water quality and reduce impact to downstream areas. When built, the proposed Regional Stormwater Management Facility (ST 14) for the developed watershed on Theote Road would reduce impacts to the downstream channel, which currently displays heavy erosion and degradation (Russell, pers. comm., July 24, 2013).

Projects ST 15 (Army and Air Force Exchange Service Car Wash), ST 21 (Army and Air Force Exchange Service Car Service Center), ST 32 (249th Battalion Headquarters), ST 35 (new Retail Fuel Point), ST 49 (911th Engineering Company Operations Complex), and ST 50 (Vehicle Maintenance Shop) would provide facilities for vehicle and other equipment washing and maintenance operations. These facilities would discharge to the Fort Belvoir MS4 system and would comply with the current VPDES Industrial Stormwater General Permit conditions. The projects would need to treat wash water prior to discharging to the storm sewer system to minimize the impacts of any detergents or other cleaning fluids on downstream water quality.

Overall, implementation of Alternative 1 would have less than significant short- and long-term adverse effects on the water quality of Fort Belvoir's surface waters and waters downstream, provided BMPs, especially LID improvements, are used (i.e., with mitigation), particularly during construction.

Long-Term Projects

Implementation of the long-term projects would have impacts like those discussed for the short-term projects. Based on the analysis in Section 3.8.3.1, the long-term development and transportation projects would contribute less new impervious surface (43.7 acres) than the short-term projects (92.25 acres), and therefore generate less stormwater runoff to degrade water quality. Like the short-term projects, redevelopment of older facilities would benefit surface water quality by replacing old stormwater management facilities where they exist and adding new ones where none exist now. Application of EISA 438, adequate outfall, EO 13514, and Chesapeake Bay/EO 13508 requirements would minimize water quality impacts even further. As a result, implementation of the long-term projects under Alternative 1 is expected to have less than significant short- and long-term, adverse effects on surface water quality, provided BMPs, including LID improvements, are used (i.e., with mitigation).

3.8.3.3 Chesapeake Bay Resource Protection Areas, Fort Belvoir Riparian Areas, and the FBNA Accotink Creek Conservation Corridor

The concept behind preservation of a vegetated buffer (and restoration of a vegetated buffer where one no longer exists) adjacent to waterways such as streams and tidal waters is to provide for trapping of particulates carried in stormwater runoff as it drains towards streams and other waterways. Most excess nutrients and other contaminants would adsorb (stick) to particulates, and when the particulates are trapped by thick vegetation and soils, the nutrients and other contaminants are removed. Certain types of projects are exempt from the requirements of Virginia’s Chesapeake Bay regulations (i.e., linear public transportation projects and linear public utility projects) provided they meet certain conditions. Most projects must comply with these regulations and avoid the Chesapeake Bay RPA, or mitigate for any intrusion into the RPA.

The Chesapeake Bay RPA mapping provided in the Fort Belvoir GIS is, for the most part, an estimation of where Chesapeake Bay RPAs occurs on the installation. It is based on the Fort Belvoir GIS which includes a planning-level assessment of Chesapeake Bay RPAs, and on which streams ENRD believes are perennial and their contiguous wetlands. (The occurrence of wetlands is also based largely on planning-level mapping).The post has not conducted site-specific Chesapeake Bay RPA delineations (or the perennial flow determinations and wetland delineations that support an RPA delineation), except for projects in an

advanced stage of site planning or permitting. Therefore, for those projects listed in Table 3.8-9 that have not been delineated, the impact estimates are approximate and may change as streams are assessed for perennial flow, and contiguous wetlands delineated "on the ground." For those projects for which there is site-specific information (e.g., ST 28 and 33), that information has been used in Table 3.8-9. Based on the GIS and project-specific information, there are approximately 2,700 acres of Chesapeake Bay RPA on the post. A significant impact would result if more than one percent (27 acres) of the Chesapeake Bay RPA were impacted without mitigation.

Table 3.8-9
Potential Impacts to Chesapeake Bay RPAs (Short-Term Projects)

Project Number	Project Description	Area of Post	Chesapeake Bay RPA (acres)[1]
4	Mulligan Road Phase II	North Post	2.83[2]
7	Expansion of DAAF Fire Station	DAAF	0.11
9	Family Travel Camp	South Post	0.66
17	Golf Course Reconfiguration	North Post	0.56[3]
18	National Museum of the Army	North Post	0.86[3]
28	Main Post Commissary	North Post	0.32[4]
33	INSCOM Phase III	North Post	0.043[4]
	Short Term Project Totals		**5.28**

Notes:

1. Calculated from the Fort Belvoir GIS unless otherwise specified.

2. Most of the impacts are within HEC.

3. The design has been refined since the original EA prepared for the project, resulting in a difference between this number and the estimate provided in the EA.

4. Source is EA for the project.

Mapping is not provided for the Fort Belvoir 35-foot riparian buffers along intermittent streams. Because of the scale of the GIS mapping and the figures provided in this document, the width of the buffer would be barely legible. However, it is noted below where projects and project sites are likely to impact this buffer due to their proximity to intermittent streams. It is likely that the number of projects in proximity to riparian buffer will change as detailed site-specific perennial flow determinations and Chesapeake Bay RPA mapping is performed.

Short-Term Projects

Seven short-term projects would result in loss of Chesapeake Bay RPA, as shown in Table 3.8-9. Individually and cumulatively, these projects would affect only 0.23 percent of the total Chesapeake Bay RPA (approximately 2,700 acres) on the installation, and would have a less than significant adverse effect. The loss of RPA would also be mitigated.

The largest impact on Chesapeake Bay RPAs would result from ST 4 (also STT 1, Mulligan Road). This project has already been evaluated by an EA (USDOT, FHWA, 2006c). Project ST 4 will encroach on approximately 2.83 acres of Chesapeake Bay RPA associated with Piney Run and another, unnamed tributary to Dogue Creek. Almost all the affected RPA is within HEC. As a public linear transportation project, it is exempt under Virginia's Chesapeake Bay regulations, and the impact was not evaluated in detail. However, much of the mitigation proposed for the project's impacts to the floodplain and Forest and Wildlife Corridor, such as removal of existing pavement from a closed section of Woodlawn Road, and using bridges to span Piney Run and the Forest and Wildlife Corridor (USDOT, FHWA, 2006c), would also

replace vegetated buffer and reduce the amount of fill required in the Chesapeake Bay RPA buffer. The Forest and Wildlife Corridor and floodplain overlap the RPA through much of the installation.

Project ST 9 (Phase 1 of the Family Travel Camp) encroached on about 0.66 acres of Chesapeake Bay RPA associated with the tidal waters of Gunston Cove. Most of the RPA impacted already contains a parking area; this parking area was re-used for parking recreational vehicles, in keeping with the RPMP policy of directing new development to areas that have already been disturbed or developed. No mitigation was proposed in the EA, as there was no disturbance to vegetated buffer (US Army, 2010j).

Based on the most current concept design, the 36-Hole Golf-Course Reconfiguration and the NMUSA, and Projects ST 17 and ST 18, would together encroach on approximately 1.42 acres of Chesapeake Bay RPA associated with a tributary to Accotink Creek. The encroachment would largely result from construction of the entrance road to the Museum and reconstruction of one of the golf course fairways. As a detailed design for the entrance road is developed, the Army would strive to reduce the encroachment, and would develop an appropriate mitigation plan (US Army, 2010d). The Army has already redesigned the golf course to reduce impacts on the RPA (US Army, 2012d).

The proposed Main Post Commissary (ST 28) would impact approximately 0.32 acres of Chesapeake Bay RPA. The RPA buffer in this location is already disturbed by the access road to the old PX (US Army, 2010a).

Project ST 33 (INSCOM Headquarters Expansion Phase III) would impact about 0.043 acres of Chesapeake Bay RPA associated with a tributary of Mason Run and Accotink Creek. The Army would provide mitigation in the form of replanting the buffer around a stormwater pond south of the INSCOM Headquarters facility and removing pavement from a road crossing the RPA south of the site. Fort Belvoir has demonstrated through a water quality impact assessment that the loss of buffer resulting from the project would be mitigated through these measures, and that the project complies with the Virginia Chesapeake Bay regulations (US Army, 2012d).

For all of these projects, the building permit approval process requires compliance with all applicable codes and regulations, including Virginia's Chesapeake Bay regulations.

The short-term projects that have caused, or have the greatest potential to cause, adverse impacts on Fort Belvoir-designated riparian buffer include ST 1 (the new PX), ST 28 (the new Commissary), and ST 32 (the 249th Battalion Headquarters). The minor impacts of construction of the PX and Commissary on intermittent streams and their buffers were addressed in an EA and FNSI (US Army, 2010b). The site for the 249th Battalion Headquarters is in proximity to, but may not intrude into, riparian buffer associated with a stream that the Fort Belvoir GIS shows rising just south of the proposed site. There is already a parking lot at the 249th Battalion Headquarters location.

None of the short-term projects on the FBNA would impact the Accotink Creek Conservation Corridor.

Long-Term Projects

None of the long-term development projects would encroach on Chesapeake Bay RPA. It is possible that LTT 3 (Monitoring for US Route 1 Intersection Improvements at Fairfax County Parkway, Pohick Road, and Fort Belvoir Road) could lead to the need to improve these intersections. Improvements could result in small impacts to the RPA associated with Accotink and Dogue Creeks and their tributaries. The impacts would be determined during project design, and if not avoidable, would be mitigated.

Long-term project sites LT 3 (the South Post Community Support District), LT 4 (the Administrative Campus District), LT 6 (the Industrial Area District), and LT 9 (the FBNA District) occur in proximity to intermittent streams, based on the Fort Belvoir GIS. However, it is likely that projects at these sites can be configured to avoid riparian buffers.

The one long-term project proposed on the FBNA (LT 9) would not impact the Accotink Creek Conservation Corridor.

3.8.3.4 Floodplains

The floodplain mapping shown in Figure 3.8-1 is based on the Federal Emergency Management Administration's 100-Year Flood Zone maps which are suitable for general planning guidance. The installation requires projects to follow Fairfax County regulations with regard to establishing the 100-year floodplain limits for new construction. These limits are evaluated at the project development and site plan review phase. ENRD reviews individual projects to determine compliance with Army, federal, state and county floodplain regulations. Generally, no development that could alter downstream flood heights is permitted in flood zones.

On Fort Belvoir, the floodplain is associated with the large stream valleys (i.e., Accotink, Pohick, and Dogue creeks), and overlaps much of the Chesapeake Bay, Forest and Wildlife Corridor and other sensitive resources. The installation has planned RPMP projects and sites to be located on the upland plateaus that make up the installation to the maximum extent feasible, and thus has avoided the stream valleys, and therefore the floodplain, as well as the other sensitive resources as much as possible.

Short-Term Projects

Table 3.8-10 shows the potential minor long-term impacts of short-term projects on floodplain acreage. The short-term projects together would occur on less than 5 acres or only 0.32 percent of the mapped floodplain on the installation, and Alternative 1 would have a less than significant adverse effect on floodplain and flood elevations. None of these projects would raise flood elevations or encroach on the floodway. The short- and long-term impacts of this alternative on human safety, health, and welfare would therefore be negligible. The presence of these improvements in the flood zone would have a less than significant impact on "the natural and beneficial values served by floodplains" (EO 11988, Floodplain Management) because the improvements proposed for these low-lying areas would not interfere with the floodplain's function (Executive Office of the President, 1977).

Table 3.8-10
Potential Impacts to Floodplains

Project Number	Project Description	Area of Post	Floodplain (acres)
4	Mulligan Road Extension Phase II	North Post	2.13[1]
7	Expansion of DAAF Fire Station	Davison Army Airfield	0.11
9	Family Travel Camp	South Post	0.64
18	National Museum of the Army	North Post	2.11
	Short Term Project Totals		**4.99**

Note:
1. On-post impacts only
Source: Fort Belvoir GIS, 2013

Of the short-term projects, ST 4 (Mulligan Road) and ST 18 (the National Museum of the Army Roads and Infrastructure) would occupy the most floodplain. In both cases, the impacts result from the need for roadways to cross streams with associated floodplain, and are unavoidable. Both projects have been evaluated by EAs (USDOT, FHWA, Eastern Federal Lands Highway Division, 2006c; US Army, 2010d). Mitigation was proposed for the floodplain impacts to be caused by Mulligan Road, namely using a bridge to span Piney Run and the associated floodplain (USDOT, FHWA, Eastern Federal Lands Highway Division, 2006c), and it is likely that similar measures would be used for the National Museum of the Army

entrance. Moving the portion of roadway leading from Fairfax Parkway to the museum site out of the floodplain was considered but found not to be possible because of the need to maintain a minimum distance between the new intersection and the intersection of the parkway with John J. Kingman Road.

Project ST 7 (Expansion of the DAAF Fire Station) would have a very small impact on the floodplain. The project involves an addition to an existing fire station, and the location is determined by the location of the existing station (US Army, 2010a). The impact is therefore unavoidable, but minor, and would not contribute to an increase in flood elevations.

Project ST 9 (Phase 1 of the Travel Camp) made use of an existing parking lot that is located in the floodplain associated with Gunston Cove. It did not involve raising the elevation of the ground surface and it replaced a larger building with a smaller one. Therefore, it did not displace any flood storage or change flood elevations in this area. The portions of the Travel Camp located inside the flood zone are limited to RV pads, vehicle parking spaces, and a shelter. In the event of a flood, the RVs and other vehicles could be moved from these areas quickly (US Army Garrison Fort Belvoir, 2010f).

Long-Term Projects

None of the long-term development project sites would adversely affect floodplains. The long-term transportation projects LTT 2 (Fairfax County Parkway/John J. Kingman Road Intersection and NMUSA Entrance) and LTT 3 (Monitoring of the US Route 1 Intersections with Fairfax County Parkway, Pohick Road, and Belvoir Road) could adversely affect floodplains, depending on the final design and the extent to which the existing roadways would be widened. Any improvements at these intersections could require minor amounts of fill in the floodplain (which is consistent with the limits of the RPA in this area of the post) associated with Accotink and Dogue Creeks and their tributaries. However, the short- and long-term adverse effects of these transportation projects would be less than significant.

3.8.4 Environmental Consequences of Alternative 2 – Modified Long-Term

3.8.4.1 Fort Belvoir Watersheds

Short-Term Projects

Implementation of Alternative 2 would result in no change to the cumulative total of impervious surface from short-term projects as compared to Alternative 1. While Alternative 2 would delay construction of ST 40 and 52 (the new DLA headquarters and parking garage) for several years, neither of these projects would create new impervious surface. (The DLA projects would utilize existing parking areas in this section of the North Post.) Implementation of the short-term projects under the Modified Long-Term Alternative would therefore have less than significant, short- and long-term, adverse effects on Fort Belvoir's watersheds.

Long-Term Projects

Implementation of Alternative 2 would eliminate construction of LT 9 (proposed secure administrative center on the FBNA), which would reduce the cumulative total of impervious surface by about 26 percent of the net impact. Alternative 2 would result in a net increase of approximately 1.7 acres of pervious surface, when just the long-term projects are considered. As a result, implementation of the long-term projects under the Modified Long-Term Alternative is also expected to have less than significant, short- and long-term, adverse effects on Fort Belvoir's watersheds.

3.8.4.2 Surface Water Quality

Short-Term Projects

Implementation of the short-term projects under Alternative 2 would not change the impacts of the short-term projects on surface water quality as compared to Alternative 1, and would have less than significant, short- and long-term, adverse effects on surface water quality.

Long-Term Projects

Implementation of the long-term projects under Alternative 2 would reduce the total runoff generated by the long-term projects, and therefore have less adverse impact on water quality as compared to Alternative 1, and would have less than significant, short- and long-term, adverse effects on surface water quality.

3.8.4.3 Chesapeake Bay Resource Protection Areas, Fort Belvoir Riparian Areas, and the FBNA Environmental Quality Corridor

Short-Term Projects

Alternative 2 would delay construction of ST 40 and 52 (the new DLA headquarters and parking garage), but neither of these projects are located where they would impact Chesapeake Bay RPA, riparian areas, or the FBNA Accotink Creek Conservation Corridor; both sites are characterized by parking lots and landscaping. It would also delay the impacts of ST 19, 26, 33, and 46 (the INSCOM Headquarters expansion – a total of 0.043 acres of Chesapeake Bay RPA) from the short-term to the long-term for several years. The overall short- and long-term impacts of the short-term projects on Chesapeake Bay RPA and Fort Belvoir riparian areas under Alternative 2 would be less than significant. There would be no effect on the FBNA Accotink Creek Conservation Corridor.

Long-Term Projects

Implementation of Alternative 2 would eliminate project site LT 9 (the New Administrative Center at the FBNA) as a potential development site. According to the Fort Belvoir GIS planning-level mapping, this site abuts intermittent streams and use of this site could lead to encroachments on Fort Belvoir riparian buffer. It does not overlap Chesapeake Bay RPA or the FBNA Accotink Creek Conservation Corridor. It is likely that careful site design could avoid impacts to the streams and their riparian buffers, however, and implementation of this alternative is unlikely to change the overall impacts of the RPMP. The overall short- and long-term impacts of the long-term projects on Chesapeake Bay RPA and Fort Belvoir riparian areas under Alternative 2 would be less than significant. There would be no impacts on the FBNA Accotink Creek Conservation Corridor.

3.8.4.4 Floodplains

Short-Term Projects

Implementation of Alternative 2 would result in no change to the overall impacts on floodplain to be caused by Alternative 1. The overall short- and long-term impacts from short-term projects on floodplain and flood elevations under Alternative 2 would be less than significant.

Long-Term Projects

Implementation of Alternative 2 would result in no change to the overall impacts on floodplain to be caused by Alternative 1. The overall short- and long-term impacts from long-term projects on floodplain and flood elevations under Alternative 2 would be less than significant.

3.8.5 Environmental Consequences of Alternative 3 – Modified Short-Term

3.8.5.1 Fort Belvoir Watersheds

Short-Term Projects

Implementation of Alternative 3 would delay, but not change, the overall impacts of the proposed action short-term projects as compared to Alternative 1. Alternative 3 would lead to the same amount of impervious surface, but several years later than under Alternative 1. Implementation of the short-term projects under the Modified Short-term Alternative would have less than significant, short- and long-term, direct, adverse effects on Fort Belvoir's watersheds.

Long-Term Projects

Implementation of Alternative 3 would not delay the long-term projects and therefore not change the overall impacts of these projects on Fort Belvoir's watersheds. Alternative 3 would lead to the same amount of impervious surface as under Alternative 1, and its implementation is expected to have less than significant, short- and long-term adverse effects on Fort Belvoir's watersheds.

3.8.5.2 Surface Water Quality

Short-Term Projects

Implementation of Alternative 3 would delay, but not change, the overall impacts of the long-term projects on water quality as compared to Alternative 1, and would have less than significant, short- and long-term, adverse effects on surface water quality.

Long-Term Projects

Implementation of Alternative 3 would not change the overall impacts of the proposed action on water quality as compared to Alternative 1, and would have less than significant, short- and long-term direct, adverse effects on surface water quality.

3.8.5.3 Chesapeake Bay Resource Protection Areas, Fort Belvoir Riparian Areas, and the FBNA Environmental Quality Corridor

Short-Term Projects

Alternative 3 would delay, but not change, the overall impacts of the proposed action short-term projects as compared to Alternative 1. The overall short- and long-term impacts of the short-term projects on Chesapeake Bay RPA and Fort Belvoir riparian areas under Alternative 3 would be less than significant. There would be no effect on the FBNA Accotink Creek Conservation Corridor.

Long-Term Projects

Implementation of Alternative 3 would not change the overall impacts of the proposed action as compared to Alternative 1. The overall short- and long-term impacts of the long-term projects on Chesapeake Bay RPA and Fort Belvoir riparian areas under Alternative 3 would be less than significant. There would be no impacts on the FBNA Accotink Creek Conservation Corridor.

3.8.5.4 Floodplains

Short-Term Projects

Implementation of Alternative 3 would result in no change to the overall impacts on floodplain to be caused by Alternative 1. The overall short- and long-term impacts from short-term projects on floodplain and flood elevations under Alternative 3 would be less than significant.

Long-Term Projects

Implementation of Alternative 3 would result in no change to the overall impacts on floodplain to be caused by Alternative 1. The overall short- and long-term impacts from long-term projects on floodplain and flood elevations under Alternative 3 would be less than significant.

3.8.6 Proposed Mitigation and Protective Measures

Fort Belvoir's foremost protective measure for water resources is to locate proposed short-term and long-term projects away from stream valleys and surface waters in order to avoid impacts to streams, wetlands, floodplains, and Chesapeake Bay RPAs. Correct siting would minimize direct impacts to these resources; compliance with stormwater management requirements would reduce indirect impacts. To mitigate short-term project impacts, Fort Belvoir proposes the following:

- **Project-level Mitigation**. Future projects on Fort Belvoir would be designed, and developed in accordance with the following laws, regulations, and guidance: the Clean Water Act, EO 11988 (Floodplain Management) as amended by Executive Order on January 15, 2015; Energy Independence and Security Act (EISA); EO 13514 (Federal Leadership in Environmental, Energy, and Economic Performance); the Chesapeake Bay Program/EO13508 (Chesapeake Bay Protection and Restoration); as well as Virginia and Fairfax County laws and regulations implementing the provisions of the laws and regulations listed above.

  For each project:

  - Projects would apply EISA Section 438, EO 13514, and EO 13508 guidance to the design and implementation of on-site stormwater management features.
  - Projects would comply with the applicable requirements of the Virginia Stormwater Management Act, 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), projects with activities disturbing land areas one acre or greater in size would prepare and implement stormwater pollution prevention plans.
  - Where on-site measures are not practicable, projects would contribute to stream and wetland restoration projects at the 26 stream and wetland mitigation sites on Fort Belvoir.

- **Cumulative, Installation-wide Water Resources Proposed Mitigation.** To mitigate the cumulative impacts of the proposed RPMP short-term projects on water resources, Fort Belvoir would pursue funding to assess, design, and restore 17 degraded stream segments shown on Figure 3.8-4 as "proposed stream mitigation sites." These stream restoration projects may include repairs such as culvert removals or more extensive stream channel restoration and bank stabilization. An initial stream assessment would determine the proper restoration strategy.

Since publication of the Draft EIS, the Army has been able to take a more refined view of the potential mitigation and funding sources. For further information about proposed mitigations, see Chapter 5.

3.8.7 Comparison of Alternatives

The effects on water and related resources potentially resulting from the implementation of the No Action and three action alternatives as presented above are summarized in Table 3.8-11.

Table 3.8-11
Summary of Water Resource Impacts by Alternative

Environmental Consequence	No Action Alternative	Alternative 1 – Full Implementation – The Preferred Alternative	Alternative 2 – Modified Long-Term	Alternative 3 – Modified Short-Term
Short-Term Projects				
Short-term construction-related impacts on surface water quality	No effect	Less than significant adverse effects, with mitigation	Less than significant adverse effects, with mitigation	Less than significant adverse effects, with mitigation
Long-term impact on watersheds	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
Long-term impact on surface water quality	No effect	Less than significant adverse effects, with mitigation / Beneficial effect	Less than significant adverse effects, with mitigation / Beneficial effect	Less than significant adverse effects with mitigation / Beneficial effect
Long-term impact on Chesapeake Bay RPAs, Fort Belvoir Riparian Buffers, and the Accotink Creek Conservation Corridor	No effect	Less than significant adverse effect; no effect on the Accotink Creek Conservation Corridor	Less than significant adverse effect; no effect on the Accotink Creek Conservation Corridor	Less than significant adverse effect; no effect on the Accotink Creek Conservation Corridor
Long-term impact on floodplains	No effect	Less than significant adverse effect	Less than significant adverse effect	Less than significant adverse effect
Long-Term Projects				
Short-term construction-related impacts on surface water quality	No effect	Less than significant adverse effect, with mitigation	Less than significant adverse effect, with mitigation	Less than significant adverse effect, with mitigation
Long-term impact on watersheds	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
Long-term impact on surface water quality	No effect	Less than significant adverse effects, with mitigation / Beneficial effect	Less than significant adverse effects, with mitigation / Beneficial effect	Less than significant adverse effects, with mitigation / Beneficial effect
Long-term impact on Chesapeake Bay RPAs, Fort Belvoir Riparian Buffers, and the Accotink Creek Conservation Corridor	No effect	Less than significant adverse effect, if any; no effect on Chesapeake Bay RPAs and Accotink Creek Conservation Corridor	Less than significant adverse effect, if any; no effect on the Accotink Creek Conservation Corridor	Less than significant adverse effect, if any; no effect on the Accotink Creek Conservation Corridor
Long-term impact on floodplains	No effect	Less than significant adverse effect	Less than significant adverse effect	Less than significant adverse effect

3.9 BIOLOGICAL RESOURCES

This section describes the existing biological resources on Fort Belvoir and the likely impacts of the proposed action on those resources. The Army NEPA regulations recommend that EISs be focused on those environmental resources or landscape features important to maintaining the biodiversity of not only the site in question, but also of the surrounding area, in this case of eastern Fairfax County. This analysis is therefore focused on Fort Belvoir habitats, with consideration of how these habitats interact with regional natural resources. This approach is consistent with DoD, Army, and Fort Belvoir policies to take a regional view of management and recognize that ecosystem boundaries extend beyond installation boundaries (US Army, 2001a).

DoD Instruction 4715.3 states that all DoD's conservation programs shall work to guarantee continued access to DoD land, air, and water resources for realistic military training and testing while ensuring that the natural and cultural resources entrusted to DoD care are sustained in a healthy condition for scientific research, education, and other compatible uses. Army Regulation 200-1, Environmental Protection and Enhancement, directs installations to promote biodiversity and ecosystem sustainability on Army lands and waters consistent with the mission and Integrated Natural Resources Management Plan (INRMP) (US Army, 2001a) objectives. Natural ecosystems can best be maintained by protecting, conserving, enhancing, and managing the diversity of native organisms, habitat, and the ecological processes that they perform.

Fort Belvoir has developed and implemented an ecosystem-based natural resources management program that does not emphasize single-species management or aim to increase the number of species or number of biological communities on-post. Fort Belvoir aims to retain large intact areas of natural habitat, maintain and improve ecological connectivity between habitat areas, and reduce or correct situations that degrade habitat quality and function. This is how ecosystem management is included in the Master Planning process. Managing for these focal points also ensures compliance with DoD and Army directives by managing for overall biological diversity.

Ecosystem Management

Fort Belvoir recognizes its role as one piece in a complex of the largest continuous and most diverse habitat area in eastern Fairfax County (Huntley Meadows Park to the north and Mason Neck State Park and Potomac River National Wildlife Refuge Complex to the south), and involves outside partners/participants in its management program.

The resources evaluated in this section include the most sensitive species or resources with the potential to be affected. These are: refuges and other large tracts of habitat; forested areas; wetlands, threatened and endangered species and their critical habitats; and, habitat for bird species of concern under the Partners-in-Flight (PIF) Program. Habitats included as sensitive resources are shown in Figure 3.9-1. Assessing the impacts of a proposal on the most sensitive resources can serve as a good framework for evaluating the impacts on all species.

Thresholds of Significance

The following thresholds were used to determine the significance of an impact in the biological resources impact analysis:

- Plant Communities and Forest Resources – The action would result in the permanent loss of more than two percent of the native plant communities.
- Aquatic Macroinvertebrates/Fish – The action would result in the loss of more than two percent of the available habitat.
- Wildlife – The action would interrupt the continuity of habitats or result in the loss of more than two percent of the habitat on post.

- Rare, Threatened, and Endangered Species and Their Habitats – The action would result in an adverse effect that cannot be resolved with the regulatory agencies through some form of mitigation.
- Wetlands – The action would result in the loss of more than one acre of non-tidal wetland or open water, or of 1,500 linear feet of stream for any single and complete project. Cumulatively, the action would result in a total loss of wetland that exceeds more than two percent of the total estimated wetland area on the installation.

3.9.1 Affected Environment

Fort Belvoir is in an ecologically complex area where three ecological subregions converge: the Outer Piedmont subregion of the Piedmont Plateau to the west; the Coastal Plain ecoregion to the east; and, the Upper Atlantic Coastal Plain subregion of the Eastern Broadleaf Forest (Oceanic) ecoregion to the north. The installation also occupies an important location for many bird species, because it is located along the Atlantic Flyway, a major North American bird migration route, near the connection of a principal migratory route from the southeastern Great Lakes region along the Delaware River corridor.

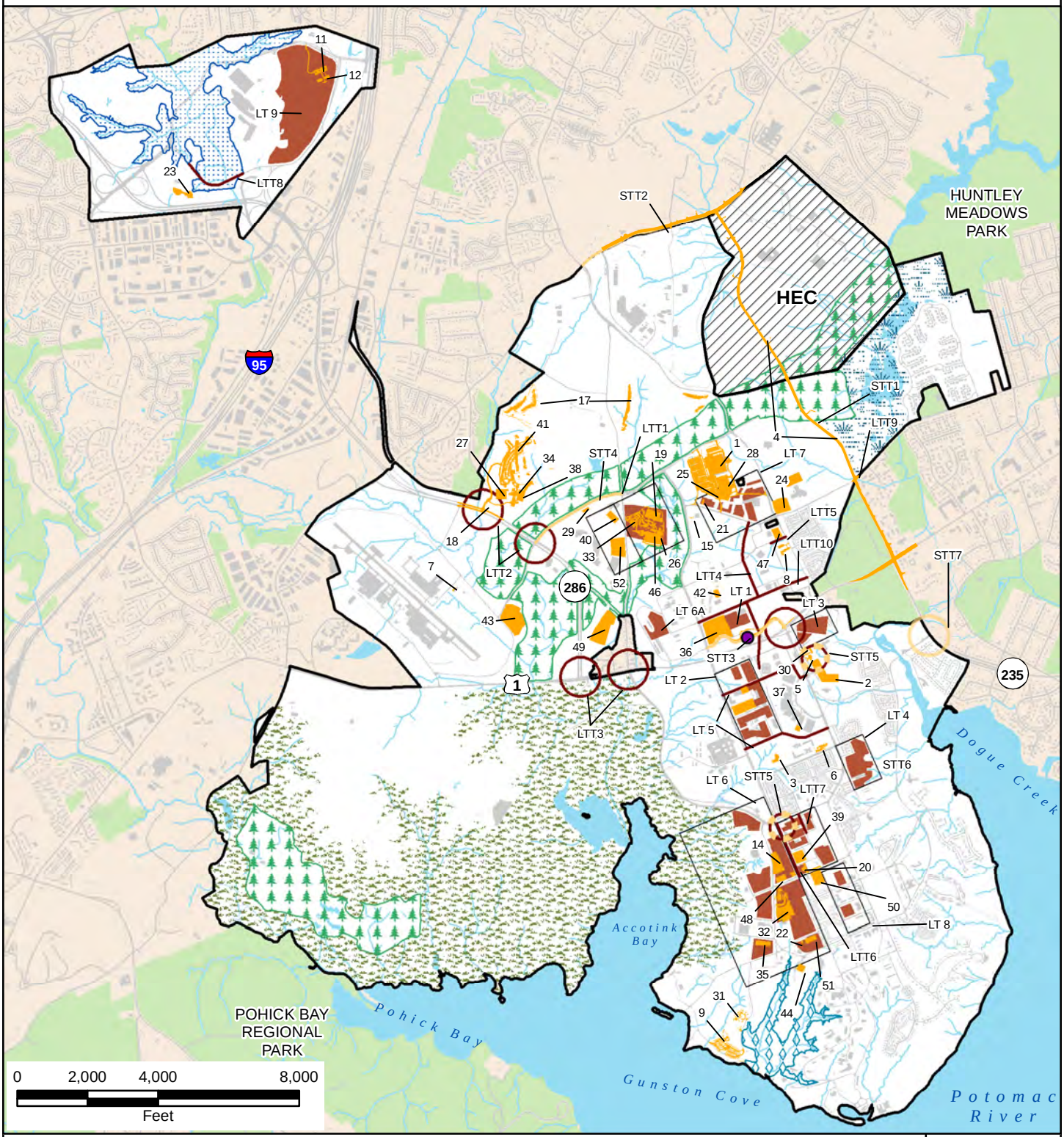
Given its location in relation to large tracts of undisturbed wildlife habitat in the region (e.g., Huntley Meadows County Park to the northeast and the federal, state, and regional refuge and parks on Mason Neck peninsula to the southwest), Fort Belvoir has designated three significant habitat areas within the installation as wildlife refuges (Figure 3.9-1): the 1,480-acre Accotink Bay Wildlife Refuge along Accotink and Pohick Bays, the 234-acre Jackson Miles Abbott Wetland Refuge along Dogue Creek, and the 126-acre former T-17 training range along Gunston Cove. It has designated an additional 740 acres as the Forest and Wildlife Corridor (FWC) through the Main Post, and 191 acres as the Accotink Creek Conservation Corridor through the FBNA. It has established bald eagle management areas around its shoreline. These large areas of habitat not only are valuable in and of themselves but they also provide for ecological connectivity through the installation to the other regional habitats. These "Special Natural Areas" are shown in Figure 3.9-1, with the exception that the bald eagle management areas are shown on Figure 3.9-4.

The significant habitat designations by Fort Belvoir were made and expanded as mitigation for various land use actions, such as the adoption of the 1988 and 1993 RPMPs, the 1988 BRAC, and the 2005 BRAC realignment, and recognize the sensitive ecological resources within these land areas. Mitigation for various projects has led to Fort Belvoir conducting wetland and stream restoration projects, habitat enhancement for bird species of concern, and reforestation. All of these designations and management measures are discussed in more detail later in this chapter.

3.9.1.1 Plant Communities

Fifteen (11 native, three planted, and "urban" landscaping) plant community types have been identified on Fort Belvoir's Main Post. Table 3.9-1 lists the plant communities in order of their abundance and provides information about the general distribution of the community types. The distribution of these plant communities in relation to the projects proposed or anticipated under the RPMP is shown in Figure 3.9-2. On Main Post three types of hardwood forest – oak/ericad (heath family), beech/mixed oak, and tulip poplar/mixed hardwood forest – each with nearly 1,000 acres or more, are the most abundant natural plant communities. Some of the communities, such as the oak/ericad forest, occur as relatively large, contiguous areas, while others occur as smaller areas intermixed with other community types. A few plant communities have been planted (loblolly pine, white pine, and Virginia pine), while the majority have grown in response to natural constraints of soil type, topography, and moisture.

Special Natural Areas



Accotink Bay Wildlife Refuge
T-17 Refuge
Jackson Miles Abbott Wetlands Refuge
Accotink Creek Conservation Corridor
Forest and Wildlife Corridor
Off-Post Parkland and Reserves
Short-Term Improved/New Road
Long-Term Improved/New Road
Short-Term Project Sites (Construction FY 2012 - 2017)
Long-Term Project Sites (Construction FY 2018 - 2030)

Source: Fort Belvoir GIS, Fairfax County GIS

Figure 3.9-1

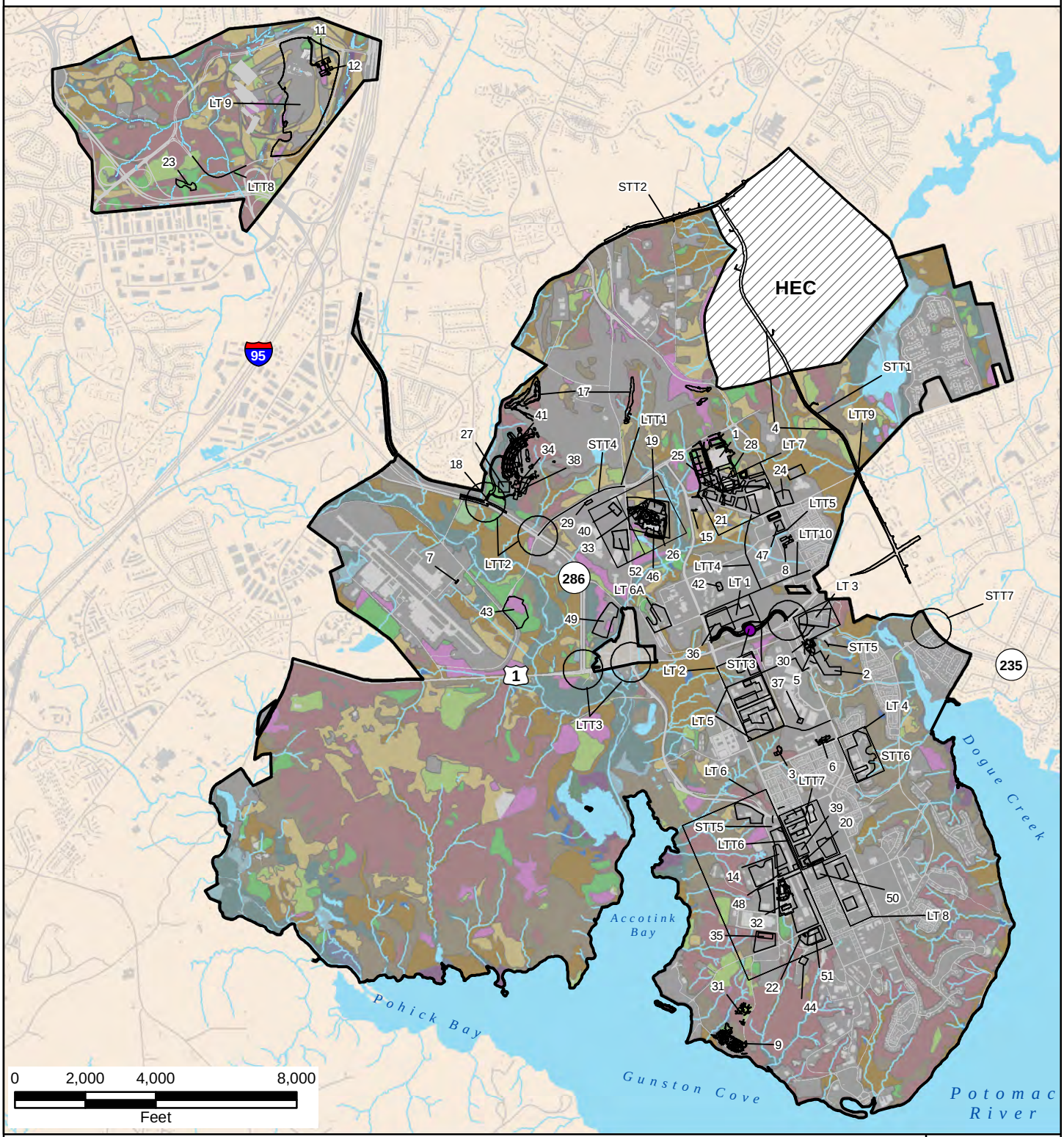
Please refer to Figure 3.8-1 for wetlands and RPA boundaries.

Fort Belvoir RPMP EIS

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Distribution of Plant Communities



Beech Mesic - Mixed Oak Forest
Floodplain Hardwood Forest
Loblolly Pine Forest
Mixed Pine - Hardwood Forest
Non-Tidal Freshwater Marsh-Beaver Pond
Oak Submesic - Ericad Forest
Old Field Grassland
Seeps
Tidal Freshwater Marsh
Tidal Freshwater Scrub-Shrub
Tidal Freshwater Swamp Forest
Tulip Popular Mesic - Mixed Hardwood Forest
Virginia Pine Forest
White Pine Forest
Urban
Short- and Long-Term Project Sites

Fort Belvoir RPMP EIS

Figure 3.9-2

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Table 3.9-1
Fort Belvoir Plant Communities

Plant community	Acreage		Distribution
	Main Post	FBNA	
Oak/Ericad (Heath family) Forest	1,172	225	Upland areas of gravelly ridges and dry slopes
Beech - Mixed Oak Forest	1,079	12	Upland areas of gradual, well-drained ravine slopes
Tulip Poplar Mixed Hardwood Forest	895	75	Moist, fertile ravine slopes and ravine bottoms
Virginia Pine Forest	423	185	Previously-disturbed areas in mid-succession
Floodplain Hardwood Forest	470	53	Moderately well-drained to very poorly drained floodplain bottomlands and sloughs
Loblolly Pine Forest	221	11	Planted stands
Old Field Grassland	208	53	Previously disturbed areas in early successional stages
Mixed Pine hardwood Forest	185	49	Previously disturbed areas in late succession
Nontidal Marsh/Beaver Pond	121	3	Above tidal limits of Accotink, Pohick, and Dogue Creeks
Tidal Marsh	34	0	Shallow tidal areas (Accotink and Pohick Creeks) and at the mouths of several small streams
Freshwater Tidal Swamp Forest	39	0	Tidally influenced palustrine areas
Seep Forest	27	1	Groundwater-saturated flats and slopes
Tidal Scrub/Shrub Wetland	13	0	Edges of tidal swamp forests near the transition to tidal marsh
White Pine Forest	6	0	Planted stands
Urban	2,747	136	All developed areas including improved and semi-improved grounds
Source: Fort Belvoir GIS, 2013.			

The acreages presented in Table 3.9-1 are based on the acreages currently in the Fort Belvoir GIS, and based on the categories used in the 1999 survey (Paciulli, Simmons & Associates, Ltd., 1999, as cited in US Army, 2007a). The native communities are prevalent in all undeveloped portions of the post, particularly in the Southwest Area of the Main Post, near the Jackson Miles Abbott Wetland Refuge, and on the western part of the FBNA. Virginia, loblolly, and white pine plantation are similarly distributed, planted to enhance and add to the diversity of existing habitat.

A vegetation survey of the FBNA conducted in 1999 identified 12 plant community types (Paciulli, Simmons & Associates, Ltd., 1999, as cited in US Army, 2007a; Tetra Tech, 2006a, as cited in US Army, 2007a). Oak forest is the most common plant community, followed by beech/mixed oak forest and tulip poplar/mixed hardwood forest (Table 3.9.1). These are also shown in Figure 3.9-2.

Army Regulation 200-1, other DoD directives and policies, and Fort Belvoir's INRMP establish a commitment to manage Fort Belvoir's forested lands on an ecosystem basis and conserve and enhance existing flora and fauna. Fort Belvoir's Tree Removal and Protection Policy (Fort Belvoir Policy

Memorandum #27) requires protection of existing trees and, when tree loss is unavoidable, mitigation for trees lost to construction. Fort Belvoir strives for replacing all trees 4 inches or greater in diameter, at a 2 for 1 basis on-post. When this is not possible, an alternative mitigation method, such as stream or riparian area restoration, may be pursued.

Fort Belvoir has done surveys for invasive 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 (wind- or water- borne, carried by animals). 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. The Fort Belvoir staff reviews landscaping plans to reduce the potential for invasive species introduction.

It should be noted that the Potomac River in the vicinity of the Main Post contains shallow water that provides habitat for various types of submerged aquatic vegetation. Submerged aquatic vegetation contribute to the health of estuary systems by providing habitat for many fish and shellfish species, creating food for waterfowl, erosion control, and absorbing excess nutrients. A dramatic baywide decline of all submerged aquatic vegetation species in the late 1960s and 1970s was correlated with increasing nutrient and sediment inputs from development of the surrounding watersheds, and was a primary reason for the multi-state Chesapeake Bay Agreements to clean up the Bay. Through recent restoration and mitigation, submerged aquatic vegetation populations have begun to increase in some areas of the Bay (Maryland Department of Natural Resources, 2007; Orth et al., 2010).

3.9.1.2 Fish and Wildlife

Aquatic Macroinvertebrates/Fish

As outlined in Chapter 3.8, Fort Belvoir is located on a peninsula projecting into the Potomac River, between Pohick and Accotink Bays, and adjacent to Gunston Cove. It is connected to the Chesapeake Bay and ultimately the ocean, resulting in a tidal freshwater regime. The many freshwater streams that flow through or originate on the post allow free movement of fish in perennial streams. These features, in addition to the complex of habitats provided by the natural shorelines of the bays and cove, the water quality benefits provided by riparian corridors, and the nursery areas provided by extensive beds of submerged aquatic vegetation along the shoreline, have contributed to a good overall diversity of fisheries, including anadromous (fish that live in saltwater and migrate to freshwater to spawn) and catadromous (fish that live in freshwater and enter saltwater to spawn) species, as well as non-migratory species.

Fort Belvoir's nearshore waters support recreational and commercial fishing for species typical of the Mid-Atlantic Coastal Plain. Studies by various groups on the installation's waterways and nearshore waters (e.g., EA Engineering, Science & Technology, Inc., 1999a; EA Engineering, Science & Technology, Inc., 2000; Ernst et al., 1995; and Jones and Kelso, 1999, all as cited in US Army, 2001a) have indicated a total of 60 fish species. The predominant groups, both in numbers of species and in abundance are minnows and sunfish. Also common are killifish, perch, and American eel (*Anguilla rostrata*, which are catadromous).

Two anadromous species of river herring, alewife (*Alosa pseudoharengus*) and blueback (*Alosa aestivalis*) migrate up Accotink and Pohick Bays and Creeks, and Dogue Creek, during the spawning season, although not far up installation creeks (EA Engineering, Science & Technology, Inc., 1999a; EA Engineering, Science & Technology, Inc., 2000, both as cited in US Army, 2001a). Both spawn in Gunston Cove (Jones and Kelso, 1998, as cited in US Army, 2001a). The semi-anadromous gizzard shad (*Dorosoma cepedianum*) and white perch (*Morone americana*) also spawn in the post waterways (Jones and Kelso, 1998, as cited in US Army, 2001a), as well as desirable species such as largemouth bass (*Micropterus salmoides*). Gunston Cove is recognized as a rich nursery area for these species.

As described in Section 3.8, the waters on and around Fort Belvoir have also been negatively impacted in the past by development, much of which occurred prior to enactment of any stormwater management

regulations. A number of the streams, particularly Accotink, Pohick, and Dogue Creeks, are subject to high concentrations of nutrients and pesticides, lower bank stability, increased bank erosion, and less riparian (stream bank) vegetation than non-degraded sites. This degradation is largely due to stormwater discharges from the increase in impervious surface in their watersheds. Accotink Bay, Gunston Cove, Accotink Creek, Dogue Creek and Potomac River watersheds have high percentages of impervious surfaces (see Section 3.8.1.3). Studies by Fort Belvoir and the Waterways Experiment Station in the late 1990s and early 2000s (Landgraf, 1999; Landgraf, 2003, as cited in US Army, 2007; Allen et al., 1991, as cited in US Army, 2007) noted the ongoing pollution problems in installation streams resulting from the uncontrolled or poorly controlled stormwater. These problems included low baseline flows, flashy stormwater flows, and chemical inputs from developed land areas. The flashy stormwater flows have caused erosion and gullying downstream of stormwater outfalls and deeply incised channels and unstable banks.

Fort Belvoir also has relatively unaffected streams, such as those within the Pohick Creek and Pohick Bay watersheds, which support a healthy, diverse fauna. The small stream known as Butterfly Creek that drains subwatershed 48 (Figure 3.8-2) is unique for Fort Belvoir in that it drains an undeveloped portion of the installation and does not appear to be severely influenced by stormwater or other man-made factors. It is the only stream where eastern mudminnows (*Umbra pygmaea*) were seen during sampling (EA Engineering, Science & Technology, Inc., 1998; 1999b, 1999c; 2000, as cited in US Army, 2001a). This species is a good indicator of good water quality and unaltered channels, and Butterfly Creek is considered to provide a good baseline for any future stream mitigation or restoration projects.

Most of the installation's smaller tributary streams tend to have a less diverse fish assemblage (EA Engineering, Science & Technology, Inc., 2000, as cited in US Army, 2001a), most likely due to limitations in habitat and possibly water quality problems from stormwater or other inputs.

There are no dams or obstructions to prohibit anadromous fish passage up Pohick, Accotink, and Dogue creeks through the installation, but the small size and intermittent flow conditions of most of the smaller tributaries preclude all but the smallest fish species from inhabiting the smaller streams (EA Engineering, Science & Technology, Inc., 2000, as cited in US Army, 2001a).

Fort Belvoir and other organizations (George Mason University, the Virginia Department of Game and Inland Fisheries [VDGIF], and the Virginia Department of Conservation and Recreation – Division of Natural Heritage [VDCR-DNH]), have conducted numerous aquatic surveys to characterize and monitor trends not only for fish, but for other aquatic resources, as well. George Mason University (Jones and Kelso, 1998, as cited in US Army, 2001a; Ruck, pers. comm., July 2013) monitors Gunston Cove, Pohick Bay, and Accotink Bay for Fairfax County on an ongoing basis for water quality and invertebrates, as well as fish. Monitoring results are reported annually to the County.

Like the fish populations, the benthic macroinvertebrate community is typical of upper Coastal Plain streams in the Mid-Atlantic region (USEPA, 1997, as cited in US Army, 2001a), with a predominance of taxa tolerant of pollution (i.e., chironomid midge and oligochaete worm taxa), low numbers of more sensitive taxa (mayflies, stoneflies, and caddisflies), but high numbers of dragonflies and damselflies, the latter being typically considered moderately sensitive. This species composition indicates a benthic community tolerant of changing physical habitat conditions as well as of variable water quality conditions.

None of the fish identified in Fort Belvoir waterways or ponds are designated as threatened or endangered at the federal or state level. The only such species identified in this region are the shortnose and Atlantic sturgeon (*Acipenser brevirostrum* and *Acipenser oxyrinchus oxyrinchus*, respectively), which occur rarely in the Potomac River. These species may occur in the nearshore Fort Belvoir waters, but are unlikely to occur in any of the streams.

Fort Belvoir has been subject to an influx of invasive species, such as the Oriental mystery snail (*Bellamya chinensis*) and snakehead fish (*Channa argus*). Snakeheads are top predators and feed on and compete with native and/or naturalized fishes (VDGIF, 2013). In addition, they may transmit parasites and diseases to

native wildlife. Control of invasive species is one of Fort Belvoir's water resource management objectives (US Army, 2001a).

Recreational and commercial fishing are important activities in Fairfax County and Fort Belvoir participates in regional management efforts, such as shad (*Alosa sapidissima*) restoration.

Wildlife

Fort Belvoir's natural environment is a complex area where several ecological subregions converge, resulting in diverse environmental conditions, habitats, and climate. The installation also occupies an important location for many bird species because it is located along the Atlantic Flyway.

While located in one of the most congested regions of the country, approximately 65 percent of Fort Belvoir (Main Post and FBNA) is still undeveloped. These large tracts of undeveloped land, together with other tracts such as the Huntley Meadows County Park to the northeast and the federal, state, and regional refuge and parks on Mason Neck peninsula to the southwest, provide a chain of habitats that support a diverse and abundant regional wildlife population.

Fort Belvoir has taken the lead on many key environmental initiatives, including: ecosystem management, habitat connectivity and preservation, species migration, biodiversity, and endangered species management. As mentioned, Fort Belvoir has provided for ecological connectivity through the installation by designating significant portions of the post as wildlife refuges, bald eagle management areas, the FWC through Main Post, and the Accotink Creek Conservation Corridor through the FBNA. These area designations were made and expanded as mitigations for various land use actions, and recognize the sensitive ecological resources and functions provided by those land areas.

The post provides habitat for a wide range of wildlife species. A series of baseline small mammal field surveys covering representative areas of all habitat types on the Main Post between 1987 and 1994 identified 43 species. The mix of species identified are those that can be found in a variety of habitats, such as the northern short-tailed shrew (*Blarina brevicauda*), and those that prefer habitat types that the installation provides, such as the woodland vole (*Microtus pinetorum*) in undisturbed mature forest, and the meadow vole (*Microtus pennsylvanicus*) in grassy old fields.

Some mammal species present management concerns. Beaver (*Castor canadensis*) can significantly alter habitat conditions through tree removal and dam building, and their impoundments are responsible for the presence of extensive areas of palustrine wetland along Dogue Creek and within drainages to Accotink and Pohick Creeks (US Army, 2007a). White-tailed deer (*Odocoileus virginiana*), the largest mammal found on the installation, is found throughout the installation in nearly all habitats (US Army, 2007a). The current deer population is declining but still remains a management concern. Overbrowsing has declined with the current decline in population (Walter, pers. comm., November 2013).

The FBNA supports common species such as Virginia opossum (*Didelphis marsupialis*) and gray squirrel (*Sciurus carolinensis*) (Tetra Tech, 2006b; US Army Toxic and Hazardous Materials Agency, 1990, both as cited in US Army, 2007a). More recent surveys have detected the presence of species not previously seen on post such as red fox (*Vulpes vulpes*) and coyote (*Canis latrans*) (Walter, pers. comm., November 2013).

Wildlife Management

Fort Belvoir coordinates with appropriate state and federal agencies on its wildlife management activities and practices. With the Virginia Department of Game and Inland Fisheries (VDGIF), this includes a deer-hunting program to control overbrowsing, and participation in the Virginia Deer Management Assistance Program (US Army, 2014a).

Bird surveys are conducted annually on the Main Post. These surveys have identified 275 bird species including resident, temperate migrant, and neotropical migrants. Ninety-nine species are common or abundant during the seasons when they occur on-post, indicating that the mix of habitats on the installation and the extensive areas of natural habitat provide suitable habitat for many bird species. Those habitat features include large, contiguous areas of undeveloped land; a variety of ecological communities; and abundance of food sources (e.g., insects, seeds, berries, aquatic invertebrates).

Partners-in-Flight (PIF) is a cooperative effort launched in 1990 to emphasize the conservation of birds not covered by existing conservation initiatives. PIF is a partnership among federal, state, and local government agencies, philanthropic foundations, professional organizations, conservation groups, industry, the academic community, and private citizens (Partners in Flight, 2010).

Bird species of management concern to Fort Belvoir include those considered by VDCR-DNH to be rare in Virginia, and Partners-in-Flight (PIF) concern species for conservation. Fort Belvoir actively promotes preservation and enhancement of habitat for some of these species (US Army, 2007a). Based on the current GIS mapping, there are approximately 4,200 acres of PIF habitat on Fort Belvoir (Figure 3.9-3), a portion of which overlaps with the wildlife refuges and the FWC (US Army, 2014a). These PIF concern species are also the avian species recognized by the US Fish and Wildlife Service's (USFWS) Migratory Bird Rule, EO13186, and the Memorandum of Understanding (MOU) for Migratory Bird Conservation (USFWS and DoD, 2006; Executive Office of the President, 2001). These are the regulations agreed upon between the USFWS and DoD that indicate the responsibility for DoD land managers to monitor and manage for these species and their habitats. PIF concern species include the eastern towhee (*Pipilo erythrophthalmus*), Baltimore oriole (*Icterus galbula*), chimney swift (*Chaetura pelagic*), northern flicker (*Colaptes auratus*), brown thrasher (*Toxostoma rufum*), eastern wood-pewee (*Contopus virens*), and grasshopper sparrow (*Ammodramus savannarum*).

Fort Belvoir natural resources management tries to control undesirable species, such as the brown-headed cowbird (*Molothrus ater*), a brood parasite that lays its eggs in the nests of other small birds. The cowbird poses a significant threat to nesting migrants, including several of the Fort Belvoir PIF concern species. Cowbirds benefit from habitat fragmentation, and management includes minimizing fragmentation to control intrusion into forested tracts and protecting vulnerable migratory bird species from nest predation (US Army, 2007a).

Information on birds on the FBNA includes data from annual bird surveys and observations of PIF species. The forest clearings associated with the former training ranges on the FBNA west of Accotink Creek appear to provide good habitat for bird species favoring old field habitats, such as the eastern towhee and field sparrow. The oak/heath forest and other mature upland forests on the slopes adjoining Accotink Creek provide good habitat for species favoring forest interior habitat, while the brushy, open areas surrounding Heller Loop provide habitat for species favoring old fields. The dense Virginia pine saplings around the perimeter of Heller Loop and other scattered locations on EPG might provide habitat for species favoring coniferous forests (US Army, 2007a)

Field surveys of reptiles have identified 32 species occurring or likely to occur on Main Post, including 10 species of turtle, 18 species of snake, and 4 species of lizard. All of the species are typical of the northern Virginia, upper-Coastal Plain, although several are at the limits of their ranges (e.g., the North American wood turtle, a state-listed threatened species). All 10 species of turtles occur in association with shallow, slow-moving waters with mud bottom, while snakes occur in all habitat types at Fort Belvoir, including surface waters. Three of the four lizard species occur in deciduous or deciduous/mixed woods; the fourth occupies dry, open areas.

On the FBNA, the former ranges and the old-fields provide good habitat for snakes common to brushy upland areas, and for turtles common to upland areas, such as the eastern box turtle (*Terrapene carolina*

carolina). The only venomous snake endemic to Fort Belvoir is the copperhead (*Agkistrodon contortix*), which occurs in moist, deciduous/mixed woods (US Army, 2001a).

Twenty-seven amphibian species have been identified as occurring or potentially occurring on the Main Post, including 11 species of frog, 3 species of toad, and 13 species of salamander. Like the other wildlife species, they are all typical of the northern Virginia upper-Coastal Plain, and several are at the limits of their range. The varied aquatic and terrestrial habitats on the installation, including wetland areas, wooded drainage areas, and ephemeral ponds, provide extensive areas of suitable amphibian habitat. Development, loss of cover, loss of surface waters, habitat fragmentation, and disruption of natural travel corridors are threats to the amphibian populations on the installation (US Army, 2007a). The most recent survey for amphibians and reptiles was conducted in 2010, and focused on the combined Training Areas seven (T-7) and ten (T-10), and a portion of the Accotink Bay Wildlife Refuge. That survey identified 11 frogs, 4 salamanders, 5 turtles, and 4 snakes within the limited area of investigation (Mitchell, 2010a).

The small, narrow areas of wetlands on the FBNA along Accotink Creek and its tributaries provide favorable habitat for amphibians. These areas are surrounded by undeveloped forested uplands, providing improved habitat value (US Army, 2007a).

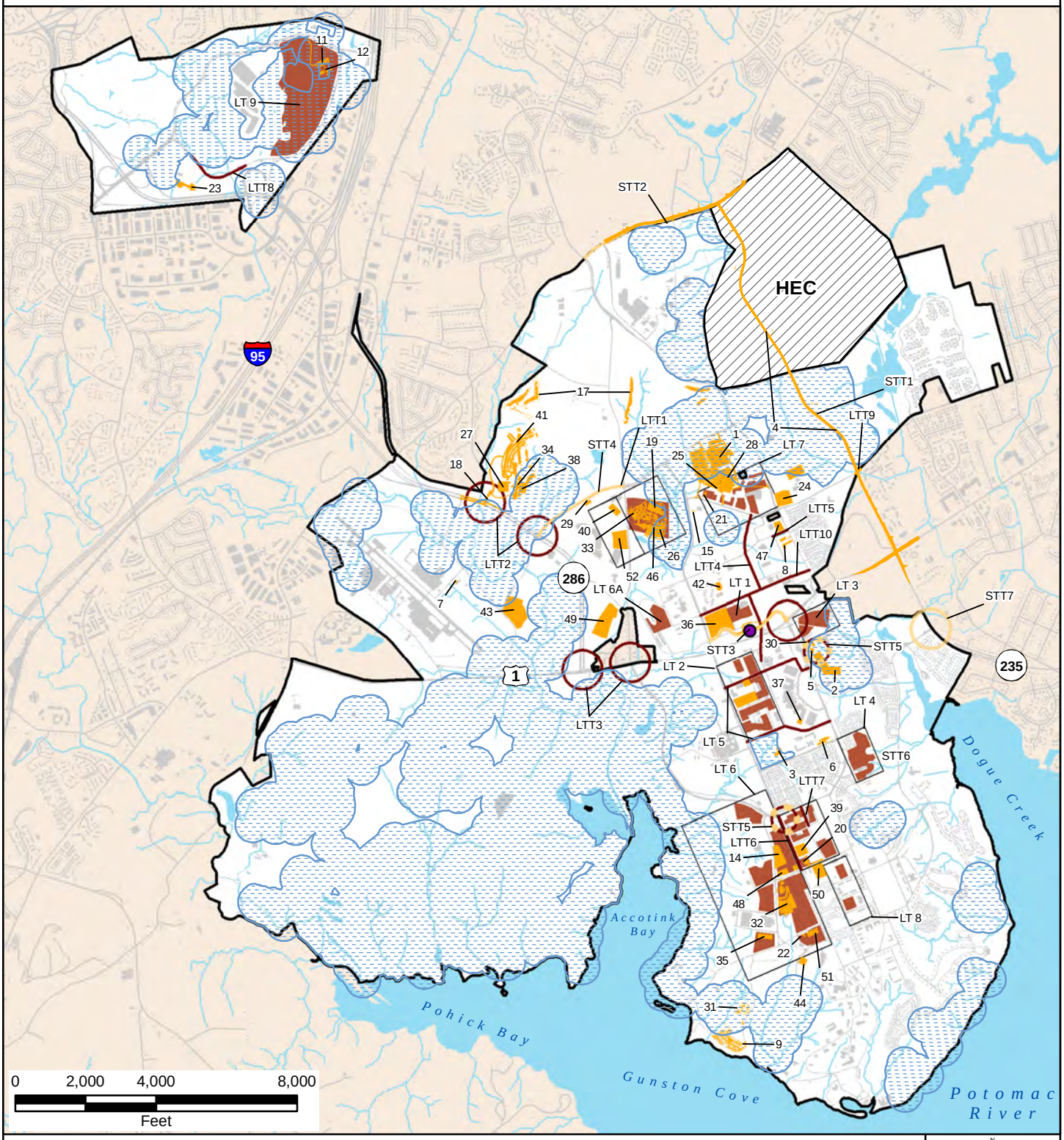
3.9.1.3 Rare, Threatened, and Endangered Species & Habitats

Under the Endangered Species Act of 1973, plant and animal species in danger of extinction throughout all or a significant part of their range are listed as "endangered." Species that are likely to become endangered within the foreseeable future throughout all or a significant part of their range are listed as "threatened." The Endangered Species Act establishes the federal government's responsibility for protection and recovery of species considered to be in danger of extinction. The act requires federal agencies to undertake affirmative actions to protect and restore populations of listed threatened and endangered species and to prevent proposed and candidate species (i.e., species at risk or SAR) from being listed (US Army, 2001a).

Endangered and threatened listings impart protective status to the listed species and their habitats. With the exception of the federal- and state-listed-as-threatened small whorled pogonia (*Isotria medeoloides*), a perennial terrestrial orchid which has been found on the FBNA, Fort Belvoir has no federally-listed threatened, endangered, candidate or proposed species (the bald eagle was delisted in 2007). There are no designated critical habitats for federally-listed species on Fort Belvoir. However, this section also addresses the Northern Virginia well amphipod. The only reason this species has not been listed is because the responsible agency (USFWS) believes its range is limited to Main Post, and that Fort Belvoir is taking the necessary steps to preserve it and its habitat (Keough, pers. comm., November 25, 2013).

Virginia has also promulgated a state endangered species acts that provides endangered and threatened listings for animal species vulnerable to extinctions at the state level. The Virginia statute prohibits the taking, transportation, possession, sale, or offer for sale within the Commonwealth of Virginia of species listed on the US Endangered Species List or any other species designated by the state board (4 VAC 15-20-130). The Commonwealth also provides protection for plant and insect species through Chapter 10 §3.2-1000 of the Code of Virginia. It is the role of VDCR-DNH to maintain listings and rarity (i.e., conservation) rankings of rare plant and animal species and ecological communities, and to work with landowners to help identify what natural heritage resources inhabit their property. VDCR-DNH rates individual species and communities with resource conservation rankings from S1 (extremely rare) to S5 (very common). VDCR-DNH rates specific sites of these species and communities with site conservation rankings of B1 (outstanding significance) to B5 (general biodiversity significance).

Partners-in-Flight Concern Species Habitat



Partners-in-Flight Buffer
Short-Term Improved/New Road
Long-Term Improved/New Road
Short-Term Project Sites (Construction FY 2012 - 2017)
Long-Term Project Sites (Construction FY 2018 - 2030)

Fort Belvoir RPMP EIS

Figure 3.9-3

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DoD's natural resources management policy (DoD Instruction 4715.3, Environmental Conservation Program) requires installations to inventory and protect important biological resources. The Army's natural resources management policy in AR 200-1 reiterates the Army's commitment to carry out mission and program requirements that are consistent with the requirements of the federal Endangered Species Act, be sensitive to those species listed as endangered or threatened under state law, and prepare endangered species management plans for listed and proposed species.

Rare, Threatened, and Endangered Plant Species and Communities

A natural heritage inventory of Main Post and FBNA in the late 1990s by VDCR-DNH identified the installation's natural heritage resources, including those sites supporting unique or exemplary natural communities, rare species, and other significant natural areas (Hobson, 1996; 1997, as cited in US Army, 2001a). Since that time, Fort Belvoir has conducted field surveys for the federally-listed threatened and Virginia state-listed endangered small whorled pogonia and other rare plant species on a project-by-project basis, usually during the NEPA process, for those projects that encompassed natural areas. Of the RPMP projects, ST 1 (new PX), ST 4 (Mulligan Road Phase II), ST 10 (Utility Upgrades), ST 17, 18, 27, 34, 38, and 41(NMUSA), and ST 19, 26, 33, and 46 (INSCOM) project sites have been surveyed. The locations for rare, threatened and endangered plant and animal species are shown in Figure 3.9-4; the locations of rare plant communities are shown in Figure 3.9-5.

VDCR-DNH resurveyed parts of Fort Belvoir for small whorled pogonia during the 2011-2012 field seasons, concentrating on sites for proposed new water and sewer lines, or lines to be upgraded (ST 10), and the 300 Area on South Post. Most of the areas surveyed were on South Post; two surveys were on North Post bordering US Route 1. All surveys focused on areas of high and medium potential for the species. The survey of the 300 Area indicated suitable habitat on some of the wooded slopes surrounding the developed area (VDCR-DNH, pers. comm., July 16, 2012; Van Alstine, 2013a). No RPMP projects are proposed in the 300 Area through 2030.

Potential habitat for the threatened small whorled pogonia includes open, dry, deciduous woods with acidic soil and a relatively open understory and sparse groundcover, or shaded openings in mixed hardwood-pine woods (USFWS, 1996, and Wetland Studies and Solutions, Inc., 2005, both as cited in US Army, 2007a)

To date, the small whorled pogonia has not been found on Main Post (Bedker, 2005; Wetland Studies and Solutions, Inc., 2005, both as cited in US Army, 2007a; VDCR-DNH, pers. comm., July 16, 2012; Van Alstine, 2013a), but it has been observed on steep, oak-dominated forested slopes of a first order tributary of Accotink Creek in the southwestern part of the FBNA. This is the only location in Fairfax County where the species has been found (Wetland Studies and Solutions, Inc., 2005, as cited in US Army, 2007a). Potential habitat for the small whorled pogonia can be found along the western, southern, and eastern boundaries of the FBNA.

VDCR-DNH also surveyed suitable habitats on the post – the fresh tidal marsh habitat of the lower Pohick Creek, Accotink Creek, and Dogue Creek drainages – for another federally- and state-listed threatened species, sensitive joint-vetch (*Aeschynomene virginica*) during the 2011-2012 field seasons, but none was found (Van Alstine, 2013b). It is an annual that lives in fresh tidal marsh habitat.

While not listed as threatened or endangered, four of the plant communities on Main Post are considered very rare or extremely rare, and three are ranked as rare to uncommon. They are therefore addressed in this section. Their conservation is important to Fort Belvoir's goal of maintaining biodiversity. These plant communities include:

- Tidal Freshwater Marsh – Spikerush/Golden-club: extremely rare
- Tidal Freshwater Marsh – Mixed: extremely rare
- Coastal Plain/Piedmont Acidic Seepage Swamp: very rare

- Tidal Shrub Swamp: very rare
- Tidal Freshwater Marsh – Wild Rice/Smartweed: rare to uncommon
- Tidal Freshwater Marsh – Mud Flat: rare to uncommon
- Tidal Hardwood Swamp: rare to uncommon (McCoy et al., 2000).

All of these communities are wetland types, located in the stream valleys and along shorelines, away from areas likely to be impacted directly by RPMP projects (Figure 3.9-5). However, other potential threats to the ecological integrity of each of these plant communities include (1) displacement by invasive/exotic species, and (2) stormwater-related problems (e.g., sedimentation) (US Army, 2001a).

Rare, Threatened, and Endangered Animal Species

There presently are no known federally-listed threatened or endangered animal species inhabiting either the Main Post or FBNA. For years, the bald eagle (*Haliaeetus leucocephalus*) represented the only federally-listed animal species known to inhabit the installation. It was "delisted" from the federal 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 Migratory Bird Act.

Inventories conducted by VDCR-DNH identified nine Virginia state rare animal species (including one migrant – the peregrine falcon) and 16 state "watchlist" animal species. Each of these species was documented as occurring in aquatic or wetland habitats. Figure 3.9-4 shows the locations of habitats for these species on Fort Belvoir. A complete listing of rare species can be found in the Fort Belvoir INRMP. These inventories have included the FBNA property. Only two rare species are considered to occur or potentially occur on the FBNA (US Army, 2007a).

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 the Fort Belvoir shoreline's being included in the state's designated Mason Neck Eagle Concentration Area. This is one of only five such designated Eagle Concentration Areas in all of Virginia. Historic records indicated that eagles nested along the river and embayment shorelines and well up into the installation interior along sloped drainages. There are also records of nesting at FBNA in the 1940's (US Army, 2001a).

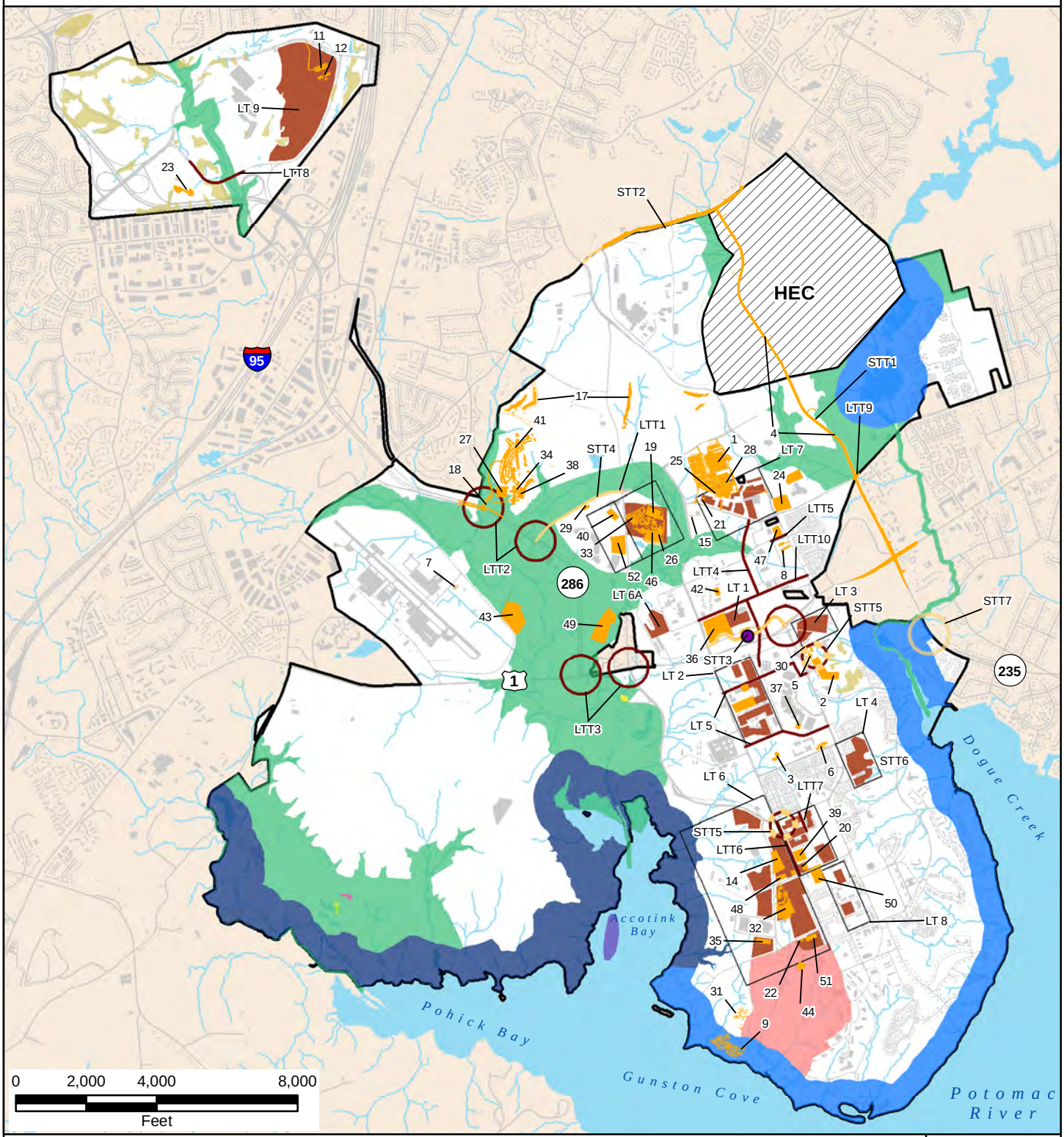
There was a period of time when no eagle nesting occurred on the installation, until 1991. Since then, there have been up to four active eagle nests along the Dogue Creek, Potomac River, and Pohick Bay shorelines (US Army, 2001a). Every one of these nests fledged at least one chick during the 2013 season (Pilcicki, pers. comm., September 9, 2013).

Bald and Golden Eagle Protection Act of 1940 – Prohibits the taking of bald and golden eagles or their nests and eggs. Under this Act, taking is defined as "to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb."

Migratory Bird Treaty Act of 1918 – Established to protect migratory birds and prohibits the taking of any migratory bird, nest, egg, or part, except as permitted by the US Fish and Wildlife Service. The prohibitions under this law and its regulations generally include activities or attempted activities that pursue, hunt, shoot, wound, kill, trap, capture, possess, or collect any migratory bird species and their nests and eggs.

Fort Belvoir incorporated the management requirements and recommendations of the USFWS Bald Eagle Guidance for Virginia (USFWS, 2000), the VDGIF Management Guidelines and Recommendations (Cline, 1996), and the staff's own knowledge of local conditions into its own eagle management guidelines (Paciulli, Simmons & Associates, Ltd., 2000) for Fort Belvoir. These guidelines are provided in its INRMP (US Army, 2001a). The Fort Belvoir INRMP bald eagle guidelines emphasize conservation of all bald eagle habitat, including foraging habitat.

Rare, Threatened or Endangered Species Habitats



- Bald Eagle Occasional Use Forage Area
- Bald Eagle High Use Forage Area
- Furtive Forktail
- Least Bittern
- Northern Virginia Well Amphipod
- Paper Ponshell
- Peregrine Falcon
- Sphagum Sprite
- Umber Shadowfly
- Wood Turtle
- Small Whorled Pogonia
- Short-Term Improved/New Road
- Long-Term Improved/New Road
- Short-Term Project Sites (Construction FY 2012 - 2017)
- Long-Term Project Sites (Construction FY 2018 - 2030)

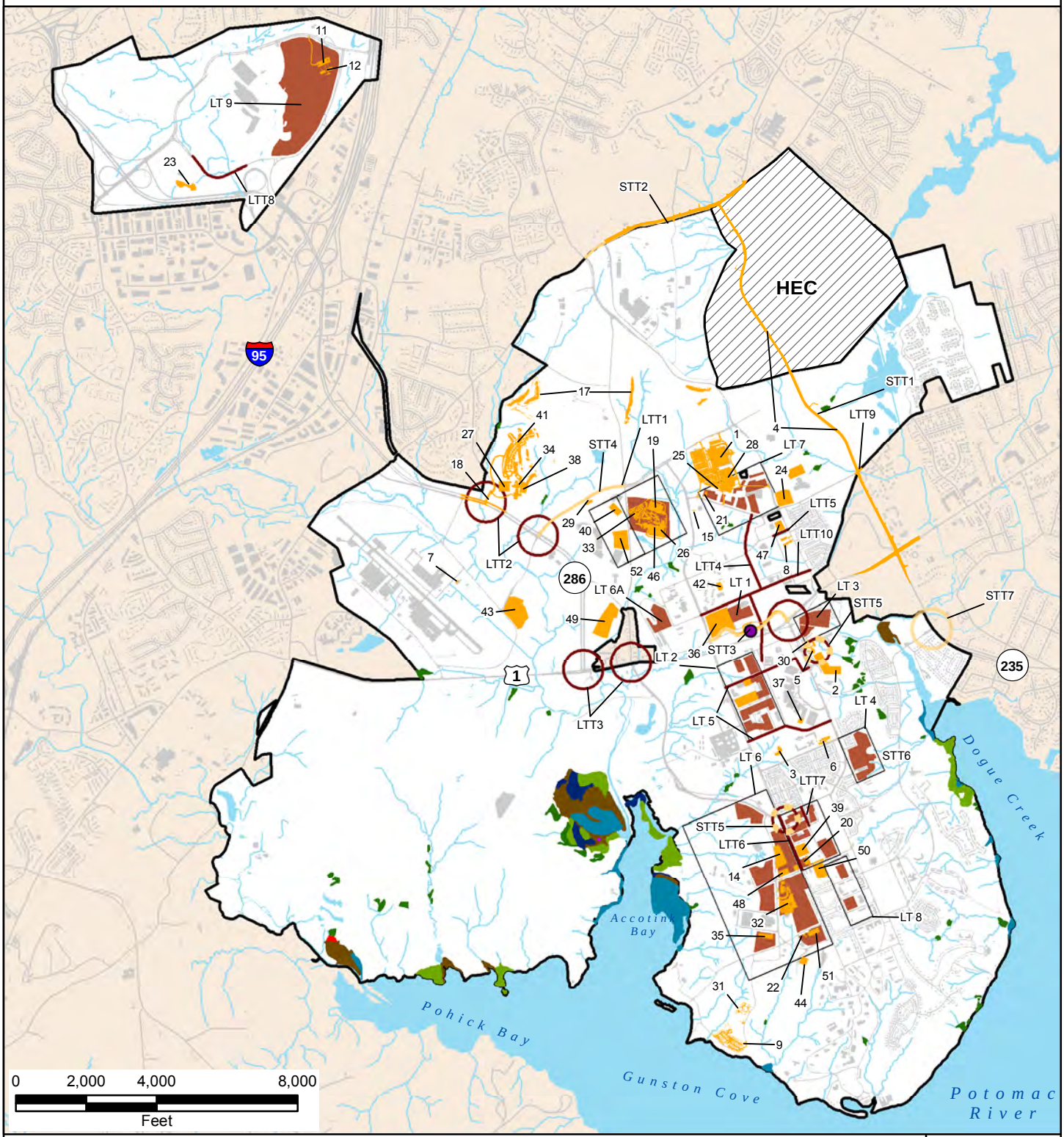
Fort Belvoir RPMP EIS

Figure 3.9-4

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Rare Plant Communities



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Figure 3.9-5

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They established four broad management actions:

- Designating specific eagle management areas, i.e., Active Nest Site Protection Area, Historic Nest Site Protection Area, High-Use Foraging Protection Area, and Occasional Use Foraging Protection Area, with area-specific management activities to protect the eagle and its habitat on Fort Belvoir. (High Use and Occasional Use Protection Areas are show on Figure 3.9-4.)
- Implementing habitat enhancement projects by correcting utility poles that pose an electrocution hazard, and performing timber stand improvements to improve potential nest habitat.
- Developing and implementing an eagle awareness training program for installation personnel, and developing and implementing a public education program on bald eagles and their protection to minimize the risk of disturbance to eagles.
- Continuous monitoring of bald eagle activity and bald eagle habitat on post, including active nest sites, potential nest habitats, and shoreline foraging and loafing areas.

Detailed management actions are provided in Table 12.4 of the INRMP (US Army, 2001a).

The Fairfax Audubon Society has reported sighting bald eagles in forested land on Accotink Creek upstream of the FBNA, and it is reasonable to expect that the creek can provide foraging habitat for bald eagles where it passes through FBNA. Bald eagles historically nested on FBNA in the Accotink Creek riparian corridor (US Army, 2007a).

Fort Belvoir coordinates with the VDGIF and the USFWS for any activities proposed in bald eagle nesting and activity areas to ensure compliance with the guidelines and minimal disturbance of the birds.

American Peregrine Falcon

The American peregrine falcon (*Falco peregrinus*) is a state-listed threatened species that occurs seasonally at Fort Belvoir but is not considered a resident. Falcons forage along the Accotink Creek/Accotink Bay stream corridor and the Jackson Miles Abbott Wetland Refuge during fall migration (US Army, 2001a). They also are likely to forage along the Accotink Creek corridor where it crosses the central part of the FBNA (US Army, 2007a).

North American Wood Turtle

The North American wood turtle (*Clemmys insculpta*) is a state-listed threatened species that has been found in the Dogue Creek and Accotink Creek drainages on Main Post (US Army, 2001a). At Fort Belvoir, the species is near the southeastern extent of its range. Within its range, the turtle is generally uncommon to rare (Harding, 2002; US Army, 2001a). Wood turtles are generally found near moving water, though they may use areas at considerable distances from water, and in some places they appear to use riparian woods, shrub or berry thickets, swamps, and open, grassy areas. Some unvegetated or sparsely vegetated patches are needed for nesting. The turtles hibernate in stream bottoms in winter and use stream valleys as dispersal corridors. Wood turtles are a conservation concern because their populations have been depleted by collecting for the pet trade and habitat destruction. A naturally low reproductive rate and continued habitat loss keep turtle populations from recovering.

A wood turtle on Fort Belvoir was first observed in the Jackson Miles Abbott Wetland Refuge on North Post near the western edge of the marsh in 1988 (Hobson, C. S., 1996, as cited in US Army, 2001a), then not again (despite searches) until 1998, when two wood turtles were observed on Main Post, one along Dogue Creek near the Jackson Miles Abbott Wetland Refuge, and another along Accotink Creek near US Route 1. In 1999, another was observed along Accotink Creek in the Accotink Bay Wildlife Refuge.

During a study of standardized field reptile and amphibian monitoring techniques in 2009 and 2010, no wood turtles were found. The study was conducted in Training Areas 7 (T-7) and 10 (T-10), and a portion of

the Accotink Bay Wildlife Refuge (Mitchell, 2010a). A third survey conducted along Mason Run in 2010 to support the EA for the INSCOM Expansion (ST 19, 26, 33, and 46) (Mitchell, 2010b) on North Post found no turtles, and indicated that Mason Run and its primary tributary in the INSCOM area do not provide wood turtle habitat. The vegetation in the associated floodplains is limited in diversity and sparse, and there is no adequate habitat for hibernation.

On the FBNA no wood turtles were found during a survey from April to June in 2002 (Paciulli, Simmons, and Associates, Ltd., and Mitchell Ecological Research, LLC, 2002, as cited in US Army, 2007a). That survey included eight days of visual encounter survey work and 46 days of turtle trapping activities along Accotink Creek. The survey noted that some areas along the creek within the FBNA possess physical characteristics similar to suitable wood turtle habitat in more rural settings, but it concluded that those areas are not optimal wood turtle habitat because of the narrow floodplain, presence of exotic riparian vegetation, and runoff from dense, upstream development.

Wood turtles may be found in the future on Fort Belvoir, particularly in the areas where they have been found in the past – in the Accotink and Dogue Creek watersheds and in and near the Jackson Miles Abbott Wetland Refuge. Projects proposed in and near these areas must include surveys for their presence.

Fort Belvoir planners make every effort to site projects and activities away from areas of high quality wood turtle habitat. When activities must occur in areas of potential habitat, Fort Belvoir conducts field surveys of the project area, and provides educational materials to construction staff to aid in identification of wood turtles. Fort Belvoir's designation of the wildlife refuges and the FWC, as well as preservation of riparian forested areas, all serve to protect wood turtle habitat on post.

Shortnose and Atlantic Sturgeon

The federally-listed endangered shortnose sturgeon (*Acipenser brevirostrum*) and Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) are present in the Potomac River (National Marine Fisheries Service, 1998, Atlantic Sturgeon Status Review Team, 2007). The Chesapeake Bay distinct population segments of each of these species include sturgeon that occur in the Potomac River.

The shortnose and the Atlantic sturgeon share many common characteristics – both species are long-lived, late-maturing, estuarine-dependent, anadromous species. Atlantic sturgeon grow larger, spend more time in marine environments, and have a more northerly range than the shortnose sturgeon (National Marine Fisheries Service, 1998). Although classified as anadromous, shortnose sturgeon spend only a limited amount of time at sea and do not venture far offshore. Morphological differences that differentiate the two species include snout shape, mouth width, and bony plates along the anal fin.

Both the shortnose sturgeon and Atlantic sturgeon are demersal (bottom-dwelling) omnivores that use their flattened snouts to search through bottom sediments and their sensitive barbels (whisker-like tactile organs) to find crustacea, insects, worms, and small mollusks, which they suck into their mouths. Sturgeon are opportunistic and feed on organisms in mud substrates or on plant surfaces. Potential habitat for both shortnose sturgeon and Atlantic sturgeon occurs within the study area and Anadromous Fish Use Areas of the Chesapeake Bay area, including Accotink Creek, Dogue Creek, Pohick Creek, and the Potomac River (US Army, 2007a).

Between 1996 and 2010, 15 shortnose sturgeon were documented in the Potomac River, with the closest recent sighting near Craney Island just south of Fort Belvoir and Mason Neck on September 20, 2005 (Eyler, pers. comm., January 11, 2011). The shortnose sturgeon capture and tracking data from the Potomac River indicate that shortnose sturgeon in the Potomac River are very rare (Kynard et al., 2007).

A total of 226 Atlantic sturgeon were reported in the Potomac River between 1996 and 2010 (Eyler, pers. comm., January 11, 2011). All Atlantic sturgeon have been captured below Fort Belvoir. No spawning has been recorded for either species in the Potomac River; however, if sturgeon were to spawn it would likely

occur well upriver of Fort Belvoir at the head of the tidal zone in the vicinity of Little Falls (Kynard et al., 2009; National Oceanic and Atmospheric Administration Fisheries Service, 2013).

Northern Virginia Well Amphipod

The Northern Virginia well amphipod (*Stygobromus phreaticus*) is a distinctive species of underground amphipod that has a very limited range (Holsinger, 1991 as cited in VDCR-DNH, 2013). It is a tiny crustacean, in the group commonly known as shrimp, scuds, or sideswimmers. It is a federal species of concern that is listed by Virginia as extremely rare and is considered to be globally rare. It is designated as a species at risk by Fort Belvoir.

The Northern Virginia well amphipod has been documented at only three sites, including historical collections from Alexandria (1921) , Vienna (1948), and at a "single ravine seepage habitat on a military base in Fairfax County, Virginia" (Chazal and Hobson, 2003, as cited in VDCR-DNH, 2013), namely the T-17 training area ravine seep on the South Post. A single specimen was collected from here in 1996; a few specimens were collected in 2003; and a number of specimens were found during recent (2013) sampling. The 2013 sampling was coupled with water quality sampling to identify the groundwater system with which the Northern Virginia well amphipod is associated (Pilcicki, pers. comm., September 9, 2013).

The T-17 ravine was designated as a wildlife refuge by Fort Belvoir in order to protect this species. The exact collection sites for the Alexandria and Vienna records are unknown, and it is likely these sites have been destroyed by urbanization, making the T-17 Range site all the more important. As indicated above, the amphipod has not been designated as endangered by the USFWS or the state for the sole reason that the T-17 seep on Fort Belvoir is its only known habitat, and the agencies are confident that Fort Belvoir would protect its habitat (Keough, pers. comm., November 25, 2013).

The Northern Virginia well amphipod is not known to occur on the FBNA, although suitable seep habitat occurs there in the Accotink Creek riparian corridor. VDCR-DNH surveyed for *Stygobromus phreaticus* and other *Stygobromus* species in the summer of 2012 (Vega, pers. comm., February 15, 2012). Other species of the genus *Stygobromus* were found, but no specimens of the Northern Virginia well amphipod.

Northern Long-eared Bat

The northern long-eared bat (*Myotis septentrionalis*) was recently listed as "threatened" under the ESA (effective May, 2015) and may occur in forested areas on Fort Belvoir.

3.9.1.4 Wetlands

Wetlands perform a variety of functions important to maintaining the quality of natural and cultural resources. Healthy native wetlands supply habitat for wetland-dependent plant communities and fish and wildlife species. They contribute to environmental quality by moderating flood flows; protecting against erosion; improving water quality; and supporting global cycling of available nitrogen, sulfur, carbon dioxide, and methane. Additionally wetlands provide aesthetic and recreational value to support the quality of life for soldiers and supply realistic training conditions for field training exercises (US Army, 2001a)

Wetlands at Fort Belvoir are characteristic of the upper Coastal Plain/lower Piedmont, typically occurring in association with the drainage network. The larger tributary waterways to the Potomac, such as Accotink Creek, Dogue Creek and Pohick Creek, tend to have wide areas of tidal wetlands (marsh and mudflats) at their outfalls. Upstream from the outfall area, the marsh wetland area gives way to floodplain/bottomland hardwood forest within the riparian zone. This forest area tends to be wider in the lower reaches, where the tidally influenced floodplain is wider and lower, and diminishes in extent further upstream concurrent with the narrowing of the floodplain area. The region, including Fort Belvoir, has another characteristic wetland type – the seepage swamp wetland which occurs in steep-sloped areas along the Potomac River and its associated tributaries (US Army, 2001a).

The regulatory programs for wetland protection at both the federal and state levels also include protection of streams and other surface waters, and regulation of these other waters are discussed in this section, as well. The US Army Corps of Engineers regulates the discharge of dredged and fill material into wetlands and waterways under Section 404 of the Clean Water Act (33 C.F.R. §§ 320 -330). The State of Virginia also regulates any alteration of wetlands or inland waterways under the Virginia Wetland Permit Program (9 VAC 25-210), and tidal wetlands, subaqueous or bottomlands, and coastal primary sand dunes under the Tidal Wetlands Act (4 VAC 20). "Subaqueous or bottomlands" do not generally include wetlands, but stream and river bottoms where the average annual flow is 5 cubic feet per second or the contributing drainage area is 5 square miles.) In Virginia, the regulating agencies have cooperated to provide one application process (the Joint Permit Application), although separate permits are required from each agency with jurisdiction. Some type of permit or authorization is generally required for the filling or alteration of wetlands and other waterways, and permit conditions generally require avoidance if practicable, and mitigation for unavoidable impacts. Mitigation can be in the form of wetland creation or restoration to compensate for the impacts of individual projects, or it can be in the form of purchasing credits from a federal and state-approved commercial wetland or stream mitigation bank. Fort Belvoir's policy is to try to mitigate somewhere on the post, before considering off-post commercial banks. Figure 3.8-4 shows stream and wetland mitigation projects on Fort Belvoir.

There are approximately 1,200 acres of wetlands on Fort Belvoir's Main Post, which is approximately 12 percent of the land area (US Army, 2014a). The predominant wetland type on Fort Belvoir is palustrine forested wetland, which tends to occur in association with the riparian areas of Accotink, Dogue, and Pohick creeks. Wetlands generally occur along the perennial and intermittent streams that are drainages of these creeks. The FBNA supports approximately 27 acres of wetlands, once again along perennial and intermittent streams associated with Accotink Creek. Figure 3.9-2 shows how wetlands are distributed on both the Main Post and the FBNA. Over the years, Fort Belvoir has constructed wetlands and has restored sections of streams as mitigation for various projects on the post (Figure 3.8-4).

3.9.1.5 Mitigation / Restoration / Enhancement Projects

Fort Belvoir has provided mitigation in association with wetland permits or as specified in NEPA-required FNSIs or RODs for various actions. Fort Belvoir has also performed restoration and enhancement work in various locations on the post, such as PIF habitat projects, as stewardship actions, not because of requirements for a permit or FNSI/ROD.

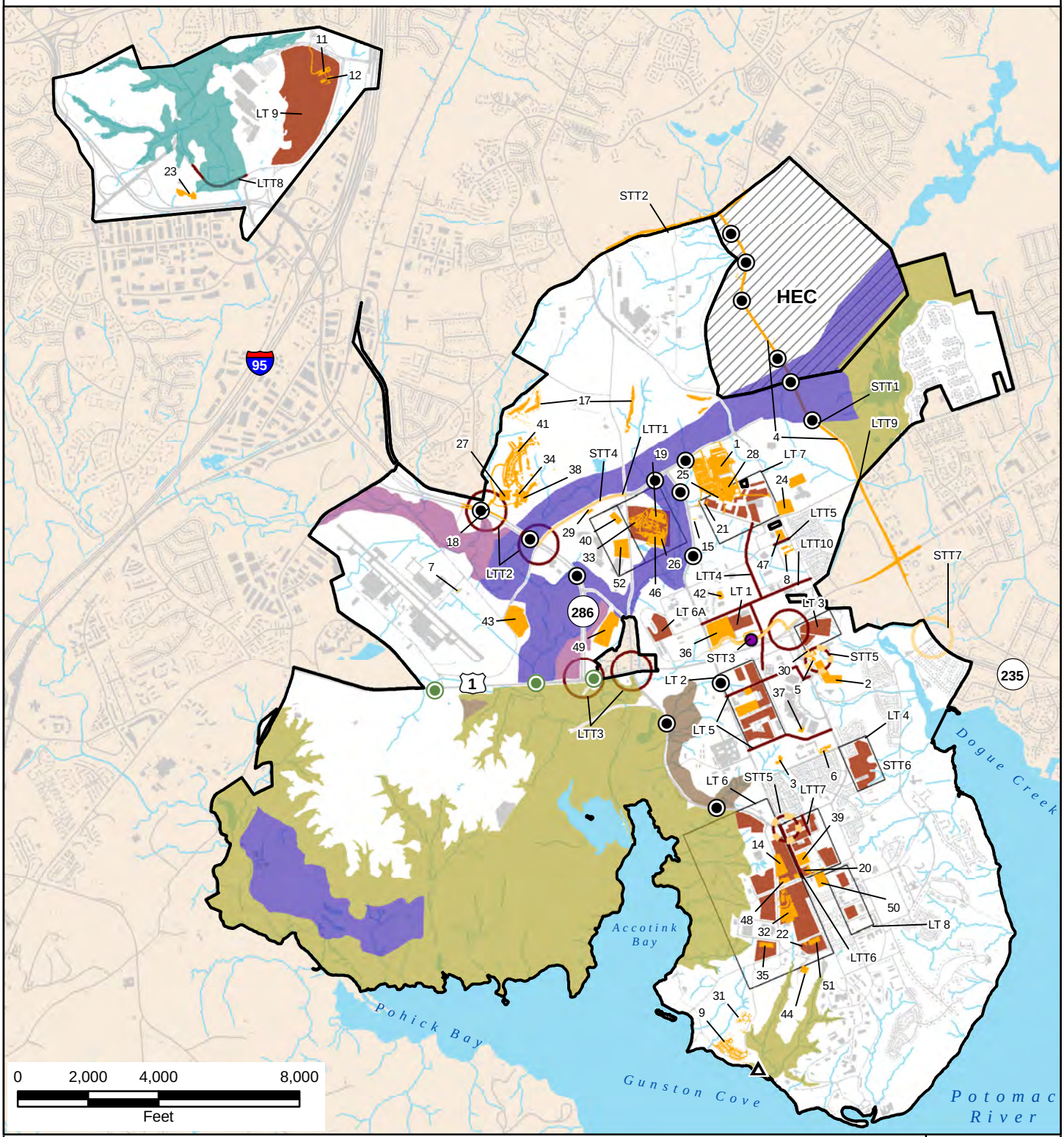
The major mitigation projects that have resulted from NEPA actions include:

- Establishment of the FWC
- Construction of wildlife crossing structures for roads through the FWC
- Establishment of the T-17 Wildlife Refuge
- Expansion of the Accotink Bay Wildlife Refuge
- Expansion of the Jackson Miles Abbott Wetland Refuge
- Reforestation.

In addition, several projects requiring stream and wetland permits have resulted in stream restorations as mitigation commitments.

Figures 3.8-4, 3.9-6, 3.9-7, and 3.9-8 show the stream and wetland mitigation areas (completed and potential), the refuges, the FWC, existing PIF habitat restoration areas, PIF habitat mitigation sites, and potential tree planting sites, respectively.

Mitigation Sites: Refuges and Forest and Wildlife Corridor



Completed Mitigation Sites/Areas
- Conservation Corridor
- Forest Wildlife Corridor
- Refuge
- Trail
- Wildlife Crossing

Proposed Mitigation Sites/Areas
- Forest Wildlife Corridor
- Refuge
- Wildlife Crossing

- Short-Term Improved/New Road
- Long-Term Improved/New Road
- Short-Term Project Sites (Construction FY 2012 - 2017)
- Long-Term Project Sites (Construction FY 2018 - 2030)

Fort Belvoir RPMP EIS

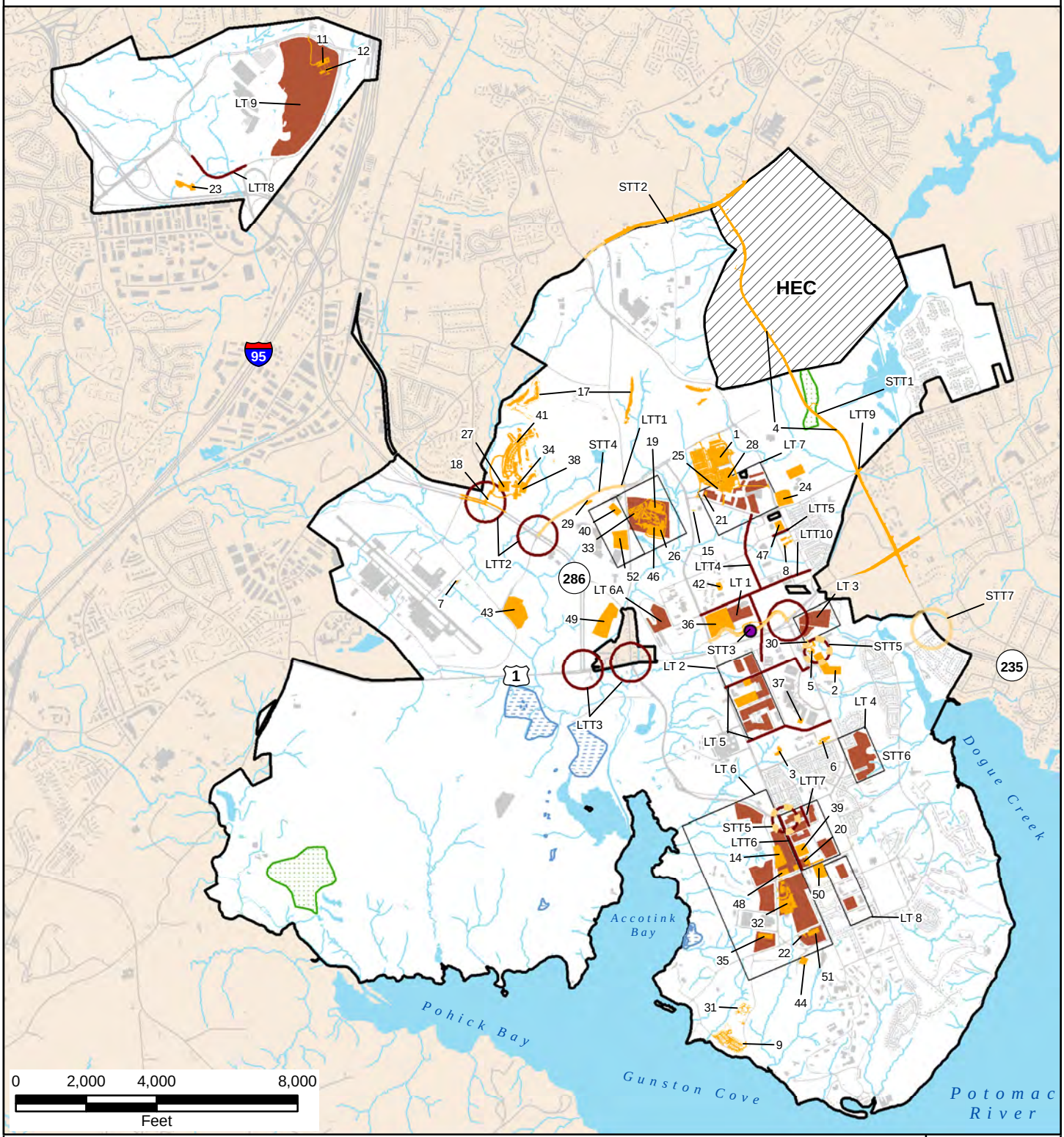
Source: Fort Belvoir GIS

Figure 3.9-6

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Mitigation Sites: Partners-in-Flight Areas



Partners-in-Flight Restoration Sites - Complete
Partners-in-Flight Mitigation Sites - Proposed
Short-Term Improved/New Road
Long-Term Improved/New Road
Short-Term Project Sites (Construction FY 2012 - 2017)
Long-Term Project Sites (Construction FY 2018 - 2030)

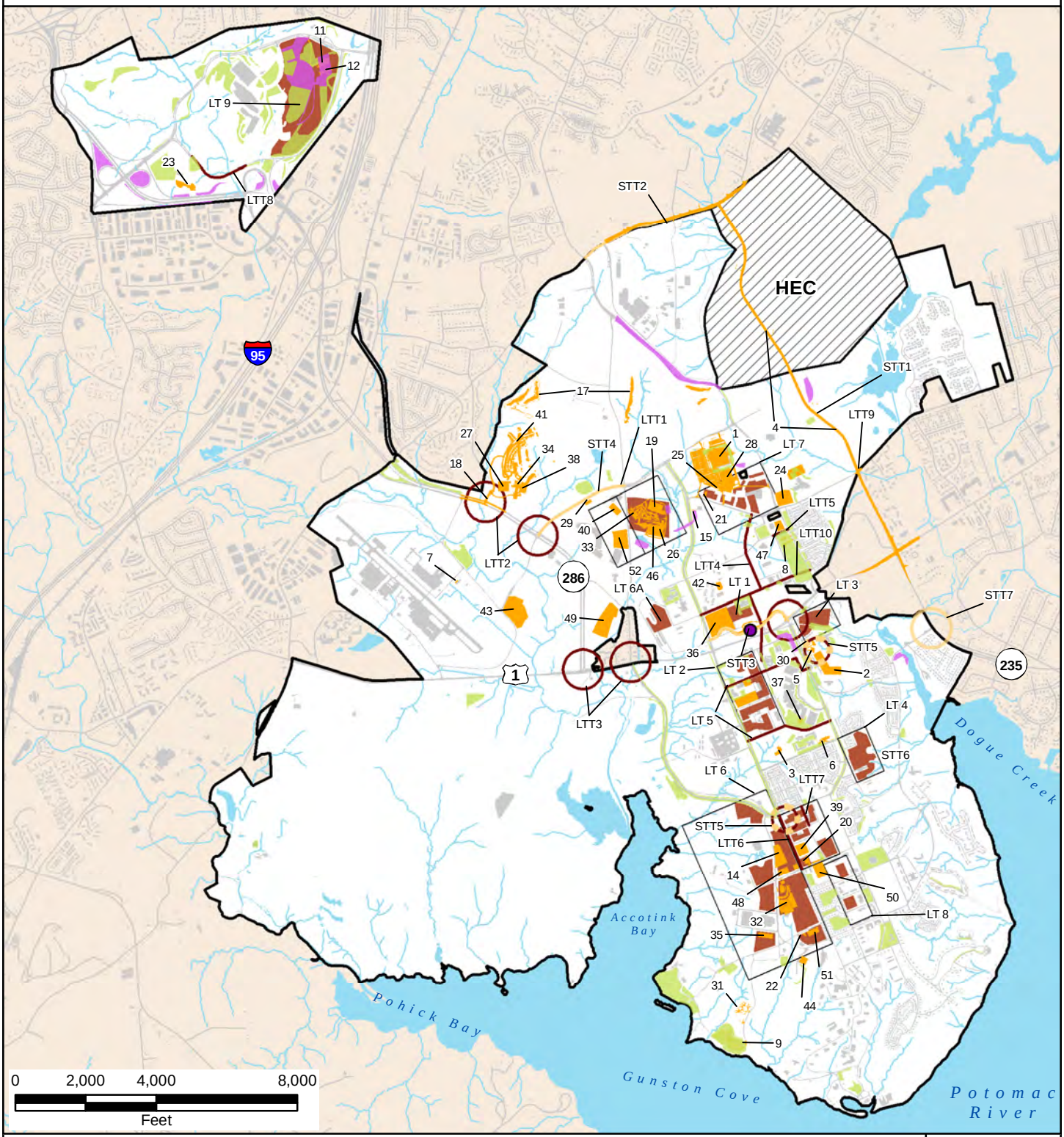
Fort Belvoir RPMP EIS

Figure 3.9-7

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Mitigation Sites: Existing and Potential Tree Planting Sites



Tree Planting Site - Existing

Tree Planting Site - Potential

Short-Term Project Sites (Construction FY 2012 - 2017)

Long-Term Project Sites (Construction FY 2018 - 2030)

Short-Term Improved/New Road

Long-Term Improved/New Road

Fort Belvoir RPMP EIS

Figure 3.9-8

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The stream and wetland mitigation sites (Section 3.8.1.6, Figure 3.8-4) that have been constructed or are prioritized as proposed mitigation for wetland permit or NEPA actions help compensate not only for impacts on water quality, but also provide valuable habitat for fish and wildlife. As stated in Section 3.8.1.6, Wetlands mitigation projects are legally binding agreements between the Army and the governing state and federal agencies responsible for regulating these protected resources. The sites are not open for development (US Army, 2014a).

With implementation of the BRAC 2005 actions, Fort Belvoir continued its policy of replacing trees at a two-for-one ratio, replacing on Fort Belvoir any removed tree with a diameter of four inches or more at breast height with two other trees. Revegetation and landscaping projects are ongoing, but with completion of the BRAC 2005 development in 2011, the installation had planted thousands of new trees from seedlings to landscape specimens. The trees planted for the most part were native species with some semi-native cultivars, such as American elm hybrids resistant to Dutch Elm disease. Native species are not only beneficial to wildlife, but ensure that these plantings have the best shot of surviving. In addition, the tree reforestation program includes the removal of invasive species and exotic vegetation control, which improves the health of native species and provides cleared areas for potential reforestation.

3.9.2 Environmental Consequences of the No Action Alternative

The No Action Alternative would have no effect on biological resources. It would not affect any of the environmental resources, landscape features, or established conservation areas important to maintaining the biodiversity of Fort Belvoir and surrounding areas, namely: refuges and other large tracts of habitat; forested areas; wetlands; rare, threatened and endangered species, or bald eagles and their critical habitats.

3.9.3 Environmental Consequences of Alternative 1 – Full Implementation – The Preferred Alternative

The thrust of the RPMP is to preserve large tracts of buildable areas for future campuses and/or phased infill type development. These buildable areas have been configured to the extent feasible to avoid ecologically sensitive areas, so that they can be preserved. The buildable areas identified in the RPMP represent only 40 percent of the total land at Fort Belvoir; 60 percent of the land would remain as open space (US Army, 2014a). In addition, any unavoidable impact on these sensitive resources must be mitigated, either as a requirement of governing state and federal regulations (e.g., Section 404 of the Clean Water Act Virginia Water Protection Permit Program) or Fort Belvoir's own policies (e.g., the Fort Belvoir Tree Removal and Protection Policy).

Based on current information, implementation of Alternative 1 would have no effect on wildlife refuges, federally threatened and endangered species and their critical habitats, or mitigation sites established as the result of NEPA or wetland / stream permit actions. Some of the projects would have less than significant adverse effects on forest resources, wetlands, state-listed threatened and endangered species habitats, and habitat for PIF concern species. As planning progresses, particularly for the long-term projects, the estimates for these impacts, shown below, may change.

3.9.3.1 Plant Communities and Forest Resources

Adoption of the RPMP would lead to short- and long-term physical impacts on Fort Belvoir plant communities as building sites are cleared and graded for construction of various projects. Vegetation would be permanently removed in proposed "hardscape" areas (pavement and buildings), but would be replaced in areas of temporary disturbance, such as construction staging and access roads, or areas to be landscaped. Plant communities can also be choked or displaced by invasive species introduced when the community is disturbed, or harmed by salt and chemicals in stormwater runoff where these communities occur next to roadways and pavement. The

threshold for significance for impacts to plant communities would be if more than two percent of the native plant communities were permanently lost as the result of the RPMP short- and long-term projects.

Short-Term Projects

Fort Belvoir has planned the overall RPMP to cluster the proposed projects in the central core of the installation in areas that have already been developed to avoid fragmenting large tracts of forest land, to the extent practicable. Potential impacts on forest resources are shown in Figure 3.9-9 and in Table 3.9-2.

Table 3.9-2
Alternative 1 Potential Impacts to Forest Resources Short-Term Projects

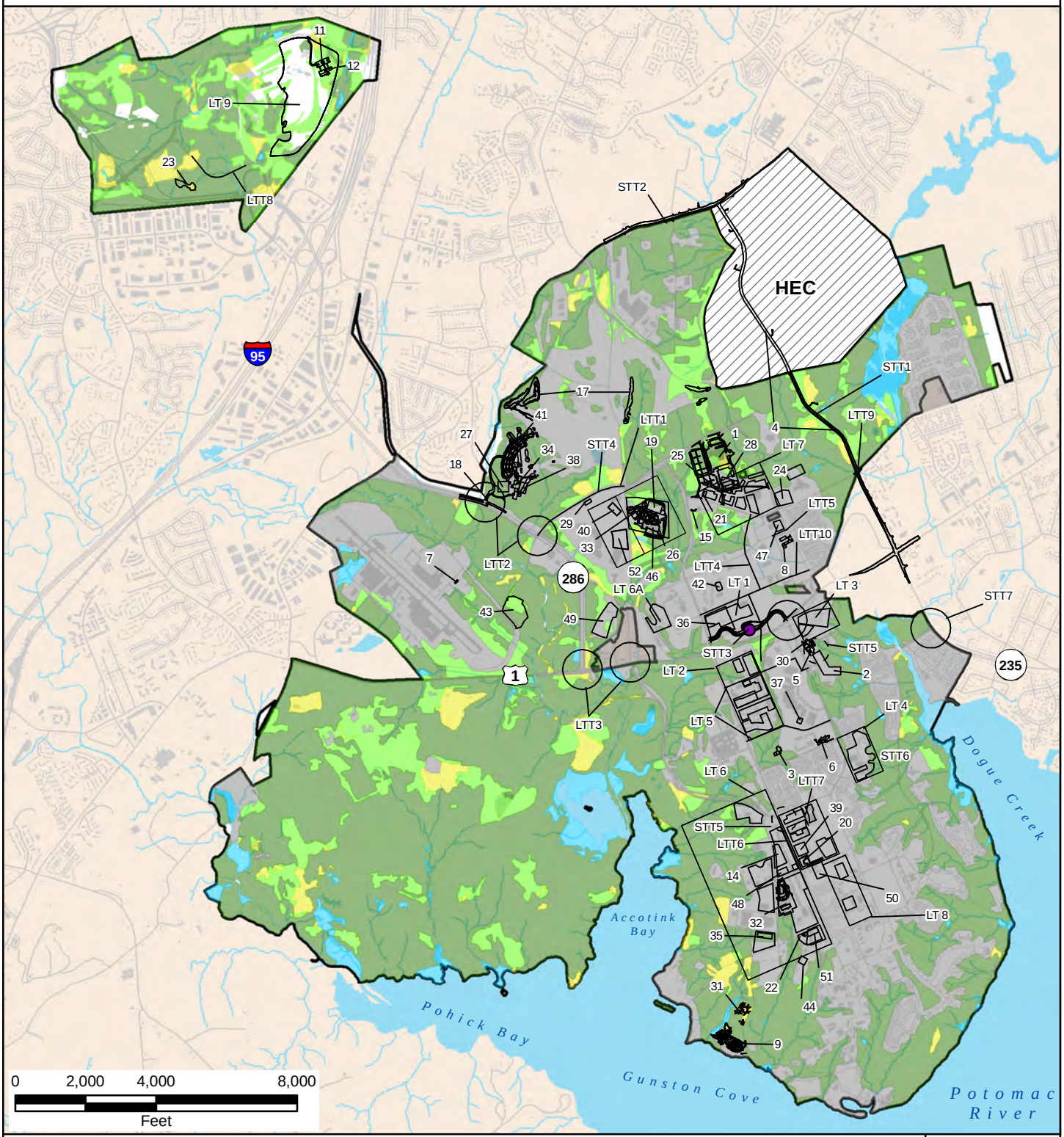
ST Project Number(s)	Project Description	Area of Post	Native Forest Acreage	Planted Forest Acreage
1	PX	North Post	10.23	4.36
2	PAL – East of Belvoir Road Circle	South Post	0.04	0
3	NICoE	South Post	0.52	0
4	Mulligan Road Phase II	North Post	8.54	6.35
9	Family Travel Camp – Phase I	South Post	1.20	0
11	Child Development Center 1 on FBNA	FBNA	0.18	1.75
12	Child Development Center 2 on FBNA	FBNA	0	0.30
13	Lieber Gate	North Post	<0.01	0
15	AAFES Car Wash	North Post	0	<0.01
17	36-hole Golf Course Reconfiguration	North Post	4.7	1.66
18	NMUSA Road & Infrastructure Improvements	North Post	1.36	0
19	INSCOM HQ Expansion, Phase I	North Post	0.28	0.14
23	NGA Canine Training/Rest Facility	FBNA	1.38	0
24	FFX County School Expansion	North Post	0	1.11
26	INSCOM Expansion, Phase 2	North Post	0.55	0
27	NMUSA Phase I	North Post	1.73	0
28	Main Post Commissary	North Post	0.45	1.34
31	Family Travel Camp – Phase 2	South Post	0.16	0
33	INSCOM Expansion, Phase 3	North Post	1.64	0.36
35	Retail Fuel Point	South Post	1.30	0
37	Medical Office Building	South Post	0.13	0
43	OSEG Training Compound	DAAF	4.45	4.07
49	911th Engineering Company Operations Complex	North Post	0	1.01
	Short Term Project Totals		**38.85**	**22.46**

Notes: All acreages were calculated from the Fort Belvoir GIS, 2013.

Projects not listed would not impact forest resources.

Sites for Projects ST #34, ST 38, and ST 41 (NMUSA Phases 2, 3 and 4) overlap native forest communities, but these forests would be impacted by Project ST 17 (Golf Course Reconfiguration) prior to these projects being constructed.

Impacts on Forest Resources



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Figure 3.9-9

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The native forest resources as shown in Figure 3.9-9 represent a combination of the forested upland plant community-types portrayed in Figure 3.9-2, minus the areas of white pine, loblolly pine, and Virginia pine, which largely have been planted. Both native and planted forested wetland types have been included in the wetland impacts in Table 3.9-5.

The numbers provided in the table are approximate, based on measuring forested areas on Fort Belvoir GIS files overlaid on project design footprints. Some of the project footprints are well-along in design, but others (the Long-Term Projects) have not been well-defined, but are represented as an area. In some cases, as more detailed project designs are developed, the actual impacts to forest and other resources may change. In most cases, it is anticipated that the impacts would be reduced as the designers try to avoid forest resources.

A number of the short-term projects listed in Table 3.9-2 have already been addressed by EAs and have been approved for construction – namely ST 1, 2, 3, 4, 9, 17, 18, 19, 26, 27, 28, 31, 33, 34, 38, and 41. These projects comprise the elements of Mulligan Road, NMUSA/Golf Course Realignment, INSCOM Expansion, and PX/Commissary projects and account for approximately 49.58 acres of impact to forest resources, or 81 percent of the total 61.09 acres (native and planted) overall impact. They are included here because they are part of the RPMP. In some instances, the impacts on forest resources stated in the applicable EAs may not agree with the acreages provided in Table 3.9-2 because the figures provided in Table 3.9-2 are based on the latest design footprints.

In all cases, the loss of trees has been or would be mitigated as much as possible through the application of the Fort Belvoir Tree Removal and Protection Policy, or where open space was/is not available, out-of-kind mitigation was/would be provided by supporting the stream and wetland mitigation or other ecosystem improvement projects. For example, for Mulligan Road, impacts were mitigated through removing existing pavement from a closed section of Woodlawn Road and allowing the plant community to regenerate, and by using bridges at Piney Run and at the FWC to reduce direct impacts on forest and other resources, and to allow wildlife to pass beneath the bridges instead of crossing the road (Section 3.9.3.5).

The short-term transportation projects are still in early planning stages, but most of the projects would involve widening of existing roads or intersections or providing transit facilities such as bus parking and passenger shelters within developed areas of the post. These types of projects are likely to have very minor impacts on adjacent forest lands, or no impact at all. The exception is STT 1 (Mulligan Road Phase II) which is addressed above as ST 4 and included in Table 3.9-2. That project includes construction of a new roadway through a relatively undisturbed area of the post, and involves impacts to forested and other plant communities.

Overall, implementation of Alternative 1 would have a less than significant adverse effect, even without mitigation. The project would result in a loss of 1.1 percent of the on-post forest resources, based on approximately 5,600 acres total of forest acreage, 36.7 percent of which are resources that have been planted in the past (US Army, 2014a).

Long-Term Projects

Planning for the long term projects is very preliminary, and the sites shown in Figure 2-9 and the small area maps are project sites – not projects. No detailed site designs have been developed to show the placement of buildings, parking facilities, stormwater management measures, or grading requirements, and it is likely that the sites can be designed to avoid or at least minimize impacts on forest resources. The sites themselves are being configured to avoid forested habitat to the maximum extent possible. Project sites LT 3 (the South Post Community Support District), LT 4 (the Administrative Campus District), LT 6 (Industrial Area District) or its alternative, LT 6A (the Lower North Post West District), and LT 9 (the Fort Belvoir North Area District) abut or slightly overlap forest resources. However, projects at these sites are unlikely to cause more than a few acres impact individually or cumulatively, and would therefore cause less than significant adverse impacts on forest resources, particularly if the project components are laid out carefully on the site.

3.9.3.2 Fish and Wildlife

Aquatic Macroinvertebrates/Fish

Alternative 1 has the potential to affect fish and aquatic macroinvertebrates through direct destruction of habitat and indirect effects such as short- and long-term changes in hydrology. Such changes could lead to downstream bottom and bank erosion, siltation, and sedimentation, and degrade water and habitat quality. The threshold for significance for these impacts would be if the implementation of the RPMP projects, individually or cumulatively, would result in the loss of more than two percent of the available habitat. Also significant would be if the projects, individually or cumulatively, resulted in a lowering of the species diversity, or shift in the nature of the species inhabiting the streams or nearshore waters of Fort Belvoir to a more pollutant-tolerant community.

Alternative 1 has a strong potential to improve habitat for fish and aquatic macroinvertebrates. As indicated in Section 3.9.1.2, many of Fort Belvoir's streams are already impacted by stormflows from development that occurred prior to enactment of stormwater management regulations and the pollution problems associated with those flows. The fish inhabiting the affected streams are species tolerant of degraded habitat and water quality conditions. The relatively unaffected streams (those within the Pohick Creek and Pohick Bay watersheds) are located in the Southwest Area where no development is planned under the RPMP. The fish and macroinvertebrate populations in these streams would be unaffected by the adoption of any of the proposed action alternatives.

One planned project (ST 14) is a regional stormwater management facility in the South Post area to handle stormwater from several undermanaged sites. This project, plus the fact that most of the RPMP projects involve redevelopment of already disturbed, undermanaged sites, and the need to comply with modern stormwater management requirements at these sites, would lead to beneficial effects on downstream aquatic habitat and water quality. Implementation of BRAC 2005 and other recent projects have already corrected some of the historic stormwater management deficiencies through upgrades and retrofits.

Like the BRAC 2005 and other projects that have already contributed to stream restoration projects (Figure 3.8-4) in order to meet mitigation requirements, the RPMP projects would contribute to and have beneficial effects on-post stream restoration efforts.

Wildlife

Adverse effects on terrestrial wildlife are largely a reflection of the adverse effects on terrestrial habitat, namely Fort Belvoir's plant communities (Section 3.9.3.1). As plant communities are destroyed or changed, habitat is destroyed or changed, and the overall capacity of the installation to support a diversity of wildlife is reduced.

Changes in the interconnectivity of habitats can also adversely affect wildlife, by reducing wildlife's ability to move between islands of habitat as species populations increase, or to breed with individuals outside their family group. This is why Fort Belvoir established, and is aware of the ongoing importance of, maintaining the FWC.

Forest land and other habitats persist, for the most part, in the undeveloped areas of the post, as shown in Figure 3.9-9. The RPMP preserves these habitats by concentrating development as much as possible in the core areas of the post that have already been developed, and avoiding the less developed areas that still support significant habitats. The RPMP also continues protection of the wildlife refuges and preservation of the FWC and the Accotink Creek Conservation Corridor. Under the RPMP, Fort Belvoir would also continue to actively promote preservation and enhancement of habitat for PIF Concern Species. By preserving and enhancing PIF habitat, Fort Belvoir is also preserving and enhancing overall habitat diversity, and the installation's capacity to support native wildlife.

Because forest types are the most common habitat, they are used, in addition to impacts to the FWC and PIF concern species habitat, as an indicator of habitat loss. The threshold for significance for impacts on wildlife resources would be if the implementation of the RPMP projects, individually or cumulatively, interrupted the continuity of habitats or loss of more than two percent of the habitat on-post. No projects would be allowed under the RPMP to result in a loss of FWC acreage (i.e., without mitigation), nor would any projects be allowed, under the RPMP, to result in a loss of acreage in any of the three wildlife refuges.

Construction activities can cause temporary disruption of habitat extending beyond the actual project area, as areas are cleared for grading purposes or as staging areas for the construction activity. These areas would be reseeded and, as needed, replanted to replace trees under the Fort Belvoir Tree Removal and Protection Policy. These planted areas would provide edge habitat and as they mature, forested habitat.

Construction activity can also impact individual animals, especially smaller mammals, reptiles, and amphibians, and breeding birds, their nests, eggs and hatchlings that cannot get out of the way of operating machinery. Fort Belvoir natural resources management recommends avoiding land disturbance during critical times of the year to cause the least amount of impact to a particular species or group of species. For example, Fort Belvoir recommends land disturbance to take place outside of April-mid July to avoid disturbance, damage, or mortality of breeding birds, nests, eggs, and hatchlings. These impacts are especially significant if the species impacted is rare, threatened or endangered, or at risk, such as the Northern Virginia well amphipod. The impacts of the proposed action on such species are addressed in Section 3.9.3.3.

Short-Term Projects

Aquatic Macroinvertebrates/Fish

Alternative 1 short-term projects would result in the filling or culverting of a cumulative total of approximately 1,532 linear feet (0.29 miles) of stream habitat (see Table 3.9-5), which would eliminate or greatly reduce the habitat quality of the sections of streams affected. The US Army Corps of Engineers and VDEQ would consider these impacts to be a “loss” of stream habitat. Eleven hundred linear feet of this loss, plus loss of 0.19 acres of open water (pond), would be the result of ST 4 (also STT 1, Mulligan Road), which has already been evaluated by an EA (USDOT, FHWA, Eastern Federal Lands Highway Division, 2006c), been approved, has a signed FNSI, and is under construction. This loss of habitat is considered a less than significant adverse effect in that it is a very small percentage (0.22 percent) of the stream habitat on the installation (128 miles of stream – see Section 3.8.1.1) and because these losses would be mitigated through contributions to habitat restoration at the mitigation sites (Figure 3.8-4). The other short-term projects that would impact streams (either by filling or culverting) include ST 1 (the new PX), PT 17 (the Golf Course Reconfiguration), PT 18 (NMUSA), and PT 28 (the Main Post Commissary).

Construction activities would cause temporary exposure of soils, and potential for erosion and downstream siltation. During construction, compliance with the strict monitoring activities imposed by the Virginia Stormwater Management Program permit conditions would minimize these short-term impacts.

Wildlife

The short-term projects included in Alternative 1 for the RPMP would together cause the loss of 0.34 acres of the FWC (Table 3.9-3), 59.2 acres of PIF habitat (Table 3.9-3), and 61.3 acres of forested habitat (Table 3.9-2). The impacts to the FWC would be replaced through the mitigation proposed for that project. The 59.2 acres is 1.4 percent of the PIF habitat on the post (approximately 4,200 acres), while the 61.3 acres is 1.1 percent of the forested habitat on the post. These impacts would thus be a less than significant adverse effect.

Table 3.9-3
Potential Impacts to PIF Habitat and the Forest and Wildlife Corridor (Short-Term Projects)

Project Number(s)	Project Description	Area of Post	Partners-in-Flight Acreage	Forest Wildlife Corridor Acreage
1	PX	North Post	16.80	
2	PAL – East of Belvoir Road Circle	South Post	5.22	
3	NICoE	South Post	0.41	
4	Mulligan Road Phase II	North Post	12.90	
5	Fisher House 1	South Post	0.62	
9	Family Travel Camp – Phase I	South Post	0.82	
11	Child Development Center 1 on FBNA	FBNA	1.84	
12	Child Development Center 2 on FBNA	FBNA	<0.01	
13	Lieber Gate	North Post		
15	AAFES Car Wash	North Post		
17	36-hole Golf Course Reconfiguration	North Post	2.79	
18	NMUSA Road & Infrastructure Improvements	North Post	1.24	
19	INSCOM HQ Expansion, Phase I	North Post	0.47	
23	NGA Canine Training/Rest Facility	FBNA	0.20	
24	FFX County School Expansion	North Post	2.19	
26	INSCOM Expansion, Phase 2	North Post	1.39	
27	NMUSA Phase I	North Post		
28	Main Post Commissary	North Post	4.50	
30	Fisher House 2	South Post	0.08	
31	Family Travel Camp – Phase 2	South Post	0.94	
33	INSCOM Expansion, Phase 3	North Post	1.95	0.34
34	NMUSA, Phase 2	North Post	0.68	
38	NMUSA, Phase 3	North Post	1.39	
41	NMUSA, Phase 4	North Post	1.23	
43	OSEG Training Compound	DAAF	0.92	
46	INSCOM Expansion, Phase 4	North Post	0.62	
	Short Term Project Totals		**59.20**	**0.34**

Note: All acreages were calculated from the Fort Belvoir GIS, 2013.
Projects not listed would not impact PIF or FWC.

Only ST 33 (Phase 3 of the INSCOM Expansion) would intrude (by 0.34 acres) into the FWC. This impact was addressed in the EA and FNSI for this project (US Army, 2012e; US Army, 2012f). The impact would be mitigated through restoring a portion of the existing north surface parking lot that abuts the corridor as a natural area to become part of the corridor. Otherwise, the RPMP short-term projects have been sited to avoid intrusion into this important resource. Project STT 43 (the OSEG Training Compound) would abut the corridor along its eastern boundary, but has been configured to avoid impacting it.

The PIF concern species mapping has been developed by providing a buffer from known nests of the species of concern, documented through breeding bird surveys. It is not fixed, and shifts as bird shift nests and other habitat uses. The PIF habitat often extends over existing developed areas and roads, as shown in Figure 3.9-1. The impact numbers provided in Table 3.9-3 are therefore likely overstated in terms of loss of potential nesting and foraging habitat. However, because the breeding bird surveys on which the PIF mapping is based do not encompass the entire installation, it is possible that the GIS mapping does not show the full extent of this habitat, either, and each site would be evaluated on a project by project basis. Many of the proposed development projects overlap PIF habitat as it has been mapped in the Fort Belvoir GIS.

Project ST 1, the new PX, which was evaluated in an EA (US Army, 2010a), approved, has a signed FNSI, was built, and is operating, has had the greatest impact on PIF habitat at 16.8 acres. The new Commissary would add 4.5 acres to that impact. Project ST 4 (Mulligan Road Phase II) is impacting 12.9 acres of PIF habitat.

Of the remaining short-term transportation projects, only STT 4 (the John J. Kingman Road/Fairfax County Parkway Intersection Improvements project) occurs near PIF concern species habitat.

The intersection improvements projects appear to overlap PIF habitat, but the actual improvements would consist of small measures such as widening the existing roadway to accommodate new turning lanes and installing traffic and pedestrian signals. These activities would impact only a small area of PIF habitat. These intersection improvement projects for the most part include areas where the PIF habitat, as denoted in the Fort Belvoir GIS and on the small area plans, overlays existing roads and development.

As addressed in Section 3.9.3.1, projects, ST 1 (the new PX), ST 4 (Mulligan Road), ST 17 (36-Hole Golf Course Reconfiguration), and ST 43 (OSEG Training Compound) would have the greatest impacts on forest habitat.

Long-Term Projects

Aquatic Macroinvertebrates/Fish

Of all the long-term projects, only LT-9 (the Fort Belvoir North Area District), based on planning-level mapping, has the potential to impact streams (Section 3.9.3.4). Planning for the long term projects is very preliminary, and the sites shown in Figure 2-10 and the small area maps are project sites — not projects. No detailed site designs have been developed to show the placement of buildings, parking facilities, stormwater management measures, or grading requirements, and it is likely that the sites can be designed to avoid these streams, if they exist. A site-specific delineation would be needed to determine the exact extent of waters and wetlands on each of these sites, but development here would have either no effect if the stream can be avoided, or a less than significant adverse effect, given that the site overlaps only a small section of stream.

Construction activities would cause temporary exposure of soils, and potential for erosion and downstream siltation. Fort Belvoir would ensure that construction contractors adhere to the strict conditions imposed by the Virginia Stormwater Management Program permit.

Wildlife

Based on the planning level mapping shown in the RPMP, none of the long-term project sites would impact the FWC. Long-term project sites LT 3 (South Post Community Support District), LT 7 (North Post

Community Support District), and LT 9 (Fort Belvoir North Area District) have the potential to impact PIF habitat. It may be possible that as projects are directed to these sites, the designers would be able to minimize impacts on PIF habitat.

Based on the planning level mapping shown in the RPMP, the same long-term projects that have the potential to impact PIF habitat also have the potential to have a long-term impact on forested habitat. Loss of PIF habitat and forested habitat would be mitigated at least partially through replanting according to the Fort Belvoir Tree Removal and Protection Policy. It is anticipated that development at these sites would have a less than significant adverse effect.

Construction activities would likely cause additional temporary impacts as vegetation is removed to provide access for machinery and staging areas. These areas would be reseeded and replanted as appropriate.

3.9.3.3 Rare, Threatened, and Endangered Species and Their Habitats

Figure 3.9-4 shows the locations of likely or known habitats for state- and federally-listed species on Fort Belvoir. The same activities that adversely impact forest resources and other plant communities can also adversely affect these listed plant and animal species. Operating machinery and loss of habitat can cause direct and indirect losses of individuals, and a loss of a single individual can contribute to the decline of a population.

The threshold for significance for impacts on federally-listed rare, threatened or endangered species, given the requirements of the federal Endangered Species Act, would be any adverse effect that cannot be resolved with the regulatory agencies through some form of mitigation. Any effect, beneficial or adverse, triggers the formal consultation process with the USFWS. For state-listed species, the threshold for significance would be loss of more than two percent of the species' habitat on the installation.

Rare, Threatened and Endangered Plant Species

To date, the only state- or federally-listed plant species observed on Fort Belvoir is the small whorled pogonia on the forested slopes on a first order tributary of Accotink Creek in the southwestern part of the FBNA. No small whorled pogonias have been found on the Main Post (Bedker, 2005; Wetland Studies and Solutions, Inc., 2005, both as cited in US Army, 2007a), although suitable habitat appears to be present. Potential habitat for the small whorled pogonia can also be found in other areas of the FBNA and likely on the Main Post (US Army, 2007a).

Short-Term Projects

Based on the mapping in Figure 3.9-4, which has been generated by numerous surveys for small whorled pogonia and other species like the sensitive joint-vetch over the past 15 years, none of the short-term projects would impact state- or federally-listed plant species. It is Fort Belvoir's practice to require a survey for small whorled pogonia at any site where suitable habitat may occur, prior to the Fort Belvoir building permit being issued. If the small whorled pogonia or any other listed species is encountered at any proposed building site, Fort Belvoir would coordinate a biological assessment with USFWS before approving the project, to work out an appropriate mitigation plan if the plant cannot be avoided.

None of the projects would affect the freshwater tidal habitats of the lower Pohick, Accotink, or Dogue creek drainages. Therefore, if sensitive joint-vetch is present or does establish in these habitats, it would be outside any potential direct impact area.

None of the seven very rare, extremely rare, rare or uncommon sensitive plant communities (Figure 3.9-5) would be directly adversely affected by the short-term projects. For the most part, these plant communities are associated with tidal waters and do not occur where development would take place. The only community not associated with tidal waters – the Coastal Plain/Piedmont Acidic Seepage Swamp – occurs at the toes of

slopes, but no examples of the Coastal Plain/Piedmont Acidic Seepage Swamp occur within the building areas.

Indirect adverse effects to small whorled pogonia or the other rare plant communities could potentially occur through the introduction of invasive/exotic species, by opening up edge environments or through the dispersal of plant propagules by construction machinery. Fort Belvoir has an active invasive species management program, and would continue to monitor the spread of invasive plant species and take active measures, particularly near known special species habitats or any of the rare plant communities. Therefore, there should be no short- or long-term effects on the small whorled pogonia or other state or federally-listed species under Alternative 1.

Long-Term Projects

Project LT 9 (Fort Belvoir North Area District) abuts potential small whorled pogonia habitats in its southwest and northeast corners. If an administrative center is constructed at this site, these potential habitats would be surveyed for the species, as required by Fort Belvoir standard policy. It is likely that the site could be planned to avoid these areas altogether.

Care would be taken during construction to avoid the introduction of invasive species. Any invasive species found near small whorled pogonia habitat during long-term monitoring would be removed.

Based on this analysis, there would be no effects on the small whorled pogonia or other listed plant species under Alternative 1.

Rare, Threatened and Endangered Animal Species

In addition to direct impacts from construction and indirect impacts from loss of habitat, the noise generated by construction machinery or the day-to-day operation of a new facility can annoy sensitive animal species, potentially disrupting activities, such as breeding and nesting. Changes in surface water quality could adversely affect fish species, and changes in groundwater quality could impact species like the Northern Virginia well amphipod. To date, no federally-listed threatened or endangered animal species have been observed on Fort Belvoir, despite numerous surveys. None of the short or long-term projects would involve construction in the Potomac River or its tidal embayments. Therefore, implementation of Alternative 1 would have no impact on Atlantic or shortnose sturgeon. The National Marine Fisheries Service concurred with this assessment (Vaccaro, pers. comm., July 23, 2013).

Bald eagles, while no longer endangered or threatened, are protected under the Bald and Golden Eagle Protection Act, and do nest on Fort Belvoir and forage along the shoreline. There are nests on South Post and a nest across Gunston Cove on Mason Neck (The Center for Conservation Biology, 2013; Pilcicki, pers. comm., September 9, 2013), and portions of the Fort Belvoir shoreline are high use foraging areas during the winter, as shown on Figure 3.9-4, while other areas are only used occasionally by eagles. The Northern Virginia well amphipod has been found in the T-17 Wildlife Refuge, on ravine seeps (VDCR-DNH, pers. comm., August 16, 2013). Finally, the wood turtle, a state-listed species, has been observed in the past on Main Post and North Post, and its potential habitat may be widespread along the Dogue Creek and Accotink Creek drainages. The wooded streams of the installation provide potential habitat for the species.

As noted in Section 3.9.1.3, the northern long-eared bat may occur in forested areas on Fort Belvoir. Fort Belvoir would conduct a survey to see if the bat is present on the installation. In May 2015, the Army completed Programmatic Informal Consultation on the northern long-eared bat with USFWS under Section 7 of the ESA. The Programmatic Informal Consultation identified criteria under which construction projects would be considered “Not Likely to Adversely Affect” the northern long-eared bat (“Informal Conference & Management Guidelines on the Northern Long-eared Bat [*Myotis septentrionalis*] for Ongoing Operations on Installation Management Command Installations”, US Army Environmental Command, May 2015).

Fort Belvoir would use the Army's Programmatic Informal Consultation for northern long-eared bat when screening each upcoming construction project, and would conduct local Section 7 consultation for any project that does not meet the criteria for "Not Likely to Adversely Affect."

Short-Term Projects

Based on the Fort Belvoir GIS mapping, the only project with a potential to impact bald eagle habitat was the ST 9 (Phase 1 of the Family Travel Camp), which was completed in 2013. The existing parking lot that was upgraded to provide parking for RVs along the Gunston Cove shoreline underlies the eagle occasional use foraging habitat associated with the Mason Neck Eagle Concentration Area. The impact was a less than significant adverse effect; this site once housed buildings and a parking lot, and its use for RV parking represents very little change in an area where bald eagles have already adjusted to the presence of human activity. In addition, eagle use is more likely to occur in winter when use of the travel camp is low. None of the short (or long)-term projects would compromise the Fort Belvoir Bald Eagle Management Guidelines.

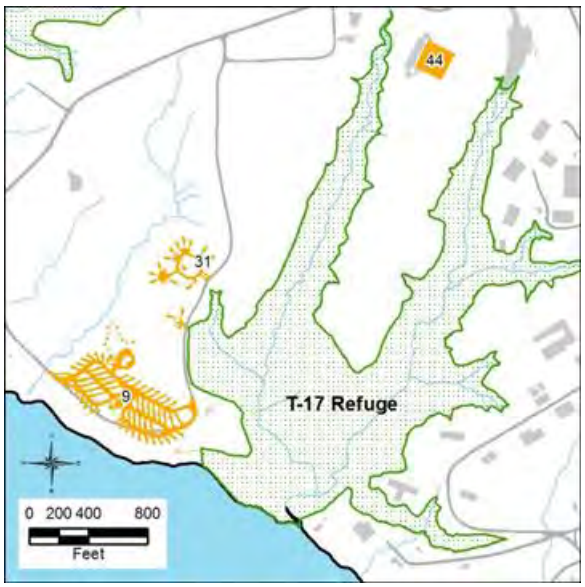


Figure 3.9-10 T-17 Refuge/Northern Virginia Well Amphipod Habitat and the Location of Nearby Short-Term Projects

Recent surveys in downhill seeps on the T-17 Refuge have confirmed the presence of the Northern Virginia well amphipod. Projects ST 9, (Phase 1 of the Family Travel Camp), ST 31 (Phase 2 of the Family Travel Camp) and ST 44 (Ballfield Replacement) are located near but do not overlap the T-17 Refuge (Figure 3.9-10). All three projects have been/would be built on fairly level, previously-disturbed sites. ST 31 and ST 44 are located on uplands above the steep T-17 ravines and the seeps where amphipods may be found. ST 9 is located near the base of the T-17 refuge, where the drainage enters Gunston Cove. ST 44 is the preferred site for ballfield construction in order to consolidate the youth baseball fields into one location on Fort Belvoir. The family travel camp is being built in this area to be part of the Tompkins Basin Recreation Area. Fort Belvoir would consider implementing mitigation measures that strive to maintain groundwater recharge and protect the downstream channel areas from erosion and sedimentation. Such mitigation would be consistent with the use of LID and other stormwater management measures as addressed in Sections 3.8.1.4 and 3.8.1.5.

Based on the Fort Belvoir GIS mapping, a number of projects overlap the wooded stream valleys that provide wood turtle habitat (Table 3.9-4). The short-term projects under Alternative 1 have the potential to eliminate 28.25 acres of wood turtle habitat. Projects ST 4 (Mulligan Road), ST 18 (the National Museum of the Army Road and Infrastructure Improvements), ST 24 (the Fairfax County School Expansion), ST 26 (the INSCOM Phase 2 Expansion), ST 27 (National Museum of the Army, Phase 1), ST 33 (INSCOM Expansion, Phase 3), ST 41 (NMUSA Phase 4), ST 43 (OSEG Training Compound), and ST 49 (11th Engineering Company Operations Complex) would impact potential wood turtle habitat, with ST 4, ST 43, and ST 49 accounting for 74 percent of the impact. The Mulligan Road project is now finished. Both the NMUSA and INSCOM Expansion projects have been addressed by EAs and are approved.

The loss of 28.25 acres of potential wood turtle habitat out of a total of approximately 1,972 acres on the post, would have a less than significant adverse effect on the wood turtle population, as this lost habitat comprises a minor fraction (1.4 percent) of the overall wood turtle habitat on the post (Figure 3.9-4).

None of the short-term transportation projects would impact threatened or endangered species habitats.

Table 3.9-4
Potential Impacts to Wood Turtle Habitat (Short-Term Projects)

Project Number(s)	Project Description	Area of Post	Acreage
4	Mulligan Road Phase II	North Post	6.6
18	NMUSA Road & Infrastructure Improvements	North Post	2.89
26	INSCOM Expansion, Phase 2	North Post	0.02
27	NMUSA Phase 1	North Post	1.70
33	INSCOM Expansion, Phase 3	North Post	0.11
34	NMUSA, Phase 2	North Post	0.68
38	NMUSA, Phase 3	North Post	1.39
41	NMUSA, Phase 4	North Post	0.44
43	OSEG Training Compound	DAAF	8.88
49	911th Engineering Company Operations Complex	North Post	5.54
	Short-Term Project Totals		**28.25**

Notes: All acreages were calculated from the Fort Belvoir GIS, 2013.
Projects not listed would not impact wood turtle habitat.

Long-Term Projects

Project LT 6 (the Industrial Area District on the South Post) abuts habitat for the Northern Virginia well amphipod. If Fort Belvoir uses this area in the future, it would plan for protection of the amphipod prior to project implementation. Fort Belvoir would develop an appropriate mitigation plan, or reconfigure the site to avoid the critical habitat and ensure that construction machinery does not inadvertently damage any habitat. Therefore, any work in this area would have no effect on this species.

Two long-term transportation improvement projects have the potential to impact wood turtle habitat, namely LTT 3 (US Route 1 Intersection Improvements projects, specifically the Route 1 / Fairfax County Parkway and Route 1 / Pohick Road intersections) and LTT 2 (the Fairfax County Parkway / John J. Kingman Road Intersections and NMUSA Entrance). The transportation projects are still in early planning stages, but most of the projects would involve widening of existing roads or intersections, and would cause minor impacts on habitat. LTT 2 would involve constructing grade-separated intersections, which could contribute to loss of several acres of wood turtle habitat associated with tributaries to Accotink Creek. This impact would still be a less than significant adverse effect, considering the amount of wood turtle habitat (1,972 acres) on the installation. None of the other long-term projects overlap threatened or endangered species habitats.

3.9.3.4 Wetlands

To the extent practicable, Fort Belvoir has directed the projects envisioned under the RPMP to already-developed sites on the top of the natural plateaus that characterize the post, in order to avoid wetlands, stream valleys, and other water bodies. This approach to development would minimize direct and indirect, temporary and permanent impacts to these resources and the biological resources they support.

It is possible that construction activities, as they disturb vegetation and soils, can adversely affect streams and wetlands through an increased rate of runoff, causing erosion of exposed soils and increased scouring and sedimentation downstream. These impacts would largely be temporary, and would be minimized through diligent use of erosion and sedimentation controls and appropriate stormwater management

practices, as required by regulation (Section 3.8.3.2). The VSMP construction permit monitoring requirements require weekly or biweekly inspections to ensure that all controls are kept in effective working order.

Most of the wetland mapping used in this EIS is based on the Fort Belvoir GIS, which in turn is based on a planning-level assessment conducted in 1999 (US Army, 2001a). The Fort Belvoir GIS wetland layers were created using aerial photography with ground-truthing by field biologists. As such, it is more detailed and accurate than National Wetland Inventory mapping, but does not reflect the detailed delineation methodology required by the US Army Corps of Engineers and VDEQ. Fort Belvoir conducts such detailed delineations as needed on a project-by-project basis, usually when project-planning and design is well-advanced.

For those projects listed in Table 3.9-5 that have not been formally delineated, the impact estimates are approximate and may change as wetlands are formally delineated according to the most current standards. Present standards are based on the *1987 Corps of Engineers Wetland Delineation Manual*, as updated by regional supplements. The two regional wetland delineation supplements applicable to Fort Belvoir are the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (Version 2.0)* (April, 2012) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0)* (November, 2010). For those projects with site-specific information, that information was used in Table 3.9-5.

Alternative 1 includes several projects (Table 3.9-5) that, based on the mapping available, would impact wetlands. The threshold for significance for impacts on wetlands is the loss of more than one acre of non-tidal wetland or open water, or 1,500 linear feet of stream. Cumulatively, the threshold for significant impacts would be if the total loss of wetland resulting from the proposed RPMP exceeded more than two percent of the total estimated wetland area on the installation.

Table 3.9-5
Potential Impacts to Wetlands and Streams (Short-Term Projects)

ST Project Number	Project Description	Area of Post	Wetland Type				
			Open water / unconsolidated bottom (acres)	Emergent wetland (acres)	Scrub-shrub wetland (acres)	Forested wetland (acres)	Streams (linear feet)
1	PX	North Post	0	0	0	0[2]	296[1]
4	Mulligan Road Phase II	North Post	0.192	0	0	0.972	1,110[2]
17	Golf Course Reconfiguration	North Post	0	0	0	0.041[1]	123[1]
18	National Museum of the Army	North Post	0	0	0	0.058[1]	93[1]
28	Main Post Commissary	North Post	0	0	0	.01[2]	0
	Short-Term Project Totals		0.192	0	0	1.069	1,532

Notes: [1] Calculated from the Fort Belvoir GIS, 2013. In the case of Project 17, the design has been changed since the original EA, and the figure obtained from the GIS is more accurate than the figure provided in the EA.

Source: Applicable EA/REC unless otherwise specified.

Short-Term Projects

Five of the short-term projects have had or would have impacts on wetlands and streams, and these projects have all been evaluated in NEPA documents. The overall impact of these projects on wetlands and streams would be minor, and include both long-term and short-term effects. In the case of ST 17, final planning of the golf course realignment reduced impacts to wetlands from the design originally analyzed in the EA (US Army, 2012d). In the case of ST 1 (the new PX) and ST 28 (the new Commissary) which were evaluated together in an EA prepared in September 2010, a detailed "on-the-ground" delineation resulted in less wetland than estimated using the Fort Belvoir GIS alone (US Army, 2010a).

Project ST 4 (also STT 1, Mulligan Road Phase II) would be responsible for the bulk of the impact, causing 91 percent of the loss of wetland, and 72 percent of the loss of stream habitat. The only other short-term transportation project under Alternative 1 likely to cause impacts to streams and associated wetlands would be STT 4 (John J. Kingman Road/Fairfax County Parkway Intersection Improvements). The plans for this project are too early in development to calculate impacts, but would involve adding/expanding left and right lanes.

None of the projects exceed the significance thresholds. Cumulatively, the projects listed above just barely exceed the lowest thresholds. They would affect less than 0.09 of a percent of the estimated wetland on the installation and less than 0.03 of a percent of the total stream miles on the post. Therefore, the adoption of the RPMP would have a less than significant adverse impact on wetlands and streams.

Long-Term Projects

Of all the long-term development projects, only the LT 9 site, the Fort Belvoir North Area District, based on planning-level mapping, has the potential to impact streams. Once again, planning for the long-term projects is very preliminary, and the sites shown in Figure 2-10 represent sites where additional building, if needed beyond that identified in the RPMP for short-term projects, could occur. No detailed site designs have been developed to show the placement of buildings, parking facilities, stormwater management measures, or grading requirements, but it is likely that the sites could be designed to avoid these streams, if they exist, or to limit impacts to no more than a few hundred feet. A site-specific delineation would be needed to determine the exact extent of waters and wetlands on the site.

Of the long-term transportation projects, LTT 2 (Fairfax County Parkway/John J. Kingman Road Intersections and NMUSA Entrance) would cross two major tributaries to Accotink Creek. The project would add or expand left and right turn lanes and upgrade signals as needed, and may require widening of the existing roadbed to accommodate these changes. It would grade-separate the John J. Kingman and NMUSA entrance intersections with the Fairfax County Parkway, which could lead to even greater grading width requirements. Project LTT 3 (Intersection Improvements) could also potentially impact wetlands and streams associated with tributaries to Accotink Creek, depending on the scope of the improvements, and the actual extent of wetlands to be determined through an "on-the-ground" delineation. The impacts to these habitats would likely be both short- and long-term, and minor. Short-term impacts such as sedimentation of stream habitats would be controlled through compliance with erosion and sedimentation control requirements. Long-term impacts would be controlled by bridging the streams and wetlands where feasible to reduce loss of stream habitat, and the amount of fill needed for the project. The proposed project would have a less than significant adverse impact on stream and wetland resources.

3.9.3.5 Mitigation/Restoration Areas

It is very unlikely Fort Belvoir would ever allow these areas to be impacted based on regulations and programs in place. The environmental mitigation areas have been or are being constructed with a significant investment from the installation and their tenant agencies.

With the possible exception of Project LTT-2 (the Fairfax County Parkway/John J. Kingman Road Intersections & National Museum of the US Army Entrance), none of the short- or long-term projects envisioned in the RPMP would affect established mitigation or restoration areas, and mitigation would be required for Project STT-2. The new projects could generate funding for these and other restoration projects, if they generate the need for stream and wetland mitigation credits. Therefore, the adoption of the RPMP would have a beneficial effect on mitigation and restoration areas.

3.9.4 Environmental Consequences of Alternative 2 – Modified Long-Term

3.9.4.1 Plant Communities and Forest Resources

Short-Term Projects

Implementation of Alternative 2 would result in no change to the overall impacts on vegetation to be caused by Alternative 1. Alternative 2 would delay construction of ST 40 and 52 (the new DLA HQ and parking garage), but neither of these projects are located in forested areas; both sites are characterized by parking lots. It would also delay the impacts of ST 19, 26, 33, and 46 (the INSCOM HQ expansion – a total of 4.68 acres of forested habitat) from the short-term to the long-term for several years. Therefore, implementation of this alternative would have a less than significant effect, even without mitigation.

Long-Term Projects

Implementation of Alternative 2 would eliminate project site LT 9 (the New Administrative Center at the FBNA) as a potential development site. This site is forested, and the alternative would therefore reduce the impacts of the RPMP on forested habitat and the wildlife it supports. The site is also PIF habitat (Section 3.9.4.2). Therefore, implementation of this alternative would have a less than significant adverse effect, even without mitigation.

3.9.4.2 Fish and Wildlife

Short-Term Projects

Implementation of Alternative 2 would result in no change to the overall impacts on fish and wildlife that would be caused by Alternative 1. The short- and long-term impacts of the short-term projects under this alternative on fish and wildlife would be minor. Alternative 2 would delay construction of ST 19, 26, 33, and 46 (the INSCOM HQ expansion) and a total of 4.68 acres of forested habitat, 4.43 acres of PIF habitat, and 0.34 acres of the FWC impacts from the short-term to the long-term for several years. These projects would all be mitigated regardless of when they are constructed. The short- and long-term impacts of the long-term projects under this alternative on fish and wildlife would be less than significant

Long-Term Projects

Implementation of Alternative 2 would eliminate project site LT 9 (the New Administrative Center at the FBNA) as a potential development site. This site provides some forested habitat and PIF habitat, and further impacts to these habitats at the FBNA would be substantially reduced. The short- and long-term impacts of the long-term projects under this alternative on fish and wildlife would be less than significant.

3.9.4.3 Rare, Threatened, and Endangered Species and Their Habitats

Rare, Threatened and Endangered Plant Species

Short-Term Projects

Implementation of Alternative 2 would result in no change to the overall impacts on threatened or endangered plant species to be caused by Alternative 1. Therefore, the short-term projects under Alternative 2 would cause no short- or long-term effects on any state- or federally-listed plant species or their habitat.

Long-Term Projects

Implementation of Alternative 2 would eliminate project site LT 9 (the New Administrative Center at the FBNA) as a potential development site. This site abuts potential small whorled pogonia habitats in its southwest and northeast corners. However, because the site would be surveyed prior to construction under Alternative 1, elimination of this project site is unlikely to change the outcome; there would be no impact on the small whorled pogonia under either alternative.

Rare, Threatened and Endangered Animal Species

Short-Term Projects

Implementation of Alternative 2 would result in no change to the overall impacts on threatened or endangered animal species under Alternative 1. This alternative would delay construction of ST 26, 33, and 46 (the INSCOM HQ Expansion, Phases 2 and 3) and the 0.13 acres of impact those projects would have on wood turtle habitat.

Long-Term Projects

Implementation of Alternative 2 would result in no change to the overall impacts on threatened or endangered animal species under Alternative 1. No projects would have an effect on Northern Virginia well amphipod. Two long-term transportation improvement projects described under Alternative 1 have the potential to impact wood turtle habitat, but this impact would still be a less than significant adverse effect, considering the amount of wood turtle habitat (1,972 acres) on the installation.

3.9.4.4 Wetlands

Short-Term Projects

Implementation of Alternative 2 would result in no change to the overall impacts of short-term projects on wetlands to be caused by Alternative 1. The overall short- and long-term impacts of the short-term projects on wetlands and streams under Alternative 2 would be less than significant.

Long-Term Projects

Implementation of Alternative 2 would eliminate project site LT 9 (the New Administrative Center at the FBNA) as a potential development site. Of all the long-term development projects, only the LT 9 site, based on planning-level mapping, has the potential to impact streams. Under this alternative, therefore, the long-term project sites would have no short- or long-term effects on wetlands and streams. Even under Alternative 1, it is likely that the project can be configured to avoid these impacts, however. Planning for the long term projects is very preliminary, and a site-specific delineation would be needed to determine the exact extent of waters and wetlands on the site.

3.9.4.5 Mitigation/Restoration Areas

It is very unlikely Fort Belvoir would ever allow these areas to be impacted based on regulations and programs in place. The environmental mitigation areas have been or are being constructed with a significant investment from the installation and their tenant agencies.

None of the short- or long-term projects included in Alternative 2 would affect established mitigation or restoration areas. The new projects could generate funding for these and other restoration projects, if they generate the need for stream and wetland mitigation credits. Therefore, the adoption of the RPMP would have a beneficial effect for mitigation and restoration areas.

3.9.5 Environmental Consequences of Alternative 3 – Modified Short-Term

3.9.5.1 Plant Communities and Forest Resources

Short-Term Projects

Implementation of Alternative 3 would delay, but not change, the overall impacts of the proposed action short-term projects on biological resources as compared to Alternative 1. Alternative 3 would lead to the same degree of impacts on all resources, but several years later than under Alternative 1. The short- and long-term impacts of the short-term projects under Alternative 3 on plant communities and forest resources would be less than significant.

Long-Term Projects

Implementation of Alternative 3 would not delay the long-term projects and therefore not change the overall impacts of these projects on Fort Belvoir's biological resources. Alternative 3 would lead to the same amount of impacts on all resources as would be caused by adoption of Alternative 1. The short- and long-term impacts of the long-term projects under this alternative on plant communities and forest resources would be less than significant.

3.9.5.2 Fish and Wildlife

Short-Term Projects

Implementation of Alternative 3 would delay, but not change, the overall impacts of the proposed action short-term projects on biological resources as compared to Alternative 1. Alternative 3 would lead to the same degree of impacts on all resources, but several years later than under Alternative 1. The short- and long-term impacts of the short-term projects under this alternative on fish and wildlife would be less than significant.

Long-Term Projects

Implementation of Alternative 3 would not delay the long-term projects and therefore not change the overall impacts of these projects on Fort Belvoir's biological resources. Alternative 3 would lead to the same amount of impacts on all resources as would be caused by adoption of Alternative 1. The short- and long-term impacts of the long-term projects under this alternative on fish and wildlife would be less than significant.

3.9.5.3 Rare, Threatened, and Endangered Species and Their Habitats

Rare, Threatened and Endangered Plant Species

Short-Term Projects

Implementation of Alternative 3 would result in no change to the overall impacts on threatened or endangered plant species to be caused by Alternative 1. Therefore, the short-term projects under Alternative 3 would cause no short- or long-term effects on any state- or federally-listed plant species or their habitat.

Long-Term Projects

Implementation of Alternative 3 would result in no change to the overall impacts on threatened or endangered plant species to be caused by Alternative 1. Therefore, the long-term projects under Alternative 3 would cause no short- or long-term effects on any state- or federally-listed plant species or their habitat.

Rare, Threatened and Endangered Animal Species

Short-Term Projects

Implementation of Alternative 3 would result in no change to the overall impacts on threatened or endangered animal species under Alternative 1. The loss of 28.25 acres of potential wood turtle habitat out of a total of approximately 1,972 acres on the post would have a less than significant adverse effect on the wood turtle population, as this lost habitat comprises a minor fraction (1.4 percent) of the overall wood turtle habitat on the post. Therefore, impacts of short-term projects under Alternative 3 would be less than significant.

Long-Term Projects

Implementation of Alternative 3 would result in no change to the overall impacts on threatened or endangered animal species under Alternative 1. No projects would have an effect on the Northern Virginia well amphipod. Two long-term transportation improvement projects described under Alternative 1 have the potential to impact wood turtle habitat, but this impact would still be a less than significant adverse effect, considering the amount of wood turtle habitat (1,972 acres) on the installation.

3.9.5.4 Wetlands

Short-Term Projects

Implementation of Alternative 3 would result in no change to the overall impacts of short-term projects on wetlands to be caused by Alternative 1. The overall short- and long-term impacts of the short-term projects on wetlands and streams under Alternative 3 would be less than significant.

Long-Term Projects

Implementation of Alternative 3 would result in no change to the overall impacts on threatened or endangered plant species to be caused by Alternative 1. The overall short- and long-term impacts of the long-term projects on wetlands and streams under Alternative 3 would be less than significant.

3.9.5.5 Mitigation/Restoration Areas

It is very unlikely Fort Belvoir would ever allow these areas to be impacted based on regulations and programs in place. The environmental mitigation areas have been or are being constructed with a significant investment from the installation and their tenant agencies.

None of the short- or long-term projects included in Alternative 3 would affect established mitigation or restoration areas. The new projects could generate funding for these and other restoration projects, if they generate the need for stream and wetland mitigation credits. Therefore, the adoption of the RPMP would have a beneficial effect for mitigation and restoration areas.

3.9.6 Proposed Mitigation and Protective Measures

Fort Belvoir's standard mitigation practices have been described and referenced throughout this chapter. Managing for these focal points, as summarized below, ensures compliance with DoD and Army directives by managing for overall biological diversity.

Fort Belvoir would mitigate adverse effects to natural resources at the project level and, cumulatively, at the installation level:

- **Project-Level Mitigation**. Natural resource-related mitigations for each short-term project would be regulated through the Fort Belvoir Tree Removal and Protection policy. Mitigation actions under this policy are determined by the number of trees four inches in diameter-at-breast-height that are removed due to development. The policy provides for several mitigation options, including replacing the lost trees at a 2- to-1 ratio or an "out-of-kind" mitigation action, such as stream restoration or PIF habitat enhancement. The out-of-kind mitigation budget would be determined by the current industry cost of the 2-to-1 tree replacement option. The final mitigation project would be selected by the Fort Belvoir DPW-ENRD staff. Areas for potential future tree mitigation plantings are shown in Figure 3.9-8. DPW-ENRD would also continue to identify opportunities where actions such as removing abandoned pavement (e.g., Woodlawn Road and Keene Road) 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.
- **Cumulative, Installation-Wide Mitigation**. Fort Belvoir proposes to mitigate the cumulative impacts on natural resources of implementing 52 short-term facility projects and 7 short-term transportation projects by adding areas of land to Fort Belvoir's protected Forest and Wildlife Corridor (FWC) (approximately 110 acres), Accotink Bay Wildlife Refuge (approximately 65 acres), and PIF habitat (approximately 59 acres), and by building three new wildlife crossings under US Route 1 in the Accotink Creek drainage area (Figures 3.9-6 and 3.9-7). The land parcels to be added to the FWC and the Accotink Bay Wildlife Refuge contain sensitive areas such as wetlands, locally-rare ecotypes, and wildlife migration corridors. Protecting these parcels under the FWC and refuge designations would preserve their ecological value.

3.9.7 Comparison of Alternatives

The effects on biological and related resources potentially resulting from the implementation of the No Action and three action alternatives as presented above are summarized in Table 3.9-6.

Table 3.9-6
Summary of Biological Resources Impacts by Alternative

Environmental Consequence	No Action Alternative	Alternative 1 – Full Implementation – The Preferred Alternative	Alternative 2 – Modified Long-Term	Alternative 3 – Modified Short-Term
Short-Term Projects				
Affect Plant Communities and Forest Resources	No effect	Less than significant adverse effect with mitigation	Less than significant adverse effect with mitigation	Less than significant adverse effect with mitigation
Affect Fish and Wildlife	No effect	Less than significant adverse effect	Less than significant adverse effect	Less than significant adverse effect
Affect Rare, Threatened, and Endangered Plants	No effect	No effect	No effect	No effect
Affect Rare, Threatened, and Endangered Animals	No effect	No effect, except less than significant adverse effect on wood turtle habitat	No effect, except less than significant adverse effect on wood turtle habitat	No effect, except less than significant adverse effect on wood turtle habitat
Affect Wetlands	No effect	Less than significant adverse effect with mitigation	Less than significant adverse effect with mitigation	Less than significant adverse effect with mitigation
Affect Established Mitigation/Restoration Sites	No effect	Beneficial	Beneficial	Beneficial
Long-Term Projects				
Affect Plant Communities and Forest Resources	No effect	Less than significant adverse effect with mitigation	Less than significant adverse effect with mitigation	Less than significant adverse effect with mitigation
Affect Fish and Wildlife	No effect	Less than significant adverse effect to beneficial effect	Less than significant adverse effect to beneficial effect	Less than significant adverse effect to beneficial effect
Affect Rare, Threatened, and Endangered Plants	No effect	No effect	No effect	No effect
Affect Rare, Threatened, and Endangered Animals	No effect	No effect, except less than significant adverse effect on wood turtle habitat	No effect, except less than significant adverse effect on wood turtle habitat	No effect, except less than significant adverse effect on wood turtle habitat
Affect Wetlands	No effect	Less than significant adverse effect with mitigation	No effect	Less than significant adverse effect with mitigation
Affect Established Mitigation/Restoration Sites	No effect	Beneficial	Beneficial	Beneficial

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3.10 UTILITIES

This section describes existing utilities at Fort Belvoir and evaluates potential effects on the utility systems from implementing the alternatives considered in this EIS. The existing Fort Belvoir stormwater system and the effects on the stormwater system are described in Section 3.8. Effects are evaluated based on the potential for implementing the updated RPMP and the plan's proposed short-term development to increase the demand on existing utilities or create a new demand for utilities.

Thresholds of Significance

Impacts would be significant if Fort Belvoir's needs exceed the ability of a utility provider to supply required services.

3.10.1 Affected Environment

Utilities on Main Post comprise potable water supply and distribution, sanitary sewage collection, electric power distribution, natural gas distribution, steam supply, telecommunications, and solid waste collection. Utility services available at FBNA include potable water supply and distribution, sanitary sewage collection, electric power distribution, telecommunications, steam, natural gas, and solid waste collection. These services are provided by public and private utility companies operating in the area.

Major utility corridors and facilities on Fort Belvoir are generally considered fixed in terms of their location and alignment, and cannot be relocated. Major utility corridors and facilities are defined as:

- Water lines 16 inches and greater
- Water tanks (elevated and ground storage)
- Sanitary sewer force mains and gravity lines 15 inches and greater
- High-voltage electric lines
- Fiber optic lines (single line or duct bank and manhole system with numerous fiber optic cables)
- High-pressure gas lines 4 inches and greater

Unless otherwise specified, the sources for this section are the 2007 BRAC EIS (US Army, 2007a), the Fort Belvoir RPMP IVDP (US Army, 2014a), and Fort Belvoir GIS (2013).

3.10.1.1 Water

Supply

Under wholesale customer agreements, Fairfax County Water Authority (Fairfax Water) delivers potable water to Main Post and FBNA from its Frederick P. Griffith, Jr., Water Treatment Plant in Lorton, Virginia. The treatment plant opened for operation in May 2006, with a production capacity of 120 million gallons per day (mgd) (Fairfax County Water Authority, 2006). The Griffith Plant is one of two supply points that feed the overall Fairfax Water system – the other being the Corbalis Water Treatment Plant in Herndon, Virginia – providing water supply redundancy and reliability to Fort Belvoir.

Water supply to the post is master metered. Fairfax Water provides potable water to Main Post via three separately-metered primary vaults/pump stations. One station is connected to a 30-inch main on Telegraph Road and another to a 24-inch Fairfax Water line on Pole Road. The third vault/pump station is on Beulah Street and connects to the Woodlawn Water System that serves the Aerospace Data Facility-East complex (Russell, pers. comm., May 31, 2013). Although technically a separate distribution system, the Woodlawn Water System is connected hydraulically to and supplies water to the primary Main Post system. A 36-inch

water supply line along Backlick Road provides drinking water to FBNA along its perimeter. A 16-inch line along Rolling Road will also provide potable water to FBNA along its perimeter in the future.

Table 3.10-1 presents Fort Belvoir water use quantities for 2012. The average demand for potable water by the post was 2.3 mgd and peak demand was 3.5 mgd. Main Post accounted for 91 percent of the average daily water use and FBNA accounted for the remaining 9 percent.

Table 3.10-1
2012 Water Use

	Water Use	
	Average (mgd)	**Peak (mgd)**
FBNA	0.2	0.4
Main Post	2.1	3.1
Total Demand	2.3	3.5
Source: US Army, 2014a, Table 5.1		

The current purchased capacity for potable water from Fairfax Water for the Main Post is 4.6 mgd (peak flow); for FBNA, it is 3.0 mgd (peak flow). When the demand reaches 80 percent of the purchased capacity at either location, the Virginia Department of Health, the regulating authority, requires submission of a plan for system upgrade. About 1.0 million gallons are held in emergency storage in American Water Operations and Maintenance, Inc. – (American Water-) owned tanks.

There are no active potable water wells on the installation and all abandoned wells have been closed and filled. There are three groundwater wells used for irrigation on the North Post golf course. A fourth groundwater well was used for irrigation at the DLA campus, but is permanently out of operation (Russell, pers. comm., May 31, 2013).

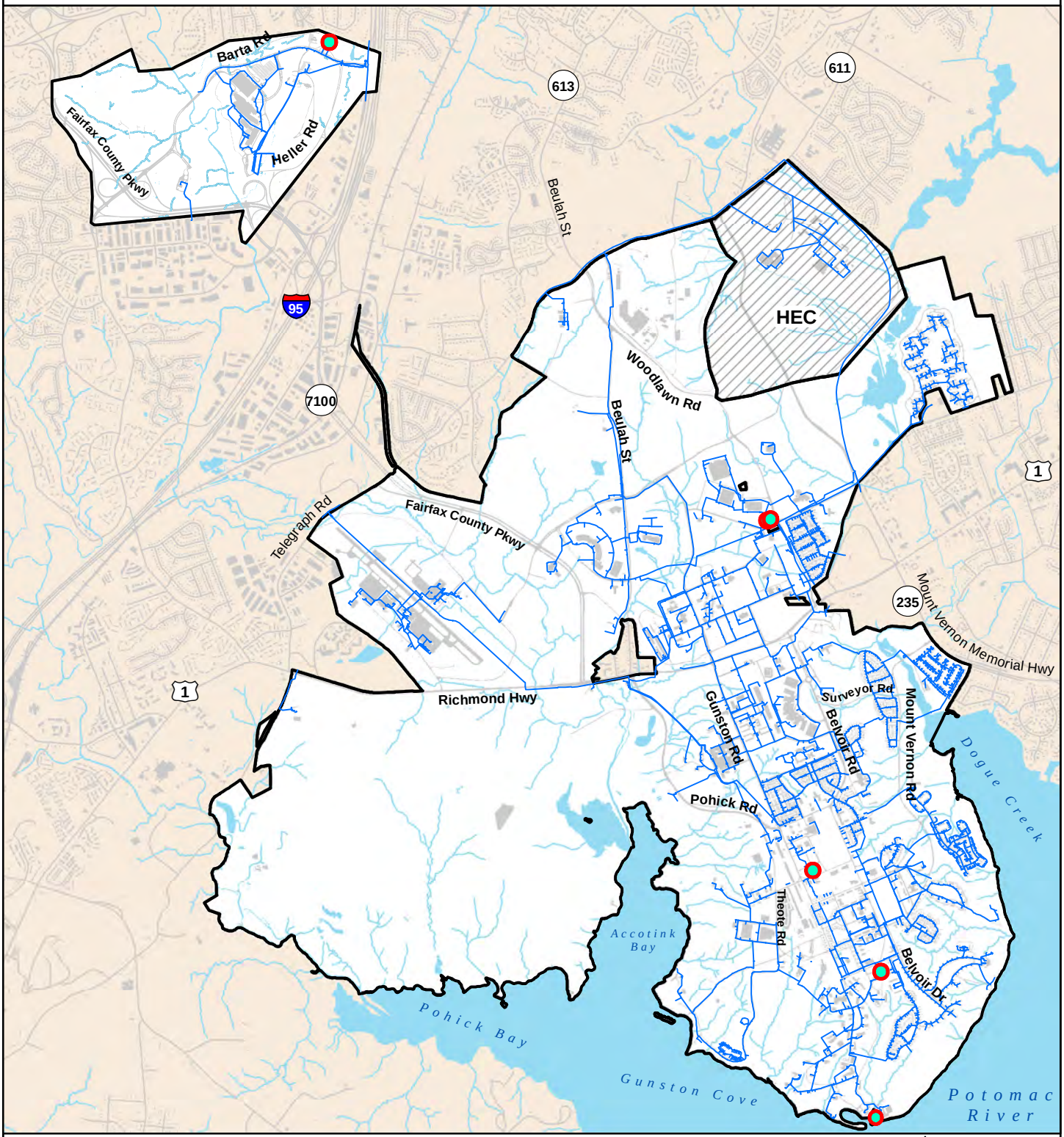
Distribution

The Main Post water distribution system provides looped service to the post and encompasses 78 miles of greater-than-6 inch-diameter water main pipes, two pumping stations, and four storage tanks. Figure 3.10-1 depicts water lines and water storage tanks on Fort Belvoir. Water pressure is aided by a pump station near the Telegraph Road connection and by four water storage tanks. In combination, the four tanks (three elevated, free-standing aboveground tanks and one at ground level) provide a total of 2.3 million gallons of storage capacity (US Army, 2013d). A chlorination system on Telegraph Road previously was operated on an as-needed basis, but was taken out of operation in 2010, when the Main Post water distribution system was privatized (Russell, pers. comm., May 31, 2013). There are no other water treatment facilities on post.

American Water owns, operates, and maintains the Main Post potable water distribution and wastewater collection systems under a 50-year utility privatization contract, effective March 2010 (Pietras, 2012a). The contract does not include the systems at the following:

- FBNA
- HEC
- Several residential areas – specifically, Cedar Grove, Colyer, Fairfax, George Washington, Herryford, Jadwin Loop, Lewis, Park, Rossell Loop, and Vernondale Villages.

Water Lines and Storage Tanks



Above Ground Water Tank

Water line

Fort Belvoir RPMP EIS

0 2,000 4,000 8,000

Feet

Figure 3.10-1

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The contract does include the remaining residential areas – Belvoir, Dogue Creek, Gerber, River, and Woodlawn Villages – which Fort Belvoir Residential Communities LLC owns, operates, and maintains.

- BRAC facilities at Main Post and FBNA, and the infrastructure improvements constructed between 2008 and 2011 to serve the facilities, which the Army owns, operates, and maintains. However, Fort Belvoir intends to modify the agreement to transfer these facilities to American Water.
- Aerospace Data Facility-East on Main Post, which the Army owns, operates, and maintains. (The Commonwealth of Virginia approved a waterworks permit for a separate water system at the Aerospace Data Facility-East.)

Under the terms of the privatization contract, American Water is required to initially replace all system components of a certain age and implement a life-cycle-based replacement program, in addition to performing operation and general maintenance activities. The majority of the distribution system was installed in the 1940s and 1950s. In the first five years of the contract, American Water will perform initial system deficiency corrections to bring the infrastructure up to standard, defined as pipes no older than 50 years and lift stations no older than 30 years. The water utility will replace all water pipes that are over 50 years old, all asbestos content water pipes, and selected newer pipes that are known to be in poor condition, totaling approximately 150,000 linear feet. Nearly all water pipes on South Post will be replaced. American Water also will repair, replace, and upgrade all the existing water storage tanks on post. American Water is replacing all three elevated water storage tanks adjacent to their current locations. Although the new tanks will be larger, the tops will be at the same elevation as those of the existing tanks.

The infrastructure improvements constructed to serve the NGA campus at FBNA include a new water distribution system and a new water storage tank sized for future development at FBNA. The NGA water distribution network connects to the existing Fairfax Water supply line along Backlick Road. An additional, new water storage tank is proposed at FBNA to provide emergency storage; the site for the proposed tank would allow construction of two additional tanks if needed. Water service to FBNA is metered at the connection to the Fairfax Water system at Backlick Road. Fort Belvoir is negotiating a new contract with Fairfax Water for service to FBNA.

A hydraulic study of the water system prepared by American Water indicates that there are no significant capacity or pressure problems on post. Nearly all areas have pressure of 38 pounds per square inch or more under peak, non-fire flow conditions; no location on post has pressure below 30 pounds per square inch. There are concerns with inadequate circulation in the 300 District on South Post.

The primary concerns with the Fort Belvoir water system are inadequate fire protection and high water age in some portions of the system, particularly at DAAF, the DLA area in Upper North Post, and the 300 District on South Post. Water age – a function of the chemical, physical, and aesthetic transformation water undergoes as it travels through the distribution system – is controlled primarily by system design and system demands (USEPA, 2002). High water age can cause odor and water quality issues and decreased disinfectant (chlorine) residuals.

All of the water storage tanks on Main Post are approaching or have reached the end of their useful life, and their continued use would decrease the overall reliability of the water distribution system (US Army, 2013d). Additionally, in order to meet current fire flow demands and future potable water demands, Fort Belvoir would require a water system with a storage capacity of 3 million gallons. Sections of water lines cross over intermittent and perennial streams, where erosion of the stream banks has affected the integrity of the lines (US Army, 2013d).

3.10.1.2 Sewage

Collection

As described in Section 3.10.1.1, American Water owns, operates, and maintains the Main Post potable water distribution and wastewater collection systems under a 50-year utility privatization contract (Pietras, pers. comm., April 27, 2012). The contract currently does not include the systems at FBNA; HEC; several residential areas; facilities at Main Post and FBNA built in response to 2005 BRAC, and the infrastructure improvements constructed between 2008 and 2011 to serve the facilities; and Aerospace Data Facility-East on Main Post.

The Main Post sanitary sewage collection system includes service laterals, collection pipes and mains, pumping/lift stations, and two main pumping stations, pump station 97 at the southern end of Jadwin Loop and pump station 687 at the southern end of Tompkins Basin. Figure 3.10-2 depicts wastewater lines on Fort Belvoir. The post also owns and operates a septic tank without a septic field at the Golf Course Maintenance Facility on Telegraph Road (US Army, 2003, as cited in US Army, 2007a).

Like the other utility systems at Fort Belvoir, most of the wastewater collection system on Main Post was built in the 1940s. In the first 5 years of the 50-year privatization contract, American Water will slipline or replace all sanitary sewer pipes that are over 50 years old and selected newer pipe that is known to be in poor condition, totaling approximately 100,000 linear feet. From 2010 to 2013, gravity sewer mains were lined using cured-in-place pipe technology (US Army, 2013d). American Water also will repair, replace, and upgrade the existing sanitary pump stations on Main Post, although to date the repair and replacement program has been delayed by utility conflicts and environmental permitting issues. Sections of gravity sewer lines cross over intermittent and perennial streams, where erosion of the stream banks has affected the integrity of the lines (US Army, 2013d).

The infrastructure improvements constructed to serve the new NGA campus at FBNA provide a network of new sanitary sewer lines that connect to the existing Fairfax County trunk sewer that runs along Accotink Creek. The sewer lines have been located and sized to serve both the NGA campus and potential additional development at FBNA. The trunk sewer varies in diameter from 42 to 54 inches.

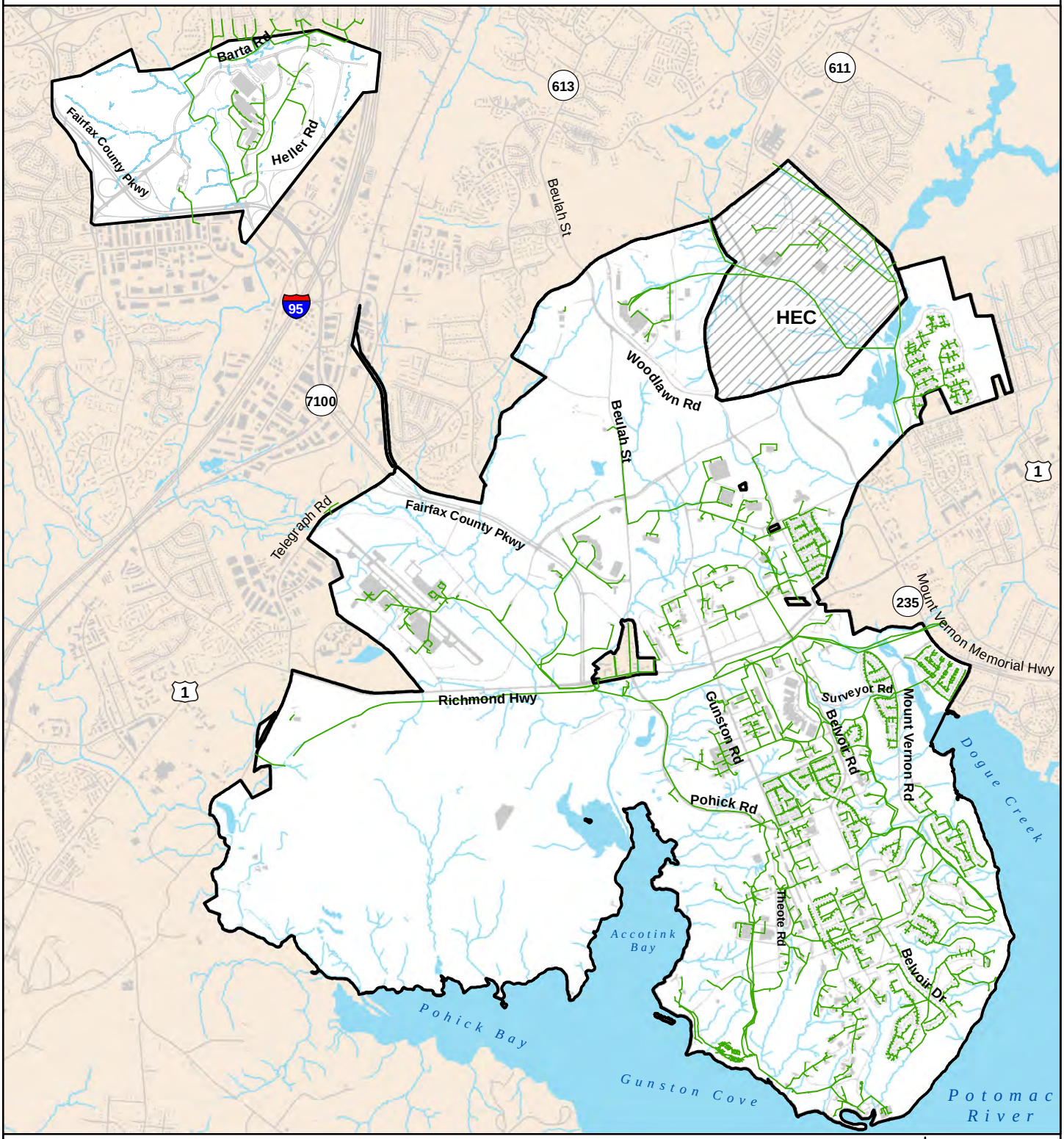
Based on a hydraulic study of the Main Post sewer system prepared by American Water using limited survey and metering data, no significant capacity problems exist on post. Sometimes during wet weather events, pump stations 97 and 687 overflow into holding tanks. Some pipe surcharging occurs during wet weather events, but there are no overflows.

The major sanitary capacity issue that American Water has identified is pump station 687, located on the Potomac River at the southwest side of South Post, and the force main, which connects this pump station to the Fairfax County sewer main on Route 1. The pump station has three pumps and adequate storage to provide capacity for current flows. However, the force main capacity is limited as only two of the three pumps can be operated simultaneously; it is inadequate for current peak flows. The existing sanitary service would need to be upgraded for a portion of the post that connects to pump station 687.

Infiltration and Interception

Infiltration and interception are extraneous water entering the wastewater collection systems through a variety of sources. Infiltration is groundwater that enters the collection system through physical defects such as cracked pipes or manholes, or deteriorated joints. Interception, or inflow, is extraneous flow entering the collection system through point sources. Interception may be directly related to stormwater runoff, from sources such as roof leaders, area drains, and cross connections from storm drains or catch basins. Interception also may be contributed by non-stormwater-related point sources, such as cooling-water discharges, or drains from springs and swampy areas. High levels of infiltration and interception reduce pipeline capacity in the collection system that would otherwise be available to transmit sanitary flow.

Wastewater Lines



Wastewater line

Fort Belvoir RPMP EIS

0 2,000 4,000 8,000

Feet

Figure 3.10-2

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Stormwater infiltration and interception is a persistent threat to sanitary system capacity and performance. Hot spots have been identified such as DAAF for infiltration and areas on the Main Post for interception. Roof drains need to be diverted from the sanitary sewers, into which they now discharge, to the storm sewers. Existing cross-connections between the sanitary sewer system and the storm sewer system also need to be corrected.

Treatment

Fairfax County owns and operates two major pumping stations close to Fort Belvoir, as well as a large-diameter force main running generally parallel to and just south of US Route 1. The county replaced the Dogue Creek force main that runs parallel to US Route 1 on the east side of Fort Belvoir. Construction began in late 2011 and was completed in the fall of 2013. Federal Government-owned sewage collection systems tie to those of Fairfax County at several points along the Dogue Creek trunk line.

Fairfax County trunk sanitary lines traverse both Main Post and FBNA, and convey Fort Belvoir wastewater to the county's Noman M. Cole, Jr., Pollution Control Plant (formerly the Lower Potomac Pollution Control Plant) adjacent to Fort Belvoir in Lorton, Virginia.

The Cole Plant, the largest advanced wastewater treatment plant in Virginia, has a capacity of 67 mgd and receives an average daily flow of 45 mgd (Fairfax County DPW & ES, 2011). Fort Belvoir purchased 3.0 mgd capacity in collection/treatment from Fairfax County, exclusive of FBNA. The capacity is based on a quarterly running average with a not-to-exceed peak limit of 6.0 mgd. Fort Belvoir is negotiating a new contract with Fairfax County for sewer service to FBNA.

Sewage flow data for Fort Belvoir are not available for 2011. In 2012, the actual sewage flow from Fort Belvoir was approximately 1.4 mgd average daily flow and peak flows were approximately 1.9 mgd (Table 3.10-2). Main Post accounted for 85.7 percent of the average daily flow, and FBNA accounted for the remaining 14.3 percent. Preliminary estimates of new loads from BRAC tenants indicate that the total peak flow from Main Post would approach 2 mgd and that the total peak flow from FBNA would approach 1 mgd; for a combined peak flow of approximately 3 mgd, or about half the 6.0-mgd maximum daily peak capacity. The Cole Plant has adequate capacity to serve future development at Fort Belvoir; however, Fort Belvoir may need to contract with Fairfax County for more treatment capacity. The plant discharges its effluent into Pohick Creek, authorized by Virginia Pollution Discharge Elimination System permit number VA0025364, effective September 29, 2008 (VDEQ, 2008; Thomas, pers. comm., September 29, 2008).

Table 3.10-2
2012 Sewage Flows

	Sewage Flow	
	Average (mgd)	**Peak (mgd)**
FBNA	0.2	0.4
Main Post	1.2	1.5
Total Demand	1.4	1.9
Source: US Army, 2014a, Table 5.1		

3.10.1.3 Electric Power

Dominion Virginia Power (DVP) supplies electricity to both Main Post and FBNA. Electric supply has always been from private sources. The electric distribution system on Main Post has been privatized since August 2007 under a contract signed by the installation and DVP. The privatization agreement excludes the electric distribution systems at FBNA, Aerospace Data Facility-East, HEC, and Building 2310 (Echo Company, 1110th Signal Battalion), which continue to be managed by the government.

Figure 3.10-3 depicts electric lines on Fort Belvoir. DVP has an extensive network of distribution lines throughout most of Main Post. DVP provides electric power to Main Post from two 34.5-kilovolt distribution circuits. Power is transferred from the Fort Belvoir substation near the HEC to the Humphreys switching station and distributed to Main Post. Four 34.5-kilovolt distribution circuits emanate from the switching station. Several overhead feeder lines serve the various areas of Main Post, with some lines being interconnected for form looped feeder areas. Power is stepped down to lower voltages for local use throughout the installation using additional substations. Auxiliary generators are used as backup for critical functions.

DVP provides electric service to the FBNA boundary, as well as distribution lines within the installation. DVP has constructed off-site transmission lines and a new substation to provide electric service. These facilities have capacity for some additional development.

In the last four years, while the projects implemented in response to 2005 BRAC actions have added a substantial load on the system, DVP has completed a number of projects to provide additional capacity, reliability, and redundancy to the distribution system. The distribution system is well balanced and has adequate capacity to serve existing needs. No system upgrades are planned for either Main Post or FBNA. In 2011, the average monthly electric consumption for Main Post was approximately 61,000 million British thermal units (MBtu) (Cermenaro, pers. comm., June 3, 2012). No estimate of the 2011 baseline annual electric consumption for FBNA is available.

3.10.1.4 Telecommunications

Telecommunications and information services on Fort Belvoir consist of a copper and fiber-optic data-distribution network. Figure 3.10-4 depicts fiber-optic lines on Fort Belvoir. The network backbone is an asynchronous transfer mode and the telephone switch is integrated services digital network-capable. Most of the distribution cable is carried through an underground ductbank. The installation owns the entire system, including copper and fiber-optic cable, utility poles, and computerized switchboard systems associated with inter-post and DoD applications.

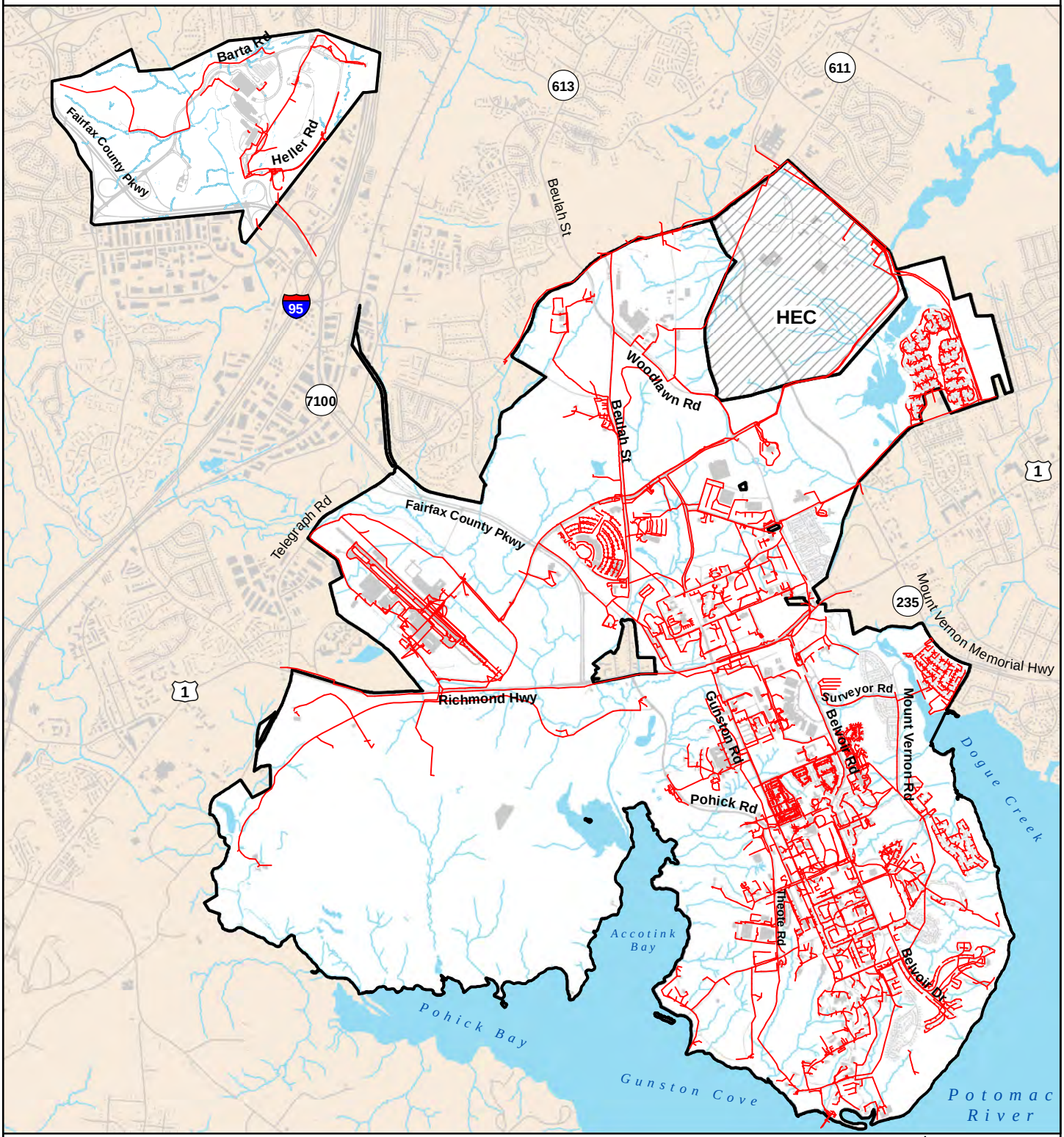
Although some tenants have separate information technology systems, most telecommunications and information services on post are provided by Verizon Federal and managed by the Network Enterprise Technology Command. Existing information technology facilities are adequate to serve the existing population on post. Under the Army's Installation Information Infrastructure Modernization Program, the Network Enterprise Technology Command currently is upgrading the network equipment in approximately 80 buildings and installing a minimum amount of fiber between some buildings.

Telecommunication facilities along Barta Road and Heller Road serve the NGA campus on FBNA. There is minimal or no telephone and internet services provided at present throughout the remainder of FBNA. However, communication lines are located along Backlick Road for the eastern side of FBNA and along Rolling Road for the western side (US Army, 2000, as cited in US Army, 2007a).

3.10.1.5 Steam

Main Post has four high-pressure steam plants, including the central plant, that serve multiple buildings and six low-pressure steam plants that serve individual buildings. The Viron/Pepco Services Partnership maintains and operates the central steam plant and ALEUT maintains and operates the other steam plants and all steam lines. Fort Belvoir owns the entire steam system (US Army, 2003, as cited in US Army, 2007a).

Electric Lines



Electric line

Fort Belvoir RPMP EIS

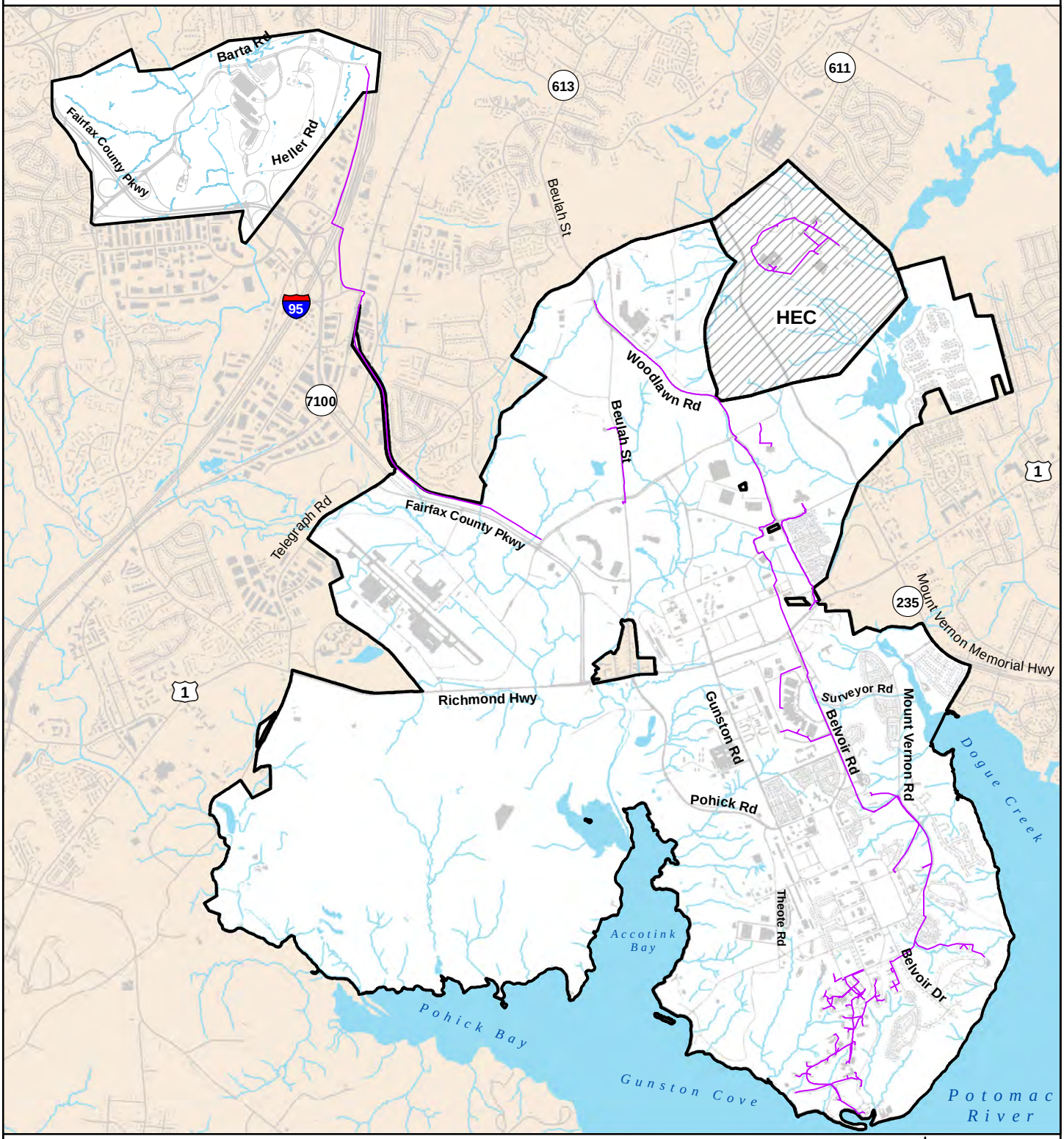
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Figure 3.10-3

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Fiber-Optic Lines



Fiber-Optic Lines

Fort Belvoir RPMP EIS

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Figure 3.10-4

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The central steam plant, Building 1422, serves a small area in South Post including the old DeWitt Hospital and approximately 20 other buildings. Steam is used in those buildings to provide heat and hot water. The plant has recently modernized boilers that use natural gas as their primary fuel and fuel oil as backup (US Army, July 2009b). The other high-pressure steam plants serve the 300 Area on South Post and DAAF on North Post.

The Main Post steam system is aging, inefficient, and leaky, and requires frequent maintenance. The post is gradually phasing out the steam system and replacing it with new heating, ventilation, and air conditioning systems in individual buildings as buildings are renovated. The plant that serves the 300 Area will be taken out of operation by the spring of 2014 and the central Building 1422 steam plant will be taken out of operation in 2014 or 2015, with the completion of the decentralization projects that are installing standalone boilers in the buildings served by the two plants. However, it will be several years before the entire steam system is abandoned. The existing steam lines will be abandoned in place and will not be removed.

No steam utility services are provided on FBNA.

3.10.1.6 Natural Gas

Washington Gas Light Company (Washington Gas) supplies natural gas to Fort Belvoir and the surrounding community. The gas company has a robust distribution system in the area that appears capable of providing adequate natural gas for current and anticipated requirements.

Washington Gas has an extensive network of distribution lines covering large parts of Main Post. Figure 3.10-5 depicts high-pressure gas lines on Fort Belvoir. Natural gas is supplied to Main Post at two delivery points, one along US Route 1 and a second at Woodlawn Road (Smith, pers. comm., December 17, 2004, as cited in US Army, 2007a). Washington Gas owns and operates Fort Belvoir's natural gas system. Natural gas is distributed to Main Post, mostly servicing the family housing areas. Based on Army Energy and Water Reporting System data (Cermenaro, pers. comm., June 3, 2012), in 2011, the average monthly gas consumption for Main Post was 202,669 therms.

Therms

A therm is a measure for a constant heating value of utility gas, defined as the energy equivalent of burning 100 cubic feet of natural gas and equal to 100,000 British thermal units.

Washington Gas provides natural gas service to the FBNA. Washington Gas has transmission lines on Backlick Road along the eastern side adjacent to FBNA. Lines along Barta Road serve the NGA campus. The closest gas main for the western side of FBNA is along Rolling Road (US Army, 2000, as cited in US Army, 2007a).

3.10.1.7 Solid Waste

Fort Belvoir has an Integrated Solid Waste Management Plan, last updated in 1999. In general, the planning goal is to reduce solid waste management costs and environmental effects by reducing the quantity of materials that must be disposed of by incineration or landfilling. In November 2011, the Environmental and Natural Resource Division of the Fort Belvoir Directorate of Public Works initiated a Recycling and Solid Waste Management Program, combining previously separate operations and responsibilities (McQuale, 2011).

Consistent with the mandatory post-wide Fort Belvoir Qualified Recycling Program policy (US Army, 2010i), the recycling program includes capturing cardboard, white and mixed colored paper, newspaper, aluminum and steel cans, plastic and glass bottles, scrap metal, printer toner cartridges, construction debris, tires, used motor oil, and landscaping materials – leaves, tree limbs, and branches for composting (McQuale, November 2011). The collected materials are managed at the post's Recycling Center, Debris Collecting Yard, and Landscape Composting Facility. Items such as tires and lead acid batteries go to the Defense Reutilization and Marketing Office for recycling.

The Fort Belvoir recycling program is consistent with the Army's Sustainable Management of Waste in Military Construction, Renovation, and Demolition Activities policy (US Army, 2006b). This policy requires that all military construction, renovation, and demolition projects include contract performance requirements for the diversion of a minimum of 50 percent of construction and demolition waste, by weight, from landfill disposal. Diversion comprises the redirection of waste, ordinarily disposed of in a landfill or burned in an incinerator, to a recycling facility, a composting yard, or another destination for reclamation or reuse.

Household and office building trash generated at Fort Belvoir is disposed of off post at the I-95 Energy/Resource Recovery Facility, a waste-to-energy facility privately owned and operated by Covanta Fairfax, Inc. The Fairfax County Division of Solid Waste Disposal and Resource Recovery oversees operation of the facility. The disposal capacity of the facility is over 3,000 tons per day (Fairfax County, 2012). Fairfax County disposes of the ash generated from the waste-to-energy facility in the adjacent I-95 Landfill Complex. The county's *Solid Waste Management Plan* (Fairfax County DPW&ES, 2004) projects that the resource recovery facility and the county's current disposal system will have sufficient capacity to handle the projected quantities of municipal solid waste through 2025. The 2010 five-year review of the management plan (Fairfax County, 2010) concludes that the available solid disposal capacity will meet the county's projected needs for the next 20 years, "based on the combination of increased recycling, lowered projections for waste generation (compared to the 2004 projections), and increased waste management system capacity (or lesser needs) ...."

A letter of agreement between Fort Belvoir and the Fairfax County Division of Solid Waste Disposal and Resource Recovery caps Fort Belvoir municipal solid waste disposed of at the I-95 Energy/Resource Recovery Facility at 100 tons per day (Meoli, pers. comm., February 16, 2007, as cited in US Army, 2007a). From June 2006 through January 2007, Fort Belvoir disposed of an average of approximately 450 tons of municipal solid waste per month, or about 15 tons per day.

3.10.2 Environmental Consequences of the No Action Alternative

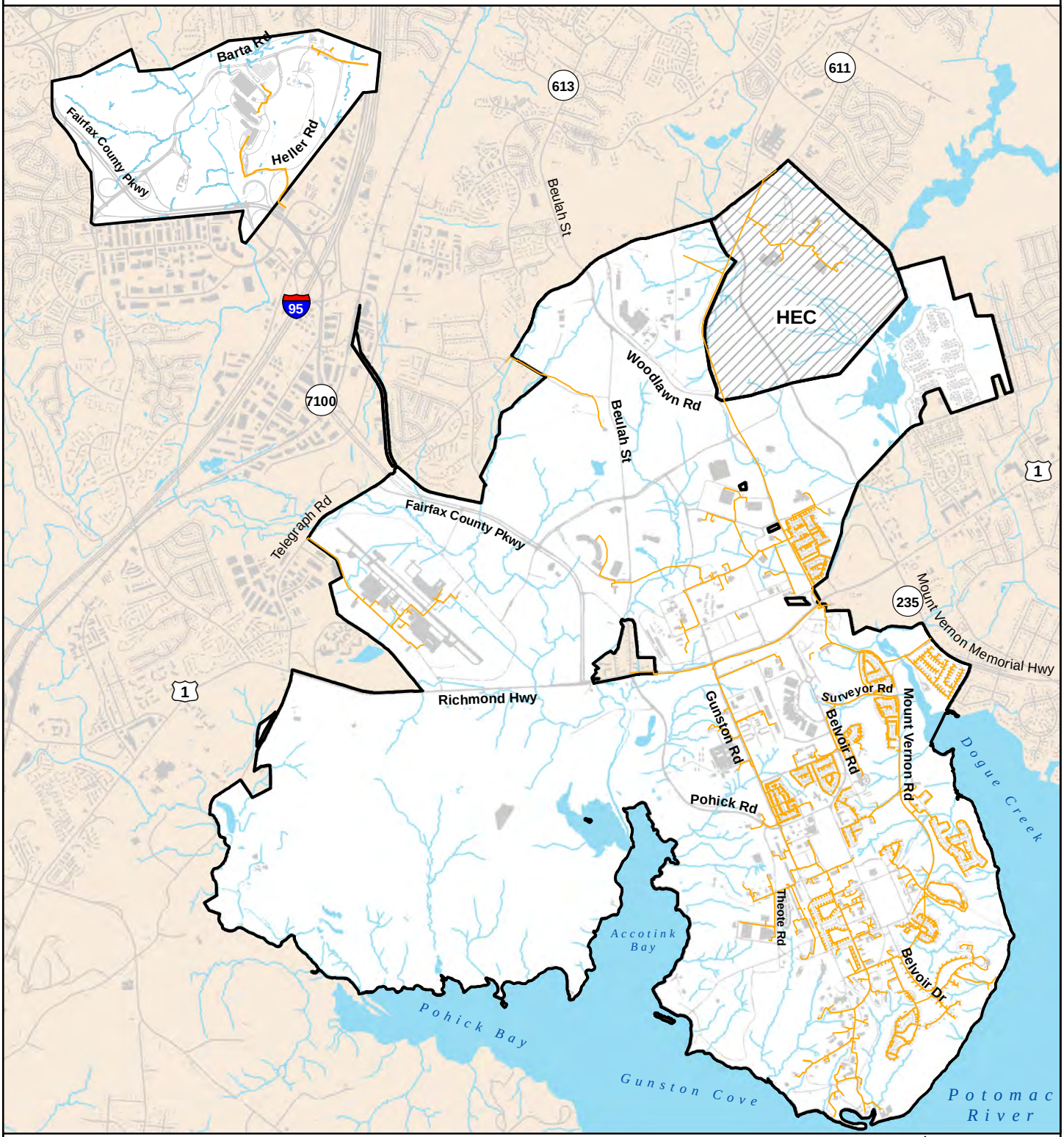
Implementation of the No Action Alternative would cause no immediate adverse effects on the utility systems that support Fort Belvoir and its tenants, and would not increase demand for utilities above existing levels. However, parts of the utility infrastructure on post date from the 1930s and 1940, and are nearing the end of their useful life, although BRAC-related projects have constructed or replaced infrastructure in several areas of the installation.

3.10.2.1 Water and Sewage

The No Action Alternative would have no impact on Fort Belvoir water use or sewage flows, but would forego upgrading the water and wastewater systems on post (ST 10). As a result, American Water would not perform operation and general maintenance activities, and would not replace aging infrastructure, including pipes, lift stations, and water towers. According to the EA prepared for ST 10 (US Army, 2013c), not upgrading the Fort Belvoir water and wastewater systems would have noticeable adverse impacts on the systems. Specifically:

- Not replacing existing water storage tanks that are approaching or have reached the end of their useful life, and the continued use of the tanks would decrease the overall reliability of the water distribution system.
- Not replacing aging sanitary sewer force mains would result in continued potential for possible rupture of a main, which could result in interruption of sewer service.

High-Pressure Natural Gas Lines



High-Pressure Natural Gas Lines

Fort Belvoir RPMP EIS

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Figure 3.10-5

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- Not constructing permanent access to manholes for specific sewer sections would hinder future inspection and maintenance activities, which could lead to clogs and backups, and missed repair and rehabilitation opportunities.
- Not abating erosion that affects the integrity of water and gravity sewer lines that cross above streams and the concrete piers that support the lines could result in the breakage or collapse of water or sewer lines, causing interruption in service.
- Foregoing systematic repair and upgrade of the water and wastewater systems would result in the continued decline of the aging infrastructure and could lead to emergency repairs and larger, more complex and costly upgrades in the future.

Implementation of the No Action Alternative would have no impact on Fort Belvoir water use and sewage flows. The No Action Alternative would have no impact on the water and wastewater systems on post.

3.10.2.2 Electric Power, Telecommunications, Steam, Natural Gas, and Solid Waste

Implementation of the No Action Alternative would have no impact on Fort Belvoir electric consumption, telecommunication and information services, steam use, natural gas consumption, or solid waste generation. The No Action Alternative would have no impact on the electric distribution system, telephone and information technology systems, steam system, natural gas distribution system, or solid waste management on post.

3.10.3 Environmental Consequences of Alternative 1 – Full Implementation – The Preferred Alternative

Under Alternative 1, the RPMP Update, including the short-term and long-term projects, would be fully implemented. Relative to the September 2011 post-BRAC workforce of approximately 39,000, the total workforce on Main Post and FBNA would increase to 44,000 by 2017 and 56,000 by 2030.

3.10.3.1 Water

Short-Term Projects

Expansion of the INSCOM HQ (ST 19, 26, 33, and 46), the development of the NMUSA (ST 17, 18, 27, 34, 38, and 41) and the DLA parking garages and administrative center (ST 40 and 52) would require extension of the water distribution system to serve the new facilities and may require water tanks and pressure improvements to accommodate the additional demand (US Army, 2014a). Redevelopment of the North Post Town Center and development at the PX/Commissary (ST 1, 16, 25, and 28) would require extension or replacement of the water distribution systems in these areas.

Construction activities could result in temporary, localized water service interruptions in order to connect new lines and extend service. Service interruptions would be minimized to the greatest extent possible, and service would be returned to normal after construction is completed. Short-term transportation projects, particularly linear projects and intersection improvement projects such as STT 1, 2, 4, and 6, likely would require the relocation of water infrastructure along roadway right-of-ways. Water demand would increase slightly during construction of the short-term projects implemented under Alternative 1. However, potential increases in water demand associated with construction activities would be temporary and would not exceed existing capacity.

During operation of the new facilities, there would be a long-term increase in potable water demand due primarily to an increase in the on-post working population. Table 3.10-3 presents the 2017 projected Fort Belvoir average and peak water use quantities for the three alternatives, as well as the 2012 water use

quantities for comparison. Note that the estimates do not take into account any actions or measures that may be taken by Fort Belvoir to reduce future water consumption; therefore, they should be considered conservative.

Table 3.10-3
2017 Projected Water Use

	2012	2017 Projected		
		Alternative 1	Alternative 2	Alternative 3
Average Water Use (mgd)				
FBNA	0.2	0.2	0.2	0.2
Main Post	2.1	2.4	2.3	2.2
Total	2.3	2.6	2.5	2.4
Peak Water Use (mgd)				
FBNA	0.4	0.4	0.4	0.3
Main Post	3.1	3.5	3.4	3.2
Total	3.5	3.9	3.8	3.6

As noted in Section 3.10.1.1, when the water demand reaches 80 percent of the 4.6 mgd purchased capacity for Main Post (or approximately 3.7 mgd peak use) or 80 percent of the 3.0 mgd purchased capacity for FBNA (approximately 2.4 mgd peak use), the Virginia Department of Health requires submission of a plan for system upgrade. For Alternative 1, the projected 2017 peak water use at both Main Post and FBNA would remain below the 80 percent threshold.

Implementation of the Alternative 1 short-term projects would individually and cumulatively have less than significant adverse impacts on water use and on the water system on Fort Belvoir.

Long-Term Projects

At North Post, the development on the Lower North Post (LT 1 and 6A) would require extension of the water distribution system to serve the new facilities and may require water tanks and pressure improvements to accommodate the additional demand (US Army, 2014a). Construction of a residential area adjacent to the PX (LT 7) also would require extension of the water distribution system, as well as replacement of existing lines that conflict with proposed development.

Development at the South Post (LT 2, 3, 4, 5, 6, and 8) would require extension or replacement of the water distribution systems in the area (US Army, 2014a). Redevelopment of the Town Center District to support higher-density development (LT 5) would require extension of the water distribution system and replacement of existing lines that conflict with proposed development.

Redevelopment of the 1400 East District as a higher-density professional/institutional center (LT 2) would require a new pipe network, as the proposed buildings, as currently planned, would conflict with most of the existing water lines in the area west of the FBCH, requiring that the existing lines be abandoned. The first portion of this new pipe network was constructed for the new US Army Legal Services Agency administration building. The 16-inch water line installed during implementation of the BRAC 2005 recommendations along Gunston Road and Kingman Road, and spanning from the Fairfax County water system in the north to just south of US Route 1, would provide adequate service for proposed 2030 development (US Army, 2014a).

The FBNA water distribution network would need to be extended for anticipated new development at FBNA (LT 9). The existing system would have adequate capacity to serve anticipated development (US Army, 2014a). If additional storage is required, a second tank would need to be constructed at FBNA.

Construction activities could result in temporary, localized service interruptions, but service would return to normal after construction is completed. Long-term transportation projects, particularly linear projects and intersection improvement projects such as LTT 2, 4, 6, 7, 8, and 10, likely would require the relocation of water infrastructure along roadway right-of-ways. Water demand would increase slightly during construction of the long-term projects implemented under Alternative 1; however, potential increases in water demand associated with construction activities would be temporary and would not exceed existing capacity.

During operation of the new facilities, there would be a long-term increase in potable water demand due primarily to an increase in the working population on post. Table 3.10-4 shows estimated average and peak water use quantities for 2030. At FBNA, both average and peak water use quantities would increase twofold under Alternative 1 relative to the respective baseline quantities but peak usage would remain well below the 80 percent of purchased capacity threshold. On Main Post, the increase would be less but peak water usage would reach 4.0 mgd, a little in excess of the 80 percent of purchased capacity threshold, requiring submission of a plan for system upgrade but still below the current purchased capacity. (As previously noted, this is based on a conservative estimate that does not take into account any water conservation measures or actions that may be taken in the future at Fort Belvoir.) Fort Belvoir would monitor water usage and develop a system upgrade plan when and as required. It is expected that Fairfax Water would be able to meet the projected future water demands and expansion of the Fort Belvoir population would not be hindered (US Army, 2014a).

Implementation of the Alternative 1 long-term projects would individually and cumulatively have less than significant adverse impacts on water use and on the water system on Fort Belvoir.

Table 3.10-4
2030 Projected Water Use

	2012	2030 Projected		
		Alternative 1	Alternative 2	Alternative 3
Average Water Use (mgd)				
FBNA	0.2	0.4	0.2	0.4
Main Post	2.1	2.7	2.8	2.5
Total	2.3	3.1	3.0	3.0
Peak Water Use (mgd)				
FBNA	0.4	0.8	0.4	0.8
Main Post	3.1	4.0	4.1	3.8
Total	3.5	4.8	4.5	4.6

3.10.3.2 Sewage

Short-Term Projects

Based on the hydraulic study of the Main Post sewer system, American Water does not see any major infrastructure problems in the sewage system to support near-term growth (US Army, 2014a). Planned short-term development would need to consider the following (US Army, 2014a):

- Future development of the NMUSA (ST 17, 18, 27, 34, 38, and 41) and at the DLA complex (ST 40 and 52) would require evaluation of the capacity of the 15-inch sewer that runs from DLA southwest toward DAAF. Based on preliminary studies, this line is at or near capacity.

- The proposed INSCOM expansion (ST 19, 26, 33, and 46) would require evaluation of the capacity of the existing pump station east of the site and the gravity sewers downstream to ensure that adequate capacity exists for the additional population.
- Anticipated development on South Post (notably ST 32, 37, 45, and 51) and at the PX/Commissary (ST 1, 16, 25, and 28) would require extension of the sanitary sewage collection system to serve these areas. No capacity problems are expected.
- In addition to serving the FBCH and the Wounded Warrior Complex, the new hospital pump station may have capacity for proposed, additional development in the 1400 area (ST 45).

Construction activities could result in temporary, localized sewage service interruptions in order to connect new lines and extend service. Service interruptions would be minimized to the greatest extent possible and service would be returned to normal after construction is completed. Short-term transportation projects, particularly linear projects and intersection improvement projects such as STT 1, 2, 4, and 6, likely would require the relocation of sewage infrastructure along roadway right-of-ways.

The increase in the Fort Belvoir population would result in a long-term increase in demand for wastewater collection and treatment. Table 3.10-5 presents the 2017 projected Fort Belvoir average and peak sewer flow quantities for the three alternatives. As 2011 data are not available, the table also provides the 2012 current sewer flows for comparison. Under Alternative 1, the average sewage flow would increase 5.3 percent relative to the 2012 baseline flow; whereas the peak sewage flow would increase 55.2 percent. The disparity between projected average and peak flow increases is due to the 2012 peak flow's being an actual, reported quantity, while the 2017 peak flow was calculated by doubling the projected average flow. For Alternative 1, the 2017 average sewage flow for Main Post would be 1.6 mgd below the 3.0 mgd collection/treatment capacity purchased from Fairfax County, exclusive of FBNA. The peak flow for Main Post would be 3.3 mgd below the 6.0 mgd not-to-exceed peak limit.

Implementation of the Alternative 1 short-term projects would individually and cumulatively have less than significant adverse impacts on sewage flows and on the wastewater system on Fort Belvoir.

Table 3.10-5
2017 Projected Sewage Flow

		2017 Projected		
	2012	Alternative 1	Alternative 2	Alternative 3
Average Sewage Flow (mgd)				
FBNA	0.2	0.2	0.2	0.2
Main Post	1.2	1.4	1.3	1.2
Total	1.4	1.5	1.4	1.4
Peak Sewage Flow (mgd)				
FBNA	0.4	0.4	0.4	0.4
Main Post	1.5	2.7	2.6	2.5
Total	1.9	2.9	2.9	2.7

Long-Term Projects

On Main Post, construction of a residential area adjacent to the PX (LT 7) and redevelopment of the Town Center District to support higher-density development (LT 5) would require extension of the sanitary sewage collection system and replacement of existing lines that conflict with proposed development (US Army, 2014a). No capacity issues are anticipated.

Redevelopment of the 1400 East District as a higher-density professional/institutional center (LT 2) potentially would overload the downstream gravity sewers and pump stations (US Army, 2014a). Part or all of this area could be diverted to the new hospital pump station and the new force main that runs from the pump station to the existing Fort Belvoir 21-inch gravity sewer. If the capacity of the pump station is not adequate for this additional flow, a second pump station could be constructed adjacent to the hospital pump station. Redevelopment of the 1400 East District would require a new pipe network, as the proposed buildings, as currently planned, would conflict with most of the existing sewer lines in the area west of the FBCH, requiring that the existing lines be abandoned. The first portion of this new pipe network was constructed for the new US Army Legal Services Agency administration building.

Potential development at FBNA (LT 9) would require extension of the sanitary sewage system. The sewer lines that serve the new NGA campus and connect to the existing trunk sewer that runs along Accotink Creek have been located and sized to serve potential additional development at FBNA. Fairfax County staff indicate that this existing trunk sewer and the existing county wastewater treatment plant both have adequate capacity to serve the new NGA facilities as well as potential additional development at FBNA (US Army, 2014a).

Construction activities could result in temporary, localized sewage service interruptions, but service would be returned to normal after construction is completed. Short-term transportation projects, particularly linear projects and intersection improvement projects, likely would require the relocation of sewage infrastructure along roadway right-of-ways.

Table 3.10-6 provides the Fort Belvoir average and peak sewer flows for 2030. The average sewer flow would increase 34.3 percent under Alternative 1 relative to the 2012 baseline average flow. Fort Belvoir peak sewer flow would increase 97.9 percent, nearly doubling relative to the baseline peak flow. The 2030 average sewage flow for Main Post would be 1.5 mgd below the purchased collection/treatment capacity; the peak flow would be 3.0 mgd below the not-to-exceed peak limit.

Table 3.10-6
2030 Projected Sewage Flow

	2012	2030 Projected		
		Alternative 1	Alternative 2	Alternative 3
Average Sewage Flow (mgd)				
FBNA	0.2	0.4	0.2	0.4
Main Post	1.2	1.5	1.6	1.5
Total	1.4	1.9	1.7	1.9
Peak Sewage Flow (mgd)				
FBNA	0.4	0.8	0.4	0.8
Main Post	1.5	3.0	3.1	3.1
Total	1.9	3.8	3.3	3.8

Implementation of the Alternative 1 long-term projects would individually and cumulatively have less than significant adverse impacts on sewage flows and on the wastewater system on Fort Belvoir.

3.10.3.3 Electric Power

Short-Term Projects

Implementation of Alternative 1 would require electric infrastructure improvements to accommodate the planned new facilities. The extension of distribution lines and other electric infrastructure to the proposed

new facilities would be required. During construction, power would need to be routed to the new facilities to meet demands. Construction activities could result in temporary, localized service interruptions in order to connect new lines and extend service. Service interruptions would be minimized to the greatest extent possible and service would be returned to normal after construction is completed. Short-term transportation projects, particularly linear projects and intersection improvement projects such as STT 1, 2, 4, and 6, likely would require the relocation of electric service infrastructure along roadway right-of-ways.

Because of the increase in the Fort Belvoir population, there would be a long-term increase in electricity demand associated with operation of the new facilities. Table 3.10-7 presents the 2017 projected Fort Belvoir electric consumption for the three alternatives, as well as the 2011 current electric consumption for comparison. Under Alternative 1, electric consumption on Main Post would increase 20.9 percent relative to the baseline 2011 consumption. Although no 2011 baseline monthly electric consumption estimate is available for comparison, electric consumption on FBNA is projected to reach almost 9,000 MBtu per month in 2017, bringing total monthly consumption for Fort Belvoir to almost 87,000 MBtu.

Table 3.10-7
2017 Projected Electric Consumption

	2011	2017 Projected		
		Alternative 1	Alternative 2	Alternative 3
Electric Consumption (MBtu per month)				
FBNA	NA	17,300	17,300	17,139
Main Post	60,911	73,639	71,653	66,824
Total	NA	86,770	84,783	79,793
Source: 2011 Main Post electric consumption based on Cermenaro, pers. comm., June 3, 2013.				

The current demands for enhanced electric service associated with more-energy-intensive uses are expected to continue with future growth, particularly with an increase in the number of secure campuses that require large data processing facilities to operate (US Army, 2013a in progress). Continuation of this trend would require advance planning with DVP and the continuation of innovative project design solutions to offset the increased energy demands.

Implementation of the Alternative 1 short-term projects would individually and cumulatively have less than significant adverse impacts on electric consumption and on the electric distribution system on Fort Belvoir.

Long-Term Projects

Construction activities could result in temporary, localized service interruptions, but service would be returned to normal after construction is completed. Long-term transportation projects, particularly linear projects and intersection improvement projects such as LTT 2, 4, 6, 7, 8, and 10, likely would require the relocation of electric service infrastructure along roadway right-of-ways.

There would be a long-term increase in electricity demand associated with operation of the facilities constructed by Alternative 1 long-term projects. Table 3.10-8 provides the Fort Belvoir projected electric consumption for 2030. Consumption on Main Post would increase 35.7 percent under Alternative 1 relative to 2011 electric consumption. Electric consumption on FBNA is projected to exceed 32,000 MBtu[1] per month in 2030 and total consumption for Fort Belvoir would exceed 110,000 MBtu per month.

Implementation of the Alternative 1 long-term projects would individually and cumulatively have less than significant adverse impacts on electric consumption and on the electric distribution system on Fort Belvoir.

[1] MBtu = 1,000 British thermal units

Table 3.10-8
2030 Projected Electric Consumption

	2011	2030 Projected		
		Alternative 1	Alternative 2	Alternative 3
Electric Consumption (MBtu per month)				
FBNA	NA	32,198	17,300	32,198
Main Post	65,259	82,638	85,320	83,035
Total	NA	110,667	98,450	111,064
Source: 2011 Main Post electric consumption based on Cermenaro, pers. comm., June 3, 2013.				

3.10.3.4 Telecommunications

Alternative 1 would require telecommunication infrastructure improvements to accommodate the planned new facilities constructed by the short- and long-term projects. Modern telecommunications fiber optics and cabling infrastructure would be provided to the facilities. Telecommunication ductbanks would be extended to new development parcels in the easements established adjacent to new roads. The ductbanks would be sized to handle the system that is needed for the facilities.

Construction activities could result in temporary, localized service interruptions in order to connect new lines and extend service. Service interruptions would be minimized to the greatest extent possible, and service would be returned to normal after construction is completed. Short- and long-term transportation projects, particularly linear projects and intersection improvement projects, likely would require the relocation of telecommunications infrastructure along roadway right-of-ways.

Implementation of the Alternative 1 short-term and long-term projects would individually and cumulatively have less than significant adverse impacts on telecommunication and information services, and on the telephone and information technology systems on Fort Belvoir.

3.10.3.5 Steam

As described in Section 3.10.1.5, Fort Belvoir is gradually phasing out the Main Post steam system and replacing it with new heating, ventilation, and air conditioning systems in individual buildings as buildings are renovated. The plant that serves the 300 Area will be taken out of operation by the spring of 2014 and the central steam plant will be taken out of operation in 2014 or 2015. No steam utility services are provided on FBNA.

Space heating and hot water for new facilities constructed by Alternative 1 short- and long-term projects at Main Post and FBNA would be provided by new heating, ventilation, and air conditioning systems in individual buildings. Steam service would not be provided to the facilities.

Implementation of the Alternative 1 short-term and long-term projects would have no impact on steam use and the steam system on Fort Belvoir.

3.10.3.6 Natural Gas

Short-Term Projects

Implementation of Alternative 1 would require natural gas infrastructure improvements, including the extension of distribution lines, to accommodate the planned new facilities. Construction activities could result in temporary, localized service interruptions in order to connect new lines and extend service. Service interruptions would be minimized to the greatest extent possible and service would be returned to normal after construction is completed. Short-term transportation projects, particularly linear projects and

intersection improvement projects such as STT 1, 2, 4, and 6, likely would require the relocation of natural gas infrastructure along roadway right-of-ways.

Because of the increase in the Fort Belvoir population, there would be a long-term increase in natural gas demand associated with operation of the facilities constructed by Alternative 1 short-term projects. Table 3.10-9 presents the 2017 projected Fort Belvoir natural gas consumption for the three alternatives, as well as the 2011 current consumption for comparison. Under Alternative 1, natural gas consumption on Main Post would nearly double, increasing 98.7 percent relative to the baseline 2011 consumption. Although no 2011 baseline monthly natural gas consumption data is available for comparison, gas consumption on FBNA is projected to exceed 94,000 therms per month in 2017, bringing total monthly consumption for Fort Belvoir to over 474,000 therms.

Table 3.10-9
2017 Projected Natural Gas Consumption

	2011	2017 Projected		
		Alternative 1	Alternative 2	Alternative 3
Natural Consumption (therms per month)				
FBNA	NA	94,584	94,584	93,704
Main Post	202,669	402,610	391,749	365,347
Total	NA	474,398	463,537	436,255
Source: 2011 Main Post natural gas consumption based on Cermenaro, pers. comm., June 3, 2013.				

Implementation of the Alternative 1 short-term projects would individually and cumulatively have less than significant adverse impacts on natural gas consumption and on the natural gas distribution system on Fort Belvoir.

Long-Term Projects

Long-term project construction activities could result in temporary, localized service interruptions, but service would return to normal after construction is completed. Long-term transportation projects, particularly linear projects and intersection improvement projects such as LTT 2, 4, 6, 7, 8, and 10, likely would require the relocation of natural gas infrastructure along roadway right-of-ways.

Because of the increase in the Fort Belvoir population, there would be a long-term increase in natural gas demand associated with operation of the new facilities. Table 3.10-10 provides the Fort Belvoir projected natural gas consumption for 2030. Consumption on Main Post would increase 122.9 percent under Alternative 1 relative to 2011 gas consumption. Natural gas consumption on FBNA is projected to be approximately 176,000 therms per month in 2030 and total consumption for Fort Belvoir would reach approximately 605,000 therms per month.

Implementation of the Alternative 1 long-term projects would individually and cumulatively have less than significant adverse impacts on natural gas consumption and on the natural gas distribution system on Fort Belvoir.

Table 3.10-10
2030 Projected Natural Gas Consumption

	2011	2030 Projected		
		Alternative 1	Alternative 2	Alternative 3
Natural Gas Consumption (therms per month)				
FBNA	NA	176,038	94,584	176,038
Main Post	202,669	451,808	466,469	453,980
Total	NA	605,049	538,257	607,221
Source: 2011 Main Post natural gas consumption based on Cermenaro, pers. comm., June 3, 2013.				

3.10.3.7 Solid Waste

Short-Term Projects

Increases in solid wastes associated with the construction of Alternative 1 short-term projects and short-term transportation projects, and with operation of the resulting facilities would be disposed of in accordance with relevant federal, state, and local regulations. Construction materials would be recycled or reused to the greatest extent possible. Construction debris that could not be recycled or reused would be taken off-post by the general contractor to an approved construction and demolition landfill within the vicinity of the installation.

Under Alternative 1, there would be a long-term increase in solid waste due to an increase in the Fort Belvoir population. As noted in Section 3.10.1.7, from June 2006 through January 2007, Fort Belvoir disposed of an average of approximately 15 tons of municipal solid waste per day (Meoli, pers. comm., February 16, 2007, as cited in US Army, 2007a). Based on this quantity of solid waste disposal and the 2006 Fort Belvoir population of 30,934, comprising 7,623 residents and 23,311 employees (US Army, 2007a), on average each resident and employee generated about 1 pound of solid waste per day requiring disposal. Assuming this per-person rate, under Alternative 1, Fort Belvoir would need to dispose of approximately 21.2 tons of municipal solid waste per day in 2017.

The estimated 2017 quantity of Fort Belvoir municipal solid waste requiring disposal would be approximately 78.8 tons per day below the 100-tons-per-day cap for disposal at the I-95 Energy/Resource Recovery Facility. As Fairfax County's *Solid Waste Management Plan* (Fairfax County DPW&ES, 2004) projects that the resource recovery facility and the county's current disposal system will have sufficient capacity to handle the projected quantities of municipal solid waste through 2025, the increase in solid waste associated with the increase in personnel projected for 2017 under Alternative 1 likely would not exceed current capacity.

Implementation of the Alternative 1 short-term projects would individually and cumulatively have less than significant adverse impacts on solid waste generation and on solid waste management on Fort Belvoir.

Long-Term Projects

Construction materials generated by Alternative 1 long-term projects and long-term transportation projects would be recycled or reused to the greatest extent possible. Construction debris that could not be recycled or reused would be taken off-post by the general contractor to an approved construction and demolition landfill within the vicinity of the installation.

Under Alternative 1, Fort Belvoir would need to dispose of approximately 27.0 tons of municipal solid waste per day in 2030, approximately 73.0 tons per day below the 100-tons-per-day cap for disposal at the I-95 Energy/Resource Recovery Facility. Although the Fairfax County's *Solid Waste Management Plan* (Fairfax County DPW&ES, 2004) only projects the sufficiency of the capacity of the resource recovery

facility and the county's current disposal system through 2025, the county will need to develop capacity to handle the projected quantities of municipal solid waste beyond that year. Therefore, the increase in solid waste associated with the increase in personnel projected for 2030 under Alternative 1 likely would not exceed future capacity.

Implementation of the Alternative 1 long-term projects would individually and cumulatively have less than significant adverse impacts on solid waste generation and on solid waste management on Fort Belvoir.

3.10.4 Environmental Consequences of Alternative 2 – Modified Long-Term

3.10.4.1 Water

Short-Term Projects

As described for Alternative 1, under Alternative 2 expansion of the INSCOM HQ (ST 19, 26, 33, and 46) and the development of the NMUSA (ST 17, 18, 27, 34, 38, and 41) would require extension of the water distribution system and may require water tanks and pressure improvements (US Army, 2014a). However, development of the two parking garages and the administrative center on the DLA site would be delayed to the long term as LT 10A. Redevelopment of the North Post Town Center and development at the PX/Commissary (ST 1, 16, 25, and 28) would require extension or replacement of the water distribution systems in these areas.

Construction activities could result in temporary, localized service interruptions in order to connect new lines and extend service. Service interruptions would be minimized to the greatest extent possible and service would be returned to normal after construction is completed. Short-term transportation projects, particularly linear projects and intersection improvement projects, likely would require the relocation of water infrastructure along roadway right-of-ways. Water demand would increase slightly during construction of the short-term projects implemented under Alternative 2; however, potential increases in water demand associated with construction activities would be temporary and would not exceed existing capacity.

During operation of the new facilities, there would be a long-term increase in potable water demand due primarily to an increase in the on-post working population. For Alternative 2, the 2017 projected average water use quantity would be 2.3 mgd for Main Post and 0.2 mgd for FBNA; projected peak quantities would be 3.4 mgd (Main Post) and 0.4 (FBNA) (see Table 3.10-3). The projected 2017 peak quantities are projected to remain below the 80 percent of purchased capacity threshold at both Main Post and FBNA.

Implementation of the Alternative 2 short-term projects would individually and cumulatively have less than significant adverse impacts on water use and on the water system on Fort Belvoir.

Long-Term Projects

The development of the DLA parking garages and administrative center (LT 10A) would require extension of the water distribution system to serve the new facilities and may require water tanks and pressure improvements to accommodate the additional demand (US Army, 2014a). As no long-term development at FBNA (LT 9, a secure campus for 7,500 personnel) would occur under Alternative 2, extending the FBNA water distribution network would not be needed.

Construction activities could result in temporary, localized service interruptions, but service would be returned to normal after construction is completed. Long-term transportation projects, particularly linear projects and intersection improvement projects, likely would require the relocation of water infrastructure along roadway right-of-ways. Water demand would increase slightly during construction of each of the

long-term projects implemented under Alternative 2; however, potential increases in water demand associated with construction activities would be temporary and would not exceed existing capacity.

During operation of the new facilities, there would be a long-term increase in potable water demand due primarily to an increase in the post's working population. In 2030, Main Post average water use would reach 2.8 mgd and peak water use would be 4.1 mgd (see Table 3.10-4). The peak water use would be above the 80 percent of purchased capacity threshold, requiring submission of a system upgrade plan, but still below the current purchased capacity. (Additionally, as previously noted, this is based on a conservative estimate that does not take into account any water conservation measures or actions that may be taken in the future at Fort Belvoir.) There would be no change in water use at FBNA relative to 2012. It is expected that Fairfax Water would be able to meet the projected future water demands and expansion of the Fort Belvoir population would not be hindered (US Army, 2014a).

Implementation of the Alternative 2 long-term projects would individually and cumulatively have less than significant adverse impacts on water use and on the water system on Fort Belvoir.

3.10.4.2 Sewage

Short-Term Projects

American Water does not see any major infrastructure problems in the sewage system to support near-term growth, although planned short-term development would need to consider the following (US Army, 2014a):

- Future development of the NMUSA (ST 17, 18, 27, 34, 38, and 41) would require evaluation of the capacity of the 15-inch sewer that runs from DLA southwest toward DAAF.
- The proposed INSCOM expansion (ST 19, 26, 33, and 46) would require evaluation of the capacity of the existing pump station east of the site and the gravity sewers downstream.
- Anticipated development on South Post (notably ST 32, 37, 45, and 51) and at the PX/Commissary (ST 1, 16, 25, and 28) would require extension of the sanitary sewage collection system to serve these areas.
- The new hospital pump station may have capacity for proposed, additional development in the 1400 area (ST 45).

Construction activities could result in temporary, localized sewage service interruptions in order to connect new lines and extend service. Service interruptions would be minimized to the greatest extent possible and service would be returned to normal after construction is completed. Short-term transportation projects, particularly linear projects and intersection improvement projects such as STT Projects 1, 2, 4, and 6, likely would require the relocation of sewage infrastructure along roadway right-of-ways.

The increase in the Fort Belvoir population would result in a long-term increase in demand for wastewater collection and treatment. For Alternative 2, the 2017 projected Fort Belvoir average sewer flow is 1.4 mgd and the projected peak flow is 2.9 mgd (Table 3.10-5). In response to the increase in the Fort Belvoir population, the average sewer flow would increase 2.9 percent, and the peak flow would increase 51.6 percent, relative to the 2012 baseline average and peak flows. The 2017 average sewage flow for Main Post would be 1.7 mgd below the 3.0 mgd collection/treatment capacity purchased from Fairfax County, exclusive of FBNA. The peak flow for Main Post would be 3.4 mgd below the 6.0 mgd not-to-exceed peak limit.

Implementation of the Alternative 2 short-term projects would individually and cumulatively have less than significant adverse impacts on sewage flows and on the wastewater system on Fort Belvoir.

Long-Term Projects

At Main Post, construction of a residential area adjacent to the PX (LT 7) and redevelopment of the Town Center District to support higher-density development (LT 5) would require extension of the sanitary sewage collection system and replacement of existing lines that conflict with proposed development (US Army, 2014a). Redevelopment of the 1400 East District as a higher-density professional/institutional center (LT 2) potentially would overload the downstream gravity sewers and pump stations (US Army, 2014a). Part or all of this area could be diverted to the new hospital pump station or a second pump station could be constructed adjacent to the hospital pump station. Redevelopment of the 1400 East District would require a new pipe network. Future development of the DLA complex (LT 10A) would require evaluation of the capacity of the 15-inch sewer that runs from DLA southwest toward DAAF.

Construction activities could result in temporary, localized sewage service interruptions, but service would return to normal after construction is completed. Short-term transportation projects, particularly linear projects and intersection improvement projects, likely would require the relocation of sewage infrastructure along roadway right-of-ways.

In 2030, Fort Belvoir average sewage flows would reach 1.7 mgd under Alternative 2, increasing 19.5 percent relative to the 2012 baseline average flow (Table 3.10-6). The peak flow would increase 76.1 percent to 3.3 mgd. The 2030 average sewage flow for Main Post would be 1.4 mgd below the purchased collection/treatment capacity; the peak flow would be 2.9 mgd below the not-to-exceed peak limit.

Implementation of the Alternative 2 long-term projects would individually and cumulatively have less than significant adverse impacts on sewage flows and on the wastewater system on Fort Belvoir.

3.10.4.3 Electric Power

Short-Term Projects

Construction activities could result in temporary, localized electric service interruptions in order to connect new lines and extend service. Service interruptions would be minimized to the greatest extent possible and service would be returned to normal after construction is completed. Short-term transportation projects, particularly linear projects and intersection improvement projects, likely would require the relocation of electric service infrastructure along roadway right-of-ways.

Due to the increase in the Fort Belvoir population, there would be a long-term increase in electricity demand associated with operation of the facilities constructed by Alternative 2 short-term projects. For Alternative 2, Main Post electric consumption would increase 17.6 percent, relative to baseline 2011 consumption, to more than 71,000 MBtu per month (Table 3.10-7). The 2017-projected monthly electric consumption for FBNA exceeds 17,000 MBtu, resulting in a projected total monthly consumption for Fort Belvoir of almost 85,000 MBtu.

Implementation of the Alternative 2 short-term projects would individually and cumulatively have less than significant adverse impacts on electric consumption and on the electric distribution system on Fort Belvoir.

Long-Term Projects

Construction activities could result in temporary, localized electric service interruptions, but service would be returned to normal after construction is completed. Long-term transportation projects, particularly linear projects and intersection improvement projects, likely would require the relocation of electric service infrastructure along roadway right-of-ways.

There would be a long-term increase in electricity demand associated with operation of the new facilities. By 2030, consumption on Main Post would increase 40.1 percent under Alternative 2 relative to 2011 electric consumption (Table 3.10-8). Electric consumption on FBNA in 2030 would remain at the level

projected for 2017—over 17,000 MBtu per month—as no new development on FBNA would occur under Alternative 2. Total electric consumption for Fort Belvoir would exceed 98,000 MBtu per month in 2030.

Implementation of the Alternative 2 long-term projects would individually and cumulatively have less than significant adverse impacts on electric consumption and on the electric distribution system on Fort Belvoir.

3.10.4.4 Telecommunications

Alternative 2 would require telecommunication infrastructure improvements to accommodate the planned new facilities constructed by the short- and long-term projects. Modern telecommunications fiber optics and cabling infrastructure would be provided to the facilities. Telecommunication ductbanks would be extended to new development parcels in the easements established adjacent to new roads. The ductbanks would be sized to handle the system that is needed for the facilities.

Construction activities could result in temporary, localized service interruptions in order to connect new lines and extend service. Service interruptions would be minimized to the greatest extent possible and service would be returned to normal after construction is completed. Short- and long-term transportation projects, particularly linear projects and intersection improvement projects, likely would require the relocation of telecommunications infrastructure along roadway right-of-ways.

Implementation of the Alternative 2 short-term and long-term projects would individually and cumulatively have less than significant adverse impacts on telecommunication and information services, and on the telephone and information technology systems on Fort Belvoir.

3.10.4.5 Steam

As described in Section 3.10.1.5, Fort Belvoir is gradually phasing out the Main Post steam system and no steam utility services are provided on FBNA. Space heating and hot water for new facilities constructed by Alternative 2 short- and long-term projects at Main Post and FBNA would be provided by new heating, ventilation, and air conditioning systems in individual buildings. Steam service would not be provided to the facilities.

Implementation of the Alternative 2 short-term and long-term projects would have no impact on steam use and the steam system on Fort Belvoir.

3.10.4.6 Natural Gas

Short-Term Projects

Implementation of Alternative 2 would require natural gas infrastructure improvements, including the extension of distribution lines, to accommodate the planned new facilities. Construction activities could result in temporary, localized service interruptions in order to connect new lines and extend service. Service interruptions would be minimized to the greatest extent possible and service would be returned to normal after construction is completed. Short-term transportation projects, particularly linear projects and intersection improvement projects, likely would require the relocation of natural gas infrastructure along roadway right-of-ways.

Due to the increase in the Fort Belvoir population, there would be a long-term increase in natural gas demand associated with operation of the facilities constructed by Alternative 2 short-term projects. For Alternative 2, Main Post natural gas consumption would increase 93.3 percent, relative to baseline 2011 consumption, to nearly 392,000 therms per month (Table 3.10-9). The 2017 projected monthly natural gas consumption for FBNA exceeds 94,000 therms, resulting in a projected total monthly consumption for Fort Belvoir of over 463,000 therms.

Implementation of the Alternative 2 short-term projects would individually and cumulatively have less than significant adverse impacts on natural gas consumption and on the natural gas distribution system on Fort Belvoir.

Long-Term Projects

Long-term project construction activities could result in temporary, localized service interruptions, but service would be returned to normal after construction is completed. Long-term transportation projects, particularly linear projects and intersection improvement projects, likely would require the relocation of water infrastructure along roadway right-of-ways.

Because of the increase in the Fort Belvoir population, there would be a long-term increase in natural gas demand associated with operation of the new facilities. By 2030, natural gas consumption on Main Post would increase 130.2 percent under Alternative 2 relative to 2011 gas consumption (Table 3.10-10). Consumption on FBNA in 2030 would remain at the level projected for 2017, as no additional development on FBNA would occur under Alternative 2. Total natural gas consumption for Fort Belvoir would exceed 538,000 therms per month in 2030.

Implementation of the Alternative 2 long-term projects would individually and cumulatively have less than significant adverse impacts on natural gas consumption and on the natural gas distribution system on Fort Belvoir.

3.10.4.7 Solid Waste

Short-Term Projects

Increases in solid wastes associated with the construction of Alternative 2 short-term projects and short-term transportation projects, and with operation of the resulting facilities would be disposed of in accordance with relevant federal, state, and local regulations. Construction materials would be recycled or reused to the greatest extent possible. Construction debris that could not be recycled or reused would be taken off-post by the general contractor to an approved construction and demolition landfill within the vicinity of the installation.

Under Alternative 2, Fort Belvoir would need to dispose of approximately 20.7 tons of municipal solid waste per day in 2017, approximately 79.3 tons per day below the 100-tons-per-day cap for disposal at the I-95 Energy/Resource Recovery Facility. As Fairfax County's *Solid Waste Management Plan* (Fairfax County DPW&ES, 2004) projects that the resource recovery facility and the county's current disposal system will have sufficient capacity to handle the projected quantities of municipal solid waste through 2025, the increase in solid waste associated with the increase in personnel projected for 2017 under Alternative 2 likely would not exceed current capacity.

Implementation of the Alternative 2 short-term projects would individually and cumulatively have less than significant adverse impacts on solid waste generation and on solid waste management on Fort Belvoir.

Long-Term Projects

Construction materials generated by Alternative 2 long-term projects and long-term transportation projects would be recycled or reused to the greatest extent possible. Construction debris that could not be recycled or reused would be taken off-post by the general contractor to an approved construction and demolition landfill within the vicinity of the installation.

Under Alternative 2, Fort Belvoir would need to dispose of approximately 24.0 tons of municipal solid waste per day in 2030, approximately 76.0 tons per day below the 100-tons-per-day cap for disposal at the I-95 Energy/Resource Recovery Facility. As Fairfax County will need to develop sufficient capacity to handle

the projected quantities of municipal solid waste beyond 2025, the increase in solid waste associated with the increase in personnel projected for 2030 under Alternative 2 likely would not exceed future capacity.

Implementation of the Alternative 2 long-term projects would individually and cumulatively have less than significant adverse impacts on solid waste generation and on solid waste management on Fort Belvoir.

3.10.5 Environmental Consequences of Alternative 3 – Modified Short-Term

3.10.5.1 Water

Short-Term Projects

As described for Alternative 1, under Alternative 3, the development of the NMUSA (ST 17, 18, 27, 34, 38, and 41) would require extension of the water distribution system to serve the new facilities and may require water tanks and pressure improvements to accommodate the additional demand (US Army, 2014a). Redevelopment of the North Post Town Center and development at the PX/Commissary (ST 1, 16, and 28) would require extension or replacement of the water distribution systems in these areas. However, expansion of the INSCOM HQ (ST 19, 26, 33, and 46) and the development of the two parking garages and administrative center on the DLA site (ST 40 and 52) would be delayed to the long term.

Construction activities could result in temporary, localized service interruptions in order to connect new lines and extend service. Service interruptions would be minimized to the greatest extent possible and service would be returned to normal after construction is completed. Short-term transportation projects, particularly linear projects and intersection improvement projects, likely would require the relocation of water infrastructure along roadway right-of-ways. Water demand would increase slightly during construction of the short-term projects implemented under Alternative 3; however, potential increases in water demand associated with construction activities would be temporary and would not exceed existing capacity.

During operation of the new facilities, there would be a long-term increase in potable water demand due primarily to an increase in the Fort Belvoir working population. For Alternative 3, the 2017 projected average water use quantity is 2.2 mgd for Main Post and 0.2 mgd for FBNA; projected peak quantities are 3.2 mgd (Main Post) and 0.3 (FBNA) (see Table 3.10-3). The 2017 peak would remain below the 80 percent of purchased capacity threshold at both Main Post and FBNA.

Implementation of the Alternative 3 short-term projects would individually and cumulatively have less than significant adverse impacts on water use and on the water system on Fort Belvoir.

Long-Term Projects

Expansion of the INSCOM HQ, and the development of the DLA parking garages and administrative center (LT 10) would require extension of the water distribution system and may require water tanks and pressure improvements (US Army, 2014a). The FBNA water distribution network would need to be extended for anticipated new development at FBNA (LT 9) and, if additional storage is required, a second tank would need to be constructed.

Construction activities could result in temporary, localized service interruptions, but service would return to normal after construction is completed. Long-term transportation projects, particularly linear projects and intersection improvement projects, likely would require the relocation of water infrastructure along roadway right-of-ways. Water demand would increase slightly during construction of the long-term projects implemented under Alternative 3; however, potential increases in water demand associated with construction activities would be temporary and would not exceed existing capacity.

During operation of the new facilities, there would be a long-term increase in potable water demand due primarily to an increase in the post's working population. In 2030 under Alternative 3, Main Post average water use would reach 2.5 mgd and peak water use would be 3.8 mgd (see Table 3.10-4). The peak water use would be above the 80 percent of purchased capacity threshold, requiring submission of a system upgrade plan but still below the current purchased capacity. (Additionally, as previously noted, this is a conservative estimate that does not take into account any water conservation measures or actions that may be taken in the future at Fort Belvoir.) Average and peak use at FBNA would increase twofold relative to 2012 but peak usage would remain well below the 80 percent of purchase capacity threshold. It is expected that Fairfax Water would be able to meet the projected future water demands and expansion of the Fort Belvoir population would not be hindered (US Army, 2014a).

Implementation of the Alternative 3 long-term projects would individually and cumulatively have less than significant adverse impacts on water use and on the water system on Fort Belvoir.

3.10.5.2 Sewage

Short-Term Projects

Although American Water does not see any major infrastructure problems in the sewage system to support near-term growth, planned short-term development would need to consider the following (US Army, 2014a):

- Future development of the NMUSA (ST 17, 18, 27, 34, 38, and 41) would require evaluation of the capacity of the 15-inch sewer that runs from DLA southwest toward DAAF.
- Anticipated development on South Post (notably ST 51) and at the PX/Commissary (ST 1, 16, 25, and 28) would require extension of the sanitary sewage collection system to serve these areas. No capacity problems are expected.

Construction activities could result in temporary, localized sewage service interruptions in order to connect new lines and extend service. Service interruptions would be minimized to the greatest extent possible and service would be returned to normal after construction is completed. Short-term transportation projects, particularly linear projects and intersection improvement projects such as STT 1, 2, 4, and 6, likely would require the relocation of sewage infrastructure along roadway right-of-ways.

The increase in the Fort Belvoir population would result in a long-term increase in demand for wastewater collection and treatment. For Alternative 3, the 2030 projected Fort Belvoir average sewer flow is 1.4 mgd and the projected peak flow is 2.7 mgd (Table 3.10-5). The average sewer flow would *decrease* 3.2 percent and the peak flow would increase 42.7 percent relative to the 2012 baseline average and peak flows. The 2017 average sewage flow for Main Post would be 1.8 mgd below the 3.0 mgd collection/treatment capacity purchased from Fairfax County, exclusive of FBNA. The peak flow for Main Post would be 3.5 mgd below the 6.0 mgd not-to-exceed peak limit.

Implementation of the Alternative 3 short-term projects would individually and cumulatively have less than significant adverse impacts on sewage flows and on the wastewater system on Fort Belvoir.

Long-Term Projects

For Alternative 3, planned long-term development at Main Post would need to consider the following (US Army, 2014a):

- Anticipated development on South Post (notably delayed ST 32, 37, and 45) would require extension of the sanitary sewage collection system.
- The new hospital pump station may have capacity for proposed, additional development in the 1400 area (delayed ST 45).

- Redevelopment of the 1400 East District as a higher-density professional/institutional center (LT 2) potentially would overload the downstream gravity sewers and pump stations (US Army, 2014a). Part or all of this area could be diverted to the new hospital pump station or a second pump station could be constructed adjacent to the hospital pump station. Redevelopment of the 1400 East District would require a new pipe network.
- Construction of a residential area adjacent to the PX (LT 7) and redevelopment of the Town Center District to support higher-density development (LT 5) would require extension of the sanitary sewage collection system and replacement of existing lines that conflict with proposed development.
- Future development of the DLA complex (LT 10) would require evaluation of the capacity of the 15-inch sewer that runs from DLA southwest toward DAAF.
- The proposed INSCOM expansion (LT 10) would require evaluation of the capacity of the existing pump station east of the site and the gravity sewers downstream.

Potential development at FBNA (LT 9) would require extension of the sanitary sewage system. The sewer lines that serve the NGA campus and connect to the existing trunk sewer that runs along Accotink Creek have been located and sized to serve potential additional development at FBNA. Fairfax County staff indicated that this existing trunk sewer and the existing county wastewater treatment plant both have adequate capacity to serve potential additional development at FBNA (US Army, 2014a).

Construction activities could result in temporary, localized sewage service interruptions, but service would return to normal after construction is completed. Short-term transportation projects, particularly linear projects and intersection improvement projects, likely would require the relocation of sewage infrastructure along roadway right-of-ways.

In 2030, Fort Belvoir average sewage flows would reach 1.9 mgd under Alternative 3, increasing 34.8 percent relative to the 2012 baseline average flow (Table 3.10-6). The peak flow would nearly double (98.6 percent increase) to 3.8 mgd. The 2030 average sewage flow for Main Post would be 1.5 mgd below the purchased collection/treatment capacity; the peak flow would be 2.9 mgd below the not-to-exceed peak limit.

Implementation of the Alternative 3 long-term projects would individually and cumulatively have less than significant adverse impacts on sewage flows and on the wastewater system on Fort Belvoir.

3.10.5.3 Electric Power

Short-Term Projects

Construction activities could result in temporary, localized electric service interruptions in order to connect new lines and extend service. Service interruptions would be minimized to the greatest extent possible, and service would be returned to normal after construction is completed. Short-term transportation projects, particularly linear projects and intersection improvement projects, likely would require the relocation of electric service infrastructure along roadway right-of-ways.

Because of the increase in the Fort Belvoir population, there would be a long-term increase in electricity demand associated with operation of the facilities constructed by Alternative 3 short-term projects. Main Post electric consumption under Alternative 3 would increase 9.7 percent, relative to baseline 2011 consumption, to almost 67,000 MBtu per month in 2017 (Table 3.10-7). The projected 2017 monthly electric consumption for FBNA exceeds 17,000 MBtu, and the projected total monthly consumption for Fort Belvoir is almost 80,000 MBtu.

Implementation of the Alternative 3 short-term projects would individually and cumulatively have less than significant adverse impacts on electric consumption and on the electric distribution system on Fort Belvoir.

Long-Term Projects

Construction activities could result in temporary, localized electric service interruptions but service would be returned to normal after construction is completed. Long-term transportation projects, particularly linear projects and intersection improvement projects, likely would require the relocation of electric service infrastructure along roadway right-of-ways.

There would be a long-term increase in electricity demand associated with operation of the new facilities. Under Alternative 3, electric consumption on Main Post would increase 36.3 percent, relative to 2011 electric consumption, to approximately 83,MBtu per month in 2030 (Table 3.10-8). Electric consumption on FBNA in 2030 would exceed 32,000 MBtu per month. Total electric consumption for Fort Belvoir would be approximately 111,000 MBtu per month in 2030.

Implementation of the Alternative 3 long-term projects would individually and cumulatively have less than significant adverse impacts on electric consumption and on the electric distribution system on Fort Belvoir.

3.10.5.4 Telecommunications

Alternative 3 would require telecommunication infrastructure improvements to accommodate the planned new facilities constructed by the short- and long-term projects. Modern telecommunications fiber optics and cabling infrastructure would be provided to the facilities. Telecommunication ductbanks would be extended to new development parcels in the easements established adjacent to new roads. The ductbanks would be sized to handle the system that is needed for the facilities.

Construction activities could result in temporary, localized service interruptions in order to connect new lines and extend service. Service interruptions would be minimized to the greatest extent possible and service would be returned to normal after construction is completed. Short- and long-term transportation projects, particularly linear projects and intersection improvement projects, likely would require the relocation of telecommunications infrastructure along roadway right-of-ways.

Implementation of the Alternative 3 short-term and long-term projects would individually and cumulatively have less than significant adverse impacts on telecommunication and information services, and on the telephone and information technology systems on Fort Belvoir.

3.10.5.5 Steam

As described in Section 3.10.1.5, Fort Belvoir is gradually phasing out the Main Post steam system and no steam utility services are provided on FBNA. Space heating and hot water for new facilities constructed by Alternative 3 short- and long-term projects at Main Post and FBNA would be provided by new heating, ventilation, and air conditioning systems in individual buildings. Steam service would not be provided to the facilities.

Implementation of the Alternative 3 short-term and long-term projects would have no impact on steam use and the steam system on Fort Belvoir.

3.10.5.6 Natural Gas

Short-Term Projects

Implementation of Alternative 3 would require natural gas infrastructure improvements, including the extension of distribution lines, to accommodate the planned new facilities. Construction activities could result in temporary, localized service interruptions in order to connect new lines and extend service. Service interruptions would be minimized to the greatest extent possible and service would be returned to normal after construction is completed. Short-term transportation projects, particularly linear projects and

intersection improvement projects, likely would require the relocation of natural gas infrastructure along roadway right-of-ways.

Because of the increase in the Fort Belvoir population, there would be a long-term increase in natural gas demand associated with operation of the facilities constructed by Alternative 3 short-term projects. Main Post natural gas consumption under Alternative 3 would increase 80.3 percent, relative to baseline 2011 consumption, exceeding 402,000 therms per month in 2017 (Table 3.10-9). The 2017 projected monthly gas consumption for FBNA exceeds 93,000 therms and the projected total monthly consumption for Fort Belvoir is exceeds 436,000 therms.

Implementation of the Alternative 3 short-term projects would individually and cumulatively have less than significant adverse impacts on natural gas consumption and on the natural gas distribution system on Fort Belvoir.

Long-Term Projects

Long-term project construction activities could result in temporary, localized service interruptions, but service would be returned to normal after construction is completed. Long-term transportation projects, particularly linear projects and intersection improvement projects, likely would require the relocation of natural gas infrastructure along roadway right-of-ways.

Because of the increase in the Fort Belvoir population, there would be a long-term increase in natural gas demand associated with operation of the new facilities. Under Alternative 3, natural gas consumption on Main Post would increase 124.0 percent, relative to 2011 electric consumption, to almost 454,000 therms per month in 2030 (Table 3.10-10). Gas consumption on FBNA in 2030 would be approximately 176,000 therms per month. Total natural gas consumption for Fort Belvoir would exceed 607,000 therms per month in 2030.

Implementation of the Alternative 3 long-term projects would individually and cumulatively have less than significant adverse impacts on natural gas consumption and on the natural gas distribution system on Fort Belvoir.

3.10.5.7 Solid Waste

Short-Term Projects

Increases in solid wastes associated with the construction of Alternative 3 short-term projects and short-term transportation projects, and with operation of the resulting facilities would be disposed of in accordance with relevant federal, state, and local regulations. Construction materials would be recycled or reused to the greatest extent possible. Construction debris that could not be recycled or reused would be taken off-post by the general contractor to an approved construction and demolition landfill within the vicinity of the installation.

Under Alternative 3, Fort Belvoir would need to dispose of approximately 19.5 tons of municipal solid waste per day in 2017, approximately 80.5 tons per day below the 100-tons-per-day cap for disposal at the I-95 Energy/Resource Recovery Facility. As Fairfax County's *Solid Waste Management Plan* (Fairfax County DPW&ES, 2004) projects that the resource recovery facility and the county's current disposal system will have sufficient capacity to handle the projected quantities of municipal solid waste through 2025, the increase in solid waste associated with the increase in personnel projected for 2017 under Alternative 3 likely would not exceed current capacity.

Implementation of the Alternative 3 short-term projects would individually and cumulatively have less than significant adverse impacts on solid waste generation and on solid waste management on Fort Belvoir.

Long-Term Projects

Construction materials generated by Alternative 3 long-term projects and long-term transportation projects would be recycled or reused to the greatest extent possible. Construction debris that could not be recycled or reused would be taken off-post by the general contractor to an approved construction and demolition landfill within the vicinity of the installation.

Under Alternative 3, Fort Belvoir would need to dispose of approximately 27.1 tons of municipal solid waste per day in 2030, approximately 72.9 tons per day below the 100-tons-per-day cap for disposal at the I-95 Energy/Resource Recovery Facility. As Fairfax County will need to develop sufficient capacity to handle the projected quantities of municipal solid waste beyond 2025, the increase in solid waste associated with the increase in personnel projected for 2030 under Alternative 3 likely would not exceed future capacity.

Implementation of the Alternative 3 long-term projects would individually and cumulatively have less than significant adverse impacts on solid waste generation and on solid waste management on Fort Belvoir.

3.10.6 Proposed Mitigation and Protective Measures

For each of the alternatives, implementing the updated RPMP and the plan's proposed short-term development would be expected to have both short- and long-term minor adverse effects. However, as Fort Belvoir's demands for utilities are not projected to exceed the ability of the respective utility providers to supply the required services, none of the expected impacts would be significant. Therefore, no mitigation or protective measures are needed or proposed for utilities.

3.10.7 Comparison of Alternatives

Table 3.10-11 summarizes the effects on utilities that potentially would result from the implementation of the No Action Alternative and the three action alternatives.

Table 3.10-11
Summary of Utility Impacts by Alternative

Environmental Consequence	No Action Alternative	Alternative 1 – Full Implementation – The Preferred Alternative	Alternative 2 – Modified Long-Term	Alternative 3 – Modified Short-Term
Short-Term Projects				
Projected water demand exceeds available supply	No effect	Less than significant adverse	Less than significant adverse	Less than significant adverse
Projected sewage flow exceeds available capacity	No effect	Less than significant adverse	Less than significant adverse	Less than significant adverse
Projected electric demand exceeds available capacity	No effect	Less than significant adverse	Less than significant adverse	Less than significant adverse
Projected telecommunication and information services demand exceeds available capacity	No effect	Less than significant adverse	Less than significant adverse	Less than significant adverse

Environmental Consequence	No Action Alternative	Alternative 1 – Full Implementation – The Preferred Alternative	Alternative 2 – Modified Long-Term	Alternative 3 – Modified Short-Term
Projected steam demand exceeds available supply	No effect	No effect	No effect	No effect
Projected natural gas demand exceeds available supply	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
Projected solid waste generation exceeds available capacity	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
Long-Term Projects				
Projected water demand exceeds available supply	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
Projected sewage flow exceeds available capacity	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
Projected electric demand exceeds available capacity	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
Projected telecommunication and information services demand exceeds available capacity	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
Projected steam demand exceeds available supply	No effect	No effect	No effect	No effect
Projected natural gas demand exceeds available supply	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
Projected solid waste generation exceeds available capacity	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects

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3.11 HAZARDOUS SUBSTANCES AND POTENTIALLY CONTAMINATED SITES

Operations and maintenance activities performed at Fort Belvoir sometimes require the storage, transport, and use of hazardous substances. The Fort Belvoir Directorate of Public Works (DPW) Environmental and Natural Resources Division (ENRD) manages hazardous substances and hazardous waste in accordance with the:

- Resource Conservation and Recovery Act (RCRA) of 1976
- Toxic Substances Control Act (TSCA) of 1978
- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980
- Superfund Amendments and Reauthorization Act (SARA) of 1986 (amendments to CERCLA)
- Defense Environmental Restoration Program (10 USC 2701)
- Occupational Safety and Health Administration (OSHA) regulations
- VDEQ hazardous waste regulations
- Virginia storage tank regulations, including *Facility and Aboveground Storage Tank (AST) Regulation* (9 Virginia Administrative Code 25-91-10 et seq.) and *Underground Storage Tanks: Technical Standards and Corrective Action Requirements* (9 Virginia Administrative Code 25-580)
- DoD regulations, including those identified in DoD Manual 4715.20, *Defense Environmental Restoration Program (DERP) Management*, dated March 9, 2012
- Army regulations, including Army Regulation 200-1, *Environmental Protection and Enhancement*, effective December 27, 2007

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

The term "hazardous substance" as used in this document identifies those contaminants (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 once used in building materials, lead once used in paint, pesticides, polychlorinated biphenyl once used to insulate electrical equipment, radioactive materials, and unexploded ordnance once used on training ranges.

Through CERCLA, SARA, RCRA, and TSCA, the USEPA promulgates and enforces regulations regarding hazardous substances and hazardous waste management. These regulations establish the mandatory procedures and requirements for compliance and must be followed by federal facilities that use, accumulate, transport, treat, store, or dispose of hazardous waste or substances. RCRA allows each state to establish and enforce its own hazardous waste management program, provided that the state's requirements are no less stringent than USEPA's. The USEPA will grant primacy – the authority to implement and enforce regulations – to each state that can demonstrate to USEPA that it can statutorily implement and fund a program equivalent in scope and coverage to the RCRA regulations. The Commonwealth of Virginia (implemented by VDEQ) has been granted such primacy.

CERCLA as amended by SARA – commonly known as Superfund – establishes requirements for identifying and cleaning up unused, closed, and abandoned hazardous waste sites. The Defense

Environmental Restoration Program was created under 10 USC Section 2710 and is implemented in general accordance with CERCLA to identify, assess, characterize, and clean up or control contamination from past hazardous waste or explosive hazardous waste disposal operations and hazardous-substance spills at DoD facilities. The Army carries out an Environmental Restoration Program at Fort Belvoir, with USEPA and VDEQ providing regulatory oversight.

OSHA regulates the safety and health of workers in the United States by establishing worker-protection standards that employers must follow. OSHA has promulgated standards to protect workers engaged in hazardous waste operations and emergency-response activities. These standards are found in 29 CFR § 1910.

Thresholds of Significance

For the purposes of the hazardous substances impact analysis, effects would be significant if they present a substantial human health or safety risk. Mitigation measures are proposed for any aspect of the action that could release hazardous substances or waste to the environment.

3.11.1 Affected Environment

3.11.1.1 Petroleum Constituents

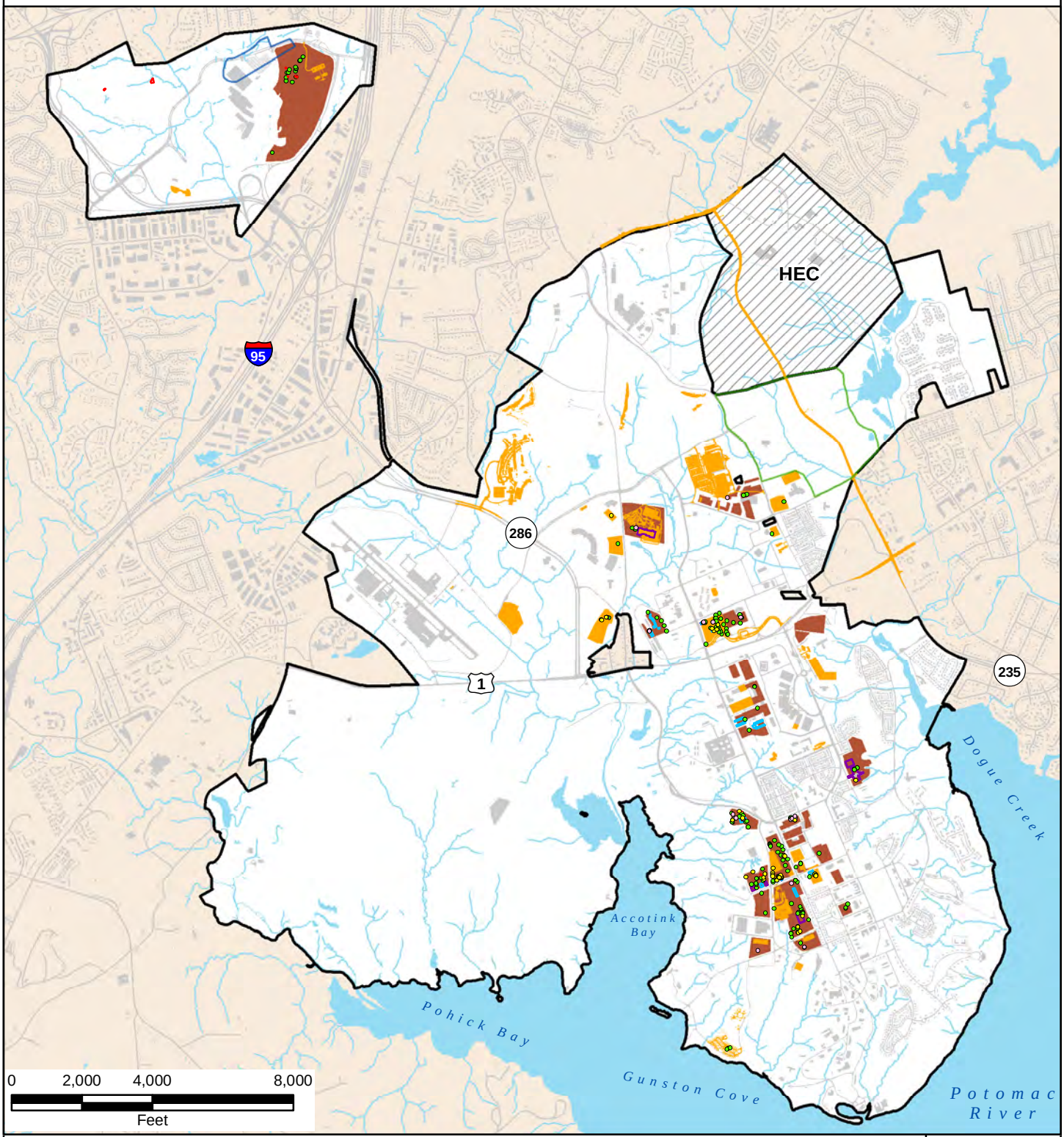
The Fort Belvoir Petroleum Management Program addresses petroleum storage areas and petroleum release sites in accordance with Virginia petroleum regulations. This program manages all aspects of petroleum storage areas and petroleum release sites, including scheduling operation and maintenance, compliance monitoring, tank closure and removal, environmental investigations, remediation system design, management, and reporting. For about three decades, the Petroleum Management Program has been addressing petroleum storage areas and petroleum release sites (US Army, 2014a).

Petroleum storage areas include aboveground storage tanks and underground storage tanks and at Fort Belvoir range in size from 55-gallon aboveground storage tanks to 50,000-gallon underground storage tanks (US Army, 2007a). Figure 3.11-1 shows the location of known petroleum storage areas and petroleum release sites. Table 3.11-1 summarizes the inventory of petroleum storage areas and petroleum release sites on Main Post and FBNA.

Table 3.11-1
Petroleum Storage Areas and Petroleum Release Sites

	Main Post	FBNA	Fort Belvoir
Storage Tanks	995	35	1,030
Active Storage Tanks	244	7	231
Aboveground Storage Tanks	275	18	293
Active Aboveground Storage Tanks	159	7	166
Underground Storage Tanks	634	17	651
Active Underground Storage Tanks	85	0	85
Petroleum Release Sites	150	0	150
Source: Fort Belvoir GIS, 2013.			

Hazardous Substances and Potentially Contaminated Sites



Potential Concern Point
Petroleum Release Site
Petroleum Storage Area
Hazardous Substance Storage Area
Hazwaste Storage Area
Potential Concern Site
Former or Operational Traning Range
Range and Training Area - CLOSED
Short-Term Project Sites (Construction FY 2012 - 2017)
Long-Term Project Sites (Construction FY 2018 - 2030)

Fort Belvoir RPMP EIS

Figure 3.11-1

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Of the approximately 1,030 petroleum storage areas that have existed at one time or another at Fort Belvoir, about 150 have released petroleum into the environment, resulting in designation of petroleum release sites (Fort Belvoir GIS, 2013). Fort Belvoir has or is actively addressing these releases. Site investigations are performed through the Petroleum Management Program to delineate the impacted areas of soil and groundwater. Fort Belvoir is actively managing petroleum release sites under the VDEQ Petroleum Program regulation guidance (US Army, 2014a).

Any disturbance to the subsurface soil at a petroleum release site could result in exposure to chemicals of concern, which would require reopening the case, developing a work plan, sampling, monitoring, and reporting of site conditions and waste generation. Disturbing previously unidentified contamination also requires proper handling and disposal, as required by federal, state, local, and Army regulations (US Army, 2014a).

Main Post

Main Post has 85 active underground storage tanks, of which 28 are regulated by VDEQ (US Army, 2007a; Fort Belvoir GIS, 2013). In addition, there are 159 active aboveground storage tanks, of which 9 are regulated by VDEQ. These tanks contain substances such as heating oil, diesel fuel, motor gasoline, type 8 jet propellant, lubricants, and used oils (US Army, 2007a). To comply with underground storage tank regulatory deadlines, Fort Belvoir completed a program of tightness-testing, removal, replacement, and upgrading for the regulated underground storage tanks on post. All underground storage tank replacements have double walls and state-of-the-art leak-detection systems to comply with underground storage tank regulations under RCRA Subtitle I.

Nevertheless, both new underground storage tanks and existing, unregulated underground storage tanks have the potential to release their contents into the soil, groundwater, surface water, and air. Any soils and groundwater where petroleum has been released would need to be properly addressed during the redevelopment of sites on Main Post. There are 150 confirmed petroleum release sites on Main Post (Fort Belvoir GIS, 2013).

FBNA

Historically, there have been a total of 35 petroleum storage areas within FBNA. Of the 35 petroleum storage areas, 18 were aboveground storage tanks and 17 were underground storage tanks (US Army, 2007a; Fort Belvoir GIS, 2013). Nearly all of the tanks associated with these petroleum storage areas have been removed, and where releases were confirmed, initial abatement measures were performed. Site characterizations were also performed at the release sites and in all cases a letter of No Further Action from VDEQ was received (US Army, 2007a). However, the natural attenuation remedy approved was based on the land use at the time. Were the land use to change because of proposed development, the regulatory community may request additional investigations to provide current site condition data.

3.11.1.2 Hazardous Waste

Fort Belvoir manages hazardous waste currently generated at Main Post through a RCRA hazardous waste storage permit issued by VDEQ. Fort Belvoir has had an active hazardous waste management program in place for more than 25 years. The RCRA/Waste Management Program at Fort Belvoir is responsible for the receipt, characterization, packaging, storage, manifesting, and proper disposal of all hazardous waste generated at the installation.

Main Post

Currently, Fort Belvoir has a RCRA Part B permit (USEPA identification number VA7213720082) issued by VDEQ for the storage of hazardous waste (US Army, 2007a). As shown on Figure 3.11-1, there are 67

satellite accumulation areas on Main Post (Fort Belvoir GIS, 2013). Building 1490 is the permitted hazardous waste long-term storage facility. Fort Belvoir also operates three temporary (less than 90 days) hazardous waste accumulation sites at Buildings 1495 and 7367 on South Post and Building 2834 on North Post.

FBNA

Current hazardous waste generation at FBNA is minimal, consisting of mostly universal waste from the administrative facilities located there. FBNA is considered a Conditionally Exempt Small Quantity Generator.

3.11.1.3 Solid Waste Management Units and Potentially Contaminated Sites

Fort Belvoir has an active program to manage Solid Waste Management Units (SWMUs) and potentially contaminated sites that is conducted in accordance with Army, federal, and state regulations. The following discussions summarize current information about the SWMUs at Main Post and FBNA.

Beginning in 1992, Fort Belvoir entered into a Federal Facilities Compliance Agreement with USEPA that identified 27 sites that had served in the past as unpermitted hazardous waste management sites (US Army, 2007a; US Army, 2013a in progress). Fort Belvoir received funding and initiated corrective action at these former hazardous waste management sites. Site cleanup and closure plans were developed, the sites were investigated and remediated, and closure reports were prepared. VDEQ has issued letters of concurrence with No Further Action determinations for all 27 sites. Twenty-six of these sites were closed using health-based risk assessments and closure is conditional on the scenarios evaluated. Many of these sites were subsequently identified for corrective action.

Any planned projects in these areas would require in-depth reviews to ensure protection of human health and the environment. Construction programs that disturb areas around these former hazardous waste management sites require appropriate federal OSHA construction worker protection and many projects on Army installations also must adhere to the requirements of the US Army Corps of Engineers' *Safety and Health Requirements Manual*, Engineering Manual 385-1-1.

Main Post

Currently Fort Belvoir manages 204 SWMUs on Main Post in accordance with RCRA Part B permit VA7213720082. The distribution of SWMU sites is as follows:

- North Post: 36 sites
- South Post: 148 sites
- DAAF: 20 sites

In 2005, Fort Belvoir categorized each SWMU on Main Post into one of four corrective action classes based on visual site inspections. These categories are the following:

- No Further Action
- Administrative Closure
- Confirmatory Sampling
- Site Investigation

Through documentation of each SWMU, recommendations for Administrative Closure or historic No Further Action (sites which received VDEQ concurrence on site closure prior to issuance of permit) were included in the following reports: Administrative Closure Report , April 2009; Administrative Closure Report (Volume II), July 2009; and RCRA Corrective Action No Further Action Closure Document, August

2012. Under this strategy, 101 SWMUs received Administrative Closure status and 42 SWMUs received No Further Action status upon regulatory concurrence of these documents.

In the 2008-2009 period, Fort Belvoir began a concentrated effort to investigate all SWMUs not identified as Administrative Closure or as having received No Further Action categorization in previous investigation activities. These investigation activities resulted in the closure of 43 SWMUs and the need for corrective action at 5 SWMUs. The remaining sites, including any newly discovered sites such as those identified during 2005 BRAC construction, are in various stages of the RCRA Corrective Action Process.

Concurrent to these investigation activities, Fort Belvoir has reviewed each site against current and anticipated land use. Further information regarding the installation's development and implementation of land use controls and other site restrictions for SWMUs can be found in the RPMP.

FBNA

In September 2005, USEPA Region III issued a RCRA Section 3013 Unilateral Administrative Order that requires Fort Belvoir to investigate sites at FBNA. These activities are monitoring, testing, analysis, and reporting of hazardous waste releases to USEPA Region III (US Army, 2007a). Fort Belvoir identified and investigated potential releases of hazardous substances to the environment on FBNA (US Army, 2014a). As of December 2013, a total of 70 sites were identified, 62 of which received a No Further Action concurrence from the USEPA. Ten sites (former ranges) require additional actions in accordance with CERCLA (see Section 3.11.1.9).

3.11.1.4 Asbestos-Containing Materials

Fort Belvoir maintains an active asbestos-containing materials management program. The Asbestos Program Manager is responsible for all elements of the program including surveys, sampling, operation and maintenance, permitting, asbestos abatement design and oversight, and restoration (US Army, 2007a). In addition, the program manager provides evaluation of proposed renovation and demolition projects, oversight for any abatement, and is responsible for the overall compliance of the asbestos response actions enacted on the installation including training, operation and maintenance, and public notice requirements. The Asbestos Program Manager ultimately ensures compliance with all applicable regulations and that air samples meet the acceptance criteria.

The installation maintains a database with information on the presence of asbestos-containing materials in nearly all facilities on post. When building renovation or demolition projects are scheduled, the Asbestos Program Manager evaluates the projects for potential effects to asbestos. Supplemental asbestos surveys are performed to gather sufficient data to prepare the abatement design. The program manager provides oversight during the abatement to ensure compliance with all applicable regulations and that air samples meet the acceptance criteria. Through this process, Fort Belvoir mitigates the potential for asbestos release while abating asbestos throughout the installation one project at a time (US Army, 2007a).

Main Post

An asbestos survey was conducted by Dewberry & Davis, Inc. in 1989 to determine the presence of asbestos-containing materials in the buildings located throughout Main Post (Jones Lange LaSalle, Inc., 2007, as cited in US Army, 2012b). In December 1994, Dewberry & Davis, Inc. conducted a field verification survey to verify the asbestos-containing materials identified in the 1989 asbestos survey.

The findings of the surveys indicate that the asbestos-containing materials remaining in buildings on Main Post mostly comprise non-friable vinyl asbestos floor tiles and mastics. Friable asbestos pipe insulation may still be present inside permanent walls and ceilings, especially in bathroom walls. Historically, friable asbestos pipe insulation has been discovered in pipes that feed the sinks and urinals. Whether asbestos pipe

insulation is present would be known only if the walls or ceilings are demolished during a renovation or demolition project.

FBNA

The findings of a survey performed in 2006 indicate that asbestos-containing materials remain in eight buildings at FBNA; specifically, Buildings 5064, 5070, 5075, 5089, 5093, 5097, 5098, and 5099. An asbestos survey would be required before demolition or renovation of these structures. Asbestos-containing materials identified at FBNA included vinyl floor tiles, caulking, glazing, acoustical tile, and roofing, among others (US Army, 2007a).

3.11.1.5 Lead-Based Paint

Fort Belvoir's program to manage lead-based paint is similar in structure to the asbestos program. The Lead Program Manager is responsible for all elements of the lead program including paint inspections, risk assessments, operation and maintenance, permitting, lead abatement design and oversight, and restoration (US Army, 2007a). When renovation and demolition projects are scheduled on post, the Lead Program Manager must evaluate each project for potential effects of lead-based paint.

Main Post

Lead-based paint sampling, analysis, and risk assessment were completed in 1997 for 11areas of existing on-post housing. The areas included pre-1978 housing within Belvoir, Gerber, Dogue Creek, Rossell, Jadwin, Fairfax, Colyer, George Washington, River, and Woodlawn Villages, as well as the T-400 (Park Village and part of Jadwin Village) and 100 (part of Gerber Village) areas (US Army, 2007a).

As a result of the sampling and risk assessment, the Army implemented interim control measures in the Dogue Creek and George Washington Villages to prevent human exposure where lead was detected above the USEPA preliminary remediation goals for soil (US Army Corps of Engineers, 2003, as cited in US Army, 2007a). In accordance with Army lead-based paint abatement guidelines, the lead-based paint found on interior walls exceeding US Department of Housing and Urban Development levels in Gerber and Dogue Creek homes were encapsulated by drywall or skim of plaster. No lead-based paint was identified in Woodlawn Village housing. Lead-based paint abatement waste, including chips and other lead-based paint debris, were turned in to the Hazardous Waste Department for manifesting and off-post disposal as RCRA hazardous waste (US Army, 2007a).

FBNA

The findings of a survey performed in 2006 indicate that lead-based paint remains in six buildings at FBNA; specifically, Buildings 5069, 5075, 5089, 5093, 5098, and 5099. Lead-based paint painted components identified at FBNA included doorframes, doors, window frames, and exterior wood components, among others (US Army, 2007a).

3.11.1.6 Polychlorinated Biphenyls (PCBs)

Fort Belvoir performs surveys of buildings scheduled for demolition and prepares a checklist identifying regulated waste including polychlorinated biphenyls (PCBs), which were once used to insulate electrical equipment. Waste is collected for proper disposal. Fort Belvoir's policy is to take all transformers that are being taken offline for repair or replacement to Building 1495, where they are sampled for PCB content. The USEPA regulates the removal and disposal of all sources of PCBs containing 50 parts per million or more of PCBs. The Army considers Fort Belvoir to be compliant with TSCA (US Army, 2007a).

Main Post

Over the years, Fort Belvoir sampled, tested, and removed all the PCB-containing electrical components on post. Two areas contaminated with PCBs are located in an industrial section of South Post known as the Supply, Storage, & Maintenance area. One spill occurred at the Defense Property Disposal Office on South Post, south of Building 1132. The second contaminated site is the former coal storage area, south of 21st street on South Post. Together the two sites had 1.7 million pounds of PCB-contaminated soil removed between October 15, 1982 and June 8, 1983. By December 1983, the two areas were capped with two feet of clean soil and vegetated with grass and tree seedlings. Before redevelopment, information regarding the known distribution and status of contaminated sites needs to be reviewed so that improvements can be safely implemented (US Army, 2007a).

FBNA

Twenty potential PCB-containing pole and pad-mounted transformers were removed in support of the right-of-way for the Fairfax County Parkway. None of the transformers sampled and analyzed contained PCBs at concentrations of 50 parts per million or greater, the threshold for designation as PCB-contaminated transformers. During an environmental investigation at FBNA performed in 1990, 55 transformers were sampled and analyzed for PCBs (US Army Toxic and Hazardous Materials Agency, 1990, as cited in US Army, 2007a). Fifty-one of the 55 transformers had PCB concentrations below detection limits. Of the 12 transformers in which PCBs were detected, only four had concentrations at 50 parts per million PCB or greater. All PCB-containing electrical equipment has been removed.

3.11.1.7 Pesticides

Pesticides, including herbicides, fungicides, insecticides, and rodenticides, have been used historically at Fort Belvoir, but today an Integrated Pest Management Program has been developed to minimize the use of pesticides. The application of all pesticides is performed in accordance with both the Army's integrated pest management techniques and Fort Belvoir's Integrated Pest Management Plan. The plan serves as a tool to reduce reliance on pesticides, to enhance environmental protection, and to maximize the use of integrated pest management techniques (US Army, 2001a).

The Commissary and PX supply household and garden pesticides for purchase by their customers. Use and sale of pesticides are regulated under the Federal Insecticide, Fungicide, and Rodenticide Act of 1947, amended in accordance with the Food Quality Protection Act in 1996.

Main Post

Pesticides are stored in industrial areas on South Post and at the North Post golf course, and their applicators are either DoD certified or certified by the Commonwealth of Virginia as "Commercial Applicators" (US Army, 2007a). Approximately three quarters of the pesticides applied on Fort Belvoir are applied on the North Post golf course. The types of pesticides used on the golf course include fungicides and herbicides. Preventive spraying is not authorized in housing units and interior pest control is performed by a Fort Belvoir Residential Communities Property Manager contracted pest control company. Fort Belvoir DPW maintains a contract with a qualified pest control company to provide pest control in commercial facilities through an integrated approach, consistent with the Integrated Pest Management Program.

FBNA

Historical use of pesticides is not well-documented at FBNA. Investigations performed at SWMU sites M-42 and M-43 identified low-level dichlorodiphenyl trichloroethane (DDT) and its breakdown products (US Army, 2007a), indicating that, to some degree, pesticides were used at FBNA in the past.

3.11.1.8 Regulated Medical Waste

Regulated medical waste includes but is not limited to blood-soaked bandages, syringes, and tissue. Medically generated waste is managed in accordance with RCRA and Virginia Regulated Medical Waste Management Regulations (9 VAC 20-120) regarding biomedical, solid, and hazardous waste.

Main Post

The main generator of medical biohazardous waste is FBCH. The regulated medical waste is collected by a contractor and disposed of at an appropriate facility. The Logan Dental Clinic generates small quantities of regulated medical waste that are disposed of off post through private waste transporters. Small quantities of medical biohazardous waste also are generated by facilities with nursing stations.

Historically, it is likely that all forms of waste, including medical biohazardous waste, may have been placed in the former landfills on South Post when the installation was operating its own landfills. These SWMU s are being monitored, investigated, and remediated under the installation's RCRA corrective action program.

FBNA

Review of the numerous historical documents for FBNA did not indicate that any regulated medical waste issues exist at FBNA (US Army, 2007a).

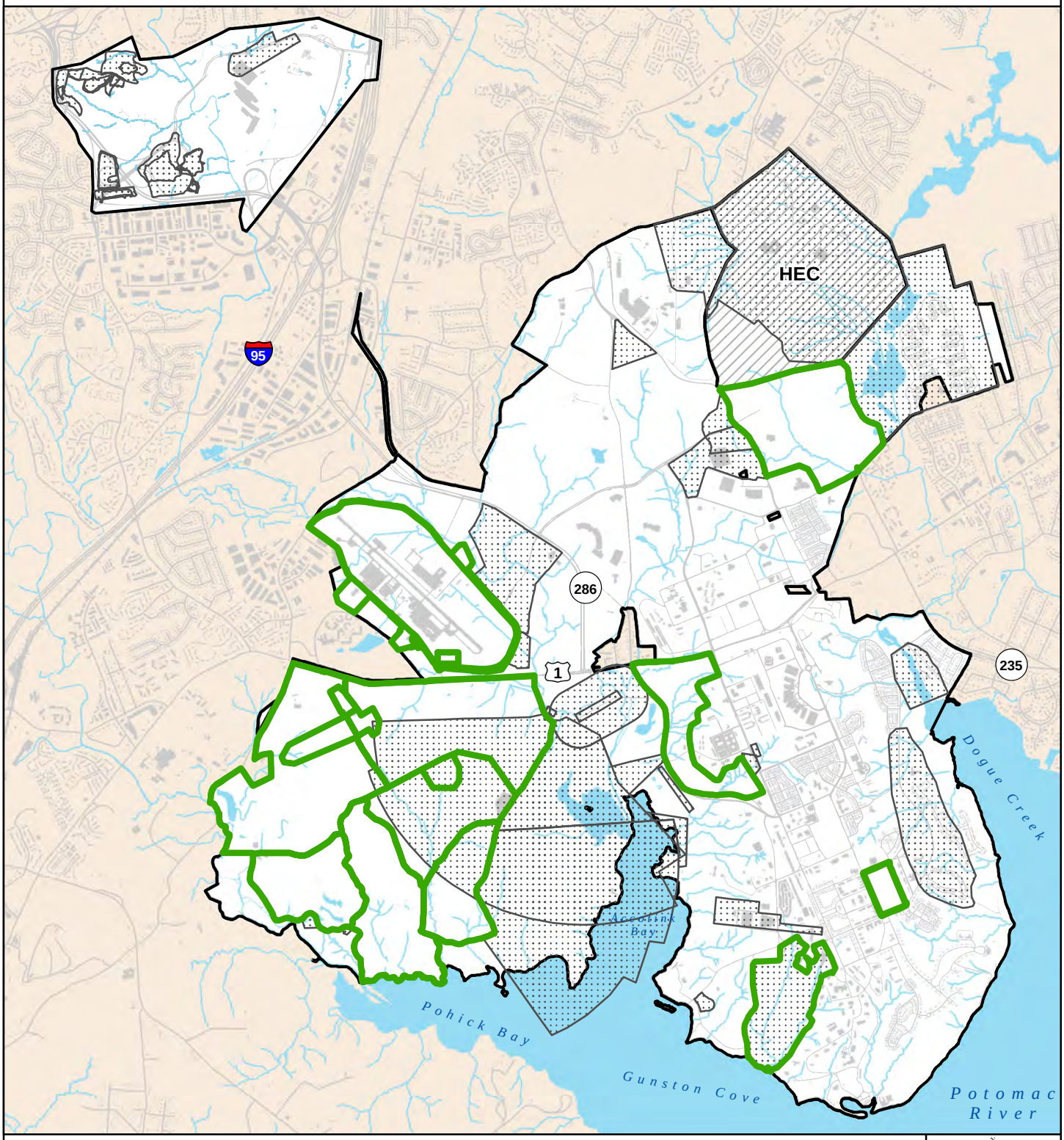
3.11.1.9 Ordnance Areas

Fort Belvoir has identified 16 active ranges and training areas and 24 closed or inactive ranges and training areas on Main Post (US Army, 2014a). Additionally, there are 10 closed or inactive ranges and training areas on FBNA. Figure 3.11-2 shows the locations of the ranges and training areas on Main Post and FBNA. Unexploded ordnance has been found both on active and on closed or inactive ranges and training areas. Unexploded ordnance on closed or inactive ranges, and associated contamination is addressed by the Military Munitions Response Program under CERCLA. The remaining active ranges are addressed under the Operational Range Assessment Program.

Main Post

The closed Main Post ranges were used for small-arms training and mine warfare and demolition training related to Army combat engineer training that took place from 1918 to 1988. In a 2008 site inspection of 19 closed ranges on Main Post, 12 were recommended for No Further Action and 7 were recommended for remedial investigations (US Army, 2014a), which were completed in December 2012. Feasibility studies for two sites are currently under way to evaluate potential remedial options and appropriate cleanup requirements. Cleanup actions for those two ranges are expected to be complete by December 2014. In August 2013, Fort Belvoir funded feasibility studies for the remaining 5 sites, as well as an investigation for a former range that originally received No Further Action. The feasibility studies are expected to be complete in August 2015, with the final remedy being completed by August 2016. Several of the Main Post Military Munitions Response Program sites overlap the Jackson Miles Abbott Wildlife Refuge, Fort Belvoir's Wildlife Corridor, and the Accotink Bay Wildlife Refuge.

Ranges and Training Areas



Range and Training Area - Active

Range and Training Area - Closed

0 2,000 4,000 8,000

Feet

Fort Belvoir RPMP EIS

Figure 3.11-2

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FBNA

Given its historical use and concentration of ranges, all of FBNA is considered a Military Munitions Response Program site (US Army, 2014a). The ranges at FBNA were used for mine warfare material testing, research, and development.

In 2006, the 10 closed ranges on FBNA were determined to be eligible for the Defense Environmental Restoration Program and were subsequently enrolled in the Military Munitions Response Program (US Army, 2014a). Several former FBNA training ranges were successfully cleared of ordnance and explosives from 2003 through 2005 in preparation for the proposed land transfer for the Fairfax County Parkway right-of-way. Subsequent clearance occurred between 2006 and 2010 for the areas outside of the Fairfax County Parkway right-of-way in support of the 2005 BRAC-related construction. Currently, Fort Belvoir is developing a feasibility study to evaluate remedial alternatives, as required by CERCLA. It is anticipated that land use controls, in keeping with the current land use, in addition to ordnance recognition briefings and training, and construction support for future projects would be the final remedy for FBNA.

3.11.1.10 Radioactive Materials

An inventory list is maintained for radioactive material on Fort Belvoir and is updated semiannually (US Army, 2007a). Today, FBCH and other on-post medical facilities, such as the Logan Dental Clinic, produce low-level radioactive waste. Historically, all forms of post waste, including low-level radioactive waste, might have been placed in the former landfills on South Post, which were identified as SWMU s and are currently under RCRA Corrective Action. Two SWMU s on South Post are identified by the Army as former radioactive waste storage facilities related to a decommissioned nuclear reactor plant built for research and development purposes within the radiation testing area along Gunston Cove on the southern tip of South Post. One is northwest of Fairfax Village in an administrative area; the other is southeast of the Visitor's Center on the other side of Pohick Road near the northern tip of Accotink Bay.

3.11.2 Environmental Consequences of the No Action Alternative

Under the No Action Alternative, no proposed short-term or long-term projects would be implemented and no further development would take place on Fort Belvoir. The 1993 land use plan as amended in 2002 and 2007 would remain in place. Continued maintenance and repair activities would occur, but the use of hazardous substances and generation of hazardous waste would be expected to remain at current levels. Short- and long-term minor adverse effects on hazardous substance generation, storage, and disposal can be summarized as follows:

- Petroleum usage would continue at current levels and no increase in petroleum storage capacity would occur. For maintenance and repair activities at petroleum storage sites, appropriate worker protection would be required as well as proper handling and disposal of contaminants as required by federal, state, local, and Army regulations.
- No substantial net increase in hazardous waste generation would occur. Hazardous waste would continue to be managed in accordance with Fort Belvoir's Hazardous Waste Storage Permit and RCRA requirements.
- No effects on the SWMUs and potentially contaminated sites would result from the no action alternative
- Negligible effects to existing asbestos-containing materials in existing structures would result from maintenance and repair activities. The Asbestos Program Manager would continue to ensure

compliance with all applicable regulations and that any air samples collected meet the acceptance criteria.

- Maintenance and repair activities would have negligible positive impacts on levels of lead-based paint abatement and disposal on post.
- No effects would be expected to occur to PCBs under the No Action Alternative.
- Pesticide usage would continue at approximately current levels with no appreciable change occurring under the No Action Alternative.
- Small quantities of regulated medical waste would continue to be generated at the FBCH, the Logan Dental Clinic, and other medical facilities on Main Post; no appreciable change in rates of generation would occur.
- The No Action Alternative would have no effects on ordnance areas.
- Small amounts of low-radioactive materials would continue to be used in medical facilities under the No Action Alternative. No appreciable change in levels of use would occur.

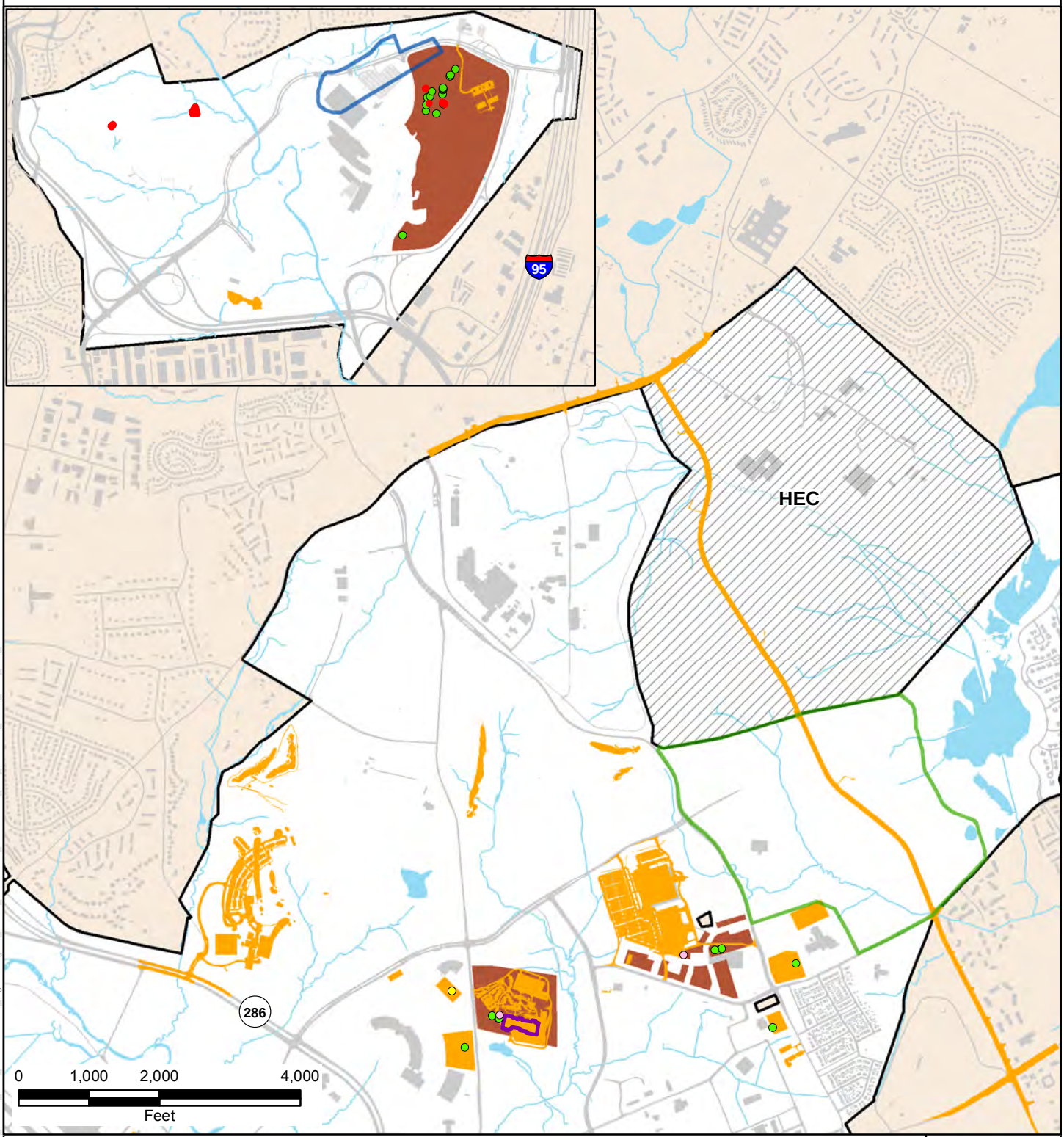
3.11.3 Environmental Consequences of Alternative 1 – Full Implementation – The Preferred Alternative

3.11.3.1 Short-Term Projects

Table 3.11-2 identifies the short-term projects that have potential hazardous substances and potentially contaminated sites remaining within the footprint of the project site, or whose site is located on an active or former military range. Figures 3.11-3 and 3.11-4 depict the project sites that are located near current potentially contaminated sites or where potentially hazardous substances are handled. Appendix H includes "small area maps" that provide detailed views of the relationship between project sites and occurrences of hazardous substances and potentially contaminated sites. This information is taken from Fort Belvoir's GIS (2013) and may not reflect remediation that has taken place but has not yet been captured in the GIS. A site's presence on an active or former military range does not necessarily indicate that any hazardous substances is present on or near the site. Some sites include current active motor pools or other industrial uses that account for the active petroleum storage. The presence of a site in this table indicates that there may be contamination issues that would be investigated and addressed before the project is built.

Environmental and health risks would be controlled by implementing existing programs, policies, regulations, and standard operating procedures (SOPs) as each project is implemented. Measures to reduce the risk of harm to humans and the environment from hazardous substances would be included in these requirements.

Hazardous Substances and Potentially Contaminated Sites – Upper North Post & FBNA



Potential Concern Point
Petroleum Release Site
Petroleum Storage Area
Hazwaste Storage Area
Potential Concern Site
Former or Operational Traning Range
Range and Training Area - CLOSED
Short-Term Project Sites (Construction FY 2012 - 2017)
Long-Term Project Sites (Construction FY 2018 - 2030)

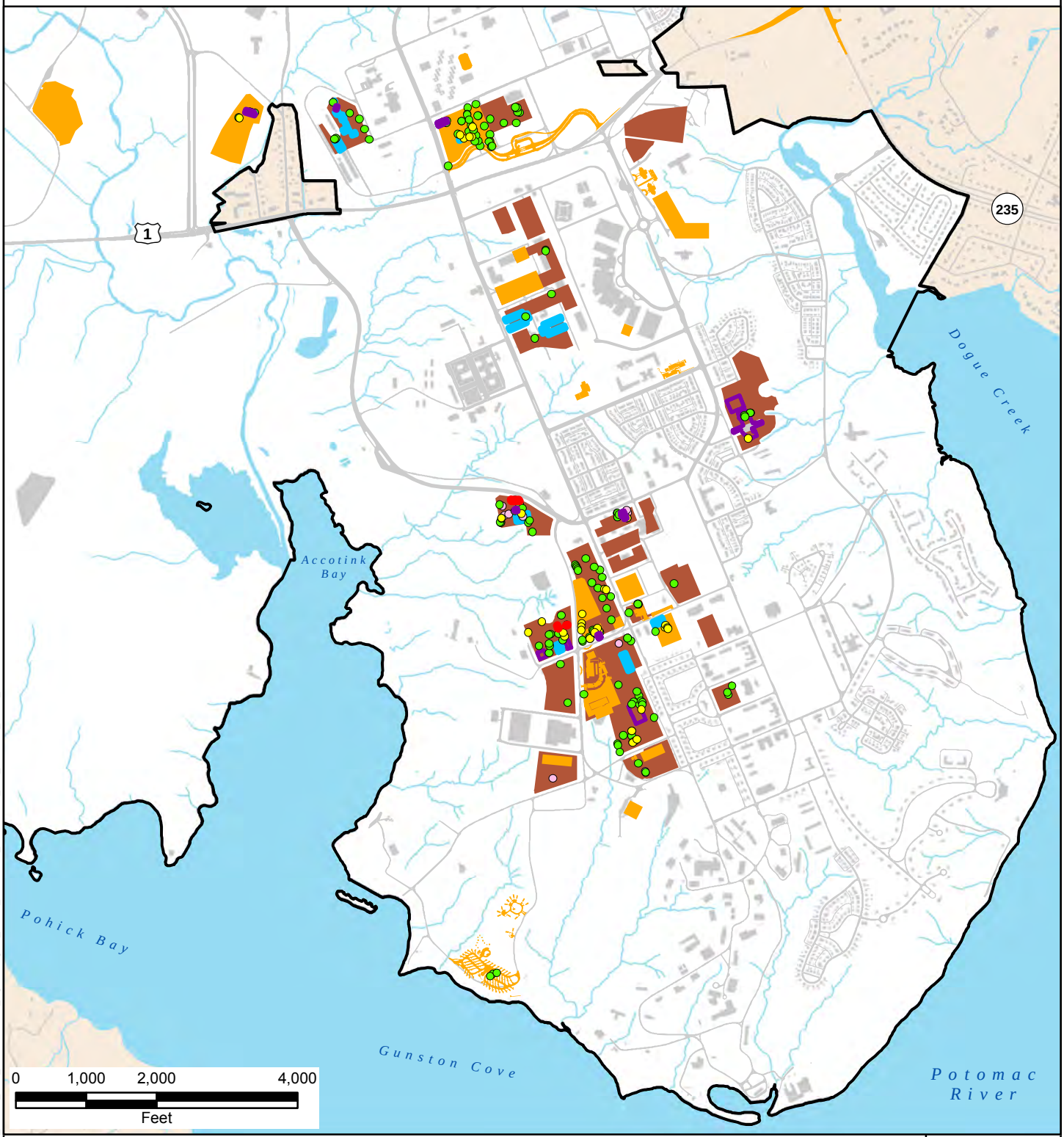
Fort Belvoir RPMP EIS

Figure 3.11-3

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Hazardous Substances and Potentially Contaminated Sites – Lower North Post & South Post



Potential Concern Point
Petroleum Release Site
Petroleum Storage Area
Hazardous Substance Storage Areas
Hazwaste Storage Area
Potential Concern Site
Short-Term Project Sites (Construction FY 2012 - 2017)
Long-Term Project Sites (Construction FY 2018 - 2030)

Fort Belvoir RPMP EIS

Figure 3.11-4

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Table 3.11-2
Short-Term Project Sites with Potential Hazardous Substances and Potential Contamination

Project # on Figures 2-4 & 2-5	Project Name	Location	Building size (ft^2)	Disturbed Area (acres)	Status/Comments
ST 4	Mulligan Road Phase II	North Post	N/A	32	• Active training range T-16.
ST 9	Family Travel Camp Phase 1	South Post	1,630	9.6	• Two above-ground petroleum storage areas, removed and permanently out of use. • Underground petroleum storage area, removed and permanently out of use.
ST 13	Access Road & Control Point – Lieber Gate	North Post	1,500	8	• Two underground petroleum storage areas, removed, permanently out of use.
ST 14	Regional Stormwater Management Facility	South Post	NA	3.5	• Former steam cleaning solvent tanks. (SMWU L-24)
ST 23	NGA Canine Training / Rest Facility	FBNA	1,200	0.5	• SWMU documented site. No further action. • Closed training range.
ST 24	Fairfax County School Expansion	North Post	98,400	4.5	• Underground petroleum storage area, removed, permanently out of use.
ST 32	249th Battalion HQ	South Post	81,783	10.5	• Underground petroleum storage area, removed, permanently out of use.
ST 33	INSCOM HQ Expansion Phase 3	North Post	194,000	Included in ST 19	• Two underground petroleum storage areas, removed, permanently out of use.
ST 36	29th Infantry HQ	North Post	33,258	7.4	• Two petroleum release sites. • Above-ground storage tank waste, petroleum, oils & lubricants (POL). • Bldg 1906 Above-ground storage tank Waste POL. (SWMU F-07) • Bldg 1938 Wash rack. (SWMU C-12) • Bldg 1939 Waste POL Storage. (SWMU E-14) • Former Incinerator. (SWMU J-06) • Two above-ground petroleum storage areas, currently in use. • Eight above-ground petroleum storage area, removed, permanently out of use. • One underground petroleum storage area, currently in use. • Thirteen underground petroleum storage areas, removed, permanently out of use.
ST 40	DLA Parking Garage	North Post	700,000	1.2	• Bldg 2455 suspected battery pit.
ST 47	Religious Education Center	North Post	18,093	1.1	• Underground petroleum storage area, removed, permanently out of use.
ST 48	INSCOM Controlled Humidity Warehouse	South Post	57,116	1.24	• Petroleum release site. • Bldg 1124 Underground storage tank hazardous waste (& sys 1) (SWMU B-06 &-08) • Bldg 1222 Bay K1AAA (SWMU L-10)

Project # on Figures 2-4 & 2-5	Project Name	Location	Building size (ft^2)	Disturbed Area (acres)	Status/Comments
					• Bldg T1125 Bulk Diesel Pump Station (SWMU L-07) • Underground Storage Tank waste (SWMU L-34) and Sys 2 (Hazardous Waste Management Unit B-07). • Three above-ground petroleum storage areas, currently in use. • Three underground petroleum storage areas, currently in use. • Ten underground petroleum storage areas, removed, permanently out of use.
ST 49	911th Engineering Company Operations Complex	North Post	39,810	6.8	• Petroleum release site. • Bldg 1396 Waste Pol Storage. • SWMU - Sanitary Sewer System (L-29). • Above-ground petroleum storage area, permanently out of use. • Underground petroleum storage area, removed, permanently out of use. • Underground petroleum storage area, currently in use.
ST 50	Vehicle Maintenance Shop	South Post	25,565	6.2	• Bldg 187 oil water separator & grit chamber (SWMU D-07) • Indoor car wash rack (SWMU C-09) • Outdoor wash rack (SWMU C-02) • Roads & grounds/ land management wash rack (SWMU L-13) • Underground petroleum storage area, removed, permanently out of use.
ST 52	DLA HQ Building	North Post	267,000	3.9	• Underground petroleum storage area, removed, permanently out of use.
STT 1	Mulligan Road, Phase 2a	North Post	Variable As Needed		• Active training range T-16.
STT 4	Kingman Road/Fairfax County Parkway Intersection Improvements	North Post	NA	0.54	• Petroleum release site.
STT 5	Transit Hub	South Post	NA	2.2	• Above-ground petroleum storage area, currently in use. • Underground petroleum storage area, removed, permanently out of use. • Two petroleum release sites.
Source: Fort Belvoir GIS, 2013.					

Petroleum Constituents

Ten active petroleum storage areas, all on Main Post, are located within proposed short-term project sites ST 36 (29th Infantry HQ), ST 48 (INSCOM Warehouse), and ST 49 (911th Engineering Company Operations Complex), and STT 5 (Transit Hub at Gunston Road). Five of the active petroleum areas are aboveground storage tanks, and five are underground storage tanks. ST 36, ST 48, and ST 49 also overlap petroleum

release sites, as do STT 4 (John J. Kingman Rd/Fairfax County Parkway Intersection Improvements) and STT 5 (Transit Hub at Gunston Road). Twelve of the sites have petroleum storage areas that have been removed and are permanently out of use. Spilled or leaked oil may remain.

Long-term, less than significant adverse effects would result from an increase in petroleum usage based on increased base population and activity levels. Storage capacity requirements for petroleum may also increase. Any construction of new storage facilities would be done in accordance with applicable laws regarding construction materials, leak protection, monitoring, and spill containment.

During the planning for the new projects, petroleum release sites would be evaluated on a case-by-case basis. In some cases, additional sampling may be necessary. Where residual petroleum contamination still exists, construction programs that call for disturbing areas around these petroleum release sites would require the appropriate federal OSHA construction worker protection. Disturbing previously unidentified petroleum contamination would also require proper handling and disposal of contaminants as required by federal, state, local, and Army regulations. Mitigation measures and soil removal can be integrated into the construction phase of the project and addressed as part of the site preparations. A closure process involving administrative and decontamination process would be required. Confirmation samples collected beneath USTs and potentially some ASTs would likely be required to demonstrate no release has occurred. It is possible for USTs to have had a release previously undiscovered. Mitigation measures could be integrated into the construction phase of the project in concert with the site preparation and earthwork features for minimal impact to the overall construction schedule.

Hazardous Waste

In addition to petroleum products, four of the sites have potential to generate hazardous waste: ST 14, steam cleaning solvents, ST 36, incinerator waste, ST 40, a suspected battery pit, and ST 50, wash racks.

With implementation of the short-term projects, construction activity would increase, and the number of buildings on post and the workforce would increase. Therefore, the amount of hazardous substances used would increase, including paints, thinners, fuel, and motor oils for vehicles and equipment. An increase in the volume of these substances used, hazardous waste generated, and hazardous waste storage required would occur. Short-term construction use of hazardous substances would have less than significant adverse effects. A long-term increase in use of hazardous substances for operations would also have less than significant adverse effects.

Less than significant adverse effects could result from an increase in spills associated with the use of more hazardous materials. Established controls such as spill containment, emergency response, and clean-up procedures would limit the impact of spills.

No effects would be expected from hazardous waste disposal. The installation is a large-quantity generator of hazardous waste and has established procedures for managing and disposing of such waste. A permitted hazardous waste storage facility is located on Main Post. Six hazardous waste storage areas on Main Post are currently located on short-term project sites ST 36, ST 46 (INSCOM HQ), ST 48, and ST 49.

The current hazardous waste disposal procedures would continue with implementation of Alternative 1. All hazardous waste would be managed in accordance with the installation's Hazardous Waste Storage Permit and RCRA requirements. Environmental and health risks are controlled by implementing existing programs, policies, regulations, and standard operating procedures (SOPs). Measures to reduce the risk of harm to humans and the environment from hazardous waste would be included in these requirements.

Solid Waste Management Units and Potentially Contaminated Sites

There are seven SWMU s within the development areas of ST Project 14 (Regional Stormwater Management Facility) and ST Project 48 (INSCOM Controlled Humidity Warehouse), and four additional SWMU s in the development area of ST Project 50 (Vehicle Maintenance Shop) that would be investigated,

remediated, and closed. Beneficial effects would occur from the development of short-term sites with SWMUs because they would be investigated and remediated before development.

Construction materials generated by Alternative 1 short- and long-term projects would be recycled, reused, or taken off-post to an approved construction and demolition landfill. There would be a long-term increase in solid waste due to an increase in the Fort Belvoir population. Fort Belvoir would dispose of an estimated 21.2 tons of municipal solid waste per day in 2017. No effects are expected from solid waste disposal. The installation has established procedures for managing and disposing of solid waste. The current solid waste disposal procedures would continue with implementation of Alternative 1.

Asbestos

Short-term less than significant adverse effects (controlled releases and disposal from demolition activities) and long-term beneficial effects would result from removal of asbestos-containing material present in existing buildings that would be demolished and the sites reused. If such buildings were demolished or renovated, asbestos-containing material, if present, would be handled in a manner consistent with applicable rules and regulations, and thus, no environmental or health effects from the removal, handling, and disposal of these materials would be expected during demolition, renovation, or construction activities.

Lead-Based Paint

Long-term beneficial effects would occur as lead-based paint present in existing buildings is removed as buildings are demolished or renovated to accommodate the new short- and long-term projects. Lead-based paint would be handled in a manner consistent with applicable rules and regulations, and thus, no long-term adverse environmental or health effects from the removal, handling, and disposal of these materials would occur during demolition, renovation, or construction activities.

PCBs

No effects would occur as all PCB-containing equipment has been removed.

Pesticides

Pesticides would continue to be used on Fort Belvoir to manage pests and invasive species in accordance with the Fort Belvoir Integrated Pest Management Plan, which aims to minimize the use of pesticides. With the implementation of Alternative 1, the amount of pesticides used overall on Fort Belvoir would increase because the number of buildings would increase. However, because Fort Belvoir would continue to minimize pesticide use by managing pests in accordance with the Integrated Pest Management Plan, the long-term effects of an increase in the amount of pesticides used while adverse would be less than significant. During construction activities, control of rats found on construction sites would have short-term, negligible negative effects because more pesticides would be needed, but there would short-term beneficial impacts on quality of life for those working on and near the sites.

Regulated Medical Waste

Long-term minor adverse effect are expected as the establishment of ST 3 (the National Intrepid Center of Excellence (NICoE) under Alternative 1 would likely result in an increase in the amount of regulated medical waste at Fort Belvoir. Because the facility would comply with all regulated medical waste regulations, impacts would be negligible.

Ordnance Areas

There would be beneficial effects from clearing and removing any used ordnance located within the proposed project sites on current or former military ranges (Figure 3.11-2). ST 4 and STT 1 (Mulligan

Road) overlay active training area T-16 on North Post. ST 23 (NGA Canine Training/Rest Facility) on the FBNA is located on former range 1 and historic range 2. LTT 3 intersects active training area T-4 and LTT 8 intersects closed range 1-A. No adverse effects are expected from any ordnance removal required because it would be carried out in accordance with DoD and Army guidance.

Radioactive Material

The establishment of NICoE (ST 3) would likely result in an increase in the amount of radioactive material generated at Fort Belvoir. To the extent that an increased workforce in the future makes greater use of the FBCH and the Logan Dental Clinic, which produce low-level radioactive waste, then their radioactive waste stream would increase, too. These increases would result in less than significant adverse effects as the facilities would need to comply with all radioactive material regulations.

3.11.3.2 Long-Term Projects

Table 3.11-3 lists and Figures 3.11-3 and 3.11-4 show the long-term project and long-term transportation project sites with potential hazardous substances and potentially contaminated sites remaining within the footprint of the project. . Appendix H includes "small area maps" that provide detailed views of the relationship between project sites and occurrences of hazardous substances and potentially contaminated sites. The long-term project sites are larger than the eventual building footprints, so even if contaminated sites remain, they may not be near the buildings that would eventually be built from 2018 through 2030. As noted for Table 3.11-2, the data in the table come from the Fort Belvoir GIS (2013), and some of the contamination issues listed may have been resolved but not updated in the GIS.

Table 3.11-3
Long-Term Project Areas with Potential Hazardous Substances and Potentially Contaminated Sites

Project # on Figures 2-10 & 2-11	Project Areas	Location	Building size (ft^2)	Disturbed Area (acres)	Status/Comments
LT 1	Lower North Post District	North Post	240,000	8.2	• Three petroleum release sites. • Above-ground storage tank waste pol.(SWMU F-07) • Bldg 1906 above-ground storage tank waste pol. • Bldg 1938 Wash rack (SWMU C-12) • Bldg 1939 Waste Pol storage. • Former incinerator (SWMU J-06) • Two above-ground petroleum storage areas, currently in use. • Six above-ground petroleum storage areas, removed, permanently out of use. • One underground petroleum storage area, currently in use. • Fourteen underground petroleum storage areas, removed, permanently out of use.
LT 2	1400 East District	South Post	266,000	10.3	• Three above-ground petroleum storage areas, currently in use. • Two underground petroleum storage areas, removed, permanently out of use.
LT 4	Administrative Campus District	South Post	220,000	5.4	• Dewitt Hospital pathological waste sterilizer. (SWMU L-17) • Underground petroleum storage area,

Project # on Figures 2-10 & 2-11	Project Areas	Location	Building size (ft^2)	Disturbed Area (acres)	Status/Comments
					currently in use. • Three underground petroleum storage areas, removed, permanently out of use.
LT 5	Town Center District	South Post	80,000	2.6	• Four petroleum release sites. • Bldg 1197 Underground storage tank waste pol. • Two above-ground petroleum storage areas, currently in use. • Two underground petroleum storage areas, currently in use. • Eight underground petroleum storage areas, removed, permanently out of use. • One underground petroleum storage area closed in place, permanently out of use.
LT 6	Industrial Area District	South Post	20,000	1.4	• Eight petroleum release sites. • Battery acid neutralization pit. (Hazardous Waste Management Unit [HWMU] I-04) • Bldg 1116 battery storage (areas “a” & “b”) H-05A, H-05B. • Bldg 1124 underground storage tank hazardous waste (SWMU B-08) (& Sys 1 HWMU B-06). • Bldg 1146 Battery Storage. (HWMU H-02) • Bldg 1146 Underground storage tank waste pol (SWMU G-08) • Bldg 1222 Bay K1AAA. (SWMU L-10) • Bldg 715 Wash rack & oil water separator.(HWMU C-11&D-11) • Bldg T1125 Bulk diesel pump station. (SWMU L-07) • Drum storage area. (SWMU L-36) • Former heavy equipment wash rack. (SWMU C-10) • Former steam cleaning solvent tanks. (SWMU L-24) • Heavy equipment wash rack oil water separator. (SWMU D-09) • Pesticide equipment wash rack. • Power unit former DPDO storage. (SWMU N-09 & -11) • Power unit school former DPDO storage underground storage tank. (HWMU N-06) • Road & grounds/land management storage area. • Road & ground/land management sump. (SWMU D-06) • Road & grounds/land management wash rack. (SWMU C-01) • Underground storage tank haz waste

Project # on Figures 2-10 & 2-11	Project Areas	Location	Building size (ft^2)	Disturbed Area (acres)	Status/Comments
					(SWMU L-34)(& sys 2 HWMU B-07). • Underground storage tank waste pol. (HWMU G-11) • Waste pol storage. (SWMU E-13) • Seventeen above-ground petroleum storage areas, currently in use. • Five above-ground petroleum storage areas, removed, permanently out of use. • Three above-ground petroleum storage areas, permanently out of use. • Eleven underground petroleum storage areas, currently in use. • Thirty three underground petroleum storage areas, removed, permanently out of use. • Seven underground petroleum storage areas closed in place, permanently out of use. • Two underground petroleum storage areas permanently out of use. • Abandoned landfill.
LT 6A	Lower North Post West District	North Post		6.86	• Petroleum release site. • Four above-ground petroleum storage areas, currently in use. • Four underground petroleum storage areas, removed, permanently out of use.
LT 7	North Post Community Support District	North Post	20,000	16.5	• Petroleum release site. • Above-ground petroleum storage area, currently in use. • Above-ground petroleum storage area, removed, permanently out of use. • Underground petroleum storage area, removed, permanently out of use.
LT 8	Historic Core District	South Post	40,000	4.1	• Three underground petroleum storage areas, removed, permanently out of use.
LT 9	Fort Belvoir North Area District	FBNA	1,500,000	42.4	• 17 SWMU document sites with no further action. • 2 former oil/water separators (M-13a & M-14a) • Former in-ground concrete tank (M-15a) • Excavated area (M-03a) • Wash rack (M-17a) • Trench (M-17b) • Area of Potential Concern 14 (No Further Action). • Remedial Action/Feasibility Study: Preliminary Site Assessment (PSA) 2034, PSA 2009, PSA 2033. • Abandoned air strip.

Project # on Figures 2-10 & 2-11	Project Areas	Location	Building size (ft^2)	Disturbed Area (acres)	Status/Comments
LTT 2	Fairfax County Parkway / Kingman RD / NMUSA Interchange	North Post	NA	4.8	• Petroleum release site.
LTT 3	US Route 1 intersections with Fairfax Co Pkwy, Pohick Rd, and Belvoir Rd	North Post / South Post	NA	TBD	• Underground Petroleum release site. • Underground Petroleum Storage Area, Removed, Permanently out of use. • Storage Area, Permanently out of use. • Active training area T-4.
LTT 8	Heller Road	FBNA	NA	1.9	• Closed range.
Source: Fort Belvoir GIS, 2013.					

Petroleum Constituents

On Main Post, 46 active petroleum storage areas and 17 petroleum release sites are located within the proposed development areas of Alternative 1 long-term projects. Eight of the nine long-term projects overlap former or current petroleum storage areas; the exception is LT 3, which has no hazardous waste sites of any kind. Five of the long-term projects overlap areas with a reported petroleum release. LT 6, the current industrial area as well as the proposed Industrial Area District has more sites than any other area. Two long-term transportation projects – LTT 2 (Fairfax Parkway/John J. Kingman/NMUSA grade-separated interchange) and LTT 3 (Upgrade of US Route 1 intersections with the Fairfax County Parkway, Pohick Road, and Belvoir Road) – overlap areas with a petroleum release. LTT 3 (US Route 1 Intersection Improvements) overlies former petroleum USTs.

Hazardous Waste

Six of the LT project development sites currently include 16 current hazardous waste storage areas: LT 1, LT 4, LT 5, LT 6, LT 6A, and LT 10. These areas would be investigated and remediated before construction of the long-term projects. Long-term project effects on hazardous waste would be similar to that described for the short-term projects, but with more buildings and an even larger workforce, more hazardous substances would be used in the short-term for construction and in the long-term for operation of the facilities.

Solid Waste Management Units and Potentially Contaminated Sites

Beneficial effects would occur from the development of long-term sites with SWMUs because they would be investigated and remediated before development. SWMUs on in the LT 5 area, the Town Center District, and LT 7, the Industrial Area District would be corrected.

Lead-Based Paint

Long-term beneficial effects would occur as lead-based paint present in existing buildings is removed as buildings are demolished or renovated to accommodate the long-term projects as described for the short-term projects

PCBs

There would be no impacts as all PCB-containing equipment has been removed from Fort Belvoir.

Pesticides

As described for the short-term projects, pesticides would continue to be used on Fort Belvoir to manage pests and invasive species in accordance with the Fort Belvoir Integrated Pest Management Plan, which aims to minimize the use of pesticides. With the implementation of Alternative 1, the amount of pesticides used overall on Fort Belvoir would increase because the number of buildings would increase. However, because Fort Belvoir would continue to minimize pesticide use by managing pests in accordance with the Integrated Pest Management Plan, the long-term effects of an increase in the amount of pesticides used while adverse would be less than significant. During construction activities, control of rats found on construction sites would have short-term, negligible negative effects because more pesticides would be needed, but there would short-term beneficial impacts on quality of life for those working on and near the sites.

Regulated Medical Waste

Any medical facilities eventually built in the LT 4 or LT5 areas may increase the amount of regulated medical waste at Fort Belvoir. However, any new facilities would comply with all regulated medical waste regulations, and impacts would be negligible.

Ordnance Areas

There would be beneficial effects from the clearing and removing of any ordnance located within the proposed project sites. LTT 8 (Heller Road Completion) on FBNA overlays closed range 1-A. No adverse effects are expected from any potential ordnance removal because Army and DoD guidance would be followed.

Radioactive Material

Any medical facilities eventually built in the LT 4 or LT5 areas may increase the stream of low-level radioactive waste. These increases would result in less than significant adverse effects as the facilities would need to comply with all radioactive material regulations.

3.11.4 Environmental Consequences of Alternative 2 – Modified Long-Term

The impacts on Fort Belvoir's hazardous substances and potentially contaminated sites resulting from implementing Alternative 2 would be the same as those described for Alternative 1. Because LT 9 on the FBNA would be implemented, hazardous substances use would not increase on the FBNA, and the overall workforce and building space would be less than for the other two action alternatives.

There would be short-term, less than significant adverse effects from hazardous substances use during the construction phase of each project. In the long term, there would less than significant adverse effects from increased hazardous substance usage and disposal, and some positive effects from contaminated site remediation and asbestos and lead paint abatement.

3.11.5 Environmental Consequences of Alternative 3 – Modified Short-Term

The impacts on Fort Belvoir hazardous substances and potentially contaminated sites resulting from implementing Alternative 3 would be the same as those described for Alternative 1. However, because implementation of the projects would be spread over more years, as short-term projects are deferred to the long term, the increase in hazardous substance and hazardous waste generation would be more gradual.

There would be short-term, less than significant adverse effects from hazardous substances use during the construction phase of each project, while in the long term there would less than significant adverse effects from increased hazardous substance usage and disposal, and some positive effects from contaminated site remediation and asbestos and lead paint abatement.

3.11.6 Proposed Mitigation and Protective Measures

No new mitigation measures would be necessary for on-post hazardous substance use and hazardous waste disposal beyond those normally required by Commonwealth of Virginia and Federal environmental regulations, and Army and Department of Defense requirements.

Each short-term and long-term project implemented would be reviewed during the planning phase for any impacts from known hazardous substances and contaminated areas (to include soil, groundwater, UXO, and landfill gas). If it is determined that contamination would impact the project, mitigation measures such as additional health and safety requirements, special material handling (removal/disposal/treatment), or engineering controls may be implemented. Proposed mitigation measures for project development would include all measures normally required by Commonwealth of Virginia and Federal environmental regulations, and Army and Department of Defense requirements.

In the event that a project encounters an area of unknown contamination, such as contaminated soil, Fort Belvoir requires the project be halted and the proponent contact DPW for guidance. Fort Belvoir would review the site conditions and determine a path forward, which would ensure protection of human health and the environment and may include mitigations such as those listed above.

Fort Belvoir would work with the project team during the planning phase to ensure any special provisions are included in the construction contract and all applicable requirements are met.

3.11.7 Comparison of Alternatives

Table 3.11-4 summarizes hazardous substances and potentially contaminated sites impacts that would result from the implementation of the No Action Alternative and three action alternatives.

Table 3.11-4
Summary of Hazardous Substances and Potentially Contaminated Site Impacts by Alternative

Environmental Consequence	No Action Alternative	Alternative 1 – Full Implementation – The Preferred Alternative	Alternative 2 – Modified Long-Term	Alternative 3 – Modified Short-Term
Short-Term Projects				
Human health or safety risk from use of hazardous substances during construction	No effect	Less than significant adverse effects with mitigation	Less than significant adverse effects with mitigation	Less than significant adverse effects with mitigation
Release of hazardous substances or waste to the environment	No effect	Less than significant adverse effects with mitigation	Less than significant adverse effects with mitigation	Less than significant adverse effects with mitigation
Long-Term Projects				
Human health or safety risk from use of hazardous substances during construction	No effect	Less than significant adverse effects with mitigation	Less than significant adverse effects with mitigation	Less than significant adverse effects with mitigation
Release of hazardous substances or waste to the environment	No effect	Less than significant adverse effects with mitigation	Less than significant adverse effects with mitigation	Less than significant adverse effects with mitigation

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3.12 ENERGY USE AND SUSTAINABILITY

This section describes and evaluates potential effects of the proposed actions on the post's sustainability commitments. According to the *US Army Sustainability Report* (US Army, 2012k), sustainability is the principles, practices and actions that ensures reliable access to energy, water, and other natural resources to preserve strategic choice and operational flexibility into the future. By implementing sustainability actions, the Army would decrease future mission constraints, increase resilience, safeguard human health, improve Army quality of life, and enhance the natural environment. According to *The Guide to Creating a Sustainable Installation in Twenty-Five Years or Less* (US Army, 2005c), a sustainable installation is one that simultaneously achieves the following:

- Optimizes military training/mission
- Provides a high quality of life for Soldiers, Families, Civilians
- Promotes a mutually-beneficial relationship with the local community
- Enables cost-effective operations throughout life-cycle
- Sustains natural resources for today and tomorrow

While this section primarily focuses on energy directly associated with installation buildings, it also addresses other sustainability elements such as water consumption, transportation energy, building materials and neighborhood pattern and design. Effects are evaluated based on the feasibility of implementing the updated RPMP while maintaining sustainability commitments.

Thresholds of Significance

For the energy use and sustainability impact analysis, an impact is deemed significant if it exceeds the following, applicable thresholds of significance:

- Fort Belvoir would be unable to meet the federal mandates and Army policies described in Sections 3.12.1.1 and 3.12.1.3, respectively.
- The effects on a natural resource or built system could not be assimilated without resulting in the degradation of the resource or system.

3.12.1 Mandates, Guidance, and Policies

3.12.1.1 Federal Mandates Applicable to Department of Defense Installations and Facilities

During the past decade, Congress has enacted major energy bills with provisions generally pertaining to all federal agency facilities, and the President has issued EOs that direct federal agencies to address energy efficiency and environmental sustainability. In addition, annual DoD appropriation bills have also included energy provisions specifically pertaining to defense facilities. The federal mandates for energy and water conservation most relevant to the proposed master plan and, therefore, are addressed in this section include the following:

- Energy Policy Act of 2005 (EPAct), PL 109-58, enacted August 8, 2005, 42 US Code § 15801

- EO 13693, Planning for Federal Sustainability in the Next Decade, signed March 19, 2015, 80 FR 15869 -15884.[1]
- Energy Independence and Security Act of 2007 (EISA), PL 110-140, enacted December 19, 2007, 42 US Code § 17001
- EO 13508, Chesapeake Bay Protection and Restoration, issued May 12, 2009, FR 74(93):23099-23104

The following paragraphs briefly summarize these federal mandates.

Energy Policy Act of 2005

EPAct of 2005 contains provisions to promote energy efficiency and conservation, encourage alternative and renewable energy sources, reduce dependence on foreign sources of energy, increase domestic production, modernize the electricity grid, and encourage the expansion of nuclear energy. The act regulates new construction and renovation, requiring that new federal buildings achieve energy consumption levels at least 30 percent below minimum baseline standards where life-cycle cost effective.

A July 2013 final rule from the Department of Energy establishes that all new federal high rise residential buildings comply with the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Standard 90.1-2010 and low rise residential comply with the International Energy Conservation Code (78 FR 40945).

The EPAct also requires federal agencies to specify and purchase energy-consuming equipment, including building mechanical and lighting equipment and builder-supplied appliances, that are ENERGY STAR qualified or meet Federal Energy Management Program designated efficiency requirements for purchase and installation in all new construction. ENERGY STAR equipment is generally more efficient than the corresponding requirements of ASHRAE Standard 90.1-2010 and may be used to achieve part of the savings required of federal building designs (78 FR 40945).

Section 203 requires that the federal government offset its electric energy consumption with an increasing percentage of renewable energy[2] as follows:

- Not less than 3 percent in FYs 2007 through 2009
- Not less than 5 percent in FYs 2010 through 2012
- Not less than 7.5 percent in FY 2013 and each FY thereafter

Executive Order 13693

To improve environmental performance and federal sustainability, EO 13693 gives first priority to reducing energy use and cost, and then to finding renewable or alternative energy solutions. Federal agencies must propose percentage reduction targets for agency-wide reductions of greenhouse gas emissions in absolute terms by the end of FY 2025 relative to a FY 2008 baseline. Agencies must also promote building energy

[1] EO 13693 replaced EO 13423, Strengthening Federal Environmental, Energy, and Transportation Management, and EO 13514, Federal Leadership in Environmental, Energy, and Economic Performance, which were cited in the Draft EIS.

[2] Section 203(b) of the act defines renewable energy as electrical energy generated from solar, wind, biomass, landfill gas, ocean (including tidal, wave, current, and thermal), geothermal, municipal solid waste, or new hydroelectric generation capacity achieved from increased efficiency or additions of new capacity at an existing hydroelectric project.

conservation, efficiency, and management by reducing building energy intensity by 2.5 percent annually through the end of FY 2025, relative to the baseline of the agency's building energy use in FY 2015.

Agencies must also ensure that the percentage of the total amount of building renewable electric energy that it consume is no less than 10 percent of the total in FYs 2016 and 2017, increasing to no less than 30 percent by FY 2025. This section introduces the use of renewable energy certificates, which would allow federal facilities to get credit for renewable energy produced elsewhere.

Agencies must also improve water use efficiency and management, including stormwater management, by reducing potable water consumption; installing water meters and collecting and utilizing building and facility water balance data to improve water conservation and management; reducing agency industrial, landscaping, and agricultural water consumption; and installing appropriate green infrastructure features to help with stormwater and wastewater management.

The EO also requires the improvement of agency vehicle fleets, including reduction of emissions compared to FY 2014 levels. This includes goals for zero emission vehicles or plug-in hybrid vehicles in agency fleets. The head of an agency may exempt military tactical vehicle fleets from the provisions of the EO. EO 13693 also has provisions for sustainable acquisition and procurement and the reduction of solid waste. Each agency must appoint a Chief Sustainability Officer who, among other things, must ensure that agency policies, plans, and strategies are implemented to achieve the goals of the order. Each agency must also have an annual integrated Strategic Sustainability Performance Plan.

Energy Independence and Security Act of 2007

EISA builds on the EPAct in creating a comprehensive energy strategy, and establishes requirements for federal agency efficiency and renewable energy use. Section 431 of the act requires federal building energy use to be reduced 30 percent by FY 2015[3] relative to a FY 2005 baseline, in accordance with the following schedule:

Fiscal Year	Percent Reduction
2006	2
2007	4
2008	9
2009	12
2010	15
2011	18
2012	21
2013	24
2014	27
2015	30

Section 432 provides a framework for facility energy and water project management as well as benchmarking, or the process of relating one facility’s performance to an energy baseline and/or to other comparable facilities for informing ways to improve performance. Federal agencies are required to designate facilities, including central utility plants and distribution systems and other energy intensive operations that constitute at least 75 percent of facility energy use at each agency (US Department of Energy, 2010a). A facility energy manager also needs to be identified and assigned to ensure that the designated facilities comply with the energy and water goals of Section 432. Comprehensive energy and water evaluations would need to be conducted for each facility every four years that identify efficiency

[3] EO 13693 establishes energy goals beyond 2015.

measures and assess savings. Annual reporting of energy and water consumption is to be uploaded into a web-based benchmarking system called the ENERGY STAR Portfolio Manager.

Section 433 requires fossil energy use in new federal buildings and major renovations to be reduced from 2003 levels by the following percentages:

Fiscal Year	Percent Reduction
2010	55
2015	65
2020	80
2025	90
2030	100

Section 523 of the EISA amends Section 305(a)(3)(A) of the Energy Conservation and Production Act, PL 94-385 (42 US Code § 6801), enacted August 14, 1976. The amendment requires that not less than 30 percent of the hot water demand for each new federal building or federal building undergoing a major renovation be met through the installation and use of solar hot water heaters, if lifecycle cost effective.

Further, Section 438 of the EISA establishes into law new stormwater design requirements for federal construction projects that disturb a footprint greater than 5,000 square feet of land. Under these requirements, predevelopment site hydrology must be maintained or restored to the maximum extent technically feasible with respect to temperature, rate, volume, and duration of flow. The stormwater design requirements established by Section 438 of the EISA are discussed in Section 3.8.

Executive Order 13508

Section 502 of EO 13508 directs the USEPA to publish "guidance for Federal land management in the Chesapeake Bay watershed describing proven, cost-effective tools and practices that reduce water pollution…." On May 17, 2010 (FR 75[94]:27552-27553), the agency issued final guidance to describe tools and practices that are appropriate to reduce water pollution from a variety of nonpoint sources, and restore and protect the Chesapeake Bay (USEPA, 2010). The guidance addresses nonpoint source pollution relevant to the bay, including that originating from agriculture, urban and suburban development, alteration of the hydrologic characteristics of waterbodies, decentralized wastewater treatment, forestry, and riparian streamside areas. Section 501 of the EO directs federal agencies with ten or more acres within the Chesapeake Bay watershed to implement the Section 502 guidance. The stormwater design requirements established by Section 438 of the EISA are discussed in Section 3.8.

3.12.1.2 Agency Guidance

This section of the EIS considers the recommendations provided by the following guidance:

- American National Standards Institute / Management System for Energy 2000:2005
- Army Energy and Water Campaign Plan for Installations
- American National Standards Institute/ASHRAE Standard/Illuminating Engineering Society 90.1-2010
- Comprehensive Energy & Water Management Plan – Fort Belvoir

American National Standards Institute / Management System for Energy 2000:2005

The American National Standards Institute / Management System for Energy 2000 addresses energy supply, demand, reliability, storage, and disposal, including alternative energy sources and technology. The standard defines an organizational management system for utility resources, comprising both primary and secondary

energy resources, such as electricity, fuels, water, steam, compressed air, and chilled water. The 2005 revised management system, American National Standards Institute / Management System for Energy 2000:2005, replaced the initial version.

Army Energy and Water Campaign Plan for Installations

The Army Energy and Water Campaign Plan for Installations (US Army, 2007c) specifically addresses energy efficiency and water use at Army installations, with the goal of assisting the Army in providing safe, secure, reliable, environmentally-compliant, and cost-effective energy and water services on installations. The plan sets the general direction for the Army with the following five major initiates:

- Eliminate energy waste in existing facilities
- Increase energy efficiency in new construction and renovations
- Reduce dependence on fossil fuels
- Conserve water resources
- Improve energy security

American National Standards Institute/American Society of Heating, Refrigerating and Air-Conditioning Engineers/Illuminating Engineering Society Standard 90.1-2010

The ASHRAE standard provides the minimum requirements for the energy-efficient design of most buildings. The standard offers, in detail, the minimum energy-efficient requirements for the design and construction of new buildings and their systems, new portions of buildings and their systems, and new systems and equipment in existing buildings as well as the criteria for determining compliance with these requirements.

ASHRAE Standard 90.1-2010 is designated as the referenced baseline federal energy efficiency performance standard for new federal commercial and high-rise multi-family residential building (10 CFR part 433). This newly updated and designated standard also helps achieve the energy intensity reductions mandated under section 431 of EISA 2007 by saving approximately 18.2 percent more source energy, or the total amount of raw fuel required to operate a building including transmission and delivery, than the previous baseline standard (Standard 90.1-2007 as cited in 78, FR, 40945).

3.12.1.3 Army Policies

The Sustainable Design and Development Policy Update on Environmental and Energy Performance (US Army, 2010h) provides guidance for how aspects of the EPAct05, EISA07, EO 13423, and EO 13514[4] apply to Army facility construction. This policy requires planning and engineering studies to incorporate sustainable design and development principles to minimize water consumption and optimize energy efficiency. Also, the Army would incorporate the high performance building requirements of EO 13514 into any facility design. Starting with the FY 2013 military construction program, new buildings and structures, and major renovations shall be built to achieve a minimum silver level through the Leadership in Energy and Environmental Design (LEED) green building rating system, one performance level above LEED certified and two levels below LEED platinum.

[4] The policy will be updated to reflect that fact that EO 13693 has replaced EO 13423 and EO 13514.

Leadership in Energy and Environmental Design (LEED)

LEED is a program that provides third-party verification that a building or community was designed and built using strategies aimed at achieving high performance in key categories of human and environmental health such as sustainable site development, water savings, energy efficiency, materials selection, and indoor environmental quality. Achievement of LEED certification requires building projects to meet prerequisites and earn credits. Credits are allocated based on the environmental impacts and human benefits addressed by drawing from a prescribed menu of tools and strategies. LEED's rating system is continuing to evolve as standards are updated, new technologies emerge, and markets transform (USGBC 2013, LEED 2009 for New Construction and Major Renovations). In order to reduce the total ownership cost of facilities, life-cycle cost analysis shall be performed during design on major building systems, structural, mechanical, electrical and energy efficiency measures (US Army, 2007b).

Measurement and verification of energy savings are critical to ensuring successful implementation of energy efficient systems. The Army Sustainable Design and Development Policy Update on Environmental and Energy Performance (US Army, 2010h) states that all US Army Corps of Engineers-managed military construction projects (MILCON) must install advanced utility monitors that collect energy consumption data. Energy monitors allow the Army to more effectively monitor, manage and maintain energy systems and compare performance across installations (US Army, 2010h). Additionally, the policy calls for facility construction projects to pursue enhanced commissioning, which is a comprehensive assessment of building systems that verifies efficient operation of building systems by surveying user satisfaction and resolving operational challenges after the building is occupied.

The Army 2010 Sustainability policy specifically calls for investigating and documenting the feasibility of including renewable energy as part of each project; on-site renewable energy sources are to be implemented with the FY 2015 new construction program. Design strategies using cool roofs, solar hot water heating, waste heat harvesting, and integrated co-generation systems are encouraged.

3.12.1.4 Comprehensive Energy & Water Management Plan – Fort Belvoir

The Comprehensive Energy & Water Management Plan (CEWMP) for Fort Belvoir (US Army, 2011e) was formulated to clarify the various provisions associated with the federal mandates for energy and water conservation and to address the recommendations provided by the American National Standards Institute / Management System for Energy 2000:2005 standard and the Army Energy and Water Campaign Plan for Installations. The Fort Belvoir plan establishes a long-range energy and water vision for the installation as well as the shorter-term actions needed to meet or exceed the current federal mandates for energy and water use.

3.12.2 Affected Environment

The CEWMP assesses Fort Belvoir's current energy and water use progress towards compliance with the various federal mandate requirements. This system helps illustrate energy and water trends, derived from the Army Energy and Water Reporting System data through FY 2010. It also defines necessary and potential plans to meet those goals, including the optimization of existing energy and water systems, and future development. The information presented in the following sections is drawn predominantly from the findings of the CEWMP, as well as Army Energy and Water Reporting System data for FYs 2003 through 2012. However, whereas the EIS and this section consider both the Main Post and the FBNA, the CEWMP study focused on the Main Post only.

3.12.2.1 Building Energy Use

Table 3.12-1 outlines the energy requirements of the federal mandates that are pertinent to evaluating Fort Belvoir's current energy use and trends, and the post's progress towards compliance with the requirements.

Table 3.12-1
Energy Requirements

Federal Mandate	Requirement	Baseline Fiscal Year	Target	
			Fiscal Year	Target
EPAct	Renewable supply of electricity not less than 5% of total consumption in FY 2010-2012, and not less than 7.5% in FY 2013 and beyond.	NA	2012	5% of total electricity consumed
			2013	7.5% of total electricity consumed
EO 13423	50% of renewable electrical energy (EPAct target) from sources established after January 1, 1999.	NA	2012	2.5% of total electricity consumed
			2013	3.75% of total electricity consumed
EO 13423 and EISA	Reduction of energy-consumption intensity by 3% annually or 30% by FY 2015.	2003	2012	21% reduction
			2015	30% reduction

Note: NA indicates not applicable. Some of these goals were replaced by the goals in EO 13693 but are shown here to match the progress shown in Table 3.12-2.
Source: US Army, 2011e; US Government Printing Office, 2005, 2007; US Executive Office of the President, 2007.

Table 3.12-2 charts Fort Belvoir's progress through FY 2012 towards meeting the energy requirements, and estimates the magnitude of additional progress required to meet upcoming targets. It should be noted that the available data reflects Main Post facilities only as comparable data are not available for the new, post-BRAC facilities at FBNA completed late in 2011 –NGA's buildings and the fire station. The energy use associated with privatized family housing, external contractors, and other private vendors are not reportable in the Army Energy and Water Reporting System and are not addressed by the table.

Table 3.12-2
Energy Requirement Progress

Requirement	Baseline	Fiscal Year 2012 Consumption	Target		Change Required to Meet Target
			Fiscal Year	Target	
EPAct – Renewable supply of electricity not less than 5% of total consumption in FY 2010-2012, and not less than 7.5% in FY 2013 and beyond.	NA	~0% of total electricity consumed	2012	5% of total electricity consumed	+5%
			2013	7.5% of total electricity consumed	+7.5%
EO 13423 – 50% of renewable electrical energy (EPAct target) from sources established after January 1, 1999.	NA	~0% of total electricity consumed	2012	2.5% of total electricity consumed	+2.5%
			2013	3.75% of total electricity consumed	+3.75%
EO-13423 and EISA – Reduction of energy – consumption intensity by 3% annually or 30% by FY 2015.	FY 2003 115.3 MBtu/kSF	102.8	2012	21% reduction to 91.1 MBtu/kSF	-10.5%
			2015	30% reduction to 80.7 MBtu/kSF	-21.5%

Notes:
NA indicates not applicable.
MBtu/kSF indicates million British thermal units per thousand square feet.
Source: US Army, 2011e; US Government Printing Office, 2005, 2007; US Executive Office of the President, 2007; Cermenaro, pers. comm., June 3, 2013; Russell, pers. comm., June 10, 2013.

FY 2012 was selected as the baseline year because the FY 2011 data do not appear to be reliable, perhaps because of the surge of construction that occurred in FY 2011 to complete the BRAC 2005-mandated facilities. There also may have been a lag in entering data into the Army Energy and Water Reporting System from 2010 to 2011, which caused a mismatch in the data between building square footage and energy consumption. FY 2012 energy consumption data appears to be more consistent with the energy tracking trends during the 2003 to 2012 period.

To meet the renewable energy requirement of EPAct Fort Belvoir needed to produce or procure 5 percent of its electrical energy from renewable sources by FY 2010. However, the amount of energy produced from renewable sources was negligible in 2012. Nevertheless, some renewable technologies that can offset electrical energy use are being implemented – notably, the geothermal application of ground-source heat pumps – although EPAct does not allow this technology to be credited towards achieving EPAct goals because it does not generate electricity.

Fort Belvoir has faced geographic and economic challenges with respect to implementing renewable energy projects. Development of renewable technology such as geothermal energy for direct use or electricity generation is largely dependent on subsurface geological conditions of hot water and steam reservoirs, which are not feasibly accessible beneath Fort Belvoir. Fort Belvoir's region does not have continuously high wind speeds required for significant wind power potential. Solar photovoltaic technology for converting sunlight into electricity has been too costly to pursue without access to the federal and state tax incentives available for the commercial and residential sector.

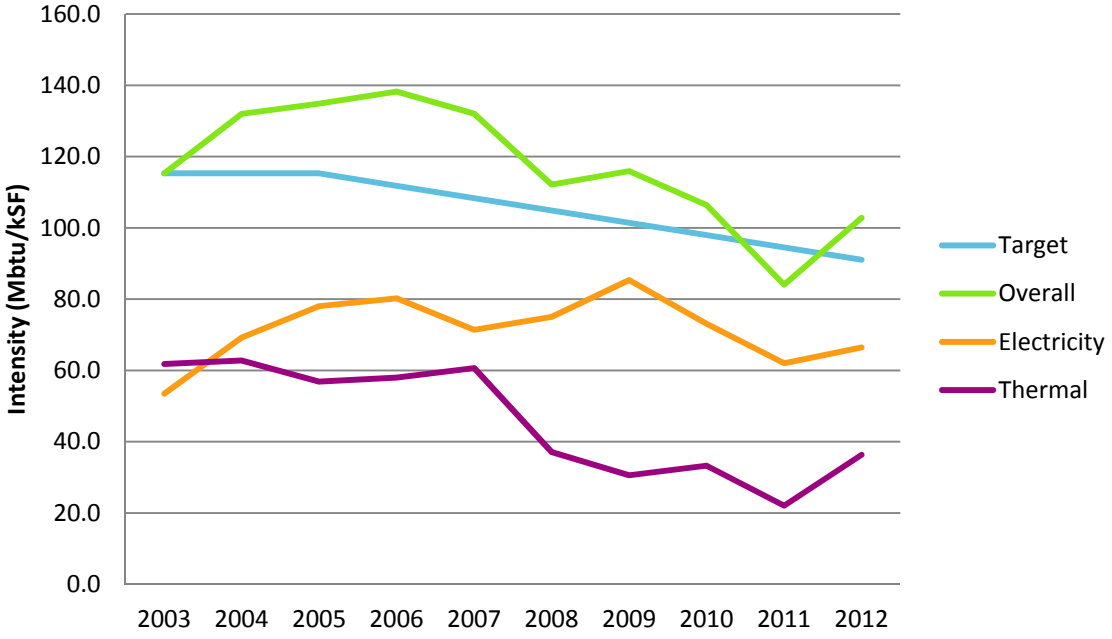
Since FY 2003 Fort Belvoir has reduced the annual energy consumption intensity of DoD-owned facilities (including auxiliary uses not assigned to individual buildings, such as street lighting) by 10.8 percent, from 115.3 million British thermal units per thousand square feet (MBtu/kSF) in FY 2003 to 102.8 MBtu/kSF in 2012. This reduction did not meet the EO 13423 requirement for a 21 percent reduction by FY 2012. The realized 10.8 percent decrease was due largely to reducing the thermal portion of the energy consumed (Figure 3.12-1). While thermal energy consumption intensity decreased by 41.2 percent between FYs 2003 and 2012, electricity consumption intensity increased by 24.2 percent during the same period.

The CEWMP attributes the decrease in thermal energy consumption intensity to the removal of buildings from the aging steam system and the installation of new, dedicated heating, ventilation, and air conditioning systems at these buildings as they are renovated. The increase in electricity consumption intensity is due to the recent construction and operation of increasingly energy-intensive buildings, such as those supporting research, development, and intelligence missions.

A review of Main Post energy use between 2003 and 2012 reveals that the average energy use intensity (electricity and thermal combined) was approximately 117 MBtu/kSF, while a typical government office building in the US consumes approximately 109.6 MBtu/kSF (US Department of Energy, September 2010).

Main Post's higher-than-average energy consumption intensity compared to the national average could be reflective of energy-intensive data processing and storage uses. Measures of power usage effectiveness, which have not been collected by the installation to date, are needed in order to understand how the installation's growing data processing needs and associated cooling have affected energy use intensity over recent years in comparison to the national US Department of Energy benchmark standard.

Figure 3.12-1
Energy Consumption Intensity



A review of how climate might affect data center energy use intensity by the Department of Energy and USEPA found no statistically significant relationship between heating and cooling degree days and power usage effectiveness. It was determined that the energy required for cooling a data center is dominated by the high internal loads generated by information technology equipment, and that climate makes a relatively low contribution to the building cooling load (USEPA, 2013d).

Computer servers have become increasingly more energy efficient in recent years. While computer and data processing facilities have expanded at Main Post, it is likely that the use of increasingly efficient server technology has kept energy consumption intensity from increasing too rapidly. An additional contributing factor to the Main Post's higher-than-average energy consumption intensity is that the square footage of every facility has not been registered into the energy tracking system, while energy consumption has been registered and reported. The incomplete data set may skew results, so that energy use intensity appears higher than the actual energy consumption per square foot. A growth of data center and cyber security operations from 2004 through 2007 without a sizable increase in building square footage likely contributed to the reported increase in energy consumption intensity.

The change in energy consumption intensity from 2008 to 2010 may also be due to newly constructed building square footage being logged in the CEWMP before full operations were underway. Despite the uncertainties of relating energy use and building square footage, the overall trends are assumed to be valid. CEWMP predicts that electricity consumption intensity would increase further after 2010, resulting from full implementation of the increased population and usage intensity associated with the 2005 BRAC realignment, the addition of the new (FBCH, and other factors. Based on Army Energy and Water Reporting System data (Cermenaro, pers. comm., June 3, 2012), both electricity consumption intensity and thermal consumption intensity decreased in 2011 and then rebounded in 2012, as shown in Figure 3.12-1. The increase in thermal consumption intensity from 2011 to 2012 is likely due to newly constructed Fort Belvoir facilities becoming operational and being integrated with Fort Belvoir's energy tracking system.

3.12.2.2 Materials and Resources

Building construction consumes large quantities of building materials for exterior structure and interior fit-out, while building operation generates waste and requires resources for waste transport and disposal. Extending the life cycle of existing buildings can conserve resources, reduce waste and reduce adverse environmental effects related to materials manufacturing, transport and disposal.

The installation includes approximately 2,300 buildings, with the majority constructed between 1940 and 2011. Many of those built prior to 1988, when the mission expanded from supporting the Army Engineer's School to supporting the global range of DoD operations, have been re-purposed and renovated, extending their life cycle. Meanwhile, most newer buildings constructed since the 1993 master plan and 2005 BRAC realignment are still operating in line with their purpose-built uses.

EO 13514 and the *Department of Defense Strategic Sustainability Performance Plan* have established waste diversion (from landfills) goals for solid waste and construction and demolition debris. While the Army's FY11 municipal solid waste diversion rate decreased to 36 percent, falling below the DoD interim goal of 42 percent, Army installations achieved a 71 percent construction and demolition debris diversion rate, exceeding the DoD 60 percent goal for FY15.

Fort Belvoir Policy Memorandum #30 calls for all installation activities to participate in the post's qualified recycling program that is committed to achieving a 40 percent diversion rate of non-hazardous solid waste and a 50 percent diversion rate of construction and demolition debris (US Army, 2012l). Fort Belvoir has demonstrated leadership in construction waste diversion: the FBCH construction process successfully recycled 92 percent of the construction waste materials, (DoD, 2012).

3.12.2.3 Water Consumption

Table 3.12-3 outlines the water requirements of the federal mandates that are pertinent to evaluating Fort Belvoir's current water use and trends, and the post's progress towards compliance with the requirements. Table 3.12-4 charts Fort Belvoir's progress through baseline FY 2011 toward meeting the water requirements and estimates the additional progress required to meet upcoming targets. The major FBNA facility, the NGA, came online late in 2011 (FY 2012), so the information analyzed in this section is for Main Post only. Also, privatized family housing, external contractors, and other private vendors are not reportable in the Army Energy and Water Reporting System and are not included in the table.

Table 3.12-3
Water Requirements

Federal Mandate	Requirement	Baseline Fiscal Year	Target	
			Fiscal Year	Target
EO 13423	Reduce overall water use intensity 2% annually through FY 2015.	2007	2012	10% reduction
			2015	16% reduction
EO 13514	Reduce potable water consumption intensity 2% annually through FY 2020.	2007	2012	10% reduction
			2020	26% reduction
EO 13514	Reduce industrial, landscaping, and agricultural water use 2% annually through FY 2020.	2010	2012	4% reduction
			2020	20% reduction
EO 13514	Identify and promote water reuse strategies.	NA	NA	NA

Note: NA indicates not applicable. Some of the goals above were replaced by the goals in EO 13693 but are shown here to compare to the progress indicated in Table 3.12-4.

Source: US Army, 2011e; Executive Office of the President, 2007, 2009

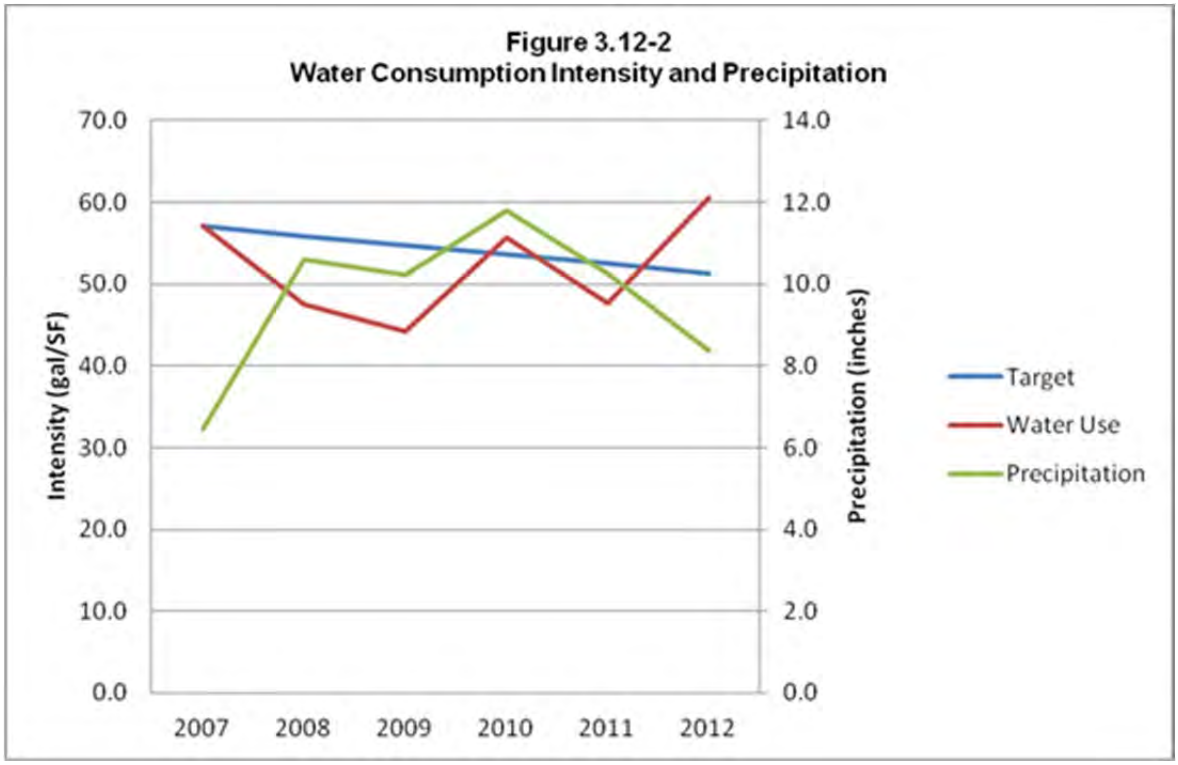
Table 3.12-4
Water Requirement Progress

Requirement	Baseline	Fiscal Year 2011	Target		Change Required to Meet Target
			Fiscal Year	Target	
EO 13423 – Reduce overall water use intensity 2% annually through FY 2015.	FY 2007 57.0 gal/SF	47.6 gal/SF	2012	10% reduction to 51.3 gal/SF	-15.2%
			2015	16% reduction to 47.9 gal/SF	-20.8%
EO 13514 – Reduce potable water consumption intensity 2% annually through FY 2020.	FY 2007 57.0 gal/SF	47.6 gal/SF	2012	10% reduction to 51.3 gal/SF	-15.2%
			2020	26% reduction to 42.2 gal/SF	-30.3%
EO 13514 – Reduce industrial, landscaping, and agricultural water use 2% annually through FY 2020.	FY 2010 41.0 Mgal	23.5 Mgal	2012	4% reduction to 39.3 Mgal	Target surpassed
			2020	20% reduction to 32.8 Mgal	Target surpassed
EO 13514 – Identify and promote water reuse strategies.	NA	NA	NA	NA	NA

Notes:
Change required to meet target is based off of FY 2012 CEWMP reported data of 60.5 gal/SF
NA indicates not applicable.
gal/SF indicates gallons per square foot.
Mgal indicates million gallons.
Source: US Army, 2011e; Executive Office of the President, 2007, 2009; Russell, pers. comm., May 30, 2013; Cermenaro, pers. comm., June 3, 2013.

Water consumption requires a sizable electricity demand with USEPA estimating that approximately 30 to 40 percent of energy demand at a municipality scale is used for treating, pumping and delivering potable water as well as pumping and treating wastewater (USEPA, 2013d). If total commercial building water consumption for all uses in the US fell by just 10 percent, this could save more than 2 trillion gallons of water each year (as cited in US Green Building Council, 2013). Additionally, Fort Belvoir's location within the watershed of the Chesapeake Bay means that a portion of the water consumed becomes treated wastewater released into the Bay's watershed, contributing to a broader set of coastal and marine environmental impacts.

In FY 2007 through FY 2010, the domestic water use intensity of DoD-owned facilities on Fort Belvoir fluctuated with the removal and addition of buildings, decreasing steadily between FY 2007 and FY 2009, but then suddenly increasing in FY 2010 (Figure 3.12-2). Water use intensity decreased again in 2011, only to surpass the FY 2007 baseline level in FY 2012.



Given the limited data availability, this analysis provides a best attempt to identify factors that may have contributed to the spike in 2012 water consumption intensity. Nationally, water use per square foot varies greatly by building type. Buildings where people live such as houses, apartments, residence halls, hotels and hospitals are the highest average water users (approximately 35-50 gallons per square foot of building space annually) while offices and schools typically average less than half that amount (10-15 gallons per square foot of building space annually) (USEPA, 2012). Fort Belvoir's average building water consumption intensity for FY 2012 appears to exceed typical building water consumption intensity. This higher-than-average water consumption may be due in part to the retrofit and re-use of older buildings throughout the installation.

A review of water usage from June through August reveals that low rainfall may partially explain the spike in water consumption intensity in FY 2012. For both 2007 and 2012, high water consumption intensity appears to correspond with low precipitation. Conversely, for 2008 and 2009, lower intensity corresponds with higher precipitation (National Climatic Data Center, 2013a). A review of corresponding high temperature data across this time period does not demonstrate any strong relationship with water consumption intensity.

The FBCH and NGA facilities become operational in FY 2012, with significant amounts of water required for initial flushing and testing of the new water distribution network. Also, modification to the water tank at the Aerospace Data Facility-East in 2011 and 2012 required considerable amounts of potable water for flushing and re-charging. An additional factor may be failed meters in 2011, which, according to a Department of Energy water study of its largest water users, accounted for uncharacteristically low annual water readings (US Department of Energy, 2010b). Overall, annual water use intensity increased by 6.1 percent between FYs 2007 and 2012, falling short of the 10 percent reduction target set by both EO 13423 and EO 13514.

Supplemental irrigation for landscaping generally is not practiced at Fort Belvoir, with the exception of irrigation of the golf course. Additionally, two 80,000-gallon cistern systems have been installed at the

FBCH to capture rainwater and air-conditioning condensate, to use to irrigate plantings in the Healing Garden. Also, the NGA maintains a stormwater treatment facility that collects rainwater and reuses the water for on-site irrigation (US Army, 2014a).

The primary supply for golf course irrigation is well water, with potable water used to augment the well water supply during peak demand portions of the year. In 2010, Fort Belvoir used approximately 10.9 million gallons of well water for golf course irrigation (Russell, pers. comm., May 30, 2013). In that year, the installation also used about 30.1 million gallons of potable water to irrigate the golf course (Honaker, pers. comm., July 8, 2013). Two years later, in 2012, Fort Belvoir used approximately 13.8 million gallons of well water and 14.5 million gallons of potable water for golf course irrigation. Based on data for Franconia, Virginia, precipitation during April through September, when the golf course typically is irrigated, was similar for the two years, with 17.8 inches of precipitation during the six-month period in 2010 and 16.0 inches in 2012 (National Climatic Data Center, 2013b). The 31.0 percent decrease in landscaping water use between FYs 2010 and 2012 surpassed the 4 percent reduction target set by EO 13514, as well as the 20 percent reduction target for 2020.

According to the CEWMP, the reuse of water has not been pursued as a means to reduce the demand on the domestic water system. The CEWMP identifies the potential use of steam condensate as a supply for make-up water for steam generation as a major opportunity for water reuse. However, as noted in EIS Section 3.10.1.5, Fort Belvoir is gradually phasing out the steam system. The use of reclaimed water that may be available from the Fairfax County Noman Cole Water Treatment Plant could be used on-post, particularly by the DLA, Intelligence and Security Command (INSCOM), and the golf course. Although conversations have occurred between Fairfax County and Fort Belvoir to explore the use of reclaimed water, obstacles remain, notably, funding needed for infrastructure investments to distribute re-claimed water distribution between the wastewater treatment plant and Fort Belvoir.

3.12.2.4 Land Use and Transportation

Sustainable planning principles such as conservation of sensitive areas like wetlands and floodplains, re-use of existing development footprints, conservation of open spaces, clustered development, minimizing impervious surfaces, and locating development near mass transit have guided planning on Fort Belvoir for many years. The presence of refuges – the Fort Belvoir Forest and Wildlife Corridor (FWC), the Accotink Bay Wildlife Refuge, the T-17 Refuge, and the Jackson Miles Abbott Wetland Refuge – and the protection of steep slopes and drainages have also enabled the installation to support the Chesapeake Bay TMDL program, a multi-state “pollution diet” that sets limits on the amount of nitrogen, phosphorus and sediment that can enter the bay and its tidal rivers to meet water quality goals (USEPA, 2013h). Also, implementing the Army’s parking allowance policy of 0.6 spaces per employee for new construction is helping to reduce the amount of impervious surface coverage as building footprints are redeveloped.

Fort Belvoir, located in a rapidly growing suburban area with a heavily congested regional transportation system, is one of the largest employers and largest traffic generators in Fairfax County. Reducing the workforce’s single occupancy vehicle trips can conserve energy resources, reduce emissions of greenhouse gas emissions, conserve open spaces for promoting groundwater infiltration, and promote compliance with aspects of EO13514 and the Army’s 60 percent parking allowance for administrative uses (0.6 space/ employee). Following implementation of BRAC 2005, Fort Belvoir formed a transportation demand management (TDM) working group and designated a full-time TDM coordinator to initiate programs that reduce single occupancy vehicle trips to the installation for improving transportation efficiency, accommodating security requirements and supporting future capacity. Ongoing TDM initiatives include updating parking policies, engaging tenants in TDM programs, and improving regional transit service (US Army, 2014b). See Transportation & Traffic Section 3.4 for discussion of affected environment and anticipated environmental consequences regarding single-occupancy vehicle trips and overall vehicle miles of travel.

3.12.3 Environmental Consequences of the No Action Alternative

Implementation of the No Action Alternative would maintain the September 2011 post-BRAC workforce of approximately 39,000 people working and living in approximately 12 million square feet of building space. This would cause no immediate adverse effects to Fort Belvoir's sustainability commitments. Some of the post's buildings date from the 1930s and 1940s, and are nearing the end of their useful life, with approximately 2 million square feet of building rated as inadequate or poor (US Army, 2014b). Although BRAC 2005-related projects have constructed or upgraded infrastructure in several areas of the installation, the lack of renovation and new building construction under the No Action Alternative would forego the opportunity to re-purpose and upgrade older buildings in order to meet present and future mission needs. Under the No Action Alternative, the increased costs of energy for building and transportation needs, an aged building stock, and the need to sustain a world-class installation would constrain the post's ability to fully support its overall mission.

Under the No Action Alternative, sustainable planning elements that have become a central component of Army design and construction policy since the 1993 RPMP was approved, would not be applied to Fort Belvoir because there would be no further growth. Examples of sustainable planning elements include energy efficient and cost effective build-out through compact development, infilling already-developed sites, clustering new development around transportation hubs, connecting transportation networks, and building energy and water efficient structures. EIS Section 1.1.2 briefly describes current Army master planning requirements.

According to the *Department of Defense Strategic Sustainability Performance Plan, FY 2012* (DoD, 2012), climate change is expected to play a significant role in DoD's ability to fulfill its mission in the future as climate-related effects are already being observed at DoD installations throughout the US and overseas. The physical changes are projected to include rising temperature and sea level, and increases in both heavy downpours and the extent of drought, which could cause increases in erosion and flooding in coastal and low lying areas. These changes could cause effects to Fort Belvoir including degrading infrastructure and increased maintenance costs for roads, utilities, and runways; degradation or loss of cold weather training venues; increased energy costs for building and industrial base operations; and increased operational health surveillance and risks (DoD, 2012). Military installations are likely to experience increased demand for electricity, both the result of increased annual average temperatures and to population growth straining both generation and transmission capacities (DoD, 2010). Equipment failure may become more frequent due to these increased demands and peak temperatures – the latter affecting the performance of generating and distribution systems.

3.12.3.1 Building Energy

In the United States, buildings are significant energy users accounting for 36 percent of total energy use and 65 percent of electricity consumed (USEPA, 2013i). Under the No Action Alternative, DoD's increasing use of computers and data centers would contribute to increases in energy consumption. Even with no construction of new buildings, data centers can require three times or more the amount of energy consumption per square foot than a typical office space, based on a comparison of available data on energy consumption by government data centers (Lawrence Berkeley National Laboratory, 2004) and energy consumption by government office buildings (US Department of Energy, 2010). Under the No Action Alternative, DoD's plans to consolidate data center and server facilities throughout its global operations would require any growing computing operations at Fort Belvoir to be integrated into existing structures. While adaptive reuse of existing structures can extend building lifecycle and aligns with the Army Sustainable Design and Development Policy (US Army, 2010h), existing facilities may lack the security, space, layout, and locations needed for optimizing mission effectiveness, minimizing total costs, and maximizing information technology effectiveness (DoD, 2011).

Implementation of the No Action Alternative would have less than significant adverse impacts on building energy use on Fort Belvoir.

3.12.3.2 Materials and Resources

Under the No Action Alternative, there would be no major building construction. The consumption of materials and resources and the generation of debris would remain at or near current levels. Implementation of the No Action Alternative would have no impact on the use of materials and resources on Fort Belvoir.

3.12.3.3 Water Consumption

Under the No Action Alternative, no substantial additional water consumption is anticipated. However, the post would forego the opportunity to reduce water consumption through renovated and retrofitted structures as part of a new construction program. Implementation of the No Action Alternative would have no impact on water consumption on Fort Belvoir.

3.12.3.4 Land Use and Transportation

The absence of an updated plan for guiding growth of community facility services under the No Action Alternative would leave professional areas as they are now; underserved by community and residential facilities, and contributing to inefficient transportation patterns and less-than-ideal quality of workplace life.

More than half of the post contains parking areas with a higher ratio of parking spaces to employees than recommended under current Army guidance (US Army, 2014c). This overabundance of parking encourages single occupancy vehicle trips, contributing to regional congestion and potential air quality impacts. The oversupply of land allocated to parking also can contribute excessive amounts of stormwater runoff into post waterways. Additionally, because most of the older developed areas of the post have not provided stormwater management, uncontrolled runoff has resulted in substantial erosion problems in several areas (US Army, 2014b). Under the No Action Alternative, these issues would not be corrected.

Fort Belvoir is located in a rapidly-growing suburban area, with a heavily congested regional transportation system and a number of interstate highways and local roadways operating above design capacity (US Army, 2014c). On a daily basis, a number of roads within the vicinity of the post are congested. Lacking a plan for improvement under the No Action Alternative, single-occupancy vehicle trips to and from the post to locations off post would continue to contribute to traffic congestion until the multi-modal system is enhanced to include significant connections to transit, enhanced accessibility from work to bus/shuttle services, and enhanced flexibility of work schedules.

Although land use and transportation infrastructure would not improve under the No Action Alternative, no additional growth would occur at Fort Belvoir. From the perspective of sustainability, implementation of the No Action Alternative would have no impact on land use and transportation.

3.12.4 Environmental Consequences of Alternative 1 – Full Implementation –The Preferred Alternative

Alternative 1 would address key elements of the Army Energy Strategy 2005 (US Army, 2005a) including:

- Increasing energy efficiency in renovation and new construction
- Reducing dependence on fossil fuels
- Conserving water resources
- Improving energy security
- Eliminating energy waste in existing facilities

This alternative would include implementation of an integrated design process that addresses sustainable design principles and Army sustainable design standards. Implementing these principles and standards would result in consolidating new development within existing development footprints to the maximum extent possible, reusing and retrofitting existing buildings, establishing community facilities that are accessible and adjacent to professional uses and residential areas, and constructing new buildings that meet high-performance energy and water efficiency standards.

3.12.4.1 Short-Term Projects

Building Energy

Since buildings consume the largest portion of energy consumed at Fort Belvoir, the implementation of short-term projects would significantly increase the installation's energy consumption with the construction of approximately 3.5 million square feet of building space. However, compliance with federal and Army sustainability policies would promote long-term resource efficiency and energy security characterized by adaptive reuse of existing structures; forty-year life-cycle cost analysis for HVAC, roofing, and on-site electrical generation systems; and integration of energy and water efficient technologies (US Army, 2014a).

While energy efficiency improvements of existing facilities would continue to be implemented for compliance with Army and federal requirements, the opportunity for energy performance improvements can be limited by facility design and cost feasibility. All short-term projects involving new building construction (greater than 1,000 square feet and serving at least one full-time-equivalent employee) and building renovations that provide opportunities for substantial improvement are required to comply with LEED sustainable design standards (US Army, 2010h). In addition to achieving LEED silver certification for new construction, measurement and verification of building performance would be required through Fort Belvoir's Energy Monitoring System (US Army, 2014b).

The majority of short-term projects proposed as part of Alternative 1 would be built to a minimum of LEED silver requirements, yielding energy, water, and material resource savings compared to typical buildings. The FBCH demonstrates the potential benefits of LEED as the new hospital is anticipated to consume 27.6 percent less energy than a typical hospital (Turner Construction Company, 2013). Also, like the FBCH green roof, the green roof and roof top garden proposed for Phase 3 of the INSCOM HQ Expansion (ST 33) could reduce utility costs by adding insulation, reducing solar thermal gain in the summer, while retaining heat and reducing thermal loss in the winter (US Army, 2014a). NMUSA (ST 27, 34, 38, and 41) is anticipated to have a high lighting load, but would operate fewer hours than other more energy-intensive buildings. Also, the geothermal system powering NMUSA would minimize this facility's dependence on grid supply.

Once constructed, the short-term projects would include a mix of low- and average-energy intensity buildings, which are anticipated to meet or exceed current ASHRAE and federal energy efficiency standards. However, several of the buildings, such as those constructed for the NICoE (ST 3) and the INSCOM HQ Expansion (ST 26, 33, and 46), would be high energy intensity buildings. NICoE has extensive computer-driven medical equipment; INSCOM has heavy data processing and storage needs. Based on a comparison of available data on energy consumption by government data centers (Lawrence Berkeley National Laboratory, 2004) and energy consumption by government office buildings (US Department of Energy, 2010), the average whole-building energy consumption intensity for buildings that contain data centers is approximately 3.3 times the average energy consumption intensity for office buildings that do not contain data centers.

A 2007 report to Congress by the USEPA projected near-term growth through 2011 in energy use of computer servers and data centers (USEPA, 2007; US Department of Energy, 2008), which is a trend that may be continuing beyond the report horizon. Average-energy intensity buildings constructed under Alternative 1 would maintain energy use intensity for Main Post at current levels or may lower overall

intensity, providing energy efficiency technologies outstrip increases in energy use by computer server operations in those buildings. However, as shown by Table 3.12-5, high-energy intensity buildings, such as those that would be constructed under the INSCOM HQ Expansion (ST 26, 33, and 46), are projected to raise the energy use intensity for Main Post from 103 Mbtu/kSF to 114 Mbtu/kSF. This increase would constrain the post's ability to meet federal energy efficiency standards.

Table 3.12-5
2017 Projected Energy Consumption Intensity

	2012	2017 Projected		
		Alternative 1	Alternative 2	Alternative 3
Main Post				
Average-Intensity Buildings	NA	103	103	103
High-Intensity Buildings	NA	339	339	339
Total – All Buildings	103	114	115	107
FBNA				
Average-Intensity Buildings	NA	103	103	NA
High-Intensity Buildings	NA	NA	NA	NA
Total – All Buildings	NA	103	103	103
Fort Belvoir Total (Main Post + FBNA)				
Average-Intensity Buildings	NA	103	103	103
High-Intensity Buildings	NA	339	339	339
Total – All Buildings	NA	112	113	106

Notes:
1. Ratio of data center energy consumption intensity to typical office energy consumption intensity estimated to be 3.3, based on analysis of available data on energy consumption by government data centers (Lawrence Berkeley National Laboratory, 2004) and by government office buildings (US Department of Energy, 2010).
2. Main Post annual building areas for 2003 through 2012 based on Cermenaro, pers. comm., June 3, 2013.
3. FBNA building areas for 2011 and 2012 include 2,770,000 square feet for the NGA campus (based on Russell, pers. comm., August 7, 2013), 10,640 square feet for the existing child development center (based on the size of the proposed child development centers under ST 11 adn12), and 10,297 square feet for the existing fire station (based on the size of the proposed fire station under ST 20).
4. Based on estimate that 2012 was the first full year during which the NGA and the fire station on FBNA were operating.
5. Building energy use intensity estimates based on ENERGY STAR Portfolio Manager Energy Use Data Trends, October 2012.
6. Energy consumption data are not available for FBNA for FY 2012 year.

In addition to buildings' meeting LEED silver standards, buildings are likely to improve energy efficiency over prior years due to compliance with EPAct requirements to specify and purchase energy-consuming equipment that are ENERGY STAR qualified or meet Federal Energy Management Program designated efficiency requirements, and compliance with the energy efficiency requirements of EO 13693. Implementing best practice data center design efficiency standards regarding air delivery and cooling, water and power systems, interior layout, and maintenance practices would optimize energy use intensity (Lawrence Berkeley National Lab, 2004).

For those short-term projects meeting prerequisite requirements for LEED silver certification, buildings would need to demonstrate a minimum of 10 percent better energy performance than a comparable ASHRAE Standard 90.1-2007 baseline building. Projects that achieve increased levels of energy

performance beyond the 10 percent prerequisite standard can secure additional points that contribute to LEED silver level certification.

Implementation of Alternative 1 short-term projects would individually and cumulatively have less than significant adverse impacts on building energy use on Fort Belvoir.

Materials and Resources

The RPMP introduces adaptive reuse guidelines that call for evaluating existing facility vacancies for reuse or demolishing the structure and rebuilding on the same location with more sustainable materials and improved energy efficiency. Implementation of these comprehensive guidelines with the short-term projects would identify adaptive building reuse opportunities that promote more sustainable use of energy and water resources by addressing site planning and landscape elements, architecture, circulation, and utility upgrades.

Per Fort Belvoir guidance, all new construction, renovation, repair and maintenance, and demolition contracts must include requirements to divert waste from landfill disposal (US Army, 2012k). Further, in order to accrue enough credits for LEED silver certification, a portion of the short-term projects that do meet the certification requirements may maintain and reuse material from demolished buildings.

Salvaged materials can be reused on site as fill, roadway material, or interior and exterior building material. This reuse and re-purposing of existing materials retains embodied energy, reduces energy needed for waste transport and disposal, and complies with the goals of the *Department of Defense Strategic Sustainability Performance Plan* for achieving compliance with EO 13423, requiring that 50 percent of non-hazardous construction and demolition materials and debris be diverted from the solid waste stream. Additionally, the Army's new construction building standard of LEED silver certification all but necessitates significant reuse of existing building materials and recycling of at least 50 percent of construction waste in order to achieve the credits necessary for a silver level LEED rating.

Once operating, buildings and tenants that engage in the required waste reduction and reuse programs would minimize impacts and optimize material reuse opportunities both within the existing facility and throughout the post.

Implementation of Alternative 1 short-term projects would individually and cumulatively have a beneficial impact on the use of materials and resources on Fort Belvoir.

Water Consumption

As discussed in Section 3.12.5.3, water consumption intensity is estimated at 47.6 gallons per square foot for FY 2011for Main Post. FY 2011 data are not available for FBNA. The implementation of Alternative 1 would substantially increase the amount of water consumed by the post, although the increased consumption levels are not anticipated to exceed the capacity of the existing county water system to supply the demand (Section 3.10.3.1). Further, the increase in the number of data centers at the post would likely drive up the water consumption intensity as data centers typically require higher levels of water consumption for cooling needs compared to conditioning requirements for typical office spaces.

The projected increases in water consumption and water consumption intensity would be moderated by Fort Belvoir's adherence to federal mandates and Army policies for new construction. The mandates and policies require water efficient designs that conserve water resources and reduce energy consumption associated with treating and delivering water, as well as pumping and treating wastewater prior to release into the Chesapeake Bay watershed. Reducing the quantity of water used can decrease maintenance and life-cycle costs for building operations. Conserving municipally-supplied potable water can reduce chemical inputs for water treatment, as well as reduce energy use and associated greenhouse gas emissions from treatment and distribution. Finally, reduced water consumption can enhance the post's cost-effectiveness in supplying, treating, and distributing water.

In order to meet LEED silver requirements, short-term projects constructed under Alternative 1 would need to meet minimum water efficiency standards for toilets, urinals, lavatories, faucets, shower heads, and pre-rinse spray valves. The Utility Upgrades (ST 10) life cycle replacement program would promote more efficient water consumption. The sustainable design standards specified in the RPMP include moderating landscape water demand through the use of drip irrigation, which can be 90 percent efficient in delivering water to plant roots versus conventional irrigation that is 65 percent efficient, and sensor-based irrigation controls that use actual weather and soil moisture to determine irrigation schedules (US Army, 2014b).

Implementation of Alternative 1 short-term projects would individually and cumulatively have less than significant adverse impacts on water consumption on Fort Belvoir.

Land Use and Transportation

The eleven districts with Regulating Plans specifically target previously-developed sites to reduce pressure on undeveloped land. Development patterns such as those for the North Post community projects (ST 1, 19, 25, and 28) and South Post community projects (ST 2, 5, and 30) promote compact clusters of mixed residential housing, retail, recreation, and administrative offices within a walking environment. If raw land must be developed, the RPMP states that sensitive areas, such as wetlands, prime agricultural land, or areas located in floodplains, would be avoided (US Army, 2014a).

Large projects, such as the 36-Hole Golf Course Reconfiguration (ST 17), NMUSA (ST 17, 18, 27, 34, 38, and 41), and the INSCOM HQ Expansion (ST 19, 26, 33, and 46), would account for approximately 29 percent (81 acres) of the total land disturbed and approximately 25 percent (22.3 acres) of the net increase in impervious surface (Table 2-2). Implementation of these projects in accordance with the RPMP would require evaluation of pervious or open-grid paving during the design process as alternatives to concrete or asphalt for parking lots and walkways. These paving systems would allow a portion of stormwater volumes to seep into the soil, thereby filtering and recharging the groundwater rather than flowing overland and contributing sediments and pollutants directly into the Chesapeake Bay waterways. Other low impact building and landscape design standards described in the master plan, such as green roofs and bio-swales, would promote natural treatment and infiltration of stormwater on site rather than by processing and releasing directly into bay waterways. Integrated pest management planning would also manage site nonpoint source runoff by reducing Chesapeake Bay TMDL contributions.

To meet LEED silver standards, projects would be required to prepare construction activity pollution prevention plans and may seek credits relating to selection of a previously-developed site or brownfield, protected or restored habitat, maximized open space, and promotion of pervious surfaces.

The population of the region in which Fort Belvoir is located (delimited in Section 3.2.1) is expected to increase by approximately 379,000 between 2011 and 2017, based on MWCOG forecasts (Table 3.2-17). During that period, implementation of the Alternative 1 short-term projects would generate a net increase of approximately 4,800 people in the workforce on Fort Belvoir (Table 2-6). The growing on-post workforce in the context of an expanding regional population, as well as the expected accompanying increase in the number of jobs in the region, would likely contribute to increased congestion on roads within the vicinity of the post as regional traffic increases.

Implementation of the RPMP would allot parking for 60 percent of personnel in administrative uses, as required by the Army technical manual (US Army, 2014a). In keeping with the broader sustainable design goals of the master plan, this parking standard is anticipated to contribute to reduced energy consumption related to transportation and reduced greenhouse gas emissions by limiting the number of single-occupancy vehicle trips to and from the installation. This requirement also would contribute to more efficient use of land that clusters development, thus promoting less auto-dependent internal base circulation.

The RPMP TMP has a goal of reducing Fort Belvoir commuters' vehicle miles travelled by 10 percent by 2017 implementation (US Army, 2014c). Sustainable design standards of the RPMP would guide how

planning and design of short-term projects and short-term transportation projects could satisfy transportation demand while meeting Army parking requirements. Provision of bicycle racks, and shower and changing facilities in employment centers would give employees the option to bike to and from work. Provision of designated, preferred parking spaces for carpool and vanpool vehicles would likely promote vehicle sharing and reduce the need for additional parking. In order to meet LEED silver requirements, projects likely would include such features that help reduce vehicle miles travelled. In addition, Mulligan Road Phase II (ST 4) would help complete transportation alignment improvements, which are anticipated to reduce congestion, and associated air quality impacts that result from vehicles idling while waiting in congested traffic.

Implementation of the RPMP and Alternative 1 short-term projects would individually and cumulatively have beneficial impacts on land use and transportation on Fort Belvoir.

3.12.4.2 Long-Term Projects

Building Energy

Implementation of Alternative 1 would construct an additional 2.4 million square feet of building space between 2018 and 2030. Implementation also would yield a large increase in energy use intensity compared to the short-term projects as high energy intensity buildings, such as those proposed for the Fort Belvoir North Area District (LT 9), would come online by 2030. Table 3.12-6 shows a projected spike in energy consumption intensity for 2030, relative to the FY 2012 baseline intensity.

The projected increase in energy consumption intensity shown in Table 3.12-6 does not consider potential improvements in the energy use efficiency of data processing systems, as such improvements cannot be quantified accurately. As energy conservation legislation, monitoring, technology, and industry innovations continue to evolve, these would likely continue to reduce the energy use intensity of administrative buildings and would slow the rate of increase of energy use intensity in data centers. However, the ongoing and anticipated growth in the capacity and intensity of data centers and the expansion of data center activity within administrative buildings suggests that construction of administrative campuses and high-intensity buildings under Alternative 1 would lead to higher overall energy use intensity compared to the FY 2012 baseline, outpacing expected improvements in energy efficiency technology.

Implementation of Alternative 1 long-term projects would individually and cumulatively have less than significant adverse impacts on building energy use on Fort Belvoir.

Table 3.12-6
2030 Projected Energy Consumption Intensity

	2012	2030 Projected		
		Alternative 1	Alternative 2	Alternative 3
Main Post				
Average-Intensity Buildings	NA	103	103	103
High-Intensity Buildings	NA	339	339	339
Total – All Buildings	103	113	114	114
FBNA				
Average-Intensity Buildings	NA	103	103	NA
High-Intensity Buildings	NA	339	NA	339
Total – All Buildings	NA	185	103	185

	2012	2030 Projected		
		Alternative 1	Alternative 2	Alternative 3
Fort Belvoir Total (Main Post + FBNA)				
Average-Intensity Buildings	NA	103	103	103
High-Intensity Buildings	NA	339	339	339
Total – All Buildings	NA	128	112	130

Notes:

1. Ratio of data center energy consumption intensity to typical office energy consumption intensity estimated to be 3.3, based on analysis of available data on energy consumption by government data centers (Lawrence Berkeley National Laboratory, 2004) and by government office buildings (US Department of Energy, 2010).
2. Main Post annual building areas for 2003 through 2012 based on Cermenaro, pers. comm., June 3, 2013.
3. FBNA building areas for 2011 and 2012 include 2,770,000 square feet for the NGA campus (based on Russell, pers. comm., August 7, 2013) and 10,297 square feet for the existing fire station (based on the size of the proposed fire station under ST 20).
4. Based on estimate that 2012 was the first full year during which the NGA and the fire station on FBNA were operating.
5. Building energy use intensity estimates based on ENERGY STAR Portfolio Manager Energy Use Data Trends, October 2012.

Energy consumption data are not available for FBNA for FY 2012 year.

Materials and Resources

The construction of new facilities from 2018 to 2030 would likely be more efficient than present-day construction, resulting in less consumption of materials and resources. The long-term projects would likely benefit from the evolving LEED sustainable design rating systems, improvements in technology, and market transformations, enabling use of a higher percentage of post-consumer and post-industrial recycled products for interior and exterior building construction.

Implementation of Alternative 1 long-term projects would individually and cumulatively have a beneficial impact on the use of materials and resources on Fort Belvoir.

Water Consumption

Similar to building energy, and materials and resources, long-term building projects would likely benefit from increased water efficiency of building fixtures and processing systems compared to current best practice construction. Also, more stringent water conservation standards and regulations may help to drive reduced water consumption by minimizing inefficient uses in future building construction and operations.

Implementation of Alternative 1 long-term projects would individually and cumulatively have less than significant adverse impacts on water consumption on Fort Belvoir.

Land Use and Transportation

Long-term projects LT 1 through 8 predominantly would redevelop existing building footprints, with conversion of approximately 56.5 acres of land (Table 2-4). The development patterns would promote higher-density, clustered, infill development compared to the No Action alternative, thus reducing VMT and promoting a higher quality of life.

Conversely, the proposed administrative campus in the Fort Belvoir North Area District (LT 9) would be constructed on an 84-acre parcel that would not be contiguous to Fort Belvoir community support facilities, due to the site's location on FBNA and the need for a self-supporting office complex, with secure access points. Construction of this administrative campus would disturb 42.4 acres of land and add 35 acres of impervious surfaces (Table 2-4). Accommodation of 7,500 personnel in this area, separated from the

community support facilities of the Main Post, would forego opportunities to conserve natural resources and transportation energy resources by concentrating development density. However, the I-95 Defense Access Roads Ramps to Fort Belvoir's North Area project currently is being constructed and will link FBNA with the I-95 HOT/HOV lanes, providing FBNA commuters with an incentive to utilize carpool and vanpools (National Capital Region Transportation Planning Board, 2013; US Army, 2014c). NCPC's parking policy for federal workers located in proximity to HOV lanes is one parking space for every two employees, which would be in effect for the LT 9 development (NCPC, 2004). This would result in a parking ratio for this project lower than for the rest of Fort Belvoir, providing further incentive for ridesharing and transit use.

Anticipated population growth on the post of up to 12,030 additional personnel by 2030 combined with population growth in the region would likely contribute to increased congestion on roads within the vicinity of the post as regional traffic increases. However, it is expected that long-term transportation projects such as John J. Kingman Gate (LTT 1), Fairfax County Parkway/John J. Kingman Road Intersections and NMUSA Entrance (LTT 2), and US Route 1 Overpass (LTT 4) would alleviate traffic delays and reduce air quality deterioration experienced during periods of vehicle idling in traffic. If the projects enhance access for pedestrians and bicyclists, these improvements can improve quality of life, promote resilience during times of traffic congestion, and further reduce negative impacts to air quality.

Implementation of the RPMP and Alternative 1 long-term projects would individually and cumulatively have beneficial impacts on land use and transportation on Fort Belvoir.

3.12.5 Environmental Consequences of Alternative 2 – Modified Long-Term

3.12.5.1 Short-Term Projects

Building Energy

As described for Alternative 1, impacts of Alternative 2 short-term projects would result in substantial increases in energy use intensity from implementation of new construction projects with buildings of average- and high-energy use intensity. As shown in Table 3.12-3, the operation of data processing facilities would yield an energy use intensity of 115 MBtu/kSF across the post, compared to an energy use intensity under the No Action Alternative of 103 MBtu/kSF. However, as described for Alternative 1, energy conservation standards and LEED goals would ensure that new facilities are designed to optimize energy resources.

Implementation of the Alternative 2 short-term projects would individually and cumulatively have less than significant adverse impacts on building energy use on Fort Belvoir.

Materials and Resources

Alternative 2, totaling 2.5 million square feet of new and renovated building construction in the short term, would yield similar impacts to those described for Alternative 1. However, the short-term projects under Alternative 2 would yield approximately 900,000 fewer square feet of new construction compared to those of Alternative 1, which would result in less consumption of building materials and resources.

Nonetheless, because of practices to generate credits for LEED certification, implementation of the Alternative 2 short-term projects would individually and cumulatively have a beneficial impact on the use of materials and resources on Fort Belvoir.

Water Consumption

The 2.5 million square feet of new building construction that would occur under Alternative 2 would result in an increase in overall water consumption necessary to meet the addition of 3,300 personnel. However, as described for Alternative 1, these new facilities and landscapes would be designed for compliance with federal and Army sustainability policy water efficiency standards, thereby moderating the increase in water consumption.

Implementation of the Alternative 2 short-term projects would individually and cumulatively have less than significant adverse impacts on water consumption on Fort Belvoir.

Land Use and Transportation

Impacts of Alternative 2 short-term projects would be consistent with those impacts described for Alternative 1, with the exception of those that would result from the DLA Parking Garage and Administrative Center (ST 40 and 52). Under Alternative 2, implementation of these two projects would be delayed from the short term to the long term with impacts similarly delayed. The resulting impacts are described in Section 3.12.8.2.

Implementation of the RPMP and the Alternative 2 short-term projects would individually and cumulatively have beneficial impacts on land use and transportation on Fort Belvoir.

3.12.5.2 Long-Term Projects

Building Energy

This Alternative would yield similar overall energy consumption impacts to those described for Alternative 1. However, Alternative 2 does not include the building of a secure administrative campus in the Fort Belvoir North Area District (LT 9). The absence of this project would result in reduced overall energy consumption on post relative to the overall energy consumption projected for Alternative 1.

On Main Post, Alternative 2 would defer implementation of the DLA Parking Garage and Administrative Center (ST 40 and 52) from the short term to the long term, delaying the increase in energy consumption to long term. As shown in Table 3.12-4, Alternative 2 would yield an energy consumption intensity of 114 MBtu/kSF compared to the FY 2012 baseline intensity of 103 MBtu/kSF.

Implementation of the Alternative 2 long-term projects would individually and cumulatively have less than significant adverse impacts on building energy use on Fort Belvoir.

Materials and Resources

Implementation of Alternative 2 long-term projects would yield an additional 1.3 million square feet of new building construction in addition to the 2.5 million square feet constructed in the short term. As described for the Alternative 1 long-term projects, the Alternative 2 long-term projects likely would benefit from advances in construction technology, and building and material design, enabling increased rates of material and resource recycling and reuse.

Implementation of the Alternative 2 long-term projects would individually and cumulatively have a beneficial impact on the use of materials and resources on Fort Belvoir.

Water Consumption

The workforce would increase by 10,180 people in the long term, in addition to the short-term project population increase of 3,800, thus increasing overall water consumption. As no long-term development at FBNA would take place under Alternative 2, the higher intensity water consumption associated with establishing a secure administrative campus for 7,500 personnel in the Fort Belvoir North Area District (LT

9) would not contribute to an increase in the post's water consumption intensity. However, the establishment of the proposed new DLA Administrative Center on Main Post (ST 52), deferred from the short term, and the associated high water intensity data center operations would contribute to high levels of water use intensity for Alternative 2 in the long term, with similar effects to those described for Alternative 1.

Implementation of the Alternative 2 long-term projects would individually and cumulatively have less than significant adverse impacts on water consumption on Fort Belvoir.

Land Use and Transportation

While the implementation of Alternative 2 long-term projects would yield similar impacts to those described for Alternative 1, Alternative 2 would not establish a secure administrative campus in the Fort Belvoir North Area District for 7,500 personnel (LT 9). Therefore, the 84-acre parcel on the east side of FBNA would not be developed, reducing overall land disturbance and the conversion of pervious surface to impervious surface. Likewise, not supporting 7,500 personnel on the FBNA parcel that is not contiguous to community support facilities would conserve transportation energy resources and avoid effects related to increased single occupancy vehicle usage, such as internal and external roadway congestion and idling.

Construction of the DLA Parking Garage and Administrative Center (ST 40 and 52) would redevelop existing paved lots to support parking for 1,650 vehicles and a new administrative building for 1,000 personnel. While these projects would result in minimal disturbance of undeveloped land, their accommodation of single-occupancy vehicles would further contribute to the local and regional transportation challenges described in the RPMP TMP (US Army, 2014c).

Implementation of the RPMP and the Alternative 2 long-term projects would individually and cumulatively have beneficial impacts on land use and transportation on Fort Belvoir.

3.12.6 Environmental Consequences of Alternative 3 – Modified Short-Term

3.12.6.1 Short-Term Projects

Building Energy

By delaying many of the short-term projects, such as the INSCOM HQ Expansion (ST 19, 26, 33, and 46) and the South Post Secure Administrative Facility (ST 45), the amount of building energy consumed by the Alternative 3 short-term projects would be considerably lower than that consumed by the short-term projects under Alternatives 1 and 2. Likewise, energy use intensity would be much lower under Alternative 3. This modified short-term implementation would yield, as shown in Table 3.12-4, an energy use intensity of 106 MBtu/kSF, compared to the FY 2012 baseline of 103 MBtu/kSF.

Implementation of the Alternative 3 short-term projects would individually and cumulatively have less than significant adverse impacts on building energy use on Fort Belvoir.

Materials and Resources

The short-term projects would construct 1.14 million square feet of new building space and delay nearly 2 million additional square feet of construction to the long term. While Alternative 3 would consume large amounts of materials for new construction and renovation, the delay of construction to 2018-2030 would enable the use of the more-efficient technology anticipated, enhanced building practices, and more stringent standards of the future to guide building design and construction.

Implementation of the Alternative 3 short-term projects would individually and cumulatively have a beneficial impact on the use of materials and resources on Fort Belvoir.

Water Consumption

Alternative 3 short-term projects would add only 788 personnel to the Fort Belvoir workforce, as many projects that would support large numbers of personnel, such as 249th Battalion HQ (ST 32, with 200 personnel), South Post Secure Administrative Facility (ST 45, 300 personnel), and 911th Engineering Company Operations Complex (ST 49, 300 personnel), would be delayed to the long term. Compared to Alternatives 1 and 2, this smaller addition to the workforce would result in lower consumption of water resources.

Implementation of the Alternative 3 short-term projects would individually and cumulatively have less than significant adverse impacts on water consumption on Fort Belvoir.

Land Use and Transportation

The delay of many short-term projects to the long term would minimize the land development impacts and transportation impacts that otherwise would occur in the short term, as described for Alternative 1. Implementation of the RPMP and the Alternative 3 short-term projects would individually and cumulatively have beneficial impacts on land use and transportation on Fort Belvoir.

3.12.6.2 Long-Term Projects

Building Energy

The 3.4 million square feet of new construction and renovated space proposed for the long term under Alternative 3 is the largest increment of construction proposed in the short or long term under any of the three action alternatives. However, although many short-term projects would be delayed to the long term under Alternative 3, most short-term and all long-term projects ultimately would be implemented. Under Alternative 3, the new facilities, including high energy intensity facilities, would yield an energy use intensity of 130 MBtu/kSF compared to the FY 2012 baseline of 103 MBtu/kSF, as shown in Table 3.12-4. Impacts would be similar to those described for Alternative 1.

Implementation of the Alternative 3 long-term projects would individually and cumulatively have less than significant adverse impacts on building energy use on Fort Belvoir.

Materials and Resources

The implementation of Alternative 3 would require large amounts of building materials in order to produce the proposed 3.3 million square feet of new building space. Although potentially greater in magnitude, impacts would be similar to those described for Alternative 1. It is likely that advances in construction technology, and building and material design, enabling increased rates of material and resource recycling and reuse, would enable more energy- and resource-efficient construction.

Implementation of the Alternative 3 long-term projects would individually and cumulatively have a beneficial impact on the use of materials and resources on Fort Belvoir.

Water Consumption

The addition of approximately 15,742 personnel with implementation of the Alternative 3 long-term projects would cause a substantial increase in water consumption, with effects similar to those described for Alternative 1. Among the larger long-term projects are the Fort Belvoir North Area District (LT 9, with 7,500 personnel); INSCOM HQ Expansion, and DLA Parking Garage and Administrative Center (LT10, 1,946 personnel); and 1400 East District (LT2, 1,330 personnel).

Implementation of the Alternative 3 long-term projects would individually and cumulatively have less than significant adverse impacts on water consumption on Fort Belvoir.

Land Use and Transportation

Alternative 3 would result in land use impacts that would be similar to those described for Alternative 1. The delay of land use development from the short term to the long term would enable regional transportation initiatives such as the Fairfax County Transit Network Study to be completed. Implementation of recommendations from the Fairfax County study relating to sustainable transit options, such as bus rapid transit or light rail transit systems, would enable integration of the post with new transit connections.

Implementation of the RPMP and the Alternative 3 long-term projects would individually and cumulatively have beneficial impacts on land use and transportation on Fort Belvoir.

3.12.7 Comparison of Alternatives

Impacts are summarized in Table 3.12-7. For all three action alternatives, cumulatively the proposed short- and long-term projects would consume building materials and resources, and increase Fort Belvoir's energy consumption, energy consumption intensity, and water consumption. Regardless of the alternative, the projects would generate effects that would be similar in magnitude. However, federal mandates and Army policies, adherence to the recommendations in the CEWMP, and implementation of the prescriptive guidance and standards of the RPMP would greatly ameliorate the adverse effects of implementing the short- and long-term projects, as would implementation of many of the projects themselves. Implementing the RPMP and the short- and long-range projects, and short- and long-term transportation projects under each of the action alternatives would promote higher-density, clustered, infill development, which can reduce vehicle miles traveled, improve air quality, and improve quality of life.

Table 3.12-7
Summary of Energy Use & Sustainability Impacts by Alternative

Environmental Consequence	No Action Alternative	Alternative 1 – Full Implementation – The Preferred Alternative	Alternative 2 – Modified Long-Term	Alternative 2 – Modified Short-Term
Short-Term Projects				
Building energy mandates and policies are not met	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
Use of materials and resources is not sustainable	No effect	Beneficial effects	Beneficial effects	Beneficial effects
Water consumption mandates and policies are not met	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
Land use and transportation systems are not sustainable	No effect	Beneficial effects	Beneficial effects	Beneficial effects
Long-Term Projects				
Building energy mandates and policies are not met	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
Use of materials and resources is not sustainable	No effect	Beneficial effects	Beneficial effects	Beneficial effects
Water consumption mandates and policies are not met	No effect	Less than significant adverse effects	Less than significant adverse effects	Less than significant adverse effects
Land use and transportation systems are not sustainable	No effect	Beneficial effects	Beneficial effects	Beneficial effects

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4 Cumulative Impacts & Other NEPA Considerations



CEQ regulations (40 CFR §§1500-1508) implementing the procedural provisions of NEPA define cumulative impact as follows:

> "Cumulative impact" is the impact on the environment 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. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. (40 CFR §1508.7)

The analysis of cumulative effects may go beyond the scope of project-specific direct and indirect effects to include expanded geographic and time boundaries, and a focus on broad resource sustainability. The true geographic range of an action's effect may not be limited to an arbitrary political or administrative boundary. Similarly, the effects of an action may continue beyond the time the action ceases. This "big picture" approach is becoming increasingly important as growing evidence suggests that the most significant effects to resources or built systems result not from the direct effects of a particular action, but from the combination of individual, often minor, effects of multiple actions over time. The underlying issue is whether a resource can adequately recover from the effect of a human action before being exposed to subsequent action or actions.

4.1 METHODOLOGY

The approach taken in this analysis of cumulative effects follows the objectives of NEPA, CEQ regulations, and CEQ guidance. Consistent with CEQ (1997) cumulative effects analysis guidance, this analysis focuses on potential cumulative effects that are "truly meaningful" rather than analyzing the cumulative effects of the proposed action "on a long laundry list of issues that have little relevance to the effects of the proposed action or the eventual decisions." In part through the public involvement and scoping process (see Section 1.4), for the purposes of this analysis, the Army has identified as "important issues of national, regional, or local significance" the following potential cumulative effects:

Socioeconomics

- Employment and income
- Housing demand and availability
- Law enforcement, fire protection, and emergency services
- School enrollment and capacity
- Shops, services, and recreation

Transportation and Traffic

- Roadway and intersection levels of service

Air Quality

- Regional air quality

Soils and Water Resources

- Ground disturbance, soil erosion, sedimentation, and stormwater discharge

Biological Resources

- Tree cover

This cumulative effects analysis identifies past and present actions, plus those actions that are in the planning phase – limited to future actions that are reasonably foreseeable (not speculative) – associated with the important potential cumulative effects listed above and with the resources and built systems analyzed in Chapter 3. Additionally, only actions that have the potential to interact with the proposed Army action are addressed in this analysis.

The cumulative effects analysis evaluates only actions with potential effects on the environment that are fundamentally similar to the anticipated effects of the proposed action, in terms of the nature of the effects, the geographical area affected, and the timing of the effects. The geographic scope of the analysis encompasses Fort Belvoir and, for certain resources or built systems, adjoining areas within Fairfax County or the region. Specific emphasis was placed on actions at Fort Belvoir and in areas adjacent to the installation. For the purposes of this cumulative effects analysis, the temporal span of consideration encompasses recent past, present, and reasonably foreseeable future actions that precede or overlap the construction periods of the short- and long-term projects included in the RPMP, or occur during operations of the constructed facilities. Construction of the short-term projects began in fiscal year 2012. The timeframe for the cumulative effects analysis extends to 2030, as all the actions proposed in the RPMP are expected to be constructed and in operation by that time.

Section 4.2 describes the actions evaluated in the cumulative effects analysis. Section 4.3 provides an assessment of cumulative impacts for the important potential cumulative effects and Section 4.4 presents a comparison of the cumulative impacts associated with the No Action Alternative and those associated with the proposed action.

4.2 PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS

A number of actions unrelated to the proposed action, occurring historically and up to the present time, or reasonably expected to occur in the future, have the potential to influence the resources and built systems affected by the proposed action, as identified in Chapter 3. A brief description of those actions that are relevant to the important potential cumulative effects previously identified follows.

4.2.1 Past Actions – Fort Belvoir

The Army began using the Belvoir peninsula as an engineer training facility in 1915 when the Army Engineer School began conducting summer training exercises there. America's entry into World War I in April 1917 led to construction of a temporary cantonment, named Camp A.A. Humphreys. To supply the camp with building materials and other necessities, the unpaved Washington-Richmond Highway was surfaced in concrete, and a plank road was constructed that linked the camp to the Washington-Richmond Highway. Standard gauge and narrow gauge railways followed. Building these transportation systems not

only facilitated deliveries to the camp, but provided engineer training experience for troops sent to the battle lines in Europe. By the close of 1919, more than 14,000 men had been demobilized at Camp A.A. Humphreys. The camp retained a small garrison after the war.

In 1919 following World War I, the Army relocated the Engineer School from the Washington Barracks to Camp A.A. Humphreys, which thereby became the "home" of the US Army Corps of Engineers. Camp A.A. Humphreys was designated a permanent post in 1922 and renamed Fort Humphreys. In 1935 the name of the installation was changed from Fort Humphreys to Fort Belvoir. The outbreak of war in Europe in 1939 motivated the US to begin preparing for possible involvement in the war. To prepare engineers adequately for their wartime role, Fort Belvoir once again became one of the Army's primary engineer training sites.

Following World War II, the engineer training role at Fort Belvoir waned and the emphasis began shifting from training to research, development, test, and evaluation activities. Activities on FBNA dropped off after the 1950's due to commercial and residential encroachment. Fort Belvoir remained the home of the Engineer School until 1988.

Although its role as an engineer training center diminished, Fort Belvoir continues to fulfill an important and valuable role today. The post is one of the larger installations in the Military District of Washington, which also includes Fort McNair, Fort Myer, Fort Meade, and Fort Detrick. The post's present mission is to operate and maintain the installation; execute mobilization requirements, military operations, and contingency/force protection missions; and to provide essential administrative and basic operations support to its tenant organizations. Fort Belvoir's ability to accommodate DoD organizations requiring secure settings coupled with its mission as a support facility for the National Capital Region led to a migration of organizations onto the post. Following the September 11, 2001 terrorist attacks, security was increased and more agencies moved to Fort Belvoir from less secure settings.

In September 2005, the Defense Base Closure and Realignment (BRAC) Commission recommended numerous realignment and closure actions for military installations across the US to advance the goals of transformation by improving military capabilities. Six major DoD organizations were realigned to Fort Belvoir. The BRAC Commission mandated that facilities were to be completed and ready for occupancy by September 15, 2011. The BRAC 2005 realignment on Fort Belvoir included constructing the FBCH and the MDA on Main Post; the NGA on FBNA; two large office buildings at the Mark Center in Alexandria for the Washington Headquarters Services; the Joint-Use Intelligence Analysis Facility at Rivanna Station in Charlottesville, Virginia; and a host of associated infrastructure improvements on- and off-post. These improvements included the construction of the final section of the Fairfax County Parkway along the southern border of FBNA.

Today, Fort Belvoir is home to 26 DoD agencies, 2 Army major command headquarters and elements of 10 others, 19 agencies of the Department of the Army, 8 elements of the US Army Reserve and the Army National Guard, a US Navy construction battalion, a US Marine Corps detachment, a US Air Force activity, and a Department of the Treasury agency (US Army, 2012i). Fort Belvoir continues its historic transformation, expanding its role as a strategic sustaining base for America's armed forces worldwide. To carry out its missions effectively, Fort Belvoir has evolved from a traditional military installation to a more broad-based community installation. Today, Fort Belvoir functions in many ways like a small city, with its own ordinances, land use plan, building codes, utilities, public parks, and academic institutions. In addition, more than one-third of the installation's acreage has been preserved as a designated wildlife sanctuary.

4.2.2 Past Actions - Fairfax County

Fairfax County, formed in 1742 from the northern part of Prince William County, is named for Thomas Fairfax, sixth Lord of Fairfax Cameron (1693–1781), proprietor of the Northern Neck. Located near Washington, DC, Fairfax County was an important region in the Civil War. The war greatly disrupted

commercial activities in the county. Both sides seized railroads and businesses, and raided and burned farms. Troops shut down business establishments depending upon the proprietors' sympathies and the troops involved. Once the war came to an end in April 1865, the economic rebuilding of the county began quickly; but the traditional lifestyle of pre-Civil War Fairfax County never returned. In 1870, Virginia was readmitted to the Union. By that time, the economy of the county had substantially recovered from the war. Despite such growth, Fairfax County in 1870 was still mainly a rural, farm-oriented society, even while doubling its population by 1930.

The county's history from 1930 to the present is characterized as a period of growth as reflected by its population increase. The start of the shift in the county's population began in the early 1930s when Franklin D. Roosevelt's tenure as president saw increases in federal programs and bureaus. Additional employees to administer and staff the new programs and bureaus settled in Fairfax County because the automobile provided increased mobility, and the county offered a less hectic lifestyle than the inner city. The pace of growth in the county picked up in the 1940s during World War II and through the 1950s and 1960s as the federal government expanded employment to meet the war emergency, the job needs of veterans, and the creation of more programs and bureaus. By 1970, Fairfax County's total population stood at over 454,000. While federal employment growth still continued in the 1970s and 1980s, much of the county's growth during this period can be attributed to private economic interests. Because of private industry's increasing need to understand and monitor federal actions aimed at the marketplace, many corporations and industry groups began to feel a need for a presence in the Washington, DC area during the 1970s. Encouraged by Fairfax County's growth, many firms and organizations located offices here.

Substantial growth since World War II has caused broad changes in Fairfax County. The county has changed from a rural, agriculturally oriented society to an urban, business oriented one. While this growth has altered the county's lifestyle, it has also provided county residents with one of the highest standards of living in the world. The economy has also made Fairfax County one of the wealthiest counties in the nation, with a 2012 median household income of $106,690; one of the highest of all jurisdictions in the US (US Census Bureau, 2013b). Fairfax County has an estimated 2012 population of 1,118,602, making it by far the most populous county in Virginia (US Census Bureau, 2012e). The county has a total land area of 391 square miles and a 2010 population density of 2,767 persons per square mile. The government is the largest employer with Fort Belvoir being the county's single largest employer, and Fairfax residents make up an estimated 22.5 percent of employees on the installation (US Army, 2014b).

The southeastern portion of Fairfax County has benefited from the expansion of the Fort Belvoir workforce due to implementation of the BRAC 2005 recommendations. According to the Southeast Fairfax Development Corporation (2014), the workforce expansion caused developers to construct many office buildings in areas near the post, along I-95, and near the Franconia-Springfield Metrorail station, despite high office vacancy rates in the county. From 2002 to 2011, employment along the Richmond Highway, or US Route 1, corridor from Fort Belvoir north to the Capital Beltway increased by 20.8 percent; considerably higher than the growth rate for Fairfax County as a whole (11.6 percent) (Southeast Fairfax Development Corporation, 2013).

4.2.3 Present and Reasonably Foreseeable Future Actions

The updated master plan includes all programmed projects to be constructed in fiscal years 2012 through 2017 and establishes a framework for developing and managing real property on Fort Belvoir through the year 2030. Therefore, the RPMP encompasses all present Fort Belvoir actions and the Army currently does not foresee any additional future actions, during the timeframe of this analysis, at Fort Belvoir that would contribute to cumulative impacts.

Employment and income, and regional air quality are evaluated in this EIS using impact analysis methodologies that incorporate cumulative effects—the employment and income analysis through use of a

regional economic model, and the air quality analysis through the State Implementation Plan (SIP) process, which includes all sources of air emissions and all activities in the region. For the other important potential cumulative effects evaluated in this cumulative effects analysis, the impacts of implementing the RPMP short-term projects would be most pronounced on Fort Belvoir and in adjoining areas within Fairfax County.

Table 4-1 provides brief descriptions and relevant data regarding the present and reasonably foreseeable future actions in Fairfax County, which are evaluated in this cumulative effects analysis. Figure 4-1 shows the locations of the actions.

4.3 POTENTIAL CUMULATIVE EFFECTS

Environmental effects associated with the proposed Army action were thoroughly analyzed in Chapter 3. Most of these effects were determined to be individually non-significant. However, these actions, when combined with other similar actions occurring on Fort Belvoir, in adjoining areas within Fairfax County, or in the region, may contribute to a cumulative significant effect on one or more resources or built systems. When determining whether a particular activity may contribute cumulatively and significantly to the effects identified in Chapter 3, the following attributes are considered: geographical distribution, intensity, duration, and the historical effects of similar activities. For each of the important potential cumulative effects, an impact is deemed significant if it exceeds the applicable thresholds of significance specified in the respective section of Chapter 3.

Because the construction and operational timeframes of the contributing actions are not specified, the impacts of these actions could overlap either the RPMP short-term projects or long-term projects, or both. Therefore, the short- and long-term projects are considered together in this analysis. As described in Section 2.2, Alternative 1 assumes that all parts of the RPMP would be approved and implemented. Alternative 2 assumes there would be no long-term development project on the FBNA and that two projects (ST 40 and ST 52) would be deferred from the short term into the long term. Alternative 3 assumes that implementation of the majority of short-term projects would be delayed from the short term to the long term. However, because the timeframes of the contributing actions are not specified, the potential overlap of their impacts cannot be differentiated with respect to the impacts of each of the three action alternatives independently. Rather, this analysis evaluates the potential overlap of the effects of the contributing actions and the proposed action.

Potential cumulative effects for each of the important issues listed in Section 4.1 are described below.

4.3.1 Cumulative Effects under the No Action Alternative

The No Action Alternative assumes no further development would take place on Fort Belvoir. Under the No Action Alternative, the RPMP Update, including the short-term and long-term projects, would not be implemented and the workforce on Fort Belvoir would continue to be approximately 39,000, the September 2011 workforce following full implementation of the BRAC 2005 recommendations. Therefore, the No Action Alternative would not result in any cumulative effects.

The No Action Alternative when combined with other past, present, and reasonably foreseeable future actions would have no effect on socioeconomics, traffic and transportation, air quality, soils, water resources, and biological resources.

4.3.2 Cumulative Effects under the Proposed Action

4.3.2.1 Socioeconomics

Employment and Income

The past, present, and future contributing actions described in Section 4.2 would have similar effects on employment and income as would the proposed action short- and long-term projects. Under the proposed action, Fort Belvoir would construct between approximately 5.7 and 9.4 million square feet of new building space from 2012 through 2030, depending on the alternative, as well as transportation and other facility improvements. The present and reasonably foreseeable future actions in Fairfax County described in Table 4-1 collectively represent a minimum of 13 million square feet of commercial, residential, and industrial development.

For both the Fort Belvoir projects and the off-post projects, construction expenditures would result in short-term increases in economic output, employment, and earnings in the region and operations of the facilities would create ongoing, long-term increases. Adverse cumulative effects could occur due to the overlapping timeframes for Fort Belvoir construction activities and off-post construction activities, with the potential adverse effects resulting from possible construction labor and material shortages. Demands for skilled building contractors, heavy and civil engineering construction contractors, specialty trade contractors, and construction materials could increase. Skilled labor or material shortages could result in a rise in labor and material costs, and ultimately a rise in overall construction costs. Over time, however, the market would respond to a shortage with new workers entering the construction industry from other industries or new workers coming from outside the region to fill available jobs.

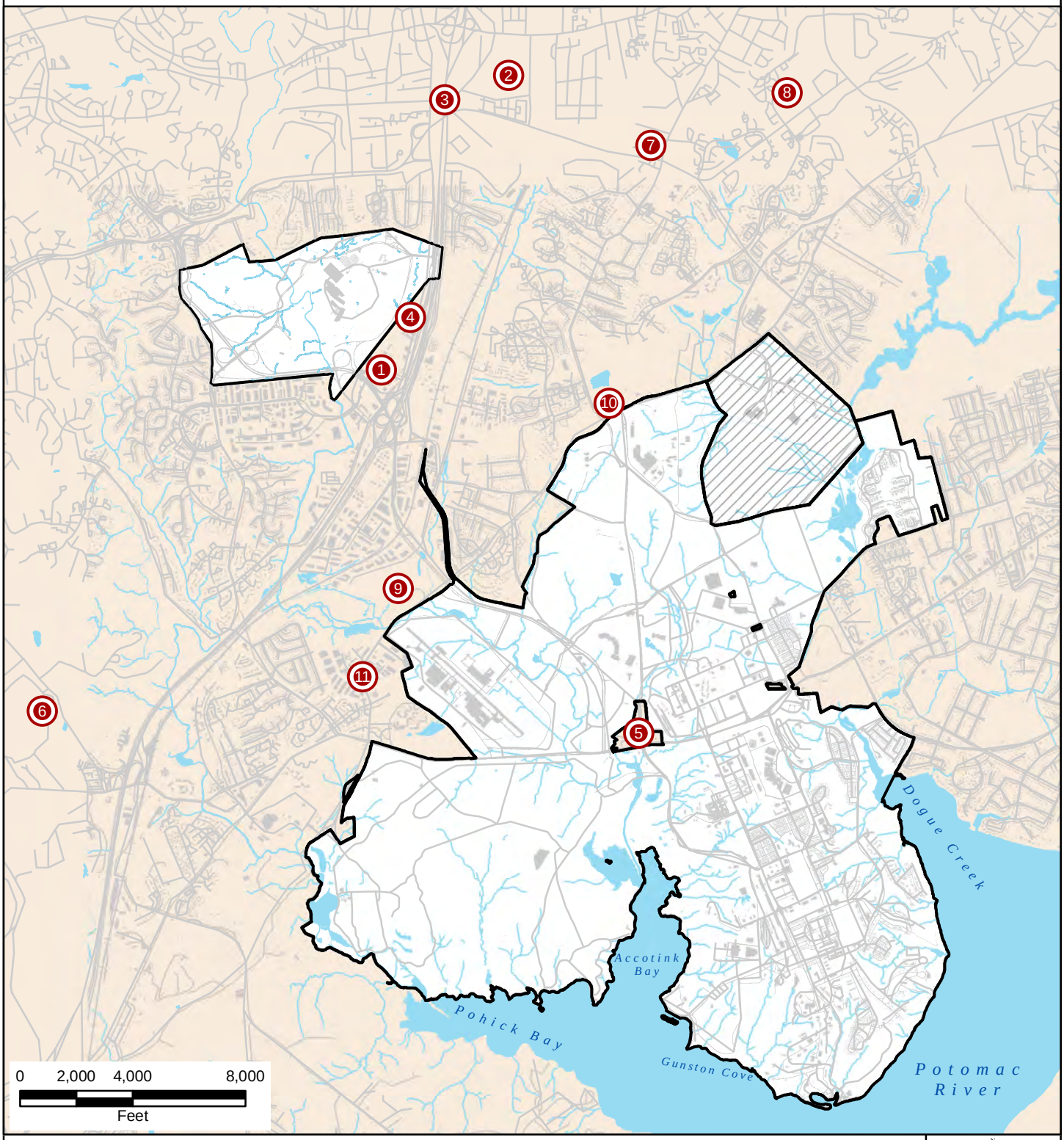
Overall, both construction and operation effects from the proposed action projects and the past, present, and future actions would be beneficial, providing regional economic benefits from construction spending and labor, as well as from long-term positive effects on employment and income in the region. Population potentially would increase if workers move to the region to fill jobs. The increase in population would increase the tax base and would increase demand for services and infrastructure, ultimately resulting in long-term increases in the services and infrastructure available in the region.

Implementation of the proposed action when combined with other past, present, and reasonably foreseeable future actions would have a beneficial effect on employment and income.

Housing Demand and Availability

Implementation of the proposed action short- and long-term projects would generate a net increase in the workforce on Fort Belvoir. As the vast majority of these personnel would be federal civilian and contractor employees already residing in the National Capital Region, these jobs would be shifted from one location to another within the region and, therefore, would not result in a change in regional employment or housing demand. Nonetheless, the proposed action may result in as many as about 8,390 households' relocating within the ROI, and a maximum of approximately 2,860 households potentially may relocate to Fairfax County. The present and reasonably foreseeable future actions in Fairfax County described in Table 4-1 may generate a net increase in employment in the county, although the number of new jobs and the scale of the increase in housing demand cannot be estimated.

Present and Future Off-Post Contributing Actions



1 Present or Future Off-Post Contributing Action Location (associated with numbers in Table 4-1)

Fort Belvoir RPMP EIS

Figure 4-1

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Table 4-1
Present and Future Off-Post Contributing Actions

Project Number	Project Name	Acreage	Development Size[1]	Development Type	Description
1	**Patriot Ridge**	15	978,000	Office	Project currently under construction adjacent to FBNA along the west side of Backlick Road, just north of Fairfax County Parkway. Site plan consists of four high-rise office buildings designed to meet government security standards, and two parking garages. The first building, totaling 240,000 square feet, was completed in 2011 and includes retail space.
2	**Springfield Mall**	80	2.1 million	Retail	Planned redevelopment of existing indoor mall as mixed-use town center.
			6.0 million	Hotel, office, and residential	
3	**Springfield Connectivity Study**	800	Not Available (N/A)	N/A	Study provides area-wide guidance for urban design, streetscape, and place-making concepts. Portions of the Springfield community business center north and south of Old Keene Mill Road are recommended for redevelopment as an urban village and commuter parking facility, respectively. Rezoning for the Springfield Metro Center Industrial Park parcels as a mixed-use zoning district was approved in May 2012. The General Services Administration (GSA) Warehouse Framework Plan was adopted as a component of this study. It includes a concept plan for the GSA facility located adjacent to the Franconia-Springfield Metro Center. The plan calls for the redevelopment of the warehouse use to a higher-intensity multimodal, transit-oriented development.
4	**Loisdale Road Special Study**	120	1.83 million	Industrial	Study includes options for vehicle sales, service centers, and office use with conditions. Fairfax County Board of Supervisors approved rezoning two parcels from R-1 to C-8 to allow for development of 200,000 square feet of office.
5	**Accotink Village**	27	(up to) 55,000	Retail	Redevelopment option for the enclave of privately-owned land surrounded by Fort Belvoir and administered by Fairfax County would also include up to 470 multi-family units with some single-family attached housing. Future redevelopment would require right-of-way dedication to support the planned widening of US Route 1 to six lanes.
			470 units	Residential	
			(up to) 16,000	Office	
6	**Laurel Hill, Lorton-South Route 1 Subunit B2 and Lorton Corner**	3,200	N/A	Mixed-use	This plan includes land use recommendations for the redevelopment of the old federal prison site and expansion of INOVA medical facilities in Lorton.
7	**Metro Park**	37	1.3 million	Office	Eight office buildings would be built as part of project.
8	**Kingstowne Town Center**	150	30,000	Retail	This 150-acre, mixed-use development is part of the larger 1200-acre planned community of Kingstowne. The last 5-acre parcel of the Town Center is currently in the planning stages. The original plans included 1,200,000 square feet of office space and 30,000 square feet of retail. The latest plans (January 2015) include 60,000 square feet of retail and 750 residential units.
			750 units	Residential	

Table 4-1
Present and Future Off-Post Contributing Actions (Continued)

Project Number	Project Name	Acreage	Development Size[1]	Development Type	Description
9	**Belvoir Business Park**	N/A	N/A	Commercial, office, and industrial	A major Federal Express distribution facility is currently located in this development. A portion of the site is also planned for office and/or industrial uses.
10	**Hilltop Village Center**	33	150,000	Grocery	The site for this project is located at the intersection of Beulah Street and Telegraph Road, and was rezoned in 2008. The development would include 953 parking spaces and is planned as an integrated mixed-use development.
			94,000	Specialty retail	
			100,000	Office	
11	**Northern Virginia Industrial Park**	69	N/A	Mixed-use	A Fairfax County Comprehensive Plan Amendment allows the project site on Telegraph Road to become a mix of office, hotel, retail, civic, and light industrial uses. The County Board of Supervisors also amended the Transportation Plan to show Telegraph Road planned for six lanes (formerly four lanes) from Richmond Highway to Fairfax County Parkway.

Notes:
1. Approximate. Square feet unless otherwise noted.

Based on MWCOG forecasts, the number of households in Fairfax County is forecasted to increase by approximately 73,000 between 2011 and 2030 (Tables 3.2-20 and 3.2-22). The MWCOG households forecasts account for full implementation of all Fort Belvoir RPMP short-term and long-term projects. The number of households that potentially may relocate to Fairfax County under the proposed action are estimated to be equivalent to only a small proportion (approximately 3.9 percent) of the anticipated household growth in the county and would not significantly affect housing demand. Although the number of relocations that may result from the present and future actions in Fairfax County are not known, it is expected that the contributing actions likewise would not significantly affect housing demand. In addition, the MWCOG forecasts account for known future development actions within the region, including implementation of Fort Belvoir RPMP short- and long-term projects and the present and future contributing actions in Fairfax County. Over time, the local economies likely would respond to the increases in housing demand represented by the MWCOG household forecasts by increasing the supply of housing.

On Fort Belvoir, ST 42 would construct unaccompanied enlisted personnel barracks to house 240 Soldiers assigned to Fort Belvoir. Off post, the Springfield Town Center project would include over 2,000 new residential units (Fairfax County Office of Community Revitalization, 2014). As envisioned in the Master Plan for the Laurel Hill Adaptive Reuse Site (Alexander Company, 2009), the project would provide 171 multi-family residential units for rent and 181 owner-occupied units. Cumulatively, these actions would increase the supply of housing and would offset some of the increased housing demand.

Implementation of the proposed action when combined with other past, present, and reasonably foreseeable future actions would have a less than significant adverse effect on housing demand and availability.

Law Enforcement, Fire Protection, and Emergency Services

The past, present, and future contributing actions described in Section 4.2 would have similar effects on employment and income as would the proposed action short- and long-term projects. The proposed action may result in as many as about 8,390 households' relocating within the ROI and a maximum of approximately 2,860 households potentially may relocate to Fairfax County. The present and reasonably foreseeable future actions in Fairfax County described in Table 4-1 may generate a net increase in employment in the county, although the numbers of new jobs, households, and businesses cannot be estimated. Similarly, the likely scale of the increase in the demand for law enforcement, fire protection, and emergency services is not known. However, the increase in households in response to the proposed action short- and long-term projects, as well as the increase in households and businesses that may be generated by the contributing actions, would be spread throughout the county. The impact on any one particular emergency response service likely would be negligible.

Implementation of the proposed action when combined with other past, present, and reasonably foreseeable future actions would have a less than significant adverse effect on the demand for law enforcement, fire protection, and emergency services.

School Enrollment and Capacity

Implementation of the proposed action short-term and long-term projects could result in an increase of a maximum of approximately 1,090 school-aged children in Fairfax County public schools between 2012 and 2030. This compares with an overall forecasted increase in school-aged children enrolled in public schools in Fairfax County of about 25,590 children. The forecast for the county accounts for full implementation of all Fort Belvoir RPMP short-term and long-term projects. The potential increase attributable to implementation of the proposed action projects would equate to only a small portion of the overall projected increase over this time period – at most approximately 4.3 percent of that increase in Fairfax County – and would not significantly affect school enrollment.

The present and reasonably foreseeable future actions in Fairfax County may generate a net increase in number of households residing in the county and the number of children enrolled in the public school

system. Although the number of relocations that may result from the present and future actions in Fairfax County are not known, it is expected that the contributing actions likewise would not significantly affect school enrollment. Even the maximum projected influx of school-aged children in Fairfax County, as well as in the other counties and cities of the ROI, would be within normal fluctuations and are not expected to exceed the ability of the school district to accommodate the growth.

Further, on Fort Belvoir, ST 24 would construct a new Fairfax County elementary school. The construction of this new school would address current and future capacity deficits experienced by the Fairfax County public school facilities. Not all children who live on Fort Belvoir attend the existing Fort Belvoir Elementary School because of lack of space; 385 children attend 12 other Fairfax County elementary schools. Implementation of ST 24 would allow the 385 children to attend a school on post and relieve capacity problems at several of the schools they attend. The current capacity deficit at Fort Belvoir Elementary school would also be addressed by balancing out the student population between the existing elementary school and the proposed elementary school.

Implementation of the proposed action when combined with other past, present, and reasonably foreseeable future actions would have a less than significant adverse effect on school enrollment and capacity.

Shops, Services, and Recreation

The proposed action would establish shops, services, and recreation on post, providing needed services close to where existing and potential future personnel on Fort Belvoir work and live. However, the establishment of these new facilities may draw business from similar businesses in adjoining areas within Fairfax County, potentially having negative impacts on those businesses. As the largest AAFES PX in the country, the new PX may draw customers from other PXs and even from non-military retailers in the ROI, particularly discount stores near Fort Belvoir or near the place workers live. The proposed Commissary also may draw sales from competing commissaries and grocery stores. Off post, those contributing actions with substantial retail components – notably the Springfield Mall, Kingstowne Town Center, and Hilltop Village Center projects – likewise may draw business from existing retail establishments in Fairfax County and the region.

However, the ROI is an economically robust region that has experienced strong growth and is anticipated to continue to grow. The sheer size of the region's population, economy, and inventory of retail and service businesses suggests that adverse impacts are likely to be less than significant, even for establishments near Fort Belvoir.

Implementation of the proposed action when combined with other past, present, and reasonably foreseeable future actions would have a less than significant adverse effect on shops, services, and recreation.

4.3.2.2 Transportation and Traffic

The transportation modeling process used for the EIS takes into account the effects of all past, present, and future transportation facilities – roads and transit facilities – levels of traffic and transit use, the distribution of employment and housing in the study area and region, future programmed transportation facilities, and new development projects. MWCOG's regional transportation model includes all of this information, adjusted for 2017 and 2030.

For the 2017 traffic analysis, by measuring levels of service at roadway intersections, the traffic generated by all past development is represented in the present traffic levels, which form the basis for projecting future traffic conditions in 2017. Future traffic projections relied on the travel demand model to account for proposed major new development and transportation projects in the study area and for general background traffic growth expected to occur in Fairfax County each year.

The results of this analysis indicated that most of the impact of implementing the short-term projects by 2017 would be absorbed by the new facilities under design and construction on Fort Belvoir: Mulligan Road, Lieber Gate, I-95 HOV ramp to FBNA, and the widening of US Route 1. However, two intersections

would sustain significant impacts, and their levels of service would decline from D to E: US Route 1 and Lorton Road (a public intersection) and the (a Fort Belvoir intersection on a VDOT road). Fort Belvoir is committed to coordinating with VDOT and FCDOT to mitigate the impact on the Fairfax County Parkway at John J. Kingman Road intersection and to study the US Route 1 and Lorton Road intersection. If it turns out that Fort Belvoir contributes more than 50 percent to the decline in level of service at the Lorton Road intersection, funding for improvements may be available from the Defense Access Roads program.

In the long-term, travel demand modeling indicates that some roadway segments in the study area would experience a decline in levels of service from D to E and F in 2030 if all of the proposed Fort Belvoir short-term and long-term projects were built. Because of the major transportation facility improvements underway on Fort Belvoir, the roadway segments that modeling indicates may be affected in the future may operate better than predicted. Fort Belvoir is committed to coordinating with VDOT and FCDOT to monitor the roadway segments and associated intersections that may be affected by 2030.

The RPMP TMP recommends a number of strategies to reduce SOV use and promote transit, ridesharing, bicycle, and pedestrian use as an alternative. Modeling of the effects of reducing SOV use in the future from current levels indicates that aggressive transportation demand management strategies could reduce much of the impact of implementing RPMP development on study area roads.

Implementation of the proposed action when combined with other past, present, and reasonably foreseeable future actions would have significant adverse effects in the short term and the long term on intersections and roadway segments on and near Fort Belvoir. These impacts would be mitigated partially or fully.

4.3.2.3 Air Quality

By directly inventorying all emissions in a nonattainment region and monitoring concentrations of criteria pollutants in attainment regions, the Commonwealth of Virginia takes into account the effects of all past and present emissions in their state. This is done by putting a regulatory structure in place designed to prevent air quality deterioration for areas that are in attainment with the NAAQS and to reduce common or criteria pollutants emitted in nonattainment areas to levels that would achieve compliance with the NAAQS (USEPA, 2013e). This structure of rules and regulations are contained in the SIP. SIPs are the regulations and other materials for meeting clean air standards and associated CAA requirements. SIPs include:

- State regulations that USEPA has approved;
- State-issued, USEPA-approved orders requiring pollution control at individual companies; and
- Planning documents such as area-specific compilations of emissions estimates and computer modeling demonstrating that the regulatory limits assure that the air would meet air quality standards (USEPA, 2013f).

The SIP process includes (either specifically or indirectly) all sources of air emissions and all activities in the region. Although there would be an increase in emissions associated with the proposed action, the total emissions would be *de minimis*. No large-scale projects or proposals have been identified that when combined with the collective actions would interfere with the state's ability to obtain the NAAQS, have substantial GHG emissions, or lead to a violation of any federal, state, or local air regulation.

Implementation of the proposed action when combined with other past, present, and reasonably foreseeable future actions would have a less than significant adverse effect on air quality.

4.3.2.4 Soils and Water Resources

Ground Disturbance, Soil Erosion, Sedimentation, and Stormwater Discharge

Implementation of the proposed action short-term and long-term projects on Main Post and the FBNA would result in the disturbance of a maximum of about 400 acres of surface topography and soils. The total

area of new impervious surface would be as much as about 140 acres. However, most of the disturbances would be concentrated in the relatively level areas on the uplands and plateaus, on urban and disturbed soils previously affected by earthmoving activities and construction and demolition. In addition, all projects would need to compensate for their imperviousness and any stormwater generated through control of both stormwater quantity and quality in accordance with EISA 438, the Virginia Stormwater Management regulations, and the Chesapeake Bay Local Assistance Division regulations. Soil erosion and sedimentation, and stormwater discharge would be minimized by developing and implementing soil erosion control and stormwater management plans.

Off post, the present and reasonably foreseeable future actions in Fairfax County collectively represent a minimum of 13 million square feet of development, although the extent of ground disturbance and new impervious surface cannot be estimated. However, similar to the Fort Belvoir projects, the contributing actions predominantly comprise redevelopment of previously developed sites. The contributing actions would need to comply with the Virginia Stormwater Management regulations and the Chesapeake Bay Local Assistance Division regulations, as applicable, and typically would require implementation of soil erosion control and stormwater management plans.

Implementation of the proposed action when combined with other past, present, and reasonably foreseeable future actions would have a less than significant adverse effect on ground disturbance, soil erosion, and sedimentation.

4.3.2.5 Biological Resources

Tree Cover

During the 32 years ending in 2006, Fairfax County lost to development almost 74,000 acres of trees and the ecosystem services the trees provided (Northern Virginia Soil and Water Conservation District, 2007; Tree Action Plan Work Group, 2006). The portion of the county's land area covered by trees decreased from 70 percent to 41 percent, or approximately 104,000 acres. In June 2007, the Fairfax County Board of Supervisors approved a goal of increasing the tree canopy cover to 45 percent by 2037.

To avoid fragmenting large tracts of forest land, Fort Belvoir RPMP would cluster the proposed short-term and long-term projects, to the extent practicable, in the central core of the installation in areas that have already been developed. Nonetheless, implementation of the proposed action projects would result in the loss of a maximum of approximately 107 acres of forest resources, or about 1.9 percent of the on-post forest resources. In all cases, the loss of trees would be mitigated as much as possible through the application of the Fort Belvoir Tree Removal and Protection Policy, which promotes site planning techniques and construction practices that maximize retention and protection of existing trees before considering removal (US Army, 2001a).

Off post, the present and reasonably foreseeable future actions in Fairfax County predominantly comprise projects that redevelop previously developed sites. The impacts to forest resources and tree cover resulting from the contributing actions therefore would be minor in extent, although the magnitude of the losses cannot be estimated. However, the losses of tree cover potentially attributable to the contributing actions, as well as those that would result from implementation of the Fort Belvoir short- and long-term projects, would be in opposition to Fairfax County's goal of increasing the tree canopy cover.

Implementation of the proposed action when combined with other past, present, and reasonably foreseeable future actions would have a less than significant adverse effect with mitigation on tree cover.

4.4 COMPARISON OF ALTERNATIVES

Table 4-2 summarizes the cumulative effects that potentially would result from the implementation of the No Action Alternative and the proposed action.

Table 4-2
Summary of Cumulative Impacts

Environmental Consequence	No Action Alternative	Proposed Action
Short-term increased employment and income from construction spending and labor	No effect	Beneficial effects
Ongoing increased employment and income	No effect	Beneficial effects
Increased housing demand	No effect	Less than significant adverse effects
Increased demand for law enforcement, fire protection, and emergency services	No effect	Less than significant adverse effects
Relocation of school children	No effect	Less than significant adverse effects
Reduced business for shops, services, and recreation	No effect	Less than significant adverse effects
Transportation and Traffic	Beneficial effect from TMP efforts	Significant adverse impacts that may be partially or fully mitigated
Construction effects would exceed applicable air quality thresholds	No effect	Less than significant adverse effects
Operational effects would exceed applicable air quality thresholds	No effect	Less than significant adverse effects
Greenhouse Gases would exceed CEQ threshold	No effect	Less than significant adverse effects
Mobile Sources would exceed applicable air quality thresholds	No effect	Less than significant adverse effects
Construction effects would generate fugitive dust	No effect	Less than significant adverse effects
Increased soil erosion during and after construction	No effect	Less than significant adverse effects
Long-term impact on watersheds	No effect	Less than significant adverse effects
Short-term construction-related impact on surface water quality	No effect	Less than significant adverse effects with mitigation
Long-term impact on surface water quality	No effect	Less than significant adverse effects with mitigation to beneficial effects
Loss of tree cover	No effect	Less than significant adverse effects with mitigation

4.5 RELATIONSHIP BETWEEN SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

NEPA requires consideration of the relationship between short-term use of the environment and the impacts that such use could have on the maintenance and enhancement of long-term productivity of the affected environment. Impacts that narrow the range of beneficial uses of the environment are of particular concern. Such impacts include the possibility that choosing one alternative could reduce future flexibility to pursue other alternatives, or that choosing a certain use could eliminate the possibility of other uses at the site.

Short-term uses of the environment associated with the action alternatives would include changes to the physical environment, and energy and utility use during demolition and construction. Construction would result in short-term increases in fugitive dust emissions and construction-generated noise, and would increase the use of fossil fuels for power equipment. In addition, expenditures of public funds and the use of labor would be required.

Given that the proposed action short- and long-term project sites are urban sites that cannot be used for natural resource management or renewable resource production (e.g., agriculture or forestry), the long-term productivity of the sites are defined by their potential to serve Army and Fort Belvoir operational needs. The RPMP and the proposed short- and long-term projects would support and improve the efficiency of operations at the post. The action alternatives would maintain and enhance the productive use of the project sites and the installation, and support long-term military productivity.

4.6 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

NEPA requires an analysis of significant, irreversible effects resulting from implementation of a proposed action. Resources that are irreversibly or irretrievably committed to a project are those that are typically used on a long-term or permanent basis; however, those used on a short-term basis that cannot be recovered (e.g., resources such as metal, wood, fuel, paper, and other natural or cultural resources) also are irretrievable. Human labor is also considered an irretrievable resource. All such resources are irretrievable in that they are used for a project and, thus, become unavailable for other purposes. An impact that falls under the category of the irreversible or irretrievable commitment of resources is the destruction of natural resources that could limit the range of potential uses of that resource.

The action alternatives would involve insignificant irreversible or irretrievable commitments of resources. The resources consumed during construction, including labor, construction materials, and fossil fuels, would be committed for the life of the project. The use of human resources for construction activities is considered an irretrievable loss only in that it would preclude such personnel from engaging in other work activities. However, the use of human resources for the action alternatives would represent employment opportunities and would be beneficial.

Construction of facilities and transportation improvements would involve irreversible commitments of common resources, including sand, stone, concrete, steel, copper wire, asphalt, and various other material supplies. The materials that would be consumed are not in short supply and their use would not limit other, unrelated construction activities.

Energy resources used as a result of the action alternatives, including nonrenewable petroleum-based products and electricity, would be irretrievably lost. During construction, gasoline and diesel would be used for the operation of construction equipment. During operation, nonrenewable fossil fuels and electricity would be consumed. However, implementation of the RPMP and the action alternatives would support redevelopment of old facilities and additional in-fill development that would incorporate energy

conservation technologies that use less energy. As a result, the new facilities on Fort Belvoir potentially would consume less renewable and nonrenewable resources than the existing facilities. While the action alternatives would contribute to the consumption of nonrenewable resources, the energy required for facility operations are not in short supply. The use of nonrenewable resources would not have an adverse effect on their continued availability, and the energy resource commitment would not be excessive in terms of region-wide usage.

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5 Mitigation & Protective Measures



The mitigation measures described in Table 5-1 were identified to address the cumulative impacts of implementing the RPMP short-term and long-term projects on the transportation network and on natural resources. For new short-term and long-term projects proposed as part of implementing the RPMP, the Fort Belvoir DPW would request funding to ensure that projects are planned, designed, built, and operated in accordance with federal, state, and local laws and regulations. Project impacts that could not be avoided would be mitigated as described in Table 5-1. **These mitigation measures would be subject to the availability of funding.**

Table 5-1
Summary of Proposed Mitigation or Protective Measures by Resource

Environmental Resource	Proposed Mitigation or Protective Measures
Land Use	No mitigation or protective measures are necessary.
Socioeconomics	Fort Belvoir would: • Monitor response times for law enforcement, fire protection, and medical services on the installation through 2030 to verify that as new projects are completed and the workforce grows, response times do not decline. If they do start to decline, reasonable and appropriate actions may be taken to adjust services, add personnel, or expand or build facilities. • Monitor family support and social services on the installation to make accommodations that may include expanding existing services or offering new ones.
Cultural Resources	On a project-by-project basis, Fort Belvoir, in consultation with the Virginia State Historic Preservation Officer and other consulting parties, as appropriate, would develop mitigation measures and execute memoranda of agreement if review under Section 106 of the National Historic Preservation Act indicates that adverse effects are unavoidable. The exact character of the mitigation measures would be determined on a case-by-case basis.

Environmental Resource	Proposed Mitigation or Protective Measures
Transportation and Traffic	Fort Belvoir would: • Coordinate with the Virginia Department of Transportation (VDOT) and the Fairfax County Department of Transportation (FCDOT) to monitor and study public intersections and roadways near Fort Belvoir to ensure that they maintain acceptable levels of service. If levels of service deteriorate and the deterioration is at least 50 percent due to growth at Fort Belvoir, Fort Belvoir would consider seeking Defense Access Road program or other federal funding for improvements: – In the short term, study levels of service at US Route 1 and Pohick Road; Jeff Todd Way intersections with US Route 1 and Telegraph Road; and US Route 1 and Lorton Road. – In the long term, study levels of service at US Route 1 and the Fairfax County Parkway, US Route 1 and Pohick Road, and US Route 1 and Belvoir Road. • Coordinate with VDOT and FCDOT concerning transit, bicycle, and pedestrian corridor studies, such as use of the US Route 1 median and the former Fort Belvoir Military Railroad right-of-way for light rail or bus rapid transit connections to Metrorail and Virginia Railway Express stations; and use of US Route 1 right-of-way through Fort Belvoir for bicycle and hiking trails, under study by state, regional, and federal agencies. • Conduct project-level site traffic impact studies for proposed new projects in accordance with US Army Corps of Engineers and Virginia guidance. • Conduct an installation-wide traffic assessment every five years that would focus on key intersections and roadway links to determine changes in levels of service. • Update the transportation elements of the Fort Belvoir Transportation Management Plan periodically, with five years being the recommended interval. Needed short-term improvements (next five years) and longer-term major improvements (next ten years) would be identified. In addition to these measures, the RPMP would include the short-term and long-term projects listed below. These transportation projects are not mitigation measures per se but elements of the proposed action. Inclusion in the RPMP of both development and transportation projects does not mean that these projects will actually occur. Rather, as development is proposed for Fort Belvoir, appropriate transportation measures would be identified from those in the RPMP as well as any site-specific measures. This process would likely be subject to project-specific NEPA analysis. The Army would need to plan so that development and transportation measures are coordinated and funded. • Short-term projects include: building Lieber Gate on US Route 1; upgrading the Fairfax County Parkway and John J. Kingman intersection by adding turning lanes and upgrading signals; implementing on-post intersection and roadway improvements; and improving Walker Gate's intersection with the Mount Vernon Memorial Highway. (The Lieber Gate Access Road and Control Point contract is funded and will be awarded soon). • Long-term projects include: improving Kingman Gate; grade-separating the Fairfax County Parkway/John J. Kingman/NMUSA intersection (with respect to the improvements to the Fairfax County Parkway/John J. Kingman Road intersection, for which VDOT would be responsible, Fort Belvoir would cooperate with VDOT in accordance with the terms of the Memorandum of Agreement executed between the two agencies in August 2011); adding internal cross streets on Abbot Road, 3rd Street, and 6th Street; widening Gunston Road from 12th Street to 16th Street; connecting 13th Street to 12th Street; completing the Heller loop on FBNA; and adding capacity to Beulah Street from John J. Kingman Road to Woodlawn Road.

Environmental Resource	Proposed Mitigation or Protective Measures
Air Quality	Subject to availability of funds, mitigation measures may be required for construction and stationary source emissions. Construction projects would be carried out in full compliance with current and pending Virginia regulatory requirements using compliant practices and products. Within the region, these regulatory requirements pertain to: • Open burning (9 VAC 5, Chapter 130) • Visible emissions (9 VAC 5, Chapters 40-80) • Fugitive dust/emissions (9 VAC 5, Chapters 40-90) • Asphalt paving operations (9 VAC 5, Chapters 45-760 et seq.) • Portable fuel containers (9 VAC 5, Chapters 45-270) • Architectural and industrial maintenance coatings (9 VAC 5, Chapters 45-520 et seq.) • Adhesives and Sealants (9 VAC 5, Chapters 45-620 et seq.) • Consumer products (9 VAC 5, Chapters 45-510) In addition, because the proposed projects would be located in a VOC control area (9 VAC 5, Chapters 20-206), cutback asphalt would be prohibited during the months of April through October except when use or application as a penetrating prime coat or tack is necessary. Regardless of whether stationary sources would be above or below the major modification thresholds, one or more air pollution control permits would be required for the proposed projects. Depending on the level of permitting required, mitigation measures associated with new permitted stationary sources of emissions may include: • Best Available Control Technology review for each criteria pollutant • Maximum Achievable Control Technology review for regulated hazardous air pollutants and designated categories • Establishing procedures for measuring and recording emissions and process rates • Meeting New Source Performance Standards and National Emission Standards for Hazardous Air Pollutant requirements • Lowest achievable emission rate review for qualifying nonattainment pollutants • Predictive air dispersion modeling • Acquiring emissions offsets for all contemporaneous emissions increases
Noise	To minimize noise during construction: • Construction would primarily occur during normal weekday business hours • Construction equipment mufflers would be properly maintained and in good working order • Construction personnel, and particularly equipment operators, would don adequate personal hearing protection to limit exposure and maintain compliance with federal health and safety regulations • Controls would be put in place to minimize noise from the indoor small arms range at the OSEG training compound. • All activities except those specifically exempt under the Noise Control Act of 1972 would fully comply with Fairfax County Noise Regulations. For long-term transportation projects: • During the preparation of NEPA documentation for the proposed Goethals Road expansion (LTT 10), a detailed analysis of construction noise may be conducted with a special focus on potential effects on historical areas, primarily the Alexandria Friends Meeting House.

Environmental Resource	Proposed Mitigation or Protective Measures
	• During the preparation of NEPA documentation for other long-term transportation projects that include lane additions or new roadways, detailed traffic noise studies may be conducted, as necessary.
Geology, Topography, and Soils	• Standard engineering practices would be followed and construction plans would be prepared in accordance with Fairfax County building codes to address construction-related issues stemming from local soil and subsurface conditions. Such practices include developing appropriate design criteria (e.g. depth and location) for placement of footings and piers in preparation for buildings, roads, bridges and foundations; and considering soil characteristics in designing landscapes, slopes, and retaining walls. • In accordance with the Virginia Erosion and Sediment Control Law (9 VAC 25-840), implemented by the Virginia Department of Environmental Quality (VDEQ), proposed projects with land-disturbing construction activities (such as clearing, grading excavating, transporting and filling of land) equal to or exceeding 10,000 square feet would require the preparation and implementation of soil and erosion control plans, inclusive of BMPs to minimize soil erosion. • In accordance with the Virginia Stormwater Program (9 VAC 25-870), all proposed projects disturbing land areas one acre or greater in size would prepare and implement stormwater pollution prevention plans. • Following construction, top soil would be replaced and sites would be planted with native vegetation to the maximum extent practicable.
Water Resources	Fort Belvoir would: • In keeping with the RPMP, locate future development away from stream valleys and surface waters to avoid impacts to streams, floodplains, and Chesapeake Bay Resource Protection Areas (RPAs) as much as possible. • Design and develop future projects in accordance with RPMP guidance; Army guidance; and 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 and 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), for action proponent with activities disturbing land areas one acre or greater in size, prepare and implement stormwater pollution prevention plans. – Apply appropriate Energy Independence and Security Act (EISA) Section 438 and stormwater management guidelines. – Include on-site mitigation measures in the project, or, where on-site measures are not practicable, contribute to stream and wetland restoration projects at the 26 stream and wetland mitigation sites on Fort Belvoir. • To mitigate the cumulative impacts of the proposed RPMP short-term projects on water resources, pursue funding to assess, design, and restore 17 degraded stream segments. These stream restoration projects may include repairs such as culvert removals or more extensive stream channel restoration and bank stabilization. An initial stream assessment would determine the proper restoration strategy.

Environmental Resource	Proposed Mitigation or Protective Measures
Biological Resources	• Project-Level Mitigation: Natural resource-related mitigations for each short-term project would be regulated through the Fort Belvoir Tree Removal and Protection policy. Mitigation actions under this policy are determined by the number of trees four inches in diameter-at-breast-height that are removed due to development. The policy provides for several mitigation options, including replacing the lost trees at a 2- to-1 ratio or an "out-of-kind" mitigation action, such as stream restoration or Partners-In-Flight (PIF) habitat enhancement. The out-of-kind mitigation budget would be determined by the current industry cost of the 2-to-1 tree replacement option. The final mitigation project would be selected by the Fort Belvoir Directorate of Public Works Environmental and Natural Resources Division (ENRD) staff. ENRD would also continue to identify opportunities where actions such as removing abandoned pavement (e.g., Woodlawn Road and Keene Road) or structures would benefit fish and wildlife resources. Also, for each project, Fort Belvoir may need to conduct a survey for potentially present federal and state-listed species and their habitat. • Cumulative, Installation-Wide Mitigation: Fort Belvoir would mitigate the cumulative impacts on natural resources of implementing the proposed short-term projects by adding approximately 110 acres of land to the protected Forest and Wildlife Corridor (FWC), approximately 65 acres to the Accotink Bay Wildlife Refuge, and approximately 59 acres of PIF mitigation areas; and by building three new wildlife crossings under US Route 1 in the Accotink Creek drainage area. The land parcels to be added to the FWC and the Accotink Bay Wildlife Refuge contain sensitive areas such as wetlands, locally-rare ecotypes, and wildlife migration corridors. Protecting these parcels under the FWC and refuge designations would preserve their ecological value.
Utilities	During the construction of new utility service lines and facilities, the mitigation measures described under Geology, Topography and Soils and Biological Resources would apply.
Hazardous Substances and Potentially Contaminated Sites	Mitigation measures for project development would include all measures normally required by Commonwealth of Virginia and Federal environmental regulations, and Army and Department of Defense requirements. Each short-term and long-term project would be reviewed during the planning phase for any impacts from known hazardous substances and contaminated areas (to include soil, groundwater, UXO, and landfill gas). If it is determined that contamination would impact the project, mitigations such as additional health and safety requirements, special material handling (removal/disposal/treatment), or engineering controls may be implemented. Fort Belvoir would work with the project team during the planning phase to ensure that any special provisions are included in the construction contract and all applicable requirements are met. If a project encounters an area with unknown contamination, Fort Belvoir would review the site conditions and determine a path forward to ensure protection of human health and the environment, which may include mitigations such as those listed above.
Energy Use and Sustainability	Fort Belvoir would consider: • Enhancing the post's reporting procedures to ensure that all building square footage, energy use, and water use data in the Army Energy and Water Reporting System are current and complete for all facilities on Fort Belvoir. • Collecting an additional metric for assessing data center energy consumption, such as power usage efficiency, to enable tracking of the contribution of high energy use buildings to overall energy consumption on the post and thereby foster more sustainable operations. • Integrating land use and transportation planning to reduce transportation-related impacts.

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6 Coastal 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 adopting and implementing an updated RPMP for Fort Belvoir's Main Post (with the exception of the HEC) and the FBNA and implementing the plan's proposed short-term development. The Army is required to determine the consistency of its activities affecting Virginia's coastal resources or coastal uses with the Virginia Coastal Resources Management Program.

This consistency determination represents an analysis of project activities in light of established Virginia Coastal Resources Management Program Enforceable Policies and Programs. Furthermore, submission of this consistency determination reflects the commitment of the Army to comply with those Enforceable Policies and Programs. The proposed action would be implemented in a manner consistent with the Virginia Coastal Zone Management (CZM) Program. The Army has determined that updating Fort Belvoir's RPMP and implementing the plan's short-term projects 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.

6.1 DESCRIPTION OF PROPOSED ACTION

The Army proposes to adopt and implement an updated RPMP for Fort Belvoir's Main Post and FBNA and to implement the plan's proposed short-term development. The proposed action would include 52 proposed future short-term construction, demolition, and/or renovation projects to be constructed in fiscal years 2012 through 2017, as listed in Table 2-2 and shown in Figure 2-4. Nine short-term transportation projects would also be included, as listed in Table 2-3 and shown in Figure 2-9.

NEPA documentation has been completed or is underway for many of the short-term projects to be implemented in the next few years, as described in Section 1.3.2. Although projects that have already completed CZM program requirements do not require further impact evaluation, they are included in this consistency determination because they form part of the proposed action, which is to implement the whole RPMP update, including the short-term projects in the RPMP's Installation Development Program.

Many of the proposed sites have been disturbed in the past and still include pavement and buildings that would be demolished. Some of the projects would be entirely built on existing impervious surfaces, such as parking lots, so would result in zero increase in impervious surfaces.

The total increase in impervious surfaces from short-term development projects is estimated to be 88.7 acres (Table 2-2), with most of the increase (55.3 acres) occurring in the Accotink Creek watershed (Table 3.8-5). Short-term transportation projects would cumulatively (over the entire Fort Belvoir and FBNA land area) result in another increase of impervious surface of about 3.85 acres (Tables 2-3 and 3.8-6). The short-term

development and transportation projects would cumulatively cause minor increases in watershed imperviousness. In all watersheds, the increase in percent watershed imperviousness would be well below one percent.

Planning for the long-term projects is preliminary, and the building and infrastructure needs, when identified, could encompass smaller areas than estimated. The project designers would plan future projects to avoid environmental and other site constraints to the extent practicable. As a preliminary estimate, the long-term projects would cumulatively result in a net increase of impervious surface over the entire Fort Belvoir and FBNA land area of 33.3 acres (Tables 2-4 and 3.8-7). Long-term transportation projects net increase in impervious surface would result in an estimated cumulative net increase of impervious surfaces of 10.4 acres (Table 3.8-8).

6.2 ASSESSMENT OF PROBABLE EFFECTS

In compliance with NEPA, Fort Belvoir has prepared this EIS to evaluate environmental impacts potentially resulting from updating Fort Belvoir's RPMP and implementing the plan's short-term projects.

The Commonwealth of Virginia has developed and implemented a federally approved CZM Program encompassing nine enforceable policies for the coastal area 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

A summary analysis of how the proposed action would affect each of the enforceable policies based on the more detailed analyses presented in this DEIS, is presented in Table 6-1.

6.3 SUMMARY OF FINDINGS

Details of effects covering in the preceding analysis are provided in Sections 3.5.3, 3.8.3, and 3.9.3 of this EIS. For all of the short-term and long-term projects included in the proposed action Fort Belvoir would ensure that: the project design includes appropriate BMPs; the construction contractor uses and maintains appropriate BMPs; project designers obtain the requisite permits and approvals; and mitigation measures proposed for each project are implemented. Proposed mitigation measures are summarized in Chapter 5.

Fort Belvoir has determined that the proposed action, which would be implemented in accordance with associated mitigation measures, would be consistent to the maximum extent practicable with the federally-approved enforceable policies of the Virginia CZM Program, pursuant to the Coastal Zone Management Act of 1972, as amended, and in accordance with 15 CFR Part 930 (c).

Table 6-1
Effects of Proposed Action on Enforceable Policies

Applicable Enforceable Policy	Effects 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 Department of Game and Inland Fisheries (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** The proposed action has little to no potential to affect fisheries, either directly or indirectly. Compliance with state and federal stormwater requirements would assure minimal impacts on water quality. Effects on finfish resources are assessed in Sections 3.9.3.2, 3.9.4.2, and 3.95.2. Pollution control strategies are discussed in Section 3.8.1.4. None of the proposed projects would build facilities on or in the Potomac River or its tributaries or use 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 VMRC (Virginia Code §28.2-1200 through §28.2-1213).	**Not Applicable** The proposed action would not involve any encroachment in, on or over state-owned subaqueous lands.
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. (i) The tidal wetlands program is administered by the MRC (Virginia Code §28.2-1301 through §28.2-1320). (ii) 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 requirements of §401 of the Clean Water Act of 1972..	**Consistent to the Maximum Extent Practicable? Yes** The proposed action would not affect any tidal wetlands at Fort Belvoir. Effects on non-tidal wetlands are assessed in Sections 3.9.3.4, 3.9.4.4, and 3.9.5.4. Five of the short-term projects have had or would have impacts on wetlands and streams (ST 1, ST 4, ST 17, ST 18, ST 28), as summarized in Table 3.9-5. These projects have all been evaluated in previous NEPA reports. The Preferred Alternative short-term projects would lead to a minor long-term impact of approximately 1,532 linear feet of stream habitat (see Table 3.9-5). Most of the loss (over 70 percent), plus loss of 0.19 acres of open water, results from the four stream crossings in the Dogue Creek watershed associated with Project ST 4 (also listed as STT 1, Mulligan Road), which has already been evaluated by an EA (USDOT, FHWA, 2006), approved, permitted, and is under construction. This loss of habitat is considered minor in light of the amount of stream habitat on the installation and the habitat being restored as mitigation for these losses. Compliance with state and the

Applicable Enforceable Policy	Effects of the Proposed Action
	new federal stormwater requirements would assure minimal impacts on water quality. Of the long-term development projects, only the LT 9 site, the Fort Belvoir North Area District, has the potential to impact wetlands and streams. Planning for the long-term projects is very preliminary, and sites could be designed to minimize impacts. The installation would prepare and adhere to a Sediment and Erosion Control Plan to prevent sedimentation from entering surface waters and associated wetlands (see non-point source pollution control section below).
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 (Virginia Code §28.2-1400 through §28.2-1420).	**Not Applicable** No permanent alteration of or construction upon any coastal primary sand dune would take place under the proposed action. There is no potential to affect coastal primary sand dunes; therefore, the EIS does not include an evaluation of this resource.
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 VDEQ (Virginia Code §*62.1-44.15:51 et seq.*).	**Consistent to the Maximum Extent Practicable? Yes** Effects on soils are assessed in Sections 3.7.3.2, 3.7.4.2, and 3.7.5.2. Watershed effects are described in Sections 3.8.3, 3.8.4, and 3.8.5. Short-term impacts would consist of erosion and sedimentation downstream during construction while soils are exposed. The greatest percentage increase in runoff, based on the increase in impervious surface, would occur in the Accotink Bay watershed. In no case would the short-term projects cause a watershed to exceed the 10 to 20 percent imperviousness threshold associated with a shift to degraded water quality, although it should be noted that the Accotink Bay watershed currently consists of approximately 26 percent impervious surfaces (Section 3.8.3.1). Strict adherence to Virginia ESC Law and Virginia Stormwater Management Program permit monitoring would minimize these impacts and help the installation resolve the severe erosion issues currently affecting many of its stream channels as the result of historic development practices.
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 National Pollutant Discharge Elimination System (NPDES) permit program established pursuant to §402 of the federal Clean Water Act and administered in Virginia as the VPDES permit program. The Water Quality Certification requirements of §401 of the Clean Water Act of 1972 is administered under the Virginia Water Protection Permit program.	**Consistent to the Maximum Extent Practicable? Yes** As described in Section 3.8.1.3, Fort Belvoir has a municipal separate storm sewer system (MS4), the discharge from which is permitted by VPDES MS4 Stormwater Permit (No. VAR040093) and a current VPDES Industrial Stormwater General Permit (No. VAR051080 – expires June 30, 2019) for DAAF. Fort Belvoir has applied for an industrial stormwater permit for the entire installation, currently under review (Draft Permit No. VA0092771). The proposed action would result in a new source (construction stormwater) of point source pollution, but adverse impacts would be minimal, controlled through a Stormwater Pollution Prevention Plan, and subject to obtaining a Virginia Stormwater Management Program (VSMP) Permit. Fort Belvoir reviews all construction site plans affecting one acre or more for compliance with the state's Stormwater Management Act.

Applicable Enforceable Policy	Effects of the Proposed Action
	Compliance with Section 438 of the 2007 Energy Independence and Security Act (EISA) requires federal development projects with a footprint exceeding 5,000 square feet to include site planning, design, construction, and maintenance strategies to maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of flow. These actions would minimize runoff and and in some cases reverse adverse effects from present conditions, by compliance with EISA Section 438 and VDEQ's requirement for adequate outfall which would also act to control point source pollution. Effects pertaining to stormwater are discussed in Sections 3.8.3.2. Use of onsite stormwater retention measures to comply with EISA Section 438 would reduce the amount and rate of stormwater discharging from the site after a rainfall for both short-term and long-term projects.
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).	**Not Applicable** Fort Belvoir relies on its sanitary sewer system and does not employ septic systems.
Air Pollution Control The program implements the federal Clean Air Act to provide a legally enforceable State Implementation Plan for the attainment and maintenance of the National Ambient Air Quality Standards. 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** Implementation of the short-term projects would have short- and long-term minor adverse effects. Short-term effects would be due to generating airborne dust and other pollutants during construction, as described in Section 3.5.3.1. Long-term effects would be from commuting activities, and introducing new stationary sources of pollutants such as back-up generators and boilers. Increases in emissions would be below the General Conformity Rule applicability thresholds and would not contribute to a violation of any federal, state, or local air regulation.
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 (Virginia Administrative Code 9 VAC 25-830-10 et seq.).	**Consistent to the Maximum Extent Practicable? Yes** Seven short-term projects would affect Chesapeake Bay Resource Protection Areas (RPAs), resulting in encroachment on approximately 5.3 acres (Table 3.8-9).The largest impact on Chesapeake Bay RPAs would result from ST 4's (also referenced as STT 1, Mulligan Road) encroaching on approximately 2.83 acres of Chesapeake Bay RPA. This project has already been evaluated in an EA. For all of these projects, the building permit approval process would require compliance with all applicable codes and regulations. Public roads are permitted within the RPA, provided that minimal criteria are met (Virginia Administrative Code 9 VAC 10-20-150 B).

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8 Distribution & Notification List



Printed and/or electronic copies of the Draft EIS were provided to the agencies and individuals listed in Appendix A. The Draft EIS distribution list was updated to reflect changes in personnel that took place between the release of the Draft EIS and the release of this Final EIS. The agencies and persons on the updated list below will receive a copy of the Final EIS or will be notified of its release.

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Katherine Weber	AECOM	Geographic Information Systems	BA, Geography	10
Steven Gleason	Atkins	Senior Project Manager, Real Property Master Plan and Transportation Management Plan	BLA., Landscape Architecture BS, Environmental Science	31
Patricia Komara	Atkins	Project Manager, Real Property Master Plan	BLA, Landscape Architecture	20
Gregory Tarker	Atkins	Senior Landscape Architect, Real Property Master Plan	BLA, Landscape Architecture	20
John (Jay) Evans	Cambridge Systematics	Travel Forecasting	MBA BS Civil and Environmental Engineering	20
Feng Liu	Cambridge Systematics	Travel Forecasting	PhD, City and Regional Planning MS, Environmental Science BS, Geography	24
Janet O'Neill	Carter's Run Environmental Corporation	Water and Biological Resources	MS, Environmental Health Engineering BS, Fisheries Biology	38
Steven Shapiro	Dewberry	Senior Associate, Traffic and Transportation Analysis	MS, Transportation; BS, Systems Science	36
Karen Coghlan	Karen M. Coghlan Associates	Public Involvement	BA, English	41
Timothy Lavallee	LPES, Inc	Air Quality and Noise Analysis	MS, Civil Engineering BS, Mechanical Engineering	17
Linda Tafazoli	LPES, Inc	Air Quality and Noise Analysis	BS, Information Systems	8

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