ENVIRONMENTAL ASSESSMENT

The National Museum of the United States Army
Fort Belvoir, Virginia

Department of the Army
US Army Garrison Fort Belvoir, VA

October 2008

DRAFT

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THE NATIONAL MUSEUM OF THE UNITED STATES ARMY

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DRAFT

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Acronym	Definition
ABWR	Accotink Bay Wildlife Refuge
Ac	acre
ACP	Access control point
ADNL	A-weighted day-night sound level
AHF	Army Historical Foundation
AM	12 Midnight to 12 Noon
APE	Area of potential effect
AQCR	Air-quality control region
AR	Army Regulation
AST	Above ground storage tank
AT/FP	Antiterrorism/Force Protection
BGEPA	Bald and Golden Eagle Protection Act
BMO	Beech Mixed Oak
BMP	Best Management Practice
BRAC	Base Realignment and Closure
CAA	Clean Air Act
CBPA	Chesapeake Bay Preservation Act
CBPO	Chesapeake Bay Preservation Ordinance
CDP	Census Designated Place
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cfs	Cubic feet per second
CIS	Capital improvements strategy
CO	Carbon monoxide
CRMP	Coastal Resources Management Plan
CZMARA	Coastal Zone Management Act Reauthorization Amendments
dB	Decibel
dBA	A-weighted sound pressure level in decibels
D-CEETA	Defense Communications Electronics Evaluation and Testing Activity
DLA	Defense Logistics Agency
DNH	Division of Natural Heritage
DNL	Day-night sound level
DoD	Department of Defense
DVP	Dominion Virginia Power
EA	Environmental Assessment
EIS	Environmental Impact Statement
EMS	Emergency Medical Service
ENRD	Environmental Natural Resources Division
EO	Executive Order
EPG	Engineer Proving Grounds
ESA	Endangered Species Act
ESC	Erosion and sediment control
^{0}F	degrees Fahrenheit
FEIS	Final EIS
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FNSI	Finding of no significant impact
FS	Feasibility Study
ft	Foot, feet

Acronym	Definition
FWC	Forest and Wildlife Corridor
GCR	General conformity rules
GIS	Geographic information system
GSF	Gross square foot
HQDA	Headquarters, Department of Army
HWMP	Hazardous Waste Management / Waste Minimization Plan
I-95	Interstate 95
IDG	Installation design guide
INRMP	Integrated Natural Resources Management Plan
JMAWR	Jackson Miles Abbott Wildlife Refuge
km	kilometer
kV	Kilovolts
kwh	kilowatt hour
LEED	Leadership in Energy and Environmental Design
L_{eq}	Equivalent sound level
MBTA	Migratory Bird Treaty Act
Mi	Mile
MOT	Maintenance of traffic
MP	Military Police
mph	Miles per hour
msl	Mean sea level
MWCOG	Metropolitan Washington Council of Governments
MWD	Moderately well drained
MWR	Morale, Welfare, and Recreation Program
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NCPC	National Capital Planning Commission
NCR	National Capital Region
NHPA	National Historic Preservation Act
NMUSA	National Museum of the US Army
NO_x	Nitrogen oxides
NOA	Notice of availability
NOI	Notice of intent
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSPS	New source performance standards
NSR	New source review
O_3	Ozone
PD	Poorly drained
PIF	Partners in Flight
PM	12 Noon to 12 midnight
$PM_{2.5}$	Fine particulate matter
psi	Pounds per square inch
PX	Post Exchange
QRP	Qualified Recycling Program
RCRA	Resource Conservation and Recovery Act
REX	Richmond Highway Express
RMA	Resource Management Area
ROD	Record of Decision
RPA	Resource Protection Area

Acronym	Definition
RPMP-LRC	Real Property Master Plan-Long Range Component
RV	Recreational vehicle
sf	Square foot
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SO_2	Sulfur dioxide
SOC	Species of concern
SRC	Short range component
SWM	Storm water management
SWPPP	Stormwater pollution prevention plan
tpy	Tons per year
USACE	US Army Corps of Engineers
USC	United States Code
USEPA	US Environmental Protection Agency
USFWS	US Fish and Wildlife Service
UST	Underground storage tank
VAC	Code of Virginia
VDCR	Virginia Department of Conservation and Recreation
VDEQ	Virginia Department of Environmental Quality
VDGIF	Virginia Department of Game and Inland Fisheries
VDHR	Virginia Department of Historic Resources
VDOT	Virginia Department of Transportation
VRE	Virginia Railway Express
VSMP	Virginia Stormwater Management Permit
WD	Well drained
WMATA	Washington Metropolitan Area Transit Authority
WTU	Warrior in Transition Unit

INTRODUCTION

The Army proposes to build the National Museum of the US Army (NMUSA) at US Army Garrison Fort Belvoir, Virginia (Figure I-1, Location of Fort Belvoir). In 1979, the US Army began serious consideration of a National Museum to collect and preserve Army memorabilia and honor the service and sacrifice of those Soldiers who have given to our country. Since that time, over 64 sites in the Washington Metropolitan area and around the country have been evaluated as potential locations for the NMUSA. Fort Belvoir, Virginia has been identified as the best and only reasonable location for the NMUSA. In October 2001, the Secretary of the Army officially designated Fort Belvoir as the site for NMUSA, and Congress made this decision into law in September 2003 (Title 10, United States Code, Section 4772).

The Army has also evaluated a number of potential sites within Fort Belvoir for NMUSA (Figure I-2, Alternative Sites on Fort Belvoir), but has narrowed the choice to just two – the Pence Gate and Gunston sites. The rationale for this site selection is provided in Chapter 2.

Decision Makers

The Garrison Commander of Fort Belvoir signs the Finding of No Significant Impact and Environmental Assessment. The siting decision will be announced by the office of the Assistant Secretary of the Army.

What is the purpose of this document?

The purpose of this environmental assessment (EA) is to:

- Provide the US Army decision makers with a tool to aid in the decision process. The EA compares the environmental impacts of each of the alternative sites as well as the impacts and implications of the "No Build" (or "do nothing") alternative.

- Document the process that has led the Army to select Fort Belvoir as the overall location for the museum, and the process that will lead to the selection of the specific site (if any) on Fort Belvoir.
- Inform the public of our proposed plan, and provide them with the opportunity to comment on what they like or don't like about the project and the alternatives.
- Comply with the requirements of the National Environmental Policy Act (NEPA) of 1969. Fort Belvoir is preparing this EA to publicly document the environmental consequences of the proposed action. The EA has been prepared pursuant to the Council on Environmental Quality (CEQ) regulations in 40 Code of Federal Regulations (CFR) Part 1500-1508, and 32 CFR Chapter V Part 651.

In what other ways is the public involved?

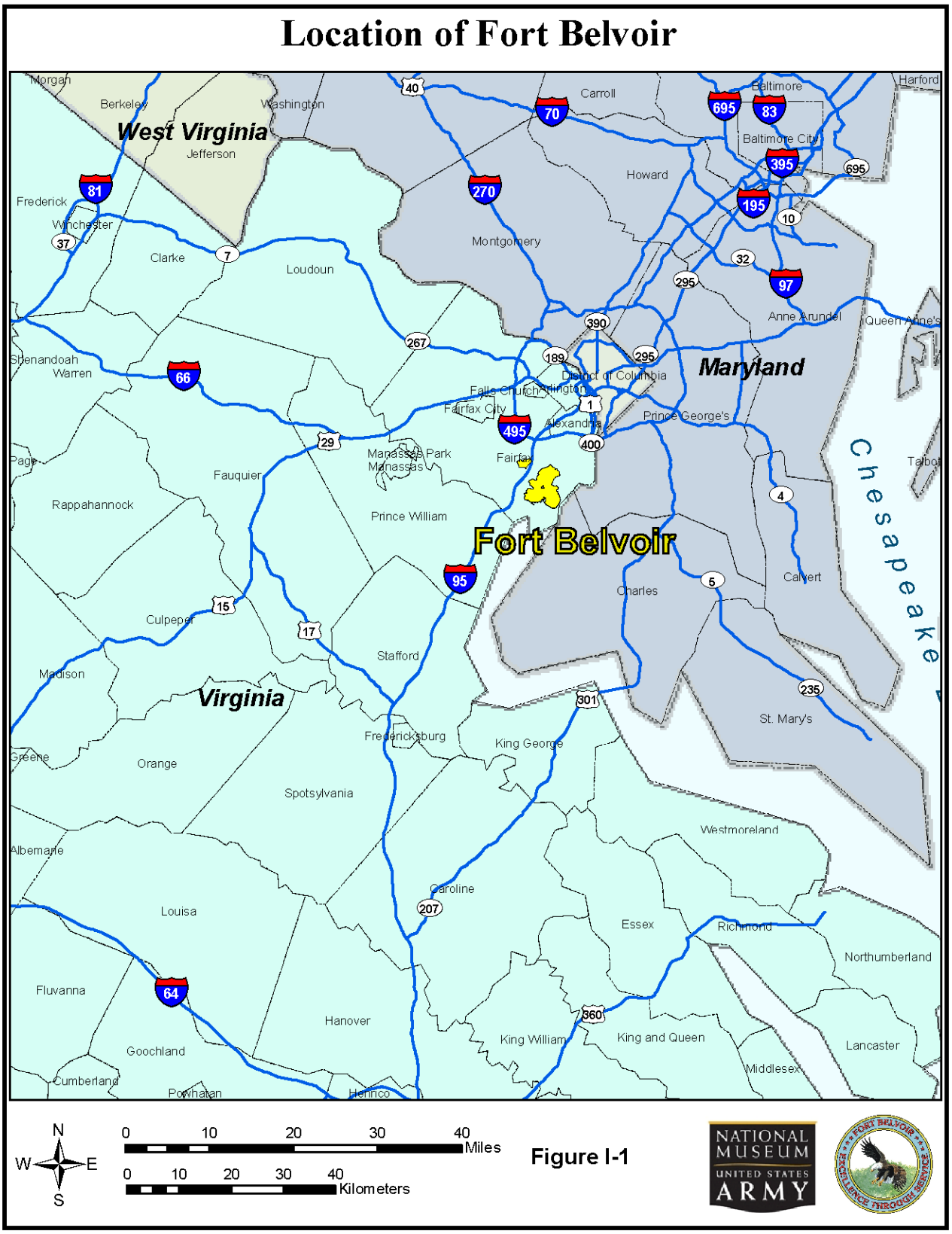
To date, the Army Historical Foundation, the entity responsible for raising funds to construct the NMUSA, has held public information presentations and has maintained a website that focuses on their mission and fund raising efforts. We also plan to hold a public information meeting once the draft EA is published. The EA will be circulated as a draft to interested federal, state, and local agencies to provide an opportunity for those agencies to comment. A Notice of Availability (NOA) will be published in newspapers, announcing that the draft EA is available for public review, so that the public similarly has an opportunity to comment.

The National Environmental Policy Act

NEPA requires the consideration of environmental issues in federal agency planning and decision-making. A federal agency must prepare an Environmental Impact Statement (EIS) or an EA for any federal action not exempt by law, "emergencies," or "categorically excluded." If a federal action might significantly affect the quality of the human environment, the federal agency must prepare an EIS. An EA is meant to be a concise public document that provides the basis for determining whether or not to prepare an EIS. The EA should address:

- The need for the proposal.
- The alternatives.
- The environmental impacts of the proposed action and alternatives.
- A listing of agencies and persons consulted.

The EA results in either a Finding of No Significant Impact (FNSI) or a Notice of Intent (NOI) to prepare an EIS. If the Fort Belvoir Garrison Commander determines that the proposed action might have a significant impact on the quality of the human environment, then he will direct his staff to prepare an EIS.


Location of Fort Belvoir
West Virginia
Virginia
Maryland
Fort Belvoir
Chesapeake
Morgan
Berkeley
Washington
Jefferson
Frederick
Winchester
Clarke
Loudoun
Carroll
Baltimore
Harford
Baltimore City
Howard
Montgomery
Anne Arundel
Queen Anne's
Shenandoah
Warren
Page
Rappahannock
Fauquier
Prince William
Manassas Park
Manassas
Fairfax City
Falls Church
Arlington
District of Columbia
Alexandria
Prince George's
Fairfax
Talbot
Calvert
Charles
St. Mary's
Culpeper
Madison
Stafford
Fredericksburg
King George
Greene
Orange
Spotsylvania
Albemarle
Louisa
Caroline
Essex
Richmond
Westmoreland
Northumberland
Fluvanna
Hanover
King William
King and Queen
Lancaster
Middlesex
Goochland
Cumberland
Powhatan
Henrico
N
W
E
S
0 10 20 30 40 Miles
0 10 20 30 40 Kilometers
Figure I-1
NATIONAL MUSEUM
UNITED STATES ARMY

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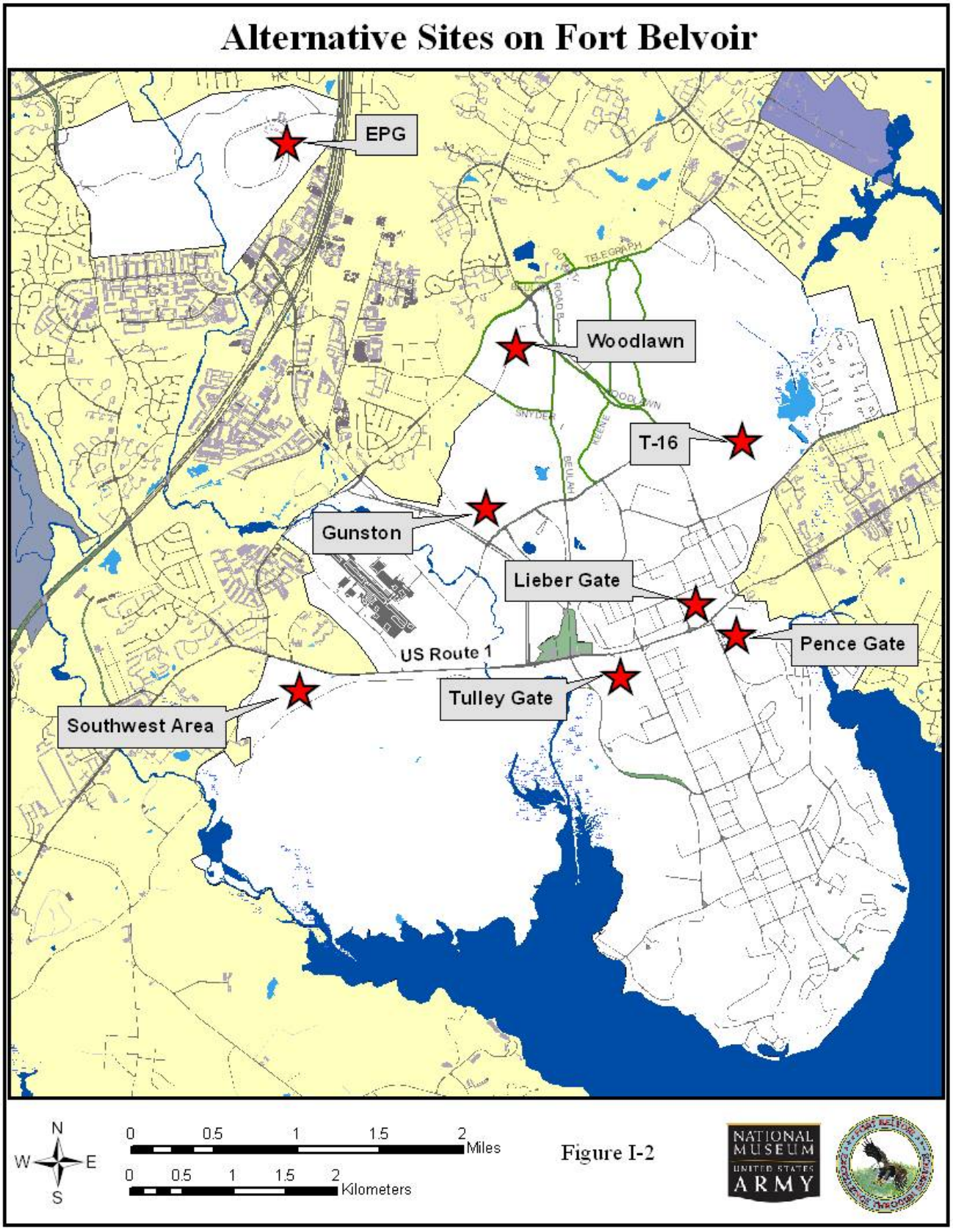

Figure I-2

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1 PURPOSE AND NEED FOR THE PROJECT

1.1 What is the purpose of the project?

The purpose of the National Museum of the United States Army (NMUSA) project is to provide the American public with a museum documenting the history of the US Army throughout its 233-year history, from its beginnings as the Colonial Militia to its present position as the world's most powerful ground force. The US Army proposes to construct a facility to house and display thousands of artifacts and works of art, ranging from buttons to armored vehicles, in a series of interpretive exhibits geared to educate visitors on the role of the Army in US and world history.

1.2 Why does the Army need NMUSA?

At present, there is no national museum for the US Army, despite the fact that it is the oldest operating branch of the US Armed Forces. The Army operates 61 smaller museums and museum activities at installations scattered throughout the country, but each of these museums commemorates a different aspect, branch, unit, theme, or historic period of the Army. A national museum is needed to provide the American public with the complete overview of the Army's history, as well as a focal point for managing the Army's valuable collections. It would also be a central forum for those members of the government and public needing to research various aspects of the Army's history. The lessons learned from past experience will provide valuable insights for future military confrontations.

The National Museum of the US Army – Strategic Vision

The Army's strategic vision for the museum is a 21st century museum of excellence, a recognized national and international visitor destination that will:

- Honor the service and sacrifice of the Soldier, veteran, and the entire Army family.
- Engage, entertain, and educate visitors about the historic role of the Army in the development of the nation, and the current relationship of the Army to the people of this nation, in order to ensure the continued growth of the Army into the future.
- Promote excellence in scholarship among the nation's youth.
- Inspire visitors and promote *esprit de corps* among Soldiers.
- Preserve the heritage and legacy of the Army.
- Ensure accurate and comprehensive portrayal of the Army's story.
- Serve as the capstone of the US Army museum system.

Even more important is the opportunity for the American public to pay tribute to the millions of men and women who have served this country as Soldiers, dedicating their time, their comfort, and often their lives for the sake of this country.

2 DESCRIPTION OF THE PROPOSED ACTION & ALTERNATIVES

2.1 What would the NMUSA include?

The Army is still in the process of planning the NMUSA, but at this time, the Army envisions several basic elements at either of two alternative sites being considered on Fort Belvoir (Sections 2.5 and 2.6). **While the final design for NMUSA may vary from the conceptual layouts presented here, no matter which site is selected, the impacts of the final design would not exceed the impacts described in this EA. Very likely, the impacts of the final design on the selected site would be less than the projected impacts of the conceptual layouts.**

Construction of NMUSA would occur in multiple phases at the chosen site. Constructing the project in phases would ensure that all the elements needed for a successful museum opening are in place but that construction does not outpace the availability of funding, which will come through the Army Historical Foundation. The program elements presented below as the proposed action are not locked into specific phases – the schedule for constructing these elements may change due to fundraising requirements. This EA assumes the full build-out of the elements presented below.

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

- **Main museum building** – an approximately 155,000-gross square foot (gsf), one and/or multi-

story building with exhibit halls, auditorium, food service, retail areas, administrative spaces, education center, and lobby with a visitor reception area.

- **Memorial Garden –** a contemplative 1.4-acre (ac) area to honor the service and sacrifices of US Army Soldiers, veterans, civilians, and their families.
- **Parade Ground and Grandstand –** a 5.6-ac parade ground with a 6,000-gsf grandstand and a staging area for special events and ceremonial events (see sidebar).
- **Amphitheater** – a 6,700-sf staging and production venue to provide a smaller, more intimate environment than the parade ground.
- **Drop-off and Arrival Plaza** – a 0.9-ac area for passenger drop-off.
- **Parking** – a total of approximately 4.6 ac of visitor (approximately 500 to 550 spaces) and employee (75 spaces) parking. Depending on the site and plan selected, this parking may be in the form of either surface or structured (garage) parking, or some combination of the two.
- **Bus and recreational vehicle** (**RV) parking** – a 0.9 ac area for larger vehicle parking (20 spaces each).
- **Screened Service Court** – a 0.3 ac area at NMUSA to provide food and other services.
- **A Main Entrance for visitors and a Service Entrance for employees and delivery vehicles** entering NMUSA complex, both with controlled access (Berger/Smith Group, August, 2008).

Future expansion phases (as funds become available) might include:

- **Expansion of the Museum –** up to 95,000-gsf.
- **Expansion of the Memorial Garden** – up to 0.9 ac.

Proposed Parade Ground Events

- Headquarters, Department of the Army-level ceremonies
  - Change of Command Responsibility
  - Retirement
- Ceremonial Special Events
  - Commemorations
  - Twilight Tattoos
  - Full Honors Parades
  - Farewell and Welcome Home
  - Counterpart Visit Welcome
- Tenant Command Events
- Training Activities and Demonstration
  - Physical Training
  - Emergency Response Training
  - Golden Knights Demonstrations
  - Vehicle Demonstrations
  - Drill
  - Historic Interpretations
- Organization Days and Family Events
- Community Partnership Events
  - Independence Day
  - Oktoberfest
  - Springfest
- Re-enactments
- Graduation Ceremonies
- High School Marching Band & Cheerleading Demonstrations and Competitions

- **Expansion of the Grandstand –** up to 12,000 gsf.
- **Additional Building** – 1,620 gsf near the grandstand to store cannons or serve as a temporary stable.
- **Macro Gallery** – a 30,375-gsf, one-story building to display large artifacts such as combat and support vehicles and dioramas.
- **Additional Parking –** up to 2.4 additional ac (300 spaces) for overflow parking.
- **Encampment Area/Outdoor Education –** a 2.0-ac outdoor education center and training area. (excerpts from Berger/SmithGroup, August, 2008).

During the initial phase of construction, the Army would provide supporting infrastructure such as internal roadways and traffic control, and changes to external roadways to accommodate visitor and employee traffic. The Army would provide stormwater drainage and management facilities (including stormwater best management practices consistent with the Chesapeake Bay Local Assistance Department regulations and the Fairfax County Chesapeake Bay Ordinance); potable water and fire protection; sanitary sewer lines and pump stations; electrical and natural gas service lines; fencing and security compliant with anti-terrorism and force protection (AT/FP) standards; etc. (excerpts from Berger/SmithGroup, August 2008). The specific infrastructure requirements would vary depending on the site selected and the final design; the impacts of these differences are addressed in Chapter 3.

2.2 Why will the NMUSA be located at Fort Belvoir?

The Army has been planning and evaluating potential locations for NMUSA since 1979. In 1998, the Directorate of Army Military History developed a list of 64 potential sites throughout the National Capital Region (NCR) to be considered (DAMH-MD[TAM], August 1998). In 2000, an Army Working Group (AWG) took a fresh look at sites both within and outside of the NCR. However, the AWG rejected locations outside the NCR – they considered a site within the NCR to be critical because it is the political center of the US; it is a national and international visitor destination; and, the Army senior leadership is concentrated in the NCR (US Army Center of Military History, March 2000).

The 2000 AWG narrowed the selection to two sites – the Southeast Federal Center and Fort Belvoir. They rejected the Southeast Federal Center due to its Navy heritage and location adjacent to the Washington Navy Yard and the US Navy Museum.

In October 2001, the Secretary of the Army announced that Fort Belvoir would be the location of NMUSA because Fort Belvoir had the appropriate public access, educational impact, accessibility for national leaders, commercial access, logistics and maintenance support, the facilitation of public law with respect to invaluable artifacts, and appropriate site physical characteristics. This preferred location has been ratified by every Secretary of the Army and Army Chief of Staff (CSA) since that time, and became law with the passage of Public Law 108-375, which amended Title 10, United States Code by adding Section 4772.

Table 2–1
NMUSA Location Evaluation Criteria

a. How many conservators are within 30 miles of the site?
b. Distance/convenience to core research facilities: the National Archives, Library of Congress, the Museum of American History, and Military History Institute.
c. Accessible by public transportation at the time of the study: Metrorail, bus, train, airport.
d. Accessible by major roadways – not feeder roads.
e. Commercial touring enterprises – number of local providers.
f. Number of military schools, high schools and universities (30-mile radius).
g. Proximity to foreign embassies.
h. Proximity to active duty Soldiers.
i. Proximity to the Pentagon.
j. Proximity to Capitol Hill.
k. How many curatorial supplies and services are located within 30 miles of the site?
l. How many guest facilities are within 10 miles of the site?
m. How many food service facilities are within 1 mile of the site?
n. Existing utilities: water, sewer, gas, electric?
o. Actual number of acres available for a building of 300,000 sq. ft. (approx. 9.6 acres) including visitor parking.
p. Actual acres available for expansion.

Source: 2000 AWG

2.3 What sites at Fort Belvoir are suitable for the NMUSA?

Only the Pence Gate and Gunston sites are considered reasonable. Figure I-2 (Alternative Sites at Fort Belvoir) shows the eight sites that have been considered at Fort Belvoir during the planning process for NMUSA: the Southwest Area, Woodlawn, the Engineering Proving Ground (EPG), the Lieber Gate, the Tulley Gate, T-16, the Pence Gate, and Gunston (US Army Center for Military History, March 2004; excerpts from Berger/SmithGroup, August 2008). At this time, only the Pence Gate and Gunston sites are considered reasonable locations for NMUSA and are evaluated in subsequent chapters of this EA. The other five sites were considered in earlier phases of the planning process but are now considered unreasonable alternatives for the reasons described below.

- **Southwest Alternative Site –** The largely-undeveloped Southwest Area is too far away from the main installation to reasonably make the necessary connections to the nearest available utility and communications lines.

- **Woodlawn Alternative Site** – A public museum at the Woodlawn site would violate the height restriction portion of the anti-terrorism/force protection (AT/FP) standards of the nearby Defense/Community and Electronic Evaluation Testing Activity (D-CEETA) complex. To conform to these standards, the height of a structure at the Woodlawn site may not exceed 225 feet above mean sea level (msl). However, the existing elevation of the Woodlawn site ranges from 200 to 230 feet above msl, making construction at this site within

AT/FP standards impossible. There are also issues with access to the Woodlawn site. Furthermore, a project at this site would require reconstruction of the existing golf course maintenance facilities.

BRAC – Defense Base Realignment and Closure is the Department of Defense (DoD) process for reorganizing installation infrastructure to more efficiently and effectively support its forces, increase operational readiness, and facilitate new ways of doing business.

- **EPG Alternative Site** – A museum at the EPG site would interfere with AT/FP restrictions for planned Base Realignment and Closure (BRAC) construction. There also are issues with the distance of this site from the main installation, the difficulty of connecting to communications and utility systems, and its distance from other area attractions.

- **Lieber Gate Alternative Site** – This was the preferred site (US Army Center for Military History, March 2004) prior to the 2005 BRAC process. It is no longer available – land previously available for NMUSA is now dedicated to the reconfiguration of the North Post access point from Route 1. There are also access issues with this site.

- **Tulley Gate Alternative Site –** The extreme topography of the Tulley Gate site would require much more grading to attain a suitable space for NMUSA buildings and other components. There are major utility corridors in the potential building areas, as well as site access issues.

- **T-16 Alternative Site** – The T-16 area was rejected because of the lack of visibility from area roadways and the limited availability of utilities and communications in the area.

The impacts of the various alternative conceptual layouts for the Pence Gate and Gunston sites are addressed in subsequent chapters of this EA.

2.4 Would the project be the same at either site?

The project would have the same basic elements, but to address constraints specific to each site, the arrangement of buildings, outdoor areas, and parking would vary. To further address site constraints, the planners have provided two alternative preliminary conceptual layouts for the Pence Gate site and four for the Gunston Site. Sections 2.5 and 2.6 provide more information on how the various elements could be accommodated at each site. **These are conceptual layouts only -- the final architectural designer, once under contract, would be responsible for the actual NMUSA configuration. The final configuration may vary from the conceptual layouts presented here, but would include the same elements and would not cause impacts that exceed those discussed in this document.**

2.5 What are the plans for the Pence Gate Site Alternative?

Figures 2-1 and 2-2 show potential alternative conceptual layouts for the Pence Gate Site ("Pence Gate Surface Parking Scheme" and "Pence Gate Structured Parking Scheme"). The site has frontage along US Route 1, which would give NMUSA good public visibility from a major highway. A portion of the site was formerly part of a military housing area (Grays Hill Village), and there are still remnants of roadways, baseball fields, and former

construction. Therefore, much of the site has already been disturbed. There is a 50-ft wide sanitary sewer easement bisecting the site. No construction is allowed in the easement, which constrains the site layout.

Either of the Pence Gate layouts (surface parking or structured [i.e., garage] parking) would take advantage of the topography of the site. The site has a central plateau incised by two steep stream valleys. NMUSA elements would be constructed on the relatively flat area at the top of the plateau to minimize cut-and-fill requirements, and avoid the steep slopes and environmentally-sensitive stream valleys. This approach would provide approximately 40 ac for construction.

For the safety of aircraft at the nearby Davison Army Airfield, building height at the Pence Gate site is restricted to 213 feet above mean sea level (msl). The Pence Gate site is adjacent to the Woodlawn Historic District. A study to define contributing viewsheds to the Woodlawn Historic District and mitigation measures to protect such viewsheds will be completed in winter 2008. If the Pence Gate site falls within an historic viewshed the museum building would have to adhere to viewshed restrictions if this site is selected. This may require that the building be built partially underground (excerpts from Berger/SmithGroup, August 2008).

Either a surface lot or a parking garage (structured parking) would fit on this site. Although more expensive, the garage would allow the designers to better avoid steep slopes, free up more area, and allow for a more flexible development of the overall site. This is the basis for two alternative conceptual layouts for this site: a Structured Parking

Alternative and a Surface Parking Alternative. If the Army decides to proceed with the plan for the parking garage, more upfront investment in the site infrastructure would be required in the initial phase of the construction schedule (excerpts from Berger/SmithGroup, August 2008).

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LEGEND:

Phase 1:

A	Museum
B	Ceremonial Events Area
C	Grandstand
D	Amphitheater
E	Drop-off
F	Service Yard
G	Memorial Area
H	Car Parking – 500 Cars
I	Staff Parking – 75 Cars
J	Bus and RV Parking
K	Retention Pond
L	Staging Area

Future Expansion Phase

M	Museum
N	Grandstand
O	Macro Gallery
P	Memorial Area
Q	Car Parking - 300 Cars
R	Encampment Area
S	Cannon Storage

Extent of Constraint Areas

Figure 2-1: Pence Gate Site, Surface Parking Scheme

LEGEND:

Phase 1

A	Museum
B	Ceremonial Events Area
C	Grandstand
D	Amphitheater
E	Drop-off
F	Service Yard
G	Memorial Area
H	Car Parking – 800 Cars
I	Staff Parking – 75 Cars
J	Bus and RV Parking
K	Retention Pond
L	Staging Area

Future Expansion Phase

M	Museum
N	Grandstand
O	Macro Gallery
P	Memorial Area
R	Encampment Area
S	Cannon Storage

Extent of Constraint Areas

Figure 2-2: Pence Gate Site, Structured Parking Scheme

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2.6 What are the plans for the Gunston Site Alternative?

Figures 2-3 through 2-6 show alternative conceptual layouts for the Gunston site (respectively, "Gunston Fairfax County Parkway Scheme – Surface Parking," "Gunston Fairfax County Parkway [FCP] Scheme – Structured Parking," "Gunston Kingman Road Scheme – Surface Parking," and "Gunston Kingman Road Scheme – Structured Parking").

The plans for the Gunston site would, as with the Pence Gate site, take advantage of the site's topography. The terrain of this site is a series of ridges and valleys topped by small, irregularly-shaped flat areas that come together to form a plateau in the center of the site. This site includes three stream valleys (with its associated wetlands and Chesapeake Bay Resource Protection Areas), and a portion of Fort Belvoir Forest and Wildlife Corridor. The site also includes most of the front nine greens and holes of the Fort Belvoir North Post Golf Course, so like the Pence Gate Alternative, it has already been disturbed. While more irregular than at the Pence Gate site, the plateau has enough room to accommodate the larger NMUSA elements with minimal re-grading.

Based on the alternative conceptual layouts described below, development would require a maximum of 41 ac for the Fairfax County Parkway Surface Parking Alternative, or 44.5 ac for the Kingman Road Surface Parking Alternative. The structured parking alternatives would – for either layout – reduce the impact footprint by up to 2 ac.

The alternatives vary based on the location of NMUSA access roads (excerpts from Berger/SmithGroup, 2008) as well as parking arrangements. The site is visible from, and

has frontage on, the Fairfax County Parkway (Route 7100), and is located approximately 1.4 miles from I-95. It also has frontage on John J. Kingman Road.

If access were provided from the Fairfax County Parkway, it would require construction of an intersection from the Parkway, located approximately 600 feet east of Ehlers Road and 1,760 feet northwest of intersection with Kingman Road. This approach would require closing the crossover and westbound turn lanes at Ehlers Road to prevent left-hand turns into and out of Ehlers Road. It would also require a four-way traffic signal and additional turning lanes (one westbound deceleration lane for right turns, and one eastbound lane for left turns) into NMUSA entrance roadway. These changes have not yet been foreseen in Virginia's plans for the Fairfax County Parkway.

If entry directly from Fairfax County Parkway proves infeasible, the Kingman Road Alternative would provide access from Kingman Road to the eastern part of the site. The latter approach would require that a bridge be built to cross the easternmost stream valley and Fort Belvoir Forest and Wildlife Corridor. A study to determine effects of the bridge and utility easement on wildlife migration and genetic viability would be conducted if either of the Gunston Kingman Road Alternatives are selected. The study would assist in defining mitigation strategies, possibly recommend design changes, or possibly conclude that the crossing should be disqualified altogether. Fort Belvoir would prepare additional NEPA documentation to assess the impacts of the proposed crossing of the Forest and Wildlife Corridor if needed based on the results of the study. The impacts on the Forest and Wildlife corridor are addressed in more detail in Subchapters 3.3 and 3.5.

Figure 2-3: Gunston Site, Fairfax County Parkway Entrance – Surface Parking Scheme

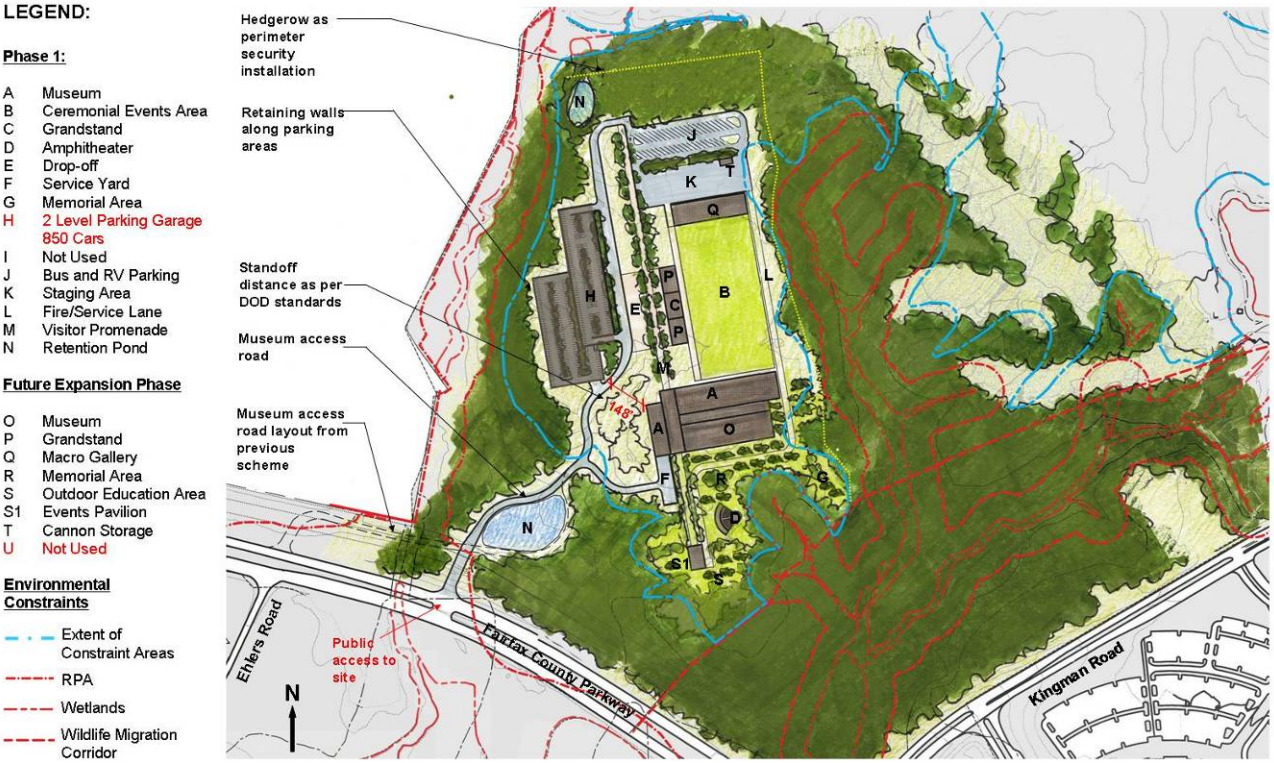

Figure 2-4: Gunston Site, Fairfax County Parkway Entrance – Structured Parking Scheme

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Figure 2-5: Gunston Site, Kingman Road Entrance – Surface Parking Scheme

Figure 2-6: Gunston Site, Kingman Road Entrance – Structured Parking Scheme

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Like the Pence Gate site, the Gunston site is within the building height restriction area for the Davison Army Airfield. Because it is closer to the airfield, the height restrictions are more limiting than at the Pence Gate site. However, the elevation of the Gunston site as compared against the height restriction would still allow for a building height of 94 feet in the northern half of the site, which is more than sufficient for the three-story museum building being considered at this point in the planning process (excerpts from Berger/SmithGroup, August 2008).

Construction at the Gunston site would cause the complete loss of five holes and the partial loss of up to four more holes of the Gunston portion of the North Post 36-hole Golf Course. The number of holes impacted would depend on the alternative selected – the Kingman Road alternative would impact more holes than the Fairfax County Parkway alternative. With either alternative, however, the loss of the five holes would make the front nine Gunston golf holes essentially unplayable. The impacts on the other holes would make the remaining nine Gunston holes unplayable, as well, unless these holes are reconfigured. The impacts on the golf course are addressed in more detail in Subchapter 3.1. However, reconfiguration of the remaining Gunston golf holes is considered part of the proposed action for the Gunston alternatives. If one of the Gunston alternatives is selected for the proposed action, the Army Historical Foundation would reconfigure the remaining holes to ensure that 27 playable holes are retained on the North Post Golf Course. The impacts of the reconfiguration are addressed in this EA.

In addition, if the Gunston Alternative is selected, the Fort Belvoir Directorate of Morale, Welfare and Recreation

(MWR), which operates the golf course, is considering constructing replacement holes to the north and east of the proposed potential NMUSA site to offset the loss of the Gunston holes and to maintain a full 36-hole golf course. Closure of the South Post Golf Course to make way for the new DeWitt Hospital has already reduced golfing opportunities for the Fort Belvoir community, and has taken away a source of funds for the Fort Belvoir MWR program. MWR is therefore reluctant to lose the golf course holes at the site of the proposed NMUSA. If this alternative is selected, and MWR proposes replacement holes, Fort Belvoir would prepare NEPA documentation to assess the impacts of proposed construction of those holes. Army Historical Foundation and MWR would continue to coordinate to ensure that the two sets of proposed holes can be integrated to provide a quality 18-hole course.

2.7 How would the project affect neighboring properties?

If the Pence Gate site is selected, the public entrance for NMUSA would be located opposite Woodlawn Road on US Route 1. The Army would need to provide additional right and left turn lanes from US Route 1 onto the site, as well as change the signalization at the intersection.

If the Gunston site is selected, the public entrance for NMUSA would be located on the Fairfax County Parkway, or on Kingman Road, opposite the entrance to the Defense Threat Reduction Agency and Defense Logistics Agency. The Army would need to provide additional right and left turn lanes on the Fairfax County Parkway, or on Kingman Road, whichever of those two alternatives is selected. The

Army is presently coordinating with VDOT to explore these alternatives, and input from VDOT is expected to influence the alternative site and design selected.

2.8 What does the Army need to do to construct NMUSA facilities?

The exact requirements would depend on which alternative is selected for the proposed action, but construction at either site would require: clearing and grading to prepare the site; excavating and trenching to lay potable water, sanitary sewer, telephone, electric, and other utility lines; and construction of the buildings and other structures.

Heavy machinery would be needed for the grading and construction, as well as heavy trucks to deliver machinery and construction materials, and to haul away debris and excess materials. Construction would require laying about 12.4 ac of asphalt pavement for parking areas, internal roadways, driveways, and paved walkways. At the Pence Gate site, the Army would need to remove approximately 4.7 ac of old road pavement at the site of the former Grays Hill family housing area, and four small buildings to make way for NMUSA facilities. At the Gunston site, the Army has already noted the need to reconfigure and replace golf course holes (Subchapters 2.6 and 3.1). Construction of the front nine replacement holes is beyond the scope of NMUSA project but is addressed as a cumulative impact in Section 3-15.

Proposed Museum Programs:

Planned programs will use indoor and outdoor areas at the NMUSA, allowing for multiple activities appealing to a broad audience.

Education Program – student education, home-school, teacher development, university and military education, and staff professional development and training.

Interpretation Program – interpretive and live dramatic presentations.

Veterans Program – host and participate in special events, traveling exhibits, receptions, reunions, and dramatic events.

Interactive Web Program – online access to the museum's collections, exhibitions, programs and education initiatives.

Public Programs – host viewings of films and literature relating to the US Army, and sponsor book signings, presentations, and question and answer sessions.

Family Programs – Host social opportunities for families, including festivals, workshops, and informal learning classes.

Research and Oral History Program – quality curatorial research to support the museum's collection, interpretive scripts, training programs, and Center for Military History and Army Museum System research activities.

Volunteer Program – opportunities for individuals with diverse skills to serve as gallery representatives, docents, welcome attendants, interpreters, and more.

2.9 What would be involved in the operation of NMUSA?

The Army anticipates that approximately 740,000 visitors would visit NMUSA annually, with approximately 4,800 visitors on peak days. The Army anticipates that at any one time there would be up to 2,200 visitors on-site during NMUSA's operating hours (Economic Research Associates, April 2006).

A workforce of approximately 90 people would be needed to operate NMUSA, including the various programs, the food center, the gift shop, the public entrances, and building and landscape maintenance. As many as 185 people might be working at NMUSA on a typical day when the anticipated number of volunteers, Army Historical Foundation personnel, and contract personnel are included. The Army also anticipates approximately 3 to 4 truck deliveries per day (USPS, FedEx, UPS, food, solid waste hauling, etc.), once NMUSA is in full operation.

Periodically, NMUSA would host parades, training programs, reenactments, ceremonies, and other events (see textbox, page 2-2). Smaller events, such as plays and other small productions, would be staged at the amphitheater.

2.10 When would the NMUSA be built, and how long would it take?

The Army would like to begin construction in the spring of 2010. The Army anticipates that it would take two and one-half years to complete construction of all NMUSA elements. However, due to the schedule for exhibit installation, the

main museum would most likely open to visitors by the summer of 2013. If the Gunston Alternative is selected, reconfiguration of the North Post Golf Course to 27 holes would also be completed by 2013.

2.11 Why do we consider a "No Build" Alternative?

The Army evaluates the "no build" alternative to create a baseline for comparing the effects associated with the "build" alternatives. The No Build Alternative maintains the status quo, meaning that only routine activities would occur over the next 20 years. The No Build Alternative does not satisfy the project's intended purpose of constructing NMUSA and is not the preferred course of action.

2.12 Did environmental factors affect your selection of sites or project design?

The site selection process always includes consideration of the extent to which wetlands, seeps, riparian buffer and Chesapeake Bay RPAs, steep slopes, critical habitats for threatened and endangered species, the Fort Belvoir Wildlife Corridor, and other environmentally-sensitive habitats occur on a site and whether the project can avoid these resources. As demonstrated by the conceptual layouts (Figures 2.1 through 2.6) presented in this chapter, the Army is refining the conceptual layouts to avoid these resources as much as possible. The Army is working the elements of the project into each site in a way that avoids and minimizes impacts on these important environmental resource areas. The Army is considering structured parking as an alternative to surface

parking lots to reduce encroachment on steep slopes and riparian areas. If the Army chooses the Gunston site but determines that the Fairfax County Parkway access alternative is infeasible, the Kingman Road access alternative would be used. In that case, the Army would bridge the stream valley to minimize impacts on the waterway and on the Fort Belvoir Forest and Wildlife Corridor. The impacts for the Forest and Wildlife Corridor are addressed in Section 3.3 and 3.5. The Army would also consider using retaining walls to contain steep slopes and avoid impacting the stream valleys and wetlands. These measures are more expensive than normal construction measures.

As the Army refines the design plans, the Army will continue to evaluate measures that could further reduce adverse impacts.

3 ENVIRONMENTAL IMPACTS: A COMPARISON BETWEEN ALTERNATIVES

Will the project have environmental impacts?

Yes. The environmental impacts of the proposed action would vary based on the alternative site and design selected. In the following paragraphs, the Army assesses the impacts of each alternative. Section 3.14 provides a summary comparing the impacts of the alternatives.

3.1 Land Use, Plans and Coastal Zone Management

What is our study area for this analysis?

The study area for this project includes Fort Belvoir and the adjacent Fairfax County neighborhoods. The proposed action is likely to have limited impacts on land uses beyond the limits of the alternative project sites, as discussed below.

What are the current land uses in the study area?

Land uses around Fort Belvoir are predominantly residential, although commercial and industrial areas, such as the Lorton Valley Industrial Park and a number of retail malls, are located along US Route 1 and near Interstate 95 (I-95). Several sizable tracts in public ownership are located nearby, including Huntley Meadows Park, Pohick Bay Regional Park, Mason Neck State Park, the Washington Grist Mill Park, Mount Vernon Estate and Parkway, Gunston Hall Plantation, Woodlawn Plantation, Potomac River National Wildlife Refuge, and Mason Neck National Wildlife Refuge. Many of these tracts are located along

the Potomac River, resulting in a continuous band of natural habitat along the river.

The post itself is divided into five general areas: North Post, South Post, the Southwest Area, the Davison Army Airfield, and the EPG. The Pence Gate site is located on the South Post, a 2,720-ac area which is the location of the garrison headquarters and associated functions, many administrative offices, warehouses, 11 housing areas, the new DeWitt Hospital, and the proposed Warrior in Transition Unit complex. The Gunston site is located on the 2,400-ac North Post, which is also the location of administrative facilities for larger tenant agencies, two housing areas, and two 18-hole golf-courses (US Army Corps of Engineers, Mobile District, August 2007). Specifically, the Gunston site is located on the southern portion of the North Post Golf Course.

What are the current uses at and next to the two alternative sites?

The Pence Gate site, located near the northeastern corner of the South Post, is unused at this time, but includes roadways that are remnants of Grays Hill Village, a military housing area that was constructed in 1942 and demolished between 1960 and 1994. A baseball field is located at the northeastern end of the site, across from the Woodlawn Baptist Church. A second baseball field occupies the center of the site. Two small buildings and dugouts associated with these fields are located on the Pence Gate site. A 3.0-ac parking lot and a 30,000-sf community club building occupy the southern part of the site (excerpts from Berger/SmithGroup, August 2008).

The Pence Gate site is located at the boundary of the installation, across US Route 1 from the Friends Meeting House and just west of the Woodlawn Baptist Church. The site also abuts the Fairfax County Woodlawn Historic Overlay District. This overlay district limits the heights of buildings that could adversely affect the viewshed of several important cultural resources (the Woodlawn Plantation, the Pope-Leighey House designed by Frank Lloyd Wright, and the Friends Meeting House) to 35 ft. As a federal facility, Fort Belvoir is not bound by the Fairfax County Comprehensive Plan or zoning regulations. However, the Army does strive, to the greatest extent practicable, to ensure that its actions are compatible with County planning restrictions. The Army is also responsible, under Section 106 of the National Historic Preservation Act (NHPA), to consider the effects of its actions on cultural resources, including adverse impacts to viewsheds. The evaluation of this project under Section 106 is addressed at Subchapter 3.6 of this EA. To cooperate with the county planning, and to prevent adverse effects on the cultural resources listed above, and as the result of a BRAC Programmatic Agreement between the Army and the Virginia Department of Historic Resources (VDHR), the Army is conducting a study of the Woodlawn Historic District area on Fort Belvoir to determine the appropriate building height restrictions.

Viewsheds

A *viewshed* is defined as the area visible from a fixed vantage point. Viewsheds tend to be areas of particular scenic or historic value that are deemed worthy of preservation against development or other change. Development of a property that is not listed on (or eligible for) the National Register of Historic Places (NRHP) can still cause a significant effect if the project would be visible from a listed or eligible property.

Another planning factor for this site is that it is located 1.7 mi east of the Davison Army Airfield, and within the three-dimensional space around the airfield that must be kept free of obstructions for the safety of incoming and departing aircraft. Given the distance from the airfield and the site topography, and if the building is located more toward the southeastern portion of the Pence Gate site, the maximum height of a building at the Pence Gate site could be over 213 ft, which should be more than sufficient for a two or three-story building. This restriction is not

as limiting as the height restriction likely to be imposed by the Woodlawn Historic Overlay District, and would be more than met (excerpts from Berger/SmithGroup, August 2008) under the proposed action and alternatives.

The majority of the Gunston site, located north of the intersection of the Fairfax County Parkway and Kingman Road, is already developed with a portion of the North Post Golf Course. The remainder of the site is forested; there are no structures on the site except for a small brick comfort station.

Like the Pence Gate site, the Gunston site is located in the area of building height restrictions caused by operations at nearby Davison Airfield. Given the distance from the airfield and the site topography, the maximum height a building on the northern half of this site can be is 94 feet, which is more than sufficient to construct a three-story building (excerpts from Berger/Smith Group, August 2008), or even a five-story building.

What comprehensive plan currently guides land use decisions at Fort Belvoir?

Until recently, land use at Fort Belvoir was guided by the 1993 Real Property Master Plan (RPMP), which consisted of four elements: the *RPMP Long Range Component (LRC) – 1993;* the *RPMP Short Range Component 1993 – 2000*; a *Capital Investment Strategy*; and a *Mobilization Mission Planning Component*. In 2002, the Army revised the RPMP to include the *Regional Community Support Center Subarea Development Plan*, to address plans for relocation of the DeWitt Hospital, expansion of the Post Exchange (PX), and development of a chapel (US Army Corps of Engineers, Mobile District, August 2007).

The Army again updated the RPMP-LRC to comply with Army requirements (AR 210-20) that mandate the update of current installation master plans as circumstances require. This most recent update was triggered by Congress when the 2005 Defense Base Closure and Realignment Commission (BRAC) recommendations became law in November 2005. Those recommendations included moving several Army agencies and their personnel to Fort Belvoir. The Army published a Final Environmental Impact Statement (FEIS) entitled *Implementation of the 2005 Base Realignment and Closure Recommendations and Related Army Actions at Fort Belvoir, Virginia*, in August 2007 addressing the adoption of the BRAC changes to the RPMP-LRC as well as the BRAC realignments.

AR 210-20

Real Property Master Planning For Army Installations, provides that an RPMP be organized into five components: the RPMP Digest, the Long Range Component (LRC), the Installation Design Guide (IDG), the Capital Improvements Strategy (CIS), and the Short Range Component (SRC).

The Army continues to revise the RPMP to address future land uses at the garrison, beyond those immediate changes needed to accommodate the BRAC 2005 actions.

What other land use planning standards or restrictions apply?

Federal actions in the National Capital Region must be reviewed by the National Capital Planning Commission (NCPC) and must be consistent to the maximum extent practicable with the enforceable policies of the applicable state's Coastal Zone Management Program.

National Capital Planning Commission

The NCPC is the central planning agency for the federal government in the National Capital Region, which includes the District, several Maryland counties, and the Northern Virginia counties. NCPC prepares the *Federal Elements of the Comprehensive Plan for the National Capital*. One element of the Comprehensive Plan, *Federal Workplace: Location, Impact, and the Community*, lists policies with regards to building and

development codes, energy efficiency, working environment, and physical security. Policies applicable to the proposed action include:

- Using innovative energy conserving techniques (e.g., LEED) in the design and construction, operation, location, and orientation of federal workplaces.
- Designing security barriers and checkpoints at vehicular entry points on federal installations to accommodate vehicular queuing on site, and to avoid adverse effects on adjacent public roadways operations and safety.

LEED

Leadership in Energy and Environmental Design (LEED) is a certification program for building design, construction and operation. LEED promotes sustainable site development, water savings, energy efficiency, materials selection and indoor environmental quality.

A second element of the NCPC Comprehensive Plan, *Transportation*, lists federal parking policies and associated parking ratios in response to the area's congestion and poor air quality. For suburban federal facilities more than 2,000 feet from a Metrorail Station, the parking ratio should reflect a phased approach linked to planned improvements over time. Federal facilities served by HOV lanes today and in the future are expected to achieve a parking ratio of one space per two employees (NCPC, August 2004).

A third element of the NCPC Comprehensive Plan, *Visitors*, lists policies regarding the placement and operation of new memorials and museums. While these policies largely relate to the Monumental Core and other areas of DC, the *Visitors Section of the Comprehensive Plan* encourages dispersing new attractions and activities away from the Mall. "*By looking to other areas of the city and region, the federal government can protect and enhance the unique historic resources of the Monumental Core, while aiding local and regional efforts to stimulate economic activity in areas not traditionally associated with federal visitor attraction*s."

Coastal Zone Management

The Commonwealth of Virginia has developed and implemented a federally-approved Coastal Resources Management Program (CRMP) with the following enforceable policies applicable to the federal government:

- Fisheries Management
- Subaqueous Lands Management
- Wetlands Management
- Dune Management
- Non-point Source Pollution Control
- Point Source Pollution Control
- Shoreline Sanitation
- Air Pollution Control
- Coastal Lands Management

Virginia's coastal zone includes all of Fairfax County, including Fort Belvoir. Therefore, federal actions at Fort Belvoir are subject to federal consistency requirements. The Virginia Department of Environmental Quality (VDEQ) serves as the lead agency for consistency reviews.

The Coastal Zone Management Act

(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 (CZMARA) 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.

How would the project affect land uses at the two alternative sites?

While the proposed project introduces a new use at the Pence Gate site, and changes the character of the landscape, it would displace few current users. The baseball fields and associated dugouts and storage buildings would be removed, and any users of these fields would be displaced. The Army would demolish the remaining portions of Grays Hill Village to make way for the NMUSA and its infrastructure, with the exception of a community clubhouse and parking lot located at the south end of the site, which would remain. One of the advantages of this alternative is that it makes use of a site that has already been

developed and disturbed by past uses (excerpts from Berger/SmithGroup, August 2008).

As noted, use of the Gunston site would result in the direct loss of five golf holes (Holes 3 through 7) at the North Post Golf Course, making the front nine holes unplayable (a functional loss of nine holes – see Section 2.6). It is likely that the Gunston Kingman Road alternative would, in addition, require building the NMUSA access road through hole 2 and very close to holes 11 and 12, to achieve the terrain grade acceptable for a road. The remaining holes of the Gunston and Woodlawn Golf Courses, which together make up the North Post 36, would be reconfigured to retain 27 playable holes, and to support the future expansion to 36 holes. (As mentioned previously, the construction of replacement holes to offset the loss of the Gunston holes, and restore the North Post Golf Course to 36 holes, is presently under consideration by the Fort Belvoir MWR Program.)

The golf course irrigation system would need to be reconfigured with either Gunston alternative. There is also the possibility that a utility corridor may have to be routed from the north through the golf course. Construction of the pipeline would briefly interrupt use of the affected holes, but would not require a permanent change in the use or the nature of the course.

Is the proposed use consistent with the Fort Belvoir RPMP designated land uses at the two sites?

Generally, yes. This EA compares the proposed project with the 2007 draft RPMP-LRC. The NMUSA is not specifically addressed in the RPMP, but both NMUSA sites are designated as "Community."

However, the draft Master Plan includes the Hospital Area Plan, which proposes a future educational campus and hotel located on the Pence Gate site (Belvoir New Vision Planners, 2008). If this site is selected, the Army would have to amend the draft Master Plan and Hospital Area Development Plan, and move the proposed hotel and educational campus to other sites on South Post. Because these uses are only suggested as a potential future use, the conflict with the draft Master Plan is considered minor.

However, the Master Plan also proposes extending Belvoir Road to the north side of US Route 1 via a grade-separated bridge. To accommodate this, 3rd Street would be extended through the Pence Gate site to intersect US Route 1. The placement of structures and other improvements for the Pence Gate alternative would preclude extending 3rd Street, which could have a long-term impact to the traffic circulation of Fort Belvoir if an alternative connection to US Route 1 cannot be identified. This is considered a moderate impact.

Is the proposed use consistent with the NCPC Comprehensive Plan?

Yes. While this EA is being prepared in the planning of the proposed NMUSA, the Army intends for the proposed NMUSA and its associated facilities to qualify for a LEED Silver designation, and would incorporate energy-saving measures. The Army is also evaluating needed roadway changes (signalization, turn-lanes, etc.) to accompany alternative sites and vehicular access points.

There would be an estimated 185 employees and volunteers working at the NMUSA. The current plans provide only 75 employee parking spaces, which is less than the 1:2 federal facility parking ratio recommended by NCPC. (The recommendation is for an upper limit; the NCPC wants to

encourage carpooling and use of public transit by limiting available parking.) Approximately 500 to 550 visitor parking spaces are planned. Visitor space would be expanded during later phases of construction if needed, unless the structured parking alternative is used. This EA assumes that additional space would be needed, and assesses the impacts of providing 850 visitor parking spaces.

Is the proposed use consistent with the Coastal Resources Management Plan policies?

Fort Belvoir's Coastal Zone Consistency Determination for the proposed action is included in Appendix A. Fort Belvoir has determined that the proposed action would be consistent with the Commonwealth of Virginia's CRMP's enforceable policies to the maximum extent practicable at either site. The proposed action would not affect fisheries, subaqueous lands, coastal dunes, or shoreline sanitation. It would have minor effects on resources subject to the following policies:

- Wetlands Management: Section 3.5 of this EA summarizes the impacts of the proposed action on wetlands. The project is not likely to eliminate any wetlands at the Pence Gate Site. Wetlands would be impacted at the Gunston Site, with greater impacts if the Kingman Road alternative is selected. However, the Army would obtain any wetland permits necessary, would avoid and minimize impacts to the extent practicable, and would mitigate any unavoidable wetland losses. Therefore, the proposed action, no matter what alternative is selected, would be consistent with this enforceable policy to the maximum extent practicable.
- Non-point Source Pollution Control: No matter which alternative is selected, the Army would follow the standards required by the Code of Virginia and implementing regulations to ensure that non-source

pollution control impacts are minimized during construction (Section 3.2). The Army would also act consistently with the Fairfax County Chesapeake Bay Preservation Area regulations (Chapter 118 of the Fairfax County Code) to minimize long-term impacts on water quality. The stormwater management ponds would be designed to provide compliance with Chesapeake Bay Best Management Practices (BMPs) nutrient reduction goals. Therefore, no matter which alternative is selected, the proposed action would be consistent with this enforceable policy to the maximum extent practicable.

- Point Source Pollution Control: the proposed action would result in a new source (construction activity) of point source pollution control. At either site, adverse impacts would be minimal, controlled through a Stormwater Pollution Prevention Plan. The Army would also obtain a Virginia Stormwater Management Permit (Section 3.2). No new sanitary point sources would result from the proposed action. Therefore, no matter which alternative is selected, the proposed action would be consistent with this enforceable policy to the maximum extent practicable.
- Air Pollution Control: impacts of the proposed action on air quality are addressed in Section 3.8 of this EA. Adverse impacts of any of the alternatives would be minimal. Therefore, no matter which alternative is selected, the proposed action would be consistent with this enforceable policy to the maximum extent practicable.
- Coastal Lands Management: Subchapters 3.4 and 3.5 outline the impacts of the proposed action on sensitive lands, including Resource Protection Areas and Resource Management Areas. The Army would do everything practicable to minimize impacts on these

resources, and impacts would be minimal at either site, with either layout alternative. Therefore, no matter which alternative is selected, the proposed action would be consistent with this enforceable policy to the maximum extent practicable.

How would project construction affect uses of other properties in the immediate vicinity?

The construction activity would temporarily generate noise, fumes, and dust from machinery. These impacts are addressed under Sections 3.8 and 3.9 of this document. Construction of turning lanes on (depending on the alternative) US Route 1, the Fairfax County Parkway, or Kingman Road is addressed in Section 3.13. Otherwise, the impacts from construction activity would have little or no effect outside of the actual project site.

Long-term operation would contribute minimally to peak traffic over area roadways as employees commute to work, but the majority of new traffic would be from visitors and would likely be during off-peak hours. There would be little difference in impacts between the alternatives.

Activities on the parade ground (ceremonies, re-enactments, etc.) would periodically generate noise that would carry to adjacent properties. Section 3.9 of this EA addresses the potential noise impacts of any of the proposed alternatives, and none of the alternatives would generate appreciable long-term increases in the overall noise environment. Both sites are adjacent to the installation boundary, but noise from parade ground events would be more likely to be an issue at the Pence Gate site, which is also immediately adjacent to two churches (Woodlawn Baptist Church and the Society of Friends meeting house), as well as the Woodlawn Plantation. The Pence Gate site is also closer to (within 1,000 ft of) the nearest residential areas than the Gunston

site, and will be across from the new DeWitt Hospital, which will have a Wounded Warrior unit. The receptors at the Gunston site would include golf course patrons and wildlife in the adjacent Fort Belvoir Forest and Wildlife Corridor (FWC). Section 3.9 also provides potential mitigation measures to reduce these impacts further.

The operation of the NMUSA at either alternative site (Pence Gate v. Gunston) would cause impacts on existing on-site and adjacent uses, but with appropriate mitigation measures (discussed below) these impacts would not be significant. The loss of the front nine North Post Golf Course holes at the Gunston site would be considered a moderate impact, while cumulative impacts of the project at either location would be minor (Section 3.15).

What have we done – what would we do – to avoid or minimize negative effects?

Section 2.12 of this EA outlines the factors already considered in selecting alternative sites, and still being considered in designing the project at each site, to avoid and minimize adverse impacts on people and environmental resources. Depending on the alternative selected, the Army will continue to provide mitigation for any unavoidable impacts.

Mitigation

Mitigation measures are steps taken to reduce the impacts of a project. Steps taken to comply with existing laws and regulations, however, are not considered mitigation.

With the exception of mitigation measures to ensure that noise from events at the Parade Ground have little or no effect on churchgoers, visitors to the Woodlawn Plantation and Pope-Leighey House, or residents of the adjacent neighborhoods (Section 3.9), the Army does not anticipate the need to provide mitigation for the Pence Gate alternatives.

The Army would reconfigure five existing holes to maintain 27 playable holes on the North Post Golf Course. The Gunston

Fairfax County Parkway Structured Parking Alternative would avoid the back nine Gunston golf holes (holes 10 – 18) altogether. Alternatives requiring more land, such as the Gunston Kingman Road Surface Parking Alternative, would require modification of up to five golf holes to keep 27 playable holes. Mitigation for noise impacts is less of an issue at the Gunston site, because of the distance to the nearest receptors, but the same types of measures (Section 3.9) would be employed as necessary.

Mitigation of the impacts to vegetation would be accomplished through a combination of policies, including the protection of existing native trees, the replacement (at a 2:1 ratio) of trees that are removed, revegetation of areas to provide food and cover for wildlife, planting native water-tolerant plants in drainage areas, and other steps. See Section 3.3 for more details on the tree replacement policy for Fort Belvoir.

In terms of Coastal Zone Management, mitigation would take place through consistency with the individual enforceable policies. For this action, the only enforceable policy requiring mitigation would be wetlands management. Mitigation will likely be required as part of the wetland permitting process. This is addressed in Section 3.5.

What effect would the "No Build" Alternative have on land use at or next to Fort Belvoir?

At this time, no impacts are foreseeable. The Pence Gate site has been proposed as the location of an educational campus and hotel/conference center, whereas no uses have been identified for the unused portion of the Gunston site. However, because it has been previously used and vacated, the Pence Gate site is likely to be more useable than the Gunston site, which is currently part of the North Post golf course.

3.2 Soils and Topography

Understanding the soils and topography of the project areas is important to understanding the potential for wetlands and wildlife habitats, and for determining how surface and groundwater moves across the sites. Soil and topography can also affect development plans, because construction on areas of steep topography or weak soil can affect soil erosion and drainage.

What is the study area for soil and topography?

The study area for topography and soils includes all areas within the boundaries of the two alternative sites, where grading and construction could change the current condition.

What soil types are located in the study area?

The Fort Belvoir GIS mapping identifies the soil types on the Pence Gate site as Beltsville silt loam, Dumfries fine sandy loam, Matapeake silt loam, Matapex silt loam, Sassafras fine sandy loam, and Urban Build-up. The GIS identifies soils on the Gunston site as Beltsville silt loam, Dumfries sandy loam, Lunt fine sandy loam, and Wehadkee silt loam. The Fort Belvoir GIS

soil information is generally consistent with recent geotechnical reports for these sites (Louis Berger Group, May 2008; and US Army Engineer District, Baltimore Engineering Division, November 2004). Tables 3.2-1 and 3.2-2 below summarize the relevant information about soils at both sites. "Problem Class A" refers to soils with a potential for unstable slopes, land slippage, high shrink-swell clays, poor foundation support, and high water tables. "Problem Class B" refers to soils with problems related to wetness and drainage that can be addressed in construction. "Problem Class C" soils are not considered problem soils for building foundations.

Table 3.2-1 Soil Types Identified on the Pence Gate Site

Name	Drainage Class	Problem Class	Flooding	Foundation Support	Hydric
Beltsville silt loam	MWD	B	No	Good with proper drainage; foundation drains and waterproofing necessary.	No
Dumfries sandy loam	WD	A	No	Could be unstable, especially near marine clays.	No
Matapeake silt loam	WD	C	No	Generally favorable.	No
Mattapex silt loam	WD-MWD	B	No	Marginal; foundation drains and waterproofing needed.	No
Sassafras fine sandy loam	WD	C	No	No data.	No
Urban build-up	N/A	Not Rated	N/A	Suitable.	No

Drainage Class Abbreviations:
MWD: Moderately Well Drained PD: Poorly Drained WD: Well Drained
Source: Natural Resource Conservation Service (NRCS), Soil Survey Report, Fort Belvoir, 1982

Table 3.2-2 Soil Types Identified on the Gunston Site

Name	Drainage Class	Problem Class	Flooding	Foundation Support	Hydric
Beltsville silt loam	MWD	B	No	Good with proper drainage; foundation drains and waterproofing necessary.	No
Dumfries sandy loam	WD	A	No	Could be unstable, especially near marine clays.	No
Lunt fine sandy loam	WD-MWD	A	No	Stable above sands; could be unstable near marine clays.	No
Wehadkee silt loam	PD	A	Frequent	Poor; basements not recommended.	Yes

Drainage Class Abbreviations:
MWD: Moderately Well Drained PD: Poorly Drained WD: Well Drained
Source: Natural Resource Conservation Service (NRCS), Soil Survey Report, Fort Belvoir, 1982

What is the general topography of the study area?

The Pence Gate site slopes gently from west to east, ranging from approximately 140 to 120 feet above msl. Beyond the eastern property border, the topography slopes steeply down to Dogue Creek.

The Gunston site includes numerous steep ravines trending away from the northern and central portions of the site and leading towards the southeast, southwest, and west. Flat upland areas are limited to the northeastern and south-central portions of the site. These upland areas range in elevation from 115 to 135 feet above mean sea level (msl). The remainder of the site slopes down to the west, south and east, extending to an elevation as low as 58 feet above msl.

How would the construction of the NMUSA affect soils and topography on the study area?

Preparation of both sites would require cut-and-fill work to prepare for the various NMUSA improvements. The estimated amounts of cut-and-fill required for each conceptual layout are presented in Table 3.2-3 below.

Table 3.2-3 Estimated Cut-and-Fill Requirements for Conceptual Layouts at the Pence Gate and Gunston Sites

Conceptual Layout	Estimated Cut (cubic yards)	Estimated Fill (cubic yards)	Total (cubic yards)
Pence Gate (Surface Parking)	63,325	39,910	103,235
Pence Gate (Structured Parking)	62,725	32,930	95,655
Gunston (Fairfax County Parkway Entrance - Surface Parking)	128,930	127,700	256,630
Gunston (Fairfax County Parkway Entrance - Structured Parking)	112,000	113,000	225,000
Gunston (John J. Kingman Road Entrance – Surface Parking)	150,830	135,900	286,730
Gunston (John J. Kingman Road Entrance – Structured Parking)	134,000	121,000	255,000

Source: Berger/Smith Group, August 2008

Due to its relatively flat topography, the Pence Gate site would require much less grading and ground disturbance than the Gunston site. Grading would occur mainly along the southeastern side of the staging area, memorial garden, macro gallery, detention pond, and parking lot.

At the Gunston site, much more fill would be needed in the vicinity of the planned main NMUSA building, events pavilion, service court, and the southern stormwater detention pond. Other areas of grading include the northern overflow parking lot and bus/recreational vehicle (RV) parking lot. If one of the Gunston Fairfax County Parkway alternatives is selected, fill would be required for the access road in the southwest corner of the property, as well.

In general, grading and paving would result in localized changes in slopes, soil infiltration rates, and surface runoff patterns at

either site. Because the proposed project would affect more than 1 ac, both an erosion and sediment control (ESC) plan employing soil best management practices and a Virginia Stormwater Management Permit would be required for clearing and grading activities. The ESC plan would include measures consistent with the Virginia Erosion and Sediment Control Handbook, such as silt fences around the limits of clearing and grading, to reduce construction impacts.

The extent to which the proposed project at either site would contribute to cumulative impacts is discussed at Section 3.15.

Are there appropriate mitigation measures we could take?

The Army does not plan any measures over and above the required ESC and VSMP requirements. These standard requirements would be effective at minimizing the adverse effects of grading and construction.

How would the No Build alternative affect the soils and topography of the study area?

Under the No Build alternative, no construction or grading would be performed at either project site. The Pence Gate site would continue to be cleared land with scattered trees and a baseball field for some time, although the Hospital Area Development Plan suggests this site for future development. The Gunston site would continue to consist of undeveloped, forested land and cleared golf course holes, tees, and fairways.

3.3 Vegetation and Wildlife

Upland Vegetation

is associated with dry areas away from water or wetlands, vegetation that is not located within the area influenced by a body of water.

The Army considers both vegetation and wildlife as it plans this project. Wildlife species tend to be associated with specific plant

communities, and changes in plant communities can affect the populations and distribution of wildlife.

What is our study area and how did we determine it?

The Army defined the study area for vegetation to include all areas within the proposed site boundaries for the Pence Gate and Gunston sites where the effects from construction would occur.

What types of vegetation and wildlife habitat did we find in the study area?

The types of vegetation found within the Pence Gate site include: Beech – Mixed Oak, Oak – Ericad Forest, and Seeps. The vegetation types identified for the Gunston site include: Tulip Poplar – Mixed Hardwood Forest, Oak – Ericad Forest, Beech – Mixed Oak Forest, Seeps, and Mixed Pine – Hardwood Forest.

The Army mapped the wildlife habitats within the study area using the same land cover types used to describe upland vegetation. A category for wetlands is listed because existing wetlands within the study areas provide important habitat for a wide variety of wildlife.

Table 3.3-1 identifies the amount of land cover and habitat types located within the study area.

Table 3.3-1 Land Cover and Wildlife Habitat Type within the Study Area

Cover Type	Characteristic Species	Land Cover (Acres)	
		Pence Gate	Gunston
Beech – Mixed Oak Forest	American beech (*Fagus grandifolia)*, white oak *(Quercus alba)*, northern red oak *(Quercus rubra)*, flowering dogwood *(Cornus florida)*, cherryleaf viburnum *(Viburnum prunifolium*).	0.6	16.3
Mixed Pine – Hardwood Forest	Virginia pine (*Pinus virginiana),*Loblolly pine *(Pinus taeda),* white oak *(Quercus alba*), northern red oak *(Quercus rubra*), Chestnut oak (*Quercus prinus)*.	0	6.9
Oak – Ericad Forest	chestnut oak (*Quercus prinus),* white oak *(Quercus alba*), northern red oak (*Quercus rubra),* scarlet oak *(Quercus coccinea),* huckleberry *(Gaylussacia baccata)*, deerberry *(Vaccinium stamineum)*, mountain laurel *(Kalmia latifolia*).	6.7	24
Seeps/Wetlands /Streams	red maple (*Acer rubrum)*, blackgum *(Nyssa sylvatica)*, sweetbay magnolia *(Magnolia virginiana)*, skunk cabbage *(Symplocarpus foetidus)*, sensitive fern *(Onoclea sensibilis),* royal fern *(Osmunda regalis*), fetterbush (*Leucothoe racemosa*), lizard tail (*Saururus cernuus*) and smooth alder (*Alnus serrulata*).	0	1.9
Tulip Poplar – Mixed Hardwood Forest	tulip-poplar (*Liriodendron tulipifera)*, red maple *(Acer rubrum)*, white oak *(Quercus alba)*, American beech *(Fagus grandifolia)*, northern red oak *(Quercus rubra),* cherryleaf viburnum *(Viburnum prunifolium*).	0	2.9
Urban Forest /Landscape Trees	red maple *(Acer rubrum)*, white oak *(Quercus alba)*, northern red oak *(Quercus rubra)*	3.7	2.4
Maintained Lawn /Golf Course	tall fescue *(Festuca elatior),* Kentucky bluegrass *(Festuca arundinacea*	25.3	43.1
Pavement/Developed		4.7	0
Total		41.0	97.5
Habitat Type		Wildlife Habitat (Acres)	
		Pence Gate	Gunston
Upland Forest	See characteristic species above for Beech-Mixed Oak, Mixed Pine, Oak Ericad and Tulip Poplar-Mixed Hardwood forests.	7.3	50.1
Seeps/Wetlands /Streams	red maple (*Acer rubrum)*, blackgum *(Nyssa sylvatica)*, sweetbay magnolia *(Magnolia virginiana)*, skunk cabbage *(Symplocarpus foetidus)*, sensitive fern *(Onoclea sensibilis),* royal fern *(Osmunda regalis*), fetterbush (*Leucothoe racemosa*), lizard tail (*Saururus cernuus*) and smooth alder (*Alnus serrulata*).	0	1.9
Urban Forest /Landscape Trees	red maple *(Acer rubrum)*, white oak *(Quercus alba)*, northern red oak *(Quercus rubra)*	3.7	2.4
Maintained Lawn /Golf Course	tall fescue *(Festuca elatior),* Kentucky bluegrass *(Festuca arundinacea*	25.3	43.1
Total		36.3	97.5

Do any special status plant species occur in the study area?

There are no known occurrences of special status plant species in the study areas (Virginia Department of Conservation [VDCR] 2008). However, the United States Fish and Wildlife Service (USFWS) has recommended that a survey be completed at either site, whichever is selected, for the federally listed threatened small whorled pogonia (*Isotria medeoloides*).

Which common wildlife species do we know to live in the study area?

Based on the habitat available in the study area the Army expects wildlife species that commonly occur in urban areas to be located at both sites. This includes species such as raccoon, coyote, opossum, American crow, American robin, wood thrush, eastern wood pewee, scarlet tanager, and other common mammal and migratory and non-migratory bird species.

How are wildlife habitats connected in the study area?

Fort Belvoir has designated 742 ac for the Fort Belvoir Forest and Wildlife Corridor (FWC). The FWC traverses the installation, connecting Huntley Meadows Park just north of the installation to the Jackson Miles Abbott Wetland Refuge (JMAWR) on the North Post. The corridor continues through the installation to the Accotink Bay Wildlife Refuge (ABWR) on the South Post and on to the Mason Neck State Park and the Potomac River National Wildlife Refuge Complex south of the installation (US Army Garrison Fort Belvoir, 2001d). The Pence Gate site does not overlap the FWC, but the Gunston site is located just west of the FWC, and would overlap the FWC for the two Gunston Kingman Road alternatives.

Do any special status wildlife species occur in the study area?

Coordination with the USFWS, the Virginia Department of Game and Inland Fisheries (VDGIF), and the VDCR indicates that there are, as yet, no documented occurrences of special status species within either Pence Gate or Gunston sites, but that there is the potential for four special status species to be there (Table 3.3-2) (VDCR, 2008). Surveys for the presence of these species would be needed prior to construction at either site. These species, their status, and their documented occurrences in the study area are shown in Table 3.3-2.

Special Status Wildlife Species

Special status wildlife species include those listed as endangered or threatened under the Endangered Species Act (ESA); species that are candidates or are proposed for listing under the endangered species act; species of federal concern; species listed by the Virginia Department of Conservation and Recreation (VDCR) as endangered, threatened, candidate, or sensitive, and other priority species.

Table 3.3-2. Special Status Species documented near or Potentially Occurring in the Pence Gate and Gunston Study Areas

Species	Status	Occurrence in Study Areas
Bald eagle *Haliaeetus leucocephalus*	State Threatened Federal Species of Concern (SOC)	Documented within 0.25 mile of Pence Gate and 1.5 miles of Gunston (VDGIF 2008)
Wood turtle *Glyptemys insculpta*	State Threatened	Documented within 1 mile of Pence Gate and 0.75 mile of Gunston -Coordination recommended (VDGIF 2008)
Peregrine falcon *Falco peregrinus*	State Threatened	Documented at two miles from Pence Gate (VDGIF 2008)
Northern Virginia well amphipod *Stygobromus phreaticus*	Federal SOC	Documented at Fort Belvoir – Surveys recommended (VDCR 2008)

Entry Levels in the PIF Priority Species Pool

Tier I - High Continental Priority
Tier I A - High Continental Priority – High Regional Responsibility
Tier I B - High Continental Priority – Low Regional Responsibility
Tier II – High Regional Priority
Tier II A - High Regional Concern
Tier II B - High Regional Responsibility
Tier II C - High Regional Threats
Tier III – Additional Watch List
Tier IV – Additional Federally Listed
Tier V – Additional State Listed
Source: partnersinflight.org

What other wildlife resources/programs are important at Fort Belvoir?

The potential forest impact areas for both the Pence Gate and Gunston sites are within the buffer zone for the Partners in Flight Program (PIF). The PIF program strives to address the problems facing neotropical migratory birds through communication, cooperation, and conservation efforts. The PIF buffer areas at the Pence Gate site are associated with the wood thrush and scarlet tanager. At the Gunston site, the PIF buffer areas are for the wood thrush, scarlet tanager and eastern wood pewee. Both the wood thrush and scarlet tanager species are ranked as Entry Level IA in the PIF Priority Species Pool Order of Concern. The eastern wood pewee is ranked as Entry Level IIA (Partnersinflight.org, 2005).

Natural Heritage Resources

are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

Do any rare ecological communities occur in the study area?

The VDCR Division of Natural Heritage (VDCR-DNH) has also searched its Biotics Data System for occurrences of natural heritage resources in the project areas. The VDCR-DNH files do not indicate the presence of any State Natural Area Preserves under VDCR's jurisdiction in the project vicinity (VDCR, 2008).

Do any Special Natural Areas occur in the study area?

Fort Belvoir has designated four Special Natural Areas: the ABWR, the JMAWR, the T-17 Ravine Conservation Site, and the Fort Belvoir FWC described above. Fort Belvoir manages these areas with the primary emphasis on conservation. The ABWR is 1,479.5 ac located along Accotink Bay and Accotink Creek in the central portion of the South Post. The JMAWR is 233.5 ac in size and is located in the northeastern corner of the North Post. The T-17 Ravine Conservation Site is 69.4 ac

located at Tompkins Basin, along the north bank of Gunston Cove. No designated Special Natural Areas occur in the vicinity of the Pence Gate Site. The Fort Belvoir FWC, established to connect the ABWR and the JMAWR, is located just east of the Gunston Site.

How would the project affect upland vegetation?

Table 3.3-3 shows the impacts of each project alternative on different vegetative communities.

Table 3.3-3 Land Cover and Wildlife Habitat Type affected within each of the Study Areas

Cover Type	Land Cover Affected (Acres)		
	Pence Gate	Gunston Kingman Road	Gunston Fairfax County Pkwy
Beech – Mixed Oak Forest	0.1	5.0	5.8
Mixed Pine – Hardwood Forest	0	0	2.3
Oak – Ericad Forest	4.8	8.2	8.1
Forested Wetlands/Seeps*	0	0.3	0
Tulip Poplar – Mixed Hardwood Forest	0	0.3	0.3
Urban Forest\Landscape Trees	3.7	2.4	1.5
Maintained Lawn/Golf Course	16.2	28.3	22.9
Pavement/Developed	4.7	0	0
Total	29.5	44.5	40.9
Habitat Type	Wildlife Habitat Affected Acres		
	Pence Gate	Gunston Kingman Road	Gunston Fairfax County Pkwy
Upland Forest	4.9	13.5	16.5
Urban Forest\Landscape Trees	3.7	2.4	1.5
Forested Wetlands/Seeps*	0	.3	
Maintained Lawn/Golf Course	16.2	28.3	22.9
Total	24.8	44.5	40.9

* Based on Fort Belvoir GIS Data, not field verified.

For the Pence Gate Surface Parking Alternative, construction of the NMUSA would permanently convert 0.1 ac of Beech –

Mixed Oak Forest, 4.8 ac of Oak-Ericad Forest and 3.7 ac of Urban Forest\Landscape trees, for a total of 8.6 ac of forest. The Surface Parking Alternative would also impact 16.2 acres of maintained lawn/golf course. The Structured Parking Alternative, as compared to the Surface Parking Alternative, would reduce impacts to Oak-Ericad Forest by about one ac.

At the Gunston site, the construction of either of the Fairfax County Parkway Alternatives would impact 5.8 ac of Beech – Mixed Oak Forest, 2.3 ac of Mixed Pine–Hardwood Forest, 8.1 ac of Oak-Ericad Forest, 0.3 acres of Tulip Poplar-Mixed Hardwood Forest and 1.5 acres of Urban Forest\Landscape Trees for a total of 18 ac of forest. The Surface Parking Alternative would impact 22.9 ac of maintained lawn/golf course. The Structured Parking Alternative, as compared to the Surface Parking Alternative, would reduce impacts to forest by about two acres and to maintained lawn/golf course by about an acre.

The Gunston Kingman Road Alternatives would impact approximately the same amount of Beech – Mixed Oak and Oak-Ericad Forest as the Gunston Fairfax County Parkway Alternatives, but would not impact any Mixed Pine–Hardwood Forest. Both Kingman Road Alternatives would affect 0.3 ac of Seeps/Wetlands/Streams. The Surface Parking Alternative would impact 28.3 ac of maintained lawn/golf course. The Structured Parking Alternative would reduce the impacts to forest by about two acres, and to maintained lawn/golf course by about an acre.

Construction equipment may cause additional, temporary disturbance in adjacent upland areas, beyond the footprint of the project at each site. This disturbance would be temporary – disturbed areas would be seeded and vegetation restored following completion of construction.

The Gunston alternatives would therefore have greater impacts on forest and vegetation resources than the Pence Gate alternatives. None of the alternatives would cause significant impacts – these impacts represent a very small fraction of the forest on Fort Belvoir – even when considered in the context of the cumulative impacts from a number of projects being proposed at Fort Belvoir, particularly with respect to BRAC. Section 3.15 of this EA addresses cumulative impacts.

How would the No Build Alternative affect upland vegetation?

Under the No Build alternative, the Army would continue to manage the vegetation within the Pence Gate and Gunston sites in their current condition. Management activities would include periodic mowing, removal of dead or dying trees and tree limbs, and clearing of brush that encroaches on roadways and the golf course. These activities affect vegetation by preventing trees from establishing themselves in mowed areas and preventing forested areas from developing natural features such as snags and downed wood.

How would the project affect wildlife?

Effects on wildlife in general would result largely from loss of habitat, i.e., vegetation. Reduction in the cover types listed in Table 3.2-3 would likely cause a reduction in the number of animals supported by that cover type and the overall landscape. The Gunston alternatives would therefore have the largest impacts on wildlife based on habitat loss alone.

At the Pence Gate site, approximately 7 of the 15.4 ac of PIF buffer area that would be impacted are Oak Ericad Forest. At the Gunston Site, approximately 7.94 of the 35 ac of PIF buffer would be impacted. The habitats are as follows: 1.85 acres of

forest, 0.55 acres of urban forest\landscape trees and 5.54 acres of maintained lawn\golf course. Once again, this is only a small fraction of the available upland forest throughout the installation, and the effects of any of the alternatives on these species should be minimal. These impacts are considered in the context of the cumulative impacts of other planned projects on Fort Belvoir at Section 3.15.

The Gunston Kingman Road Alternatives, in addition to the impacts described above, could adversely affect the Fort Belvoir FWC. This corridor was established as a mitigation measure in the BRAC 88 EIS Record of Decision (ROD) to offset the siting of the Defense Logistics Agency complex. According to the Real Property Master Plan, no facility construction, except for wildlife habitat and movement enhancement, is authorized in the FWC. Thus, the Kingman Road designs would need to span the FWC with a new bridge (excerpts from Berger/SmithGroup, August, 2008). The FWC at this location is 750 ft wide. (A George Mason University Study has recommended minimum widths of between 820 to 1,000 feet for wildlife migration [Integrated Natural Resources Management Plan (INRMP), 2001]). Even if the Fort Belvoir FWC is completely spanned, construction of the bridge would require removal of trees and placement of footers in the corridor, and would still create a disturbance, both temporarily during construction and over the long-term by its presence. This potential impact on the Fort Belvoir FWC is one of the most important in terms of direct **and** cumulative impacts. If the proposed project is allowed to impact this corridor, it could weaken the long-term effectiveness of the corridor and the purpose for which it was established, and may require an examination of the basis for the 1991 BRAC Record of Decision.

Utility access to the Gunston site is still under review, and will likely require a maintained (brush and saplings removed every

one to three years) corridor. The Army intends to make every effort to combine the utilities with the access road (i.e., to route the utility lines within the road shoulder) and avoid and minimize impacts to the Fort Belvoir FWC. Some intrusion into the edge of the corridor might be required. Alternately, a utility corridor could possibly be routed to the site from the north, through the existing golf course.

If one of the Gunston Kingman Road Alternatives is selected, Fort Belvoir would conduct a study prior to construction to determine the effects of the bridge and the utility easement on wildlife migration and genetic viability. The study will help define mitigation strategies, possibly recommend design changes, or possibly conclude that the crossing should be disqualified altogether.

Both the Pence Gate and Gunston sites are already partially developed for human uses. It is unlikely that the operation of the NMUSA would, beyond loss of habitat, adversely affect most species present (with the exception of the possible impacts to the Fort Belvoir FWC in the Gunston Kingman Road Alternatives). At least a portion of each site has already been altered and converted to developed areas, or areas of managed grassland (e.g., mowed grassland at either the former residential area or the golf course). In addition, the NMUSA grounds would provide partial replacement for the habitats lost. The species associated with grassland habitats and those that adapt well to developed areas would be least affected.

Fort Belvoir has, as does all of northern Virginia, an overabundance of resident Canada geese (*Branta canadensis*) (US Army Garrison Fort Belvoir 2001d). Currently, both the Pence Gate and Gunston sites have extensive grassy areas so it is not expected that replacement of the existing grassy areas, with

the NMUSA parade ground would cause an increase in “attractiveness” to geese. Moreover, the lack of permanent standing water likely limits the use and reduces the "attractiveness" of these areas to Canada geese. The introduction of stormwater management ponds at either site by any of the alternatives could increase the "attractiveness" of the project area for geese. If geese do become a problem at the NMUSA complex, the installation will take management actions to control the geese. All of the alternatives are equal in terms of creating an attraction for geese.

How would the project affect special status species of wildlife?

Bald eagles are protected under the Bald and Golden Eagle Protection Act (BGEPA) of 1940 and the Migratory Bird Treaty Act (MBTA) of 1918. Until recently, they were also protected under the Endangered Species Act.

USFWS and VDGIF Bald Eagle Protection Guidelines for Virginia

Guide Lines for Eagle Nests

Primary Management Zone – This is defined as the area 750 feet in radius around an active nest.

Secondary Management Zone – This is defined as 750 feet to 1,320 feet in radius around an occupied nest.

As shown in Table 3.3-2, the bald eagle has been known to forage within Fort Belvoir; however, they tend to nest in areas away from human contact. Shorelines along creeks, rivers and lacustrine areas on Fort Belvoir provide valuable nesting, foraging and loafing habitat for resident and migratory bald eagles. Potential threats to bald eagle nesting, foraging and loafing habitat include disturbances caused by near shore activities and waterfowl hunting. There is an active eagle nest along the shoreline of Dogue Creek.

The USFWS and VDGIF have published Bald Eagle Protection Guidelines for Virginia, which will be revised in accordance with the USFWS National Bald Eagle Management Guidelines. Based on these guidelines construction of the NMUSA at either the Pence Gate or Gunston location would be far enough away

from nests to preclude an adverse effect on bald eagles at Fort Belvoir.

Suitable habitat for wood turtle habitat occurs within the stream valleys at or near both sites, but the disturbance to their habitat is more likely to be an issue at the Gunston site. Surveys for wood turtle would be completed prior to starting construction, and appropriate measures would be taken to ensure their protection. Of the alternatives, the Gunston Kingman Road alternatives would be the most likely to impact wood turtle habitat along the perennial stream and its associated RPA. The entrance roadway for the Fairfax County Parkway alternatives at Gunston would also likely cause some impact, but careful design could avoid the intermittent stream and its riparian area.

Small whorled pogonia may occur within either site. Prior to construction, Fort Belvoir will conduct a survey for the small whorled pogonia, no matter what site or conceptual layout is selected. If the small whorled pogonia is found, mitigation measures outlined by the USFWS would be implemented to protect the species. Since the small whorled pogonia is most frequently found on steep north or east-facing slopes, small whorled pogonia may be present at either site. The difference between site alternatives would likely be minimal, whereas the difference between design alternatives (surface v. structured parking) may be more critical. The structured parking alternatives would have fewer impacts on steep slopes than surface parking alternatives.

The Northern Virginia well amphipod (*Stygobromus phreaticus*) may occur within the seeps at or adjacent to either site. Prior to construction, a survey for the amphipod would be completed. If the amphipod is found, mitigation measures by the USFWS would be implemented to protect the species.

Any of the project alternatives would increase impervious surfaces and soil compaction, and adversely affect the ability of the site soils to infiltrate rainwater and recharge the surface groundwater table. This could potentially reduce the flow of existing groundwater to nearby seeps, including potential habitat for *Stygobromus phreaticus*. Because a portion of the Pence Gate site is already paved (4.7 ac), the Pence Gate alternatives would have less of an impact on stormwater infiltration (particularly the Structured Parking Alternative) and therefore the amount of groundwater reaching seeps and potential amphipod habitat. The Gunston Kingman Road alternatives, while impacting a somewhat smaller area of permeable ground surface than the Gunston Fairfax County Parkway alternatives, would directly eliminate 0.3 ac of seeps which are potential habitat for the amphipod. As mentioned, if either of these alternatives is selected, Fort Belvoir will survey the site for the amphipod, and take any mitigation measures recommended by the USFWS if *Stygobromus phreaticus* is found.

The potential loss of habitat and groundwater recharge from any of these alternatives would be minor, and would not contribute significantly to cumulative impacts.

How would we avoid or minimize adverse effects on vegetation and wildlife during construction?

Construction-period impacts to both vegetation and wildlife would be minimized by adhering to Virginia and Fairfax County ESC and air quality requirements. But, in addition to complying with these regulatory requirements, the Army would take additional measures to ensure that impacts from construction do not exceed the planned impact area or are unnecessarily disturbing to vegetation and wildlife. Prior to construction, the Army (or its contractors) would flag the limits of impact areas to

provide a clear sign to construction workers where they may be exceeding the project area. The contract specifications would also include any recommended measures for avoiding impacts to wood turtles or other special status species.

Would we mitigate any unavoidable adverse effects?

Yes. The Army plans to take the following measures to mitigate the effects of the construction:

- Protect existing trees to the extent feasible by removing only those trees that would interfere with proper alignment and grading for buildings and asphalt surfaces.
- Plant trees at a 2:1 ratio to replace those lost after clearing and grading.
- Remove the least amount of native vegetation possible during clearing.
- Revegetate areas located adjacent to the shoulder with herbaceous and woody species to provide for aesthetics, and food and cover for wildlife.
- Plant native wetland or water-tolerant plants in storm drainage areas which will also promote water quality through infiltration and/or filtration.
- Landscape with a mixture of deciduous shade and flowering trees, such as maple, southern red oak and eastern redbud, and plant seedlings, such as dogwood, viburnum, euonymus, and deerberry throughout the landscaping.

How would the No Build Alternative affect wildlife, including Special Status Species?

Under the No Build alternative, the Army would continue to manage vegetation through periodic mowing, removal of dead or

dying trees and tree limbs, and clearing of brush. These actions would prevent additional trees from establishing in mowed areas and prevent forested areas from developing more natural features such as snags and downed wood that would otherwise support a greater variety of wildlife. However, no additional effects to wildlife, including special status species, would occur under the No Build Alternative.

3.4 Surface Water, Water Quality, and Floodplains

What is our study area for this analysis?

The study area is defined as the area in which surface water and floodplains could be directly or indirectly impacted by construction or operation of the NMUSA.

What surface water features occur in or near the study area?

For the Pence Gate site, the closest surface water features are two intermittent streams located east of the proposed NMUSA building site (Figure 3.5-1). These streams discharge to Dogue Creek. At the Gunston site, the nearest water features are perennial stream systems with small intermittent tributaries located to the east and west of the proposed NMUSA building site (Figure 3.5-2). All streams discharge to Accotink Creek. Both Accotink and Dogue Creeks discharge to the Potomac River.

What is the quality of surface water in the study area?

The VDEQ defines surface water quality standards that protect designated uses of surface waters in Virginia. Water quality

standards consist of three components: use designations, general criteria, and numeric water quality criteria necessary to protect those uses. All streams in Virginia, including those flowing through Fort Belvoir, are minimally assigned the uses of: recreation (e.g., swimming, boating); propagation and growth of a balanced, indigenous population of aquatic life, including game fish, which might reasonably be expected to inhabit them; wildlife; and the production of edible and marketable natural resources (e.g., fish and shellfish) (VDEQ Website, July 2008). To date, there are no numeric water quality data available for the perennial and intermittent stream channels that occur at either the Pence Gate or Gunston sites.

Do flood hazard or floodplain areas exist at either project site?

One hundred-year floodplains are considered a moderate constraint on proposed development at Fort Belvoir (US Army Garrison Fort Belvoir 2001a). Moderately constrained areas are considered compatible only with lower-intensity development. According to floodplain mapping for Fort Belvoir prepared by the Federal Emergency Management Agency (FEMA), there are no 100-year flood hazard areas located within the boundaries of either the Pence Gate or Gunston sites.

Would the project affect floodplains?

Current development plans at both the Gunston and Pence Gate sites were specifically designed to avoid the delineated Resource Protection Areas, which by definition extend to cover all areas inside the 100-year floodplain.

Would the project affect surface water or water quality?

Construction of the NMUSA at either site would cause minor short term impacts to streams due to clearing, grading, and excavation during construction. Over the long term, re-routing of water through stormwater management features could cause an increase in stream velocities and a reduction in water infiltration rates. Development of the Gunston alternatives would likely generate more severe impacts than the Pence Gate site, due to the more extensive grading required and the proximity of the site to the nearest streams. Construction of structured parking alternatives would have less impact than either of the surface parking alternatives.

While the impacts of the individual project would not be significant, they would contribute to cumulative impacts when taken together with other planned development at Fort Belvoir in the near future (Section 3.16)

What mitigation is appropriate?

Compliance with Erosion and Sediment Control requirements, Virginia Stormwater Management regulations, Virginia Pollutant Discharge Elimination System (VPDES) requirements for construction sites (these requirements are incorporated in the VSMP) and the Fairfax County Chesapeake Bay ordinance would minimize transport of sediments and other contaminants offsite and into Accotink and Dogue Creeks and their tributaries during construction. Beyond the requirements of these regulations, the Army will explore the use of low impact development techniques (bioretention, vegetated swales in lieu of curb and gutter, etc.) as a mitigation measure to promote infiltration of stormwater, replenish the surface groundwater table, and reduce the need for stormwater management (SWM)

facilities. Fort Belvoir, as a normal mode of operation, uses fertilizers and other treatments judiciously.

Would the No Build Alternative affect surface water, water quality, or floodplains in the study area?

No. Existing conditions would continue under the No Build Alternative.

3.5 Wetlands & Chesapeake Bay Preservation Areas

Wetlands provide habitats for many plants and animals. They help to moderate stormwater flows and reduce flooding by slowing down and retaining floodwater during rain events. Wetlands improve water quality and help to control erosion by slowing down water so sediment and chemicals can settle to the bottom. For these reasons, wetlands and streams are regulated by both the US Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act, and the VDEQ under their Water Protection Permit Program.

Fort Belvoir also ensures its actions are consistent to the maximum extent practicable with the Fairfax County Chesapeake Bay Preservation Ordinance (CBPO), and gives special consideration to the Fairfax County designated Chesapeake Bay Resource Protection Areas (RPAs) on the installation. These areas include the streams with perennial flow,

Types of Wetlands and Other Surface Waters

Palustrine Forested Wetlands are swamps dominated by trees that are not associated with large rivers, lakes, or coastal zones.

Perennial Streams are natural open channels that are primarily groundwater fed and support a continuous flow of water all year long.

Intermittent Streams are natural open channels that flow water in all but the dry seasons of the year.

their contiguous wetlands, a 100 ft buffer, and the 100-year floodplain where present. RPAs are sensitive areas that are constrained for most development. Development within RPAs, with certain exceptions, is largely restricted to water dependent activities, maintenance of public activities, passive recreation, water wells, and historic preservation. These areas are compatible only with very low-density or no development (US Army Garrison Fort Belvoir, 2001b).

The Fairfax County Chesapeake Bay Preservation Ordinance

The CBPO was enacted pursuant to the Chesapeake Bay Preservation Act (CBPA), Sections 10.1-2100, et seq., of the Code of Virginia (VAC).

Any land area in Fairfax County that is not a Chesapeake Bay RPA is considered a Chesapeake Bay Resource Management Area. Development within these areas must use Chesapeake Bay BMPs to reduce nutrients in stormwater discharges.

For non-perennial streams without Chesapeake Bay RPA, Fort Belvoir also designates buffer areas ("riparian areas"). While not RPAs, these riparian areas are considered environmentally sensitive, as well.

What is our study area for this analysis?

The study area for wetland, Chesapeake Bay RPA, and riparian resources includes all areas within or adjacent to the boundaries of the two alternative sites being considered. This is where the effects of the project (both construction and operation) are most likely to occur.

Characteristics of a Wetland

Vegetation that is able to grow and thrive under wet conditions

Soils that lack oxygen during persistently wet conditions, technically know as anaerobic (without oxygen) conditions.

Hydrology that induces persistently wet conditions.

What are the wetlands in the study area and what are their characteristics?

Figures 3.5-1 shows the nearest waterways, wetlands and Chesapeake Bay RPA at the Pence Gate Site, while Figures 3.5-2 shows streams, wetlands and Chesapeake Bay RPA at and near the Gunston Site. This mapping is based on an inventory of wetlands and streams on the Main Post conducted in 1997

(Paciulli, 1997a). This inventory consisted of aerial photo interpretation combined with ground-truthing, following methods outlined in the 1987 Corps of Engineers Wetland Delineation Manual. Wetland types are classified according to the USFWS classification system (Cowardin, et al., 1979) In addition, the Army Corps of Engineers conducted a wetland delineation of the Pence Gate site in 2006.

What functions do the wetlands in the study area provide?

Based on aerial photos and maps, the Army expects that the wetlands at either study area likely provide the following functions: habitat for fish and wildlife, improvement of water quality, flood water storage, erosion protection, and aesthetic appreciation opportunities.

How would the project affect wetlands and Chesapeake Bay Resource Protection Areas?

Based on the conceptual layouts, no wetlands are located within the project footprint for either of the Pence Gate alternatives. Either alternative could cause adverse effects to offsite wetlands and streams through increased runoff and decreased groundwater infiltration. These factors could potentially reduce the flow of groundwater to nearby seeps. The Army will explore the use of low impact development techniques such as bioretention and vegetated swales as mitigation measures (Section 3.4) to reduce runoff and promote onsite infiltration of stormwater to the groundwater table.

At the Gunston site, all four alternatives have potential to impact streams and wetlands. The access road for the Kingman Road alternatives would bridge the perennial stream to the east of the site, associated forested wetlands, and its Chesapeake Bay RPA

(approximately 400 to 500 linear ft). Construction of the bridge would require removing trees, grading, excavation, and pouring of concrete for the footers. The access road for the Fairfax County Parkway Alternatives would require crossing 200 to 250 linear ft of Chesapeake Bay RPA associated with a perennial stream west of the site, and potentially filling small areas of an intermittent stream on the site or its associated riparian buffer for the access roadway embankment. Construction of subsurface utilities for any of the alternatives at the Gunston site may also impact wetlands and either stream and its buffer. In all cases, any utilities brought into the site along the access roads would be within, or as close as possible to, the road shoulder. The Chesapeake Bay Preservation Ordinance exempts or allows utility and roadway crossings of the RPA.

Thus, from a perspective of impacts on wetlands and their associated Chesapeake Bay RPA or riparian areas, the ranking of alternatives would be either of the two Pence Gate alternatives as the most environmentally preferable alternative, while the Gunston Kingman Road alternative would be the least environmentally preferable alternative. The Kingman Road alternatives have the greatest potential impacts – the crossing of the perennial stream, 400 – 500 linear ft of RPA, and 0.3 ac of forested seeps as compared to the relatively small impact of the Fairfax County Parkway alternatives on an intermittent stream, its riparian buffer, and Chesapeake Bay RPA. The impacts at the Gunston site could be substantial, although the Fairfax County Parkway alternative would cause less of an impact than the Kingman Road access alternative. These impacts would still not be significant in terms of the overall quality of the human environment, and would not contribute significantly to cumulative impacts at Fort Belvoir.

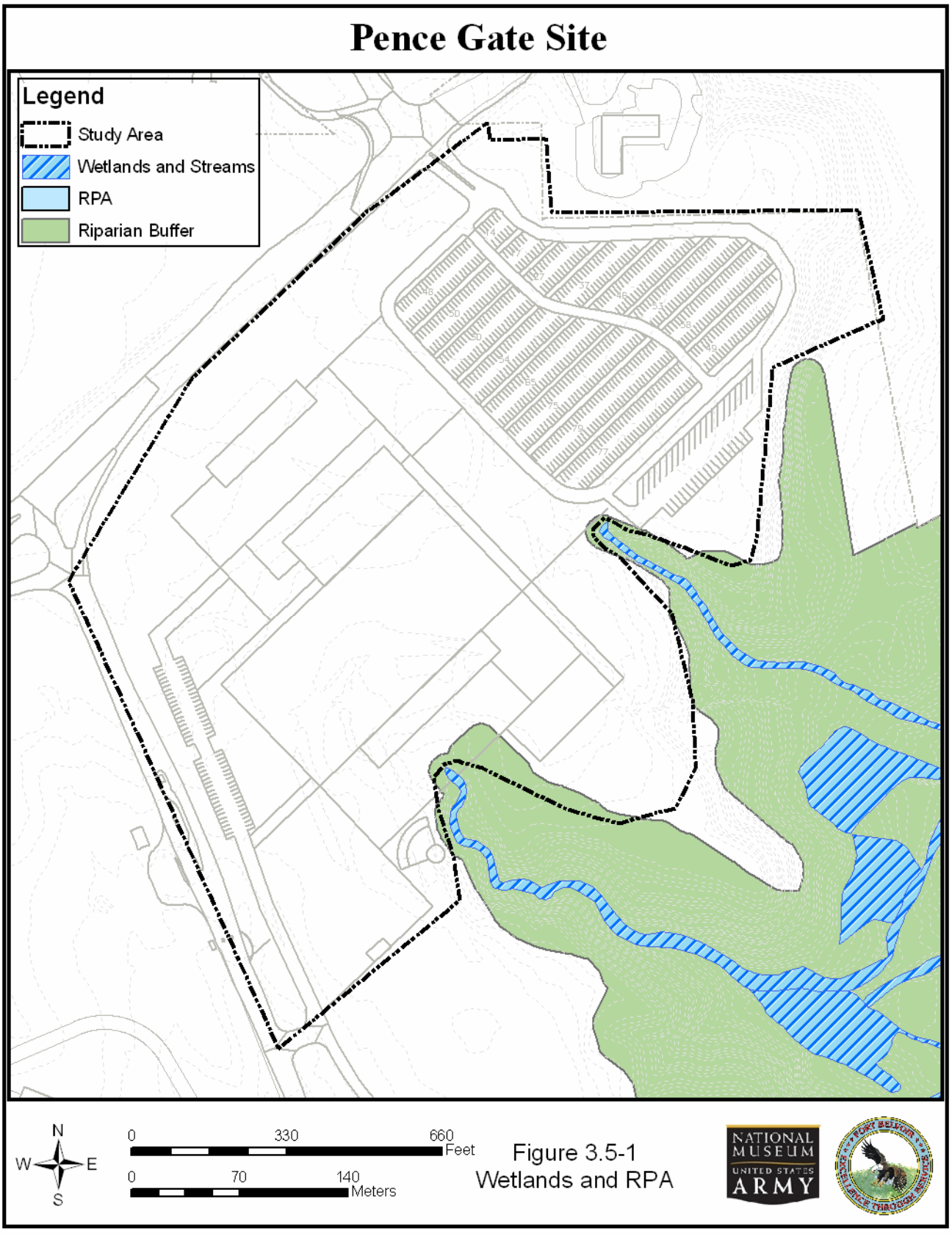

Figure 3.5-1
Wetlands and RPA

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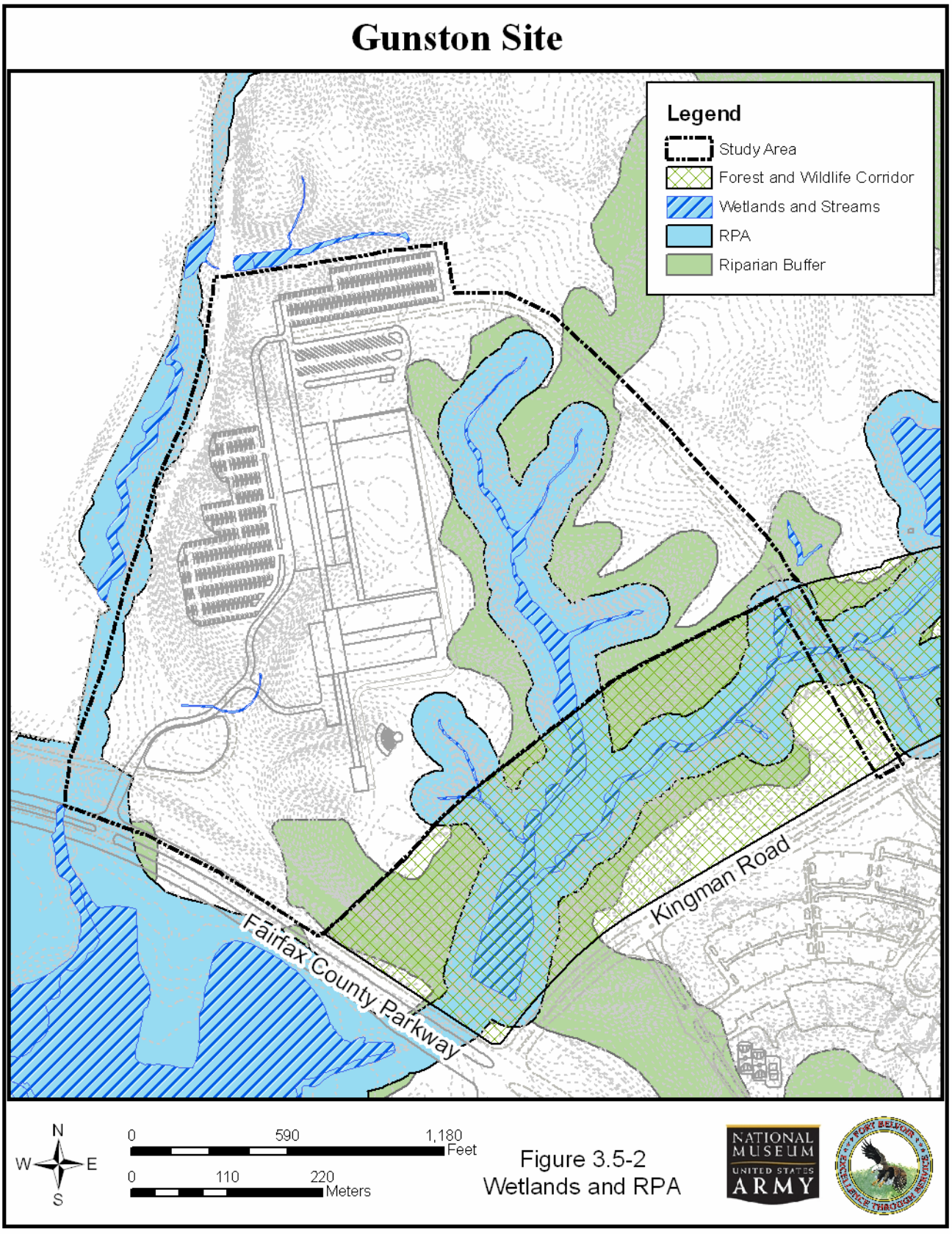

Figure 3.5-2
Wetlands and RPA

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How would we compensate for unavoidable negative effects on wetlands?

If the Gunston site is selected, the Army would coordinate an official wetland delineation and jurisdictional determination with the USACE Regulatory Branch, prior to final design, to assist in both planning the site (the access road and utilities) in a way that avoids and minimizes impacts as much as possible.

Concept planning for each site to date has been, and continues to be, largely an effort to plan the project in a way that minimizes adverse effects on wetlands, waterways, and other natural and cultural resources. The Army is working to avoid and minimize adverse effects at either the Pence Gate or Gunston Sites by choosing a conceptual layout and design that avoids these resources to the greatest extent practicable.

For unavoidable impacts, the Army would obtain permits from the USACE and from the VDEQ prior to the start of construction, based on the chosen alternative. As part of the application process, the exact impacts to the wetlands and surface waters would be determined, and compensation requirements for unavoidable impacts would be determined by these two agencies.

The objective of compensatory mitigation as a regulatory requirement for wetland impacts is to ensure no net loss of wetlands. Therefore, the mitigation would offset any potential direct cumulative impacts this project, regardless of alternative, would have on wetlands.

How would we avoid or minimize adverse effects from construction?

During construction, the Army would be required by the USACE and VDEQ to minimize the unnecessary disturbance of wetlands and ensure their restoration when work is complete. Compliance with ESC, stormwater management, and wetland permit requirements will minimize unnecessary impacts. These measures will include certain protocols. The Army would mark impact and non-impact areas of wetlands in the field prior to construction to avoid accidental disturbance of these areas. If heavy equipment must work from wetlands, the equipment would be placed on mats, geotextile fabric, or other suitable material to minimize soil disturbance, and would be removed immediately upon completion of work. All temporarily disturbed wetlands and streams would be restored to preconstruction conditions within 30 days of completing work. Restoration would include re-establishing pre-construction contours, and planting or seeding with appropriate native wetland vegetation according to type that was present (i.e. emergent, scrub/shrub, or forested).

How would the No Build Alternative affect wetlands?

The no build alternative would have no adverse or beneficial effects on any wetlands.

3.6 Historic, Cultural, and Architectural Resources

Cultural resources refer to the things, places and human institutions that provide information about people from the past, their experiences, and their cultural identities. Cultural resources can include archeological sites, cultural landscapes, spiritual

places, documents, sites, buildings, and objects. Several interrelated federal, state and local laws and regulations require, and provide guidance for, consideration of how development projects might adversely affect cultural resources.

What is our study area for this analysis?

The first step in the Section 106 review process is to determine whether any protected cultural resources could potentially be affected by a proposed action. What resources exist in or near the project area? For this project, the area of potential effect (APE) for either site is considered to include the site itself, as well as any resources within the viewshed of either site's boundaries, or any resources within the range of noise generated by NMUSA activities.

Are any cultural resources located in the area of potential effect for either site?

Fort Belvoir has surveyed the entire installation, including both the Pence Gate and Gunston sites, to identify potential cultural resources (archeological and architectural). There are no known National Register of Historic Places (NRHP) -listed or -eligible architectural resources within either the Gunston or Pence Gate study area, although Pence Gate is adjacent to the Woodlawn Historic District (DHR ID# 029-5181). This historic district has been recommended eligible for NRHP.

Two archeological sites are located on or near the eastern side of the Pence Gate site. Site 44FX1918 is 0.86 acres in size, and a Phase II archeological assessment and report was completed in January 2007. The Virginia Department of Historic Resources (VDHR) indicated that the site is not eligible for the NRHP based on a draft report dated December 1, 2006 (Berger/Smith Group, August 2008). Site 44FX1917 was identified in a Phase I

Section 106 of the National Historic Preservation Act (NHPA)

Under Section 106, the head of any federal agency having direct or indirect jurisdiction over a proposed federal or federally financed undertaking is required to account for the effects of this action on any district, site, building, structure, or object that is included or eligible for inclusion in the NRHP. Eligibility determinations are based on criteria for historic significance contained in 36 CFR 60.4.

The Virginia Department of Historic Resources (VDHR) is the designated State Historic Preservation Office (SHPO), in charge of administering Section 106 in the Commonwealth of Virginia. The SHPO must be consulted about any potential adverse effects from a federal action to protected architectural or archaeological resources. If adverse effects are expected, appropriate mitigation measures must be developed, also in cooperation with the SHPO.

survey in 1992and remains unevaluated, but is outside the actual Pence Gate area of potential effect.

At the Gunston site, surveyors identified eight archeological sites within or near the project site. Of these, six have been formally assessed by the VDHR and have been determined not eligible for the NRHP (VDHR, 2008). The two remaining sites remain unevaluated. Site 44FX0663 was recorded in 1982 as a possible Archaic site with intact archeological deposits. Further work would be required to determine the site's eligibility for inclusion to the NRHP. Site 44FX2277 is historic with dwellings and associated formal gardens. It is known as Mount Air and was identified in a reconnaissance level survey in 1997. It is outside the Gunston project site.

How would the project affect cultural resources?

If the NMUSA is constructed at the Pence Gate site, it would have the potential to cause adverse visual and noise effects on the Woodlawn Historic District. Per the BRAC Programmatic Agreement, Fort Belvoir has already agreed to conduct a viewshed study for the Woodlawn Historic District. This study would define development restrictions and viewshed mitigation strategies for any Fort Belvoir developments within the Woodlawn Historic District Viewshed. Vegetative buffers and other means will be considered for minimization of visual effects. For noise effects, the Army is exploring measures such as building arrangements to minimize noise carrying to these receptors.

At this stage, it is unknown if archeological site 44FX0663 at the Gunston project site is eligible for listing on the NRHP. Construction or grading for the Fairfax County Parkway access road could adversely affect this site (see next section).

How would project construction and operation affect cultural resources?

Short-term effects would be primarily due to heavy equipment noise during construction and demolition activities. Noise effects on adjacent properties, including the various properties within the Woodlawn Historic District, are addressed in Section 3.9 of this EA. In summary, any construction-related noise effects on cultural resources would be short-term, and would likely occur during the week during work hours, and not on weekends when visitors to these resources are likely to peak.

If the Gunston site is selected, clearing and grading for the Fairfax County Parkway alternatives access road could impact site 44FX0663. The Kingman Road alternatives would not impact these areas.

As for cumulative impacts, the Pence Gate alternatives would contribute to cumulative impacts on architectural resources, but not significantly. The activity and noise generated by the operation of the NMUSA at the Pence Gate site has a potential to occasionally disturb visitors to the Woodlawn Plantation and Pope Leighey House.

The Gunston Fairfax County Parkway alternatives would adversely affect archeological resources. However, testing and data recovery (see next question) would generate valuable information and offset any potential cumulative impacts.

What would we do to avoid or minimize effects on cultural resources?

Minimization of construction-related noise effects is discussed in Section 3.9.

If one of the Gunston Fairfax County Parkway alternatives is selected, the Army would do any additional work needed to make the determination of whether site 44FX0663 is eligible for the NRHP. If eligible, appropriate measures would be taken to either avoid the site by realigning the location of the access road, or mitigate damage to the site (i.e., testing and/or data recovery as appropriate and in consultation with VDHR).

How would the No Build Alternative affect cultural resources?

Under the No Build Alternative, there would be no adverse impacts to cultural resources. The known archeological sites at the Gunston site would remain undisturbed.

3.7 Hazardous Substances

Hazardous waste management at Fort Belvoir is conducted in compliance with the Resource Conservation and Recovery Act (RCRA). Fort Belvoir has a Hazardous Waste Management/ Waste Minimization Plan (HWMP) and a Master Spill Plan. Fort Belvoir has one RCRA Part B permit for storage of hazardous wastes from the VDEQ. All current and former hazardous waste permitted facilities present potential constraints to future development, in that closure of such sites is required prior to reuse.

What hazardous substances occur at the site?

There are no hazardous waste accumulation sites within the immediate vicinity of either the Pence Gate or Gunston Site. There are currently no aboveground storage tanks (ASTs) or known underground storage tanks (USTs) located at either the Gunston or Pence Gate sites. A 1,000 gallon heating oil tank previously located at the Pence Gate site was removed in 1999.

The tank was used to heat former Building 1201 on Washington Road. Initial soil abatement occurred because of a minor release, but no further action was warranted (excerpts from Berger/SmithGroup, August 2008).

How would the project affect the storage or use of hazardous substances?

Operation of the NMUSA may require the installation of additional USTs or ASTs to fuel emergency power generators. All federal, state, and local requirements would be followed to ensure the safe storage and transfer of fuel to the storage tanks. If a fuel spill were to occur, Fort Belvoir personnel would follow the Fort Belvoir Master Spill Plan, and the Environmental and Natural Resources Division (ENRD) would be notified. Any hazardous substances, petroleum contaminants, or contaminated soils generated would be disposed of in accordance with state and federal regulations. A tank activity permit is required to be submitted to Fort Belvoir ENRD prior to installation of USTs. Permits and inspections by the VDEQ are required for installation, upgrade, repair or closure of USTs.

Other than fuel for heating and cooling, operation of the NMUSA would not involve use of more than minimal amounts of hazardous materials, e.g., household cleaners for cleaning and fertilizers and pesticides for grounds maintenance. Events at the Parade Grounds could involve the discharge of dummy ordnance from small firearms or the use of gunpowder for cannons. All materials and ordnance would be properly stored and used according to state and federal regulations.

Because Fort Belvoir tightly controls the storage and transfer of fuel, the storage and discharge of gunpowder and dummy ordnance, and the storage and use of other hazardous substances,

the operation of the NMUSA should contribute little in terms of cumulative impacts from the use and storage of these substances.

What impacts on storage or use of hazardous substances would the construction activity generate?

Construction activities would include a short-term increase in the use of fuel, oil, asphalt substances, and fertilizers, and would generate solid and sanitary waste. Some of these substances may be considered "hazardous" if released. Various types of control measures would be implemented to minimize such releases.

The NMUSA construction contractors must follow the Fort Belvoir Master Spill Plan, which explains required hazardous substances spill response procedures. The construction contractor must call the Fort Belvoir Fire Department (FBFD) if there is a hazardous substance spill of five gallons or more. The FBFD would contact the Directorate of Public Works (DPW), if necessary. The DPW would contact the VDEQ, if required.

How would the No Build Alternative affect storage or use of hazardous substances?

Under the No Build Alternative, there would be no short- or long-term adverse increase in the production of hazardous substances or waste at either site.

3.8 Air Quality

Who regulates air quality in Virginia?

Air quality in Virginia is regulated by the US Environmental Protection Agency (USEPA) Region 3 and the VDEQ.

What standards apply to air quality?

The Clean Air Act (42 USC. 7401-7671q), as amended, gives the USEPA responsibility to establish the primary and secondary National Ambient Air Quality Standards (NAAQS) (40 CFR Part 50) that set acceptable concentration levels for seven criteria pollutants: particulate matter, fine particulate matter ($PM_{2.5}$), sulfur dioxide (SO_2), carbon monoxide (CO), nitrous oxides (NO_X), ozone (O_3), and lead. Short-term NAAQS (1-, 8-, and 24-hour periods) have been established for pollutants contributing to acute health effects, while long-term NAAQS (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 has generally adopted the federal standards.

How is the air quality in this region?

Air-quality Control Regions (AQCRs) in violation of the NAAQS are *nonattainment* areas. AQCRs with levels below the NAAQS are *attainment* areas. *Maintenance* AQCRs are areas that have previously been designated nonattainment and have been re-designated to attainment for a probationary period through the implementation of maintenance plans. According to the severity of the pollution problem, 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). The National Capital Interstate AQCR is in the O_3 transport region that includes 12 states and Washington, DC. The USEPA has designated Fairfax County as the following:

- Moderate nonattainment for the 8-hour O_3 NAAQS.
- Nonattainment for the $PM_{2.5}$ NAAQS.

Attainment for all other criteria pollutants (40 CFR 81.347).

How do we evaluate air quality effects from the project?

Both the USEPA and VDEQ have established General Conformity Rules (GCR) specifically to ensure that the actions taken by federal agencies in nonattainment and maintenance areas do not affect a region's ability to meet the NAAQS in a timely fashion. The GCR plays an important role in helping states and tribal regions improve air quality in those areas that do not meet the NAAQS. The GCR sets applicability thresholds, below which is understood that emissions associated with a federal action would not have significant affect on air quality.

To determine the applicability of the GCR, air emissions from construction and proposed stationary and mobile sources were compared to the applicability thresholds and regional emissions budgets. The construction emissions estimates included equipment use for site preparation, construction, and landscaping for the new facilities. The facility's operational emissions estimates included emissions from vehicles operated by employees and NMUSA visitors, and from boilers and emergency generators.

How would the NMUSA's construction and operation affect air quality?

	Estimated Emissions (Tons per Year)			
Year	NO_X	VOC	$PM_{2.5}$	SO_2
2010	10.4	0.7	1.3	1.8
2011	8.9	1.1	0.9	1.4
2012	8.3	0.9	1.2	1.5
2013	16.2	2.5	2.1	2.6
Operational	12.6	5.9	1.0	0.4
Applicability threshold	100	50	100	100
Exceeds threshold?	No	No	No	No

The NMUSA's construction and operation could affect air quality in three ways: generating pollutants during construction;

introducing new stationary sources of pollutants, such as heating boilers and standby generators; and changes in vehicular emissions.

For all alternatives, construction of the NMUSA would generate equipment exhaust and fugitive dust emissions during site preparation, construction, and landscaping. Construction emissions would be below the general conformity applicability thresholds and therefore low enough as not to interfere with the regions ability to meet the NAAQS in a timely fashion.

The overall building size and construction phasing would be similar for all alternatives in this EA. Therefore, all alternatives would have similar levels of emissions. When compared to other alternatives, the Pence Gate Structured Parking alternative would include demolition of existing structures, additional excavation, and the fabrication of a structured parking garage. Although only slight variation in the overall emissions would be expected with the different alternatives, this alternative represents the upper bound of potential emissions associated with any of the alternatives within this EA.

Regardless of which site is ultimately selected, the new facilities would likely be equipped with dual-fired (natural gas and #2 fuel oil) boilers and diesel fuel emergency generators. Relatively small amounts of emissions would be generated by these sources. Operational emissions would be below the general conformity applicability thresholds and therefore would not interfere with the regions ability to meet the NAAQS in a timely fashion. In addition, none of the alternatives would lead to violations of federal, state, or local air regulations.

Mobile emissions of concern primarily include vehicular traffic. Emissions from motor vehicles were included in the overall

operational emission estimations, which as stated above were below the applicability thresholds. The project is not located in a nonattainment or maintenance area for CO; therefore, CO is not anticipated to be an air quality concern. Particulate matter or Mobile Source Air Toxics from vehicles are not anticipated to be an air quality concern because the intersections affected are primarily secondary arterial roads (US Environmental Protection Agency, 2006 and Federal Highway Administration [FHWA], 2006).

How would the project comply with existing air regulations?

Construction activities would be in full compliance with current and pending Virginia regulatory requirements, with compliant practices and/or products. Applicable requirements include:

- Visible emissions and fugitive dust and emissions (9 VAC 5-40-60).
- Asphalt paving operations (9 VAC 5-40-5490).
- Open burning (9 VAC 5-40-5600).
- Portable fuel containers (9 VAC 5-40-5700).
- Architectural and industrial maintenance coatings (9 VAC 5-40-7120).
- Consumer products (9 VAC 5-40-7240 *et seq.*).

This listing is not all-inclusive; the Army and any contractors would comply with all applicable air pollution control regulations.

The dual-fired boilers (natural gas and #2 fuel oil) and diesel generators would be subject to federal and state air permitting regulations. These requirements include, but are not limited to: minor new source review (NSR), nonattainment new source review, prevention of significant deterioration, and new source

performance standards (NSPS) for selected categories of industrial sources. Exceedence of the major modification thresholds of 40 tons per year (tpy) is not anticipated with any of the alternatives. Therefore, only a new minor NSR permit would be required to construct new boilers and emergency generators. The boilers and emergency generators may require a Best Available Control Technology review for each criteria pollutant, and predictive air dispersion modeling, depending upon VDEQ's requests. These new stationary sources of air emissions would be added to Fort Belvoir's Title V air permit. Monitoring and recordkeeping requirements outlined in the permit would apply.

Manufacturer specifications for the generators and boilers have not been finalized. Generators and boiler ultimately selected may differ in specific features from the ones described in this EA, but the emissions profiles would be consistent with or lower than the Tier 2 engines described herein.

Moderate changes in the size or type of equipment ultimately selected would not change the level of impact described in this EA. In the final design stage extra care would be taken to ensure all equipment selected would be in full compliance with federal, state, local air regulations.

The extent to which this project would contribute to cumulative impacts on air quality in the region is addressed in Section 3.15 of this EA.

Does the construction or operation of the NMUSA require mitigation?

No air-quality mitigation would be required for any of the alternatives.

Would the No Build Alternative cause any impacts?

The No Build Alternative would not cause any impacts to air quality.

3.9 Noise

Sound consists of vibrations that travel through a medium, such as air, and are sensed by the 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 is often 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) are use to quantify sound frequency. The human ear responds differently to different frequencies. *A-weighing*, 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 3.9-1.

Table 3.9-1 Common Sounds and Their Levels

Outdoor	Sound Level (dBA)	Indoor
Motorcycle	100	Subway train
Tractor	90	Garbage disposal
Noisy restaurant	85	Blender
Downtown (large city)	80	Ringing telephone
Freeway traffic	70	TV audio
Normal conversation	60	Sewing machine
Rainfall	50	Refrigerator
Quiet residential area	40	Library
Source: Harris, 1998.		

The dBA noise metric describes steady noise levels, although very few noises are, in fact, constant. Therefore, A-weighted day-night Sound Level (ADNL) has been developed. Day-night Sound Level (DNL) is defined as the average sound energy in a 24-hour period with a 10-dB penalty added to the nighttime

levels (10 P.M. to 7 A.M.). DNL is a useful descriptor for noise because: (1) it averages ongoing yet intermittent noise, and (2) it measures total sound energy over a 24-hour period. In addition, Equivalent Sound Level (L_{eq}) is often used to describe the overall noise environment. L_{eq} is the average sound level in dB.

What standards apply to noise?

The Noise Control Act of 1972 (PL 92-574) directs federal agencies to comply with applicable federal, state, and local noise control regulations. In 1974, the USEPA provided information suggesting continuous and long-term noise levels in excess of DNL 65 dBA are normally unacceptable for noise-sensitive land uses such as residences, schools, churches, and hospitals.

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, they prohibit 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

What is the current noise environment near the alternative NMUSA sites?

Existing sources of noise near the proposed sites include roadway traffic, high-altitude aircraft overflights, rotorcraft, lawn maintenance equipment, and natural noises such as the rustling of leaves and bird vocalizations. Noise levels are typical for a suburban setting. Two churches (the Friends Meeting House and the Woodlawn Baptist Church), the DeWitt Hospital (planned), several on-Post residences, and portions of the Woodlawn Historic Overlay District are located within 1,000

feet of the Pence Gate site. There are no residences, churches, hospitals, or schools located within 1,000 feet of the Gunston site.

How would the NMUSA's construction and operation affect the existing noise environment?

Short- and long-term minor adverse effects to the noise environment would be expected with the implementation of either Pence Gate alternative. Noise effects would extend to both humans and wildlife around the site. Short-term effects would be primarily due to heavy equipment noise during construction and demolition activities. Construction noise would be clearly audible at the Friends Meeting House, the Woodlawn Baptist Church, and nearby residences. However, construction would not normally occur during weekend daytime hours.

No appreciable long-term increases in the overall noise environment can be expected with the implementation of either Pence Gate alternative. No regular military training activities, demolitions, or aircraft operations would occur. Military bands, re-enactment activities, parades, and educational activities (camping, occasional discharge of dummy ordnance, amplification of voices and music to reach a large crowd) would be expected.

Short- and long-term minor adverse effects to the noise environment would be expected under the Gunston alternatives. Sources of noise and their levels would be similar to those outlined under the Pence Gate alternatives, except that the receptors would include golf course patrons and wildlife in the adjacent FWC. These adverse effects are likely to be minor. If additional noise sources are identified, additional studies could

be conducted to determine the impact to these receptors, including mammals, birds, and reptiles in the FWC.

How would the project comply with existing noise regulations?

Construction noise is expected to dominate the soundscape for all on-site personnel. Construction personnel, and particularly equipment operators, would wear adequate personal hearing protection to limit exposure and ensure compliance with federal health and safety regulations.

Because construction activities (the primary source of noise associated with the alternatives) would occur primarily during normal weekday business hours, no violation of the Fairfax County noise ordinance would be expected for any alternative.

Does the construction or operation of the NMUSA require mitigation?

Although construction-related noise effects would be small, the following best management practices would be used to reduce these already-limited noise effects:

- Construction would predominately occur during normal weekday business hours.
- Construction equipment mufflers would be properly maintained and in good working order.

No mitigation measures for noise would be required with the implementation of the proposed action, with the possible exception of the Pence Gate alternatives. If the Pence Gate site is selected, additional measures may be required to limit the effects of noise on the historical soundscape. These requirements would be set by programmatic agreement between Fort Belvoir, the SHPO, and consulting parties.

3.10 Infrastructure and Utilities

Construction of any new complex or facility generally requires an examination of the availability of utilities including potable water, sanitary wastewater, solid waste service, electricity, natural gas, communications, and stormwater. It is important to identify the needs that would be generated by the proposed facility and compare those needs against what is already supplied to the site. This process helps identify what additional utilities infrastructure would be required to implement the project.

What is the study area for these analyses?

The study area for utilities includes the two potential NMUSA sites and those nearby areas which are serviced by the same utility providers, as the utility availability to these areas could be impacted by the increased demand created by the construction and operation of the NMUSA.

How would potable water be supplied to the NMUSA?

Fort Belvoir owns, operates and maintains the on-Post water supply and distribution system. Fairfax Water provides potable water for Fort Belvoir.

Currently, the Post is undergoing design review for water distribution system upgrades. At the Pence Gate site, potable water would likely be supplied from an existing 16-inch water line located on the west side of Belvoir Road (excerpts from Berger/SmithGroup, August 2008).

At the Gunston site, potable water could be provided from two possible water lines. The first of these is the existing Fort Belvoir

water main along Beulah Street, located approximately 4,100 feet northeast of the Gunston site. The new water line would likely extend from the south end of the site to Fairfax County Parkway, trending east along the shoulder of the Fairfax County Parkway across the Fort Belvoir FWC to John J. Kingman Road, and from there trending northeast to Beulah Street. Alternatively, the water line could be installed to the north, through the North Post Golf Course.

The second possible water source for the Gunston site is the existing Fairfax Water main located at Telegraph Road, approximately 4,000 ft from the Gunston site (excerpts from Berger/SmithGroup, August 2008). This line is not part of the Fort Belvoir water distribution system, and would therefore require that Fort Belvoir make contractual changes with Fairfax Water.

Are the two sites currently supplied with sufficient potable water?

The NMUSA is expected to generate a peak need of approximately 408,000 gallons per day of potable water. This number exceeds the currently-available capacity, and would cause available water pressure for the local portion of the Fort Belvoir water distribution system to drop below the desired 40-60 pounds per square inch (psi) range. Upgrades would be required (EA, Inc., 2008) to meet this demand.

The Fairfax Water main at Telegraph Road is reported to have sufficient capacity for the Gunston site (EA Technical Memorandum, March 21, 2007). If the Gunston site is selected and the Fairfax Water main is used, no additional upgrades would be required beyond the installation of a new transmission line and a point of connection between the Fairfax Water Telegraph Road water main and the installation's distribution

system at the intersection of Gunston Road and US Route 1. The NMUSA water line would be tapped from this new transmission main.

How would the Army mitigate the increase in potable water use from the NMUSA?

The Army plans to enhance the Beulah Street water main as specified in the Hydraulic Evaluation (EA, Inc., 2008) to meet installation needs. The first set of improvements includes the installation of 12-inch lines along US Route 1 (replacing an 8-inch line) and 16-inch lines along Belvoir Street (replacing smaller lines of unspecified diameter). These upgrades are currently undergoing permitting. The second set of improvements includes the installation of a 12-inch line along Beulah Street (replacing a 6-inch line) and connection of the Post to existing water storage tanks. These upgrades have been given preliminary approval but are still in the conceptual design phase as of the writing of this report.

Current projections indicate that once these improvements are complete, all facilities serviced by the Beulah Street water main would have access to potable water in the desired 40-60 psi range, even once the water use from the NMUSA is included. The construction of the NMUSA would therefore not significantly affect the availability of potable water in the study area once these upgrades are complete.

If the Gunston site is selected and the Fairfax Water main is used, no mitigation would be required.

How would sanitary sewer service be supplied to the NMUSA?

Fort Belvoir owns, operates and maintains the on-Post sanitary sewer system, which includes 37 sewage pumping/lift stations

and two main pumping stations. The installation discharges approximately 1.3 million gallons (5 million liters) per day of wastewater to the Fairfax County system (US Army Garrison Fort Belvoir, 2001b).

The Pence Gate site would connect to a 42-inch gravity line located near the northwest corner of the site located near the intersection of Belvoir Road and US Route 1 (excerpts from Berger/SmithGroup, 2008). For the Gunston site, the closest connection point is an existing 15-inch sanitary sewer line located approximately 3,100 ft from the site across John J. Kingman Road.

Are the two sites supplied with sufficient sanitary sewer service?

The NMUSA is expected to generate 250,000 to 255,000 gallons per day of sanitary sewerage (excerpts from Berger/SmithGroup, 2008). For the Pence Gate site, the 42-inch gravity line could be connected to at the northwestern corner of the site. According to the Fort Belvoir Directorate of Public Works, the available capacity of this line is sufficient.

For the Gunston site, it is not currently known if the 15-inch line located across Kingman Road has sufficient capacity to accept the estimated wastewater from the NMUSA. Additional studies are planned in order to determine the suitability of this line.

Providing sanitary sewer service to the Gunston site would also require the construction and operation of a pump station along the new sanitary sewer line (Berger/Smith Group, August 2008). The Army has not proposed any pump station locations as of the writing of this report.

The Fairfax Water 36" Force Main: Pence Gate Design Constraint

A 36" Fairfax Water force main crosses the center of the Pence Gate site from east to west. The Pence Gate alternative would require special consideration during design of the NMUSA in order to avoid and protect this subsurface line during construction and operation of the NMUSA.

What about stormwater requirements?

Fort Belvoir is classified as a small municipal separate storm sewer system (MS-4) discharger under applicable stormwater regulations. It has a general storm water permit that is in effect through December 2008, and the Army will seek a renewal of that permit for another 10 years.

Under the applicable regulations, any construction activity such as clearing, grading, and excavation that is greater than 2,500 sf requires a Virginia Stormwater Management Permit. In addition, based on the Executive Council of the Chesapeake Bay Program Directive 01-1, *Managing Storm Water on State, Federal and District-owned Lands and Facilities*, Fort Belvoir personnel are to lead by example in controlling nutrient, sediment and chemical contaminant runoff during project construction and operation of the proposed site. Fort Belvoir implements this by following the Fairfax County Chesapeake Bay Preservation Ordinance at Chapter 118 of the Fairfax County Code.

Fort Belvoir's stormwater system consists predominately of open channels that receive sheet flow. Stormwater at the Pence Gate site currently flows to an intermittent tributary of Accotink Creek. If the NMUSA is built at the Pence Gate site, stormwater would be collected and would drain to a on-site stormwater management pond, and from the pond to the one of the intermittent tributaries. The peak stormwater discharge for the Pence Gate alternatives would be approximately 23.30 cubic feet per second (excerpts from Berger/SmithGroup, 2008).

At the Gunston site, stormwater currently drains to a perennial tributary to Accotink Creek. If the NMUSA is built at the Gunston site, stormwater would be collected and would drain to two on-site stormwater management ponds, and from these ponds to a perennial stream feeding Accotink Creek. The estimated peak stormwater discharge for the Gunston site would be approximately 39.00 cubic feet per second (excerpts from Berger/SmithGroup, 2008).

At either site, these stormwater systems would use stormwater management/ best management practices (SWM/BMP) to ensure compliance with stormwater regulations and consistency with Chesapeake Bay quantity and quality control requirements.

Stormwater Regulatory Requirements

Section 402 of the Clean Water Act of 1977 established requirements for discharges of industrial and sanitary wastewater effluents, and of storm water through the National Pollutant Discharge Elimination System (NPDES) permit program. In Virginia, the stormwater portion of the NPDES program is administered through the VSMP program administered by the VDCR. The VDCR is also responsible for enforcing the other requirements of the Virginia Stormwater Management Law (Title 10.1, Chapter 6, Article 1.1 of the Code of Virginia) and regulations (4VAC3-20 et seq.) of the Virginia Administrative Code.

What about natural gas requirements?

Fort Belvoir's natural gas system is owned and operated by Washington Gas. As of 2000, natural gas was distributed to the Post through 25 miles of main gas line and 11 miles of service lines mostly servicing housing areas.

For the Pence Gate site, an existing 4-inch natural gas line located on the site has enough capacity to meet the NMUSA's needs. Approximately 600 ft of on-site underground gas line

would be required to connect to this main (excerpts from Berger/SmithGroup, August 2008).

The Gunston site is not currently serviced by natural gas. The closest natural gas main is located at the corner of Telegraph Road and Snyder Road, approximately 3,100 feet north of the site (excerpts from Berger/SmithGroup, August 2008). No natural gas line locations have been proposed at this time, but a likely scenario is to install a natural gas line that would trend west from the Gunston site along Fairfax County Parkway to its intersection with Telegraph Road, and from there northeast to the existing natural gas main.

At peak usage times, the NMUSA is expected to require 12,500 cubic feet per hour of natural gas (excerpts from Berger/SmithGroup, August 2008). Based on telephone conversations between representatives of Washington Gas and the Louis Berger Group, this peak usage is expected to be well within the capacity of the existing infrastructure. During the design stage of the NMUSA, the designers will send a load letter to Washington Gas to ensure capacity is available. The Army would also adhere to all applicable local, state and federal laws.

What about electricity requirements?

Dominion Virginia Power owns the entire on-Post electrical system, including the distribution feeder system. As of 2000, 10 substations were located on Post. These substations were used to transform from the Dominion Virginia Power substation to a Fort Belvoir-owned combination substation to switching stations (US Army Garrison Fort Belvoir, 1998a), prior to Dominion Virginia Power ownership.

For the Pence Gate site, there is currently an overhead 34.5kV line running north-south through the site. Approximately 1,170

linear ft of overhead line would be replaced with underground lines and connected to the existing 34.5kV service (excerpts from Berger/SmithGroup, August 2008).

For the Gunston site, 3-phase electrical power is currently available to the site from an elevated line located along John J. Kingman Road, located approximately 200 ft east of the site. However, this line requires further evaluation to determine if the line would meet the NMUSA's needs (excerpts from Berger/SmithGroup, August 2008).

The estimated peak demand of the NMUSA would be 2,500 kilowatt hour (kwh) (excerpts from Berger/SmithGroup, August 2008). Based on telephone conversations between representatives of Dominion Virginia Power and the Louis Berger Group, this peak usage is expected to be within the capacity of the existing infrastructure. During the design stage of the NMUSA, a load letter would be sent to Virginia Dominion Power, and the Army would adhere to all applicable local, state and federal laws.

What about communications requirements?

The installation owns the entire communications system, including copper and fiber optic cables, utility poles, and computerized switchboard systems. Most distribution cable is carried overhead on utility poles, while most fiber-optic cable is carried through an underground duct bank, along with some conventional cable (US Army Garrison Fort Belvoir, 1998a).

An existing fiber optic line located along the east side of Belvoir Road is available to the Pence Gate site. Approximately 950 feet of additional fiber optic line would be required to connect the

NMUSA at the proposed Pence Gate (excerpts from Berger/SmithGroup, 2008).

Copper telecommunication lines are currently available to the Gunston site. In addition, fiber optic cables are available to the DLA facility located to the east of the site. The nearest fiber optic connection appears to be located approximately 6,500 feet from the site, at the intersection of John J. Kingman Road and Beulah Street (excerpts from Berger/SmithGroup, 2008).

It is not currently known if the existing communications infrastructure at either site is sufficient, because the communications needs of the NMUSA have not been established. Once these needs have been determined, additional studies would be required to examine the impact of the NMUSA on communications infrastructure.

What about solid waste generated by the NMUSA?

The amount of solid waste generated by the NMUSA is primarily determined by three factors:

1) The number of full-time employees at the site.
2) The number of visitors at the site.
3) The number of meals served at the site.

The NMUSA is expected to require up to 185 employees and volunteers and an average of 2,200 visitors per day (Economics Research Associates, April 2006). Approximately 1,500 meals would be served each day at the NMUSA (excerpts from Berger/SmithGroup, August 2008). Based on an estimated solid waste generation rate of one pound (lb) per day per employee, 0.25 lb per day per visitor, and two lbs per meal, the NMUSA is expected to generate 4,385 lbs of solid waste per day, and 1,600,525 lbs (800 tons) per year.

A civilian contractor currently collects Fort Belvoir's solid waste (approximately 10,460 tons per year), which is disposed of at a state-approved, off-Post landfill (US Army Garrison Fort Belvoir, 2001a). The anticipated solid waste generated by the NMUSA represents a 7.6 percent increase in the amount of solid waste generated by the installation, and is therefore expected to be well within the capacity of Fort Belvoir's existing infrastructure and contractual arrangements.

Fort Belvoir has a mandatory Post-wide Qualified Recycling Program (QRP) which collects white paper, colored paper, newspaper, aluminum cans, tin/steel cans, scrap metal, cardboard, glass bottles, plastic containers, and toner cartridges. In 2004, 5.3 tons of cardboard, 88 tons of scrap metal and 5 tons of commingled mixed paper to include aluminum, glass, plastic, and newspaper) was collected and separated off-site. Controlled non-regulated solid waste (special and universal waste), such as tires, used oil, paint and fluorescent lighting, batteries, pesticides, thermostats, mercury-containing equipment and scrap metal, is handled through the Environmental and Natural Resources Division in accordance with the Resource Conservation and Recovery Act (40 CFR 273).

3.11 Socioeconomics

What is our study area for this analysis?

Greater Washington Metropolitan Area

The counties of Prince William, Fauquier, Stafford, King George, Loudoun, and Arlington, and the city of Alexandria in Virginia; the counties of Montgomery, Prince George's, and Charles in Maryland; and the District of Columbia are within a 30-mi (48 km) radius of Fort Belvoir.

The study area for this project includes Fort Belvoir, Fairfax County, and to a lesser extent, other jurisdictions within the Greater Washington Metropolitan Area. The NMUSA workforce would come primarily from Fairfax and neighboring counties. Revenue generated by the NMUSA would most likely benefit the entire Greater Washington Metropolitan Area.

Who lives within the study area?

The Greater Washington Metropolitan Area is a large and growing metropolitan area with a population estimated at over 4.9 million people in 2005. Strong population growth is expected to continue through 2030 (Metropolitan Washington Council of Governments [MWCOG], 2005[a] in: US Army Corps of Engineers, Mobile District, August 2007). Fairfax County is the jurisdiction with the biggest population in the Greater Washington Metropolitan Area. In 2006, an estimated 1.04 million people lived in Fairfax County (Fairfax County Website, 2008). Fairfax County's population (including Falls Church City) is expected to increase by 95,000 people (nine percent) by the year 2010. The population along Northern Virginia's I-95 corridor (including Fairfax County, Fairfax City, Falls Church City, Prince William County, Manassas, and Manassas Park City, and Stafford County) is expected to increase by 177,000 (11 percent) by the year 2010 (US Army Corps of Engineers, Mobile District, August 2007).

As of January 2006, Fort Belvoir had a working population of about 22,150 persons and supported 2,070 family housing units (US Army Garrison Fort Belvoir Website, 2006). This number will grow by about 19,000 additional workers (for a total of 41,150) as a result of the 2005 Defense Base Closure and Realignment actions (College, August 2007).

Approximately 6,630 people live on Fort Belvoir (US Army Garrison Fort Belvoir Website, 2006). Table 3.11-1 provides data from the 2000 US Census on race and ethnicity for Fort Belvoir, Fairfax County, and Virginia. Table 3.11.2 provides similar data as estimated for 2005 by the American Community Survey. These data are important because Executive Order (EO) 12898 (*Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*) requires all federal agencies to evaluate how their programs, policies, and activities could affect minority and low income neighborhoods. Federal agencies must examine whether their proposed actions are having an unfair effect on neighborhoods or communities because of their race, color, or national origin.

Environmental Justice

According to CEQ guidance on Executive Order (EO) 12898, "minority populations should be identified where either: (a) the minority population of the affected area exceeds 50 percent or (b) 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.

Census Designated Place

A CDP is a non-incorporated area identifiable by name with sufficient density of population to justify singling them out for census purposes.

For Tables 3.11-1 and 3.11-2, the "Fort Belvoir Census Designated Place (CDP)" coincides with the boundaries of Fort Belvoir, while Accotink Village is a small village on US Route 1, surrounded by Fort Belvoir property. Accotink Village and Fairfax County are home to proportionately more non-white minorities than the state as a whole, but more than half of the population of Accotink Village (210 out of 390 residents) belongs to a racial or ethnic minority. Therefore, Accotink Village qualifies as an environmental justice community on the basis of racial or ethnic criteria.

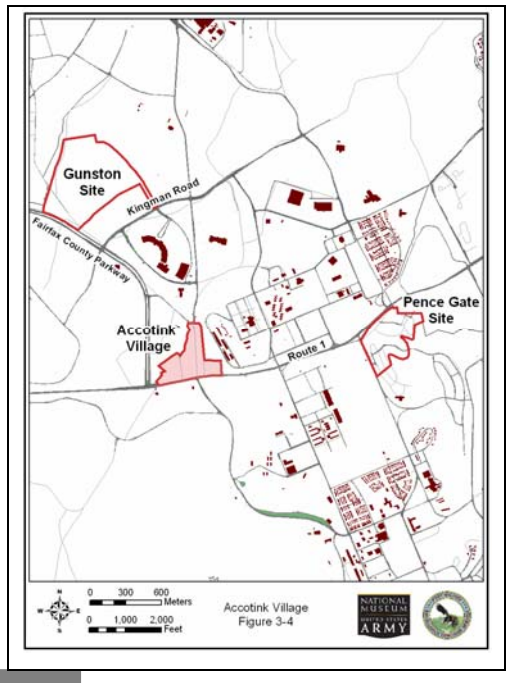

Table 3.11-1
Race and Ethnic Distribution for 2000 Census (Percent)

Jurisdiction	White	Black[1]	Other Non-White	Two or More Races	Total Non-White	Hispanic[2]
Fort Belvoir CDP	55.7	31.8	8.2	4.3	44.3	10.5
Accotink Village[3]	46.2	37.4	12.1	4.3	53.8	7.9
Fairfax County	69.9	8.6	17.9	3.7	30.1	11
State of Virginia	72.3	19.6	6.1	2.0	27.7	4.7

Source: US Census Bureau Website, February 2005
[1] Having origins in any black racial groups of Africa.
[2] Hispanic origin, may be of any race.
[3] Block group 2 of census tract 4220.

Table 3.11-2
2005 Total Population Estimate (Percent)

Race	State of Virginia	Fairfax County	8th Congressional District
White	71.7	68.3	68.8
Black or African American	19	9.2	13
Other Non-white	9.3	22.5	18.2
Hispanic (any race)	6	12.6	15.6

Source: US Census Bureau, 2005 American Community Survey
Note: The 2005 American Community Survey does not break out data for the Fort Belvoir CDP or Accotink Village. Instead, data for the 8th Congressional District (109th Congress) are presented; it is adjacent to Fort Belvoir, and includes Accotink Village and other parts of Fairfax

Table 3.11-2 shows that little change has occurred in the racial and ethnic distribution of Virginia and Fairfax County from 2000 to 2005. It also shows that both Fairfax County and the 8th Congressional District are more ethnically diverse than the state as a whole.

Are there low income communities within the study area?

Environmental Justice

According to CEQ guidance on EO 12898, low-income populations in an affected area should be identified using the annual statistical poverty thresholds from the Bureau of the Census.

Based on Census 2000 data, 5.6 percent of the population within the Fort Belvoir CDP was living in poverty (Table 3.11-3). However, military personnel salaries do not necessarily reflect benefits such as on-base housing or off-base housing allowances, Army-provided medical care, or the ability to purchase goods through the Post Exchange (PX). Income alone is therefore probably not a good metric for poverty level when considering a military community.

Table 3.11-3
Median Income and Poverty for 1999

Jurisdiction	Median Household Income ($)	Median Family Income ($)	Persons Living in Poverty (Percent)
Fort Belvoir CDP	39,592	39,107	5.6
Accotink Village[1]	31,696	26,875	N/A
Census Tract 4218 Block Group 1	46,284	47,440	N/A
Fairfax County	81,050	92,146	4.5
State of Virginia	46,677	54,169	9.6

Source: US Census Bureau Website, 2005 and 2008.
[1] Block group 2 of census tract 4220

No Census 2000 poverty data are available for Accotink Village alone. However, income data from 1999 indicate that the median household income in Accotink Village at that time was $31,696, as opposed to $81,050 for Fairfax County and $46,677 for Virginia as a whole. Thus, Accotink Village is significantly poorer than the surrounding jurisdictions, and qualifies as an environmental justice community on the basis of income.

Fairfax County, on the other hand, is one of the most prosperous jurisdictions in the United States. The Fairfax County Website

(July, 2008) does indicate a census tract (Census Tract 4218) located immediately east of the Post along US Route 1 where the 1999 median family income distribution is less than $50,000. The US Census Bureau Website shows median household and median family incomes of $46,284 and $47,440, respectively. While significantly lower than the county medians, these figures are not greatly lower than the state medians.

Would the project at either of the two alternative sites unfairly affect minority or low-income populations?

To answer this, one needs to determine 1) how would the proposed construction and operation of the proposed NMUSA affect people living in the area, and 2) whether the residents of Accotink would be more (disproportionately) affected as compared to other residents in the area.

The most likely impacts to residents around Fort Belvoir and especially the NMUSA sites would be:

- The noise, dust, and fumes generated by construction machinery, as well as increases in traffic from construction workers and trucks delivering construction materials or hauling away debris.
- During operation, the noise generated by ceremonies, re-enactments, and events on the parade ground, re-enactment camps, and amphitheatre, as well as the traffic generated by visitors and employees to the NMUSA.

The details of these impacts – how the project would affect traffic and air quality for all residents – are addressed in Sections 3.7 and 3.12 of this document.

Accotink Village is located 3,500 feet from the Gunston site, and 4,000 feet from the Pence Gate site. Accotink Village is the closest residential area to the Gunston site, while the on-Post residential area of George Washington Village is closest to, and within a few hundred feet of, the Pence Gate site. Construction and operation of the NMUSA at either site is unlikely to cause noise at levels that would be perceived by Accotink Village, while residents of George Washington Village may experience slightly elevated noise levels during construction, or again during special events such as reenactments. Neither location would likely be exposed to a greater degree of air quality impacts, either during construction or operation, than other residents of the base, the area, or travelers along US. Route 1. As for traffic, the additional vehicle trips from NMUSA visitors and employees/volunteers would not be significant, and any impact from these trips would be shared by residents at Fort Belvoir, Accotink Village, and this part of Northern Virginia equally. Therefore, the proposed NMUSA project at either location would not result in disproportionate impacts to residents of Accotink Village.

Table 3.11-4 Under-18 Population in 2000 (Percent)

Jurisdiction/Area	Population under 18
Fort Belvoir CDP	44.4
Accotink Village[1]	20.3
Fairfax County	25.4
State of Virginia	24.5

Source: US Census Bureau Website, February 2005.
[1] Block group 2 of census tract 4220

What about children living in the study area?

Table 3.11-4 shows the percentage of the populations at Fort Belvoir CDP, Accotink Village, Fairfax County, and Virginia that are under 18, as of 2000. The Fort Belvoir CDP had a higher proportion of under-18 residents than the state as a whole, because of the many military families housed on the Post. These under-18 residents are likely to be concentrated in the residential areas of the Post, most of which are located on the South Post.

Similar to the EO 12898, EO 13045, Protection of Children from Environmental Health Risks and Safety Risks, requires government agencies to recognize that children may suffer more than adults from environmental health and safety risks. (Children are more apt to ingest or touch items that contain contaminants,

Environmental Health and Safety Risks

EO 13045 defines these risks as "risks to health or to safety that are attributable to products or substances that the child is likely to come in contact with or ingest." Regulatory actions that are affected by this EO are those substantive actions that involve an environmental health risk or safety risk that an agency has reason to believe may disproportionately affect children

e.g., lead paint on window sills). This EO directs federal agencies to identify and assess such risks, and to ensure that its policies, programs, activities, and standards address effects on children.

The Gunston site is quite far away from any of the Post's residential areas. The Pence Gate site is adjacent to one Post residential area – George Washington Village.

Would the project at either of the two alternative sites disproportionately affect children?

The first thing to consider is that the proposed NMUSA would involve no industrial processes likely to generate contaminants. All materials used for construction would be free of lead paint and similar toxic materials.

To a limited extent, lawn and garden maintenance would involve use of fertilizers, herbicides, and pesticides, and maintenance of the buildings would involve use of cleaners. Pesticides would be applied by certified applicators, using the principles of Integrated Pest Management. The products used for cleaning and grounds maintenance would be similar to the products used in household applications.

The NMUSA would also store cannons, gunpowder, and dummy ordnance for ceremonies involving salutes and re-enactments. However, no products or firearms would be stored where children could get at them easily. It is also important to remember that children visiting the NMUSA would be accompanied by adults, who would monitor their access to hazardous or toxic materials. It is very unlikely that children from adjacent neighborhoods would gain access to the NMUSA grounds without adult supervision, because children would be

excluded from storage closets and vaults where these materials would be kept.

No matter which alternative is selected, the project is unlikely to disproportionately affect children.

Is there a high or low rate of employment within the study area?

The Virginia Employment Commission reported Fairfax County's average employment in 2005 to be 565,179. The number for Virginia as a whole was 3,576,716; thus, Fairfax County accounted for almost 16 percent of statewide employment. Unemployment in Fairfax County for 2007 was 2.2 percent, as compared with 3.0 percent for Virginia and 4.6 percent for the United States as a whole (Virginia Employment Commission Website, July 2008).

Would the project increase or decrease area employment?

The project would very slightly increase employment. The anticipated workforce at the NMUSA would be 170 additional people (15 employees are already working at Fort Belvoir), but many of these workers would be volunteers. Most of the paid positions could be filled from the local workforce, with very few potential employees having to move their residence to the area. There would be no measurable impact to the demographics of Fairfax County and Fort Belvoir.

Even if all 170 additional workers were paid employees, this number would only represent approximately 0.83 percent of the current population and 0.45 percent of the future population under the changes mandated by BRAC (which will bring about 19,000 new employees to the installation, as per the ROD for the BRAC EIS (College, August 2007). Therefore, the impact of the

proposed action on the Fort Belvoir working population, from both a direct and cumulative perspective, would be small. The impacts of the proposed action on employment in Fairfax County from both a direct and cumulative perspective would be even smaller.

Construction of the NMUSA would generate direct economic benefits for the contractors performing the job and their employees, as well as indirect benefits to the communities in which the contractors are based. The additional earnings generated by the work would be felt further down the line as these earnings are spent in the local economy. These positive impacts would be relatively small and temporary.

Operation of the NMUSA would generate more substantial benefits as visitors and participants in the ceremonies and reenactments spend money at local hotels, restaurants, and service stations.

3.12 Community Facilities & Services

What are community facilities and services?

Community services include government-provided safety, security, and medical services. Community facilities are primarily schools and active and passive recreational facilities in public ownership. An increase in population living or working within a specific area can increase the need to use these services and facilities, thus pressuring governments to expand services or provide additional new facilities.

Because the proposed action is unlikely to cause an influx of new residents, the Army has not addressed impacts on schools or hospital services in this EA.

What is our study area for this analysis?

The study area for this project includes Fort Belvoir and that part of Fairfax County adjacent to the Post. It is these communities that would most likely provide the services and facilities that would be used by the proposed NMUSA employees, volunteers, and visitors.

Who provides safety and security services in the study area?

Safety and security issues at Fort Belvoir are handled by the Army's Military Police (MP) and Fire and Emergency Medical Services (EMS). The MP headquarters are located on Abbot Road, on the North Post, about midway between the Pence Gate and Gunston sites.

There are three fire stations on Fort Belvoir, housing five fire companies (three engine companies, one ladder truck company, and one airport crash company), with a total staff of approximately 65 firefighters (Fort Belvoir Directorate of Public Works [DPW] ENRD, 2002, in: US Army Corps of Engineers, Mobile District, August 2007). At least 21 firefighters are on duty 24 hours a day. The closest Fort Belvoir fire station to the Pence Gate site is located on Abbot Road (Station 63), while the closest station to the Gunston Site is located across the Fairfax County Parkway at Davison Army Airfield (Station 66) (Fairfax County Geographic Information Systems [GIS] Website, May, 2008).

Additionally, Fort Belvoir has mutual aid police and fire service agreements with Fairfax County (US Army Corps of Engineers, Mobile District, August 2007). The Fairfax County stations located closest to the Pence Gate site are Fairfax County Fire Station 24 at 8701 Lukens Lane, and the Mount Vernon Police Department at 2511 Parkers Lane. The stations closest to the Gunston site are Fairfax County Fire Station 37 at 7936 Telegraph Road, and the Franconia Police Department at 6121 Franconia Road (Fairfax County GIS Website, May, 2008).

How would the project affect these services?

Any proposal that has the potential to increase the number of employees or visitors to an area also could cause an increased demand for, and therefore pressure on, fire, police, and emergency medical services. However, the increase in number of employees, volunteers, and contractors (fewer than 185) associated with the NMUSA, most of whom would come from Fairfax County and already use County services, added to the peak daily average of 4,800 visitors per day, is negligible compared to the number of Fort Belvoir employees that are presently using (22,150), or that will be using (41,150) these services by the time the NMUSA is fully constructed. Therefore, the impact of the project on these services would be minimal.

What recreational facilities are available to Fort Belvoir workers and residents?

Fort Belvoir offers 1,006 ac of recreational areas that are convenient to the population they serve. Facilities include two 18-hole golf courses, officers and non-commissioned officers clubs, tennis courts, swimming pools, softball and soccer fields, etc. In addition, the Dogue Creek Marina rents boats and slips and dry-storage facilities. There are a number of smaller parks and picnic areas, including the Anderson Park Picnic Area,

located just south of the Gunston site on Ehlers Road, across from the Davison Army Airfield.

Some of Fort Belvoir's undeveloped areas are open to recreational use: two wildlife refuges; fishing at Mulligan Pond and along Gunston Cove, Accotink Creek, Dogue Creek, and Pohick Creek; bow hunting in designated areas; bird watching, hiking, nature photography, and environmental education programs at the Accotink Bay Wildlife Refuge Education Center along with 10 miles of trails.

The Fort Belvoir MWR program also manages two 18-hole golf courses on the North Post. The former 9-hole South Post Golf Course has been displaced to make room for the new DeWitt Hospital and proposed Warrior in Transition Unit (WTU) complex.

The Fairfax County Park Authority operates 388 parks on more than 23,000 ac. Facilities include nine indoor recreational centers, nature and visitor centers, eight golf courses, five nature centers, a horticulture center, a working farm, an activities/equestrian center, an indoor ice-skating rink, a skate park, a water park, campgrounds, and hundreds of athletic fields, tennis courts, picnic areas, playgrounds, historic sites and trails. A wide variety of activities and programs are operated at the county parks and recreational centers (Fairfax County Website, 2005).

How would the project affect these facilities?

At the Gunston site, the biggest potential impact on recreational facilities would be the loss of the front nine (direct loss of five, and functional loss of four more) holes on the North Post Golf Course. This loss would reduce the course from 36 to 27 holes. This would take place relatively soon after the loss of the 9-hole

South Post Golf Course, and is probably the most substantive impact in terms of direct and cumulative impacts of the project.

The South Post Golf Course was a relatively easy course favored by seniors, families, and inexperienced golfers, and loss of this course through BRAC has reduced the number of rounds played on the Fort Belvoir golf course complex, and the associated revenues to the MWR program, by an estimated 30 percent. Moreover, closure of the South Post Golf Course has likely resulted in an increase in use of the North Post Golf Course, causing peak period tee-time competition, frustrating patrons, and reducing opportunity to play golf (US Army Corps of Engineers, Mobile District, August 2007). Reducing the North Post Golf Course to 27 holes is expected to further reduce the number of rounds played by golf course patrons, and thus cause even more frustration. This would not be an issue at the Pence Gate site. However, this impact would be effectively negated if the Fort Belvoir MWR program obtains funding for a separate project to construct new holes and reconfigure old golf holes to reestablish the full 36 holes on the North Post Golf Course.

Otherwise, the impacts on recreational facilities would be similar to the impacts on fire, police, and emergency medical services – a negligible increase in the demand for, and therefore pressure on, recreational areas. Some impacts to traffic entering Anderson Park would be expected if the Fairfax County Parkway access road alternative is selected for the Gunston site. Specifically, closing the existing median break would cause an increase in travel distance, because drivers would have to perform a U-turn to enter the park.

3.13 Transportation and Traffic

The team of Berger-Smith Group, and their sub-consultants, has conducted feasibility studies for both the Pence Gate and Gunston sites (Berger/SmithGroup, August 2008). The efforts for the feasibility study for each site are running concurrently with this EA, and therefore some findings of the expected future conditions may change as more up-to-date information is completed. The full review of the feasibility study is included as a transportation technical document in Appendix E.

What is traffic like now?

Traffic on roadways surrounding Fort Belvoir is generally congested in the peak direction of traffic flow in both the morning (AM) and evening (PM) peak periods; the morning peak direction is towards the District of Columbia while the evening peak direction is south and westbound. Traffic tends to flow unimpeded in the off-peak direction of flow, except for traffic queuing to turn into Fort Belvoir. Peak period traffic congestion affects all three major arteries that serve Fort Belvoir: the Fairfax County Parkway, US Route 1, and Interstate 95 (I-95). I-95 is typically congested for up to three hours during each of the peak periods.

Congestion also occurs at intersections that are the access points or adjacent to the access points for Fort Belvoir: US Route 1 intersections with the Fairfax County Parkway, Pohick Road (Tulley Gate) and Belvoir Road (Pence Gate); and the intersection of the Fairfax County Parkway and Kingman Road (Kingman Gate). During the AM peak period, Fort Belvoir often has heavy inbound flows at all the gates; queues form as people wait for security checks. Sometimes, traffic backs up onto US Route 1.

Once vehicles are on the installation, some congestion occurs at key intersections scattered around Fort Belvoir: Gunston Road near Jackson Loop, where ingress and egress can be difficult for turning vehicles; the Twelfth Street, Pohick Road and Gunston Road intersection; and the Gunston and Gorgas Road intersection. Generally speaking, traffic congestion on Fort Belvoir is less severe than on US Route 1 or Fairfax County Parkway.

In the PM peak period, traffic leaving Fort Belvoir is very heavy. On Kingman Road and Belvoir Road; vehicles often have to wait several cycles at the traffic signals in order to get onto US Route 1 or Fairfax County Parkway. These corridors are often congested in the peak direction of traffic.

During the off-peak hours, little traffic congestion occurs on roadways near the installation. Traffic turning along Gunston Road at Jackson Loop has longer wait times because drivers have to find an acceptable gap to enter the traffic stream. On-post, Gunston Road is the major internal north-south connection between North and South Posts.

As the design is currently conceived at both alternative sites, all visitor traffic destined to NMUSA would enter the facility's parking lots directly, without going through the Post's security gates. At the Pence Gate site employees would have to pass through an Access Control Point (ACP); however, the entrance to the lot is immediately south of Pence Gate, so on-Post traffic would have no effect on NMUSA traffic and vice versa.

Are there safety concerns in the study area?

VDOT had been conducting a safety study along the US Route 1 Corridor and has identified spot improvements needed. VDOT is currently working to address these concerns. Signage and

pavement marking improvements have been implemented, and other improvements would be considered as funding is available. No safety concerns exist at this point along the Fairfax County Parkway.

Fort Belvoir, as part of the BRAC 2005 Implementation, is reviewing the infrastructure needs on Main Post near both proposed sites. Included with this is the identification of safety concerns and measures to correct the concerns. As roadway improvements are designed, any deficiencies to correct safety issues will be included in the upgrades and/or improvements.

What transit service is available in the study area?

The Washington Metropolitan Area Transit Authority (WMATA) operates the REX Express along the US Route 1 Corridor, linking Fort Belvoir to the Yellow Line Metrorail Station, the King Street Virginia Railway Express (VRE) commuter rail station, and the Amtrak Station, to the northeast. On South Post, the route runs along Belvoir Road, 9th Street, and Jackson Loop.

The Fairfax Connector bus service, operated by Fairfax County, includes one route that provides service along US Route 1, but it does not enter Fort Belvoir. A second route's terminus is at the DLA complex off Kingman Road on North Post. The latter route links North Post to the Springfield Transportation Center, where a Blue Line Metrorail Station, a VRE station, and a bus transfer station are located. VRE links to points south, and the Metrorail line provides service to Ronald Reagan National Airport, the Pentagon, and central Washington, DC, with connections to each of the other Metrorail lines. A number of private commuter bus operators have services at the Springfield Transportation Center.

Metrorail stations are located within four miles (Blue Line) and seven miles (Yellow Line) of Fort Belvoir. Currently, few on-Post shuttle circulator services exist.

How do we determine future traffic volumes?

The first step in the process is to document the existing traffic volumes at key intersections near the alternative sites by performing traffic counts. Once the current volumes are known, historical growth factors are used to project future traffic volumes. Then, traffic generation rates from other similar developments (or rates published by the Institute of Transportation Engineers) are used to add site-specific traffic impacts expected due to the proposed development.

For this project, traffic was first projected to the year 2013. Then, the projected traffic due to BRAC was factored in. This produces the 2013 No-Build volumes, which are then used as a comparison to measure the impacts of the different proposed sites. The full details of the development of the future volumes and the traffic analysis can be found in Appendix E.

A previous study, conducted by Clark-Nexson for NMUSA, was the lead-in for the feasibility study that is currently being conducted. The study examined traffic patterns at other museums in the region to develop traffic projections for NMUSA based on its size and expected number of daily visitors. These site-generated volumes were layered onto the roadway network, on top of the No-Build volumes to develop Build alternative volumes. Each of the two NMUSA site alternatives is considered a separate build alternative. Because the two sites are close to each other, it is expected that the trip generation rates – the number of trips to and from NMUSA – would be the same for both sites, and the general travel patterns towards NMUSA would be identical. Specific traffic assignments would only vary

at the local level depending on the specific siting and the final access plans.

The site access plan for the Pence Gate site includes separate access points for visitors and employees. All visitors would access the site opposite Woodlawn Road at the existing signal on US Route 1, to which a new driveway for the site would be added to the intersection. The second access point would be for Museum employees only, located off Belvoir Road south of the Pence Gate checkpoint.

The Gunston site has two access plans. The first would be a direct connection to the Fairfax County Parkway between the Parkway's intersection with Kingman Road and the ramps at the Telegraph Road / Fairfax County Parkway interchange. The second alternative would provide access from Kingman Road to the eastern part of the site. The two different access plans would not change the trip generation for this site, but would change the turning movements at two intersections on the Fairfax County Parkway.

How would the project affect future traffic volumes?

The proposed project would increase traffic volumes on regional roadways surrounding Fort Belvoir – mainly US Route 1 and the Fairfax County Parkway. It is expected that the total portion of the traffic on these facilities due to NMUSA would be less than 10 percent of the total traffic stream during the AM and PM peak hours. Because most of the traffic to and from NMUSA is expected to occur during the off-peak hours – after the morning peak period and before the evening peak – little impact is expected to commuting traffic. The traffic generated by the site would increase traffic volumes on US Route 1 and the Fairfax County Parkway during the off-peak hours, but is expected to

have little impact on traffic flows because sufficient capacity exists during the off-peak hours. Some NMUSA-generated traffic would occur during the peak hours, and therefore, would increase the volumes at key intersections, thus increasing the delay at nearby intersections slightly.

In the event that the Gunston site is selected, and an access point is provided directly off the Fairfax County Parkway, the existing median break for Elhers Road and Anderson Park would be closed. This would require some vehicles accessing the Park to make a U-turn at the Telegraph Road interchange or at Kingman Road to enter or exit the Park, based on their origins and destinations.

For either of the two proposed sites, the impact to future traffic volumes is expected to be minor in the long-term.

How would the project affect transit?

As most of the visitors are expected to travel to and from NMUSA during the off-peak period, it is expected that little impact to the existing transit services would occur. Currently, neither site has direct transit services. It is unknown at this time whether the sites will be serviced in the future by either WMATA's Metrobus or the Fairfax Connector. These agencies periodically review their service plans and make adjustments at a regional level.

For either of the two proposed sites, impacts to transit are expected to be negligible.

How will local surface streets operate in the future?

For the No Build Alternative, it is expected that traffic conditions will continue to deteriorate as traffic volumes continue to grow. Prior to the opening day of NMUSA, a number of roadways will have been widened or improved as part of the BRAC action (including Belvoir, Pohick and Gunston Roads, and Ninth Street), existing gates will have been improved (Pence and Tulley Gates), and a new gate will have been constructed (on the site of the old Lieber Gate). As these projects are being implemented in conjunction with the BRAC Action, they are considered in place for the baseline (No-Build) analysis. Because most of the NMUSA traffic is expected to enter and leave either site outside of the peak commuting hours, little impact is expected to occur during the off-peak hours.

For the Build alternative at Pence Gate, delays would increase and the level-of-service would slightly deteriorate along the US Route 1 intersections at Belvoir Road and Woodlawn Road. This is due to the site traffic entering or exiting the site. However, the increase in traffic is expected to have minimal impact.

For the Build alternative at the Gunston Site, delays would increase at the intersection of Fairfax County Parkway and Kingman Road. For either Gunston access alternative, the intersection that provides direct access would also see an increase in delay for vehicles, as the level-of-service slightly deteriorates.

For either of the two proposed sites, the operational performance of the local roadways is expected to deteriorate slightly over the No Build Alternative. It should be noted that while some intersection turning movements would worsen, other movements

would improve as the results of new signal operations. Therefore the expected impact would be minor in the long-term.

How would the project affect bicycle and pedestrian facilities?

New access roads into NMUSA at either site would be designed to minimize conflicts with existing bicycle and pedestrian facilities. Depending on the construction sequence, short-term closures of bicycle and pedestrian facilities might be required during construction. However, these facilities would reopen once construction is completed.

Impacts to bicycle and pedestrian facilities are expected to be negligible.

How would the project affect transportation?

Minimal impact is expected to the transportation network as a result of the proposed action, because most of the trips to and from each of the sites are expected to occur during off-peak hours. Some localized impacts at the direct point of access are expected to occur, but these impacts would not affect the overall transportation network around Fort Belvoir.

How would we avoid or minimize adverse effects from construction?

Because most of the construction would occur off of existing roadways, the traffic impacts are expected to be minimal. At the site access points, minimal impacts would result from tying in the new roadway improvements. Before the start of any project that affects VDOT roadways (including intersection improvements due to a new entrance), the developer is required to submit Maintenance of Traffic (MOT) plans to VDOT for review (VDOT, Location and Design Division, *Instructional and*

Informational Memorandum IIM-LD-241.2, Richmond Virginia, September 26, 2007). This required submission would also include engineering studies that demonstrate that the MOT sequencing would not affect the peak hour traffic.

To minimize adverse traffic effects, the Army would develop MOT plans for all access points tying in to state roadways during the final design phase. VDOT would review and approve the MOT plans to ensure that impacts are minimized, prior to granting access to state roadways. Typically, VDOT does not permit construction on the roadways during the peak hours, to avoid impacts to the peak hour traffic flows.

3.14 Impact Summary

Table 3.14-1 on the page 3-9110 provides a quick summary of the impacts of the three Surface Parking Alternatives. Table 3.14-1 provides a summary comparing the impacts between the three alternatives. The impacts of the Surface Parking alternatives would, for the most part, be only slightly greater than the impacts of the Structured Parking Alternatives, depending on the issue or resource impacted. Where the difference is more substantial, it has been noted in the table.

Of the Build alternatives, the Pence Gate alternatives would have less impact on all environmental resources except land use, cultural resources (the potential for NMUSA activities to disturb nearby Woodlawn Historic District) and air quality. The moderate impacts on land use reflect not so much the displacement of the educational campus and hotel/conference center envisioned in the Hospital Area Development Plan, but the conflict with the potential extension of 3rd Street to US Route

1. That extension could do much to ensure traffic circulation, especially as this area of the South Post develops.

The difference in air quality impacts would result because demolition would be required at this site and the construction period would therefore be longer. The construction of the parking garage would require more excavation at the Pence Gate then other sites. (The fabrication of a structured parking garage, at all sites, would contribute to greater air emissions, as well.) All these factors would contribute to a larger construction effort and the generation of more pollutant emissions at the Pence Gate site, and particularly for the Structured Parking Alternative.

The impacts on cultural resources at the Pence Gate site stem from the potential for noise, even though sporadic and minor, to reach sensitive receptors at the two churches and the Woodlawn Historic District. However, appropriate mitigation measures such as the arrangement of buildings and other NMUSA elements, and the use of vegetated buffers, could do much to prevent noise from becoming an issue.

To some extent, noise would also be an issue for any of the four alternatives at the Gunston site. Golfers and wildlife could be disturbed by the noise, even though sporadic and minor, generated by activities at the NMUSA. Wildlife characterizing the area should already be adjusted to human activity because of the presence of the golf course.

The impacts on wildlife at the Gunston site would be greater than the Pence Gate site. Even if the entire Fort Belvoir FWC can be bridged (about 750 feet), the Gunston Kingman Road alternatives would cause the greatest impact on wildlife habitat. Bridging would reduce impacts as compared to a solid fill causeway across the FWC, but it would still require removing

trees, placing abutments, and substantial temporary construction impacts within the FWC. All Gunston alternatives may also involve bringing utility lines into the site across the FWC (from the southeast). The latter would require trenching or excavating, and maintaining a right-of-way relatively free of anything but grassy vegetation. At this time, there appears to be ample alternative means for providing utilities to the site from other directions. The Kingman Road alternatives would also involve filling 0.3 ac of Forested Wetland / Seeps.

The Gunston Fairfax County Parkway alternatives would involve possibly filling the intermittent stream to the west of the site, and / or its riparian buffer. It would impact more upland forest (an additional 3.0 ac) than the Kingman Road alternative, but overall would have less adverse effect on wildlife than the Fairfax County Kingman Road Alternative.

Any of the Gunston alternatives would result in the effective loss of nine of the 36 holes of the North Post Golf Course. This is an important impact in terms of both land use and recreational resources, and as a direct and cumulative impact given the recent loss of the South Post golf course. However, this impact would be effectively negated if the Fort Belvoir MWR Program is able to finance a separate project to construct new holes and reconfigure old holes to reestablish the 36 holes of the North Post Golf Course.

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Table 3.14-1 Impact Comparison for Alternatives

	PENCE GATE ALTERNATIVE	GUNSTON ALTERNATIVE		NO BUILD ALTERNATIVE
		Fairfax County Parkway Alternative	Kingman Road Alternative	
Land Use, Plans and Coastal Zone Management	Equal impact to the Gunston alternatives - Removal of two baseball fields, dugouts and storage buildings; displacement of uses identified in Hospital Area Development Plan. See also Cultural Resources.	Equal impact to the Pence Gate alternative- 36-hole golf course reduced to 27 holes. (Fort Belvoir MWR considering replacing lost holes as separate project.)	Equal impact to the Pence Gate alternative - 36-hole golf course reduced to 27 holes. (Fort Belvoir MWR considering replacing lost holes as separate project.)	No impact
Soil and Topography	Less impact than Gunston alternatives - Up to 103,235 cubic yards of cut and fill	Greater impact than Pence Gate alternative - 256,630 cubic yards of cut and fill	Greatest impact - 286,730 cubic yards of cut and fill	No impact
Upland Vegetation and Wildlife	Less impact than Gunston alternatives - 29.5 acres of land / 24.8 acres of habitat affected. Potential impact to special status wildlife and plants (survey required)	Greater impact than Pence Gate alternative – 40.9 acres of land / 40.9 acres of habitat affected. Potential impact to special status wildlife and plants (survey required). Impact to riparian buffer and intermittent stream.	Greatest Impact - 44.5 acres of land / 44.5 acres of habitat affected. Potential impact to special status wildlife and plants (survey required). Requires crossing the FWC (additional study required).	No impact
Surface Water, Water Quality, and Floodplains	Less impact than Gunston alternatives (less extensive grading). Minor indirect impact to streams from increase in surface water runoff, velocities, and infiltration rates.	Greater impact than Pence Gate alternative (more extensive grading). Minor direct (shoulder of access road) and indirect impacts to intermittent stream. Increase in surface water runoff, velocities, and infiltration rates.	Greatest impact (most extensive grading. Indirect impacts to streams still minor (increase in surface water runoff, velocities, and infiltration rates). Impact to perennial stream from access road will be minor if bridged.	No impact
Wetlands and Chesapeake RPAs	Less impact than Gunston alternatives. No direct impacts. Indirect impacts to seeps from increased runoff and reduced infiltration.	Greater impact than Pence Gate alternative - Direct impacts from road crossing the Chesapeake Bay RPA. Possible direct impact to intermittent stream and riparian buffer from access roadway and utilities	Greatest impact Possible direct impact to wetlands from utilities. Direct impacts to 0.3 ac seeps and longer crossing of Chesapeake Bay RPA needed.	No impact

ISSUE	PENCE GATE ALTERNATIVE	GUNSTON ALTERNATIVE		NO BUILD ALTERNATIVE
		Fairfax County Parkway Alternative	Kingman Road Alternative	
Historic, Cultural, and Architectural Resources	Greatest impact. Possible viewshed / auditory impact to Woodlawn Historic District.	Greater impact than Gunston Kingman Road Alternative. Potential impact to archeological site 44FX0663; survey required.	Less Impact than Pence Gate or Gunston Fairfax County Parkway Alternative. No impact	No impact
Hazardous Substances	Minor impacts from construction, generator tanks	Minor impacts from construction, generator tanks	Minor impacts from construction, generator tanks	No impact
Air Quality	Greater but temporary construction impact; impact from generators. Demolition of existing pavements and excavation for parking structure would increase duration of construction.	Temporary construction impact; impact from generators.	Temporary construction impact; impact from generators.	No impact
Noise	Short and long-term minor impacts Mitigation measures needed to ensure impacts on existing and proposed hospital uses on adjacent properties are minimized	Short and long-term minor impacts	Short and long-term minor impacts	No impact
Infrastructure and Utilities	Less impact than Gunston alternatives. Beulah Street potable water main upgrade required	Shared greater impact. Sanitary sewer pump station required, sanitary sewer line might require upgrade; Beulah Street potable water main upgrade required unless Fairfax Water line used	Shared greater impact. Sanitary sewer pump station required, sanitary sewer line might require upgrade; Beulah Street potable water main upgrade required unless Fairfax Water line used	No impact
Socioeconomics	No impact	No impact	No impact	No impact

ISSUE	PENCE GATE ALTERNATIVE	GUNSTON ALTERNATIVE		NO BUILD ALTERNATIVE
Community Facilities and Services	Less impact than Gunston alternatives. Loss of two baseball fields, dugouts	Shared greater impact. Net loss of nine holes at 36-hole golf course. . (Fort Belvoir MWR considering replacing lost holes as separate project.)	Shared greater impact. Net loss of nine holes at 36-hole golf course. (Fort Belvoir MWR considering replacing lost holes as separate project.)	No impact
Transportation and Traffic	Minor, long-term impact	Minor, long-term impact	Minor, long-term impact	No impact

3.15 Cumulative Impacts

Cumulative Impacts

The Council on Environmental Quality's (CEQ) regulations for implementing NEPA define cumulative impacts as: *Impacts on the environment, which result from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions*.

What are cumulative impacts?

Cumulative impacts are the incremental impact caused by an action added to other past, present, and reasonably foreseeable future actions. The consideration of cumulative impacts is not necessarily restricted to only those actions caused by the same agency or project proponent. It is important that the effects of the project be examined in the context of other development in the community or region (CEQ, January, 1997).

What is our study area for this analysis?

The study area for this project includes Fort Belvoir and the adjacent portions of Fairfax County.

What other actions are reasonably foreseeable in the project area?

Implementation of BRAC 2005 will include construction of some 20 facilities at Fort Belvoir to support realignment of Army agencies and associated transfers of personnel. In addition, the Army foresees 32 non-BRAC projects at the installation – including this project – that would occur at the same time as the BRAC actions, from small scale projects involving only renovations to existing buildings to large projects involving the construction of new structures and associated parking, utilities, and other infrastructure. For the BRAC 2005 EIS process, Fairfax County identified over 185 publicly and privately-proposed projects, planned within three miles of Fort Belvoir, 20 of which are at least 20 ac in size (US Army Corps of Engineers, Mobile District, August 2007).

To what extent would construction and operation of the NMUSA contribute to cumulative impacts?

The construction and operation of the NMUSA would change land uses at one of the two alternative sites and contribute to the substantial conversion of unused land into office, industrial, and commercial land that has been occurring in Northern Virginia over the past three decades. However, construction at the Pence Gate site would have less of an impact because it would involve reuse of an abandoned site that was previously a military housing area. The Gunston site has also been previously disturbed, but is presently being used for recreation (golf), and construction of the NMUSA at this site would contribute to a cumulative loss of golfing as a recreational opportunity at the Post.

Construction of the NMUSA and nearby reasonably foreseeable projects would involve land disturbances associated with soil excavation and would cause an increase impervious surface in numerous locations, many within the same watershed. These activities could result in potentially greater cumulative soil erosion and sedimentation and other pollution impacts to the receiving water bodies and wetlands, and eventually, the Potomac River and Chesapeake Bay. Cumulatively, these effects could adversely impact sensitive aquatic resources, as well as other users (wildlife and human) of these water bodies and wetlands.

However, any land disturbing activity greater than one acre would require a VSMP and SWPPP. The Army would follow the Virginia erosion and sediment control standards of Title 10.1 Chapter 5, Article 4 of the Virginia Code to ensure that non-source pollution control impacts are minimized during construction.

The Army would also follow the Fairfax County Chesapeake Bay Preservation Area regulations (Chapter 118 of the Fairfax County Code) to minimize long-term impacts on water quality. Stormwater management ponds would be designed to provide compliance with BMP nutrient reduction goals. Therefore, the NMUSA contribution to cumulative impacts on receiving surface waters at either site would be minor.

The construction of the NMUSA at the Pence Gate site could cause viewshed and noise impacts on nearby historical properties. A viewshed analysis would be completed to identify appropriate mitigation measures that would prevent viewshed impacts. Many of the same mitigation measures to prevent viewshed impacts (e.g., vegetation to provide visual screens) would also mitigate the potential for noise to travel to these and other sensitive receptors. Testing and data recovery for potential archeological resources would generate valuable information. All of these measures would offset any potential cumulative impacts from NMUSA on these resources.

Other construction and development projects would occur within the region, each of which would produce some amount of air pollutants. The effects of all past, present, and reasonably foreseeable projects in the region and associated emissions are taken into account during the development of the SIP. This includes all on- and off-Post projects including BRAC related activities at Fort Belvoir. Estimated emissions generated by all the alternatives would conform to the SIP or be below the applicability thresholds. Therefore, by definition, the net effects of the NMUSA project in addition to all other collectively identified projects would not contribute to significant adverse cumulative air quality effects.

State Implementation Plan (SIP)

The SIP contains mobile, non-road, and vehicle emissions broken down by county. It accounts for growth as part of its planning process – it accounts for emissions on a county level and then sums them into a regional level.

No appreciable long-term increases in the overall noise environment can be expected with the implementation of any of the alternatives. Therefore, the project would not contribute significantly to adverse cumulative effects to the noise environment.

The traffic produced by the approved, growth-inducing action taking place at Fort Belvoir –the BRAC Action – is included in the No Build Alternative for this project. The No Build Alternative also takes into account the background traffic growth that will take place in addition to the BRAC Action because of the growth in regional population and tripmaking.

Other actions being considered at Fort Belvoir that have not been approved or their impacts analyzed also could have an impact on traffic levels when combined with the NMUSA project and the BRAC Action. Such other actions might include the expansion of the Commissary and Exchange, to be located off of Kingman Road, as well as the expansion of the employment base on Fort Belvoir if another military command or government agency were to relocate to the Post. The impacts of these other actions on traffic (as well as on other resources) would be assessed prior to approval and might require transportation system improvements to accommodate these developments.

Pence Gate Alternative

Depending on the siting and timeline of other projects on Fort Belvoir in conjunction with NMUSA, there could be an impact to Pence Gate and the proposed access control point for lower North Post. This would require that the current plans by Fort Belvoir to improve on-post roadways and intersections with US Route 1 be able to accommodate future roadway improvements. Some form of an interchange along US Route 1 may likely be

needed, and the design would need to consider any clear zones needed for the flight path of helicopters destined to the Hospital.

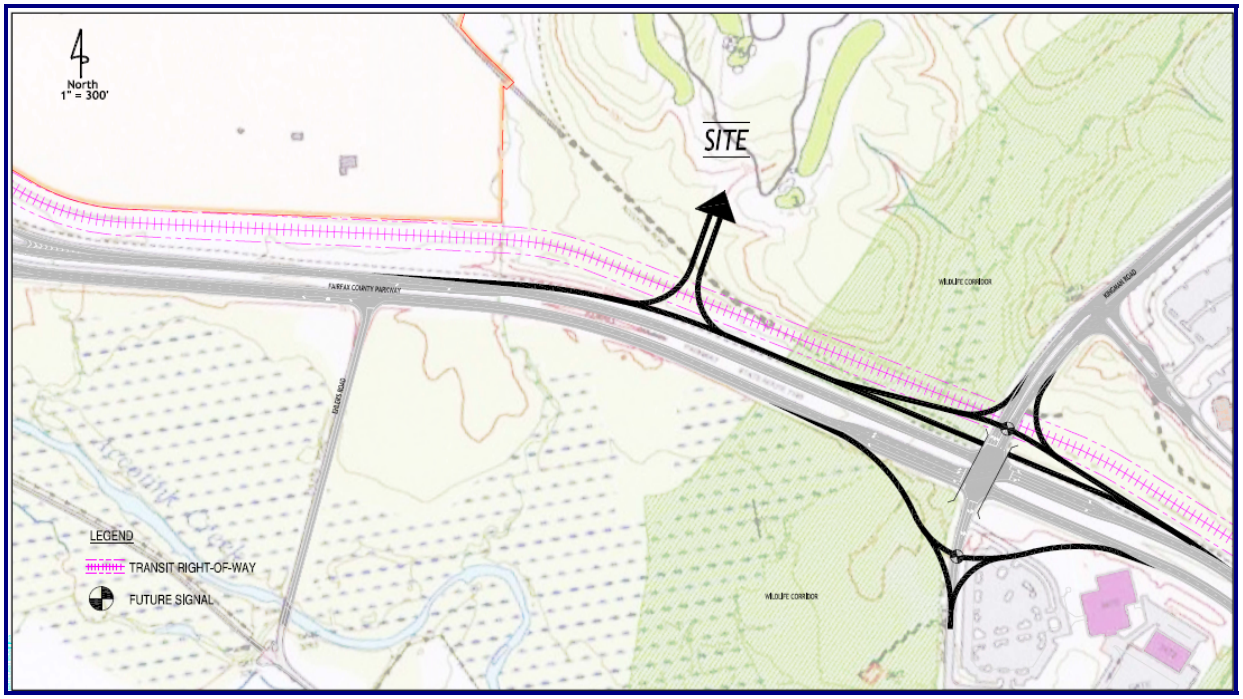
Gunston Alternative

In the long term, the Fairfax County Comprehensive Plan envisions an interchange at the existing intersection of Fairfax County Parkway and Kingman Road, the latter being the main access to Fort Belvoir's North Post area. Projected future projects will increase the traffic at this intersection. The close proximity of the proposed NMUSA's direct connection in relation to the existing intersection of Fairfax County Parkway and Kingman Road would drive the need for a more complicated interchange configuration to accommodate both.

The Corridor Study[1] conducted by Gorove/Slade Associates examined the operational characteristics of Fairfax County Parkway with a direct connection for NMUSA access. Several concepts (see Figures 3.15-1 and 3.15-2) were developed as possible interchange configurations to provide a full interchange for Kingman Road, while providing access to NMUSA. Both concepts would traverse the wildlife corridor and impact the reserved right-of-way for a future transit corridor. This would pose a higher construction cost when the transit corridor is developed because it would have to be elevated over the complex interchange. The environmental impacts of the interchange improvements would be considered in a separate NEPA document.

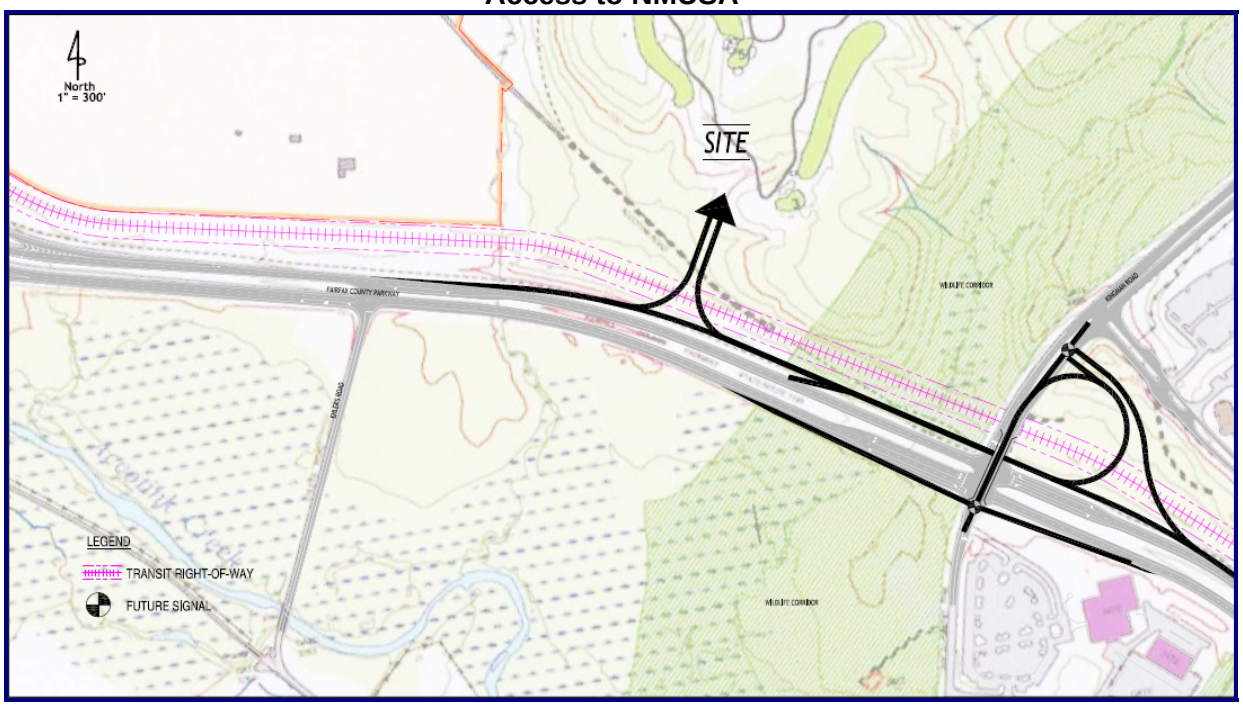
[1] Gorove/Slade Associates Inc. 2008. *National Museum of United States Army – Corridor Study*. Prepared for the National Museum Project Office for the siting of the Museum at the Gunston Site. July 1, 2008

Figure 3.15-1: A Conceptual Interchange at the Parkway/Kingman Intersection and Access to NMUSA



Source: Gorove/Slade, 2008. **Note concept only**

Figure 3.15-2: A Conceptual Interchange at the Parkway/Kingman Intersection and Access to NMUSA



Source: Gorove/Slade, 2008. **Note concept only**

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The first concept, as shown in Figure 3.15-1 could potentially impact 300,000 sf of the Fort Belvoir FWC to the west of Kingman and Farrar Roads, and may likely require a bridge over a portion of the corridor. It will also impact the parking area for the building on the southeastern corner of the intersection, as well as approximately 125,000 sf of the wooded area in the northeast quadrant of the intersection. The concept illustrated in Figure 3-15.2 has a narrower footprint impact to the wildlife corridor as approximately 100,000 sf of land would be impacted by the ramps. Although this option may have fewer impacts to the wildlife corridor, the interchange has a larger footprint in the northeast quadrant of the intersection, approximately 250,000 to 300,000 sf.

The proximity of Davison Airfield could pose restrictions on the height of any interchange structure due to the runway's clear zone. No new structure should be allowed to penetrate this clear zone. Based on the information presented in the Master Plan, maximum height of any structure in the vicinity of the existing intersection would be capped at 120 ft above ground level. This means that an interchange, including roadway lighting could be constructed here without impacting the runway clear zone.

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