

4. IMPACTS OF THE PROPOSED ACTION

This chapter summarizes the beneficial and adverse social, economic, and natural environmental effects of the alternatives under consideration for this project. The alternatives are the No-Build and Preferred (Build) Alternative, Alternative 4CR. The chapter was developed with guidance from FHWA Technical Advisory T 6640.8A, *Guidance for Preparing and Processing Environmental and Section 4(f) Documents*. Particular focus is given to cultural resources, natural resources, noise effects, and transportation. The No Build Alternative would be a continuance of existing conditions, and is assumed to have no impact in the study area except for increased traffic congestion.

The Preferred Alternative was evaluated for impacts by combining detailed Geographic Information System (GIS)¹ and field review data with preliminary engineering information. Applying design criteria noted in Chapter 2, engineers and scientists estimated impacts for the Preferred Alternative. For NEPA purposes, calculations for direct impacts extended to the estimated limits of cut and fill.²

This chapter is organized similar to Chapter 3. Sections 4.1 through 4.10 address the impacts on specific resources. Sections 4.11 through 4.17 address antiterrorism/force protection requirements, cumulative impacts, unavoidable adverse impacts, mitigation measures of impacts, the relationship between local short-term uses of the environment and the enhancement of long-term productivity, and irreversible and irretrievable commitments of resources.

4.1 Land Use, Plans, Right-of-Way, and the Visual Environment

4.1.1 Land Use

4.1.1.1 Existing Land Use

The majority of land under the Preferred Alternative is undeveloped and wooded. The portion of the Preferred Alternative on a new location, approximately 1.5 miles, is on Fort Belvoir and HEC property. The remainder of the build alternative ties-in to existing roadways at both termini; each of Old Mill Road and Telegraph Road would be widened. Of the federal property, most land impacted by the Preferred Alternative currently consists of second growth woods, criss-crossed by some utilities. Near the intersection of Mulligan and Kingman Roads, the Preferred Alternative would be adjacent to an approximately 500 X 1,500 foot-long grass-capped landfill (SWMU A-07a). The alignment was purposefully placed between that landfill and a smaller one (SWMU A-25) in order to avoid impacts to the Jackson Miles

¹ Fairfax County and Fort Belvoir supplied GIS data

² Acreage calculations and direct impacts for land use and natural resources impacts assumed the limit of cut-and-fill (LOC) for the main alignment (on new location). Right-of-way limits proportionately are less, estimated to extend approximately 13 feet beyond the outside edges of pavement except as noted; much of the side slope is assumed to be contained within construction easement.

Abbott Wetland Refuge (JMAWR). On Fort Belvoir and HEC properties the Preferred Alternative avoids traversing any existing internally fenced area, the entirety of Fort Belvoir and HEC property boundaries are considered as special security zones requiring authorized access.

The Preferred Alternative avoids splitting any residential community. It would widen Old Mill Road, taking land from the Woodlawn Plantation woods, and not from the medium-density housing on the residential side of the road (opposite Woodlawn Plantation). It would widen Telegraph Road along a section already designated by Fairfax County for widening, and for which most of the land has been dedicated. The Preferred Alternative is partially contained within the County's designated Woodlawn Historic Overlay District. No change to the land uses occurring along U.S. Route 1, Mount Vernon Memorial Highway, or Telegraph Road is expected under either the Build or No Build alternative

As a replacement roadway with no new access (other than potential emergency egress use by HEC), no increased or altered land use is expected.

4.1.1.2 Planned Land Use

The Preferred Alternative is consistent with Fairfax County's adopted 2003 *Comprehensive Plan*. That Comprehensive Plan recommended a 2-lane facility to be constructed in the general location of the Preferred Alternative, connecting Telegraph Road to Old Mill Road; however, Beulah Street and Woodlawn Road through the Post were not only shown as open to the general public but also shown to be widened to 4-lanes. Widening of Telegraph Road between Beulah Street and Hayfield Road is also included in the plan.

As noted in Chapter 3, the County is in the process of revising the *Transportation Component* of its Comprehensive Plan.³ Instead of a 2-lane route, it identifies a 4-lane facility extending from Old Mill Road to Telegraph Road. The Preferred Alternative is within the corridor identified in that proposed plan revision. The plan continues to identify widening of Telegraph Road in the study area to 4-lanes.

A corridor similar to the Preferred Alternative is contained in Fort Belvoir's draft *Long Range Component* of its Master Plan for the North Post.⁴ The Preferred Alternative is consistent with development plans for Fort Belvoir. As a result of the Base Realignment and Closure (BRAC) Commission findings and approved recommendations in 2005,⁵ Fort Belvoir is engaged in new master planning effort, which will reflect a 4-lane Connector Road generally along the alignment of the Preferred Alternative.

The Preferred Alternative is not inconsistent with use of HEC property. The Preferred Alternative passes through land that HEC defined as open space in their 1997 Master Plan.⁶ HEC is currently evaluating its Master Plan components.

³ The draft version is under public review; public meetings were conducted in the fall 2005; the County Council is expected to review and adopt the update in Summer 2006.

⁴ *Op. cit.*, unpublished draft, 2005. The Fort Belvoir draft proposed land use plan places housing to the west of the Connector Road and on the western portion of the HEC property; this is not consistent with HEC plans.

⁵ The Defense Base Closure and Realignment Act of 1990, as amended, provided for approval of the subsequent federal real property screening. Since Congress chose not to enact a joint resolution of disapproval, the BRAC recommendations became final on November 9, 2005.

⁶ While proposals to relocate the Headquarters of the U.S. Army Corps of Engineers (HQUSACE) from downtown Washington, D.C. to HEC had been made in prior years, the current policy is to maintain the headquarters function downtown. The Preferred Alignment would not preclude construction of a headquarters facility.

Neither the Preferred nor No Build alternative affects planned land use; however, the No Build is inconsistent with adopted plans for the area while the Preferred Alternative is consistent with them.

4.1.2 Right-of-Way and Relocation

FHWA is required to comply with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, for any right-of-way acquisition or relocation assistance. The majority of the Right-of-Way (ROW) for the Preferred Alternative is located on federal property, either Fort Belvoir or HEC. Approximately 16.5 and 17.4 acres from Fort Belvoir and HEC, respectively, will be required for the Preferred Alternative. For its property, the Army⁷ will arrange a formal land use agreement⁸ with the Virginia Department of Transportation (VDOT). Additionally, the Army will transfer approximately 2.5 acres of land as mitigation for a like amount anticipated to be taken from Woodlawn Plantation property (See Cultural Resources section for more description of this action).

Privately owned property would be required along Telegraph Road, Old Mill Road and U.S. Route 1 for the Preferred Alternative. No complete tax parcel would be required; strips from certain parcels along existing VDOT ROW likely would be needed under the Preferred Alternative. No new ROW is expected along Mt. Vernon Memorial Highway. Detailed acreage requirements would be determined following design and subsequent property surveys. **Table 4-1** provides a summary of likely ROW requirements for the Preferred Alternative.

Table 4-1: Estimated Right-of-Way Impacts^a

Type	Number of Properties Effected	Number of Buildings Removed	Total Area Taken (Acres)	
			No Build	Alt 4CR
Fort Belvoir ^{abc}	1	0	0	19.4
HEC ^{ac}	1	0	0	20.4
Woodlawn Plantation ^{abd}	1	0	0	2.6
Residential Properties	3 ^e	0	0	1.0
Business Properties	5 ^f	0	0	2.0
County Services	1	0	0	0.3
TOTAL	12	0	0	45.7

NOTES:

- ^a Per Fairfax County recorded property ownership data; excludes construction easements.
- ^b Excludes compensation acreage at Woodlawn Gate.
- ^c Federal lands for roadway may be in the form of a perpetual easement to VDOT rather than direct land transfer.
- ^d To be adjusted based on anticipated Memorandum of Agreement.
- ^e Two residential owners and one community association, along Telegraph Road
- ^f All business properties belong to the same owner, along Telegraph Road

⁷ The land is owned by the United States of America and is under the jurisdiction of the Department of the Army.
⁸ The mechanism of land transfer from Fort Belvoir or HEC is expected to be a perpetual easement rather than direct conveyance of ownership.

Some additional land would be required for construction easements, for example for creating side slopes. Relocation impacts are calculated based upon the anticipated direct impacts to buildings typically occupied by residents or business entities. Neither alternative requires residential structures or businesses. Minor changes in access to some properties may occur under the Preferred Alternative. As long as the minimum of right-in-right-out ingress and egress exists, the Commonwealth of Virginia requires no compensation consideration.

4.1.3 Visual Environment

Visual impact concerns include views from and to the project at the reconfigured intersection at the southern terminus, the northern terminus, and the 4-lane facility through the undeveloped Fort Belvoir/HEC property.

Title 23 of the U.S. Code, Section 109(h) and the U.S. Department of Transportation Order 5610.1C, Revised Attachment 2, require FHWA to consider the design quality in transportation projects, which involve public use areas, such as historic districts. Impacts to the visual environment by the Preferred Alternative were evaluated with several methods, including:

- Field review;
- Analysis of preliminary engineering horizontal and vertical alignments; and
- Landscaping opportunities for the southern terminus, developed from coordination efforts during the study.

4.1.3.1 Southern Terminus Area

The greatest visual change to the environment with the Preferred Alternative is that it would align the currently awkward and offset intersection of U.S. Route 1, Mount Vernon Memorial Highway (VA Route 635), Woodlawn Plantation entrance, and Old Mill Road. **Figure 4-1** presents the concept of the southern terminus. Mount Vernon Memorial Highway would generally align with the widened Old Mill Road rather than with the entrance to Woodlawn Plantation; the approach of Old Mill Road towards U.S. Route 1 would align with Mount Vernon Memorial Highway rather than a gas station. Regardless of the roadway widenings, an overall aesthetic benefit of the intersection alignment would be the noticeable reduction of signage and traffic signal clutter.

The Preferred Alternative would relocate the current entrance drive to Woodlawn Plantation, approximately 700' south along U.S. Route 1. (The existing colonial revival guardhouse would be removed to the new entrance.) The new entrance drive location offers a more visually unified connection between the manor side of the property and the stables side of the property. Rustic fencing already offers a unifying element for the Woodlawn Plantation property on both sides of U.S. Route 1; this type of fencing would be retained.

Mount Vernon Memorial Highway would remain largely visually unchanged with the Preferred Alternative. The approach to the intersection with U.S. Route 1 would be shifted towards the businesses opposite the Woodlawn stables property. This allows more green space along the Woodlawn Plantation stable property.

The Preferred Alternative includes construction of a proposed extension of the Potomac Heritage National Scenic Trail. This would be a shared-use pedestrian/bicycle facility, likely to be constructed along two sides of the perimeter of the Woodlawn stables property. Along

Mount Vernon Memorial Highway, the trail would be placed on the “reclaimed” roadway area; along U.S. Route 1, it would be on easement on Woodlawn Plantation property. Initial landscape proposals place the trail inside of parallel rustic fencing. (Section 4.11 discusses the Potomac Heritage Trail in more detail.) For the shared use path proposed along the Old Mill Road side of the Woodlawn Plantation property, users would enjoy a meandering path in the woods; tree cutting would be minimized wherever possible.

Old Mill Road would convert from a 2-lane to a 4-lane facility with a median/center turn lane. The visual effect of a forested edge along the Woodlawn Plantation NHL side of the road would remain, but the Preferred Alternative would clear approximately 20 feet of woods for the new roadway. Because it is important to protect the vistas and rural image of and to the Woodlawn Plantation, additional plantings (concentrating on evergreens) would occur to ensure a natural visual screening effect. The sidewalk on the residential side of Old Mill Road would remain, as would the entrance driveways.

Vistas of U.S. Route 1 (as described in Chapter 3) to and from grand view at the manor house of Woodlawn Plantation as well as the Woodlawn stables would remain largely the same under the Preferred Alternative, except for the new driveway entrance to the plantation site. Natural elevations, trees and other vegetation would continue to obscure U.S. Route 1 from Woodlawn Plantation, so that the additional left turn lane and median would likely be unseen from the manor house.

Vistas from U.S. Route 1 approaching Woodlawn Road would be improved under the Preferred Alternative. Once the Army closes its entrance at Woodlawn gate, the large white security tent and military checkpoint between the Woodlawn Friends Meeting property and the Woodlawn Plantation will be removed and either VDOT or Fairfax County would maintain the roadway to Fort Belvoir’s property line. It is expected that the traffic signal would remain.

For the Preferred Alternative, where possible, natural vegetation would be placed in medians. Because this area is located in an historic district, special treatments of crosswalks, medians, and signs would occur; details will be considered during design. Continued coordination would occur prior to construction with the Fairfax County Architectural Review Board and Woodlawn Plantation. (See also Section 4.3, Cultural Resources.)

4.1.3.2 Northern Terminus Area

The section of Telegraph Road between Beulah Street and Hayfield Road is to be widened regardless of whether the Preferred Alternative is selected or constructed. This section of Telegraph Road would ultimately resemble the 4-lane section of Telegraph Road from Beulah Street to the Fairfax County Parkway, including a 16 foot grassed median. The Preferred Alternative assumes that typical section along Telegraph Road (by others), but adds turning lanes necessary for the intersection with the new connector road. The new intersection would contrast with what has been a 2-lane Telegraph Road. Ameliorating the visual impact of the Connector Road, however, are recent and planned development activities. For example, opposite Fort Belvoir, the developer of a recent housing development added an acceleration lane from the development entrance to Piney Run; on the Post side, the DCEETA is adding a lane (deceleration and acceleration) on Telegraph Road at a new entrance to its new remote delivery facility.⁹ Additionally on Telegraph Road,

⁹ See *Environmental Assessment and Finding of No Significant Effect* for the Remote Delivery Facility, October 2005.

the owner of the golf driving range south of Piney Run plans to add deceleration and acceleration lane at its entrance.

The preliminary engineering plans for Preferred Alternative included showing the widened Telegraph Road south and north of the new intersection. To the south, the road widening would extend to the current 4-lane section near Beulah Street. To the north, the road widening would extend to the already-widened pavement section beyond the entrance to HEC, approximately 900 feet north of the intersection of Old Telegraph Road.

Bicycle lanes may be included on the widened Telegraph Road, with pedestrian facilities accommodated either by sidewalk or shared-use paths, or both.

The Preferred Alternative could also alter the visual environment not only by the additional lanes, Connector Road intersection, and medians along Telegraph Road, but also by the possible introduction of a noise wall¹⁰. The affected subdivision currently has a 6-foot high wooden fence along its boundary with Telegraph Road. The noise wall would need to be 11 feet high by 300 feet long in order to ameliorate traffic noise. (See Noise, Section 4.6.) Decisions regarding a sound barrier would involve both resident and VDOT review later during the design phase. The noise impacts result from the planned widening of Telegraph Road.

4.1.3.3 Mainline Component

For the portion of the project interior to Fort Belvoir and HEC, the Preferred Alternative would provide drivers with a visual environment of undeveloped, largely forested land along a pleasantly curving 4-lane roadway. The roadway would not provide dramatic or uninterrupted vistas.

The Preferred Alternative offers an anticipated median treatment of grass and trees, and shrubs as permitted by VDOT sight-distance and clear zone requirements. Side slopes would be re-vegetated. For the shared use path proposed along the length of the Connector Road, bicyclists and pedestrians would enjoy the new connection between Pole Road and Telegraph Road, and the opportunity to connect to trails to the Jackson Miles Abbott Wetland Refuge, Woodlawn Plantation, the Grist Mill and other locations.

4.2 Natural Resources

4.2.1 Physiographic Impacts

The Preferred Alternative is not expected to affect the geological formations or geomorphology in the site's vicinity. The Preferred Alternative would not require deep excavation, but it would require grading of approximately 1.5 miles of undeveloped rolling terrain, as well as widening of existing roadway facilities. Grading at the edges of the roadway slopes would taper to match to existing contours.

¹⁰ Any mitigation measures for noise impacts, such as noise walls, will require further acoustic analysis and public outreach efforts. Virginia Department of Transportation, *Noise Walls - Frequently Asked Questions*, <http://www.virginiadot.org/projects/pr-faq-noise-walls.asp>

Through Fort Belvoir and HEC, the Preferred Alternative generally follows the contours of a ridgeline; this offers a more uniform profile, lessens the amount of cut and fill and the amount of runoff flowing over impervious surface.

The Preferred Alternative traverses areas with problem soils ("Class A Soils" as defined by Fairfax County). These soil conditions are most predominant in the northern section of the alignment. Fairfax County has specific requirements¹¹ for construction activities on such soils and subsoils, developed from experience with foundation support, slope stability, and permeability. A detailed geotechnical engineering report will be prepared during design. The geotechnical investigation will analyze the specific soil and subsurface conditions; engineers will then render recommendations. Examples of measures to be considered for design and construction within such soil groupings include: removal and replacement of the soil, mixing of additional substances (such as lime or bentonite), placement of geotextile fabrics, as well as following applicable erosion and sedimentation control practices.

4.2.2 Water Resources

The U.S. Army Corps of Engineers (USACE) regulates activities affecting waters of the United States (streams, wetlands and other generally defined aquatic habitats) and navigable waters pursuant to Section 404 of the Clean Water Act of 1977, as amended, and Section 10 of the Rivers and Harbors Act of 1899, respectively. There are no navigable waters in the study area subject to jurisdiction under Section 10 of the Rivers and Harbors Act.

The Virginia Department of Environmental Quality (DEQ) administers the Virginia Water Protection (VWP) permit program regulation (9 VAC 25-210-10), Section 401 of the Clean Water Act, and the State Water Control Law for activities affecting jurisdictional wetlands, streams, and other waters.

Subsurface and surface water resources are protected by the EPA pursuant to the federal Safe Drinking Water Act of 1974, as amended in 1986 and 1996 and include all public drinking water systems and reservoirs, lakes, aquifers, springs, groundwater, and wellhead protection areas, with especial emphasis on EPA-designated Sole Source Aquifers (SSAs). The Preferred Alternative crosses no designated SSAs.

The Wellhead Protection (WHP) Program protecting underground-based sources of drinking water was established in 1986 by the Safe Drinking Water Act amendments. The Preferred Alternative crosses no designated wellhead protection areas.

4.2.2.1 Stream Impacts

The Preferred Alternative has four stream crossings, all within the Dogue Creek watershed. In total 1,110 linear feet would be crossed by the Preferred Alternative, including 760 linear feet of Piney Run. The Preferred Alternative does not impact the Accotink Creek Watershed. Potential impacts to the streams may include changes in flow volume and velocity, water quality reduction from runoff, and reduced habitat quality due to piping or placing culverts. Because the Preferred Alternative generally follows the ridges and maintains a much higher elevation than the streams, expected impacts have been reduced. Proper erosion and sedimentation control measures would also be implemented to minimize the permanent

¹¹ See geotechnical guidelines in Fairfax County Public Facilities Manual (PFM, section 4-0301).

impacts to streams. Temporary impacts may also be incurred during construction from runoff and erosion and sedimentation.

Telegraph Road currently crosses over Piney Run, currently carried by culvert to the opposite side. This 2-lane crossing would be widened to approximately 6-lanes. Proposed preliminary design of the Preferred Alternative assumes the stream will be bridged at this location to carry the widened roadway. The improved hydraulic capacity should restore and enhance stream flow.¹² The Preferred Alternative crosses Piney Run approximately 1,500 feet east of Telegraph Road. Current design assumes a bridge at this location, as well.¹³ Placement of impediments such as retaining walls or bridge pilings in streams could cause impacts to stream flow; preliminary design for the Preferred Alternative avoids such placement. The alignment also crosses an unnamed tributary of Dogue Creek near Pole Road, and a small unnamed tributary of Dogue Creek near the current entrance to Woodlawn Plantation. The former would be placed in a box culvert, the latter would be piped.

Water quality impacts to the streams will be minimized by requiring Best Management Practices (BMPs) consistent with federal, state, and local regulations. Temporary impacts during construction will be minimized by requiring that all flow in the streams be maintained in accordance with VDOT design standards and applicable permit requirements. Impacts to streams from contaminants such as salting/sanding, road spills, and other road runoff could occur along the replacement roadway.

4.2.2.2 Stream Mitigation

The Preferred Alternative has been aligned to minimize the number of stream crossings. An additional stream impact minimization technique is to cross at a perpendicular angle in order to present the shortest distance across the water body. The alignment of the Preferred Alternative utilizes perpendicular crossings to the extent practicable. Another means of reducing impacts is to span the stream entirely, namely with a bridge. The Preferred Alternative will span Piney Run in two locations; no piers would be placed in the stream bed. During design, further evaluation of stream flows will be considered to avoid streambank and riparian impacts. An often-acceptable practice for smaller stream crossings is to place the stream in a culvert. A mitigation feature that would be employed for culverts is to countersink them. This technique would be used for small drainage ways along the Preferred Alternative. If multiple culverts are used at one location, providing a low-flow culvert is a mitigation measure to maintain natural stream flow, which provides for movement of aquatic life.

Coordination with Fairfax County and Fort Belvoir environmental personnel will occur during design to determine appropriate minimum and storm-flow conditions for crossings of Piney Run. Evidence of beavers upstream will also be factored into the qualitative analysis. Design of the bridges shall include measures to minimize scour of the stream bed and stream bank. To mitigate for water quality impacts, drainage pipes will be placed on the bridges to collect and filter the first one-half inch of rainfall.

¹² A preliminary hydrologic and hydraulic analysis indicates that a 8 feet wide by 6 feet high box culvert is needed if a bridge is not used.

¹³ A preliminary hydrologic and hydraulic analysis indicates the need for two 12 feet wide by 10 feet high box culverts if a bridge is not used.

4.2.2.3 Groundwater Impacts

The Preferred Alternative will increase impervious surface area by approximately 40 acres. This could impact groundwater by reducing infiltration of surface water through soils to the water table, and by increasing the pollution from runoff. FHWA will include design features which employ low-impact techniques for protecting groundwater.

4.2.2.4 Groundwater Mitigation

Potential impacts to groundwater can be minimized or avoided through proper design, and by including construction of appropriate stormwater management facilities to collect runoff and pretreat the runoff prior to release to the ground. FHWA will include design features which employ low-impact techniques for protecting groundwater.

4.2.2.5 Stormwater Impacts

Construction of the Preferred Alternative would increase impermeable surface area and surface water runoff. The potential impacts associated with this increased runoff are the same as indicated previously. The water quality of receiving surface waters could be degraded and groundwater could be contaminated.

BMPs will be part of the design to include controlling the velocity and volume of runoff in order to equal or improve the present conditions. For water quality control, bio-retention areas or rain gardens will be used to the extent possible. Generally, the maximum allowable contributing drainage area is limited to one acre for these types of BMPs, with runoff entering the basin as sheet flow (rather than via pipe or directional swales, for example). In locations where it is not feasible to place a bio-retention basin due to topographical or other constraints, a different BMP such as an extended dry detention pond, would be used. For curb and gutter sections, inlets would drain water from the roadway surface to a collector pipeline system. In turn this system would drain into stormwater management facilities, including bio-retention basins.

Further mitigation for stormwater impacts would be realized through the reclamation of the land now occupied by the closed portion of Woodlawn Road. The old roadway will have the pavement removed and will be reforested to partially restore permeable surface area within the project area. The restoration of this two-lane facility will partially offset the creation of new impervious surface created by the construction of the new four-lane facility.

4.2.2.6 Stormwater Mitigation

The project will be required to meet the Virginia and Fairfax County Storm Water Management Criteria for water quality and quantity control. The contractor must also comply with the terms of Fort Belvoir's MS-4 permit. To reduce the amount of storm water runoff generated by the roadway facility, the design would minimize natural area lost, reduce impervious surface, and use natural bioremediation techniques where possible, dependant on the availability of Right-of-Way. Specific criteria for stormwater management facilities will be decided in the design phase of the project. Alignment placement already has minimized the amount of non-roadway drainage by locating the Preferred Alternative along or close to a ridge line.

Initial calculations for stormwater estimated approximately 0.8 acres are needed for placement of bio-retention basins. An estimated additional 3 acres along the Preferred Alternative would be needed for maintenance access and safety separation from the travel lanes. (These areas are included in the impacts calculations for other resources.) FHWA will coordinate with Fairfax County and Fort Belvoir to seek additional ways to incorporate low impact development techniques for stormwater.

4.2.3 Floodplains

4.2.3.1 Floodplain Impacts

In accordance with Executive Order 11988, FHWA must avoid impacts to floodplains wherever possible. Impacts to floodplains can be assessed in terms of whether proposed development within the floodplain and/or floodways has the potential to obstruct flood flows. Impacts also can be from adversely increasing flood velocities or elevations, or significantly affecting the storage or flood control capacity of the floodplain, which would cause adverse flooding impacts on upstream, downstream or abutting properties, or to pose a hazard to human life, health, or property. The vast majority of the Preferred Alternative is located outside the floodplain. Approximately 4.3 acres of the 100-year floodplain are contained within the estimated limits of construction for the Preferred Alternative.¹⁴

4.2.3.2 Floodplain Mitigation

The Preferred Alternative would improve the floodplain conditions by improving the hydraulic capacity at Piney Run under Telegraph Road. For the crossing of Piney Run 1,500 feet east of Telegraph Road, the Preferred Alternative would provide suitable sizing to allow unimpeded flow. The floodplain impacts would be reduced and minimized by spanning these two crossings with bridges. VDOT requires that the design accommodate 50-year storms, and not increase the floodplain by more than 1 foot; Fairfax County guidelines permit no increase to the floodplain. Because the Preferred Alternative largely follows ridges and thus crosses streams and the floodplains at higher elevations, no increase to the floodplain is expected.

4.2.4 Natural Environmentally Sensitive Areas

4.2.4.1 Environmentally Sensitive Area Impacts

The Preferred Alternative will impact two of the four specific environmentally sensitive locales noted in Chapter 3. See **Figure 4-2**. It does not directly affect the Jackson Miles Abbott Wetland Refuge (JMAWR) or Huntley Meadows Park. This section explains the effects of the Preferred Alternative on the other key locales.

The Preferred Alternative will cross the Forest and Wildlife Corridor (Corridor) on Fort Belvoir. Because this designated corridor extends continuously through Fort Belvoir/HEC property, any new location roadway alignment connecting U.S. Route 1 with Telegraph Road would have to cross it. Several existing roadways already cross it. The Preferred Alternative crosses approximately 1,850 feet of the corridor, resulting in a total of approximately 7 acres affected. The primary impacts associated with placing a road crossing in the wildlife corridor

¹⁴ As designated by others. FEMA does not show this portion of Piney Run as within either 100- or 500-year floodplain, according to the Flood Insurance Rate Map, Fairfax County, Virginia, Panel 128 of 150, March 5, 1990.

is fragmentation of the forest and increased potential for wildlife-human conflicts. In accordance with Section 4(f) of the U.S. Department of Transportation Act of 1966, a separate Section 4(f) evaluation has been prepared and is presented elsewhere in this document.

The second natural environmentally sensitive area that will be impacted is the Resource Protection Area along Piney Run. RPAs have been established to act as buffers for water quality. As noted in Chapter 3, transportation projects are exempt from procedural requirements related to RPAs; nonetheless, FHWA anticipates following practices to minimize impacts, and control erosion and sedimentation. The Preferred Alternative crosses the RPA along Piney Run at one location along Telegraph Road and at a second location about 1,500 feet east of Telegraph Road.

4.2.4.2 Environmentally Sensitive Area Mitigation

To minimize impacts to wildlife, the alignment generally follows along ridgelines, allowing for continuation of natural ravines and streams, and reduces earthwork, cut and fill slopes as well as disturbance/removal of existing vegetation. Potential impacts to wildlife from vehicle collisions will be addressed by placing wildlife crossings within the Corridor. One major wildlife crossing would be constructed at the intersection of the Preferred Alternative and unimproved John J. Kingman Road through the Corridor.

The wildlife crossings within the Corridor would be located in areas with a natural depression of the topography, which wildlife are thought to favor in their migration patterns. At least one location would be suitable for a wildlife crossing for larger animals. The major wildlife underpass at Kingman Road would be suitable for passage of larger animals. Two other major wildlife crossings will occur, both over Piney Run at Telegraph Road and about 1,500 from Telegraph Road. Coupled with the Kingman Road major wildlife crossing, these underpasses should improve passage of wildlife. At Telegraph Road, Piney Run is currently in a culvert; the new bridge will enhance wildlife and riparian connectivity, facilitating better movement of wildlife to and from the post's Forest and Wildlife Corridor, and other forested and open spaces.

To reduce fragmentation in the forest corridor, the footprint of the roadway will be minimized to the maximum extent possible¹⁵. The Preferred Alternative has already been aligned in close proximity to a grass-covered landfill that already exists in the Corridor. No Right-of-Way fencing will be used in the wildlife corridor crossing areas to further reduce the fragmentation effect of the new road. Without fencing, the potential for deer-vehicle collisions is likely to increase. To help reduce this potential increase, wildlife drift fencing (to channel deer and other wildlife towards the wildlife crossings) and deer reflectors will be installed to discourage deer crossing in areas other than the constructed wildlife crossings. Additionally, deer crossing signs will be installed to alert motorists to the potential for deer-vehicle collisions.

Four additional minor wildlife crossings in the form of culverts will be installed at selected locations along the roadway alignment. Two of these additional crossings will be located within the designated Corridor and the other two will be located in the natural area located outside of the Corridor. During the roadway design phase, the utility of installing wildlife drift fencing for the minor wildlife crossings will be investigated.

¹⁵ Consistent with VDOT design standards.

Other measures for mitigation include installing street lighting only at the three intersections and along the residential portion of the alignment. In conjunction with Fort Belvoir's plans to close sections of Woodlawn Road within the Garrison, this project will remove the existing pavement of two-lane Woodlawn Road where it passes through the Corridor (or reduce its width to convert it to a trail) and re-vegetate the existing open areas along the to be removed roadway as well as those created by the pavement removal. This action will eliminate an existing transportation corridor currently passing through the Fort's designated Corridor.

In summary, the combined effect of the following listed mitigation actions will greatly reduce the impact of the proposed undertaking upon the Fort's designated Corridor:

- Eliminate/remove the existing two-lane Woodlawn Road through the Corridor.
- Re-vegetate the eliminated Woodlawn Road corridor through the Corridor.
- Replace the existing small drainage culvert conveying Piney Run under Telegraph Road and replace with a bridge structure that will also serve as a large animal/wildlife underpass.
- Provide a bridge structure as large animal/wildlife underpass on proposed connector road in the Corridor.
- Provide a bridge structure as stream and large animal/wildlife underpass on proposed connector road for its crossing of Piney Run.
- Re-vegetate cut and fill slopes, outside of clear zone, of the proposed connector road.
- Provide 4 additional minor wildlife crossing structures, 2 in the Corridor, 2 between the Corridor and Telegraph Road.
- Provide minimal drift fencing at proposed wildlife crossings.
- Provide "deer crossing" warning signs along the proposed connector road.
- Provide deer reflectors along the proposed connector road.
- Provide no lighting along the proposed connector road except at its three intersections and at the existing residential area.
- Facilitate discussion to reduce posted roadway speed below 45 MPH.

4.2.5 Wetlands

4.2.5.1 Wetlands Impacts

The Preferred Alternative will unavoidably cross approximately 1.15 acres of wetlands. The single largest wetland impact potentially occurs about 1,500 feet from Telegraph Road, where approximately 200 feet of wetlands adjacent to Piney Run would be spanned. Similarly, the crossing of Piney Run by Telegraph Road is largely wetlands. A third area of wetlands traversed by the Preferred Alternative is the northwest quadrant of the Pole Road intersection, along an unnamed tributary to Dogue Creek.

Along Telegraph Road, the Preferred Alternative would impact forested wetlands at the Piney Run crossing. Along U.S. Route 1 and Mount Vernon Memorial Highway, the Preferred Alternative will not impact wetlands.

The extent of the anticipated wetland impacts are summarized in **Table 4-2**. Wetland impacts due to dredging or filling must be authorized under Section 404 of the Clean Water Act by the USACE and under the Virginia Water Protection Act by DEQ.

Type	Impact	
	Square Feet	Acres
Palustrine forested (PFO)	35,078	0.81
Palustrine Unconsolidated Bottom	3,871	0.09
Palustrine emergent (PEM)	0	0.00
Palustrine scrub/shrub (PSS)	0	0.00
Palustrine open water (POW)	4,141	0.10
Unknown (likely PFO)	6,807	0.16
TOTAL	49,897	1.15

Numbers may not add due to rounding

4.2.5.2 Wetlands Mitigation

The Preferred Alternative generally stays on the crest or ridgeline, minimizing impacts to streams and wetlands. During development of the preliminary alternatives, and subsequent refinement of the Preferred Alternative, FHWA has undertaken specific measures to avoid and minimize wetland impacts. Of the early alternatives considered, the Preferred Alternative had the least wetland impact. Another example of minimizing wetland impacts included shifting the alignment at Telegraph Road from the west side of Piney Run to the east side to avoid acidic seepage swamp and bottomland hardwood wetlands. Similarly, the proposed perpendicular crossing and bridging of Piney Run at that location minimizes wetland impacts.

Further wetland impact minimization may be accomplished by use of steeper roadway side slopes or retaining walls at sensitive locations to reduce the footprint width. Stormwater management facilities will be placed outside of wetlands. Measures that meet the requirements of the Virginia Erosion and Sediment Control Handbook will be used during construction to minimize indirect impacts to wetlands. Further, equipment and material staging areas would be placed outside of wetlands. Unavoidable wetlands impacts will be mitigated according to the type and ratios specified in the permit, and may include actual onsite construction of wetlands, purchase of wetland credits from an approved mitigation bank, or payment into the wetland restoration trust fund.

4.2.6 Vegetation and Wildlife Habitats

4.2.6.1 Habitat Impacts

(a) Aquatic Habitat Impacts

The Preferred Alternative impacts approximately 1,110 linear feet of aquatic habitat due to stream crossings at Piney Run and two unnamed tributaries to Dogue Creek. The Preferred Alternative poses minor short-term and long-term impacts on vegetation and wildlife habitats in the study area; however, it would neither divert nor block any stream. Spanning streams is more beneficial to maintaining aquatic habitat than placing streams in culverts. Loss of habitat would result in fewer animals. The most important factor serving to minimize the impacts to both aquatic and terrestrial habitat is placing the alignment higher along the ridgeline than near the foot of the slopes, where more aquatic animals and fish live.

Other potential impacts to the aquatic habitat that may occur would be increased runoff from the roadway, resulting in potential increased pollutant loading.

(b) Terrestrial Habitat Impacts

The Preferred Alternative would bisect relatively undisturbed forested habitat used by migratory songbirds, which require large blocks of intact forest for nesting and foraging activities. Loss of this acreage will reduce the habitat available for use by resident and migratory species. The Preferred Alternative will impact about 8 acres of forested terrestrial habitat identified in the Partners-in-Flight program as breeding and foraging areas for a several PIF designated priority bird species. Additionally, approximately 11 acres of habitat identified as potential and/or uncertain wood turtle habitat would be impacted. The primary impacts will result from direct loss of a relatively small acreage of habitat, and from additional habitat fragmentation. Even though some habitat fragmentation will occur within the northern portion of Fort Belvoir/HEC, areas of woods on either side of the Preferred Alternative will remain in excess of 100 acres in size, so the loss of habitat is not expected to substantially impact the PIF priority bird species' ability to nest. Another potential impact that could result from construction of this new roadway is the introduction of invasive plant species in the disturbed footprint of the roadway shoulders.

(c) Wildlife Impacts

Impacts to wildlife will occur primarily through the loss of habitat. Some additional impacts will likely occur as a result of vehicle/wildlife conflicts.

4.2.6.2 Habitat Mitigation

(a) Aquatic Habitat Mitigation

Crossing a water resource at a perpendicular angle is one of the primary means of minimizing impacts of a roadway crossing. A perpendicular crossing is the shortest distance across the water body, thus the crossing type with the least impact on aquatic habitat. Spanning the crossing is another form of mitigation through minimization. Appropriate design efforts will be undertaken to minimize changes in stream patterns such as flow volume and velocity. This may be accomplished by sizing culverts to carry high flow volume without unnecessarily increasing velocity. Also, to facilitate passage of aquatic life, culverts can be countersunk or, if multiple culverts are used at one location, by providing a low-flow culvert. Another potential mitigation measure is to use culverts with natural bottoms. When combined with the realignment of the roadway closer to the top of the ridge line, potential impacts to aquatic resources will have been minimized to the maximum extent possible.

Impacts to aquatic habitats resulting from increased runoff of roadway pollutants will be minimized and mitigated by installation of appropriate BMPs along the roadway. Every effort will also be made to incorporate Low-Impact Development (LID) methods into the stormwater runoff treatment plans for this project. These methods, which mimic pre-development hydrology and stress infiltration of stormwater as opposed to direct runoff into stormwater facilities, can help minimize impacts on hydrology and water quality.

(b) Terrestrial Habitat Mitigation

Impacts to forest habitat are unavoidable. To reduce fragmentation in the forest corridor, the footprint of the roadway will be minimized to the maximum extent possible for VDOT standards and the roadway will be aligned in close proximity to a grass-covered landfill that already exists in the Wildlife corridor. Bridging of several areas along the alignment will allow for less interrupted connection between the Resource Protection Areas that are located on both sides of Telegraph Road, thus reducing impacts to terrestrial habitat. Impacts can also be offset through mitigation in the form of removal of pavement and reforestation of Woodlawn Road from Kingman Road to Beulah Street.

In accordance with Executive Order 13112, *Invasive Species*, every effort will be made to prevent and control the spread of invasive species during construction and subsequent operation of the proposed action. Example controls could include ensuring sterility of soil placed during grading for construction. New plantings and seeding of side slopes or landscaping will meet state and federal guidelines to avoid invasive species.

(c) Wildlife Mitigation

Impacts to wildlife not addressed through habitat mitigation measures detailed above are those that would be associated with direct vehicle/wildlife conflicts. Mitigation for these impacts will include the installation of wildlife crossings at specific locations along the roadway. At least three major wildlife crossings will be constructed under the Preferred Alternative: the crossing at Kingman Road and two bridges over Piney Run. At Kingman Road, the Preferred Alternative will span approximately 100 feet of natural topography at a height of about 17 feet, with an open median. It is expected that animals (including fish and amphibians) also would pass underneath the Preferred Alternative at its crossing of Piney Run about 1,500 feet south of Telegraph Road; this span would be approximately 175 feet long, also with an open median to offer daylight. Telegraph Road improvements would also bridge over Piney Run. While smaller fauna may use any of these major crossings, at least four additional minor wildlife crossings in the form of culverts will be installed at various locations along the roadway. The location for placement of these minor wildlife crossings will be determined during the preliminary road design phase of the project. At least two of these will be placed within Fort Belvoir's designated Forest and Wildlife Corridor.

Additionally, as noted previously, no Right-of-Way fencing will be used in the wildlife corridor crossing areas to further reduce the fragmentation effect of the new road. However, without fencing, the potential for deer-vehicle collisions could increase. To help reduce this potential increase, deer reflectors will be installed to discourage deer crossing in areas other than the constructed wildlife crossings. Signs alerting motorists to deer crossings will be installed in order to reduce the potential for deer-vehicle collisions. During design, further coordination between FHWA and Fort Belvoir environmental specialists will consider the utility of installation of wildlife drift fencing which could serve to channel wildlife towards the major and minor wildlife crossings.

4.2.7 Threatened and Endangered Species

4.2.7.1 Threatened and Endangered Species Impacts

(a) Federally Listed Species

The Preferred Alternative is not expected to impact federally-listed threatened or endangered species. The Bald eagle (*Haliaeetus leucocephalus*) may use the Dogue Creek shoreline south of the project. No nesting pairs are located near the Preferred Alternative.

The Preferred Alternative will not impact known locations of the Small Whorled Pogonia (*Isotria medeoloides*). In June 2005, qualified personnel found no plants along the southern section of the Preferred Alternative, nor along a northern variation of an earlier alignment. Qualified personnel conducted a subsequent evaluation for suitable habitat and determined that the Preferred Alternative crosses almost 9 acres of potential Small Whorled Pogonia habitat. However, no specimens of the plant were found in June 2006 within the limits of the Preferred Alternative.

The Preferred Alternative is not expected to impact the federally listed species of concern, the Cerulean warbler and the yellow lampmussell. Impacts to the Cerulean warbler would potentially result from forest fragmentation, and to the yellow lampmussell from stream degradation.

(b) State Listed Species

The Preferred Alternative traverses habitat potentially suitable for two state-listed species. The Preferred Alternative crosses potential wood turtle habitat along Piney Run and potential small whorled pogonia habitat. The potential habitat consists of mesic deciduous woodlands in and near clear creeks and would be impacted by roadway construction, including temporary access.

The Preferred Alternative is also not expected to impact the state-listed species of concern: the great egret, yellow-crowned night heron, brown creeper, winter wren, purple finch, and Northern Virginia well amphipod. The bird species would potentially be impacted by forest fragmentation, and the well amphipod would potentially be impacted by groundwater quality reduction.

4.2.7.2 Threatened and Endangered Species Mitigation

Before construction begins, qualified personnel will conduct a survey for wood turtle in potential habitat areas. Any individuals located will be moved to suitable habitat outside of the project area.

Effective erosion and sediment control and stormwater management would minimize the potential for adverse water quality impacts to the yellow lampmussel and the Northern Virginia well amphipod.

Wildlife crossings would be constructed under the Preferred Alternative to maintain the continuity of habitat and migration routes for various species. Where spanning of potential habitat's streams by bridging is not possible, using culverts with natural bottoms offers better opportunity for the amphibian and fish species utilization than a closed culvert.

Mitigation for potential impacts to the Cerulean warbler and the yellow lampmussell habitat would be accomplished by measures put into place as mitigation for other wildlife and water resource impacts associated with this project. Similarly, any potential impacts to the great egret, yellow-crowned night heron, brown creeper, winter wren, purple finch, and Northern Virginia well amphipod would be accomplished by the same measures.

4.3 Cultural Resources

The Preferred Alternative will directly impact historic, and potentially archaeological resources (historic properties) listed in or eligible for listing in the National Register of Historic Places (NRHP). In general, impacts to historic properties can take the form of physical impacts to a property, alterations to the property's setting, the introduction of visual or audible elements to the property or its immediate vicinity, or other actions. Impacts resulting from a project may or may not represent an "adverse effect" to identified cultural resources under 36 CFR 800, the implementing regulations for Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended. The criteria of adverse effect must be applied to evaluate whether a project impact would result in an adverse effect to historic properties. These criteria provide the basis for determining the project's potential effect on historic properties.

The proposed project impacts and adverse effects to standing structures and other historic properties are well-defined. However, because of current information gaps in the archaeological record and some degree of uncertainty about the boundaries of previously inventoried archaeological sites, the extent of impacts regarding archaeological properties are not yet specified. Therefore, the following sections consider future steps necessary to determine adverse effects to known, but poorly-defined, archaeological properties.

4.3.1.1 Determining Adverse Effects - Regulatory Framework

In order to comply with Section 106 of the NHPA, and the implementing regulations found in 36 CFR 800, FHWA must take into account the effects of this undertaking on historic properties, i.e. cultural resources that are listed or eligible for listing in the National Register of Historic Places (NRHP). National Historic Landmarks (NHL), designated by the U.S. Secretary of the Interior, are also included in this group.

In order to identify historic properties that may be affected by the proposed undertaking, FHWA has defined the parameters of an Area of Potential Effects (APE) for the project. The APE is the geographic area or areas within which an undertaking may cause changes in the character or use of historic properties, if any such properties exist. The APE is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking (36 CFR 800.16). For this project, FHWA proposed an APE for construction-related impacts of 150 feet on either side of the proposed centerline of the Preferred Alternative. In order to address possible visual and/or audible impacts to historic properties, such as the Woodlawn Historic District and Woodlawn Plantation, the APE includes a ¼ mile on either side of the proposed centerline of the Preferred Alternative.

According to 36 CFR 800.4, a federal agency must proceed to the assessment of adverse effects outlined by 36 CFR 800.5 if historic properties, identified in the APE, will be affected by an undertaking. Examples of adverse effects to historic properties include:

- Physical destruction of, alteration of, removal of, or damage to all or part of the property as well as changes of the character of the property's use or of physical features within the property's setting that contribute to its historical significance.
- Introduction of visual, atmospheric or audible elements that diminish the property's significant historic features.
- Neglect of a property causing its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization.
- Transfer of ownership of a historic property to/from federal ownership, through transfer, lease, or sale.

The criteria of adverse effect state that "...adverse effects occur when an undertaking may directly or indirectly alter characteristics of a historic property...". In addition, alteration or destruction of an archaeological site is considered to be an adverse effect, whether or not recovery of archaeological data from the site is proposed (36 CFR 800.5).

4.3.1.2 Consulting Parties

In accordance with the requirements of Section 106, the federal agency consults with appropriate parties. FHWA coordinated with the State Historic Preservation Officer (SHPO) in developing a roster of agencies, organizations and individuals who might be part of the consulting parties process.¹⁶ The Consulting Parties work with the federal agency and SHPO towards development of mitigation measures to resolve adverse effects. As culmination of the process, FHWA executes a formal Memorandum of Agreement (MOA) with the SHPO and the Advisory Council on Historic Preservation (ACHP). FHWA may invite other parties to be signatories. It is expected that the U.S. Department of the Army (USACE and Fort Belvoir) and the National Trust for Historic Preservation (NTHP) will be signatories for the Section 106 MOA on this project. As agencies and the public review this EA, but prior to FHWA rendering a decision, an MOA will be executed detailing measures to which FHWA and other agency stakeholders (including the Department of Defense) will be bound.

4.3.1.3 National Historic Landmark Status

The designation of the Woodlawn Plantation NHL requires that FHWA follow the requirements of 36 CFR 800.10, which outlines agency responsibilities for protecting NHL's. This requires the agency, "to the maximum extent possible, undertake planning and actions to minimize harm to the National Historic Landmark that may be directly and adversely affected by the undertaking." In addition, the agency must request the participation of the ACHP as well as the U.S. Secretary of the Interior in any consultation where there may be an adverse effect on a NHL. In a letter dated March 22, 2006, FHWA invited the ACHP to participate in the consultation process. In addition, FHWA invited the regional National Park Service (NPS) (a designated representative of the Secretary of the Interior in NHL matters) to comment on the proposed project and Woodlawn Plantation NHL in a letter dated March 17, 2006.

¹⁶ Consulting parties for the Connector Road project: Department of the Army, National Trust for Historic Preservation, Virginia Department of Transportation, Fairfax County Architectural Review Board, Fairfax County Department of Transportation, Woodlawn Friends Meeting, Fairfax County History Commission, Fairfax County Office of Planning, Virginia Department of Historic Resources, Historic Mount Vernon, the Gum Springs Historical Society, and Martha Catlin.

Some of the affected properties (adversely affected as defined by 36 CFR 800) are also considered under Section 4(f) of the U.S. Department of Transportation Act and are presented in the accompanying Section 4(f) statement elsewhere in this document.

4.3.1.4 Impacts to Historic Properties

Table 4-3 lists the cultural resources identified within the APE, or which may be identified and/or relocated during additional Phase I archaeological resources surveys¹⁷. The potential impacts to these resources also appear in the table.

Table 4-3: Summary of Cultural Resources within the project APE

Resource	NRHP/NHL Status (individually)	Additional Status	Project Impact	Adverse Effect/Comment	Suggested Mitigation
Woodlawn Plantation National Historic Landmark	NHL-listed		Taking of property along Old Mill Road and the Woodlawn Plantation NHL side of U.S. Route 1	Yes MOA will address	<ul style="list-style-type: none"> • Transfer of property at the southern terminus of Woodlawn Road to the Trust • Misc. improvements to NHL property along U.S. Route 1 and Old Mill Road
Woodlawn Historic District	NRHP-eligible		Taking of property along Old Mill Road and both sides of U.S. Route 1	Yes MOA will address	Misc. improvements through District along U.S. Route 1 and Old Mill Road (Table 4-4)
Woodlawn Plantation	NRHP-listed	Contributes to Woodlawn Historic District	Taking of property along Old Mill Road and both sides of U.S. Route 1	Yes MOA will address	<ul style="list-style-type: none"> • Transfer of property at the southern terminus of Woodlawn Road to the Trust • Misc. improvements to property along U.S. Route 1 and Old Mill Road (Table 4-4)
Pope-Leighey House	NRHP-listed	Is contained within Woodlawn Historic District	Edge of pavement approximately 40' closer along Old Mill Road	Yes - Visual adverse effects MOA will address as part of Historic District Property	Misc. improvements to NHL property along and Old Mill Road
Grand View House	NRHP	Contributes to Woodlawn Historic District	None	No (see District discussion)	
Woodlawn	NRHP-not eligible	Contributes	None	No	

¹⁷ Archeological surveys expected will include anticipated property takings along Old Mill Road, and improvement areas on Woodlawn Plantation along U.S. Route 1, or along Telegraph Road.

Table 4-3: Summary of Cultural Resources within the project APE

Resource	NRHP/NHL Status (individually)	Additional Status	Project Impact	Adverse Effect/Comment	Suggested Mitigation
Baptist Church property and cemetery		to Woodlawn Historic District		Property not individually eligible (see District discussion)	
Woodlawn Friends Meeting House	NRHP-not eligible ¹⁸	Contributes to Woodlawn Historic District	None	No Property not individually eligible (see District discussion)	Potential adverse effect due to elimination of federal ownership would be negated with covenant to apply Section 106
George Washington Grist Mill	NRHP-listed	Contributes to Woodlawn Historic District	None	No	
44FX0461	NRHP-potentially eligible		Taking of property along Old Mill Road	Unknown Relocation survey and evaluation needed	If adverse effect, avoidance or data recovery
44FX1146	NRHP-potentially eligible		Taking of property through Fort Belvoir	Unknown Relocation survey and evaluation needed	If adverse effect, avoidance or data recovery
44FX1944	NRHP-potentially eligible		Taking of property through Fort Belvoir	Unknown/Relocation survey and evaluation needed	If adverse effect, avoidance or data recovery
Unknown archaeological resources within APE on Woodlawn Plantation	Unknown		Taking of property along Old Mill Road and improvements to plantation property on Woodlawn Plantation NHL side of U.S. Route 1	Unknown Phase I survey and evaluation needed	If adverse effect, avoidance or data recovery
Unknown archaeological resources within APE along Telegraph Road	Unknown		Taking of property along residential/commercial side of Telegraph Road	Unknown Phase I survey and evaluation needed	If adverse effect, avoidance or data recovery

¹⁸ The Woodlawn Friends Meeting are seeking re-evaluation of their property's eligibility status for listing in the NRHP, as of May 30, 2006.

Three parcels of land associated with Woodlawn Plantation would be impacted by the proposed project. The largest taking is due to expansion of Old Mill Road along the northern boundary of Woodlawn Plantation. The taking of land along Old Mill Road only consists of approximately 2.24 acres. The site's property along Old Mill Road is second growth forest. Accommodating turn lanes along U.S. Route 1 also requires takings on both sides of U.S. Route 1. Approximately 0.27 acres would be taken from the Woodlawn Plantation NHL side of U.S. Route 1, and 0.13 acres of land would be acquired from the Woodlawn Stables side of U.S. Route 1. The total amount of right-of-way required from the Trust is approximately 2.64 acres. Placement of shared-use paths are expected to be through easement.

The project will also move the existing Woodlawn Plantation main entrance. Currently, the primary entrance is located at the intersection of U.S. Route 1 and Old Mill Road; the Preferred Alternative proposes to move the entrance to a new access point approximately 700 feet south on U.S. Route 1.

A beneficial impact will occur with the removal of military security activity from a non-contributing but contiguous parcel presently owned by Fort Belvoir near its Woodlawn Gate. The Army¹⁹ will transfer this parcel, approximately 2.5 acres, as part of this project to the Commonwealth of Virginia, which in turn will transfer this to the Trust, owners of Woodlawn Plantation.

4.3.1.5 Assessment of Adverse Effects

The proposed project impacts represent an adverse affect to the Woodlawn Plantation National Historic Landmark, the Woodlawn Historic District, and Woodlawn Plantation property. While these resources have all been considered for this project, the Woodlawn Historic District has a prominent place because it encompasses the other two as well as other properties in the APE (see **Table 4-3**). While the transfer of 2.5 acres from the Army to the Commonwealth (as authorized by statute) has the potential to have an "adverse effect" if it altered the characteristics of the historic property; the Agency intends to negotiate between the Army and the SHPO conditions for the transfer that will prevent any alteration of the historic characteristics of the historic property, and, in addition, will result in the improvement of the entrance to the property, thereby enhancing the historic property and serving as mitigation for the Project.

Development around U.S. Route 1 and Old Mill Road has introduced modern intrusions within the Woodlawn Historic District boundaries. These intrusions include strip commercial, residential, and utility usage that detract from the integrity of the historic setting of the Woodlawn Historic District. Because of these previous impacts to the setting, only physical impacts on other individual properties has been considered in this analysis. Cumulative and Indirect impacts to cultural resources are discussed in Section 4.13. As noted in the table, for example, the project will have no effect on the individually-listed Grist Mill.

The proposed project may represent an adverse effect to three previously identified archaeological sites and an as yet unknown number of archaeological sites in areas not previously surveyed within the APE. None of the other properties identified within the APE would be adversely affected by the proposed project.

¹⁹ The land is owned by the United States of America and is under the jurisdiction of the Department of the Army.

4.3.1.6 Mitigation

(a) Standing Structures Mitigation

FHWA will continue to work with the Consulting Parties to determine project effects and develop consensus for measures to avoid or minimize impacts on significant cultural resources. FHWA will sponsor measures to mitigate these impacts through documentation or other forms of data recovery. These measures will be detailed in the MOA.

FHWA has focused the initial consultation effort on the development of mitigation measures to enhance the relationship between the historic and modern features within the boundaries of the Woodlawn Historic District. The acquisition of land from Woodlawn Plantation property along Old Mill Road and U.S. Route 1, would be ameliorated by replacement land and certain design features. The Consulting Parties have considered several of these measures. The Preferred Alternative would provide an overall improvement to the physical setting of the Woodlawn Historic District. A comparative summary of several anticipated measures appears in **Table 4-4**.

The consultation effort includes, as previously described, a transfer of 2.5 acres of property from Fort Belvoir to VDOT and in turn to the Trust, owners of Woodlawn Plantation. Conditions of this transfer will be negotiated by the Army and the SHPO in order to ensure legally enforceable conditions for maintaining protection of the NHL and adjoining properties under the NHPA. The parcel for transfer is contained within the Woodlawn Historic District at the intersection of Woodlawn Road and U.S. Route 1. A transfer to the Trust would allow for a reestablishment of the historic, physical connection between the Woodlawn Plantation property and the Woodlawn Friends Meeting House. The current military presence, including the security checkpoint at the Woodlawn Gate, would be removed, once a new security gate is constructed. This transfer would enhance the setting among these contributing elements of the Woodlawn Historic District. In addition, the Trust has indicated that it would agree to maintain NHPA protection on the parcel through covenants and in the context of the MOA.

Table 4-4: Preferred Alternative Summary of Changes to Woodlawn Plantation

Advantages	Disadvantages
<i>Intersection and Driveway</i>	
<ul style="list-style-type: none"> ▪ Improves safety and efficiency of Woodlawn driveway operations by separation from Mt. Vernon/Old Mill Road ▪ Maintains or enhances access to Woodlawn driveway from U.S. Route 1, particularly for northbound visitors ▪ Provides pedestrian access to the Woodlawn Plantation main house driveway ▪ Improves visibility of pedestrian use at the Mt. Vernon Memorial Highway/U.S. Route 1 intersection ▪ Includes striping and other treatments at the crosswalks, both at Old Mill Road and at the relocated entrance ▪ Allows opportunity for enhanced treatment of utilities at intersection, dependant on cost and complexity (e.g. burying cables) 	<ul style="list-style-type: none"> ▪ Removes existing driveway (constructed in the 1930's) ▪ Removes alignment of Woodlawn Driveway and Mount Vernon Memorial Highway ▪ Temporary disorientation of visitors accustomed to current location of entrance drive ▪ Short-term vegetation loss, while new plantings achieve growth

<ul style="list-style-type: none"> ▪ Incorporates landscaping to reflect the historic, pastoral character of Woodlawn Plantation ▪ Provides staged construction to minimize disruption to estate operations 	
Trail Connections	
<ul style="list-style-type: none"> ▪ Provides “meandering” shared use path adjacent to Old Mill Road, connecting to Pole Road and Telegraph Road trails ▪ Extends the Potomac Heritage National Scenic Trail (PHNST) along Woodlawn Plantation property on both Mt. Vernon Highway and U.S. Route 1, tying to the stable drive ▪ Allows trail users to experience pastoral and agrarian character of the estate ▪ Provides connection between trail and other pedestrian facilities on Old Mill Road, consistent with the County’s Trail Plan ▪ Facilitates access to the Plantation for pedestrians, bicyclists, and persons with disabilities from around the region and visitors from other nearby historic properties ▪ Links the Plantation with a federally designated trail system that extends from Pennsylvania to Virginia ▪ Reconnects Woodlawn to Mount Vernon, and Washington, D.C. by the PHNST ▪ Proposed trails and crosswalks would reconnect Woodlawn Plantation properties on both sides of U.S. Route 1 ▪ Trails would be maintained by a designated agency ▪ Allows staged construction minimize disruption to estate operations 	<ul style="list-style-type: none"> ▪ Temporary disruptions due to construction of trails ▪ Minor clearing of trees for the path
Land Transfer	
<ul style="list-style-type: none"> ▪ Provides transfer of 2.5 acres of land at the southern terminus of Woodlawn Road, by the U.S. Department of the Army ▪ Reconnects Woodlawn Plantation with Woodlawn Friends Meeting House ▪ Eliminates military presence and security activities at this current entrance to Fort Belvoir ▪ Creates opportunity for Woodlawn Plantation to relocate its maintenance entrance road from U.S. Route 1 	<ul style="list-style-type: none"> ▪ Takes 2.24 acres of undeveloped forest land from Woodlawn Plantation along Old Mill Road ▪ Takes 0.4 acres of undeveloped pastoral land from Woodlawn Plantation along both sides of U.S. Route 1 ▪ Maintenance of Woodlawn Road (at the Woodlawn Gate) would shift from Fort Belvoir and federal maintenance to another entity.
Signage	
<ul style="list-style-type: none"> ▪ Plans for and installs interpretative signs along trail and pedestrian facilities, e.g. locations east before and at the Mount Vernon Estate. Signs would guide trail users to the Plantation, and educate users on history of the Plantation 	

<ul style="list-style-type: none"> ▪ Reduces clutter of highway signage at the existing offset intersection of U.S. Route 1/Old Mill Road/MVMH 	
Construction Phasing	
<ul style="list-style-type: none"> ▪ Minimizes intrusion on existing entrance by constructing new entrance first 	<ul style="list-style-type: none"> ▪ Construction activity could temporarily reduce patronage.

Notwithstanding the conversion of approximately 2.6 acres of Woodlawn property to roadway use, the proposed project will enhance Woodlawn Plantation and the Woodlawn Historic District by creating a setting that improves the visitor experience. **Figure 4-1** illustrates a preliminary rendering of Alternative 4CR, including trails and other pedestrian enhancements. The current entrance to Woodlawn Plantation (constructed in the 1930s) is offset from Mount Vernon Memorial Highway, is difficult to reach from Old Mill Road, and presents safety concerns for vehicles entering or leaving the plantation property. The Preferred Alternative proposes to move the public vehicular entrance to Woodlawn farther south to facilitate safer ingress/egress of the property.

Additionally, the project would provide for an extension of the Potomac Heritage National Scenic Trail. The proposed installation of shared-use pedestrian/bicycle facilities along U.S. Route 1 and at the intersection with Old Mill Road and Mount Vernon Memorial Highway would enhance the visitor experience. New interpretive signage would be installed in these areas and elsewhere leading trail users to Woodlawn Plantation, and providing trail user with relevant historical information about the historic sites. These improvements would provide a more meaningful balance between the historic features of Woodlawn and modern development in the area.

(b) Archaeology Mitigation

In addition to the measures outlined above for the Woodlawn Historic District the proposed project requires mitigation measures for potential impacts to archaeological sites on the Woodlawn Plantation NHL along Old Mill Road or U.S. Route 1, along the margins of Telegraph Road, and within Fort Belvoir.

Currently there is one previously recorded archaeological site on Woodlawn Plantation. Site 44FX1146 is likely within the boundary of the proposed taking along Old Mill Road (the exact location of the site is unclear at this time) and may be eligible for listing on the NRHP. In order to relocate Site 44FX1146 and understand the nature of any currently unknown archaeological sites in other portions of the taking, FHWA will conduct an archaeological resources survey within the area of the entire taking. Preliminary determinations of NRHP eligibility of archaeological properties may be possible at the time of the survey of the entire parcel subject to acquisition. If not, FHWA would conduct formal evaluations. For those sites recommended by FHWA to be eligible for listing, FHWA would determine adverse effects and implement avoidance or mitigation measures (agreed upon by the consulting parties) per the terms of the MOA. Areas of land taken along Telegraph Road would be treated in a similar manner.

Currently two archaeological resources on Fort Belvoir may be impacted by the proposed project. These resources, Sites 44FX0461 and 44FX1944, are considered potentially eligible for listing on the NRHP at this time. VDHR has concluded that the vicinity of the proposed alignment has been previously surveyed for archaeological resources. However, there exists

ambiguous location data for the above noted potentially eligible sites. FHWA will conduct a Phase I archaeological survey in the vicinity of these resources to locate them in relation to the proposed project APE. Preliminary determinations of NRHP eligibility of archaeological properties may be possible at the time of the survey. If not, FHWA would conduct formal evaluations. For those sites recommended by FHWA to be eligible for listing, FHWA would determine adverse effects and implement avoidance or mitigation measures (agreed upon by the consulting parties) per the terms of the MOA.

4.4 Hazardous Materials

The Resource Conservation and Recovery Act (RCRA), Toxic Substances Control Act (TSCA), and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) regulate hazardous waste sites under federal laws. The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERLCA), also known as Superfund, was created to provide the authority and a source of funding for cleaning up hazardous substances released into the environment.

Impacts to hazardous material sites were analyzed using GIS and solid waste management unit (SWMU) data provided by Fort Belvoir, as well as field surveys conducted in November 2005. As described in Chapter 3, numerous databases which compile information on hazardous materials were also reviewed for the location of other hazardous materials sites. Two of the previously mentioned landfill sites (SWMU A-07a and SWMU A-25) are in proximity of Preferred Alternative; however, these sites were avoided in the design of the Preferred Alternative's alignment.

The alignment traverses former field training and demolition training ranges on the Post. These ranges are no longer so used, and are in the process of being decommissioned and cleared. The characterization and clean-up of the ranges and disposal areas that lay within the footprint of the Preferred Alternative offers no additional impact under NEPA. Prior to the construction phase, appropriate measures would be taken to identify and remove unexploded and spent ordnance and demolition materials. Similarly, if other hazardous materials are encountered during construction, appropriate measures would be taken to prevent adverse affects to the environment and construction workers.

4.5 Air Quality

The Metropolitan Washington Council of Governments (MWCOG) includes the proposed project in the 2005 air quality conformity determination for the region.²⁰ For pollutants of regional concern (Ozone and PM_{2.5}), the impacts due to the project have already been analyzed by the COG in its most recent conformity determination. For those pollutants, the impact will be the same regardless of final design of the roadway, and thus no additional regional analysis has been performed. The Preferred Alternative also lies within a federally designated air quality attainment area for Carbon Monoxide (CO); however, a hot spot analysis was conducted for the project because it met the Annual Average Daily Traffic (AADT) threshold. Based on that analysis, it was concluded that the project will have no substantial adverse impact on air quality as a result of CO emissions.

²⁰ The Air Quality Conformity Determination is based on the 2005 Constrained Long Range Plan and the FY 2006-2011 Transportation Improvement Program (TIP), MWCOG.

In the March 10, 2006 Federal Register publication relating to PM_{2.5} hot-spot requirements in project-level conformity determinations, the EPA notes that PM_{2.5} is both a regional and a localized air quality concern in certain circumstances. Secondary formation from PM_{2.5} precursors (such as NO_x and SO₂) is a critical component to the regional PM_{2.5} air quality problem and it is anticipated that EPA standards relating to low sulfur diesel fuels (effective in 2006) and heavy-duty engines (effective in 2007) will lower the contribution of secondary PM_{2.5} emissions on a regional basis. Local emissions due to diesel vehicles would not be greatly reduced due to these standards as the Preferred Alternative does not involve a substantial number of diesel vehicles. However, because the Preferred Alternative does not involve a significant number of diesel vehicles, it is expected that local emissions due to the project will not have a substantial impact on local PM_{2.5} levels.²¹

Mobile source air toxics (MSATs) have been assessed qualitatively in accordance with recent FHWA guidance²². Results indicate that in the design year, the Preferred Alternative offers reduced MSAT emissions in the general area of the project, relative to the no build alternative, due to the reduced vehicle miles traveled (VMT) associated with more direct routing, and due to EPA's MSAT reduction programs. On a regional basis, EPA's vehicle and fuel regulations, coupled with fleet turnover, will over time cause substantial reductions that, in almost all cases, will cause region-wide MSAT levels to be significantly lower than today.

The air quality analysis conducted by the project team therefore concluded the Preferred Alternative will have no substantial adverse impact on air quality. The Preferred Alternative will result in the reduction of Vehicle Miles Travelled (VMT's) on the regions roadway as well, which could also benefit air quality over current conditions (vehicles using more circuitous routes).

4.6 Noise

FHWA noise guidelines call for comparing existing conditions to future build conditions in order to assess traffic noise impacts. A noise technical analysis²³ evaluated the predicted noise resulting from the Preferred Alternative. The noise analysis evaluated three scenarios: current year (2005), design year (2030) No Build, and design year (2030) Build condition. The build condition analyzed impacts as a result of the Preferred Alternative. The No Build alternative assumes the Connector Road will not be constructed, and provides a baseline from which to measure the performance, costs, and impacts of the Build alternative.

4.6.1 Noise Sensitive Areas

Federal noise abatement criteria (NAC) were explained in Chapter 3. A noise impact assessment was performed for noise sensitive sites near the Preferred Alternative. VDOT practice predicts noise at apartment buildings and condominiums for both first and second

²¹ Federal Highway Administration Eastern Federal Lands Highway Division, *Richmond Highway-Telegraph Connector, Air Analysis Technical Report*, Prepared by HDR Engineering, Inc., March 2006.

²² Federal Highway Administration (FHWA) 2006. "Interim Guidance on Air Toxic Analysis in NEPA Documents," Memorandum by Cynthia J. Burbank, Associate Administrator for Planning, Environment and Realty, February 3, 2006.

²³ Federal Highway Administration Eastern Federal Lands Highway Division, *Richmond Highway-Telegraph Connector, Noise Analysis Technical Report*, Prepared by HDR Engineering, Inc., March 2006.

floor units. **Figure 4-3** shows the general location of the noise sensitive receptors (NSR) along the project corridor.

4.6.2 Noise Impacts

Of the seventy-three (73) individual noise sensitive receptors found to exist along the project corridor, six were found to approach or exceed the FHWA NAC under the build alternative. The change in relative noise levels for the design year (2030), defined as any noise level increase or decrease directly attributable to the build alternative, varies from 0 to 9 dBA greater than the noise levels modeled for the existing year (2005) alternative. There are no substantial increase impacts predicted. In the existing case, none of the noise sensitive receptors approaches the FHWA NAC.

The FHWA Traffic Noise Model (TNM) predicted a number of residences along Telegraph Road (NSR 67 through 72) to have noise levels above 66 dBA, the VDOT exterior noise abatement level for residences. This level is above the NAC.

TNM predicted noise levels at Woodlawn Plantation (Receptor 25) to be 49 dBA. Monitoring data that was taken at this receptor in the field indicated an existing noise level of 52 dBA. The low modeled noise level from TNM at Woodlawn Plantation is a result of the distance from the modeled traffic on U.S. Route 1 and Old Mill Road. This indicates the traffic from these roadways does not contribute significantly to the noise environment at Woodlawn Plantation. The monitored noise level of 52 dBA at this location is a result of some airplane noise, birds chirping loudly, and roadway noise in the background. For NEPA purposes, it will be assumed that both the no-build and build noise levels at Woodlawn Plantation will be equivalent to the monitored noise level of 52 dBA.

Along Mount Vernon Memorial Highway, an additional analysis²⁴ was conducted for noise levels at Grist Mill Estates, a single-family residential development near the Grist Mill. A total of eight (8) NSR's were identified at this development for analysis. None approach or exceed the FHWA NAC. All eight are predicted to experience increases of 0 dBA to 3 dBA over existing conditions.

Four of the six receptors along Telegraph Road which exceed VDOT criteria would also be impacted by the widening of Telegraph Road, regardless of the construction of the Preferred Alternative.

4.6.3 Noise Mitigation

By definition, a noise impact must approach or exceed the NAC criteria, or result in an increase greater than 10 dBA. For Category B, residential, predicted noise levels must be greater than or equal to 67 dBA (or 66 dBA for VDOT).

Noise abatement measures typically considered when noise impacts are predicted to occur include: alteration of vertical alignments, management of traffic, construction of sound barriers, and acoustical insulation of public use and non-profit facilities. There are no known future developments in the project corridor that qualify for sound barrier consideration.

²⁴ Federal Highway Administration, Eastern Federal Lands Highway Division, *Richmond Highway-Telegraph Road Connector Environmental Assessment, Grist Mill Estates Noise Investigation Memorandum*, February 9, 2006

4.6.3.1 Alignment Modification and Traffic Management

This noise abatement measure can be incorporated into a project to reduce traffic noise impacts where the receivers are typically on one side of the project or where the elevation is relatively constant. Since sound intensity decreases with distance, shifting the centerline away from the receivers may reduce noise levels. Due to the presence of receivers and other constraints on both sides of the new alignment, substantial shifting of the alignment horizontally is not feasible or reasonable. However, during design, both minor additional shifts and reductions in typical sections near the NSRs will be explored further.

Traffic management measures that limit the motor vehicle types, travel speed, traffic volume, and/or time of operation are sometimes used as noise abatement measures. The build alternative will have a 35-45 mph posted speed along the Connector Road. Speeds would have to be lowered a considerable amount before any significant noise reduction would be noticed. Any reduction in speed would affect the roadway's ability to accommodate anticipated traffic volumes and reduce the capacity of the proposed facility. Therefore, this option is not recommended for mitigation.

Limiting truck volumes or their time of operation along the Connector Road would likely have little to no effect on the predicted noise levels due to the low (0-1%) percentage of heavy trucks predicted to use the Connector Road. Additionally, shifting the trucks would probably mean a shift of the noise problem to other routes. Therefore this option is not recommended for noise mitigation purposes.

4.6.3.2 Noise Attenuation Devices (Sound Walls)

The construction of sound barriers has been considered at all impacted locations within the project corridor. Sound barriers reduce noise levels by blocking the sound path between a roadway and noise sensitive area. A sound barrier evaluation was performed for this project to determine whether reasonable and feasible barriers²⁵ could be constructed at the noise sensitive sites predicted to approach or exceed the NAC as a result of the build alternative.

Currently VDOT considers a barrier feasible if it can be constructed to provide a minimum noise level reduction (insertion loss) of 5 dBA at the sites predicted to approach or exceed the FHWA Noise Abatement Criteria for the build alternative. In addition, VDOT considers a barrier to be cost reasonable if the cost per benefited receptor is no more than \$30,000.

The two locations along Telegraph Road where NSRs would be impacted were evaluated for effectiveness of sound barriers. One proposed barrier shields NSRs 67-69. Analysis showed this barrier would provide greater than 5 dBA benefit to 2 of 3 receptors, however, this barrier is not cost-effective. The cost per benefited receptor exceeded the VDOT limit.

Another barrier was evaluated to shield impacted NSRs 70-73. Analysis showed this barrier provides greater than 5 dBA benefit to all 3 impacted receptors. This barrier is estimated to be within the VDOT guidelines per benefited-receptor.²⁶ No decision can be made to

²⁵ "Feasibility" primarily addresses engineering considerations (physical constraints affecting barrier construction, ability to provide a substantial noise reduction given certain access, drainage, safety or maintenance requirements, etc.). "Reasonableness" addresses the use of common sense and good judgment when considering noise abatement. Factors such as noise abatement benefits, cost of abatement, visual impacts, absolute noise levels, change in predicted noise levels, and adjacent development are all important.

²⁶ The estimated cost for the barrier is under \$54,000.

construct a noise attenuation device until more design is completed, followed by detailed evaluation, and input from the impacted property owners. FHWA anticipates following VDOT procedures for noise walls. These include reviewing feasible sound barriers with the joint VDOT/FHWA Noise Abatement Committee, which in turn would render a recommendation to the VDOT Chief Engineer.

4.7 Infrastructure and Utilities Impacts

No long-term impacts to utilities or existing infrastructure are expected from the Preferred Alternative. Construction of the Preferred Alternative could result in short-term disconnections and reconnections of buried and aboveground infrastructure items, such as phone, fiber-optics, electrical lines and storm water, wastewater and potable water supply lines. Any utilities associated with the Preferred Alternative would be placed within its ROW.

Among the utilities, Washington Gas mainline running southwest to northeast across Fort Belvoir would be crossed by the Preferred Alternative near the Telegraph Road intersection. Appropriate measures would be taken to maintain gas service during construction, as the gas line would be relocated as necessary.

A Fairfax County water line runs roughly parallel to the Preferred Alternative's alignment for about 1000 feet, in proximity to the proposed intersection with Pole Road. Another water main runs along the residential side of Telegraph Road (opposite Fort Belvoir); the project would relocate this 50-year old pipe. Appropriate measures would be taken to maintain water service during construction. Similarly, relocation and maintenance of service would be accomplished for electrical or telephone or other utilities crossed by the Preferred Alternative.

4.8 Socioeconomic Impacts

The Preferred Alternative displaces no residents or businesses. Widening Old Mill Road and Telegraph Road could produce visual and noise impacts to existing residences. These impacts are discussed in detail in Section 4.1.3 and 4.6.

Socioeconomic characteristics of census tracts where the Preferred Alternative would be located were evaluated. Particular attention focused on identification of possible impacts to low-income and minority populations. This emphasis is due to Executive Order 12898 requiring federal agencies to incorporate consideration of environmental justice into the NEPA evaluation process. Socioeconomic characteristics for census tracts in the study area are discussed in Section 3.8.

Census Tracts 4219 and 4218 have higher low-income and minority populations than county and state-wide averages. These two census tracts bound the Preferred Alternative towards the southern terminus and within Fort Belvoir. Census Tract 4211, where the proposed northern terminus at Telegraph Road is located, has lower levels of low-income populations than county and statewide averages. A review of assessed property values for new homes adjacent to Telegraph Road, however, indicate low-income populations do likely not own them. Existing census information, field review of the Preferred Alternative, and review of assessed property values for townhouses along Old Mill Road, indicate that the Preferred Alternative would adversely and disproportionately affect no minority and low-income populations. The affordable housing apartment complex near Old Mill and Pole Roads would be no more impacted than others along Old Mill Road.

As an additional outreach measure, affected property owners (within Census Tract 4218) along Old Mill Road were sent an advance brochure that described the project, provided a status update, and also served as invitation to a public meeting held for the project in October 2005. Should additional public involvement identify disproportionate impacts to potential Environmental Justice populations, FHWA will consider measures to avoid or minimize any such impacts.

The Preferred Alternative affects access to businesses at the intersection of U.S. Route 1/Mount Vernon Memorial Highway/Old Mill Road. It creates right-in/right-out only conditions for two locations along Old Mill Road. Although some user convenience to local businesses and commercial sites is lost, right-in/right-out only movements would improve safety and traffic flow efficiency.²⁷ However, it should be noted that the right-in/right-out restriction is only introduced as result of the project.

4.9 Community Facilities and Services Impacts

Facilities and services evaluated include schools, churches, cemeteries, emergency, and on-Post services for the army community, as described in Chapter 3. The Preferred Alternative does not adversely impact community facilities. No community facilities or services would be displaced or relocated as a result of the Preferred Alternative. There would be no division of neighborhoods, nor separation of neighborhoods from schools, shopping, churches, parks or other community facilities by the Preferred Alternative. Access to schools would continue similar to existing conditions. A left-turn lane similar to the present one, would allow access to the private school adjacent to the Grist Mill estates. The church on Old Mill Road would experience an increase in noise levels, but it would still remain under the NAC.

The Preferred Alternative could enhance response times for emergency response vehicles. Emergency responders would no longer have to utilize circuitous routes to access neighborhoods at the edges of the study area. For example, two Fairfax County fire stations located on Telegraph Road and Lukens Lane, would benefit from improved access under the Preferred Alternative. Occasional median breaks are included to allow emergency vehicles to turn around.

The Preferred Alternative would not adversely affect man-made recreational facilities. It will enhance bicycle access in the area (See Section 4.11.) It bisects two hunting areas on Fort Belvoir/HEC (W-4 and R-3). Hunters must be permitted, and maintain a distance of at least 100 yards from a road or residence.

Access between Fort Belvoir and HEC property would be via an underpass, near the unimproved section of John J. Kingman Road. Hunters, as well as maintenance vehicles and wildlife, could use the grade-separation planned.

4.10 Traffic

Understanding how existing traffic and transportation conditions will change over time is important in the evaluation of transportation project impacts. The Preferred Alternative would play a minor role in the regional highway network. Under either the Build or No Build

²⁷ Virginia Department of Transportation (VDOT) does not require all-direction access; namely, right-in-right-out is all which is legally required, regardless of past usage.

alternative, this area of Fairfax County will experience increased traffic as a result of more accelerated growth of the regional economy and associated changes in employment and population. FHWA has assessed the data for both the Preferred and the No Build Alternative for 2010 and 2030 conditions, to provide a comparison of traffic conditions within the study area.

An examination of the surrounding roadway network in conjunction with likely impact areas led to the selection of fifteen signalized and unsignalized intersections in the study area for analysis. **Figure 4-4** illustrates forecasted Average Daily Traffic (ADT) volumes both within and in proximity to the study area .

4.10.1 Methodology

Assumptions regarding future improvements to the other roadways in the study area were based on the MWCOG *Constrained Long Range Plan* (CLRP). The CLRP is financially constrained and thus includes only those projects that can be funded by revenues that can be reasonably expected to be available. In addition to the Connector Road, two important improvements projected by the year 2015 are the widening of U.S. Route 1 and Telegraph Road (from Beulah Street to South Kings Highway). The traffic projections for the future years assumed these, and other, improvements.

Daily and peak hour AM and PM forecasts for key roadways and intersections in the study area were generated for 2010 No-Build, 2010 Build, 2030 No-Build and 2030 Build.²⁸ From these forecasts, Level of Service (LOS) for key intersections was calculated.²⁹

Table 4-5 and **Table 4-6** show the results of the LOS analysis for the Build and No-Build scenarios. The tables indicate the overall LOS for the intersection as well as the average vehicle delay (in seconds). In some cases, the LOS may not change dramatically, but the differences in expected amount of time each vehicle is delayed may offer a more telling result.

²⁸ Federal Highway Administration, Eastern Federal Lands Highway Division, *Connector Road Study*, prepared by Vanasse Hangen Brustlin, Inc., January 2006.

²⁹ Federal Highway Administration, Eastern Federal Lands Highway Division, prepared by HDR Inc., *Technical Memorandum Future Traffic Conditions for the Richmond Highway (U.S. Route 1) and Telegraph Road Connector Environmental Assessment*, prepared by HDR Engineering, Inc., February 10, 2006

Table 4-5: Signalized Intersection Analysis Results

SIGNALIZED INTERSECTION	2010 NO-BUILD		2010 BUILD		2030 NO-BUILD		2030 BUILD	
	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS
AM PEAK HOUR								
U.S. Route 1 @ Telegraph Rd	45.5	D	43.3	D	89.9	F	98.0	F
U.S. Route 1 @ Fairfax County Pkwy	46.9	D	36.9	D	36.9	D	30.5	C
U.S. Route 1 @ Backlick Rd / Pohick Rd	27.0	C	24.2	C	23.8	C	20.7	C
U.S. Route 1 @ Belvoir Rd	32.3	C	34.8	C	35.2	D	62.1	E
U.S. Route 1 @ Woodlawn Rd	15.6	B	16.4	B	15.1	B	14.8	B
U.S. Route 1@Old Mill Rd / Mt Vernon Mem Hwy / Woodlawn Plantation	136.7	F	-	-	141.9	F	-	-
U.S. Route 1 @ Connector Road	-	-	50.7	E	-	-	42.5	E
Fairfax County Pkwy @ Kingman Rd	48.3	D	48.0	D	57.0	E	44.1	D
Kingman Rd @ Beulah St	30.2	C	18.2	B	30.2	C	32.0	C
Telegraph Rd @ Fairfax County Pkwy SB Ramp	17.5	B	17.1	B	19.6	B	23.2	C
Telegraph Rd @ Fairfax County Pkwy NB Ramp	11.3	B	10.8	B	13.1	B	17.7	B
Telegraph Rd @ Newington Rd	10.9	B	10.7	B	16.0	B	14.1	B
Telegraph Rd @ Beulah St	36.4	D	35.2	D	49.0	D	42.7	D
Telegraph Rd @ Connector Rd	-	-	12.5	B	-	-	15.2	B
Telegraph Rd @ Hayfield Rd	54.2	D	59.2	E	63.6	E	70.0	F
PM PEAK HOUR								
U.S. Route 1 @ Telegraph Rd	37.3	D	43.4	D	50.4	D	67.9	E
U.S. Route 1 @ Fairfax County Pkwy	82.9	F	119.7	F	136.4	F	109.0	F
U.S. Route 1 @ Backlick Rd / Pohick Rd	166.8	F	136.9	F	223.5	F	205.0	F
U.S. Route 1 @ Belvoir Rd	86.7	F	78.3	E	159.1	F	157.5	F
U.S. Route 1 @ Woodlawn Rd	34.9	C	40.1	D	63.1	E	61.4	E
U.S. Route 1@Old Mill Rd / Mt Vernon Mem Hwy / Woodlawn Plantation	190.8	F	-	-	225.4	F	-	-
U.S. Route 1 @ Connector Road	-	-	63.5	E	-	-	103.3	F
Fairfax County Pkwy @ Kingman Rd	175.2	F	155.6	F	226.8	F	178.9	F
Kingman Rd @ Beulah St	73.4	E	105.2	F	73.4	E	61.6	E
Telegraph Rd @ Fairfax County Pkwy SB Ramp	20.9	C	16.7	B	23.7	C	21.0	C
Telegraph Rd @ Fairfax County Pkwy NB Ramp	70.3	E	38.3	D	114.6	F	48.0	D
Telegraph Rd @ Newington Rd	21.0	C	20.2	C	36.9	D	31.6	C
Telegraph Rd @ Beulah St	40.5	D	37.5	D	63.9	E	58.7	E
Telegraph Rd @ Connector Rd	-	-	68.0	E	-	-	46.8	D
Telegraph Rd @ Hayfield Rd	59.5	E	65.0	E	65.3	E	81.5	F

Note: Delay is reported as the average delay per vehicles in seconds. Shaded cells indicate intersections where LOS changes between the No-Build and Build Alternatives.

Table 4-6: Unsignalized Intersection Analysis Results

UNSIGNALIZED INTERSECTION	2010 NO-BUILD		2010 BUILD		2030 NO-BUILD		2030 BUILD	
	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS
AM PEAK HOUR								
Telegraph Rd @ Snyder Rd								
WB Left	15.2	C	15.1	C	24.4	C	24.6	C
NB Right	12.6	B	12.8	B	14.3	B	13.8	B
PM PEAK HOUR								
Telegraph Rd @ Snyder Rd								
WB Left	17.3	C	14.7	B	31.7	D	26.3	D
NB Right	14.1	B	13.5	B	18.6	C	17.7	C

4.10.2 Traffic Impacts

Both VDOT and Fairfax County generally strive for new construction projects to provide at least a LOS C for the design year. Because this connector is a replacement facility in an already congested area, that general rule is not applicable. The Preferred Alternative does not render a better LOS for every intersection compared to the No Build. However, many intersections obtain improvements in terms of the amount of delay. For example, the 2030 morning peak hour average vehicle delay at the existing Old Mill Road/Mt. Vernon Memorial Highway/Route 1 intersection is projected to be 141.9 seconds compared to 42.5 seconds under the build scenario.

The impact of the Preferred Alternative (Connector Road) on the traffic volumes of other roadways in the study area is, in general, not substantial. Due to reassignment of the traffic when the connector would be built, a few roadways in the study area would be expected to see an increase in traffic as a result of the build alternative while several roadways would be expected to see a decrease in traffic.

The future traffic analysis forecasted Year 2010 and 2030 daily volumes on the Preferred Alternative (near Telegraph Road) as 19,000 and 21,200 vehicles per day, respectively. Near U.S. Route 1, the forecasted Year 2010 and 2030 daily volumes are 20,300 and 23,600 vehicles per day, respectively.

The analysis found that approximately 35 percent of the traffic on the Preferred Alternative would begin or end their trips on Fort Belvoir. The remaining 65 percent would be external traffic. At the intersection of the Connector Road and Telegraph Road, approximately 80 percent of the Connector Road traffic originates from or is destined to points further east and north via Telegraph Road and Hayfield Road. The remaining 20 percent originates from or is destined to points further to the west and north via Telegraph Road and Beulah Street.

Near the southern terminus, approximately 40 percent of the traffic originates from or is destined to points further northward via U.S. Route 1. Approximately 50 percent originates from or is destined to points further west and south via U.S. Route 1 while approximately 10 percent originates from or is destined to points further east and via the Mount Vernon Memorial Highway.

That the Connector Road may attract over 20,000 trips per day without dramatically impacting volumes on other roadways is indicative of a congested transportation network. In many cases, traffic from the Connector Road will simply “displace” the pre-Connector Road traffic on other roadways. That is, the Connector Road will distribute traffic from these roadways to other roadways which in turn will distribute traffic to other roadways throughout the region. The result is that the traffic-related impacts of the Connector Road become diluted. Along the Connector Road there are limited opportunities for new development or the potential for new trip generators.

4.10.3 Traffic Mitigation

The traffic analysis performed for the No Build and the Build Alternatives assumed optimized signal timing based upon projected turning movements. For the Build condition, traffic engineers identified locations and desired lengths for turning lanes and intersection configurations. Working with VDOT and Fairfax County DOT, preliminary design engineers in many cases

accommodated these lengths and turning movements along the Preferred Alternative. During detailed design, FHWA will consult further with VDOT and Fairfax County DOT for placement of turning lanes, further opportunities to reduce conflicting movements, and further optimization of signal timing.

As noted under 4.1.2 Right of Way, 4.8 Socioeconomics, some properties along the Preferred Alternative and Telegraph Road would be limited to right-in-right-out access. The restrictions would be necessary for safety, clear sight distance, and operational efficiency of the facility.

4.11 Considerations for Pedestrians and Bicyclists

Transportation facilities and choices for pedestrians and bicyclists in the study area would be expanded and enhanced with the Preferred Alternative. The proposed typical section includes a shared-use path and/or sidewalk.

Along Old Mill Road under the Preferred Alternative, both a sidewalk and a shared use trail are proposed. The sidewalk on the residential side of the road would remain (some reconstruction may be necessary). On the Woodlawn Plantation side, a shared use path would be constructed. This trail would meander within Woodlawn Plantation property and tie-in to the Woodlawn Plantation driveway as well as to the crosswalks at the U.S. Route 1 intersection at Old Mill Road.

Along the Fort Belvoir/HEC portion of the Preferred Alternative, a shared use path is proposed. Due to the lack of intersections and driveways on this portion of the facility, an off-road path is suitable for both casual and commuter bicyclists.

Along the Telegraph Road improvements, a shared-use path and/or sidewalk are also proposed. The four-lane divided section of Telegraph Road between Beulah Street and Fairfax County Parkway enjoys a sidewalk on one side, a multi-use trail on the other side, and 4' bike lanes on each outside travel lane. To minimize right-of-way between Beulah Street and Old Telegraph or Hayfield Roads, alternative widths and features may be more appropriate; the Preferred Alternative places a shared use path along the non-federal side of Telegraph Road.

The Preferred Alternative offers the opportunity to connect the Potomac Heritage National Scenic Trail (PHNST) across Woodlawn Plantation to the Grist Mill and also towards Fort Belvoir and further south along U.S. Route 1. The National Park Service (NPS) has had plans to extend the PHNST across the Woodlawn Plantation. The PHNST is a federally designated system of trails that extends from Pennsylvania to Virginia. In this region, the PHNST follows the length of George Washington Memorial Parkway from Mount Vernon to Washington, D.C. NPS plans to connect Mount Vernon to the Grist Mill. As part of the Preferred Alternative, FHWA would construct a shared use path along the portion of Mt. Vernon Memorial Highway to be realigned as part of this project, and U.S. Route 1 on VDOT ROW and/or Woodlawn Plantation property.³⁰ The path anticipated as part of the Connector Road would be located on the Woodlawn Stables side of Mt. Vernon Memorial Highway and U.S. Route 1, and would also extend to the Woodlawn stable's driveway. Details for the specific location of the PHNST will be coordinated among the NPS, Fairfax County, and Woodlawn Plantation.

³⁰ Details for maintenance of the PHNST will be developed during the next phase of the project. An easement to either Fairfax County or regional park authority would allow for maintenance of the trail.

Overall access for pedestrians and bicyclists would be improved by aligning the intersection at U.S. Route 1/Old Mill Road/Mount Vernon Highway. Pedestrian crosswalks will be installed at that intersection and at Telegraph Road.

4.12 Antiterrorism and Force Protection Requirements

The Preferred Alternative must comply with DoD minimum Antiterrorism and Force Protection (AT/FP) requirements, particularly the minimum standoff distance of 45 meters (148 feet) between new or occupied buildings and roadways. Standoff distances for the Preferred Alternative were determined using GIS data for building locations provided by Fort Belvoir and HEC. The Preferred Alternative maintains a distance of about 400 meters (1300 feet) to the closest DCEETA structure. The closest building at the HEC is approximately 120 meters (400 feet). Details for addressing other security issues will be addressed during design.

4.13 Indirect and Cumulative Impacts

The FHWA and other Federal agencies' responsibility to address and consider direct, indirect, and cumulative impacts in the NEPA process was established in the Council of Environmental (CEQ) Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (40 CFR §§1500-1508). The definitions are:

Direct effects are caused by the action and occur at the same time and place. (40 CFR § 1508.8)

Indirect effects are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems. (40 CFR § 1508.8)

Cumulative impact is the impact on the environment, which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. (40 CFR § 1508.7)

In 1992, FHWA developed guidance for assessing indirect and cumulative impacts. FHWA has subsequently continued to refine its analysis process for these effects. The CEQ developed a handbook for addressing cumulative effects in NEPA documents; additionally, EPA has developed guidance to assist EPA reviewers in their review of NEPA documents.

This section focuses on the indirect and cumulative impacts of the connector road and future transportation projects through the study area.

4.13.1 Indirect Impacts

Indirect impacts from highway projects are often related to induced land development that can result from the construction of a highway. As a project whose purpose is to provide replacement access between a major arterial (U.S. Route 1) and minor arterial (Telegraph Road), it is not expected that the Preferred Alternative would induce major long-term growth inside or outside of

the study area. The most substantial indirect impact foreseen is that the project could provide a catalyst for widening Telegraph Road 1 to 5 years sooner than anticipated. This improvement is already planned in the MWCOG's 2006-2011 *Transportation Improvement Program* for completion by 2010, and would not occur simply as a result of the Preferred Alternative. In itself, the Connector Road would serve as a minor arterial, connecting arterials. Except for an emergency access gate for HEC, no roadway connection to the Preferred Alternative occurs except at the termini.

About one-third of the corridor is located within the Woodlawn Historic District. The National Trust for Historic Preservation, owner of Woodlawn Plantation, is committed to preserving the pastoral landscape on its property and a National Historic Landmark, and not commercial or residential development. About two-thirds of the corridor crosses undeveloped land on Fort Belvoir and HEC property. The Department of the Army (DA) and USACE dictate land use policy on these undeveloped lands, not private developers or landowners.

Another key constraint to development within Fort Belvoir and HEC would be force protection measures which are required for new facility construction on military property. These facilities would likely require 400 meter security buffers and controlled access points, which increase operational costs. As has been mentioned, the Headquarters of the U.S. Army Corps of Engineers has been proposed for relocation to HEC (in proximity to the Preferred Alternative). The relocation of USACE headquarters is incidental to this project.

Fairfax County predicts³¹ that the planning districts in the study area will grow at faster rates than other districts in the county. The county anticipates accelerated growth as the demand for affordable housing grows, and the shift of employment centers further out into the growing suburban areas of the county. The Preferred Alternative would not be a causative factor in these growth and land use trends occurring in the county, as its function in the regional highway system would be limited.

4.13.2 Cumulative Impacts

Cumulative impacts often relate to the long-term effects on natural resources resulting from development. This section analyzes past, present and future activities that have a potential to impact the environment. The extent of cumulative impacts can vary by resource. An analysis of cumulative impacts can therefore sometimes extend beyond the limits of the study area. For example, evaluating cumulative impacts from all development in the contiguous 15-mile Forest and Wildlife Corridor, even outside the study area, is appropriate. Alternatively, the wood turtle's habitat is more limited within the study area, and proposed development on U.S. Route 1 may have less impact on this resource.

4.13.2.1 Past Pattern of Settlement and Development

Lands now within Fairfax County have been inhabited for more than 12,000 years beginning with Native American populations. European settlement began in the 1650's. By the 18th century Fairfax County had grown to a population of over 12,000 people. Fairfax County was greatly impacted by the Civil War because of its strategic location, although no major battles were fought there. After the Civil War, the County returned to a rural, agricultural economy which sustained residents into the early twentieth century. Proximity to Washington, D.C. allowed the

³¹ Fairfax County, Virginia Department of Transportation, *Fairfax County Transportation Plan Update – "Fairfax Futures" Preliminary Recommendations*, November 1-10, 2005, Powerpoint Presentation.

County to grow through this time necessitating road and rail facilities for the transport of agricultural goods (especially dairy products). The establishment of Fort Belvoir (then Fort Humphreys) also occurred in the early twentieth century during and immediately after World War I. Following World War II, Fairfax County began its suburbanization and traditional farming activities began to disappear. The population grew from the 1940's to the 1950's, from 40,900 to 98,500 residents. By the mid-1960's, Fairfax County had 454,300 residents. By 2004, the population of Fairfax County is estimated to have grown to slightly over 1,000,000 people.

4.13.2.2 Present Conditions

Several projects in the immediate vicinity of the corridor have a reasonable expectation to be constructed in the next year or two. The first project is the DCEETA Remote Delivery Facility (RDF), a military facility to be located south of the Preferred Alternative. This facility will serve approximately 100 vehicle trips per day via new access on Telegraph Road. No new vehicle trips into DCEETA are expected, rather existing traffic will access the Remote Delivery Facility from a different location. The second project is a planned retirement community (residential development) to be constructed near the proposed Telegraph Road intersection. Although the retirement community would be adjacent to the Resource Protection Area (Dogue Creek and tributaries-including Piney Run) none of the RPA lands would be developed. Other development proposed along Telegraph include a miniature golf-course south of the Preferred Alternative on Telegraph Road, and the expansion of a veterinary hospital north and opposite of the HEC entrance.

Huntley Meadows Park is one of the last remaining large wetland areas in the County, as well as the County's largest park, with a high priority for conservation by the County. Another sensitive wetland area is the Jackson Miles Abbott Wetland Refuge, on Fort Belvoir property. These resources contribute in large measure to the water quality in the Dogue Creek Watershed. Unlike Accotink Creek, Dogue Creek and its tributaries are not listed on the Commonwealth of Virginia's 2002 303(d) List of Impaired Waters. The Preferred Alternative would not require taking of any of these lands, nor would any other private or public projects propose taking of these lands in the short-term. To minimize the impacts of development, Fairfax County has also implemented a variety of measures, such as the establishment of Resource Protection Areas and Stormwater Management regulations to improve water quality in the region.

Forest and wildlife habitat has the potential to be cumulatively impacted by the Preferred Alternative and other near-term development in the study area. The Preferred Alternative would disturb about 7 acres of land from the designated Forest and Wildlife Corridor within Fort Belvoir. Two Solid Waste Management Units (SWMU), located in the Forest and Wildlife Corridor near the Preferred Alternative, have been capped and are grass-covered. South of the project area, the Forest and Wildlife Corridor has been recently degraded by removal of adjacent forest for placement of the Fairfax County Parkway, expansion of Telegraph Road, expansion of U.S. Route 1 and several housing developments. No other development has been proposed which has the potential to cumulatively impact the Forest and Wildlife corridor in the short-term at this time.

Potential threatened and endangered species habitat has been identified within the study area. Approximately 10 acres of potential and uncertain Wood Turtle habitat would be disturbed by the Preferred Alternative. As these sensitive habitats lie within Resource Protection Areas, and on federal property (HEC and Fort Belvoir) they are not likely to see other types of development or encroachment in the short-term.

To a lesser extent, other resources considered in this Environmental Assessment could be cumulatively impacted by the project with other development. In the short-term, the construction of the Preferred Alternative has minor socioeconomic impacts as no new opportunities for commercial and residential development would be created.

4.13.2.3 Future Plans

Projects discussed in this section are expected to occur in the longer term, five or more years away.

(a) Base Realignment and Closure Commission (BRAC)

The Base Realignment and Closure Commission (BRAC) is charged with recommending changes to military operations throughout the country. The 2005 BRAC recommendations are in the process of being implemented. By the year 2011, Fort Belvoir will expand, by accepting:

- Medical care functions from the Walter Reed Army Medical Center
- Army and DoD organizations presently in leased space in the National Capital Region
- Logistics functions from Naval Support Activity, Mechanicsburg, PA and Wright-Patterson Air Force Base
- Elements of PEO Enterprise Information Systems from Fort Monmouth, N.J.
- National Geospatial Agency units from leased locations in the NCR and Bethesda, MD

This consolidation of activities on Fort Belvoir would bring an additional 21,125 jobs to the Post. It is presently unclear exactly where new facilities would be located to accommodate all the jobs expected to shift to Fort Belvoir. The added traffic from BRAC recommendations has not been included in the future conditions for either the Build or No Build forecasts.

(b) National Museum of the U.S. Army

In 2001, the Secretary of the Army announced plans to open the National Museum of the U.S. Army with Fort Belvoir as the chosen location. The museum is expected to open between 2009 and 2011. The museum will encompass approximately 48 acres of Fort land. The initial location for the museum was in proximity to Pence Gate on the South Post. That location is on hold pending the recommendations made in Fort Belvoir's Master Plan update (expected to be released in later 2006). The museum is being funded through private donations, and being developed in a partnership between the Department of the Army and the Army Heritage Foundation. The construction costs for the museum are estimated to be 200 million dollars. An estimated one million annual visitors are expected to the museum. The added traffic from the Museum has been included in the future conditions for both the Build and No Build forecasts.

(c) Other Fort Belvoir Projects

Fort Belvoir plans to close Woodlawn Gate in the next few years as a force protection measure, providing additional standoff distances for the Lewis Heights Military Housing development. The gate closing may be accelerated by the transfer of land to the National Trust for Historic Preservation. A replacement gate would be expected.

As part of its North Post and South Post planning efforts, Fort Belvoir has proposed several projects, which individually may not introduce severe adverse impacts, but taken together, and

combined with the BRAC activities, could contribute to a change in the environmental character of the Post. These projects include:

- Woodlawn Road Road Reforestation
- Soldier Support Center
- Navy Seabee Complex
- Upgrade of Physical Fitness Center
- Religious Education Center adjacent to North Post Chapel
- US Army Intelligence & Security Command
- Residential Communities Initiative (RCI)
- DeWitt Army Hospital Replacement (proposed relocation depending on BRAC decision (Subchapter 3.9.1))

(d) Planned Transportation Improvements in the Study Area

Fairfax County outlines several long range transportation planning goals in the County's 2003 Comprehensive Plan.

In the Lower Potomac Planning District (primarily from the west to Fort Belvoir Boundary):

- Widen U.S. Route 1 to 6 lanes from Prince William County to Virginia Route 235 North.
- Providing paved, pull-off bus loading areas
- Developing centrally controlled, coordinated signalization along U.S. Route 1
- Using reversible lanes along portions of U.S. Route 1 to handle peak hour traffic volume.

In the Mount Vernon Planning District, high priority recommendations along U.S. Route 1 (from the north to Woodlawn Plantation boundary) include:

- Widening U.S. Route 1 from 6 lanes to 8 lanes from VA Route 235 North to the Capital Beltway. The newly constructed outer lane would be used by buses and right-turning vehicles exclusively during the peak periods. Encouraging long distance commuter traffic (outside of Fairfax County) to use the Interstate highways rather than U.S. Route 1 as a commuting route
- Expanding the capacity of U.S. Route 1 to 6 lanes through the Woodlawn historic district.

MWCOG's 2004 Update to the *Financially Constrained Long Range Transportation Plan* and 2005-2010 Transportation Improvement Program either recommends or programs funding for several transportation improvements in the short and medium term within the study area, including:

- Widening U.S. Route 1 through the historic district to 6 lanes (programmed by 2015).
- Widening Telegraph Road to 4 lanes, from Beulah Street to South Kings Highway (programmed by 2015).
- Installing signal pre-emption for buses along U.S. Route 1 from Mount Vernon Highway/Old Mill Road to Fort Hunt Road.
- Improving bus stops and associated facilities along the U.S. Route 1 corridor from Gunston Road to Huntington Avenue. This is a short term improvement (programmed for 2006).

(e) Fairfax County Transportation Plan Update

Fairfax County is currently updating their Transportation Plan recommending several major new transportation projects within the general U.S. Route 1 corridor. These projects could include the development of Bus Rapid Transit (BRT) or Light Rail Transit (LRT) service along U.S. Route 1 and the extension of Metrorail service to Fort Belvoir. The added capacity from these mass transit improvements were not included in the future conditions for either the Build and No Build forecast.

4.13.2.4 Cumulative Impacts Assessment

Likely the largest development in this area of Fairfax County would be the relocation of 21,125 military-related jobs from other parts of the region and U.S. While the impact of the BRAC project could be substantial, the Preferred Alternative would play a limited role in cumulatively impacting resources along with BRAC. Development proposals related to BRAC are rapidly evolving and subject to change.

Fort Belvoir identifies approximately 723 acres of developable land between the Forest and Wildlife Corridor and Telegraph Road (*NOTE: this includes some HEC land*). Fort Belvoir also identifies approximately 500 acres of developable land between the Forest and Wildlife Corridor and the Pole Road intersection with Meeres Road. If the Army were to develop in locations near the Preferred Alternative in the future (outside of the HEC boundaries), Fort Belvoir's *Long Range Component* recommends residential land use in this area. Any future military facility or housing must maintain force protection standards which affects where these facilities can be located. The operational costs of maintaining controlled access to facilities or housing must also be considered. The National Museum of the U.S. Army is expected to be located on the South Post, and would not cumulatively impact environmentally sensitive resources in the study area.

Cumulative impacts to water quality would be minimized by stormwater Best Management Practices (BMP's) that will be employed in the construction and design of any transportation facility, as required by the Department of Defense for all military facilities, and as required by Fairfax County and Virginia Storm Water Management Criteria for water quality and quantity control. The construction of the Preferred Alternative would employ a variety of stormwater management techniques as described in Section 4.2.5.2. The *Virginia Stormwater Management Handbook* provides guidance for implementing BMP's both during and after the construction. Relevant regulation on stormwater management is discussed in Section 4.2.2.

Other transportation projects also have the potential to cumulatively impact environmental and cultural resources in the study area. This is particularly the case in evaluating the long-term cumulative impacts of the widening U.S. Route 1 from 4 lanes to 6 lanes, and the widening Telegraph Road from 2 lanes to 4 lanes. These two projects represent major highway improvements for this area of Fairfax County in the long-term. A concern related to the U.S. Route 1 widening project is the encroachment on Woodlawn Plantation. Should that project advance it could increase cumulative effects on the Woodlawn Plantation and the Woodlawn Historic District. The current Preferred Alternative plans to enhance pedestrian access to the Woodlawn Plantation property while preserving its pastoral character. Other projects, listed previously, are not expected to cumulatively impact Woodlawn Plantation or other historic resources in the study area.

The widening of U.S. Route 1 to 6 lanes is planned by 2015 in the latest MWCOG *Constrained Long Range Regional Transportation Plan*. VDOT has indicated that funding has not been

secured for the widening in the short-term, and that the project is envisioned to include a transit component. VDOT conducted a NEPA study in 2003, but did not complete the process. Based on citizen concerns with the proposed 8-lane section in the northern segment, the U.S. Route 1 Corridor Steering Committee deferred the selection of a preferred alternative until a comprehensive transit study examining transit in the median area could be performed.

By congressional authority, as noted, the Army is preparing to transfer approximately 2.5 acres of land to the Commonwealth of Virginia. The SHPO will be involved in the covenant anticipated to be placed on the land, in order to ensure its long-term protection under the NHPA. This land in turn would pass to the owners of Woodlawn Plantation as a mitigation measure for the Connector Road. The parcel reconnects Woodlawn Plantation with the Woodlawn Friends Meeting House on Woodlawn Road. This is approximately the same amount of land being taken from Woodlawn Plantation for conversion to transportation use. Trail and pedestrian/bicycle facilities are planned which would ultimately reconnect Woodlawn Plantation to the historic Mount Vernon Estate, and further to Washington, D.C. along the Potomac Heritage National Scenic Trail. These pedestrian/bicycle facilities improve access to Woodlawn Plantation. There are presently no pedestrian or bicycle facilities which serve the Plantation grounds directly.

The widening of U.S. Route 1 and Telegraph Road would likely result in minor cumulative impacts to water resources in the long-term. It is assumed extensive measures would be taken to manage and treat stormwater runoff for any newly constructed transportation facilities. The Forest and Wildlife Corridor and threatened and endangered species habitat appear to not be impacted by either the U.S. Route 1 or Telegraph Road widening projects. Both projects are expected to closely follow alignments of the existing highways.

As mentioned, this area of Fairfax County is forecasted to see accelerated population growth, job growth and economic development in the coming years. The factors involved in this growth and development eclipse the Connector Road project, and the Connector Road would not aggravate these trends (and their environmental impacts).

4.14 Construction Impacts

The Contractor will be required to comply with all terms of all permits associated with this project. For example, the U.S. Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act must permit all wetland impacts. The Virginia Department of Environmental Quality (VDEQ) would permit stream crossings. Discharges of storm water from construction activities are authorized pursuant to the Virginia Pollutant Discharge Elimination System (VPDES) and the Virginia State Water Control Law. Discharge of stormwater from construction activities to waters within the Commonwealth of Virginia requires authorization from the State Water Control Board. The Contractor must comply with the special and general conditions of those permits, as well as all applicable state, local and federal laws, ordinances, and regulations.

Working with the natural resources personnel from Fort Belvoir, VDOT and VDEQ, appropriate locations for construction laydown and staging areas will be identified during design. There will be no forest clearing for staging, nor staging within Resource Protection Areas (RPA's). Efforts to minimize their size, natural environmental impacts, and residential or traffic impacts will be a priority; none will be located in wetlands. Appropriate Stormwater Management (SWM) and other controls during use will minimize direct impacts; appropriate restoration to pre-construction

conditions is expected, where the location was not otherwise used for the roadway or associated facility (such as SWM facility).

The project construction period is expected to last almost two years. Should there be a phased implementation, similar disruption and construction impacts could occur, but with several years in between.

4.14.1 Land Use and Access

Temporary disruption of access to certain properties may occur during construction. Any disruption would be minimized as much as possible through development of maintenance-of-traffic plans. Where possible, construction of new entrance(s) would be completed and placed in operation before old entrance(s) are impacted. Temporary detours or lane-shifts may occur along existing roadways of Old Mill Road, Route 1, Mount Vernon Memorial Highway, Pole Road and Telegraph Road.

4.14.2 Wildlife and Habitat

Direct, short-term impacts during construction would include loss of vegetation and resulting displacement of larger animal species, such as deer and fox. Smaller mammals, reptiles and amphibians may be displaced during construction. Field surveys within known potential habitat areas for state-listed animal species would be conducted prior to construction. Any listed species would be relocated according to the Virginia Department of Game and Inland Fisheries (VDGIF). An increase sediment-laden runoff could have direct, short-term impact on aquatic biota. Measures to prevent and control runoff are described below.

4.14.3 Soil Erosion/Storm Water Controls

Short-term water quality and stormwater impacts may occur from grading activities and erosion during construction. The contractor will employ best management practices (BMPs) to control erosion and sedimentation during construction to minimize impacts on water quality.

FHWA would ensure that the contractor implement and maintain strict erosion and sedimentation procedures in accordance with the Virginia Department of Conservation and Recreation (DCR), Division of Soil and Water Conservation (DSWC) 1992 Virginia Erosion and Sediment Control Manual (VDCR, 1992) and the Public Facilities Manual of the County of Fairfax (Fairfax County, 2001). These measures would be summarized in an E&S Control Plan that would be approved by VDOT, Fort Belvoir, and Fairfax County and included in the Virginia Pollutant Discharge Elimination System (VPDES) General Permit for Discharges of Storm Water from Construction Activities application.

Construction activities will be monitored to ensure that erosion and storm water management practices are adequate in preventing sediment and pollution migration into nearby surface waters. Problem soil issues would be addressed in the design phase of the project, with a complete geotechnical analysis. BMPs for certain soil types could include staging construction to minimize the amount of earth exposed at any one time. Construction methods may include use of berms, dikes, mulch, netting, bio-retention features and other forms of stormwater management controls.

4.14.4 Resource Protection Areas, Stream Crossings, and Wetlands

Short-term water quality and erosion impacts may occur during construction. For the crossing of RPA and streambeds, the following measures could be taken by the contractor, as appropriate:

- Apply BMPs to minimize impact on the RPA and associated wetlands.
- Stabilize affected slopes.
- Minimize vegetation removal.
- Minimize the trench width for buried utility banks.
- Expedite construction within the RPA.
- Use silt fences and other erosion control measures to delineate the RPA buffer prior to site work to prevent accidental intrusion of the buffer.
- Enhance the riparian buffer through replanting following disturbance.
- Avoid unnecessary disturbances to vegetation and soils outside of the proposed grading limits.

4.14.5 Hazardous Materials

Portions of the Preferred Alternative traverse former military training ranges that have the potential for unspent ordnance and demolitions materials. The U.S. Army will take measures to detect, neutralize and remove these prior to construction. Additionally, construction of the project would result in a short-term increase in the use of hazardous materials and generation of hazardous wastes from the operation of construction equipment. During construction there would be a small potential for soil contamination from motor oils, hydraulic oils, and gasoline and diesel fuels as a result of construction vehicle repair, maintenance and fueling. Placement and use of any fuel tanks will be performed in accordance with Virginia Department of Environmental Conservation (DEC) requirements.

4.14.6 Air Quality

Construction impacts on air quality include dust created by disturbance of earth and exhaust emissions from construction equipment. The Virginia Department of Environmental Quality (VDEQ) regulations will be enforced in order to minimize these impacts.

Fugitive particle emissions would be minimized during construction through use of standard control measures outlined in Virginia Standards for Fugitive Dust Emissions (9 V AC 5-50-90) and Fort Belvoir's Title V operating permit (NVRO70550). The contractor will:

- Where possible, spray water or chemicals for control of dust in the demolition of existing buildings or structures, construction operations, the grading of roads, or the clearing of and;
- Apply water, or suitable chemicals on dirt roads, materials stockpiles, and other surfaces which may create airborne dust;
- Use adequate containment methods during sandblasting or other similar operations;
- Cover open equipment for conveying or transporting material likely to create objectionable air pollution when in motion; and
- Remove promptly spilled or tracked dirt or other materials from paved streets and dried sediments resulting from soil erosion.

4.14.7 Noise

Land uses that will be sensitive to traffic noise will also be sensitive to construction noise. A method of controlling construction noise is to establish the maximum level of noise that construction operations can generate. In view of this, VDOT has developed and FHWA has approved a specification that establishes construction noise limits. This specification can be found in VDOT's January 2002 Road and Bridge Specifications, Section 107.14(b.3), "Noise". The contractor will be required to conform to this specification to reduce the impact of construction noise on the surrounding community.

4.15 Relationship between Local Short-term Use of the Environment and the Enhancement of Long-Term Productivity

Implementation of the Proposed Action Alternative would result in long-term benefits for the mobility of residents in the surrounding area who must now use more circuitous routes instead of Woodlawn Road and Beulah Street, with minor long-term impacts on the environment.

4.16 Irreversible and Irretrievable Commitments of Resources

The construction of the Connector Road would not expend unusual amounts of man-hours, fuel, and materials associated with design and construction, in relation to other projects of similar size. The project would consume non-renewable resources (oil, gasoline) as well as the labor costs to design and build the roadway facility.