
4 IMPACTS OF THE PROPOSED ACTION AND ALTERNATIVES

This chapter provides an assessment of the potential environmental impacts that would result from the outgrant of Army land to accommodate VDOT's Proposed Action to widen a portion of US 1 and to realign Old Colchester Road (OCR). The land outgrant would be for 2,521 feet (768 m) or 0.477 miles (0.768 km) along US 1 and 822 feet (251 m) along OCR. Any construction projects, traffic, or other site-specific impacts associated with subsequent phases of construction to widen US 1 would be addressed in follow-on environmental documentation. In addition to the Proposed Action, shown as Alternative A in the VDOT EA, three alternatives to reduce the amount of Army land to be outgranted along OCR and US 1 were developed (VDOT, 1998).

In performing this environmental evaluation of the Proposed Action, three alternatives were evaluated: (1) Alternative I – a four lane road with a 250-foot (76.2-m) queue and taper length with no wall and; (2) Alternative II – a three lane road with a 250-foot (76.2-m) queue and taper length with no wall; (3) Alternative III – a three lane road with a 250-foot (76.2-m) queue and taper length with a retaining wall; and (4) the No Action Alternative. The assessment compares the short and long-term environmental impacts of the Proposed Action and each of the Alternatives I through III.

This chapter is organized similarly to Chapter 3. Subchapters 4.1 through 4.10 address the impacts on specific resources. Subchapters 4.11 through 4.15 address 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; irreversible and irretrievable commitments of resources; and a conclusion.

4.1 Impacts on Land Use, Plans, Aesthetics and Coastal Zone Management

4.1.1 Proposed Action

Implementation of the Proposed Action is consistent with existing and future land use patterns in the vicinity of the site area. The disturbance due to planned construction on these roads would not appreciably change the current and proposed land use or movement in the site area.

Fairfax County Planning Commission (FCPC) reviewed the proposed plans and found them to be consistent with the Fairfax County Comprehensive Plan with no variances required. In addition, implementation of the Proposed Action would be consistent with National Capital Planning Commission (NCPC) directives. The majority of the properties along the north side of US 1 and the west side of OCR are designated as residential and would remain so after construction. The land use is consistent with the LP-2 Community Planning Sector of the Lower

Potomac Planning District – in Fairfax County Planning Area IV. The property along the south side of US 1 and the east side of OCR belongs to Fort Belvoir.

The Fairfax County Department of Conservation and Recreation, Division of Planning and Recreation Resources, indicated that there are no existing or planned parks or other recreational facilities in the vicinity of the site area. The Proposed Action would not involve addition of major intrusive structures along either US 1 or OCR nor would the construction affect the Virginia Coastal Resources Management Program (CRMP).

During construction, drivers along both OCR and US 1 would witness extensive disturbance. The landscape would change when US 1 is widened to six lanes. However, it would have a similar appearance to other stretches of six-lane highways in Fairfax County, such as the Fairfax County Parkway. The clearing of land would be noticeable as graded and landscaped slopes would replace the natural woodland along the widened highway.

Under the Proposed Action, a zone of forested landscape along OCR would be cleared and graded from one to 87 feet (26.5 m) in width for the entire length of road realignment. Motorists traveling in the northbound lane of OCR would view the realigned OCR a considerable distance prior to arriving at US 1. The view would be of a widened paved road with a graded and landscaped area against a backdrop of upland forest. The width of the road would increase from 25 feet (7.6 m) to 50 feet (15.2 m). In addition, a rustic guardrail and a 1.5-foot (0.4 m) wide curb and gutter would be constructed along the east side of OCR (Subchapter 2.1).

4.1.2 Alternatives to the Proposed Action

In comparison with the Proposed Action, Alternatives I - III would reduce the length of construction from 822 feet (251 m) to 250 feet (76.2 m) and would reduce the adverse impacts on land use and aesthetics along OCR (Subchapter 2.2). A retaining wall that would be part of Alternative III would reduce the width of lateral grading to 61 feet (18.6 m) from 87 feet (26.5 m). Under Alternative III, adverse effects on land use plans and aesthetics would be further reduced by minimizing the realignment of OCR and by reducing the amount of fill required to support the new roadway. Motorists traveling in the northbound lane of OCR would not observe any significant change in the scenic view of natural, upland forests along OCR (Subchapter 2.2).

4.1.3 No Action Alternative

Under the No Action Alternative, there would be no short or long-term adverse impacts associated with land use plans or aesthetics.

4.2 Impacts on Natural Resources

4.2.1 Physiographic Impacts

4.2.1.1 Proposed Action

The Proposed Action is not expected to affect the geological formations or geomorphology in the vicinity of the site area. The proposed construction would not require foundations that would result in deep excavation.

Because the Proposed Action would require some excavation and grading, there would be a direct, long-term impact on the site topography and soils in the vicinity of the site area. Clearing, grading, backfilling and any necessary excavation as part of the construction for the Proposed Action would directly alter the surface soils.

The steep slopes of the existing road shoulder along OCR drop almost 18 feet (5.5 m) from roadbed to the base of the slope. VDOT's required 2:1 graded slope would extend 87 feet (26.5 m) from the current OCR east pavement edge. This construction would change the site topography and alter surface drainage (Subchapter 4.2.2). In addition, grading would require substantial tree clearing of upland woods for much of the proposed road area along OCR.

There would be a moderate long-term impact on site topography along the south side of US 1, where the site topography is typically less than a five percent slope and grading would be substantially smaller in width than along OCR (Subchapter 4.2.4).

The predominant soils to be affected during construction are the Beltsville, Mattapex and Dumfries soil series (Appendix A). These soils support upland woodlands, may have perched water tables and have severe erosion potential. Slope stability would require adequate planning of erosion and sedimentation controls to mitigate the loss of soil during construction. One short-term impact would be increased surface water runoff resulting from removal of vegetation and topsoil. Where topsoil is intact, surface infiltration rates are usually higher than in the deeper horizons, and less runoff occurs. Impacts would be diminished if erosion and sedimentation controls are implemented.

4.2.1.2 Alternatives to the Proposed Action

In comparison with the Proposed Action, Alternatives I and II would reduce the adverse impact on site topography, soils and erosion by reducing the amount of grading and excavation. Compared to the Alternatives I and II, Alternative III would further reduce the impacts on site topography, soils and erosion by narrowing the filled area created by the new roadway

4.2.1.3 No Action Alternative

Under the No Action Alternative, there would be no short or long-term adverse impact on existing physiographic resources.

4.2.2 Impacts on Water Resources

4.2.2.1 Proposed Action

Implementing the Proposed Action would create minor short-term impacts on the surface water resources. There are no perennial or intermittent streams near the site area. However, drainage from the three ephemeral swales in the site area (Subchapter 3.2.2.2) would continue to be piped beneath OCR and US 1. Drainage from the ephemeral swale along OCR is directed to the Pohick Creek watershed west of the road while drainage from the ephemeral swales along US 1 is directed to the Accotink Creek watershed on the north side of US 1. During periods of heavy rainfall, surface runoff would contribute sediment in the Accotink and Pohick Creek watersheds (Subchapter 4.2.4).

This Proposed Action would have a direct, short-term impact to sediment loading during construction. The increase in impervious surface area in the site area would result in a long-term increase in erosion and sedimentation due to stormwater runoff. This would adversely affect surface waters by siltation; changes in flow characteristics; increased contaminants; and increased sediment to the ephemeral swales located in the site area. Implementation of the Proposed Action would disturb approximately 1.322 acres (0.535 ha) of forest. The Proposed Action could have potential long-term secondary impacts on downstream water quality and impact on fish habitat. All alternatives except the No Action Alternative would require a Virginia Pollutant Discharge Elimination System (VPDES) permit.

This project would have minimal short or long-term impact on groundwater. Wells in the Southwest and South Post areas of Fort Belvoir are only used for irrigation and the confining units for the Middle and Lower Aquifers should be adequate to protect these aquifers from vertical migration of contaminated groundwater through subsurface water percolation.

4.2.2.2 Alternatives to the Proposed Action

In comparison with the Proposed Action, Alternatives, I-III would reduce the amount of land to be cleared and graded. Thus, the short and long-term adverse impact on water resources would be reduced. Due to the smaller amount of clearing, grading and impervious surface under Alternative III, the short and long-term adverse impact on water resources would be further reduced under this alternative.

4.2.2.3 No Action Alternative

Under the No Action Alternative, there would be no short or long-term adverse impact on water resources.

4.2.3 Impacts on Environmentally Sensitive Areas

4.2.3.1 Proposed Action

Environmentally sensitive areas designated by Fort Belvoir include the forest and wildlife corridor (FWC), floodplains, wetlands, wildlife refuges, steep slopes, stream valleys, mature forests and Chesapeake Bay Resource Protection Areas (RPA's). The Proposed Action is not expected to have adverse short or long-term impacts on these environmentally sensitive areas because: 1) the nearest FWC is located at the Accotink Creek bridge crossing on US 1, about 0.75 miles (1.2 km) east of the eastern terminus of the site area; 2) the site area is located outside the 100-year floodplains for the Accotink and Pohick Creeks; 3) there are no jurisdictional wetlands in the vicinity of the site area; 4) the closest refuge is the Accotink Bay Wildlife Refuge, which is 210 feet (64 m) south of the site area; and 5) there are no designated Fairfax County RPAs in or adjacent to the site area. The closest mapped RPA is along Accotink Creek, 950 feet (290 m) east of the eastern terminus of the site area.

4.2.3.2 Alternatives to the Proposed Action

Alternatives I - III are not expected to have short or long-term adverse impact on environmentally sensitive areas.

4.2.3.3 No Action Alternative

Under the No Action Alternative, there would be no short or long-term adverse impact on environmentally sensitive areas.

4.2.4 Impacts on Vegetation and Wildlife Habitats

4.2.4.1 Proposed Action

The Proposed Action would cause a loss of approximately 1.322 acres (0.535 ha) of mature upland hardwood forest and other vegetation because of clearing and grading. Loss of habitat, such as food, cover, and nesting areas would have both a short and long-term impact on and wildlife because it would displace animals and cause increased competition for suitable habitat elsewhere.

Based upon the Integrated Natural Resources Management Plan (US Army Garrison Fort Belvoir, 2001b), the acreage of oak/ericad forest on the Main Post is 1,251 acres (506 ha).

Assuming the entire site area (permanent and temporary construction easement) is oak/ericad forest, this habitat type represents 1.322 acres (0.535 ha) or 0.10 percent of the total oak/ericad forest on the Main Post of Fort Belvoir.

Direct, short-term impacts during construction would include loss of vegetation and displacement of animal species, such as deer and fox, as well smaller mammals, reptiles and amphibians during construction activity. Therefore, the Proposed Action poses minor short-term impacts on the vegetation and wildlife on Fort Belvoir.

Some animals displaced by construction would likely return to the general vicinity after completion of the work. The wildlife at the site area comprises species tolerant of human presence and activity (Subchapter 3.2.4). In the long-term, these species would dominate the area rather than species requiring deep forest habitat, resulting in decreased richness and diversity for wildlife species.

Because only ephemeral swales are present in the site area, no aquatic species would be affected in the short-term by the implementation of the Proposed Action. Long-term, increased sediment and nutrient concentration could affect aquatic biota population in Accotink Creek and Pohick Creek watersheds. Impacts could also occur farther downstream in Accotink Bay and Gunston Cove, which have larger populations of aquatic invertebrates, fish, and other aquatic organisms (Subchapter 4.6).

4.2.4.2 Alternatives to the Proposed Action

Alternative I and II would reduce the amount of land to be cleared and graded. Thus, the short and long-term adverse impact on vegetation and wildlife habitat would be reduced. Alternative III would further reduce the amount of clearing, grading and impervious surfaces, and the short and long-term adverse impacts on vegetation and wildlife.

4.2.4.3 No Action Alternative

Under the No Action Alternative, there would be no short or long-term adverse impact on vegetation and wildlife habitat.

4.2.5 Impacts on Rare, Threatened and Endangered Species

4.2.5.1 Proposed Action

The rare, threatened and endangered species of animals sighted or documented at Fort Belvoir (Subchapter 3.2.5) are not expected to inhabit the site area. Therefore, the Proposed Action would not affect federal or state-listed rare, threatened and endangered animal species or their critical habitats.

The Proposed Action is not expected to affect federal or state listed rare, threatened and endangered plant species, such as the small whorled pogonia. Based on the site review for this project by Dr. Donna Ware, any potential habitat of the small whorled pogonia is located outside of the outgrant area and would not be affected by the proposed construction.

4.2.5.2 Alternatives to the Proposed Action

Alternatives I – III would create no short or long-term adverse impacts on rare, threatened and endangered species.

4.2.5.3 No Action Alternative

Under the No Action Alternative, there would be no short or long-term adverse impact on rare, threatened and endangered species.

4.3 Impacts on Cultural Resources

4.3.1 Proposed Action

Based on a survey of areas of historic significance on Fort Belvoir, three archeological sites have been identified in the site area. In addition, two historic sites, the Pohick Episcopal Church and the OCR, are located outside Fort Belvoir but adjacent to the site area. VDOT evaluated these impacts (VDOT, 1998) and has agreed to implement mitigation measures to minimize impacts during construction: avoiding construction procedures that would cause harmful vibrations; monitoring of vibrations during construction; and providing several property improvements to improve access, signage, and a wall along US 1. In addition, VDOT would conduct periodic reviews with Virginia Department of Historic Resources (VDHR) on material and design issues to avoid adverse effects. Through implementation of these measures there would be no direct or indirect adverse effects on the cultural resources in the area (URS, 2003).

The Proposed Action would have long-term positive impacts on Church property: 1) proposed landscaping would enhance the aesthetics along US 1; 2) redesigned entrances and sidewalks would enhance access; and 3) moving OCR's western pavement edge to the east, would create a buffer that provides safer access to parking lots by decreasing congestion at the entrances (VDOT, 1998).

The realignment of OCR would have a direct, long-term impact on the northernmost segment of OCR from the Stewart Road junction north to the OCR / US 1 intersection. The proposed action would alter the road's character (Subchapter 3.3.2). Under the Proposed Action, OCR would be widened to 55 feet (16.8 m) and shifted 36 feet (11 m) to the east.

The area of potential effect (APE) for the three archeological sites in the vicinity of the site area would be affected by the proposed construction. However, a cultural resources survey

determined that these sites yielded only low-density artifacts and exhibited a lack subsurface integrity (Lautzenheiser, 2002). Thus, the sites have little archeological significance and are not eligible for listing.

4.3.2 Alternatives to the Proposed Action

Alternative I and II would have an impact on cultural resources in the site area similar to that of the Proposed Action. The retaining wall proposed for Alternative III would not be visible from OCR and would not affect historic integrity and significance of OCR. Alternative III would reduce the amount of clearing, grading and impervious surface and thereby reduce the short and long-term impacts on the cultural resources compared to the Proposed Action or Alternatives I, or II.

4.3.3 No Action Alternative

Under the No Action Alternative, there would be no short or long-term adverse impact on cultural resources.

4.4 Impacts on Climate and Air Quality

4.4.1 Proposed Action

As a result of operating construction equipment and vehicles, adverse short-term air quality impacts would be expected. Air quality impacts created during construction would be from fugitive dust and increased emission of volatile organic compounds (VOCs) and nitrogen oxides (NO_x), which are considered precursors of ozone (O₃). Control measures would be implemented to conform to VDOT's Road and Bridge Specifications, and the State Implementation Plan.

In the long-term, the Proposed Action would improve the flow of traffic and thus would reduce air quality degradation from vehicular air pollution, especially for NO_x. This decrease in NO_x would reduce the rising levels of O₃ in the region. The reduction of O₃ and NO_x would ultimately lower the effects of greenhouse gas emissions and long-term climate change, such as global warming.

Results of the microscale air quality analysis for the No Action Alternative (Year 2003) indicate that Carbon Monoxide (CO) levels would be below or the same as those predicted under existing conditions at the two studied intersections (Table 4-1). The analysis shows no violations of the one-hour CO standard of 35 ppm or the eight-hour standard of 9 ppm.

According to the estimate of the net change in personal vehicle miles traveled (VMT) before and after construction, a slight net emissions reduction would be expected under the proposed operational condition. More vehicles would pass through the OCR intersection without stopping

Table 4-1
Worst-Case CO Levels

Intersection Receptor Location	1-Hour Concentration ¹	8-Hour Concentration ¹
Proposed Action:		
US Route 1 / Backlick Road / Pohick Road – PM peak	9.2	5.2
Kingman Road / Fairfax County Parkway – PM peak	8.3	4.6
No Action Alternative:		
US Route 1 / Backlick Road / Pohick Road – PM peak	9.2	5.2
Kingman Road / Fairfax County Parkway – AM peak	8.1	4.5

¹in parts per million (ppm). Includes background concentrations of 6 ppm (1-hour) and 3 ppm (8-hour).

or waiting and thus reduce emissions. Therefore, an overall emissions reduction would occur and a general conformity determination is not required. The project is in conformance with the current SIP and is not expected to interfere with the attainment or maintenance of the NAAQS.

In an environmental impact review of Fairfax County Parkway, the Virginia Air Pollution Control Board (VDEQ) determined that the Parkway construction would not interfere with the attainment and maintenance of the NAAQS standards in Fairfax County (US Army Garrison Fort Belvoir, 1998). Based on the proximity of the site area to the Parkway, it can be concluded that the Proposed Action would receive a similar determination. An air quality analysis indicates that these emissions would not exceed regional *de minimis* levels (Subchapter 5.3).

Information from other recent road projects supports the conclusion that the Proposed Action would reduce air pollutants. New signalized intersections and dedicated left turn lanes at Telegraph Road and Beulah Street and at Woodlawn Road and Beulah Street; new access roads to the DCEETA and DRMO facilities; and new roadway geometrics would have a beneficial long-term impact on air quality because of reduced automotive emissions from engine idling during excessive traffic stoppages.

The widening of Beulah Street from Franconia Road to Woodlawn Road was identified as a CO and hydrocarbon reduction measure (US Army Garrison Fort Belvoir, 1998a). The Beulah Street widening is estimated to reduce vehicle emissions of hydrocarbon and O₃ precursors from the year 1988 to 2002 by 87.64 tons (89 metric tons) per year (VDOT, 1994).

The greatest potential for improvement exists where smooth traffic flow can be provided by coordination of signals and reduction of heavy acceleration and deceleration. This reduction in vehicle hydrocarbon emissions, which are precursors to the formation of O₃, would help to improve local O₃ measurements, and thus improve the region's standing in regard to O₃ attainment area status.

4.4.2 Alternatives to the Proposed Action

Alternatives I - III would have a similar impact on climate and air quality as the Proposed Action.

4.4.3 No Action Alternative

Under the No Action Alternative, there would be no short or long-term adverse impact on climate or air quality.

4.5 Noise Impacts

4.5.1 Proposed Action

The potential short-term impact of the Proposed Action on the Church would consist of increased noise impacts from construction equipment. Currently, noise levels range from 63 to 66 dBA at the OCR / US 1 intersection and will range from 66 to 69 dBA for the design year build case for 2022 (VDOT, 1998c). Noise levels in the site area that are approaching or exceeding the noise abatement criteria (NAC) of 66 dBA would not meet or exceed the 10 dBA threshold for the design year build case, which is defined as a ‘substantial noise level increase.’ A substantial noise level increase is defined as when the noise level for a design year build case is equal to or exceeds 10 dBA higher than the existing noise level, such as 76 dBA at the OCR / US 1 intersection.

Long-term increase in traffic noise due to the Proposed Action can be determined based on the proportional increase in traffic (on a logarithmic basis) associated with the project. For instance, a doubling of traffic volumes would result in a three-dBA increase in noise level, which is an increase that is barely perceptible. Based on the TransCore traffic analysis, future traffic volumes at or near Fort Belvoir during peak-hour conditions under the Proposed Action are unlikely to be twice those expected under the No Action Alternative (TransCore, 2002). Therefore, noise increases from project-related increase in traffic would be barely perceptible and would not be significant. Due to the slight increase in traffic volume over current levels, the noise level would not exceed that acceptable limit established by FHWA.

Short-term increases in noise levels would result from equipment operating at the site and vehicles traveling to and from the site area. Noise impacts would vary widely, depending on the phase of construction – demolition, land clearing and excavation, grading and roadway construction. Noise levels would be greatest during the early stages of construction, but these periods would be of relatively short duration.

Construction noise levels at a given receptor location would depend on the type and number of pieces of equipment operated and the receptor's distance from the construction site. Small increases in noise levels would be expected from operation of delivery trucks and other construction vehicles. Overall, the noise generated would be similar to noise generated by other construction projects in the area.

4.5.2 Alternatives to the Proposed Action

All three alternatives would have a similar impact on noise and vibration levels as that of the Proposed Action. Construction machinery and methods employed would be the same regardless of alternative.

4.5.3 No Action Alternative

Under the No Action Alternative there would be no short or long-term adverse impact on the noise levels.

4.6 Impacts of Hazardous Substances

4.6.1 Proposed Action

There would be a short-term increase in the use of hazardous materials and generation of hazardous wastes from the operation of construction equipment. During construction there is 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. Potential soil contaminants would be managed in such a way as to limit accidental release to the surface soils. If a spill occurs, soils that become contaminated would be excavated and disposed of in accordance with State and federal regulations. To minimize the potential of hazardous substance spills during construction, a Spill Prevention Control and Countermeasures (SPCC) Plan would be in effect, which would describe proper procedures for parking, fueling and maintenance of vehicles during construction.

Under the Proposed Action there would be an increase in impervious surfaces. This would result in increased runoff flow during high rainfall periods. There would be minor increases in hazardous substances due to potential contaminants from vehicular traffic in the runoff that includes hydrocarbons (petroleum), lead, engine oils, antifreeze, herbicides and road salt.

4.6.2 Alternatives to the Proposed Action

Alternative I would have impacts similar to the Proposed Action due to production of hazardous substances. Alternatives II and III, because of a slight reduction in the amount of impervious surface, would have smaller impacts than the Proposed Action or Alternative I.

4.6.3 No Action Alternative

Under the No Action Alternative, there would be no short or long-term adverse impact on the production of hazardous substances.

4.7 Impacts on Infrastructure

4.7.1 Proposed Action

Implementation of the Proposed Action would result in short-term disconnections and reconnections of buried and aboveground infrastructure items, such as phone, fiber-optics, electrical lines, wastewater or water supply lines, and cable TV principally along the south side of US 1 and secondarily along the east side of OCR. The Proposed Action would not cause a change in the infrastructure.

There would be no construction of buildings and, thus, no requirement for additional services, such as communications, electric service (except for signal lights), wastewater or water supply lines, heating and cooling, and solid waste disposal. There would be no interference with the potable water supply, sewer or wastewater connections.

4.7.2 Alternatives to the Proposed Action

Alternatives I – III would have a similar impact on the infrastructure as the Proposed Action.

4.7.3 No Action Alternative

Under the No Action Alternative, there would be no short or long-term adverse impact on infrastructure.

4.8 Socioeconomic Impacts

4.8.1 Proposed Action

Implementation of the Proposed Action does not require new building construction or external work to existing buildings. There would be no expected increase in personnel on Fort Belvoir or in the vicinity of the site area as a result of the Proposed Action. Thus, socioeconomic impacts would not be significant.

The Proposed Action would increase traffic capacity. This could in turn increase the volume of traffic. Most of the increase, however, would be from the normal annual increase in population of the region.

No short-term increase in Fairfax County population or income would occur during construction, as local contractors would be used for this project. Short-term construction employment would last for one construction season. Average monthly employment is expected to be less than 100 workers. Because of the relative size and costs associated with this action, impacts would not alter the overall income and local employment levels for Fairfax County.

The Proposed Action would not adversely affect minority, low-income or children populations. As shown in Subchapter 3.8, half the population of the area including Fort Belvoir belongs to a racial or ethnic minority and therefore the area qualifies as an Environmental Justice Community. Accotink Village is the only community in the vicinity of the site area that would be considered eligible for EO 12898 consideration. The community is located a significant distance from the site area, and would not be adversely affected by the Proposed Action. The widening of US 1 to six-lanes would benefit local residents because it would alleviate traffic congestion.

4.8.2 Alternatives to the Proposed Action

Alternatives I – III would have a similar impact on the socioeconomic conditions as the Proposed Action.

4.8.3 No Action Alternative

Under the No Action Alternative, there would be no short or long-term adverse impact on the socioeconomic conditions.

4.9 Impacts on Community Facilities and Services

4.9.1 Proposed Action

Under the Proposed Action, there would be no increase demand on public community facilities and services. There would be no long-term increase in the number of employees. Thus, the residential population immediately outside the installation would not increase. There would be no adverse impact on educational facilities of the surrounding Fairfax County school system.

There would be no increased use of surrounding area facilities (ballfields, banks, gas stations, food services, etc.) because the number of additional personnel would be negligible. The increased demand for services, such as schools, fire and rescue would be negligible.

4.9.2 Alternatives to the Proposed Action

Alternatives I – III would have a similar impact on the community facilities and services as that of the Proposed Action.

4.9.3 No Action Alternative

Under the No Action Alternative, there would be no short or long-term adverse impact on the community facilities and services.

4.10 Impacts on Transportation and Traffic

4.10.1 Proposed Action

Because US 1 roughly parallels and is very near I-95 in this area, peak-hour commuter traffic is expected to increase on both the east and westbound lanes of US 1. The long-term positive impact of the Proposed Action would be to improve the capacity along US 1 to handle additional commuter traffic through Fort Belvoir to locations further east and north, such as Alexandria.

For the long-term, the Proposed Action would deliver more through traffic on US 1. This increase would be the result of:

- ?? Expected growth in Fairfax County;
- ?? An increase in working population at Fort Belvoir as a result of enlarging employment centers, such as AMC, DCEETA, DTRA, INSCOM and the possible construction of Administrative Park Complex and additional family housing. In addition, there would be an increase in public visitor traffic to the Army Museum, located along US 1 on Fort Belvoir;

- ?? An increase in through traffic capability would encourage some commuters to select US 1 as a means of bypassing I-95 as they travel to employment centers in Alexandria, Arlington, and Washington, D.C.;
- ?? An increase in motorists who select US 1 as an alternate means of accessing I-95 or the Fairfax County Parkway north and west; and
- ?? An increase in traffic volume would occur at peak hours when accidents and traffic slowdowns occur along US 1.

Expanding the OCR/US 1 intersection to three northbound lanes would help handle morning peak hour northbound OCR right turn traffic onto eastbound US 1. Furthermore, the widening would decrease the accident potential of the northbound OCR drivers who mistakenly enter oncoming southbound lane Telegraph Road.

The Proposed Action would have an unavoidable direct, short-term adverse impact on traffic patterns. The majority of the construction along US 1 would occur on the north side of the road with only limited construction interference resulting from work on the Fort Belvoir side of US 1. Consequently, morning peak hour commuters through Fort Belvoir would notice only temporary disturbance in normal traffic patterns during construction. At present, US 1 is wide enough to accommodate construction vehicles, as well as provide unobstructed through lanes. Southbound traffic along Telegraph Road would witness temporary disturbance and minor traffic pattern interruptions as a result of lane and median changes. This disturbance would be intensified because the morning traffic would have the unavoidable added factor of sun glare.

On OCR, drivers would experience significant disturbances in traffic patterns during construction. As result of the decreased area for maneuverability of construction equipment and two-lanes of traffic, the impact of construction on traffic would be major. Disruption would occur as construction crews maneuver trucks onto and off of the narrow two-lane road particularly during the early stages of construction while clearing and grading for OCR. Although traffic would not be blocked along the road during construction, it would be impeded and delays would be encountered for morning peak hour drivers.

Once widened, the fast flowing six-lane traffic on US 1 would encourage Mason Neck commuters to travel an additional 0.75 miles (1.2 km) to US 1 via Gunston Road rather than using OCR, avoiding the two-lane obstructed OCR with four sharp 15 mph S curves and a single-lane, timber-decked bridge. By taking Gunston Road, motorists could use a wider, unobstructed road to access US 1. Some local commuters would still use the aesthetically pleasing heritage route (OCR) regardless of the lost time or increased accident potential.

Transportation engineers believe the increased carrying capacity of U.S. 1 would reduce morning commuter traffic on OCR (TransCore, 2002). VDOT is unlikely to spend state funds to alter Old Colchester Road further along a route that is in a static or low growth area because of the low current and projected traffic volumes (URS, 2003).

4.10.2 Alternatives to the Proposed Action

Alternatives I – III would have a similar impact on the transportation and traffic. OCR would have one less northbound lane at its intersection with US 1 under Alternatives II and III.

4.10.3 No Action Alternative

Under the No Action Alternative, there would be a long-term adverse impact on the transportation and traffic in the site area. Traffic congestion would increase beyond its present level due to an expected 32 percent population growth rate from 2001 to 2025. The Level of Service (LOS) for the Telegraph Road / OCR / US 1 intersection would continue to decline from LOS E to LOS F (Subchapter 3.10.2). Despite the placement of warning signs and additional lighting at or near the intersection, the high potential for a head-on collision as a result of the misaligned northbound OCR through lane into the southbound Telegraph Road would continue.

4.11 Cumulative Impacts

Cumulative impacts have been defined by the CEQ as:

Impacts on the environment, which result from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions.

The CEQ regulations require NEPA environmental analyses to address connected, cumulative, and similar actions in the same document (Subchapter 5.1). This requirement prohibits segmentation of a project into smaller components to avoid required environmental analysis. Each of the proposed projects individually may not introduce severe adverse impacts, but taken together, these projects may have the potential to do so, particularly if mitigation measures do not consider all the proposals together. As indicated earlier, this is the first “segment” of the planned widening of the entire 2.9-mile (4.73-km) stretch of US 1 through Fort Belvoir. Widening of future segments of US 1, when considered together with the Proposed Action, may negatively affect the environment and will be assessed in respect to:

- ?? Physical, Natural, and Cultural Resources
- ?? Air Quality
- ?? Noise
- ?? Hazardous Substances
- ?? Infrastructure / Utilities
- ?? Socioeconomic
- ?? Community Facilities/Services
- ?? Transportation/Traffic

The following Fort Belvoir proposed projects may not individually cause significant adverse impacts. However when the projects are taken together with future segments of the US 1 widening project, there may be a cumulative impact on the environment if mitigation measures are not implemented. To consider all cumulative impacts, Fort Belvoir plans to assess the following projects as components of the Master Plan:

- ?? Tompkins Basin Recreation Area
- ?? Relocation of the Defense Threat Reduction Agency (DTRA)
- ?? Relocation of Army Material Command (AMC) personnel
- ?? DeWitt Hospital Replacement
- ?? National Army Museum
- ?? Defense Communications-Electronics Evaluation and Testing Agency (DCEETA) Complex
- ?? North Post Transportation
- ?? Administrative Park Complex
- ?? Renovation of Dogue Creek Marina
- ?? North Post Chapel
- ?? US Army Intelligence & Security Command (INSCOM)
- ?? Residential Communities Initiative (RCI)

Because the site area is located on the extreme western edge of Fort Belvoir and is not in close proximity to above listed projects, no adverse cumulative impacts are anticipated to occur from the implementation of the Proposed Action.

4.12 Unavoidable Adverse Impacts

Implementation of the Proposed Action would result in both short and long-term unavoidable adverse impacts to the environment at Fort Belvoir.

Short-term unavoidable adverse impacts that would occur during construction include:

- ?? Soil loss due to erosion;
- ?? Degradation of surface water from increased erosion and organic/inorganic pollutants from construction equipment and vehicles;
- ?? Increase in noise due to construction equipment operation; and
- ?? Decrease in air quality from fugitive dust.

Long-term adverse impacts would include:

- ?? Degradation of surface water from organic and inorganic pollutants caused by roadway use and maintenance;

- ?? An increase in peak runoff into the swales in the site area from an increase in the amount of impervious surfaces;
- ?? Degradation of downstream wetlands and aquatic biota from increased sedimentation;
- ?? Loss of mature hardwood forest and wildlife habitat due to clearing and grading in the permanent and temporary easement; and
- ?? Loss of aesthetic view and character of an eligible National Register Historic Places property.

4.13 Mitigation Measures of Impacts

As a condition to outgrant Army land to VDOT, the US Army Garrison Fort Belvoir will require that measures be taken to mitigate unavoidable adverse impacts of this action. The Environmental and Natural Resource Division (ENRD) will ensure that the following measures and guidelines are incorporated in the construction plans for this project and are effectively implemented throughout the construction phase of the project.

VDOT will implement and maintain strict erosion and sedimentation control measures in accordance with the Virginia Dept of Conservation and Recreation, Division of Soil and Water Conservation (DSWC) 1992 Virginia Erosion and Sediment Control Manual. These controls will minimize soil erosion, slow stormwater flows and reduce downstream sedimentation. Soil erosion best management practices (BMPs) would include:

- ?? Provide silt fences on slopes;
- ?? Seed and mulch denuded areas as soon as possible with annual grasses to minimize soil exposure to 14 days;
- ?? Store and spread topsoil on graded areas;
- ?? Place hay bales and stabilization grids to keep the soil in place;
- ?? Construct berms, sediment traps, and infiltration trenches;
- ?? Confine construction activities to discrete areas of workable size;
- ?? Landscape all denuded slopes to eventually restore forest cover and increase area beautification;
- ?? Collect and discharge stormwater into the existing BMP-designed stormwater systems;
- ?? Provide check dams for diversion ditches with high surface water flows;
- ?? Provide sediment basins at storm water runoff outlets; and
- ?? Construct diversion dikes or ditches upgradient of all construction areas and slopes drains to carry drainage from the dikes/ditches past construction areas.

To reduce soil erosion VDOT will prepare a stormwater management plan that:

- ?? Effectively controls runoff after construction;

- ?? Protects receiving waters and wetlands and adjacent properties sedimentation and erosion; and
- ?? Minimizes adverse impacts to water quality and aquatic biota.

To mitigate impacts on vegetation and wildlife habitat, VDOT will:

- ?? Remove the least amount of native vegetation possible during clearing of the right of way and revegetation of the median and areas adjacent to the shoulder;
- ?? Implement the urban forest management requirements as stated in Fort Belvoir's Tree Removal and Protection Policy, 220-22-00, dated August 15, 2000, that requires two new trees to be planted for each tree greater than four inches in diameter that is removed (sizes, species, and locations of new trees will be recommended by ENRD);
- ?? Adopt site-planning techniques to minimize areas to be disturbed by construction;
- ?? Adopt construction practices that maximize retention and protection of existing trees before considering removal; and revegetate areas adjacent to the shoulder with herbaceous and woody species to provide for aesthetics and food and cover for wildlife and;
- ?? Landscape with a mixture of deciduous shade and flowering trees, such as maple, southern red oak and eastern redbud. Seedlings, such as dogwood, viburnum, euonymus, and deerberry, will be interspersed through out the landscaping.

To mitigate impacts on air quality during construction, VDOT will:

- ?? Avoid the use and application of cutback asphalt or impervious surfaces during the months of April through October (State Rule 4-39);
- ?? Cover truck beds during construction and hauling;
- ?? Cover, water, or spray non-VOC chemicals on excavation piles to suppress fugitive dust emissions;
- ?? Wash down construction equipment vehicles to minimize the creation of fugitive dust;
- ?? Perform periodic street sweeping; and
- ?? If possible, wet down paved surfaces in the vicinity of the construction site (State Rule 5-1).

Other mitigation measures VDOT will adopt are:

- ?? Minimize the potential for groundwater contamination by following the recommendations in the Best Management Practices Handbook: Sources Affecting Groundwater.
- ?? Minimize the potential of hazardous substances spills through the development of a site-specific Spill Prevention Control and Countermeasures Plan (SPCC) that describes proper procedures for parking, fueling and maintenance of construction vehicles on-site.

- ?? Collect and dispose of soils contaminated with petroleum-based compounds from leaks or spills from construction vehicle repair and refueling.
- ?? Traffic management measures to be considered for this project included reduced speeds and truck restrictions on US 1. Truck restrictions are not practical since this facility is a major north-south primary route used by local traffic. Reducing speeds would result in unperceivable noise reduction. Typically, a 10 mph reduction in speed would result in only a 2-dBA decrease in noise level.
- ?? Mitigate noise impacts by restricting construction to daytime hours. In addition, hours for construction trucks to arrive or leave the site would be limited to 0700 to 1630 hours (7 am to 4:30 pm), Monday through Friday.
- ?? Conduct a vibration analysis of an area that encompasses the Pohick Church to determine vibration levels during construction of OCR / US 1 intersection would not adversely affect the buildings (VDOT, 1998).
- ?? Implement mitigation measures to include: avoiding construction procedures that would cause harmful vibrations and monitoring of vibrations during construction, such as utilizing Select Material, Type I, minimum CBR 30 fill, to accommodate the new right-of-way.
- ?? Use compacting techniques, which reduce the potential for harmful vibrations.

4.14 Relationship between Local Short-term Uses of the Environment and the Enhancement of Long-term Productivity

Implementation of the Proposed Action would have long-term benefits because people would have a faster, less stressful commute and safer from residences in south Fairfax County and Prince William County to and from Fort Belvoir, Alexandria, Arlington and Washington, D.C.

4.15 Irreversible and Irretrievable Commitments of Resources

There will be no irreversible and irretrievable expenditure of funds or man-hours to plan and carry out the Proposed Action.

4.16 Conclusion

The anticipated consequences of the Proposed Action, Alternatives I - III and the No Action Alternative are summarized in Table 4-2. These impacts represent a subjective rating that is representative of:

- ?? quality/uniqueness of the resources affected;
- ?? intensity and duration of the impact, such as short and long-term; and

?? potential to minimize the impact through mitigation.

In summary, this EA described and identified the potential impacts of the Proposed Action, Alternatives I - III, and the No Action Alternative. The Proposed Action has merit and would support VDOT's project while minimizing the adverse impact on natural and cultural resources. For these reasons, it is recommended that the Proposed Action be selected for the project, and that an environmental impact statement (EIS) not be prepared.

Table 4-2
Summary of Impacts of Proposed Action, Alternatives I, II, and III, and the No Action Alternative.

Resources	Proposed Action	Alternative I	Alternative II	Alternative III	No Action
Land Use	-	-	-	-	-
<i>Land Use</i>	O	O	O	O	O
<i>Plans</i>	O	O	O	O	O
<i>Aesthetics</i>	H-	M-	L-	L-	O
Natural Resources	-	-	-	-	-
<i>Physiography</i>	-	-	-	-	-
Geology	O	O	O	O	O
Geomorphology	O	O	O	O	O
Topography	H-	M-	L-	L-	O
Soils	H-	M-	L-	L-	O
<i>Water Resources</i>	-	-	-	-	-
Groundwater	O	O	O	O	O
Surface Water	L-	L-	L-	L-	O
<i>Environmentally Sensitive Areas</i>	-	-	-	-	-
Forest & Wildlife Corridor	O	O	O	O	O
Floodplains	O	O	O	O	O
Wetlands	O	O	O	O	O
Chesapeake Bay RPAs	O	O	O	O	O
<i>Vegetation & Wildlife Habitats</i>	M-	L-	L-	L-	O
<i>Rare, Threatened & Endangered Species</i>	O	O	O	O	O
Cultural Resources	H-	L-	L-	L-	O
Climate & Air Quality	M+	M+	M+	M+	H-
Noise	M-	M-	M-	M-	O
Hazardous Substances	M-	L-	L-	L-	O
Infrastructure & Utilities	O	O	O	O	O
Socioeconomics	O	O	O	O	O
Community Facilities & Services	O	O	O	O	O
Transportation & Traffic	H+	H+	H+	H+	H-

O = No Impact
- = Adverse Impact

H = High Impact
+ = Positive Impact

M = Moderate impact

L = Low impact