
FINAL ENVIRONMENTAL IMPACT STATEMENT (EIS)

BRAC Actions at Aberdeen Proving Ground
Harford and Baltimore Counties, Maryland



July 2007

FINAL ENVIRONMENTAL IMPACT STATEMENT (FEIS)

for

**Base Realignment and Closure Actions
at US Army Garrison Aberdeen Proving Ground
Harford and Baltimore Counties, Maryland**

July 2007

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Cooperating Agencies: None

Affected Jurisdictions: Harford County, Maryland; Aberdeen, Maryland; Bel Air, Maryland;
Edgewood, Maryland

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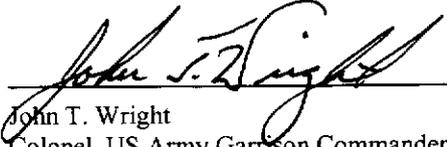
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Abstract: This FEIS evaluates the potential environmental impacts from implementation of the Base Realignment and Closure recommendations for Aberdeen Proving Ground (APG), Maryland. The Proposed Action includes the realignment of assets and staff from a number of Army command level, administrative, and research and development activities to APG. When completed, the net population at APG will increase by about 4,400 military, government civilian, and civilian contractor staff. Both the Proposed Action and the No Action Alternatives are analyzed. The FEIS has determined that the Proposed Action will result in significant impacts to transportation and to socioeconomic factors. Depending on the final siting of new facilities, there may be significant impacts to cultural resources at APG. There are no other significant adverse or significant beneficial impacts to regional environmental resources resulting from implementation of the Proposed Action.

Date

26 Jun 07


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U.S. ARMY GARRISON ABERDEEN PROVING GROUND, MARYLAND**

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EXECUTIVE SUMMARY

ES.1. Introduction

This Environmental Impact Statement (EIS) analyzes and documents environmental effects associated with the Army's compliance with the Base Realignment and Closure (BRAC) and other transformation activities at Aberdeen Proving Ground (APG), Maryland. Its purpose is to inform decision makers and the public about likely environmental consequences of the Proposed Action and alternatives. This EIS identifies and evaluates all relevant impacts, conditions, and issues associated with the proposed realignment actions at APG.

On September 8, 2005, the Defense Base Realignment and Closure Commission recommended that certain military realignment and relocation actions occur at United States Army Garrison Aberdeen Proving Ground, Maryland. The President of the United States approved the recommendations on September 15, 2005, and they were forwarded to Congress. Congress did not alter any of the BRAC Commission's recommendations, and on November 9, 2005, the recommendations became law.

The BRAC Commission's recommendations will align U.S. base structure with the force structure needed over the next 20 years. The Preferred Alternative will reposture the Department of the Army's global force; facilitate the ongoing transformation of U.S. forces to meet the challenges of the 21st Century; and restructure important support functions to capitalize on advances in technology and business practices. Overall, the BRAC recommendations will support force transformation; address new threats, strategies, and force protection concerns; consolidate business-oriented support functions; promote joint- and multi-service basing; and provide significant savings.

The Defense Base Closure and Realignment Act of 1990 (Title XXIX, Public Law 101-510), as amended through the fiscal year (FY) 2005 Defense Authorization Act specifies that the National Environmental Policy Act of 1969 (NEPA) does not apply to actions of the President, the Commission, or the Department of Defense (DoD), except "(i) during the process of property disposal, and (ii) during the process of relocating functions from a military installation being closed or realigned to another military installation after the receiving installation has been selected but before the functions are relocated." Sec. 2905(c) (2) (A), Public Law 101-510. The law further specifies that in applying the provisions of NEPA to the process, the Secretary of Defense and the secretaries of the military departments concerned do not have to consider "(i) the need for closing or realigning the military installation which has been recommended for closure or realignment by the Commission, (ii) the need for transferring functions to any military installation which has been selected as the receiving installation, or (iii) military installations alternative to those recommended or selected." Sec. 2905(c)(2)(B), Public Law 101-105. The Commission's deliberation and decision, as well as the need for closing or realigning a military installation, are exempt from NEPA. Accordingly, this EIS does not address the need for realigning units to or from APG. Rather, this EIS identifies how to support the organizations once they arrive at APG.

This EIS has been prepared by the U.S. Army Corps of Engineers (USACE) to support the Army realignment at APG. It is compliant with NEPA and the Council for Environmental Quality (CEQ) regulations that require federal agencies to develop internal implementing procedures to ensure that environmental factors are considered in decision-making by using a systematic and interdisciplinary analytical approach. The DoD Instruction 4715.0, *Environmental Planning and Analysis*, and the Army's implementing regulation for NEPA, *Environmental Analysis of Army Actions* (32 Code of Federal Regulations Part 651), were used to provide NEPA guidance for the preparation of this document.

This EIS evaluates the potential environmental and socioeconomic impacts that may result from the implementation of the BRAC actions (the Preferred Alternative) at APG. In accordance with NEPA it also evaluates the No Action Alternative.

The Army must initiate all realignments no later than September 15, 2007, and complete all realignments no later than September 15, 2011. At APG, the NEPA analysis (this EIS and the Record of Decision) will be completed by the end of FY2007. Planning, engineering, and design of facilities will begin in FY2007 with construction continuing from FY2008 through FY2011. Depending upon the availability and suitability of facilities, incoming units will relocate to APG beginning in FY2008, and continue through FY2011. The departing units (Army Environmental Command and the Ordnance Center and School) are scheduled to depart APG starting in FY2010 through to FY2011. The realignment of organizations earlier than 2007 is not feasible due to the time required to plan, design, and renovate/build facilities.

ES.2. Installation Setting and Mission

APG is situated on more than 72,000 acres (about 39,000 acres of land area and 33,000 acres of water) primarily within Harford County, Maryland. The facility is located in the northeast portion of the state on the northwestern shore of Chesapeake Bay. Harford County is located in the north central portion of Maryland at the confluence of the Susquehanna River and Chesapeake Bay and is bounded by Baltimore County on the west, the Commonwealth of Pennsylvania on the north, the Susquehanna River on the east, and Chesapeake Bay on the south.

The majority of the facility is located on two peninsulas bordered and separated by the Bush and Gunpowder Rivers and encompasses the majority of Harford County's Chesapeake Bay waterfront. Smaller portions of the facility are on the west bank of the Gunpowder River (see Figure 1.3-1). Northern Harford County is more rural in character than Southern Harford County. The city of Bel Air and greater surrounding area, located about 7 miles north of the APG's Southern Peninsula, is the largest urban center in the County with a population of 72,000. Other urban centers in southern Harford County include Aberdeen, Havre de Grace, Edgewood, and Joppatowne.

Aberdeen Proving Ground is a U.S. Army Installation Management Command installation operated by the U.S. Army Garrison Aberdeen Proving Ground (USAGAPG) that hosts units and activities of nine major Army Commands, supporting 66 tenants, 20 satellites, and 17 private organizations, making USAGAPG one of the largest landlords in the Army.

APG tenants employ numerous military and civilian scientists, research engineers, technicians, trainers, and administrators. In addition to the APG workforce and those residing on APG, the installation provides support and services to authorized personnel in the surrounding areas.

ES.3. Preferred Alternative

The Preferred Alternative is to implement all BRAC Commission recommendations through a combination of new construction and renovation and reuse of existing facilities to accommodate incoming BRAC missions.

The purpose of the Preferred Alternative is to implement the congressionally mandated realignment to APG. The BRAC Commission's recommendations include realignment and relocation of a number of agencies and related functions/activities to APG to facilitate continuation of essential mission functions, and to improve the ability of the nation to respond rapidly to military challenges of the 21st century. To enable implementation of the actions, the Army (Department of the Army, Secretary of the Army, and Assistant Chief of Staff for Installation Management) is charged with providing necessary facilities to support the changes in force structure. This EIS analyzes and documents environmental effects associated with the Army's Preferred Alternative at APG.

The BRAC Commission made the following recommendations concerning the realignment of activities to APG.

From Fort Monmouth, New Jersey

- Relocate the procurement management and related support functions for Depot Level Repairables to APG, and designate them as Inventory Control Point functions, detachment

of Defense Supply Center, Columbus, Ohio, and relocate the remaining integrated materiel management, user, and related support functions to APG (BRAC Recommendation 5).

- Relocate the Information Systems, Sensors, Electronic Warfare, and Electronics Research and Development and Acquisition to APG (BRAC Recommendation 5).

From Fort Belvoir, Virginia

- Relocate and consolidate Sensors, Electronics, and Electronic Warfare research, development, and acquisition (RDA) activities to APG, except the Night Vision Lab and the Project Manager Night Vision/Reconnaissance, Surveillance and Target Acquisition (PM NV/RSTA) (BRAC Recommendation 5).
- Relocate and consolidate Information Systems RDA (except for the Program Executive Office, Enterprise Information Systems) to APG (BRAC Recommendation 5).
- Relocate the Chemical Biological Defense (CBD) Research component of the Defense Threat Reduction Agency (DTRA) to the Edgewood Chemical Biological Center (ECBC), APG (BRAC Recommendation 174).

From Fort Knox, Kentucky

- Realign the Army Research Institute (ARI) by relocating Human Systems Research to APG (BRAC Recommendation 5).

From Redstone Arsenal, Alabama

- Relocate and consolidate Information Systems Development and Acquisition to APG (BRAC Recommendation 5).

From Park Center Four, Alexandria, Virginia

- Relocate and consolidate Army Test and Evaluation Command (ATEC) with its subcomponents to APG (BRAC Recommendation 136).

From Brooks City Base, San Antonio, Texas

- Relocate the Non-Medical CBD Development and Acquisition to ECBC, APG (BRAC Recommendation 170).

From Falls Church, Virginia, Skyline 2 and 6

- Relocate the Joint Program Executive Office for CBD (JPEO-CBD) to ECBC, APG (BRAC Recommendation 5).

From Fort Huachuca, Arizona

- Relocate the procurement management and related support functions for Depot Level Repairables to APG, and designate them as Inventory Control Point functions, detachment of Defense Supply Center, Columbus, Ohio. Relocate the remaining integrated materiel management, user, and related support functions to APG (BRAC Recommendation 5).

From Langley, Virginia and Glenn, Ohio

- Realign the Army Research Laboratory (ARL) Langley, Virginia, and Glenn, Ohio, by relocating the Vehicle Technology Directorates (VTD) to APG (BRAC Recommendation 187).

From Silver Spring, Maryland

- Realign Walter Reed Army Medical Center, Washington, D.C. by relocating the Medical Chemical Defense Research of the Walter Reed Institute of Research (Forest Glen Annex) to APG (BRAC Recommendation 169).

The BRAC Commission recommended relocation of three organizations from APG. This EIS addresses the impacts associated with the departure of these organizations from APG, but does not address the potential impacts of their future realignment at their new locations. Impacts of those actions will be included in separate EIS documents prepared for BRAC realignment actions at Fort Sam Houston, Texas, Fort Lee, Virginia, and Fort Dix, New Jersey. These realignment activities include:

From Aberdeen Proving Ground, Maryland

- Realign APG by relocating the Army Environmental Command (AEC) to Fort Sam Houston.
- Realign APG by relocating the Ordnance Center and School to Fort Lee.
- Realign APG by relocating all Headquarters and Support Activities Joint Cross Service Group mobilization functions to Fort Dix, New Jersey, designating it as Joint Pre-Deployment/Mobilization Site Dix/McGuire/Lakehurst.

ES.4. Alternatives

This EIS evaluates the siting alternatives for the BRAC Commission directed realignment at APG. Realignment to locations other than APG are not under consideration due to Public Law 101-510 as discussed in the previous section. General siting requirements for activities realigning to APG are administrative and research and development (R&D) in nature. Only locations suitable for administrative and R&D activities are considered acceptable.

The Preferred Alternative includes construction of new facilities and renovation of existing facilities (including those of departing units), but is constrained by a number of budgetary and physical limitations. In addition, the Army is required to comply with Army Regulation 210-20, *Master Planning at Army Installations*, which mandates the maximum use of existing facilities. At APG, the Master Plan and the APG 2025 Strategy Plan provides guidance to collocate units with similar functionality and requirements, and separate units with incompatible functions. Due to the existing mix of units on the two peninsulas, the Preferred Alternative meets this guidance by allocating incoming BRAC units to their most appropriate and cost effective location. Table ES-1 provides information on the incoming units and the preferred siting location.

The APG planning and engineering analyses are not yet finalized for the incoming BRAC units. Final placement will depend on a combination of minimizing environmental impacts, designing to accommodate engineering constraints, and meeting the unit's mission. The EIS shows areas where potential construction and/or renovation will occur; however, the exact footprint, in many cases, has not yet been determined. The EIS analyzes the potential impacts within these developmental areas, and placement of construction footprints anywhere within these areas will produce no major differences in the context, extent, or severity of the potential environmental impacts. As such, the Preferred Alternative reflects the most accurate estimation of the mix of construction and renovation at APG.

The EIS evaluates and rejects from further consideration other siting alternatives within APG for the incoming BRAC units. With the combination of unsuitable siting and engineering constraints, and the physical and budgetary constraints affecting implementation of BRAC actions at APG, no additional realistic, distinct, or feasible alternatives to the Preferred Alternative are included in this EIS.

The No Action Alternative is required by CEQ regulations to identify the existing environmental baseline conditions against which potential impacts are evaluated. The No Action Alternative must be described because it is the environmental baseline condition or the current status (November 2005) of the environment if the Preferred Alternative is not implemented. For realignment actions recommended by the BRAC Commission, it is noted that for the No Action Alternative, maintenance of current conditions is not feasible since the BRAC actions are congressionally mandated.

Under the No Action Alternative, APG would not implement the Preferred Alternative. Organizations presently assigned to APG would continue to train and operate from the post. Impacts from other actions planned or funded in November 2005 for execution during 2007 - 2010 are included in the No Action Alternative. Additionally, APG would use its current inventory of facilities, though routine replacement or renovation actions could occur through normal military maintenance and construction procedures, as circumstances independently warrant.

Table ES-1 Preferred Siting of Incoming Units at APG

Organization	Realigning From	Estimated Arrival Date at APG	Comment	Site Location
Army Research Institute	Fort Knox, Kentucky	2011		4400 or 4500 Block – renovation of vacated Ordnance Center and School space.
Army Research Laboratory (ARL)– Vehicle Technology Directorate (VTD) (Glenn, Ohio and Langley, Virginia)	Langley, Virginia and Glenn, Ohio	2010	The functions relocating from Glenn and Langley require laboratory support. APG does not currently have a sufficient amount of laboratory space to support this relocation. Accordingly, new construction is necessary and ARL has requested that the VTD activities and personnel be collocated with the Rodman Building (Building 4600) on APG’s Northern Peninsula.	4600 Block – new construction (an addition to the Rodman Building).
Army Test and Evaluation Command (ATEC)	Park Center Four, Alexandria, Virginia	2011	The ATEC is a Major Command Headquarters that should be sited in a prominent area on APG and, preferably, near the Developmental Test Command, an ATEC subordinate command.	New construction at Aberdeen Blvd. and Swan Creek Dr. or at Susquehanna Ave. and Havre De Grace St. Renovation of 4500 Block barracks into administrative space is a third option.
Chemical Biological Defense Research Component of the Defense Threat Reduction Agency; Non-Medical CBD Development and Acquisition; and Joint Program Executive Office for CBD (JPEO-CBD)	Fort Belvoir, Virginia; Brooks City-Base, San Antonio, Texas; Falls Church, Virginia, Skyline 2 and 6	2011	APG Southern Peninsula is preferred because it is slated to become the APG Chemical/Biological Center of Excellence in the latest draft land use plan. In addition, the JPEO-CBD is the procurement activity for chemical and biological R&D and should be collocated in the same area as existing chemical and biological R&D activities on APG.	New construction in the E1800 and E1900 Blocks.

Table ES-1 Preferred Siting of Incoming Units at APG (Continued)

Organization	Realigning From	Estimated Arrival Date at APG	Comment	Site Location
Walter Reed Army Institute of Research (WRAIR)	Silver Spring, Maryland	2011	WRAIR mission is being integrated with existing similar Medical Research Institute of Chemical Defense (MRICD) functions; MRICD is located on APG's Southern Peninsula.	Construction of an addition to Building E3081.
Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR)	Fort Monmouth, New Jersey; Fort Belvoir, Virginia; Redstone Arsenal, Alabama; Fort Huachuca, Arizona	2011	C4ISR must be viewed as one organization; originally, Communications Electronics Research Development and Engineering Center (CERDEC) and Communications Life Cycle Management Command (CE-LCMC) were being planned as two distinct organizations that would be realigning to APG.	Some buildings from the 3100 and the 5000 Blocks – renovation; the 5400 Block – demolition of existing buildings and new construction.
Barracks		Existing at APG	Consolidation of all barracks space on APG's Northern Peninsula will meet the land use guidelines set forth in the draft APG Land Use Plan; consolidation will also allow greater efficiencies in a number of areas by collocating barracks space with morale, welfare, and recreation support services currently located on APG's Northern Peninsula.	4500 Block – renovation of interior configuration from 2+2 (two units joined by a bathroom) to 1+1 (one unit with one bathroom).
Directorate of Information Management (DOIM)		Existing at APG	DOIM must be centrally located with majority of APG users and incoming BRAC organizations.	Renovate barracks in the 4400 Block.

ES.5. Environmental Consequences

This EIS addresses existing environmental resources likely to be affected by the Preferred Alternative, including those resource areas identified during the public scoping process.

Direct, indirect, and cumulative impacts of the No Action Alternative and Preferred Alternative have been considered. Direct significant impacts have been identified for Socioeconomics and Transportation, and possibly for Cultural Resources. No significant beneficial or significant impacts have been identified for Land Use, Aesthetics and Visual Resources, Air Quality, Noise, Geology and Soil, Water Resources, Biological Resources, Utilities, and Hazardous and Toxic Substances.

The Preferred Alternative will result in direct significant impacts to Socioeconomic factors when the Primary Region of Influence is Harford and Cecil Counties. When the larger Region of Influence (the City of Baltimore and Anne Arundel, Baltimore, Carroll, Harford, Howard, and Queen Anne Counties) is evaluated, these socioeconomic factors are not considered to be significant.

The Preferred Alternative will result in a decrease in the traffic Level of Service (LOS) at certain intersections leading to the Northern Peninsula at APG, resulting in significant impacts to transportation.

One intersection in the Southern Peninsula roadway network already at unacceptable LOS E will decrease to unacceptable LOS F.

The Preferred Alternative has the potential to result in significant impacts to Cultural Resources. Should renovation and construction activities disturb previously unidentified sites or destruct certain unevaluated buildings (detailed in Section 4.9.2.2), it is possible that adverse effects (significant impacts) could result to these cultural resources. Impacts to these cultural resources would be direct, long-term, and significant. Depending on final siting of the new facilities, potential significant impacts may result to APG cultural resources that have not yet been fully evaluated. Demolition or renovation of eight World War II buildings could result in direct and potentially significant impacts (adverse effects under Section 106) if these buildings are determined to be National Register of Historic Places (NRHP)-eligible. Indirect impacts include potentially significant impacts (adverse effects under Section 106) due to vibration, audio intrusion, and other disturbance to unidentified NRHP-eligible resources adjacent to the area of potential effect.

Under the Preferred Alternative, direct impacts include short- and long-term impacts to isolated or jurisdictional wetlands. A total of 15-23 acres of wetlands on APG may be affected by the Preferred Alternative. On APG's Northern Peninsula, the area of potential wetlands impact by project is estimated to be:

C4ISR	12-15 acres
ATEC	0-1 acres
ARL	0-1 acres
<u>Route 715 Gate</u>	<u>0-1 acres</u>
Northern Peninsula Total	12-18 acres

On APG's Southern Peninsula, the area of potential wetlands impact by project is estimated to be:

JPEO	2-3 acres
<u>Route 24 Gate</u>	<u>1-2 acres</u>
Southern Peninsula Total	3-5 acres

Indirect impacts include short- and long-term impacts on terrestrial and aquatic vegetation, wetlands, and wildlife due to increased erosion and sedimentation.

An analysis of the potential cumulative impacts resulting from the Preferred Alternative coupled with other feasible regional actions, shows potential cumulative impacts to transportation from the Preferred Alternative, other planned Army actions at APG, and other regional commercial actions.

ES.6. Mitigation Responsibility and Permit Requirements

Mitigation Measures The preferred mitigation for impacts to cultural resources is avoidance. Avoidance preserves the integrity of cultural resources and protects their research potential (*i.e.*, their NRHP eligibility). Avoidance also reduces costs and potential construction delays associated with data recovery.

Historically, data recovery of archaeological sites through professional techniques such as surface collection, mapping, photography, subsurface excavation, technical report preparation and dissemination, has been the standard mitigation measure. Under the revised Section 106 regulations (36CFR800.5(a)(2)(i)), data recovery conducted as mitigation is now considered, in and of itself, an adverse effect. Data recovery investigations should be designed in consultation with the Maryland Historical Trust and implemented prior to construction. Mitigation measures may also include renovation using architecturally compatible design and materials and documentation through programs administered by the National Park Service.

Implementing the Preferred Alternative would result in significant adverse impacts to the transportation system with respect to congestion and increased travel time to both the Northern Peninsula and the Southern Peninsula. Numerous regional organizations are involved in the assessment of transportation

impacts from the BRAC actions at four military installations in Maryland. These impacts will require coordinated efforts to evaluate and maintain roadway integrity, intersection optimization, and roadway improvements.

APG will mitigate loss of wetlands in accordance with permit requirements and mitigation plans approved by Maryland Department of the Environment.

For all other resources analyzed in this EIS, no active mitigation measures are required to reduce impacts from the Preferred Alternative to non-significant levels.

Best Management Practices (BMP) will be implemented in association with the Preferred Alternative construction activities.

The Army will work with federal, state, and regional governmental agencies to comply with the respective regulations and avoid adverse impacts wherever possible. Wherever reasonable and possible to do so, unavoidable impacts will be managed through consultation with the appropriate agencies. During the development and design of projects, meetings are held to coordinate such consultation.

Representatives from the following organizations are typically involved in these meetings: APG, USACE, U.S. Fish and Wildlife Service, U.S. Environmental Protection Agency, Maryland Department of the Environment, Maryland Department of Natural Resources, the Maryland Historical Trust, and private sector companies. In addition, the USACE regulatory office holds joint evaluation meetings to discuss pending wetland permits and other Clean Water Act, Section 404 issues.

As the Army moves forward with detailed engineering plans and specifications for new construction and renovation at APG to accommodate incoming BRAC units, the Army will work with governmental agencies to identify and comply with regulatory requirements for construction, utility connections, dust suppression, erosion control, and surface and stormwater management and discharge.

For each resource discussed in this EIS, Table ES-2 lists all potential impacts and examples of relevant BMPs to manage impacts to the resource. Details of these and additional BMPs are provided in Section 4.15 of the EIS.

Table ES-2 Summary of Potential Environmental Consequences at Aberdeen Proving Ground, Maryland

Resource Category		Impact Category							Discussion	Best Management Practices	Mitigation Measures if Needed
		Significant	Direct	Indirect	Cumulative	Temporary	Short-Term	Long-Term			
Land Use	No Action Alternative								No impacts to land use are anticipated.	Follow procedures in the Master Plan and APG 2025 Strategy Plan for land use planning.	None
	Preferred Alternative										
Aesthetics and Visual Resources	No Action Alternative		✓		✓			✓	Under the No Action Alternative, long-term impacts would include the continued deterioration of older buildings. Under the Preferred Alternative, the direct and cumulative impacts would be similar. Long-term beneficial impacts would include renovation and demolition of deteriorated and dilapidated structures. Temporary impacts would result from construction activities, and long-term impacts would occur to natural vistas due to building height and overall square footage required for new construction.	Utilize landscaping to reduce construction-related short-term impacts.	None
	Preferred Alternative		✓	✓	✓	✓		✓			
Air Quality	No Action Alternative								Under the Preferred Alternative, direct impacts include temporary and short-term impacts due to increased construction and operation emissions, and long-term impacts would occur due to increases in emissions from daily operations. Indirect impacts include temporary impacts due to increased contractor and off-post emissions. Cumulative impacts include short term impacts associated with fugitive dust from on- and off-post construction and increased use of privately owned and government owned vehicles.	Use dust suppression techniques to reduce particulate releases from construction sites.	None
	Preferred Alternative		✓	✓	✓	✓	✓	✓			

Table ES-2 Summary of Potential Environmental Consequences at Aberdeen Proving Ground, Maryland (Continued)

Resource Category		Impact Category								Discussion	Best Management Practices	Mitigation Measures if Needed
		Significant	Direct	Indirect	Cumulative	Temporary	Short-Term	Long-Term	Permanent			
Noise	No Action Alternative									Temporary impacts from noise would occur under the Preferred Alternative. During construction, renovation, and demolition, there would be temporary, localized noise impacts associated with increased traffic volumes and the operation of construction equipment and machinery, power tools, and the delivery of construction materials. Indirect noise impacts would occur to wildlife.	Avoid high noise propagation activities when weather conditions are unfavorable. Maintain vegetative buffers to reduce noise transmission.	None
	Preferred Alternative			✓		✓						
Geology and Soil	No Action Alternative									Temporary and short-term impacts to soil would occur under Preferred Alternative. Soil would be disturbed by renovation activities such as compaction from vehicles and vegetative clearing, and by construction and demolition activities such as grading, vegetation clearing, and excavating during construction of the new facilities. Increased impervious surfaces would result in permanent impacts to the soil. There is the potential for cumulative impacts to the soil through implementation of Preferred Alternative construction projects and related projects on and off post.	Use dust suppression techniques to reduce particulate releases from construction sites. Implement erosion prevention and reduction management practices at construction sites.	None
	Preferred Alternative		✓		✓	✓	✓		✓			

Table ES-2 Summary of Potential Environmental Consequences at Aberdeen Proving Ground, Maryland (Continued)

Resource Category		Impact Category								Discussion	Best Management Practices	Mitigation Measures if Needed
		Significant	Direct	Indirect	Cumulative	Temporary	Short-Term	Long-Term	Permanent			
Water Resources	No Action Alternative									No direct impacts to water resources would occur. Under the Preferred Alternative, indirect impacts include temporary impacts due to run-off from soil disturbance and related construction and demolition. Long-term impacts would occur due to increases in impervious surfaces, which could lead to an increase in stormwater runoff and reduce groundwater recharge. Portions of the Preferred Alternative footprint encroach on the stormwater protection area for the City of Aberdeen. Cumulative impacts from the Preferred Alternative include short-term impacts related to construction on- and off-post.	Utilize erosion control measures to reduce surface water runoff from construction sites Implement water retention basins into office park designs. Comply with Stormwater Pollution Prevention Plans (where applicable). NRCS Critical Area standards, "General Performance Standards" outlined in the Maryland Stormwater Design Manual and Code of Maryland Regulations (COMAR) 26.17.02, would reduce stormwater and groundwater recharge impacts.	None
	Preferred Alternative			✓	✓	✓		✓				
Biological Resources	No Action Alternative									Under the Preferred Alternative, direct impacts include short- and long-term impacts to isolated or jurisdictional wetlands from the possible loss of 15-23 acres of wetlands. Indirect impacts include short- and long-term impacts on terrestrial and aquatic vegetation, wetlands, and aquatic vegetation and wildlife due to increased erosion and sedimentation. Cumulative impacts include long-term impacts to regional wetlands from ongoing and future activities at APG and continued growth in the surrounding region.	Maintain compliance with APG forest delineation and conservation plans. Impacts to wetlands will be subject to permitting and mitigation requirements.	Mitigate Replace lost wetlands in accordance with permit requirements and mitigation plans approved by USACE and Maryland Department of the Environment.
	Preferred Alternative		✓	✓	✓	✓	✓	✓	✓			

Table ES-2 Summary of Potential Environmental Consequences at Aberdeen Proving Ground, Maryland (Continued)

Resource Category		Impact Category							Discussion	Best Management Practices	Mitigation Measures if Needed
		Significant	Direct	Indirect	Cumulative	Temporary	Short-Term	Long-Term			
Cultural Resources	No Action Alternative	✓	✓						<p>Under the Preferred Alternative, demolition or renovation of eight WWII buildings could result in potentially significant permanent impacts if these buildings are determined to be eligible for inclusion on the National Register of Historic Places (NRHP). Indirect impacts include potentially significant temporary impacts due to vibration, audio intrusion, and other disturbance to unidentified NRHP-eligible resources adjacent to the area of potential effect. Potentially significant, permanent cumulative impacts to archaeological sites and architectural resources would occur from construction, on-post and off-post, in undisturbed areas; renovation, and/or demolition of NRHP-listed or NRHP-eligible buildings or structures from other APG and regional projects. Disturbance or destruction of these cultural resources would further diminish the regional archaeological record decreasing the potential of its overall research contribution. In addition, the loss of NRHP-listed or NRHP-eligible buildings and districts would undermine the historic quality of the region.</p>	<p>Buildings vacated by APG tenants should be placed in caretaker status to preserve structural and cultural integrity.</p> <p>Avoid vibratory impacts near culturally sensitive sites.</p> <p>Continue to coordinate with State Historic Preservation Officer (SHPO) in accordance with Section 106 of the National Historic Preservation Act.</p>	<p>Conduct Phase I archaeological survey to identify sites; conduct Phase II archaeological testing and architectural surveys to evaluate for NRHP eligibility; coordinate with SHPO to identify subsequent mitigation measures for NRHP-eligible resources.</p> <p>Implement mitigation measures for affected NRHP-eligible resources, as designed in consultation with the SHPO.</p>
	Preferred Alternative	✓	✓			✓					

Table ES-2 Summary of Potential Environmental Consequences at Aberdeen Proving Ground, Maryland (Continued)

Resource Category		Impact Category								Discussion	Best Management Practices	Mitigation Measures if Needed
		Significant	Direct	Indirect	Cumulative	Temporary	Short-Term	Long-Term	Permanent			
Socio-economics	No Action Alternative									<p>The relocation of personnel over a 1-year period would result in significant impacts to business sales volume, employment, and population in the primary region of influence (ROI). Personnel relocation over 2 years would result in significant impacts to employment and population in the primary ROI. If the personnel relocations are distributed over 3 years, however, none of these economic variables would have significant impacts. Housing demand in the primary ROI could experience a significant impact if the relocation of personnel occurs over 1 or 2 years.</p> <p>Direct short-term beneficial economic impacts would be realized by the regional and local economy during the construction phase of Preferred Alternative. In addition, direct long-term economic impacts would be realized from the increase in operations and associated personnel. Other direct impacts include those on schools, housing, and other social programs. The magnitude of the impacts will depend upon regional planning efforts to minimize impacts on schools and social services.</p> <p>Beneficial cumulative impacts would be in the form of increased business volume, income, and employment associated with construction activities and increased on-post operations in combination with other non-BRAC proposed on-post actions and construction projects.</p>	None	None
	Preferred Alternative	✓	✓	✓	✓	✓	✓	✓				

Table ES-2 Summary of Potential Environmental Consequences at Aberdeen Proving Ground, Maryland (Continued)

Resource Category		Impact Category							Discussion	Best Management Practices	Mitigation Measures if Needed
		Significant	Direct	Indirect	Cumulative	Temporary	Short-Term	Long-Term			
Trans- portation	No Action Alternative		✓		✓				<p>Continued cumulative impacts would result under the No Action Alternative from continued regional traffic growth.</p> <p>Direct impacts to transportation would result under the Preferred Alternative. Without structural improvements to affected intersections, the Preferred Alternative will result in significant impacts at selected intersections leading to access to APG’s Northern Peninsula. The Preferred Alternative will result in one intersection leading to access to APG’s Southern Peninsula with existing unacceptable Level of Service (LOS) to experience a further decrease in LOS. Additional temporary impacts to transportation can be expected from traffic congestion due to construction equipment entering and leaving the Preferred Alternative development sites.</p> <p>Long-term direct, indirect, and cumulative impacts to local and regional roadway networks would result from the increased APG and dependent population. Without structural improvements to affected intersections, impacts would be permanent.</p>	<p>Manage on and off-post AM and PM peak traffic congestion by implementing flex work hours and staggered openings.</p> <p>Encourage car pools.</p> <p>Modify affected intersections with structural and non-structural modifications to enhance traffic flow at peak times.</p>	<p>The Army will provide mitigation for on- and off-post impacts resulting from the Preferred Alternative. To mitigate on-post impacts, entry/exit gates will be re-engineered to accommodate the increased vehicular volume.</p> <p>On APG’s Northern Peninsula, traffic impacts from the new C4ISR campus will be mitigated by designing and constructing structural improvements to a number of intersections, turn lanes, and varying work-hour signal timing.</p> <p>The Army is committed to participate in regional planning studies that focus on the roadway network affected by implementation of the Preferred Alternative. For regional transit development, the Army</p>
	Preferred Alternative	✓	✓	✓	✓	✓	✓	✓			

Table ES-2 Summary of Potential Environmental Consequences at Aberdeen Proving Ground, Maryland (Continued)

Resource Category	Impact Category							Discussion	Best Management Practices	Mitigation Measures if Needed
	Significant	Direct	Indirect	Cumulative	Temporary	Short-Term	Long-Term			
										<p>is committed to work with the state and regional agencies to evaluate mass transit options that could serve APG, including, for example, a shuttle service for its employees from their place of work to a “mass transit facility.”</p> <p>The Army is committed to coordinate with MDOT to identify future transportation projects that may be funded under the Defense Access Roads (DAR) program, authorized in 23 U.S.C. 210, to mitigate the traffic impacts due to BRAC implementation.</p>

Table ES-2 Summary of Potential Environmental Consequences at Aberdeen Proving Ground, Maryland (Continued)

Resource Category		Impact Category							Discussion	Best Management Practices	Mitigation Measures if Needed
		Significant	Direct	Indirect	Cumulative	Temporary	Short-Term	Long-Term			
Utilities	No Action Alternative							✓	Under the No Action Alternative, continued degradation of APG utility infrastructure would produce long-term impacts. Under the Preferred Alternative, impacts to solid waste disposal capacity would occur from facility demolition. All utilities have sufficient capacity to accommodate the Preferred Alternative but will be upgraded to meet operational and safety standards. Cumulative impacts under the Preferred Alternative include a long-term beneficial impact on the installation core infrastructure. The existing regional solid waste disposal system does not have adequate capacity to address the long-term impacts of the Preferred Alternative. Additional capacity is dependent on regulatory approval and adequate funding.	Design for energy efficient use of heating, ventilation and air conditioning. Implement Leadership in Energy and Environmental Design (LEED) building design criteria.	None
	Preferred Alternative		✓	✓	✓	✓					
Hazardous and Toxic Substance	No Action Alternative								Under the Preferred Alternative, direct impacts include long-term impacts associated with increases in the use of hazardous and radiological materials and hazardous and radiological waste production. Long-term beneficial impacts would occur due to the removal and disposal of lead-based paint and asbestos containing materials from demolished buildings. Indirect impacts include short- and long-term impacts to soil, groundwater, and/or surface water should accidental hazardous and toxic substance spills be insufficiently contained or improperly identified, and allowed to migrate to the surrounding media. Cumulative impacts include the long-term potential for short-term impacts due to hazardous and toxic spills because of on- and off-post activities.	Identify asbestos containing materials prior to renovation for appropriate disposal. Provide oil waste recovery systems for construction equipment. All new structures will be constructed to meet current hazardous material handling, storage, and disposal requirements.	None
	Preferred Alternative		✓	✓			✓	✓			

SECTION 1.0 PURPOSE, NEED, AND SCOPE

1.1 INTRODUCTION

On September 8, 2005, the Defense Base Realignment and Closure (BRAC) Commission recommended that certain military realignment and relocation actions occur at U.S. Army Garrison Aberdeen Proving Ground (APG), Maryland. Figure 1.1-1 shows the location and boundaries of APG in Harford County, Maryland. The President of the United States approved the recommendations on September 15, 2005, and forwarded them to Congress. Congress did not alter the BRAC Commission's recommendations, and on November 9, 2005, the recommendations became law. Accordingly, actions of the BRAC Commission must be implemented as provided in the Defense Base Closure and Realignment Act of 1990 (Public Law 101-510) (BRAC law), as amended through the fiscal year (FY) 2005 Defense Authorization Act.

The BRAC Commission made the following recommendations concerning APG (DoD 2005):

- **5. FORT MONMOUTH, NEW JERSEY (ARMY 11):**

Close Fort Monmouth, NJ Relocate the US Army Military Academy Preparatory School to West Point, NY. Relocate the Joint Network Management System Program Office to Fort Meade, MD. Relocate the Budget/Funding, Contracting, Cataloging, Requisition Processing, Customer Services, Item Management, Stock Control, Weapon System Secondary Item Support, Requirements Determination, Integrated Materiel Management Technical Support Inventory Control Point functions for Consumable Items to Defense Supply Center Columbus, OH, and reestablish them as Defense Logistics Agency Inventory Control Point functions; relocate the procurement management and related support functions for depot level repairables to Aberdeen Proving Ground, MD, and designate them as Inventory Control Point functions, detachment of Defense Supply Center Columbus, OH, and relocate the remaining integrated materiel management, user, and related support functions to Aberdeen Proving Ground, MD. Relocate Information Systems, Sensors, Electronic Warfare, and Electronics Research and Development & Acquisition (RDA) to Aberdeen Proving Ground, MD. Relocate the elements of the Program Executive Office for Enterprise Information Systems and consolidate into the Program Executive Office, Enterprise Information Systems at Fort Belvoir, VA.

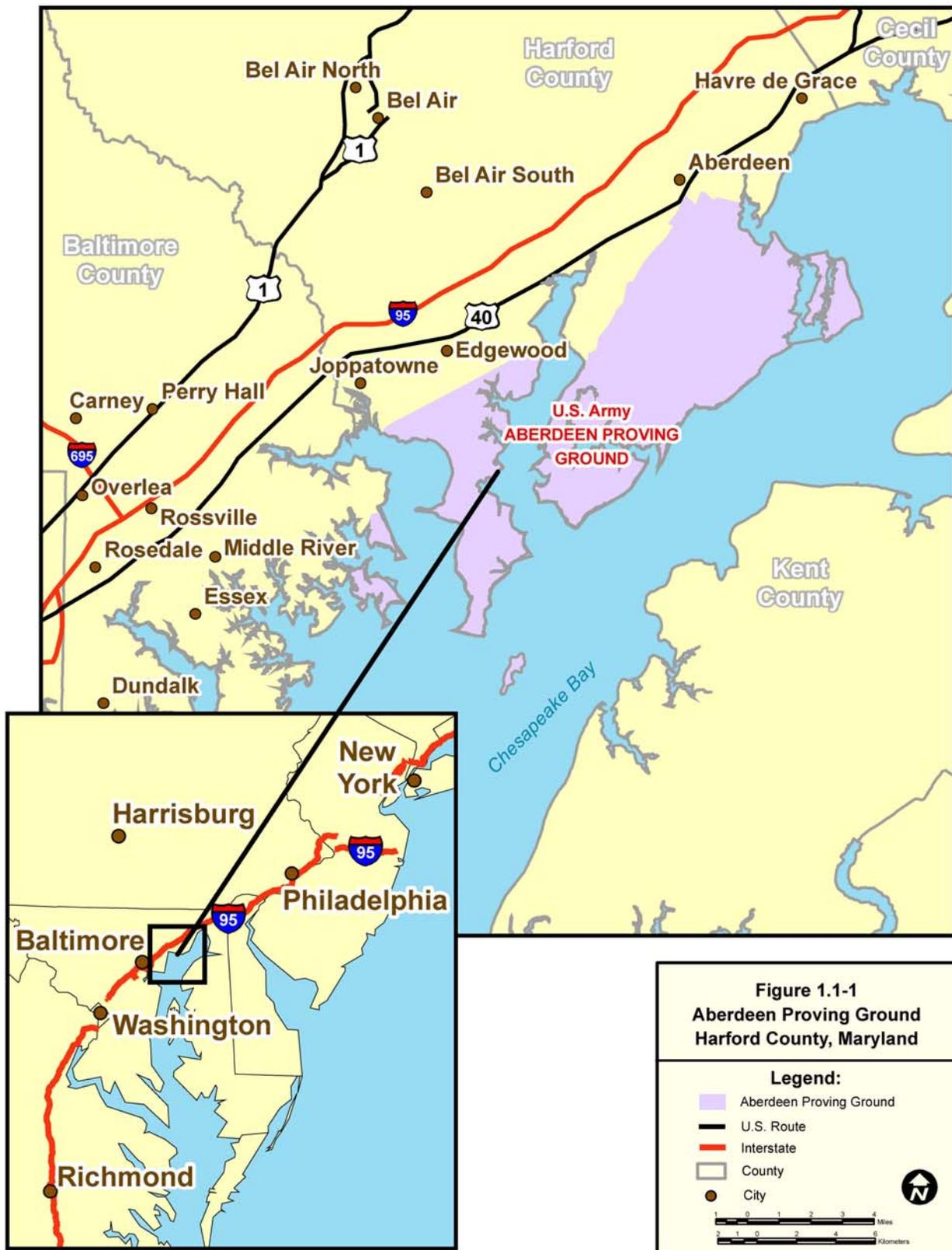
Realign Fort Belvoir, VA by relocating and consolidating Sensors, Electronics, and Electronic Warfare Research, Development and Acquisition activities to Aberdeen Proving Ground, MD, and by relocating and consolidating Information Systems Research and Development and Acquisition (except for the Program Executive Office, Enterprise Information Systems) to Aberdeen Proving Ground, MD.

Realign Army Research Institute, Fort Knox, KY, by relocating Human Systems Research to Aberdeen Proving Ground, MD.

Realign Redstone Arsenal, AL, by relocating and consolidating Information Systems Development and Acquisition to Aberdeen Proving Ground, MD.

- **136. CONSOLIDATE ARMY TEST AND EVALUATION COMMAND (ATEC) HEADQUARTERS (H&SA 18):**

Realign Park Center Four, a leased installation in Alexandria, VA, by relocating and consolidating Army Test and Evaluation Command (ATEC) with its subcomponents at Aberdeen Proving Ground (APG), MD.



- **169. WALTER REED NATIONAL MILITARY MEDICAL CENTER, BETHESDA, MD (MED 4)**

Realign Walter Reed Army Medical Center, Washington, DC, as follows: relocate all tertiary (sub-specialty and complex care) medical services to National Naval Medical Center, Bethesda, MD, establishing it as the Walter Reed National Military Medical Center Bethesda, MD; relocate Legal Medicine to the new Walter Reed National Military Medical Center Bethesda, MD; relocate sufficient personnel to the new Walter Reed National Military Medical Center Bethesda, MD, to establish a Program Management Office that will coordinate pathology results, contract administration, and quality assurance and control of DoD second opinion consults worldwide; relocate all non-tertiary (primary and specialty) patient care functions to a new community hospital at Ft Belvoir, VA; relocate the Office of the Secretary of Defense supporting unit to Fort Belvoir, VA; disestablish all elements of the Armed Forces Institute of Pathology except the National Medical Museum and the Tissue Repository; relocate the Armed Forces Medical Examiner, DNA Registry, and Accident Investigation to Dover Air Force Base, DE; AFIP capabilities not specified in this recommendation will be absorbed into other DoD, Federal, or civilian facilities, as necessary; relocate enlisted histology technician training 223 to Fort Sam Houston, TX; relocate the Combat Casualty Care Research sub-function (with the exception of those organizational elements performing neuroprotection research) of the Walter Reed Army Institute of Research (Forest Glen Annex) and the Combat Casualty Care Research sub-function of the Naval Medical Research Center (Forest Glen Annex) to the Army Institute of Surgical Research, Fort Sam Houston, TX; relocate Medical Biological Defense Research of the Walter Reed Army Institute of Research (Forest Glen Annex) and Naval Medical Research Center (Forest Glen Annex) to Fort Detrick, MD, and consolidate it with US Army Medical Research Institute of Infectious Diseases; relocate Medical Chemical Defense Research of the Walter Reed Army Institute of Research (Forest Glen Annex) to Aberdeen Proving Ground, MD, and consolidate it with the US Army Medical Research Institute of Chemical Defense; and close the main post.

- **170. BROOKS CITY BASE, TX (MED 6)**

Close Brooks City Base, San Antonio, TX. Relocate the Air Force Audit Agency and 341st Recruiting Squadron to Randolph AFB. Relocate the United States Air Force School of Aerospace Medicine, the Air Force Institute of Operational Health, and the Human Systems Development and Acquisition function to Wright Patterson Air Force Base, OH. Relocate the Naval Health Research Center Electro-Magnetic Energy Detachment and the Directed Energy portion of the Human Effectiveness Directorate of the Air Force Research Laboratory to Fort Sam Houston, TX Consolidate the Human Effectiveness Directorate with the Air Force Research Laboratory, Human Effectiveness Directorate at Wright Patterson Air Force Base, OH. Relocate the Air Force Center for Environmental Excellence, the Air Force Medical Support Agency, Air Force Medical Operations Agency, Air Force Element Medical Defense Agency, Air Force Element Medical-DoD, Air Force-Wide Support Element, 710th Information Operations Flight and the 68th Information Operations Squadron to Lackland Air Force Base, TX. Relocate the Army Medical Research Detachment to the Army Institute of Surgical Research, Fort Sam Houston, TX. Relocate the Non-Medical Chemical Biological Defense Development and Acquisition to Edgewood Chemical Biological Center, Aberdeen Proving Ground, MD. Disestablish any remaining organizations.

- **174. JOINT CENTERS OF EXCELLENCE FOR CHEMICAL, BIOLOGICAL, AND MEDICAL RESEARCH AND DEVELOPMENT AND ACQUISITION (MED 15)**

Realign Fort Belvoir, VA, by relocating the Chemical Biological Defense Research component of the Defense Threat Reduction Agency to Edgewood Chemical Biological Center, Aberdeen Proving Ground, MD.

Realign Skyline 2 and 6, Falls Church, VA, by relocating the Joint Program Executive Office for Chemical Biological Defense to Edgewood Chemical Biological Center, Aberdeen Proving Ground, MD.

- **176. DEPOT LEVEL REPARABLE PROCUREMENT MANAGEMENT CONSOLIDATION (S&S 7)**

Realign Ft. Huachuca, AZ, as follows: relocate the Budget/Funding, Contracting, Cataloging, Requisition Processing, Customer Services, Item Management, Stock Control, Weapon System Secondary Item Support, Requirements Determination, Integrated Materiel Management Technical Support Inventory Control Point functions for Consumable Items to Defense Supply Center Columbus, OH, and designate them as Defense Logistics Agency Inventory Control Point functions; relocate the procurement management and related support functions for Depot Level Repairables to Aberdeen Proving Ground, MD, and designate them as Defense Supply Center Columbus, OH, Inventory Control Point functions; and relocate the remaining integrated materiel management, user, and related support functions to Aberdeen Proving Ground, MD.

- **187. DEFENSE RESEARCH SERVICE LED LABORATORIES (TECH 22)**

Realign Army Research Laboratory Langley, VA, and Army Research Laboratory Glenn, OH, by relocating the Vehicle Technology Directorates to Aberdeen Proving Ground, MD.

The BRAC Commission recommended relocation of three organizations from APG. This environmental impact statement (EIS) addresses impacts associated with the departure of these organizations from APG, but does not address the potential impacts of future relocation of these organizations to their new installations. Impacts of those actions will be included in separate environmental documentation prepared for BRAC realignment actions at Fort Sam Houston, Texas; Fort Dix, New Jersey; and Fort Lee, Virginia. These realignment activities include:

- *Realign APG by relocating the Army Environmental Center (AEC) to Fort Sam Houston (BRAC Recommendation 148).*
- *Realign APG by relocating the Ordnance Center and School (OC&S) to Fort Lee (BRAC Recommendation 121).*
- *Realign APG by relocating all Headquarters and Support Activities Joint Cross Service Group mobilization functions to Fort Dix, New Jersey, designating it as Joint Pre-Deployment/Mobilization Site Dix/McGuire/Lakehurst (BRAC Recommendation 144).*

1.2 PURPOSE AND NEED FOR THE PREFERRED ALTERNATIVE

The purpose of the Preferred Alternative is to implement the congressionally mandated realignment to APG. The BRAC Commission's recommendations include realignment and relocation of a number of agencies and related functions/activities to APG to facilitate continuation of essential mission functions, and to improve the ability of the nation to respond rapidly to military challenges of the 21st century. The Army (Department of the Army, Secretary of the Army, Assistant Chief of Staff for Installation Management) is charged with providing necessary facilities to support the changes in force structure.

- The BRAC Commission's recommendations will align U.S. base structure with the force structure needed for the future. The Preferred Alternative will implement reposturing of the Department of the Army global force; facilitate the ongoing transformation of U.S. forces to meet the challenges of the 21st century; and restructure important support functions to capitalize on advances in technology and business practices. Overall, the BRAC recommendations will support force transformation; address new threats, strategies, and force protection concerns; consolidate business-oriented support functions; promote joint- and multi-service basing; and provide significant savings.

1.3 SCOPE

APG occupies more than 72,000 acres of land and water, and is located in Maryland at the northern end of the Chesapeake Bay. The majority of the facility is located on two peninsulas bordered and separated

by the Bush and Gunpowder Rivers, and encompasses the majority of Harford County's Chesapeake Bay waterfront. Smaller portions of the facility are on the west bank of the Gunpowder River (see Figure 1.3-1). APG's Northern and Southern Peninsulas are also known, respectively, as APG's Aberdeen and Edgewood Areas.

The Draft EIS identifies, documents, and evaluates environmental effects of the Proposed Action at APG. In this Final EIS, the Proposed Action has been determined to be the Preferred Alternative. The Army will consider the potential effects of the proposed realignments from APG to Fort Sam Houston, Fort Dix, and Fort Lee in separate, stand-alone environmental reviews for those installations.

The Army has developed this EIS in accordance with the National Environmental Policy Act (NEPA) of 1969 and implementing regulations issued by the President's Council on Environmental Quality (CEQ) and the Army. Its purpose is to inform decision makers and the public of the potential environmental consequences of the Preferred Alternative and Alternatives.

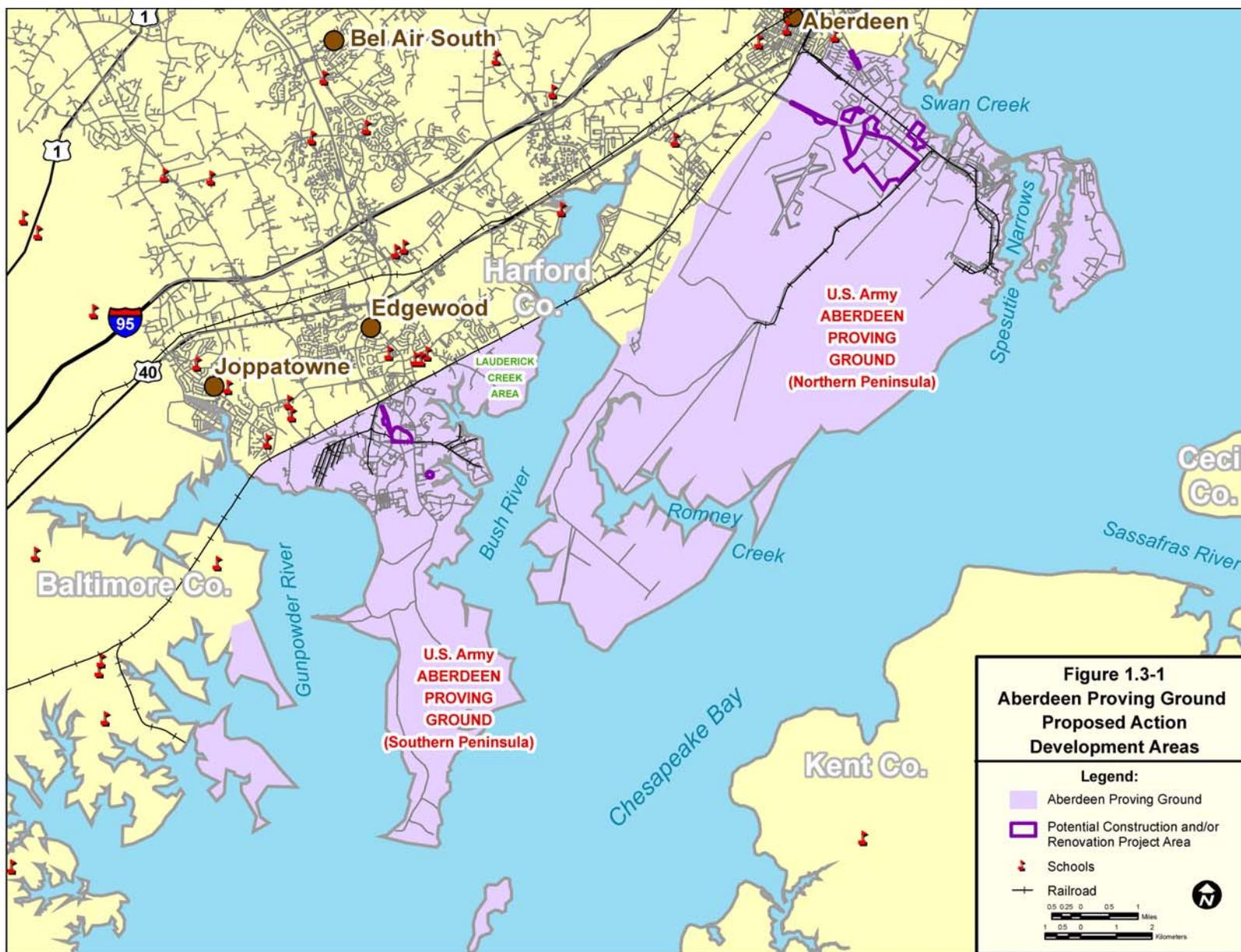
An interdisciplinary team of environmental scientists, biologists, planners, economists, engineers, archaeologists, historians, and military technicians has analyzed the Preferred Alternative in light of existing conditions, and has identified relevant beneficial and adverse effects associated with the Preferred Alternative. The Proposed Action described in Section 2 is now considered to be the Preferred Alternative, and other Alternatives, including the No Action Alternative, are described in Section 3. Conditions existing at APG as of November 2005 are considered the "environmental baseline," and are described in Section 4, Affected Environment and Environmental Consequences. The expected effects of the Preferred Alternative, also described in Section 4, are presented immediately following the description of baseline conditions for each environmental resource addressed in the EIS. Section 4.14 addresses the potential for cumulative effects. Where appropriate, Best Management Practices and mitigation measures are identified in Section 4.15. Conclusions regarding potential environmental and socioeconomic effects of the Preferred Alternative are presented in Section 5.

BRAC law specifies that NEPA does not apply to actions of the President, the BRAC Commission, or the Department of Defense (DoD), except "(i) during the process of property disposal, and (ii) during the process of relocating functions from a military installation being closed or realigned to another military installation after the receiving installation has been selected but before the functions are relocated (Sec. 2905(c) (2) (A), Public Law 101-510, as amended)." The BRAC Commission's deliberation and decision, as well as the need for closing or realigning a military installation, are exempt from NEPA. The law further specifies that in applying the provisions of NEPA to the process, the Secretary of Defense and the secretaries of the military departments concerned do not have to consider "(i) the need for closing or realigning the military installation which has been recommended for closure or realignment by the Commission, (ii) the need for transferring functions to any military installation which has been selected as the receiving installation, or (iii) military installations alternative to those recommended or selected (Sec. 2905(c)(2)(B))."

Accordingly, this EIS does not address the need for realigning units to or from APG. Rather, this EIS identifies how to support the organizations once they arrive at APG.

At one point, the scope for the EIS included the evaluation of potential impacts from a federal real estate action that would allow an Army Enhanced Use Lease (EUL) project at the Lauderick Creek site on APG's Southern Peninsula. Under the EUL Program, the Army would lease about 1,300 acres of the Lauderick Creek site to a single private developer for a maximum term of 50 years. Because this EUL project would have potential impacts in the same general region as the Preferred Alternative, and because it would begin during the same period, it was previously included in the scope of this EIS.

During the public and agency scoping process, commenters requested details on the development and design of the Lauderick Creek EUL, and expressed concerns regarding impacts to traffic, noise, safety, the loss of freshwater and tidal wetlands, coastal zone management setback requirements, and wildlife,



especially the resident bald eagle populations. The Army recognized the importance of these comments, and desired to provide comprehensive responses to adequately address those concerns. At the time of public scoping, the Proposed Action and the Lauderick Creek EUL were at the same relative level of planning for development. In the interim, the planning and pre-design process for the Proposed Action progressed, while the same processes for the Lauderick Creek EUL remained static. Since the EUL developmental process did not progress to the point where concerns could be adequately addressed in this EIS, the Army removed the Lauderick Creek EUL from further consideration in this EIS. Once the Lauderick Creek EUL development process matures to the point of environmental analysis, it will be assessed in a separate NEPA document. That NEPA document will evaluate the cumulative impacts of its proposed action combined with the impacts of the BRAC Preferred Alternative addressed in this document. This NEPA document will examine the cumulative impacts associated with the proposed Lauderick Creek EUL as a reasonably foreseeable future action.

1.4 PUBLIC INVOLVEMENT

1.4.1 General Public Involvement Process

The Army invites public participation in the NEPA process. Consideration of the views of and information from all interested persons promotes open communication and enables better decision-making. All agencies, organizations, groups, and members of the public having an interest in the Proposed Action are urged to participate in the decision-making process.

The President's CEQ and 32 Code of Federal Regulations (CFR), Part 651, provides guidance for public participation with respect to the Proposed Action. These regulations provide for six major elements of public participation available in conjunction with preparation of an EIS, including:

- 1) Notice of Intent (NOI);
- 2) Scoping;
- 3) Publication of a Notice of Availability (NOA) and public review of the Draft EIS (DEIS);
- 4) Public meeting on the DEIS;
- 5) Public release of the Final EIS (FEIS) and 30-day waiting period; and
- 6) Publication of the Record of Decision (ROD).

Each of these public participation elements is discussed below.

1.4.2 Notice of Intent

The NOI is the first formal step in the NEPA public involvement process. The public was first notified of the Army's intent to prepare an EIS for the BRAC Proposed Action at APG through publication of the NOI in the November 23, 2005 issue of the *Federal Register* (70 FR 70793, 70795).

1.4.3 Scoping Process

The scoping process is designed to solicit comments on issues or concerns that should be addressed early in the EIS process. Comments are solicited through mailings, media advertisements, and scoping meetings. These items are developed to ensure that the public is informed and provided with opportunities to participate in the decision-making process. While informal comments are welcome at any time throughout the process, the scoping period and scoping meeting provide formal opportunities for public participation in, and comment on, the environmental impact analysis process.

1.4.3.1 Project Mailing List

An initial project mailing list was developed to solicit public input throughout the scoping process. The initial (May 2006) list included members of the public who expressed interest in prior environmental documents prepared by APG and the Army. The list includes special interest groups; federal, state, and

local agencies, and elected officials; public repositories (libraries); and local media outlets (newspapers). This list is maintained and updated throughout the APG BRAC EIS process, and any additional individuals or organizations that express interest in the process have been added to the list. The mailing list is used to distribute notices and information, as appropriate, throughout the EIS process.

1.4.3.2 Public Scoping

A 30-day public scoping period for this EIS was associated with the publication of notices in local and regional newspapers of record. These public notices were published in *The Baltimore Sun* in Baltimore, Maryland (May 23, 2006), *The Aegis* in Harford County, Maryland (May 19, 2006), and *The Record* in Harford County, Maryland (May 19, 2006). These notices provided the dates and locations for scoping meetings held on June 6 and June 7, 2006.

Scoping comments received after the 30-day public scoping period were accepted, and have been incorporated into the administrative record.

Announcements or “scoping flyers” were mailed to public agencies, public interest groups and organizations, political representatives, and individuals known to, or thought to have, an interest in the Proposed Action at APG. The flyers contained a description of the meeting purpose, with an invitation to attend the meeting and/or submit comments identifying key issues to be considered as part of the EIS. Notices were mailed to the interested parties on the mailing list 2 weeks prior to the scoping meetings.

Public scoping meetings were held at the following locations:

- June 6, Holiday Inn, 1007 Beards Hill Road, Aberdeen, Maryland.
- June 7, Ramada Inn, 1700 Van Bibber Road, Edgewood, Maryland.

An informational flyer, comment sheet, and registration card were made available to all attendees at the scoping meetings.

During the APG BRAC EIS scoping process, the scope of this EIS included the Lauderick Creek EUL. Public and agency comments regarding the Lauderick Creek EUL were submitted as part of the official scoping period. All comments, whether on the BRAC Proposed Action or the Lauderick Creek EUL, are addressed in this EIS except to the extent that those questions are no longer relevant due to the removal of the Lauderick Creek EUL project from the scope of this EIS.

1.4.3.3 Agency Coordination

An agency coordination meeting was held in Aberdeen, Maryland on June 6, 2006. The intent of this meeting was to address the project with key federal, state, and local agencies early in the EIS process. Notification letters were prepared and mailed to agencies by U.S. Army Corps of Engineers (USACE) staff.

Also in June 2006, scoping material and requests for comments were mailed to federal and Maryland agencies. Informal agency coordination meetings occurred throughout the DEIS preparation period to discuss issues, clarify information, and facilitate analyses.

1.4.3.4 Scoping Results

A total of 115 comments, oral and written, were received from federal, state, and local agencies, elected officials, interest groups, commercial/industrial groups, and citizens during the public scoping period. Table 1.4.1 summarizes the number of comments received during the scoping process. It shows the number and source of comments on each resource category for the BRAC Proposed Action and the Lauderick Creek EUL. The Lauderick Creek EUL is no longer included in this EIS and will be addressed in a separate NEPA document. Therefore, the responses to comments in Appendix A are based on analyses conducted for the Proposed Action considered in this EIS. The full text of each comment and its response are found in Appendix A.

**Table 1.4.1
Summary of Comments by Resource Area**

Topic/Resource	Public	Agency	Comment Applicable To:			Number of Comments Received
			BRAC Actions	Lauderick Creek EUL ¹	Not Specified or Both	
Land Use	4	2	1	5	0	6
Aesthetics and Visual	1	0	0	0	1	1
Air Quality	1	4	3	0	2	5
Noise	11	1	0	11	1	12
Geology and Soil	0	0	0	0	0	0
Water Resources	1	5	0	0	6	6
Biological Resources	7	10	0	0	17	17
Cultural Resources	0	2	0	0	2	2
Socioeconomics	11	2	0	5	8	13
Transportation	14	3	2	2	13	17
Utilities	2	0	1	1	0	2
Hazardous and Toxic	10	5	3	7	5	15
Cumulative Effects	0	2	0	0	2	2
Scoping	4	0	0	0	4	4
Request for Detail	5	3	3	1	4	8
Not Applicable to the EIS	5	0	1	1	3	5
	76	39				
TOTAL			14	33	68	115

¹Analysis of potential impacts from the Lauderick Creek EUL is not addressed in this EIS.

1.4.3.5 Summary of Major Scoping Issues Identified

Major issues identified through the scoping process include impacts of the Proposed Action on socioeconomic issues and regional traffic.

1.4.4 Draft Environmental Impact Statement

Copies of the DEIS were made available for public review and comment. An NOA was published in the *Federal Register* on March 14, 2007 to inform the public that the DEIS was available for review. A similar notice was placed in the legal section of three local area newspapers: *The Baltimore Sun* (March 25, 2007), *The Aegis* (March 23, 2007), and *The Record* (March 23, 2007) (see Appendix E). The notices identified a point of contact to obtain more information regarding the EIS process, identified means of obtaining a copy of the DEIS for review, listed several public libraries where paper copies of the DEIS could be reviewed, and advised that an electronic version of the DEIS was available for download on the U.S. Army BRAC Division website at: http://www.hqda.army.mil/acsim/brac/nepa_eis_docs.htm. A 45-calendar day review period (starting with the publication of the NOA) was established to provide all agencies, organizations, and individuals with the opportunity to comment on the DEIS.

Table 1.4.2 lists the public libraries to which copies of the DEIS were provided.

**Table 1.4.2
DEIS Public Libraries**

Harford County Library, Aberdeen Branch 21 Franklin Street Aberdeen, Maryland 21001 (410) 273-5608	Elkton Central Library, Cecil County 301 Newark Avenue Elkton, Maryland 21921 (410) 996-5600
Harford County Library, Edgewood Branch 629 Edgewood Road Edgewood, Maryland 21040 (410) 612-1600 (Note: Library Closed March 6-18, 2007)	Kent County Public Library 408 High Street Chestertown, Maryland 21620 (410) 778-3636

In addition to the public repositories, the DEIS was provided to the public and agencies requesting copies of the document.

1.4.5 Draft Environmental Impact Statement Public Meetings

Public meetings were held during the initial 45-day DEIS review period to receive oral and written comments on the DEIS from those desiring to present them in a public forum.

Written and oral comments received at the public meetings were considered, along with other written comments received during the comment period, in development of the FEIS. Comments and responses are contained in Appendix E.

1.4.6 Final Environmental Impact Statement

The USACE assessed and considered comments, individually and collectively, provided by members of the interested public and federal, state, and local agencies. This FEIS incorporates changes suggested by comments on the DEIS, as appropriate, and contains responses to all comments received during the DEIS review period.

An NOA was published in the *Federal Register* and in the newspapers of record to inform the public of the FEIS release. The NOA identified a point of contact (see Section 1.4.7) to obtain information.

1.4.7 Record of Decision

Following a 30-day waiting period from the date of the publication of the FEIS NOA in the *Federal Register*, a ROD will be prepared and signed by the Army. The Army will consider comments received during the FEIS 30-day waiting period in reaching the final decision on this action. The ROD will describe the Army's decision regarding the Preferred Alternative. The ROD will also describe actions the Army will take to mitigate impacts associated with the Army's implementation of the selected alternative.

Throughout this process, the public may obtain information on the status and progress of the Preferred Alternative and the EIS by contacting the following office:

Commander U.S. Army Garrison Aberdeen Proving Ground (USAGAPG), Directorate of Safety, Health, and Environment, ATTN: IMNE-APG-SHE-R (Bud Keese) Building 5650, Aberdeen Proving Ground, MD 21005-5001; email: Buddy.Keese@us.army.mil.

1.5 REGULATORY FRAMEWORK FOR REALIGNMENT

The operational decisions of implementing the Preferred Alternative are affected by numerous factors, including mission requirements, schedule, availability of funding, and environmental considerations. In addressing environmental considerations, APG is guided by relevant statutes (and their implementing

regulations) and Executive Orders (EO) that establish standards and provide guidance on environmental and natural resources management and planning.

1.5.1 BRAC Procedural Requirements

The Defense Base Closure and Realignment Act of 1990 specifies that NEPA does not apply to actions of the President, the Commission, or the DoD, except “(i) during the process of property disposal, and (ii) during the process of relocating functions from a military installation being closed or realigned to another military installation after the receiving installation has been selected but before the functions are relocated” (Sec. 2905(c)(2)(A), Public Law 101-510, as amended). The law further specifies that in applying the provisions of NEPA to the process, the Secretary of Defense and the secretaries of the military departments concerned do not have to consider “(i) the need for closing or realigning the military installation which has been recommended for closure or realignment by the Commission, (ii) the need for transferring functions to any military installation which has been selected as the receiving installation, or (iii) military installations alternative to those recommended or selected” (Sec. 2905(c)(2)(B)).” The Commission’s deliberation and decision, as well as the need for closing or realigning a military installation, are exempt from NEPA. Accordingly, this EIS does not address the need for realignment.

1.5.2 Relevant Statutes and Executive Orders

In carrying out the congressionally mandated BRAC Preferred Alternative, APG is guided by relevant statutes (and their implementing regulations) and EOs that establish standards and provide guidance on environmental and natural resources protections, management, and planning. These include the Clean Air Act (CAA), Clean Water Act (CWA), Safe Drinking Water Act (SDWA), Noise Control Act (NCA), Endangered Species Act (ESA), National Historic Preservation Act (NHPA), Archaeological Resources Protection Act (ARPA), Resource Conservation and Recovery Act (RCRA), and Toxic Substances Control Act (TSCA).

The bearing of the EOs on the Preferred Alternative include EO 11988 (Floodplain Management), EO 11990 (Protection of Wetlands), EO 12088 (Federal Compliance with Pollution Control Standards), EO 12580 (Superfund Implementation), EO 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations), EO 13045 (Protection of Children from Environmental Health Risks and Safety Risks), EO 13101 (Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition), EO 13123 (Greening the Government Through Efficient Energy Management), EO 13148 (Greening the Government Through Leadership in Environmental Management), EO 13175 (Consultation and Coordination with Indian Tribal Governments), EO 13186 (Responsibilities of Federal Agencies to Protect Migratory Birds), and EO 13423 (Strengthening Federal Environmental, Energy, and Transportation Management).

These authorities are addressed in various sections throughout this EIS when relevant to particular environmental resources and conditions. The full text of the laws, regulations, and EOs are available on the Defense Environmental Network and Information Exchange (DENIX) website at <http://www.denix.osd.mil>.

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SECTION 2.0 PREFERRED ALTERNATIVE

2.1 INTRODUCTION

The Preferred Alternative includes implementation of the BRAC Commission's realignment recommendations as mandated by BRAC legislation, Public Law 101-510 and Public Law 107-107, and the National Defense Authorization Act for FY2002, proposed to occur at APG during FYs2006-2011.

2.2 BRAC REALIGNMENTS

The BRAC Commission made the following recommendations concerning APG (DoD 2005):

From Fort Monmouth, New Jersey

- Relocate the procurement management and related support functions for Depot Level Repairables to APG, and designate them as Inventory Control Point functions, detachment of Defense Supply Center, Columbus, Ohio, and relocate the remaining integrated materiel management, user, and related support functions to APG (BRAC Recommendation 5).
- Relocate the Information Systems, Sensors, Electronic Warfare, and Electronics Research and Development and Acquisition (RDA) activities to APG (BRAC Recommendation 5).

From Fort Belvoir, Virginia

- Relocate and consolidate Sensors, Electronics, and Electronic Warfare RDA activities to APG, except the Night Vision Lab and the Project Manager Night Vision/Reconnaissance, Surveillance and Target Acquisition (BRAC Recommendation 5).
- Relocate and consolidate Information Systems RDA (except for the Program Executive Office, Enterprise Information Systems) to APG (BRAC Recommendation 5).
- Relocate the Chemical Biological Defense (CBD) Research component of the Defense Threat Reduction Agency (DTRA) to the Edgewood Chemical Biological Center (ECBC), APG (BRAC Recommendation 174).

From Fort Knox, Kentucky

- Realign the Army Research Institute (ARI) by relocating Human Systems Research to APG (BRAC Recommendation 5).

From Redstone Arsenal, Alabama

- Relocate and consolidate Information Systems Development and Acquisition to APG (BRAC Recommendation 5).

From Park Center Four, Alexandria, Virginia

- Relocate and consolidate Army Test and Evaluation Command (ATEC) with its subcomponents to APG (BRAC Recommendation 136).

From Brooks City-Base, San Antonio, Texas

- Relocate the Non-Medical CBD Development and Acquisition to ECBC, APG (BRAC Recommendation 170).

From Falls Church, Virginia, Skyline 2 and 6

- Relocate the Joint Program Executive Office for CBD (JPEO-CBD) to ECBC, APG (BRAC Recommendation 5).

From Fort Huachuca, Arizona

- Relocate the procurement management and related support functions for Depot Level Repairables to APG, and designate them as Inventory Control Point functions, detachment of Defense Supply Center, Columbus, Ohio. Relocate the remaining integrated materiel management, user, and related support functions to APG (BRAC Recommendation 5).

From Langley, Virginia and Glenn, Ohio

- Realign the Army Research Laboratory (ARL) in Langley, Virginia, and Glenn, Ohio, by relocating the Vehicle Technology Directorates (VTD) to APG (BRAC Recommendation 87).

From Silver Spring, Maryland

- Realign Walter Reed Army Medical Center, Washington, D.C. by relocating the Medical Chemical Defense Research of the Walter Reed Institute of Research (Forest Glen Annex) to APG (BRAC Recommendation 169).

In addition, the BRAC Commission recommended relocation of three organizations and a mobilization function from APG. This EIS addresses the impacts associated with departure of these organizations from APG, but does not address the potential impacts of relocation to their new installations. Impacts of these actions will be included in separate NEPA documents prepared for BRAC Actions at Fort Sam Houston, Fort Dix, and Fort Lee. These realigning activities include:

- Realign APG by relocating the Army Environmental Command to Fort Sam Houston (BRAC Recommendation 148).
- Realign APG by relocating the Ordnance Center and School to Fort Lee (BRAC Recommendation 121).
- Realign APG by relocating all Headquarters and Support Activities Joint Cross Service Group mobilization functions to Fort Dix, New Jersey, designating it as Joint Pre-Deployment/Mobilization Site Dix/McGuire/Lakehurst (BRAC Recommendation 144).

Current APG infrastructure is not adequate to support the needs of the installation following realignment. The BRAC Commission recommendations for relocating organizational missions to APG will increase the number of personnel at APG, and would require construction of new facilities, renovation of existing facilities, and demolition of buildings, roads, pavements, and utilities. The Preferred Alternative requires upgrades to APG entrance gates, roadways, signage, and communications infrastructure. Improvements to electric, central steam, water, sanitary sewer, and natural gas service are required. Sidewalks, lighting, fencing, and signage improvements are also necessary to meet current anti-terrorism and force protection standards.

The current communications network on APG is not adequate to support the incoming requirements and requires upgrades to support incoming organizational requirements.

The final combination of new construction and renovation is estimated to be 3.296 million square feet (SF) of mixed administrative, laboratory, and miscellaneous facility spaces, parking, and other logistic appurtenances. The majority of this space will support administrative functions, high-tech communications and electronics research, development, testing, evaluation, and acquisition.

2.2.1 Personnel Changes Resulting from Preferred Alternative

The Preferred Alternative will result in a net increase of the installation's workforce by placement of new organizations at APG and reassignment of positions from other military installations.

The current work force at APG includes about 16,605 personnel, consisting of 2,066 active duty military personnel, 6,565 government civilian employees, 3,907 contractors, 2,908 students and trainees, and

1,159 nonappropriated funds (NAF) and other personnel. The actual workforce numbers are subject to change during the unit moves during the FY2006 to 2011 timeframe.

Table 2.2.1 lists mission realignments coming to APG as a result of the Preferred Alternative.

**Table 2.2.1
Incoming Organizations as a Result of the Preferred Alternative**

Organization	Description of Preferred Alternative	Mission
Army Research Institute	Relocate ARI Human Systems Research from Fort Knox, KY	Enhance individual and group performance and decision-making. Primary research institute for conducting research and analysis on personnel performance and training.
Army Research Laboratory	Relocate and consolidate the Vehicle Technology Directorate laboratories from Glenn, OH and Langley, VA	Provide innovative scientific and technological analyses to enable full-spectrum operations. ARL VTD is the principal Army organization for research and development in aerial vehicle propulsion and structural dynamics. ARL components are currently located on APG's Northern Peninsula.
Army Test and Evaluation Command	Vacate Park Center in Alexandria, VA	Conduct test and evaluation of rapid material equipping initiatives in support of the Global War on Terrorism. Plans, conducts, and integrates developmental testing, independent operational testing, independent evaluations, assessments, and experiments to provide essential information to Soldiers and acquisition decision makers supporting the warfighter. ATEC components currently reside on APG's Northern Peninsula. ATEC leadership desires geographic consolidation.
Chemical Biological Defense Research Component of the Defense Threat Reduction Agency; Non-Medical CBD Development and Acquisition; and Joint Program Executive Office for CBD	Relocate CBD components from Brooks City-Base, TX and Falls Church and Fort Belvoir, VA. Consolidate with Edgewood Chemical Biological Center at APG. ECBC is currently located on APG's Southern Peninsula	Develop, test, acquire and deliver the most effective automated chemical biological detection systems, medical diagnostics, and countermeasures. Principal advocate and point of contact for all chemical, biological, nuclear and radiological detection, and vaccine and medical diagnostic acquisition efforts.
Walter Reed Army Institute of Research (WRAIR) Medical Chemical Defense Laboratory	Relocate Medical Chemical Defense Research from Silver Spring, MD. Consolidate with Medical Research Institute of Chemical Defense (MRICD) at APG	Biomedical research to discover and develop medical countermeasures to chemical warfare agents, and to train and educate personnel in the medical management of chemical casualties.

Table 2.2.1
Incoming Organizations as a Result of the Preferred Alternative (Continued)

Organization	Description of Preferred Alternative	Mission
Communications-Electronics Life Cycle Management Command (CE-LCMC)	Relocate CE-LCMC Fort Monmouth, NJ, Fort Huachuca, AZ, Redstone Arsenal, AL; and Fort Belvoir, VA to APG. Upon realignment, CE-LCMC will integrate with Communications-Electronics Research Development and Engineering Center (CERDEC) to form C4ISR.	Develop, acquire, field, and sustain Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) systems for the tactical and strategic battle space and the sustaining base.
Communications-Electronics Research Development and Engineering Center	Relocate CERDEC from Fort Monmouth, NJ to APG. Upon realignment, CERDEC will integrate with CE-LCMC to form C4ISR.	Develop and integrate C4ISR technologies that enable information dominance and decisive lethality for the networked warfighter.

Source: APG 2006a

Table 2.2.2 lists outgoing and incoming personnel as estimated by the BRAC 2005 Commission and APG planners (June 2006). These estimates may change slightly during the realignment period. Incoming personnel would consist of 439 active duty military, 6,114 government civilian employees, and 2,221 embedded contractor personnel. This would be offset by the departure of about 4,371 personnel, including 702 active duty military, 431 government civilian employees, 330 contractor personnel, and 2,908 students and trainees. Together the planned departures and planned increases result in an estimated net gain of 4,403 personnel at the installation. This net gain would represent an approximate 26 percent increase in the installation's existing workforce.

Table 2.2.2
Approximate Total and Estimated Personnel Position Changes at Aberdeen Proving Ground as a Result of the Preferred Alternative

	Military	Government Civilian	Contractor	Student/Trainee ¹	NAF/Other ²	Total
Current APG Personnel	2,066	6,565	3,907	2,908	1,159	16,605
Incoming Personnel	439	6,114	2,221	0	0	8,774
Outgoing Personnel	-702	-431	-330	-2,908	0	-4,371
Net Population Change at APG	-263	5,683	1,891	-2,908	0	4,403
Estimated APG Personnel After Preferred Alternative	1,803	12,248	5,798	0	1,159	21,008

¹ Student/Trainee Personnel Numbers are Equivalent to Fulltime Employees

² NAF/Other = Non-Appropriated Fund and Other Employees

Source: Army Stationing and Installation Plan (ASIP) dated June 21, 2006

2.2.2 Facility Requirements Related to the Preferred Alternative

Implementation of the Preferred Alternative requires construction of new facilities or alteration and upgrade of existing facilities to accommodate incoming organizations. Table 2.2.3 shows the facilities needed at APG, and the estimated space required for those facilities. The table provides estimates only as space planning and facility design may slightly change the requirements. As planning, engineering, and design of facilities progress, the actual amount of new construction and renovated space can vary from estimates in the table. New construction, renovation of 22 buildings, and demolition of 72 buildings are estimated at 2,479,450 SF, 816,987 SF, and 822,732 SF, respectively.

The C4ISR campus will be constructed on APG's Northern Peninsula. The complex will include new construction of office facilities, laboratories, and test and development space. The campus will collocate all C4ISR activities in the same general area as existing APG tenants with comparable missions.

Relocation of the JPEO-CBD to the APG Southern Peninsula is preferred because it is slated to become the APG Chemical/Biological Center of Excellence in the latest draft land use plan. In addition, the JPEO-CBD is the procurement activity for chemical and biological research and development (R&D) and should be collocated in the same area as existing chemical and biological R&D activities on APG. A number of site design alternatives are being reviewed prior to final design and alignment.

Except for the Child Development Center (CDC), Directorate of Information Management, and Barracks facilities listed in Table 2.2.3, all other existing installation recreational and support facilities are believed to be adequate to support the population changes.

Table 2.2.3
Facilities Needed for Incoming BRAC Realignment Organizations
at Aberdeen Proving Ground

	Required Space (square feet) ¹
Workspace Requirements for Incoming Organizations	
ARI	8,146
ARL	12,474
ATEC	195,000
JPEO-CBD	77,661
WRAIR (MRICD)	31,100
C4ISR (CERDEC and CE-LCMC)	2,660,402
Total Required Workspace	2,984,783
Support Facilities Requirements for Incoming Organizations	
Barracks	160,000
Directorate of Information Management (DOIM)	127,604
Child Development Center	24,050
Total Required Support Facility Expansion	311,654
TOTAL REQUIRED	3,296,437

Source: APG July 2006 DD Forms 1391

¹Includes Administrative, Laboratory, and Other Facilities

Current APG infrastructure is not adequate to support the needs of the installation following realignment. The BRAC Commission recommendations for relocating organizational missions to APG will increase the number of personnel at APG and require construction, renovation, and demolition of buildings, roads, pavements, and utilities. Infrastructure upgrades to support the Preferred Alternative include improvements

to three entrance gates and associated paved roadways, underground utilities, lighting, fencing, signage, information management/information technology infrastructure, and airfield runway and taxiway operations infrastructure.

The Harford (MD 22) Gate, Maryland Boulevard (MD 715) Gate, and Hoadley Road (MD 24) Gate will all undergo structural improvements to decrease processing time for APG workers and facilitate the movement of visitors and delivery trucks. All gate improvement designs will address anti-terrorist and force protection requirements.

The Harford (MD 22) Gate will be expanded to five inbound lanes and two outbound lanes. No visitors will be allowed through this gate. Visitors will be directed to the Maryland Boulevard (MD 715) Gate.

The Maryland Boulevard (MD 715) Gate will be extensively reengineered to expand to a total capacity of ten inbound lanes. It will also have a truck-only inspection lane and visitors processing center.

The Hoadley (MD 24) Gate will be expanded to three inbound and two outbound lanes.

Information Systems Engineering Command (ISEC) and the USACE have agreed on several courses of action to support the incoming BRAC organizations' Information Technology requirements at APG. The proposal for expansion of the optical fiber network has been configured per ISEC criteria and has been reviewed by ISEC. In all cases, the proposal would allow for an overbuild of the expansion duct on the primary loop. The quantity of the expansion duct varies by run and all of the runs appear to provide only the minimum capacity necessary. As a part of the proposal, additional loop ducting would be installed for existing connections into the Dial Central Office. New buried ducting to accommodate the new manholes and new communication huts would also be installed. Lateral ducting would be constructed and installed to the new buildings from existing or proposed manholes.

In addition to permanent buildings and associated infrastructure, typical construction site staging and support areas would be required. The construction of facilities required for BRAC realignment organizations will require varying amounts of fill. The amount of fill needed will depend on final design placement within the Preferred Alternative development areas. Construction fill would be taken from on-post stockpiles, or may be acquired from off-post supplies. On-post stockpiles considered for use include:

- KD Range located on APG's Northern Peninsula: Clean soil from the earth beam of a former firing range. Contains about 50,000 cubic yards;
- Testing Pond Material located on APG's Northern Peninsula: Soil and dredged material. Contains about 2,000,000-3,000,000 cubic yards;
- J Field located on APG's Southern Peninsula: Excavated soil from a former construction site. Contains about 750,000 cubic yards.

Should any on-post stockpiles be used, APG will work with the appropriate regulatory agencies for coordination and/or permitting of disturbed areas.

2.3 SCHEDULE

Under Section 2904(a), Public Law 101-510, as amended, the Army must initiate all realignments no later than September 15, 2007, and complete all realignments no later than September 15, 2011. At APG, the NEPA analysis (this EIS and the ROD) is scheduled to be completed by the end of FY2007. Planning, engineering, and design of facilities will begin in FY2007. Construction will continue through the end of FY2011. Depending on the availability and suitability of facilities, incoming units will relocate to APG beginning in FY2008, and continue through to FY2011. The departing units (Army Environmental Command and U.S. Army Ordnance Center and School (USAOC&S)) are scheduled to depart APG starting in FY2009 through to FY2011.

The schedule is subject to minor revisions as APG reviews the schedules for funding, renovation, and construction. On a priority basis, facilities construction would be synchronized to meet the timelines of realigning organizations. The realignment of organizations earlier than FY2007 is not feasible due to the time required to plan, design, and renovate/build facilities.

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SECTION 3.0 ALTERNATIVES

3.1 INTRODUCTION

A basic principle of NEPA is that an agency should consider reasonable alternatives to a Preferred Alternative. Considering alternatives helps avoid some impacts and allows analysis of other reasonable ways to achieve the stated purpose. To be considered reasonable, an alternative must be ready for decision-making (any necessary preceding events having taken place), affordable, capable of implementation, and satisfactory with respect to meeting the purpose and need for the action.

Reasonable alternatives for implementation of the Preferred Alternative have been examined according to three variables: (1) means to physically accommodate realigned units and new tenants; (2) siting of new construction; and (3) schedule of BRAC and other Army actions during the FY2006-2011 timeframe that were sufficiently defined for analysis in 2006. This section presents the Army's development of alternatives and describes alternatives available for the Preferred Alternative. The section also describes the No Action Alternative.

3.2 DEVELOPMENT OF ALTERNATIVES

3.2.1 Means to Physically Accommodate Realigned Units

Realignment of APG involves about 8,800 incoming positions. Offset by the departure of about 4,400 positions, APG's estimated net gain is about 4,400 personnel positions. Relocation of units and establishment of new tenants involve ensuring that the installation has adequate support facilities for existing and newly acquired personnel and their on-going operational requirements. Options for accommodating incoming organizations within the more than 72,000-acre installation include 1) reuse of vacated and unoccupied structures with and without modernization or renovation; 2) new construction within developed and non-developed lands; 3) a combination of reuse/reutilization and new construction; and 4) leasing off-post facilities.

3.2.1.1 *Geographical Distribution*

The placement of any or all of the 13 incoming organizations could include any combination of construction facility reutilization on APG's Northern and Southern Peninsulas. Siting options include:

- Locating incoming organizations in cantonment (developed) areas with established support utilities (water, sewer, electric, roads, *etc.*); and
- Construction in new areas that are primarily vegetated without established support utilities.

Siting criteria for construction of new facilities and determining which existing facilities could be renovated to accommodate incoming activities were used in determining the location of the Preferred Alternative on APG. The eight criteria are:

- Consideration of compatibility between the functions to be performed and the installation land use designation for the site;
- Collocation of similar functions to support force structure efficiently and effectively, increase operational readiness, and facilitate new ways of doing business;
- Adequacy of the site for the function required and proximity to related activities;
- Distance from incompatible on- and off-post activities and availability and capacity of roads;
- Efficient use of property;

- Development density;
- Potential future mission requirements; and
- Special site characteristics, including environmental incompatibilities.

3.2.1.2 *Developed Versus Non-Developed Placement*

Both APG's Northern and Southern Peninsulas contain cantonment (developed) areas where sufficient room exists to either construct new or renovate existing facilities. The need for new construction in non-developed areas of the installation would likely result in impacts to water quality, vegetative communities, and existing wildlife habitats in the currently non-developed areas on APG. Therefore, placement of development in the cantonment areas will result in overall less environmental impact to the installation.

3.2.1.3 *Existing Structures Versus New Construction*

Requirements from the incoming organizations affected by BRAC were collected and analyzed by the APG BRAC Planning Team. Overall, APG requires about 3.3 million SF of additional space to meet the needs of the realigned and new units. Incoming requirements coupled with the timing of vacated APG space due to outgoing organizations were utilized to develop a number of potential solutions to meet incoming personnel and space requirements. A mix of new construction and reutilization of existing facilities is required to accommodate incoming personnel and equipment.

3.2.1.4 *APG's Northern Versus Southern Peninsulas*

The USAOC&S, which is realigning to Ft. Lee, Virginia, utilizes the majority of facilities that will be vacated by APG's outgoing organizations. Based on FY2008 funding availability, USAOC&S components currently occupying facilities on APG's Northern Peninsula are scheduled to vacate APG in FY2009, which will allow reutilization of the vacated facilities in FY2010. Funding availability indicates that the USAOC&S components currently located on APG's Southern Peninsula cannot vacate until FY2010; therefore, incoming organizations cannot occupy vacated areas within the mandated BRAC timeline. This, along with various utilization constraints for APG's Southern Peninsula, focuses incoming BRAC placement on APG's Northern Peninsula except to co-locate medical and CBD organizations on APG's Southern Peninsula where like organizations currently reside (USACE Baltimore 2006).

3.2.2 *Siting of New Construction and Renovation of Existing Facilities*

Multiple alternatives or courses of action were developed for each incoming activity. APG's siting guidelines rested on three primary Army elements:

- BRAC Law: The BRAC Commissions' recommendations for realigning organizations to APG rest on consolidation of training and related development to a single installation, which promotes training effectiveness and functional efficiencies. The recommendations improve the military functionality by consolidating related branch centers and schools. It enhances military value, supports the Army's Force Structure Plan, and maintains sufficient surge capability to address unforeseen requirements. This provides the same or better level of service at a reduced cost. Therefore, BRAC realignments are geared toward consolidating knowledge, skills, and capabilities to APG.
- Army Regulation 210-20, *Master Planning for Army Installations*, establishes Army policy to maximize use of existing facilities. The regulation directs that new construction would not be authorized to meet a mission that can be supported by existing, underutilized, and structurally adequate facilities, provided that use of the facilities would not degrade operational efficiency. Under this policy, selection and use of facilities to support mission requirements adheres to the foregoing choices in the order in which they are listed. That is, if there are adequate existing facilities to accommodate requirements, and absent other overriding considerations, further examination of renovation, leasing, or

construction alternatives is not required. Similarly, if a combination of use of existing facilities and renovation satisfies the Army's needs, leasing or new construction need not be addressed. New construction may proceed only when use of existing facilities, renovation, leasing, or a combination of these measures are inadequate to meet mission requirements.

- APG Master Plan: The siting of the facilities is based principally on the idea that the APG Master Plan (APG 1978), the Installation Design Guide (APG 1995) and the APG Strategy 2025 (USACE Baltimore 2003b) seek to collocate like uses and separate incompatible uses. Potential locations for new construction, shown in Figures 3.2-1 and 3.2-2, conform to the Master Plan and Strategy 2025. The locations adhere to the general and specific siting criteria set forth in the Draft BRAC Planning Study (USACE Baltimore 2006). This planning study utilized the most recent estimates of incoming activities to determine facility requirements at APG. This study examined a number of siting options, taking into consideration environmental constraints, engineering considerations, logistics, and the requirements of the incoming missions to prepare the most preferred configurations. This EIS presents the most recent siting configurations for APG's Northern and Southern Peninsulas; however, as further siting and design considerations are conducted (*e.g.*, wetlands delineation, geotechnical investigations) the final placement may vary slightly from that shown in this EIS. This EIS assesses the impacts to resources with a zone that includes the Preferred Alternative development areas, thus including final siting variations within the assessment. The preferred locations reflect the results of the Army's Master Planning process for APG.

With these guidelines APG's BRAC 2005 construction and siting decisions consist of a combination of several factors, including mission synergies, facility/infrastructure requirements, land use compatibility, environmental impacts, and timing. The results are optimal siting options for each of the incoming organizations that maximize to the extent practical reuse/new construction scenarios. Table 3.2.1 lists the preferred siting/development option for the incoming BRAC organizations.

Because the mix of renovation of existing facilities and construction of new facilities is not finalized, Figures 3.2-1 and 3.2-2 show the potential construction and/or renovation project areas for all incoming activities under the Preferred Alternative. Note that the project areas indicated on Figures 3.2-1 and 3.2-2 do not represent the footprint of actual buildings to be constructed and/or reutilized, but show the extent of the areas where the projects may be implemented. In other words, all construction and renovation related to the Preferred Alternative will occur within these areas. The alternatives addressed in this EIS effectively address the current values (square footage and cost) for the mix of new construction and building renovation. These values were used to analyze the potential environmental consequences for each resource. Minor shifts in the mix of new construction and reutilized facilities would not produce drastically different results to natural resources. If full funding for the Preferred Alternative is not received, the mix will be reevaluated, but will remain within the constraint of the identified project areas in Figures 3.2-1 and 3.2-2.

Figures 3.2-1 and 3.2-2 depict the location and extent of construction and renovation area possibilities considered for the Preferred Alternative. These extents allow flexibility to react to timing and funding obstacles. This flexibility allows the preferred footprint to change within a specified area (Figures 3.2-1 and 3.2-2) to accommodate glitches in the preferred option. For example, if the 4400 and 4500 blocks are not cleared to begin construction as scheduled, the 200, 300, or 400 blocks have been analyzed and are considered the second option to accommodate ARI. Analyses have been done for each incoming organization to determine suitable areas if the preferred option becomes unfeasible or unavailable. If this document limits its evaluation to a single footprint option, minor changes in the footprint will require additional NEPA documentation and delay BRAC realignment activities.

Table 3.2.1 Incoming Preferred Siting Option at APG

Organization	Comment	Site Location	Pro	Con
ARI		4400 or 4500 Block on APG's Northern Peninsula – renovation of vacated USAOC&S space.	Synergy with other missions on APG's Northern Peninsula.	Not collocated with similar ARL functions.
ARL-VTD (Glenn and Langley)	The functions relocating from Glenn and Langley require laboratory support. APG does not currently have a sufficient amount of laboratory space to support this relocation. Accordingly, new construction is necessary and ARL has requested that the VTD activities and personnel are collocated with the Rodman Building (Building 4600) on APG's Northern Peninsula.	4600 Block – new construction on APG's Northern Peninsula (an addition to the Rodman Building).	The area surrounding the Rodman Building offers adequate space to allow for an addition.	None
ATEC	A Major Command Headquarters will be located in this building. Should be sited in a prominent area on APG. Preferably, near the Developmental Test Command, an ATEC subordinate command.	New construction on APG's Northern Peninsula: at Aberdeen Blvd. and Swan Creek Dr. or Susquehanna Ave. and Havre De Grace St. Renovation of 4500 block barracks into administrative space is a third option.	The Aberdeen Blvd. and Swan Creek Dr. location offers an adequate sized parcel and the best land use compatibility for new construction of a Major Command facility.	Cost of new construction may be prohibitive.
Chemical Biological Defense Research Component of the Defense Threat Reduction Agency; Non-Medical CBD Development and Acquisition; and Joint Program Executive Office for CBD	APG's Southern Peninsula is preferred because it is slated to become the APG Chemical/Biological Center of Excellence in the latest draft land use plan. In addition, the JPEO-CBD is the procurement activity for chemical and biological R&D and should be collocated in the same area as existing chemical and biological research and development activities on APG.	New construction in the E1800 and E1900 Blocks.	Location in cantonment area of APG's Southern Peninsula creates synergies with similar chemical missions.	Infrastructure upgrades will be limited due to financial considerations.

Table 3.2.1 - Incoming Preferred Siting Option at APG (Continued)

Organization	Comment	Site Location	Pro	Con
WRAIR (MRICD)	WRAIR mission is being integrated with existing similar MRICD functions; MRICD is located in the APG Southern Cantonment.	Construction of an addition to Building E3081 on APG's Southern Peninsula.	This site allows for collocation of users and facilities.	None
C4ISR (CERDEC and CE-LCMC)	C4ISR must be viewed as one organization; originally, CERDEC and CE-LCMC were being planned as two distinct organizations that would be realigning to APG.	APG's Northern Peninsula. Some buildings from the 3100 and the 5000 Blocks – renovation; the 5400 Block – demolition of existing buildings and new construction.	Collocates all C4ISR activities in the same general area as existing APG tenants with comparable missions. Maximizes potential reuse of USAOC&S vacated facilities.	Existing users of the 3100 and 5400 Blocks would have to be relocated and USAOC&S must move before 5000 Block can be reused.
Barracks	Consolidation of all barracks space on APG's Northern Peninsula will meet the land use guidelines set forth in the draft APG Land Use Plan; consolidation will also allow greater efficiencies in a number of areas by collocating barracks space with morale, welfare, and recreation support services currently located in APG's Northern Peninsula.	4500 Block – renovation of interior configuration from 2+2 (two units joined by a bathroom) to 1+1 (one unit with one bathroom).	These are the most recently constructed barracks and would need little in the way of renovation to convert from 2+2 to 1+1.	These barracks can be more readily converted to administrative space than other barracks.
Directorate of Information Management (DOIM)	The DOIM must be centrally located with the majority of APG users and incoming BRAC organizations.	Renovate barracks in the 4400 Block.	This site is centrally located to the preferred sites for incoming BRAC organizations with a large DOIM requirement.	The most efficient floor plan for the computer center and administrative space is impacted by the barracks layout.

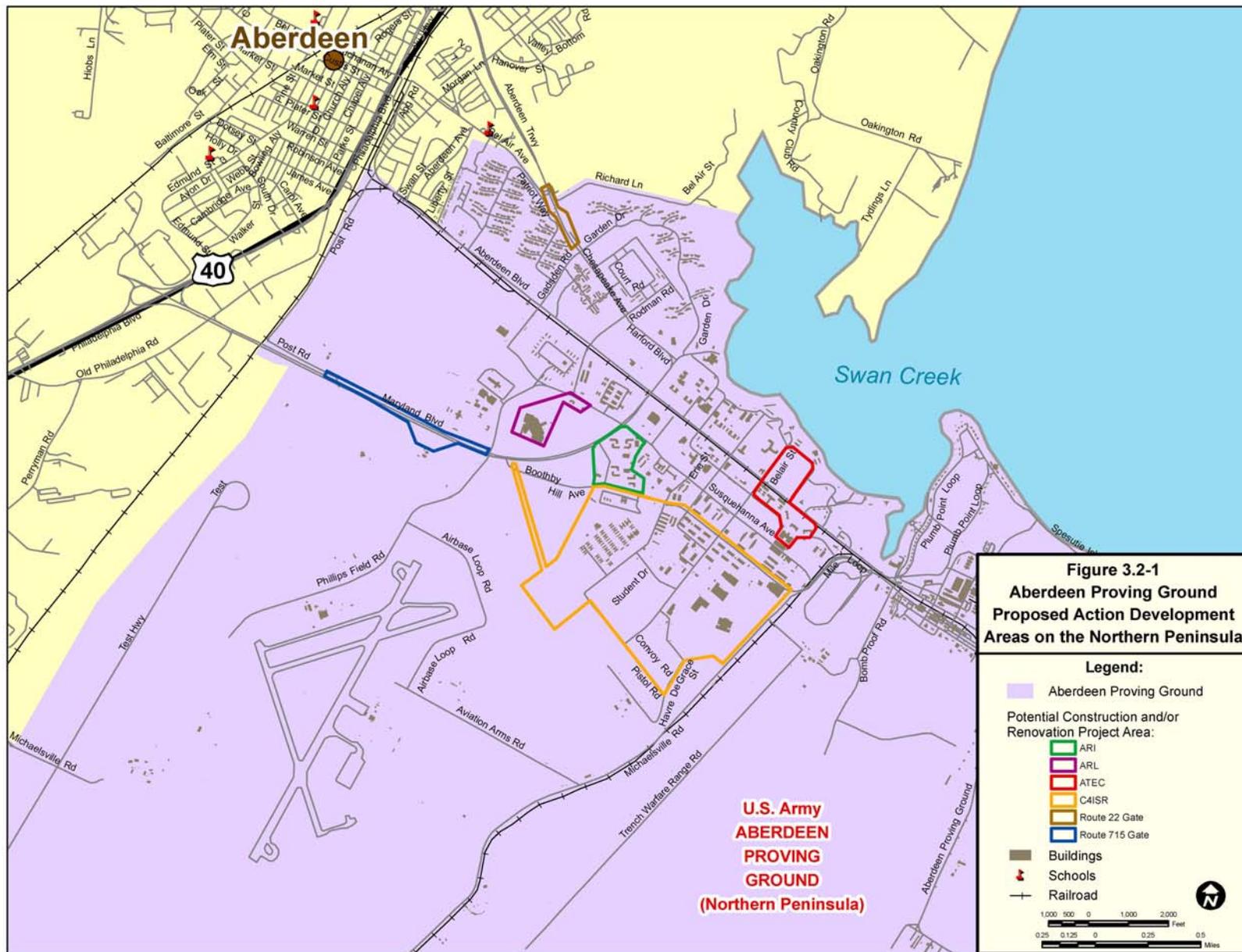
Source: Draft BRAC Facilities, Infrastructure, and Environmental / HTRW Planning Study (USACE Baltimore 2006)

3.2.3 Alternatives Originally Considered but Rejected for Further Analysis

Alternatives originally considered but rejected for further analysis within this EIS are presented in Table 3.2.2.

3.2.4 Schedule for the Preferred Alternative

Alternatives for scheduling the Preferred Alternative are principally affected by three factors: the availability of facilities to accommodate realigned personnel and functions, efforts to minimize potential disruption of mission activities based on the number of personnel involved in the relocation or the amount of work to be performed, and early realization of benefits to be gained by completion of the realignments. In most cases, minor shifts in schedule would not produce different environmental results.



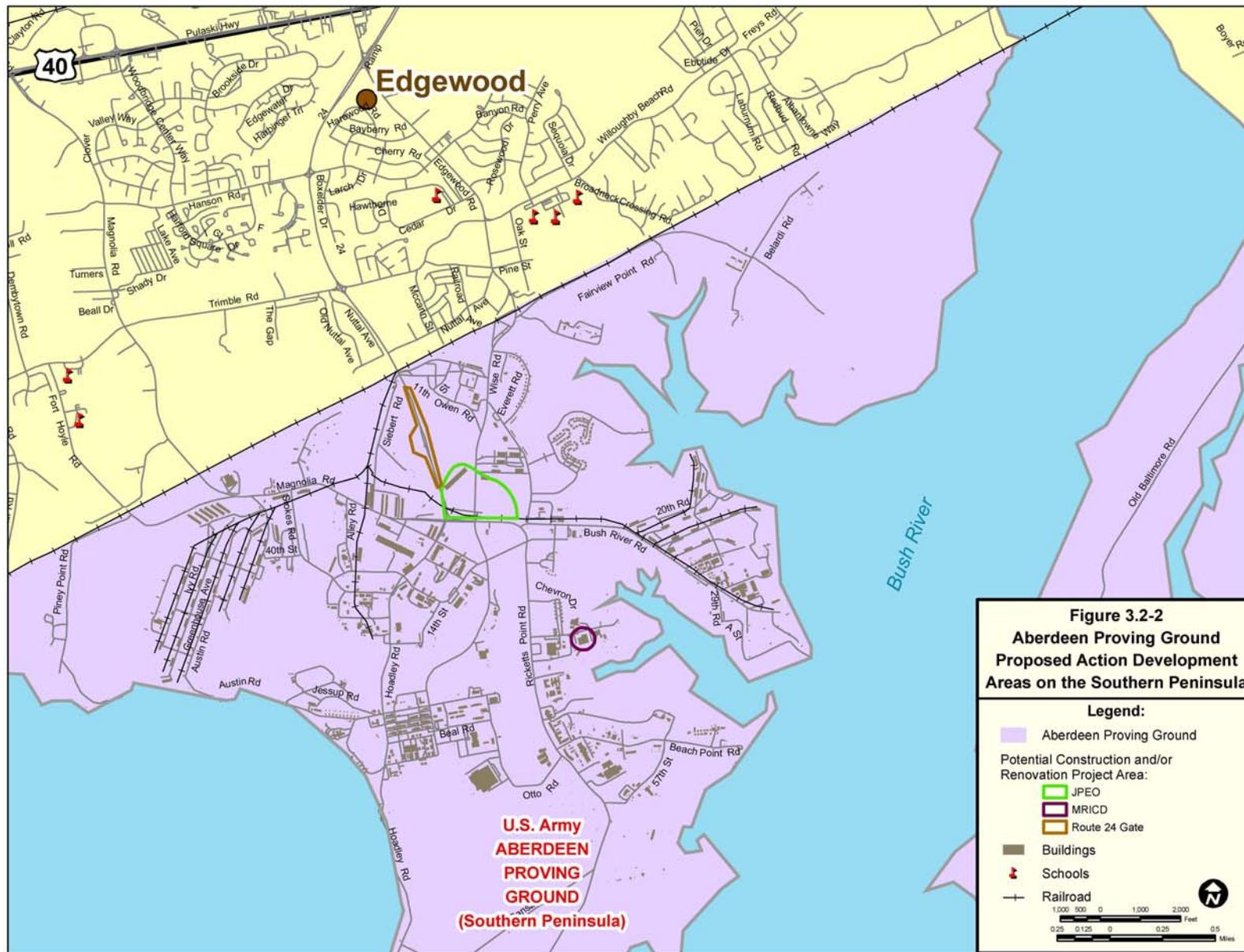


Table 3.2.2 Rejected Alternatives for APG BRAC Actions

Rejected Alternative	Reason for Rejection
New construction for all incoming organizations.	Funding is not available to construct new facilities and related infrastructure on undeveloped land.
Complete placement of incoming personnel and equipment into existing facilities on APG's Northern and Southern Peninsulas.	Lack of vacant and suitable existing space coupled with lack of funding available to construct new facilities and related infrastructure on undeveloped land.
Complete placement of incoming personnel and equipment on APG's Northern Peninsula.	Lack of vacant and suitable existing space coupled with lack of funding available to construct new facilities and related infrastructure on undeveloped land.
Complete placement of incoming personnel and equipment on APG's Southern Peninsula.	Lack of vacant and suitable existing space coupled with lack of funding available to construct new facilities and related infrastructure on undeveloped land.
Leasing some or all space off-post.	Leasing off-post space to meet the requirements would involve major drawbacks. Force protection policies specify certain facilities characteristics, such as physical security features, setback from roadways, and "hardened" construction. Personnel and equipment located on-post and off-post adversely affects command and control functions, results in higher operational costs, and impairs efficient use of resources. For these reasons, leasing off-post facilities is not feasible.

3.3 ALTERNATIVES

3.3.1 Alternative 1 - No Action Alternative

The No Action Alternative is required by CEQ regulations to identify the existing environmental baseline conditions against which potential impacts are evaluated. The No Action Alternative must be described because it is the environmental baseline condition or the current status (November 2005) of the environment if the Proposed Action is not implemented. For realignment actions recommended by the BRAC Commission, it is noted that for the No Action Alternative, maintenance of current conditions, is not feasible, since the Preferred Alternative is congressionally mandated.

Under the No Action Alternative, APG would not implement the Preferred Alternative. Organizations presently assigned to APG would continue to train at and operate from the installation. Impacts from other actions planned or funded in November 2005 for execution during 2007 - 2010 are included in the No Action Alternative. Additionally, APG would use its current inventory of facilities, although routine replacement or renovation actions could occur through normal military maintenance and construction procedures, as circumstances independently warrant.

3.3.2 Alternative 2 - Preferred Alternative

Alternative 2 consists of implementing all actions recommended by the BRAC Commission Report through a combination of new construction and reuse of existing facilities to accommodate incoming missions in project areas illustrated in Figures 3.2-1 and 3.2-2. The BRAC Commission recommendations concerning APG are provided in Section 2.2 of this document. The BRAC Commission's deliberations, decisions, and the need for realigning military installations are exempt from NEPA analysis. NEPA analysis does apply to how the realignment actions are implemented. The NEPA documentation determined to be appropriate at APG is an EIS.

Due to the physical limitations for siting incoming activities, scheduling constraints imposed by the BRAC Commission Report, and budgetary limitations affecting implementation of the Preferred Alternative at APG, no additional realistic, distinct, or feasible alternatives to the Preferred Alternative to be included in this EIS have been identified.

SECTION 4.0 AFFECTED ENVIRONMENT AND CONSEQUENCES

4.1 INTRODUCTION

The following discussion describes the affected environment within all APG locales being considered in this analysis. Following a description of the affected environment, the discussion addresses the potential environmental consequences or impacts of the alternatives evaluated. The discussion focuses on aspects of the environment that could potentially be affected by the proposed construction projects, maintenance and operation of the proposed facilities and support elements, and implementation of new activities associated with the presence of the new organizations at APG.

The discussion is structured using the following general environmental resource categories:

- Land Use;
- Aesthetics and Visual Resources;
- Air Quality;
- Noise;
- Geology and Soil;
- Water Resources;
- Biological Resources;
- Cultural Resources;
- Socioeconomics;
- Transportation;
- Utilities; and
- Hazardous and Toxic Substances.

As discussed in Section 3, the alternatives being considered in the environmental consequences section of this EIS are:

- Alternative 1 - No Action Alternative
- Alternative 2 - The Preferred Alternative

4.1.1 Definition of Key Terms

4.1.1.1 *Environmental Baseline*

The existing environmental baseline conditions have been established as the conditions at the installation as of November 2005.

4.1.1.2 *Impact*

An environmental consequence or impact (hereafter referred to in this document as an impact) is defined as a noticeable change in a resource from the existing environmental baseline conditions caused by or resulting from the Preferred Alternative. The terms “impact” and “effect” are synonymous as used in this EIS. Impacts may be determined to be beneficial or adverse and may apply to the full range of natural, aesthetic, cultural, and economic resources of the installation and its surrounding environment. In this EIS, the term “impact” implies a negative impact, unless it is described as a beneficial impact.

4.1.1.3 *Duration of Impacts*

Impacts to resources may occur in a relatively short period of time or may be permanent. In this EIS, the estimated time durations during which impacts may be perceived or measured are described as temporary, short-term, long-term, or persistent.

Temporary impacts are generally the result of implementation of the Preferred Alternative. In this EIS, temporary impacts may result from preparation of construction sites, actual construction, and renovation of existing facilities. The temporary impacts may affect air quality, water quality, visual, aesthetics, and other resources. Temporary impacts generally subside once construction activities end.

Short-term impacts are perceived even after implementation of the Preferred Alternative. Some resources may exhibit short-term impacts as they recover from any disturbances. Short-term impacts may exhibit a duration of 1 to 5 years after full implementation of the Preferred Alternative.

Long-term impacts are perceived in some resources for 5 to 10 years after implementation of the Preferred Alternative. The longer duration may be resource specific (*e.g.*, tree growth) or may be a result of the persistence of the cause of the impact (*e.g.*, increased traffic without intersection modifications).

Some impacts may persist indefinitely over time. These persistent or permanent impacts remain over longer periods of time.

The duration of an impact is not the sole determination of significance. Permanent impacts may not be significant while temporary impacts may exceed criteria and may be described as significant.

4.1.1.4 *Direct Versus Indirect Impacts*

Where applicable, the analysis of impacts associated with each course of action has been further divided into direct and indirect impacts. Definitions and examples of direct and indirect impacts as used in this document are as follows:

Direct Impacts. A direct impact is caused by the Preferred Alternative and occurs at the same time and place. A direct impact can be temporary, short-term, long-term, or persistent.

Indirect Impacts. An indirect impact is caused by the Preferred Alternative and occurs later in time or is farther removed in distance, but is still reasonably foreseeable.

Application of Direct Versus Indirect Impacts. For direct impacts to occur, a resource must be present in a particular area. For example, if highly erodible soil is disturbed due to construction, there would be a direct impact to the soil from erosion at the development site. Sediment-laden runoff might indirectly affect surface water quality in adjacent areas downstream from the development site.

4.1.1.5 *Impact Characterization*

Under NEPA, impacts are characterized by their relative magnitude. Adverse or beneficial impacts that are determined to be significant are the highest level of impacts. Each resource has one or more quantitative or a qualitative thresholds to assist in the determination of significance. The term “significant,” as defined in Section 1508.27 of the regulations for implementing NEPA (40 CFR 1500), requires consideration of both the context and intensity of the impact evaluated. Significance can vary in relation to the context of the proposed action. Thus, the significance of an action must be evaluated in several contexts that vary with the setting of the proposed action. For example, context may include consideration of effects on a national, regional, and/or local basis depending on the action proposed. Both short-term and long-term effects may be significant. In this EIS, the threshold criteria for each resource area are provided in the text.

In accordance with the CEQ implementing guidance, impacts are also evaluated in terms of their intensity or severity. Factors contributing to the evaluation of the intensity of an impact include, but are not limited to, the following:

- Because an impact may be both beneficial and adverse, a significant impact may exist even if, on balance, the impact is considered beneficial.
- The degree to which the action affects public health or safety.
- Unique characteristics of the geographic area where the action is proposed, such as proximity to parklands, historic or cultural resources, wetlands, prime farmlands, wild and scenic rivers or ecologically critical areas, and rare flora and fauna species.
- The degree to which the effects on the quality of the human environment are likely to be controversial.
- The degree to which the effects of the action on the quality of the human environment are likely to be highly uncertain or involve unique or unknown risks.
- The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.
- Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.
- The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places (NRHP) or may cause loss or destruction of significant scientific, cultural, or historical resources.
- The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the ESA.
- Whether the action threatens a violation of federal, state, or local law or requirements imposed for the protection of the environment (*i.e.*, CWA, ESA, *etc.*).

Impacts that do not reach the level of significance may exhibit varying degrees of the level of the impact, from negligible to moderate, adverse, up to significant. Characterization of these less than significant impact levels is often subjective and open to differing interpretations. Although all impacts are described, the EIS focuses on the disclosure of any significant impacts to any resource. In this EIS, impacts are disclosed and discussed generally without regard to the severity of the impact, and are described as “impacts” without any qualitative modifier.

4.2 LAND USE

Regulatory Environment

Primary elements of this resource area are current and applicable land use plans, policies, or regulations; surrounding land use; and airfield safety zones. A summary of applicable federal, state, and Department of the Army regulations is presented below. This regulatory discussion is organized based on the biological resource areas addressed in this section.

- Army Regulation (AR) 200-3, Natural Resources – Land, Forest and Wildlife Management.
- Clean Water Act Regulations (33 CFR 320-330, 335-338; 40 CFR 104-140, 230-233, 401-471).
- Coastal Zone Management Act Regulations (15 CFR 921-933).
- DoD Directive 4700.4, Natural Resources - Conservation and Management.

- DoD Directive 4165.57, Air Installation Compatible Use Zones.
- Maryland Critical Area Commission for the Chesapeake and Atlantic Coastal Bays (Code of Maryland Regulations [COMAR] Title 27, Subchapter 2).
- Maryland Coastal Zone Management Program.

Significance Determinations

Significance of potential land use impacts is based on the level of land use sensitivity in areas affected by the Preferred Alternative and alternatives. Land use impacts could be considered significant if they:

- Are in violation of or inconsistent with current and applicable land use plans, policies, or regulations.
- Preclude continued use or occupation of the surrounding area.
- Are incompatible with surrounding land use.
- Conflict with airfield safety zones.

4.2.1 Affected Environment

The description of land use in this section is taken primarily from the Aberdeen Proving Grounds Prefinal Mission Environmental Impact Statement (USACE Baltimore 2003a), and the 2004 Harford County Master Plan and Land Use Element Plan (Harford County 2004). The most recent APG Master Plan (APG 1978) includes APG's Northern and Southern Peninsulas. The APG 2025 Strategy Plan (USACE Baltimore 2003b) was used in part to consider potential consequences of the Preferred Alternative.

4.2.1.1 Regional Geographic Setting and Location

The APG facility totals about 72,000 acres. The bulk of APG lies within Harford County (Figure 1.1-1). Two small sections (Carroll Island and Grace's Quarters) on the western edge of the installation are located in Baltimore County. The Bush River divides the installation into two areas, referred to in this document as the APG Northern Peninsula and the APG Southern Peninsula. These two areas are also known as the Aberdeen and Edgewood Areas. Construction and renovation activities discussed in this document are located within APG's Northern and Southern Peninsulas.

Acreage approximations within APG are as follows (APG 2001a):

- Chesapeake Bay and estuarine river waters: 32,700 acres;
- APG Northern Peninsula (Aberdeen Area): 27,600 acres;
- APG Southern Peninsula (Edgewood Area): 9,850 acres;
- Carroll Island: 850 acres; and
- Grace's Quarters: 400 acres.

Harford County is located in the north central portion of Maryland at the confluence of the Susquehanna River and Chesapeake Bay (Harford County 2004). The county is bounded by Baltimore County on the west, the Commonwealth of Pennsylvania on the north, the Susquehanna River on the east, and Chesapeake Bay on the south. Harford County has a land area of 440 square miles and is the 11th largest county in the State of Maryland. Two physiographic provinces are found in the county, the Piedmont Plateau and the Coastal Plain. The terrain ranges from the rolling topography of the Piedmont to the gentle slopes of the Coastal Plain. A number of major streams and rivers are present, such as the Susquehanna River, Little Gunpowder River, Bush River, Deer Creek, Winters Run, Bynum Run, and Gasheys Run. There are several smaller land holdings belonging to APG within Harford and Baltimore Counties and the Chesapeake Bay.

The majority of the facility is located on the two peninsulas bordered by the Bush and Gunpowder Rivers and encompassing the majority of the county's Chesapeake Bay waterfront.

Harford County shares its western border with Baltimore County, although Harford is generally rural in character. Urbanization occurs mainly in the southern half of Harford County. The U.S. Census 2000 indicates that the City of Bel Air and greater surrounding area, located about 7 miles north of APG's Southern Peninsula, is the largest urban center in the county with a population of 72,000. Other urban centers in southern Harford County include Aberdeen, Havre de Grace, Edgewood, and Joppatowne.

4.2.1.2 Climate

APG and the surrounding Harford County area have a humid climate. The summers are warm and humid with cool, wet winters. The average daily temperatures range from a low of 25 degrees Fahrenheit (°F) in January to a high of 86°F in July. The record average high temperature for a 1-month period is 87°F in July, and the record average low temperature is 24.1°F for the month of January. The average temperature is 54°F. The record high temperature is 102°F in July 1966, and the record low is -7°F in January 1963. Frequent changes in weather and temperature are due to low-pressure systems that cross the county.

Prevailing winds are from the northwest during winter and from southerly directions in the summer. Winter and spring account for the highest average wind speeds, averaging 7.0 and 8.3 miles per hour, respectively. Average yearly rainfall is 39.3 inches and is distributed fairly evenly throughout the year. The average monthly precipitation is 3.46 inches. Harford County sees snowfalls in excess of 1 inch on an average of 6 days per year, and averages a total of 25 days of snow per year (USACE Baltimore 2003a).

4.2.1.3 Installation Land/Airspace Use

APG was established as two separate military installations in 1917. The two sites were the Ordnance Proving Ground and the Gunpowder Reservation. The Gunpowder Reservation became Edgewood Arsenal. The Ordnance Proving Ground area is referred to as APG's Northern Peninsula. The Edgewood Arsenal (formerly Gunpowder Reservation) area is referred to as APG's Southern Peninsula. In 1971, the Army administratively combined APG and Edgewood Arsenal into one Army installation (USACE Baltimore 2003a). After consolidation, each area continued with its respective military role. Administration of both areas became the responsibility of the U.S. Army Garrison Aberdeen Proving Ground with its current three staff offices, nine directorates, and support troops. APG encompasses nearly 2,000 buildings with over 14 million SF of space and is home to 66 tenants, 20 satellites, and 17 private organizations. Today APG is considered a DoD and universal leader in the Research, Development, Test & Evaluation (RDT&E) of materiel. This includes the training of military personnel who utilize the materiel.

APG's Northern Peninsula is divided into three main functions: the headquarters and research area, the training and support area, and the test range area (USACE Baltimore 2003b). The test range area covers 26,500 acres and comprises most of APG's Northern Peninsula. The headquarters and research area is dedicated to special operations and research, such as ballistics research and testing laboratories. The training and support area, located on the northern portion of APG's Northern Peninsula, is the most highly developed portion of the post. The training and support area includes training, technical, administrative, and housing facilities.

The Preferred Alternative on APG's Northern Peninsula is mainly located in previously developed areas within the training and support areas.

Land use on APG's Southern Peninsula, according to the *1978 APG Master Plan*, includes the cantonment area, industrial area, training area, R&D area, and test range area. The cantonment area, located along the Gunpowder River, includes housing, administrative offices, training, and post support. The industrial area of APG's Southern Peninsula is located east of the cantonment area, and includes supply and storage, maintenance shops, and the Weide Army Heliport. Research and development activities are mostly located east of the heliport.

The Preferred Alternative on APG's Southern Peninsula is mainly located in previously developed areas within the cantonment and industrial areas.

4.2.1.3.1 *Airspace*

The Installation Compatible Use Zone (ICUZ) program was established by the DoD to promote safe land use development in and around military airfields. ICUZ includes the delineation of Clear Zones (CZ) and Accident Potential Zones (APZ) near the ends of runways.

Runways 08/26 and 04/22 of the Phillips Army Airfield (PAAF) and runway 01/19 of Weide Army Heliport at APG are classified as Class A runways, which are typically less than 8,000 feet long and are typically intended for small aircraft (USACE Baltimore 2003b). The CZs for Class A runways are 1,000 feet wide and 3,000 feet long. Class A runways also have two APZs that extend outward from the outer end of each CZ, and are 1,000 feet wide and 2,500 long. Activities such as agriculture, transportation, industrial, recreational use, and open space are considered in APZ I. More varied land use is acceptable in APZ II, including business services, small-scale commercial, and low-density, single-family residential development.

Portions of the APZs associated with PAAF extend into the Preferred Alternative development area for the C4ISR complex. Runways 8/26 and 17/35 are slated for closure during the same time frame as the C4ISR is scheduled for basic occupancy. No activities of the Preferred Alternative lie within the CZs or APZs associated with the Weide Army Heliport located on APG's Southern Peninsula.

4.2.1.4 *Surrounding Land Use*

Land use in county lands adjacent to APG consists of residential, commercial, industrial, and agricultural. Low-density residential development and farms characterize the area between the towns of Aberdeen and Havre de Grace. Higher-density residential development occurs north of APG's Southern Peninsula. The *2004 Harford County Master Plan and Land Use Element Plan* identifies different areas in the county for resource conservation, community growth, and economic growth (Harford County 2004). The area of economic growth consists of an inverted T-shaped area referred to as the Development Envelope (see Figure 4.2-1). The Development Envelope is generally defined as the State Route 24/State Route 924 corridors north to State Route 23. These areas abut I 95 and US 40, and the US 1 corridor. The *2004 Harford County Master Plan and Land Use Element Plan* continues to focus future business/economic development within the Development Envelope.

The *Harford County Master Plan and Land Use Element Plan* also outlines the county's commitment to environmental stewardship, including the adoption of the Chesapeake Bay Critical Area program, described in greater detail in Section 4.8.1.5 of this EIS.

4.2.1.5 *Coastal Zone Management and Chesapeake Bay Programs*

4.2.1.5.1 *Federal Consistency with the Maryland Coastal Zone Management Program*

Maryland's Coastal Program was established by executive order and approved in 1978 as required by the Federal Coastal Zone Management Act (CZMA) of 1972, as amended. This program is a network of state laws and policies designed to protect resources within Maryland's coastal zone, which includes Harford County. The CZMA requires that federal actions reasonably likely to affect any land or water use or natural resource of a state's coastal zone be conducted in a manner consistent to the maximum extent practicable with the enforceable policies of a state's federally approved Coastal Zone Management Program (CZMP). The term "consistent to the maximum extent practicable" means fully consistent with the enforceable policies of management programs unless full consistency is prohibited by existing law applicable to the federal agency. The term "enforceable policy" means State policies that are legally



binding through constitutional provisions, laws, regulations, land use plans, ordinances, or judicial or administrative decisions, by which a State exerts control over private and public land and water uses and natural resources in the coastal zone.

Enforceable policies that are potentially applicable to the Preferred Alternative are summarized in Table 4.2.1.

Table 4.2.1 Summary of Federal Consistency and Enforceable Policies of the Maryland Coastal Zone Management Program Potentially Applicable to the Preferred Alternative at Aberdeen Proving Ground

Permit/Approval	Applicable Section of EIS	Issuing Agency	Circumstance	Consistency Status of the Preferred Alternative
Air Quality Permit	4.4 Air Quality	Air Quality Permits Program, Air and Radiation Management Administration, Maryland Department of the Environment (MDE)	Proposal to construct and operate an activity that discharges emissions to the outside air	The Army would apply for modifications to its existing Title V permits to reflect changes in air pollutant emissions sources that would occur under the Preferred Alternative.
Critical Area Approval	4.7 Water Resources and 4.8 Biological Resources	Critical Area Commission for the Chesapeake and Atlantic Coastal Bays	Proposal to conduct various activities within the Chesapeake and Atlantic Coastal Bays Critical Area	All development within the Critical Area would be consistent with Critical Area criteria. The Maryland Critical Area Commission would review the Preferred Alternative as part of the state's consistency review.
Controlled Hazardous Substances Facility Permit	4.13 Hazardous and Toxic Substances	Hazardous Waste Program, Waste Management Administration, MDE	Proposal to treat, store, or dispose of hazardous waste	A majority of permitted facilities at APG are covered under a single A-190 permit.
Erosion and Sediment Control Plan; Stormwater Management Plan	4.7 Water Resources	Nonpoint Source Program, Water Management Administration, MDE	Proposal for construction that disturbs 5,000 SF or more of land or results in 100 cubic yards or more of earth movement	The Army or its construction contractors will follow MDE regulations on designing sediment and erosion control and stormwater management plans.
Forest Stand Delineation and Forest Conservation Plan	4.8 Biological Resources	Forest Service, Department of Natural Resources (DNR)	Proposal for development projects greater than 40,000 SF	Forest stand delineations and forest conservation plans would be completed for each development area for review and approval by the APG forester. Any lost forest resources would be mitigated according to the Plan.

Table 4.2.1 Summary of Federal Consistency and Enforceable Policies of the Maryland Coastal Zone Management Program Potentially Applicable to the Preferred Alternative at Aberdeen Proving Ground (Continued)

Permit/Approval	Applicable Section of EIS	Issuing Agency	Circumstance	Consistency Status of the Preferred Alternative
Nontidal Wetlands and Waterways Permit	4.8 Biological Resources	Wetlands and Waterways Program, Water Management Administration, MDE	Proposal for work in a nontidal stream, 100-year floodplain, or nontidal wetland, including a 25-foot buffer	Regulated activities in nontidal wetlands and their 25-foot buffers would be avoided and minimized. Permits would be obtained if impacts to nontidal wetlands are unavoidable.
Tidal Wetlands License or Permit	4.8 Biological Resources	Wetlands and Waterways Program, Water Management Administration, MDE	Proposal for any work that may change a tidal wetlands	No activities would occur in tidal wetlands.
Water Quality Certification	4.8 Biological Resources	Wetlands and Waterways Program, Water Management Administration, MDE	Proposal to place fill or discharge pollutants into waters of the U.S. (including adjacent wetlands)	Regulated activities in nontidal wetlands and their 25-foot buffers would be avoided and minimized. Permits and a state water quality certification would be obtained if impacts to nontidal wetlands are unavoidable.
Wetlands Mitigation Plan	4.8 Biological Resources	Wetlands and Waterways Program, Water Management Administration, MDE	Accompanies Nontidal Wetlands and Waterways Permits and Tidal Wetlands Permits	A wetlands mitigation plan would be prepared, if required.

Source: Ghigiarelli 2004; list adapted to include programs added since the guide was published

Federal consistency refers to the review process mandated by Section 307 of the CZMA. This process includes submission of a consistency determination and supporting materials by the federal proponent to the State. In Maryland, the federal consistency review process is carried out by the Coastal Zone Consistency Division in the Wetlands and Waterways Program of the Water Management Administration (WMA) in the Maryland Department of the Environment (MDE). Although WMA is responsible for the official consistency decision, the decision is often based partially or entirely upon the findings of a variety of agencies within the CZMP network, depending on the nature of the proposed activity. Ghigiarelli (2004) provides specific guidance on Maryland's federal consistency process.

Descriptions of resources addressed by the enforceable policies of Maryland's CZMP are provided in the applicable resource-specific sections of this EIS. Federal consistency with Maryland's CZMP is summarized below and discussed in more detail in the resource-specific analyses presented throughout this section of the EIS.

4.2.1.5.2 *Chesapeake Bay Critical Area*

The 1984 Maryland General Assembly enacted the Chesapeake Bay Critical Area Protection Act (Critical Area Act) to help protect the Bay's environment. The Critical Area Act acknowledged that the land immediately surrounding the Bay and its tributaries has the greatest potential to affect its water quality and wildlife habitat; therefore, all lands within 1,000 feet of the tidal waters' edge or from the landward edge of adjacent tidal wetlands and the lands under them are designated as the "Critical Area." The Critical Area Act aims to protect resources within the 1,000-foot Critical Area by regulating and restricting land development. The Preferred Alternative development areas and 1,000-foot Critical Area boundary are shown on Figures 4.2-2 and 4.2-3.

The Critical Area Act created a statewide Critical Area Commission to oversee the development and implementation of local land use programs directed toward the Critical Area. The BRAC Commission developed criteria used by local jurisdictions, including Harford County, to develop individual Critical Area programs and amend local comprehensive plans, zoning ordinances, and subdivision regulations. The following paragraphs provide an overview of Critical Area criteria applicable to the Preferred Alternative; additional details are provided in COMAR 27.02.05.

4.2.1.5.3 *Development*

The existing level of development determines the criteria for additional development (*i.e.*, different criteria are applied to intensely developed areas than to undeveloped areas). The Preferred Alternative development areas are considered intensely developed areas, defined as those areas where residential, commercial, institutional, intense recreational, or industrial development land use predominate, and where relatively little natural habitat occurs. Key criteria for new development and redevelopment in these areas include the following:

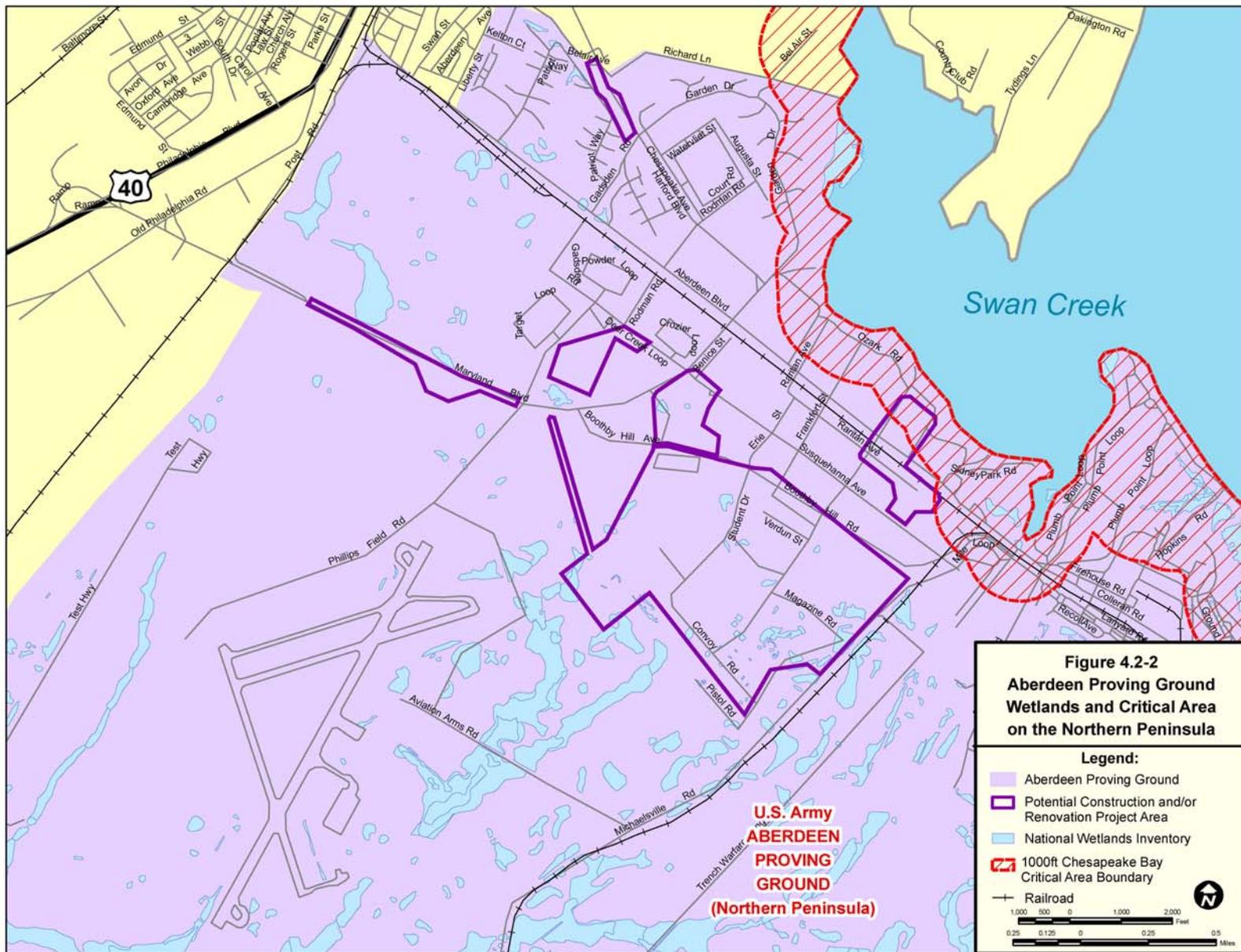
- New intense development should be directed outside the Critical Area. When new development is required in the Critical Area, it should be directed toward existing areas of intense development.
- Development shall be subjected to the habitat protection criteria described below.
- Adverse impacts to water quality caused by stormwater runoff must be minimized. The 10 percent rule applies, which requires new development or redevelopment to improve water quality by 10 percent from pre-development levels by using stormwater management or landscaping.
- To the extent practicable, future development shall use cluster development as a means to reduce impervious areas and to maximize areas of natural vegetation.
- Programs for the enhancement of forests and developed woodland areas shall be established and destruction of forest and woodland vegetation shall be minimized.

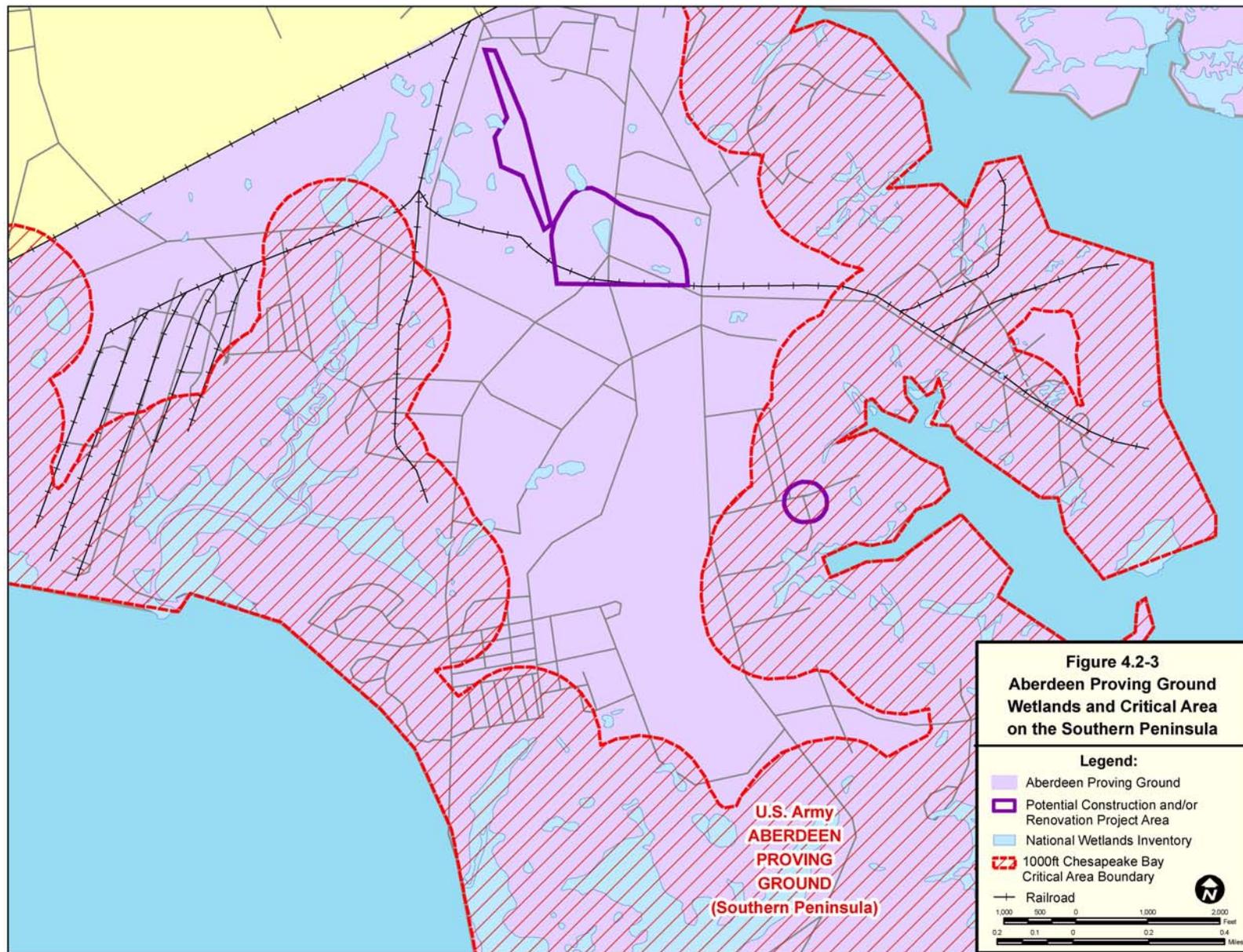
4.2.1.5.4 *Critical Area Buffer*

A 100-foot Critical Area buffer shall be established landward from the mean high water line of tidal waters, tributary streams, and tidal wetlands. New development activities are not permitted in the buffer, except those necessarily associated with water-dependent facilities.

4.2.1.5.5 *Nontidal Wetlands*

The provisions of COMAR 08.05.04 apply to nontidal wetlands in the Critical Area. A permit is required to conduct any regulated activity within nontidal wetlands.





4.2.1.5.6 *Threatened and Endangered Species and Species in Need of Conservation*

Any habitats of threatened or endangered species, or species in need of conservation, which may be affected by the development would be identified and programs developed for protection of the habitats. Such species and habitats are not present in the Preferred Alternative development areas. These programs would include designation of a protection area around each of the habitats within which development activities and other disturbances would be prohibited unless it can be shown that these activities or disturbances would not have or cause adverse impacts to these habitats. Please refer to Section 4.8.1.3 for additional information regarding rare species and other requirements such as the ESA.

4.2.1.5.7 *Plant and Wildlife Habitat*

The following plant and wildlife habitats that may be affected by development would be identified:

- Colonial water bird nesting sites.
- Historic waterfowl staging and concentration areas in tidal waters, tributary streams, or tidal and nontidal wetlands.
- Existing riparian forests (*i.e.*, those relatively mature forests at least 300 feet wide that occur adjacent to streams, wetlands, or the Bay shoreline).
- Forest areas utilized as breeding areas by forest interior dwelling birds (FIDS) and other wildlife species (*i.e.*, relatively mature forested areas within the Critical Area of 100 acres or more, or forests connected with these areas).
- Other areas that may in the future be identified by state and federal agencies as important plant or wildlife habitat areas.
- Designated natural heritage areas.

These habitats are not present in the Preferred Alternative development areas.

4.2.1.5.8 *Anadromous Fish Propagation Waters*

Anadromous fish propagation waters include tributaries of the Chesapeake Bay where spawning of anadromous fish species (fish that live in saltwater and migrate to freshwater to spawn, including rockfish, yellow perch, white perch, shad, and river herring) occurs or has occurred. The Bush and Gunpowder Rivers at APG fall into this category. Critical Area criteria for these waters include requirements to minimize watershed disturbance and adverse affects on water quality.

4.2.2 **Consequences**

4.2.2.1 *Alternative 1 - No Action Alternative*

Under the No Action Alternative, APG would not implement the Preferred Alternative. Therefore, the Army would not implement any related renovation or construction at APG. Land use would follow the APG Master Plan under the current conditions. The Preferred Alternative is congressionally mandated; therefore, the No Action Alternative is not feasible.

4.2.2.2 *Alternative 2 - Preferred Alternative*

The Preferred Alternative includes implementation of all realignments through a combination of new construction, renovation, and reuse to accommodate incoming missions.

Direct Impacts. Much of the area affected by the Preferred Alternative is already developed. Portions of the new C4ISR facilities on APG's Northern Peninsula and the WRAIR building addition to the MRICD building and the JPEO on APG's Southern Peninsula would be constructed on undeveloped land. Depending upon final design and the results of ongoing regulatory wetland delineations, portions of each

may lie within wetlands and be subject to a wetlands permit. Section 4.8.2.2 discusses potential wetlands impacts. All actions would be compatible with the APG Strategy 2025.

Portions of the APZs associated with PAAF runways 8/26 and 17/35 extend into the Preferred Alternative development area for the C4ISR complex. They are slated for closure during the same timeframe as the C4ISR is scheduled for basic occupancy. The Preferred Alternative would not impact land use.

As a federal installation, APG is not subject to Harford County land use authority. However, the Federal CZMA requires Army actions at APG to be consistent with Maryland's CZMP, which includes the Critical Area Act. Therefore, the Critical Area Commission will conduct the state's consistency review with respect to the Critical Area.

Table 4.2.1 provides a summary of consistency with enforceable policies of the Maryland CZMP applicable to the Preferred Alternative and cross references to the sections of this EIS where consistency is analyzed.

Indirect Impacts. No indirect impacts to Land Use are anticipated to occur under the Preferred Alternative.

4.3 AESTHETICS AND VISUAL RESOURCES

4.3.1 Affected Environment

APG is located on the northwestern shore of Chesapeake Bay. About half of APG's total area is land and the other half is water associated with the Chesapeake Bay and its estuaries. The installation has numerous natural forest zones as well as wooded and open shoreline areas. The shoreline sections are both elevated and at sea level.

The general topography of APG is gently rolling with a few steep slopes and a general down-slope from northwest to southeast. The land use areas for APG are divided into four types: forest, grasslands, commercial, and installation. These areas consist of deciduous and coniferous woodlands, maintained and natural grasslands, urban centers, industrial, and residential areas.

The developed areas of APG are configured to meet specific visual themes within the installation. The four basic themes focus on historical, community life, future, and support operation visual zones. Where feasible, buildings and associated landscaping are designed to meet theme criteria. Building heights within APG are typically lower than 40 feet, and tracts of trees are distributed throughout the post to offer a balance to elevated structures.

4.3.2 Consequences

Construction of new buildings, structures, landscape, and parking areas would be conducted in accordance with the *Aberdeen Proving Ground Installation Design Guide (IDG)* and the installation's Master Plan. The IDG provides a guide for improving the installation's visual environment and sets standards and planning criteria to be integrated into all construction and renovation activities at APG. As part of the Preferred Alternative, planners estimate that 72 buildings comprising about 822,000 SF would be scheduled for demolition, and 22 buildings comprising about 817,000 SF would be scheduled for renovation.

Built space totaling about 3,300,000 SF would be required. New construction would occur on previously disturbed and developed land. About 2,700,000 SF of new construction would be required to accommodate the C4ISR operations and build a new CDC. More than 150,000 SF of new construction would be required to accommodate various research and training operations in other areas.

4.3.2.1 *Alternative 1 - No Action Alternative*

Direct Impacts. Under the No Action Alternative, APG would not implement the Preferred Alternative. Therefore, the Army would not implement any related renovation or construction at APG. Long-term impacts would include the continued deterioration of older buildings. The Preferred Alternative is congressionally mandated; therefore the No Action Alternative is not feasible.

Indirect Impacts. No impacts are identified because current buildings and structures would remain in their current locations.

4.3.2.2 *Alternative 2 - Preferred Alternative*

Alternative 2 includes implementation of all realignments through a combination of new construction, renovation, and reuse to accommodate incoming missions. Most aesthetic and visual impacts are associated with building demolition and construction activities. Testing and training actions may create visible, but temporary, impacts.

Direct Impacts. Long-term beneficial impacts would include renovation and demolition of deteriorated and dilapidated structures.

Indirect Impacts. Construction activities would result in a temporary impact. Because of the building height and overall square footage required for new construction, there would be a long-term impact to natural vistas and regional background views. A long-term beneficial impact would occur with landscape plantings associated with installation design guidelines and design objectives for new building construction.

4.4 AIR QUALITY

4.4.1 Affected Environment

The status of the air quality in a given area is determined by the concentrations of various pollutants in the atmosphere. The Federal Clean Air Act (42 United States Code (USC) §§ 7401-7671q) requires the United States Environmental Protection Agency (USEPA) to establish a series of National Ambient Air Quality Standards (NAAQS) for air quality throughout the United States, along with several regulatory programs and provisions applicable to various classes of emissions sources, to ensure that the standards are met. Ambient air is defined as the outside air to which the general public is exposed. NAAQS represent maximum levels of pollution in the ambient air that are considered safe, with an adequate margin of safety, for protecting public health and welfare.

Currently, NAAQS exist for the following air pollutants, collectively referred to as “criteria pollutants” that have been identified by the CAA as being of concern to protect human health and welfare from any adverse effects of air pollution:

- Ozone (O₃).
- Carbon monoxide (CO).
- Nitrogen dioxide (NO₂).
- Sulfur dioxide (SO₂).
- Particulate matter. This includes particles sized 10 microns or less (PM₁₀), also called respirable particulates or suspended particulates; and fine particulate matter equal to or less than 2.5 microns in size (PM_{2.5}).
- Lead (Pb).

Volatile Organic Compounds (VOC) are also regulated. There are no ambient standards for VOC, but, along with nitrogen oxides are considered as precursor emissions largely responsible for the formation of O₃ in the atmosphere.

Individual states can adopt the NAAQS or establish state ambient air quality standards, which must be equal to or more stringent than the NAAQS. The MDE has adopted the NAAQS.

Table 4.4.1 lists the primary and secondary NAAQS for the above-listed criteria pollutants, along with the averaging periods to which each standard applies. The primary NAAQS are intended to protect public health, while the secondary NAAQS are intended to protect the public welfare (*e.g.*, crops, animals, buildings). Areas where ambient concentrations of a given pollutant are below the applicable ambient standards are designated as being in “attainment” for that pollutant. An area that does not meet the NAAQS for a given pollutant is classified as a “non-attainment” area for the pollutant. Non-attainment areas are under strict regulatory restriction in an effort to lower pollutant concentrations to regulatory standards. For three of the criteria pollutants (O₃, CO, and PM₁₀), non-attainment areas are classified according to severity.

The USEPA can authorize the State of Maryland to have the primary planning for and enforcement of compliance with the NAAQS if the State submits a State Implementation Plan (SIP) to the USEPA, and the USEPA approves the SIP as meeting CAA requirements. A SIP is a compilation of goals, strategies, source emission limitations and control requirements, schedules, and enforcement actions that would lead the state to compliance with all NAAQS. Any changes to the compliance schedule or plan must be approved by USEPA and officially incorporated into the SIP. Areas not in compliance with a standard can be declared “non-attainment areas” by the USEPA or the appropriate state or local agency. To reach attainment, NAAQS for certain pollutants and short-term averaging periods (*i.e.*, for 1-, 3-, 8-, and/or 24-hour periods) generally may not be exceeded more than once per year; standards for annual averaging periods are generally not to be exceeded. Areas the USEPA has re-designated to attainment status for specific pollutants are known as “maintenance areas,” and the SIP must include measures to maintain air quality standards in maintenance areas.

The MDE is responsible for maintaining air quality standards for the State of Maryland. Army Regulation 200-1 requires Army installations to comply with applicable forms of air pollution regulations.

Section 176 (c) (1) of the CAA, commonly known as the General Conformity Rule (Conformity), requires federal agencies to assure that their actions conform to applicable implementation plans for achieving and maintaining the NAAQS for criteria pollutants. To ensure Conformity, a federal action must not contribute to new violations of ambient air quality standards, increase the frequency or severity of existing violations, or delay timely state and/or regional attainment of standards.

**Table 4.4.1
National Ambient Air Quality Standards**

Air Pollutant	Averaging Period	Standard	Ambient Concentration
Particulate Matter (PM ₁₀)	24 hours	Primary	150 µg/m ³
Particulate Matter (PM _{2.5})	Annual*	Primary and Secondary	15 µg/m ³
	24 hours	Primary	35 µg/m ³
Sulfur Dioxide	Annual*	Primary	0.03 ppm / 80 µg/m ³
	24 hours		0.14 ppm / 365 µg/m ³
	3 hours	Secondary	0.5 ppm / 1,300 µg/m ³
Carbon Monoxide	8 hours	Primary	9 ppm / 10 mg/m ³
	1 hour	Primary	35 ppm / 40 mg/m ³
Ozone	8 hour	Primary and Secondary	0.08 ppm
	1 hour (designated areas only)		0.12 ppm
Nitrogen Dioxide	Annual*	Primary and Secondary	0.053 ppm / 100 µg/m ³
Lead	Quarterly*	Primary and Secondary	1.5 µg/m ³

Source: 40 CFR Part 50

* = Arithmetic mean

µg/m³ = micrograms/cubic meter

mg/m³ = milligrams/cubic meter

ppm = parts per million

4.4.1.1 Ambient Air Quality Conditions

APG is located within the Metropolitan Baltimore Intrastate Air Quality Control Region, known as Area III of the State of Maryland Air Quality Control Area. The Metropolitan Baltimore Intrastate Air Quality Control Region operates under a 10-year maintenance plan for CO, demonstrating continued attainment for this criteria pollutant through December 15, 2015. This region, however, is in non-attainment for the 8-hour O₃ and the PM_{2.5} standards. Additionally, the State of Maryland submitted an attainment demonstration for the 1-hour O₃ standard (USEPA 2006). The 8-hour O₃ standard became effective June 15, 2005 and is designed to supersede the 1-hour O₃ standard. On April 15, 2004, USEPA officially designated sections of Maryland as non-attainment for the 8-hour O₃ standard. This includes Baltimore, Cecil, and Harford Counties. Baltimore and Harford Counties are designated non-attainment for PM_{2.5} (MDE 2004).

The attainment status for each pollutant in this region is shown in Table 4.4.2.

**Table 4.4.2
Attainment/Non-Attainment Classifications for Criteria Pollutants in the
Metropolitan Baltimore Intrastate Air Quality Region**

Pollutant	USEPA Designation
O ₃	Non-Attainment - Moderate
PM ₁₀	Attainment
PM _{2.5}	Non-Attainment
SO ₂	Attainment
CO	Attainment - Maintenance
NO ₂	Attainment
Pb	Attainment

Source: MDE 2004

4.4.1.2 Regional Air Pollutant Emissions Summary

The USEPA also tracks hazardous air pollutants (HAP) emissions for each state. The total HAP emissions for the State of Maryland and the three counties adjacent to APG are shown in Table 4.4.3 below. As illustrated in the table, APG's contribution to total HAP emissions for the area is negligible. APG emission sources include stationary, mobile, and fugitive categorizations. Stationary sources include such operations as boilers, incinerators, fuel storage tanks, fuel-dispensing facilities, vehicle maintenance shops, laboratories, degreasing units, and simulator testing units. Mobile sources would include both private and government owned vehicles. Fugitive sources would include dust generated from construction activities, open burning, and roadway traffic.

Table 4.4.3
Comparative Regional Hazardous Air Pollutant Emissions for Aberdeen Proving Ground

Area	Total HAP Emissions (tpy) ¹	% of Total Emissions in Maryland
State of Maryland	68,240	100.0
Baltimore County, Maryland	6,567	9.6
Harford County, Maryland	2,852	4.2
Cecil County, Maryland	1,112	1.6
Aberdeen Proving Ground	13	0.00002

Source: USEPA Air Data 1999

¹Measured in tons per year (tpy)

4.4.1.3 Air Pollutant Emissions at Installation

APG's Northern Peninsula and APG's Southern Peninsula each have Title V air permits that consolidate all previous air permits into single, individual permits for each area. The installation's current Title V Air Operating Permits, Numbers 24-025-00081 and 24-025-00082, expire on October 31, 2009 and January 31, 2010, respectively. These permits include processes such as boilers, paint booths, storage tanks, generators, and other emission units. Any new activity to be conducted at the installation requires an air permit review. Depending on the scope of the proposed activity, a construction permit and/or a revision to the Title V air permit may be warranted. The cumulative criteria pollutant emissions calculated in both permits is denoted in Table 4.4.4 below.

Table 4.4.4
Criteria Pollutant Emissions for Aberdeen Proving Ground (2000 – 2003)

Year	NOx	SOx	PM ₁₀	CO	VOC
2003	52	73	14	33	12
2002	41	52	12	23	10
2001	39	60	11	18	6
2000	43	66	13	25	9

Source: Title V Air Operating Permits 24-025-00081 & 82

Measured in tons per year (tpy)

The emissions predicted to result from the Preferred Alternative extend into Baltimore, Cecil, and Harford Counties. A General Conformity Analysis, in accordance with 40 CFR Part 93 Subpart B is required prior to initiation of these projects. In accordance with 40 CFR 93.155(b), "A Federal agency must notify the appropriate EPA Regional Office(s), State and local air quality agencies and, where applicable, affected Federal land managers, the agency designated under section 174 of the Clean Air Act and the

Metropolitan Planning Organization (MPO) within 30 days after making a final conformity determination under §93.158.” Appendix B contains a detailed analysis of the Conformity Determination.

4.4.2 Consequences

The 1990 Amendments to the CAA, Section 176, require the USEPA to promulgate rules to ensure that federal actions that produce emissions of any criteria air pollutants for which an area is not in attainment with standards conform to the appropriate SIP. These resulting rules, known together as the General Conformity Rule (40 CFR §§ 51.850-860 and 40 CFR §§ 93.150-160), require any federal agency responsible for an action in a nonattainment area to determine that the action is either exempt from requirements of the General Conformity Rule or positively determine that the action conforms to the provisions and objectives of the applicable SIP. Any mitigation deemed necessary as a result of the conclusions reached in the conformity analysis would be implemented and integrated into the MDE SIP.

Conformity requires an assessment of the potential magnitude of potential total direct and indirect emissions of criteria pollutants, including precursors, associated with a proposed federal action when determining conformity of the Preferred Alternative. The rule does not apply to certain “exempt” actions or to actions where the total direct and indirect emissions of criteria pollutants are at or below specified *de minimis* levels. In addition, ongoing activities currently being conducted are exempt from the rule as long as there is no net increase in emissions above the specified *de minimis* levels. If the proposed emissions exceed the *de minimis* levels, a formal air conformity analysis is necessary. If *de minimis* levels are not exceeded, and if the predicted emissions do not exceed more than 10 percent of a non-attainment area’s total emission budget for a given pollutant, a record of non-applicability must be prepared.

If an action is not exempt, the federal agency must demonstrate that the total of direct and indirect emissions from the proposed action could be presumed to conform to the SIP provisions as long as the action would not:

- Cause or contribute to any new violation of any standard in any area;
- Interfere with provisions in the applicable SIP for maintenance of any standard;
- Increase the frequency or severity of any existing violation of any standard in any area;
or
- Delay timely attainment of any standard or any required interim emission reductions or other milestones in any area including, where applicable, emission levels specified in the applicable SIP for the purposes of demonstration of reasonable further progress, a demonstration of attainment, or a maintenance plan.

For purposes of determining a project’s emissions, “direct emissions” are those directly associated with project activities at the time and location of the project. For the Preferred Alternative, direct emissions include those from routine operational activities, as well as actual construction activities, construction vehicles and equipment, and any ancillary emissions sources. “Indirect emissions” are those that may be related to the project, but occur in a different place or at a different time; *e.g.*, continue after project completion. For this project, the only indirect emissions would be those associated with the vehicular transport of installation personnel and materials.

Activities to occur with implementation of the Preferred Alternative were compared to allowable threshold levels for five criteria pollutants: NO_x, VOCs, CO, SO₂, and PM_{2.5}. Based on the results of the conformity analysis, only SO₂, and PM_{2.5} did not exceed the allowable threshold levels and, therefore, a general conformity determination would be required for NO_x, VOCs, and CO for the Baltimore air quality control region. Part of this determination process involves mitigation, work practice, and emission control measures that APG is committed to implementing, so as not to compromise air quality for the

region. Table 4.4.5 provides a summary of the cumulative direct and indirect emission increases as a result of the conformity analysis.

The primary source categories that contribute to these emission levels are aircraft operations, external combustion sources, heavy construction operations, non-road vehicles, on-road vehicles, and stationary internal combustion engines. Heavy construction operations (*i.e.*, building demolition, construction, and renovation activities) accounted for nearly 50 percent of all direct emission sources, the greatest percentage of the cumulative total of criteria pollutant emissions from all the source categories. Non-road vehicles (*i.e.*, construction equipment) accounted for about 25 percent of the cumulative direct emission source total for this analysis. Based on the MDE review of APG's general conformity analysis and the regional SIP, all projected emission increases can be accounted for within the Maryland SIP. Based on this determination, the Preferred Alternative would not threaten a violation of federal, state, or local regulations and the action would comply with the regional SIP provisions.

Table 4.4.5
Conformity Analysis Comparison of Non-Attainment and Maintenance Area Criteria
Pollutants for Aberdeen Proving Ground

Pollutant	Year				Allowable Threshold Levels (TPY)
	2009	2010	2011	Total	
CO	296.5	134.7	301.5	732.7	100
NO _x	99.1	35.4	94.9	229.4	100
VOC	26.6	6.4	41	74	50
PM _{2.5}	9.8	3.4	1.9	13	100
SO ₂	9.8	3.4	13.9	27.1	100

Source: Draft Conformity Determination (General Physics Corporation) August 28, 2006
Measured in tons per year (tpy)

Executive Order 12873 requires that agencies "Comply with executive branch policies for the acquisition and use of 'environmentally preferable' products and services and implement cost-effective procurement preference programs favoring the purchase of these products and services." The EO considers careful design, construction, operation, maintenance, and/or reuse/removal of a constructed facility in an environmentally and energy efficient manner. Energy efficient HVAC controls, radiant heating systems, desiccant cooling systems, and lighting are examples of such considerations and provide a beneficial impact to criteria pollutant emissions and carbon monoxide emissions. Where feasible, APG would incorporate energy efficient systems as part of its building construction and renovation projects.

4.4.2.1 Alternative 1 - No Action Alternative

Direct Impacts. Under the No Action Alternative, APG would not implement the Preferred Alternative. Therefore, the Army would not implement any related renovation or construction at APG. Current trends in local air quality would remain relatively unchanged. No direct impacts to air quality differing from the baseline condition would be expected. The Preferred Alternative is congressionally mandated; therefore, the No Action Alternative is not feasible.

Indirect Impacts. No indirect impacts to air quality are anticipated under this alternative.

4.4.2.2 Alternative 2 - Preferred Alternative

The Preferred Alternative includes implementation of all realignments through a combination of new construction, renovation, and reuse to accommodate incoming missions.

Direct Impacts. There would be short-term and long-term impacts to air quality associated with an increase of military and civilian personnel at the installation. Based on additional privately owned vehicles at the installation certain air pollutant criteria would be affected. The increase in vehicles would

increase VOCs, CO, and NO_x. Renovation and construction of buildings would result in a short-term increase in fugitive emissions from portable equipment, proportional to the building design and dimensions. An impact would occur due to additional heating and cooling equipment emissions. The general conformity analysis represents the emissions baseline of operations and assumes operating hours for emissions calculation purposes reflecting new construction activities. Table 4.4.6 shows the cumulative total for all criteria pollutant emissions for the Preferred Alternative, reflecting a short-term impact to air quality.

The conformity analysis provides a comprehensive review of all sources associated with the Preferred Alternative. As this analysis focused on typical construction projects for the Heavy Construction Operations category, the hourly rates associated with this analysis typically reflect new construction activities. The general conformity analysis represents the emissions baseline of operations and assumes operating hours for emission calculation purposes reflecting new construction activities. Table 4.4.6 shows the cumulative total air emissions summary baseline for criteria pollutants and how the conformity analysis compares with approved MDE allocated emissions increase for the period of 2009-2011 solely for the APG activities. Based on this comparison, it is evident that the emissions associated with the Preferred Alternative would be well below projected emission increase allotments by MDE and would result in an impact to air quality. The final conformity analysis report can be found in Appendix B.

Table 4.4.6 Conformity Analysis Comparison of Preferred Alternative Criteria Pollutant Increases for Aberdeen Proving Ground (2009 – 2011)

Pollutant	CO	NO _x	VOC
MDE-Approved Budgeted Emissions Increase	1180.59	358.71	207
Conformity Analysis Emissions Increase	732.7	229.4	74

*Source: Draft Conformity Determination (General Physics Corporation) August 28, 2006
Measured in Cumulative Tons for 2009 – 2011 (Estimated)*

Emissions from increased vehicular traffic would generate a long-term impact for criteria pollutants as denoted in the conformity analysis. While the analysis solely addressed on-post vehicle operations, these activities represent the vast majority of total emissions from such units and are well below the general conformity analysis threshold levels for all criteria pollutants. Therefore, no additional modeling or control technology analysis would be required for these activities.

Best management practices associated with the Preferred Alternative would include dust suppression techniques for fugitive dust sources, utilization of air curtain destructors or related equipment for open-burning activities, and consolidated use of contractor vehicles during construction, demolition, and renovation activities on the installation. Control of particulate matter from construction, demolition, and renovation projects are addressed in the installation's Title V air permit. Additionally, any open burning activities associated with such projects are also addressed in the installation's Title V air permit and address safety determinations and reporting provisions.

Indirect Impacts. The Preferred Alternative would require a temporary influx of contractor personnel to perform building and renovation activities. This would result in a short-term impact due to the contractor's vehicles traveling on the installation to perform the work. These impacts, however, were covered under the conformity analysis review.

This alternative would also result in increased air quality impacts associated with off-post business operations from these construction activities.

4.5 NOISE

Noise is defined as sound that is undesirable. Noise can interfere with speech communication and hearing, be intense enough to damage hearing, or be annoying. The noise produced by air blast, also known as air pressure waves or over pressures, results from the generation of shock waves. Vibration, defined as a motion in which an object moves back and forth from its rest position when acted upon by an external force, often accompanies impulse noise such as that generated by explosive detonations (USACE Baltimore 2003a).

Sound is a physical phenomenon consisting of minute vibrations which travel through a medium, such as air, and are sensed by the human ear. The decibel (dB) is the accepted standard unit for measuring sound because it accounts for the large range that be detected comfortably by the human ear and reflects the way people perceive changes in sound. All dB levels presented in this analysis are referenced to a standard of 20 micro-Pascals.

Sound levels may be adjusted or “weighted” for measurement. The A-weighted sound level (dBA) is a noise measurement scale that closely resembles the sensitivity of human hearing and, therefore, provides a good indication of the impact of noise produced by sources such as traffic, aircraft, and small arms fire. Use of a different weighting, the C-weighted scale (dBC), effectively measures high amplitude impulsive noise resulting from sources such as air blasts from explosions, sonic booms, and heavy weapons fire. The C-weighting accounts for vibrations induced by low frequency sound (USACE Baltimore 2003a).

Sensitive noise receptors are, in general, those areas of human habitation or substantial use where the intrusion of noise has the potential to adversely affect the occupancy, use, or enjoyment of the environment. These can include residences, schools, hospitals, parks, and places of business requiring low levels of noise. At APG these are on-post facilities and service areas. Off-post noise receptors include those sites lying within the various noise contours along the post boundaries.

A discussion on the potential impacts of construction and operations noise on wildlife is provided in Section 4.8 of this EIS.

4.5.1 Regulatory Setting

The Federal Interagency Committee on Urban Noise (FICUN) developed land use guidelines for areas on and/or near noise-producing activities such as highways and airports (FICUN 1980). The guidelines were developed based on annual average noise levels and the prevalence of annoyance found with the sound levels. The FICUN guidelines were adopted by the Army in AR 200-1 for defining Noise Zones resulting from aircraft operations. For other specific noise sources such as small arms, large caliber weapons, and demolition activity, the Noise Zone descriptions in AR 200-1 were adjusted to metrics appropriate for assessing the particular type of noise source (APG 2005f).

According to 32 CFR Subpart G – Environmental Noise Abatement, 650.169 Noise Measurement Standards, “(b) Army facilities and activities will comply with applicable Federal, State, interstate and local noise standards unless a waiver is specifically obtained in accordance with §650.175. Where no applicable noise regulations and standards exist, installation commanders will minimize noise intrusions into areas surrounding the installations to prevent them from being a source of complaint.”

The MDE provides basic considerations for application of noise rules and regulations by local jurisdictions to define noise limits for residential properties that receive noise from or within various land uses. State noise regulations are contained in the following citations:

- State Law: Environment Article, Title 3
- State Regulations: COMAR, Title 26.02.03.

This MDE policy lists that State regulations establish two time periods and two sound level limits:

- Daytime 7 a.m. - 10 p.m. 65 dBA - for residential receiving properties; and
- Nighttime 10 p.m. - 7 a.m. 55 dBA - for residential receiving properties.

The State also mentions a criteria level for impulse noise as 90 dBA during daytime hours and above criteria of 55 dBA for nighttime periods (Michael Baker Jr., Inc. 2003). Harford County codes and regulations only refer to noise from loud music and the use of household tools.

At APG, the Environmental Conservation and Restoration Division (ECRD) of the Directorate of Safety, Health and Environment is responsible for environmental noise management. To protect the general public from noise hazards associated with military activities in the interests of their health, safety, and general welfare and to prevent degradation of mission capability due to encroachment, the Army has established an Environmental Noise Management Program (ENMP). By examining the effects of noise on an installation's adjacent communities, the program establishes a background for relating land use noise levels. The program then assesses noise levels from Army-generated operations to identify areas affected by noise and describe each area's land use compatibility. The Army has developed land use guidelines for areas on and near its installations as an element of the ENMP. These guidelines have not been developed to prevent building in these areas, but rather to recommend land uses that are compatible with activities performed on the installation. APG has in place an Operational Noise Management Plan finalized in July 2006.

For non-combat military vehicles and personal vehicles used by workers, Federal Highway Administration, CFR 772, and Maryland Department of Transportation noise policy provide standards for abatement of traffic noise. Federal Highway Administration regulations do not refer to significant noise impacts but instead quantify substantial noise increases.

Congress passed the Noise Control Act of 1972 and the Quiet Communities Act of 1978. Under these laws, commercial airports must carry out noise control measures such as: outright purchase of adjoining land; work with local communities to ensure zoning that would permit only compatible uses; develop procedures for including noise information in the consumer disclosure documents provided when real estate is sold; alter run-up procedures and locations; and change approach and take-off patterns (APG 2005f).

The Federal Aid to Airports Act exempted military aircraft from regulation, while the Noise Control Act of 1972 excluded from regulation "...any military weapons or equipment which are designed for combat use." The Noise Control Act and the Quiet Communities Act contain language outlining the responsibilities of federal agencies in protecting the public from unreasonable noise impacts. Based on DoD guidance, the Department of the Army developed its Environmental Noise Management Program that considers noise from all sources of military activities, not just military airfields.

4.5.2 Land Use Compatibility

4.5.2.1 APG Land Use

On APG's Northern Peninsula, the training and support area is the most highly developed portion of the installation. This area contains training, technical, administrative, and housing facilities. The test range area consists of relatively flat lands with wooded tracts. Firing ranges, impact areas, vehicular test courses, and munitions storage areas are the major features of the test range area.

Land use on APG's Southern Peninsula tends to be less structured and more spatially disjointed than on APG's Northern Peninsula. Major functional areas on APG's Southern Peninsula include the test range area, cantonment area, industrial area, training area, and research and development area. The cantonment area is located along the Gunpowder River and is dedicated to housing, scattered administrative offices, training, and post support. Ongoing activities in the industrial area include supply and storage, vehicular maintenance, and Weide Army Heliport. The principal research and development activities involve chemical and biological research. Although these activities are concentrated in the area east of Weide

Army Heliport, facilities involved in research and development are scattered throughout APG's Southern Peninsula (APG 2005f).

4.5.2.2 Off-Post Land Use

The nearby off-post land use consists of an unincorporated adjacent civilian community known as Edgewood, Maryland, and a variety of other land uses that include civilian residential, commercial, institutional, and transportation. Noise-sensitive civilian receivers in the area consist of single-family homes, as well as Edgewood High School, Edgewood Middle School, and Deerfield Elementary School. Amtrak and Maryland Rail Commuter Services (MARC) utilize rail lines that bisect the area. The rail lines are adjacent to the northern boundary of APG and provide a man-made separation between military and civilian land uses. Amtrak and Norfolk Southern use this section of rail line as a major thoroughfare providing regular passenger and freight rail service between large cities along the east coast (Michael Baker Jr., Inc. 2003).

4.5.2.3 Compatible Use Noise Zones

The unit of measure used in the FICUN guidelines is the A-weighted day-night average sound level (ADNL). The use of A-weighting is used for sounds such as traffic and aircraft because the metric emphasizes the portion of sound energy the human ear hears well. However, A-weighting is not appropriate for all noise sources.

On-post noise sources such as small arms and artillery produce different types of sound than traffic and aircraft. These weapons make highly impulsive sounds, and in the case of large caliber weapons, much of the sound energy is in very low frequencies that are not accounted for with A-weighting. For large caliber weapons and demolition activity, the unit of measure used is the C-weighted Day-night Average Sound Level (CDNL). For small arms, unweighted peak sound (dBP) levels are used.

Noise Zones (NZ) established in the Operational Noise Management Plan are classified in three levels to provide guidance for appropriate types of land use. None of the NZs overlaps Harford County, although the NZs do project into the Chesapeake Bay.

NOISE ZONE III. NZ III consists of the area around the source of noise in which the sound levels are greater than 75 ADNL for aircraft, greater than 104 dBP for small arms, or greater than 70 CDNL for demolition activities and weapon systems larger than 20 millimeters (mm). The noise level within NZ III is considered so severe that noise-sensitive land uses should not be considered.

NOISE ZONE II. NZ II consists of an area where sound levels are between 65 and 75 ADNL for aircraft, between 87 and 104 dBP for small arms, or between 62 and 70 CDNL for demolition activities and weapon systems larger than 20mm. This area is considered to have a major noise exposure and is, therefore, normally unacceptable for noise-sensitive land uses. Land use within NZ II should normally be limited to activities such as industrial, manufacturing, transportation, and resource production. If the community determines that land in NZ II areas must be used for residential purposes, then noise level reduction features should be incorporated into the design and construction of the buildings.

NOISE ZONE I. NZ I includes all areas around a noise source where levels are lower than the limits set forth for NZs III and II. This area is considered to have moderate to minimal noise exposure from aircraft operations, weapons firing, and other noise sources. This NZ is acceptable for noise-sensitive land uses including housing, schools, and medical facilities. But, NZ I levels do not guarantee that training noise would not be heard in these areas, nor that individual noise events could not generate complaints (APG 2005f).

LAND USE PLANNING ZONE. Noise contours are generated by averaging noise over a period for which operational data were gathered (*e.g.*, quarterly, annually, *etc.*). The training operations at APG can vary from day to day. There are periods of quiet followed by periods of noise. To provide a planning tool that could be used to account for days of higher than average operations, the Land Use Planning Zone

(LUPZ) contour can be used. The LUPZ can offer a better prediction of noise impacts when levels of operations are above average. By setting the extent of the LUPZ contours at 57 CDNL, the variability in the APG noise environment can be accounted for (APG 2005f).

Noise Zone noise limits are summarized in Table 4.5.1.

Table 4.5.1 Noise Zone Limits

Noise Zone	Noise Limits		
	Aircraft - ADNL	Impulsive - CDNL	Small Arms dBP
I	<65 ADNL	<62 CDNL	<87 dBP
II	65-75 ADNL	62-70 CDNL	87-104 dBP
III	>75 ADNL	>70 CDNL	>104 dBP

Source: APG 2005f

4.5.3 Affected Environment

4.5.3.1 On-Post Noise Environment.

Individuals on post may be subjected to multiple sources of continuous, intermittent, or impulsive noise during the day. The primary sources of noise at APG are blasts from weapons testing (*e.g.*, artillery firing, explosive demolitions); aircraft flyovers at PAAF and Weide Army Heliport, as well as vehicle testing noise (from wheeled and tracked vehicles) from the Munson, Perryman, and Churchville test areas. In general, noise from aircraft flyovers and vehicle testing is limited to the area where the noise is created. Tenant facilities on APG, with the exception of ATEC and ARL, do not produce high levels of noise. Other minor noise sources include on-post traffic, small arms firing at the field training exercise site (located between the Aberdeen and Maryland gates), noise from the rail lines west of APG, on-post facility construction, and maintenance activities (APG 2006b).

On the installation, it is possible to hear blast noise (from weapons and demolition), noise from aircraft (fixed-wing and helicopter) activities at the PAAF and Weide Army Heliport, and noise from wheeled and tracked vehicles from the Munson and Perryman test areas. Secondary sources of noise include vehicle traffic of APG personnel, small arms firing at the field training exercise site (located between the Aberdeen and Maryland gates), and noise from the rail lines west of APG.

4.5.3.1.1 Mobile Sources of Noise

For the Operational Noise Management Plan the Federal Highway Administration's Traffic Noise Model was used to evaluate noise levels for a roadway with 500 vehicles passing in a 1-hour period. The results showed that the 65 dBA contour would only extend 150 feet from the road centerline. At APG's vehicle test areas, although the vehicles are louder than typical highway traffic, the level of vehicle activity is much less than 500 per hour. Table 4.5.2 presents noise levels of common Army and civilian vehicles (APG 2005f).

Table 4.5.2
Noise Levels of Common Army and Civilian Vehicles

Type	Distance (feet) ¹	Speed (mph)	Noise Level (dBA)
Stationary Stryker	20	0	78
Moving Stryker	60	50	85
Heavy Truck	60	68	85
Bradley Fighting Vehicle	98	20	80
M1A2 Tank	328	Moving	92
Passenger Car	25	65	77

Source: APG 2005f

¹Distance from noise source to recording device

Vehicle testing activities are conducted primarily at three test areas: Munson, Perryman, and Churchville. Military and commercial vehicles are tested year-round, 6 days a week with two shifts. At APG, noise impacts resulting from vehicle testing are less than the noise impacts from blast and airfield operations. Historically, APG has received many more complaints about aircraft and blast noise than vehicle noise ().

The Perryman Test Area is located near the northwestern boundary of APG and is used primarily for cross-country road testing of vehicles for durability and reliability. One of the roadways at the test area, which runs parallel to the boundary, is about 300 feet away from the nearest sensitive receptor (residential farmhouses) (USACE Baltimore 2003a). In the spring of 1986, the Army conducted automatic noise monitoring at the Perryman Test Area. Maximum noise levels near the installation boundary were 56.4 dBA and 53.0 dBA (10-minute L_{eq} , an energy-equivalent noise level over a 10-minute averaging period) for daytime and nighttime, respectively. APG recorded a maximum ADNL of 59.8 dBA. Although measurements showed that NZ II remained within the boundaries, intermittent but non-persistent noise complaints from the immediate community were reported more frequently for the Perryman Test Area than for any other test area (Michael Baker Jr., Inc. 2003). No additional vehicle testing activities are included in the Preferred Alternative and, therefore, no noise impacts would occur under the Preferred Alternative.

4.5.3.1.1.1 Aircraft Noise

Both fixed-wing and rotary-wing operations take place at APG. APG has an airfield located in the Aberdeen area and a heliport (Weide Army Heliport) located on APG's Southern Peninsula. Airfield noise assessments are done using the NOISEMAP computer program. Though neighbors may hear aircraft approaching and departing APG airspace, and may even be annoyed when a C-130 flies over their residences, there are not enough aircraft operations at APG to generate noise contours that are outside the immediate vicinity of the runways. When off the installation, all aircraft follow Federal Aviation Administration guidelines and maintain a minimum flight altitude of 500 feet above ground level (AGL) over low densely populated areas, and a minimum altitude of 1,000 feet AGL over highly populated areas, except when training in designated low-level training areas (APG 2005f).

PAAF is located in the secured area south of Ruggles Golf Course. PAAF has one 8,300-foot and two 5,000-foot hard surface runways, one 35-foot by 35-foot heliport, three ramps totaling 43,750 SF, and three bomb ramps totaling 518,000 SF. Both cross-wind runways (8/26 and 17/35 are slated for closure during the same time frame as construction of the C4IRS complex. Any noise or safety impacts existing from the current overlap of the accident potential zones from these runways into development areas will be removed as a result of the closure. Helicopter and fixed-wing aircraft utilize PAAF. PAAF also receives transient light and heavy aircraft that land and fly touch-and-go operations.

4.5.3.1.2 *Stationary Sources of Noise*

4.5.3.1.2.1 Weapons/Demolition Noise

Primary noise sources on-post are blasts from weapons testing (*e.g.*, artillery firing, explosive demolitions); aircraft flyovers at PAAF and Weide Army Heliport, as well as vehicle testing noise (from wheeled and tracked vehicles) from the Munson, Perryman, and Churchville test areas. Major activities at APG include testing of weapons and limited small-unit training. The Aberdeen Test Center (ATC) is responsible for control of APG test ranges. From January 1991 through December 1993, 6.4 million firing events occurred, 99 percent of which are characterized as low-noise firings. The 1 percent high-explosive firings (52,000) came from 8-inch (203mm) howitzers, static charges, unexploded ordnance, 155mm and 105mm howitzers, and 120mm mortars. A reliable program of acoustic management for protection of both the surrounding communities and the installation mission is the Intelligent Firing Program as managed by ATC.

4.5.3.1.2.2 Large Caliber Weapons/Demolitions Noise

Large caliber weapons firing and explosives detonations produce extremely high sound pressure levels of predominately low frequency content that can propagate long distances. Blast noise is impulsive in nature and generally less than a second in duration; vibration is also produced. Blast noise is primarily produced by ATC and ARL field experimental facilities (USACE Baltimore 2003a; APG 2005f). Although activity at APG can frequently be heard off post, the CDNL contours only extend off post to the eastern shore across Chesapeake Bay.

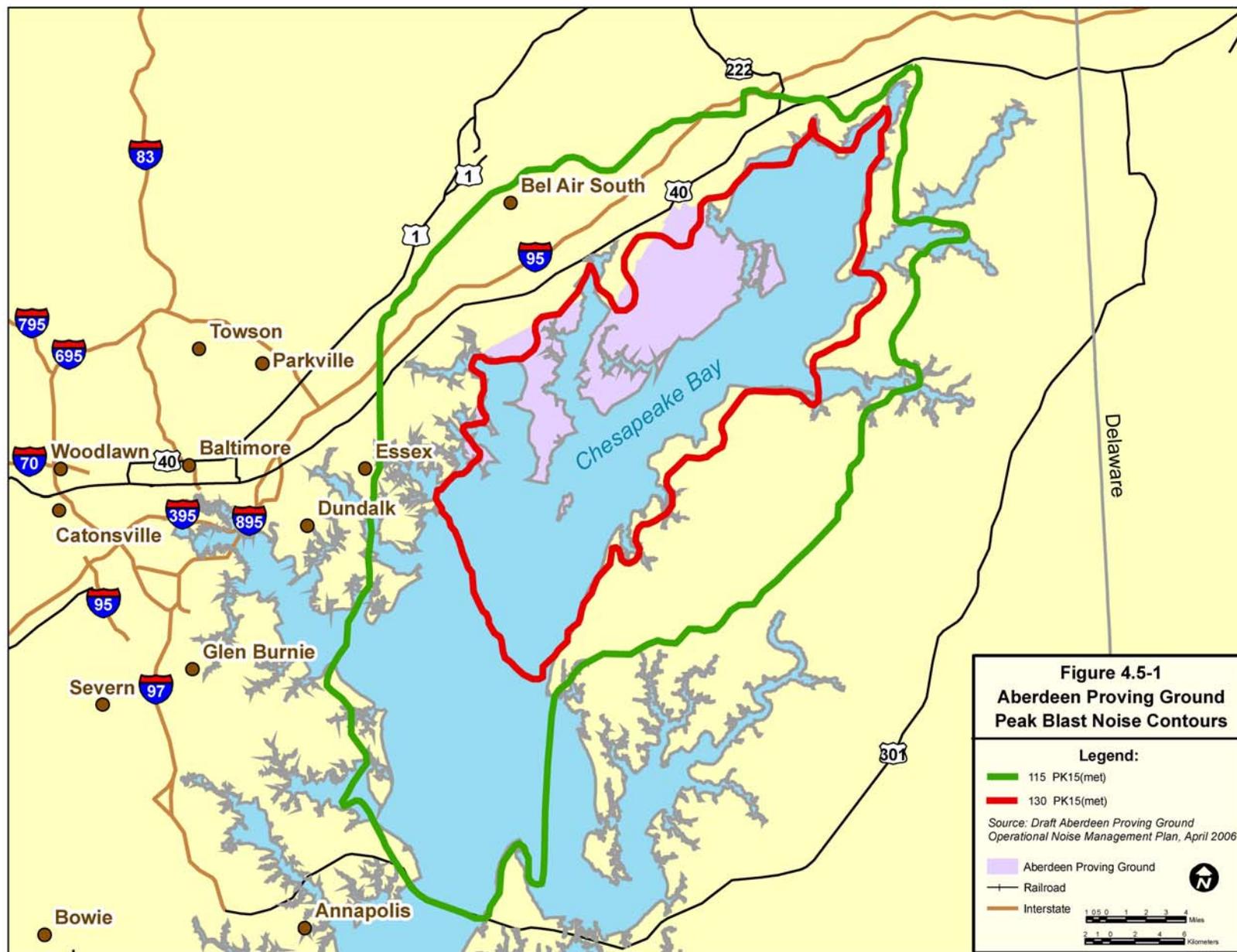
4.5.3.1.2.3 Peak Levels Blast Noise Contours

The BNOISE2 model can generate “peak contours” for single events. Peak contours show the expected level on a sound level meter when a weapon is fired. It should be noted that peak contours will be the same whether one shot or one thousand shots are fired. So areas within the peak contours might be compatible with residential land use using guidelines in AR 200-1, which are based on average levels, but there is the potential for single event levels to be high enough to cause complaints.

When peak noise levels for impulsive noise reach 115 dBP, there is a moderate risk of noise complaints. When levels exceed 130 dBP, there is a high risk of complaints. Figure 4.5-1 delineates areas where any single event noise levels may exceed these levels. Since weather conditions can cause noise levels to vary from day to day; even from hour to hour, the BNOISE2 program calculates contours that give the installation and the community the most realistic means to evaluate the areas affected by training noise without putting stipulations on land that would only receive high sound levels under different weather conditions. Under normal operations, APG uses BMPs to avoid conducting high noise-producing operations when weather conditions would favor propagation. Blast noise from APG causes a high risk of complaints from residents located on the eastern shore, including a portion of the Grove Point Peninsula of Cecil County and the northwestern part of Kent County (APG 2005f).

4.5.3.1.2.4 Small Arms Noise

All small arms activity at APG takes place on ranges already contained within NZs II and III from large caliber weapons firing. Since the weapons fired on these ranges are much quieter than large caliber weapons, the added operations at these proposed sites would not be loud enough to increase the size of the existing blast noise contours and would not add any additional property to the NZ II and NZ III noise contours. Additionally, the locations of the small arms ranges are far enough away from the boundaries that noise levels do not generate complaints (APG 2005f).



4.5.3.2 Construction Noise

Construction noise levels at and near locations on APG construction, demolition, renovation sites, and along infrastructure alignments, fluctuate depending on the particular type, number, and duration of use of various types of construction (heavy) equipment. The effect of construction noise would depend on the type of construction activity, the distance between construction activities and the nearest noise-sensitive uses, and the existing noise levels at those uses.

Table 4.5.3 shows typical noise levels generated by different types of standard construction equipment. Construction, demolition, and renovation activities associated with the Preferred Alternative would occur on the cantonment areas on APG's Northern and Southern Peninsulas that are basically already developed. The construction activities would occur over a period of 4 years.

**Table 4.5.3
Typical Construction Equipment Noise Levels**

Equipment	Noise Level at 50 feet (dBA, L_{eq})
Backhoes	80
Shovel	82
Dozers	85
Scrapers	89
Truck	88
Paver	89
Pumps	76
Generators	81
Compressors /a/	81
Jack Hammers	88
Pile Drivers	101

*Source: Transit Noise and Vibration Impact Assessment
Federal Transit Administration, April 1995*

Heavy equipment can be defined as earth-moving equipment, such as excavating machinery like excavators, backhoes, and front loaders, as well as handling equipment like graders, pavers, rollers, and dump trucks. Noise levels at a distance of 50 feet from heavy equipment range from about 75 to 101 dBs. During the heavy equipment phase of construction, noise would be generated more or less at a constant level.

Noise propagation is affected by site conditions. For example, a break in the line of sight between the noise source and the receptor can result in a 5-dB reduction. Dense vegetation can reduce noise levels by 5 dB for every 100 feet of vegetation, up to a maximum reduction of 10 dB (USDOT 1995). Atmospheric conditions can also affect the rate of sound attenuation. Sound travels farther during periods of higher humidity and also in colder temperatures. Wind can reduce noise levels by as much as 20 to 30 dBs at long distances (USDOT 1995). The influences of vegetation, topography, and atmospheric conditions as noise reduction factors can vary greatly and are often impossible to quantify.

4.5.3.3 Off-Post Noise Environment

Individuals off post may be subjected to multiple sources of continuous, intermittent, or impulsive noise during the day. Off-post, blast noise annoys residents located across Chesapeake Bay with lesser impacts 1 mile inland. The main objections are annoyance with the blast itself and vibration of the residences.

Ninety percent of the complaints result from weapons testing and training activities. Complaints tend to be more common in the morning during January through March when atmospheric conditions are more favorable for noise propagation. Noise complaints come from other areas as well, but those complaints are less frequent (APG 1997). The aircraft flights at the PAAF and Weide Army Heliport and vehicle movement at the test tracks have a negligible or minor effect off-post. Measurements and modeling results taken during a 2-year study in the mid-1990s revealed no noise levels above the critical threshold of 140 dBP for physiological damage (APG 1997) (Table 4.5.4). Operations at PAAF and Weide Army Heliport have been reduced since that time; therefore, this condition is not anticipated to be exceeded currently (USACE Baltimore 2003a).

Table 4.5.4 Impulse Noise Guidelines

Predicted Sound Level, DBP	Risk of Complaints
<115	Low risk of noise complaints.
115 – 130	Moderate risk of noise complaints.
130 – 140	High risk of noise complaints, possibility of damage.
>140	Threshold for permanent physiological damage to unprotected human ears. High risk of physiological and structural damage claims.

Note: For rapid fire test programs and/or programs that involve many repetitions of impulse noise, reduce allowed sound levels by 15 dBP.

APG conducted daytime and nighttime short-term peak and off-peak measurements in the communities surrounding APG. The data show the measured noise levels, land uses, measurement period, and dominant noise source(s) for each noise measurement site. During the sampling event, weather conditions for the week were favorable, with an average daytime temperature of 72°F, mostly sunny skies, no precipitation, and null/minimal wind conditions (Michael Baker Jr., Inc. 2003).

The data demonstrate that ambient daytime peak period noise levels varied from 49 dBA to a high of 65 dBA with Amtrak train activity creating the maximum noise values. Daytime off-peak noise levels varied from 53-63 dBA with both Amtrak trains and local construction noise contributing to the ambient noise levels. The dynamics of the nearest neighborhoods are relatively unique. Typical residential areas have peak noise periods during the day related to vehicular traffic together with normal neighborhood activities. These sound levels are generated by railroad operations, outdoor activities at the Edgewood Schools, and motor vehicle and military sources. Overall, none of the baseline sites had recorded daytime measurements above the 65 dBA criterion. The highest recorded L_{eq} levels (in the low-mid 60s) occurred during periods when train operations, housing subdivision construction, and/or school events were active.

Nighttime levels ranged from a low of 47 dBA to 63 dBA, with the Amtrak train noise the primary contributor to the highest nighttime noise levels. Overall, when the train pass-by was not occurring, the sites had recorded measurements below the nighttime criterion of 55 dBA. As expected, passing trains produced similar sound levels no matter what time of the day, with levels usually exceeding the 55 dBA criterion.

4.5.3.4 Traffic Noise

Noise from vehicles is not a dominant off-post noise source. During previous noise measurements primary noise sources identified off-post are Amtrak trains, school activity, a water pumping station, construction activities, mortar blasts, as well as traffic on MD 755 (Michael Baker Jr., Inc. 2003).

Roadways carrying over 500 vehicles per hour would produce noise levels over 65 dBA 150 feet away (see 4.5.3.1.1 *Mobile Sources of Noise* above). Table 4.5.5 lists roadways that carry over 500 vehicles per hour during the peak hour.

Table 4.5.5
Major On- and Off-Post Roadways

Off-Post	<ul style="list-style-type: none"> • MD 22 (Aberdeen Thruway) • Beards Hill Road • W. Bel Air Road • U.S. 40 (Pulaski Highway) • Post Road • MD 715 (Maryland Boulevard) • MD 24 (Emmorton Road) • MD 755 (Edgewood Road) • Otter Creek • MD 7 (Philadelphia Road)
On-Post	<ul style="list-style-type: none"> • Harford Boulevard • Maryland Boulevard • Aberdeen Boulevard • Longs Corner Road • Boothby Hill Avenue • Magnolia Road (MD 152) • Hoadley Road • Ricketts Point Road

4.5.4 Consequences

4.5.4.1 *Alternative 1 No Action Alternative*

- **Direct Impacts.** Under the No Action Alternative, APG would not implement the Preferred Alternative. Therefore, the Army would not implement any related renovation or construction at APG. No additional noise impacts are expected. The Preferred Alternative is congressionally mandated; therefore the No Action Alternative is not feasible.
- **Indirect Impacts.** Under the No Action Alternative, APG would not implement the Preferred Alternative. Therefore, the Army will not implement any related renovation or construction at APG. No additional noise indirect impacts are expected. The Preferred Alternative is congressionally mandated; therefore the No Action Alternative is not feasible.

4.5.4.2 *Alternative 2 - Preferred Alternative*

Direct Impacts. The following sections describe noise sources directly or indirectly associated with the Preferred Alternative.

4.5.4.3 *Sensitive Noise Receptors*

Sensitive noise receptors would be exposed to additional noise from the construction, demolition, and renovation of facilities that would occur with implementation of the Preferred Alternative. In addition, noise associated with collateral activities (*e.g.*, paving, cutting, heavy equipment, and generators) would contribute temporary noise impacts to sensitive noise receptors, the intensity of which is directly related to

the distance between the receptor and the noise sources. On APG's Northern Peninsula, the noise would be limited to existing developed areas. It is not anticipated that in the long-term, noise contours would vary noticeably from the baseline condition. Construction noise levels would dissipate over short distances and the duration of the noise would be determined by weather, construction schedule, and season.

4.5.4.4 Current and Recurring Noise Impacts

Under the Preferred Alternative, sensitive receptors and individuals residing and working at on- and off-post locations could be subjected to multiple sources of continuous, intermittent, or impulsive noise during the day that are not different in source, duration, and intensity than noise from current APG operations. Since the majority of noise complaints result from the types of installation noise-generating activities that, under the Preferred Alternative, are not increasing in number, intensity, frequency, or duration, off-post noise is unlikely to noticeably change with implementation of the Preferred Alternative.

Activities at the sites of current noise generation would not be affected by the Preferred Alternative. Tenant facilities on APG, with the exception of those described above, do not produce high levels of noise. Other minor noise sources include on-post traffic, on-post facility construction, demolition, and maintenance activities. Under the Preferred Alternative some current noise sources would be relocating from APG to other DoD locations, providing a small decrease in daily ambient noise generation. The major off-post source of noise affecting the City of Aberdeen and APG is the Amtrak rail system (Michael Baker Jr., Inc. 2003).

Noise impacts to wildlife are not likely to be different from the current ambient conditions, although the duration of construction noise would continue intermittently for up to 4 years. On APG's Northern Peninsula, all construction, demolition, and renovation under the Preferred Alternative would occur in areas already disturbed by prior construction and other activities. Impacts to wildlife would be intermittent and short-term. Noise impacts to wildlife are described in Section 4.8.

Potential traffic noise impacts due to the Preferred Alternative have been determined based on the comparison of the existing and forecasted future traffic volumes as well as land use adjacent to the major roadways. This approach was not used to quantify noise impacts. Noise controls are typically based on the average day-night noise levels calculated using average daily traffic and hourly distribution.

Off-Post Traffic Noise Impacts

Section 4.11 (Transportation) details the existing and estimated future traffic along primary on-post circulation routes most likely to carry employee traffic to their destinations. Although traffic for off-post traffic has not been modeled for the study, it is estimated that due to the Preferred Alternative, an additional daily 11,000 vehicle trips would be take place at APG when the Preferred Alternative is completed.

As discussed in Section 4.11 a total of 3,238 vehicles currently travel to and from APG's Northern Peninsula during the PM peak hour. A total of 2,902 vehicles travel to and from APG's Southern Peninsula during the PM peak hour. Under the Preferred Alternative an additional 2,509 trips would be generated on APG's Northern Peninsula during the PM peak hour. APG's Southern Peninsula would generate an additional 137 trips under the Preferred Alternative during the PM peak hour.

Although increased traffic volumes would occur off-post under the Preferred Alternative, due to the presence of other major noise sources (*e.g.*, artillery, vehicle testing, firing ranges), any increase in ambient noise levels would be negligible. Therefore, any additional traffic noise contributed from activities associated with the Preferred Alternative would be compatible with adjacent residential land use and would not exceed the existing APG NZ limits.

On-Post Traffic Noise Impacts

Additional on-post noise impacts are not anticipated due to additional vehicles. Traffic noise impacts typically occur when large volumes of cars travel at high speeds. Noise impacts are only considered for sensitive noise receptors such as residences. Residential areas are located along Harford Boulevard, which

would experience a reduction in vehicle trips during the PM peak hour (149 fewer vehicles). A golf course located along Maryland Boulevard would experience 337 additional cars during the PM peak hour.

For other areas of APG that would experience traffic increases, demolitions, artillery firing, and vehicle test noise dominate the noise environment and, therefore, noise generated by additional vehicles would not be noticeable. Potential noise impacts would be further minimized by low speed limits (typically 25 miles per hour).

4.5.4.5 Construction Noise

Construction noise would be generated by numerous sources during the period of construction, demolition, and renovation on APG's Northern Peninsula. Noise would be concentrated within the cantonment area and along the roadways to be upgraded. Noise control at the sources would be dictated by construction contracts. Exposure of workers to noise is regulated by the Occupational Safety and Health Administration. Since noise decreases by about 6 dBA with every doubling of the distance from the source, other human receptors away from construction sites would be exposed to lower noise levels.

4.5.4.6 Laboratory Activities

Under the Preferred Alternative, the level of future laboratory activities would increase as new facilities are renovated or constructed. Noise during operations, both inside and outside of the proposed facilities, would not differ in duration or intensity from current operations.

4.5.4.7 Other Minor Noise Sources

With implementation of the Preferred Alternative, current APG tenant facilities and routine maintenance activities are not anticipated to produce noise impacts greater than the baseline condition. The incoming activities are primarily laboratory, electronic/computer support functions, or administrative activities that would not produce a noticeable increase in noise levels.

Amtrak will continue to be one major source of noise affecting the City of Aberdeen and APG.

Indirect Impacts. Indirect impacts from noise may affect wildlife through disturbance of mating or nesting rituals. This disturbance could result in decreased annual fertility of the affected animals.

4.6 GEOLOGY AND SOIL

4.6.1 Affected Environment

4.6.1.1 Geologic and Topographic Conditions

Aberdeen Proving Ground lies within the Atlantic Coastal Plain physiographic province, characterized by low hills, shallow valleys, and flat plains. Elevations within APG range from sea level to about 60 feet above sea level. Major portions of APG are within the 100-year floodplain, which extends to the 8-foot elevation contour (above sea level). Most slopes on the installation occur within the 0 to 10 percent range, with few areas exceeding 2 percent.

Harford County spans two physiographic provinces: the Atlantic Coastal Plain Province and the Piedmont Province (Maryland Geological Survey 1969). With its southern location in Harford and Baltimore Counties, APG is within the boundaries of the Atlantic Coastal Plain Province. The Atlantic Coastal Plain Province is underlain by unconsolidated sediments such as clay, silt, sand, and gravel.

Two regional faults have been identified and two suggested for Harford County. The two identified faults have been assigned approximate locations; the existence of the other two is open to debate. The two most important faults extend across the central portion of Harford County from a point near Macton to a point roughly 2 miles north of Jarrettsville (Mill Green fault) and southwestward from Cardiff along a row of serpentinite lenses. A third fault cuts out an anticline in folded Glenarm strata and James Run Gneiss in the

lower course of Bynum Run near Emmorton. The fourth fault is believed to be along the west side of the Baltimore Gabbro near Little Gunpowder Falls. Judging by the absence of large historical earthquakes, the seismic risk for the Chesapeake Bay region is low. For example, from 1971 to 1986 no earthquake epicenters were reported in Maryland. Five small earthquakes did occur, however, in that time period near the northern apex of Chesapeake Bay in southern Pennsylvania, about 50 miles from APG. From February to May 1993, 19 earthquakes occurred in the four-state area near APG. These events ranged in magnitude from 1.0 to 2.8 on the Richter Scale.

4.6.1.2 Soil

The predominant upland soil on APG is generally very deep, nearly level to gently rolling, and somewhat poorly drained to moderately well drained. Loamy and silty alluvial and marine sediments underlie the upland soil. Soil of the floodplains and swamps of APG is generally deep to very deep, smooth and nearly level, and very poorly drained to moderately well drained. It is underlain by highly decomposed material and sandy or loamy alluvial, estuarine, and marine sediment (U.S. Department of Agriculture [USDA] NRCS 1998). The Natural Resources Conservation Service (NRCS) conducted a survey of soil on the installation. The report, published in 1998, updates the original APG survey dated 1927 to make it comparative with the survey for surrounding areas in Harford County. The soil survey identifies and maps 39 soil series or soil map units covering the installation (USDA NRCS 1998). Soil types are described and guidance on the use and management of the resource is provided. A general soil map classification for APG is shown in Figures 4.6-1 and 4.6-2. Table 4.6.1 indicates the approximate area and extent of soil types at APG. Predominant soil types on APG are the Mattapex, Romney, Udorthents, and Woodstown series (USDA NRCS 1998).

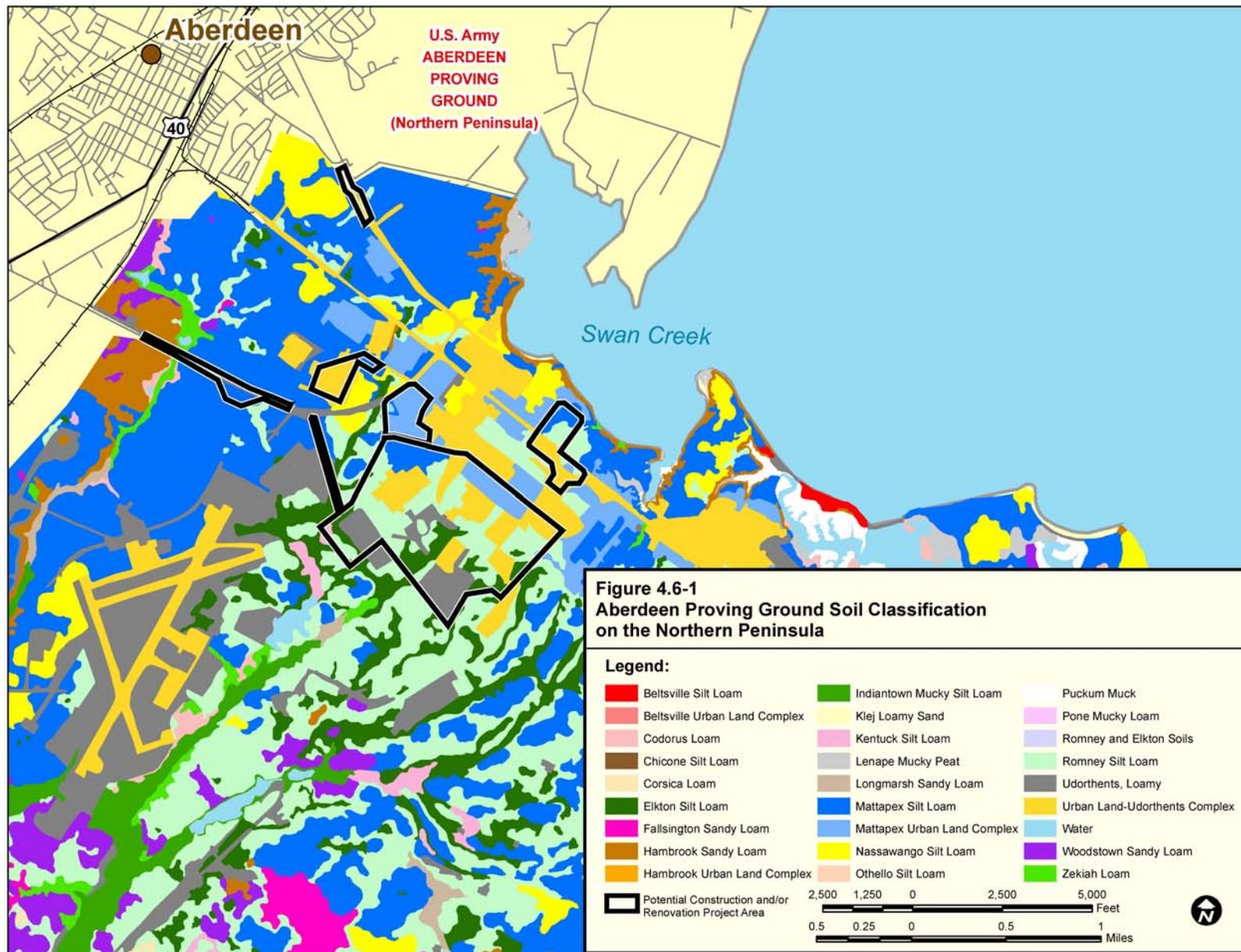
Soil in the APG area has been physically affected by operations primarily associated with range activities and chemically affected by past operations. Because test ranges occupy a large portion of the land area at APG (about 40%), physical effects (*e.g.*, changes in the soil's topography, permeability, and erosion potential) have been moderate. Effects caused by past demolition and construction are negligible because of the small area associated with the activities relative to the size of APG.

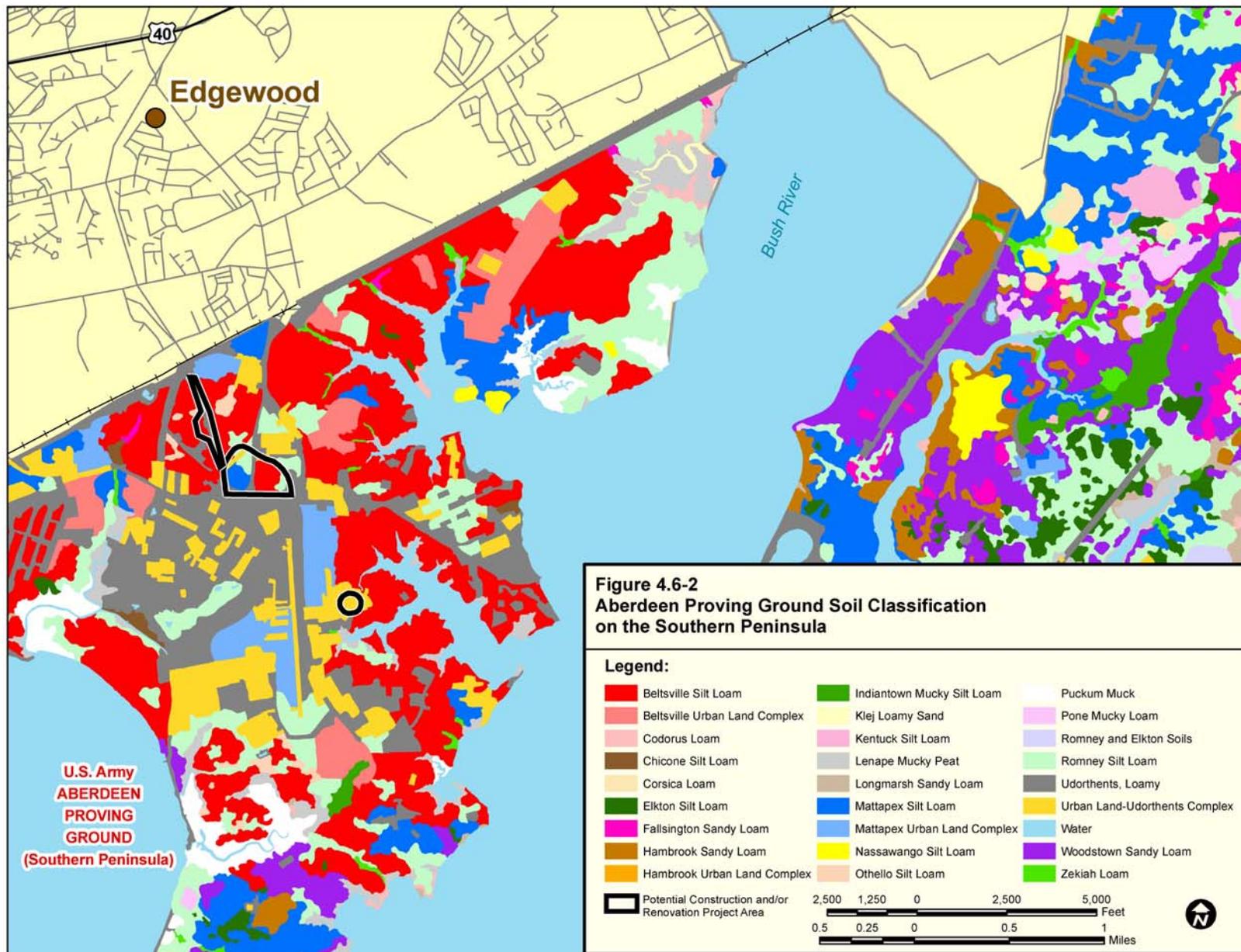
Inland erosion at APG is moderate and restricted to areas that have little vegetative cover, high relief, and flowing water (*e.g.*, the southwestern part of Boone Creek basin, the drainage basins of Kings, Lauderick, and Monks Creeks, the headwaters of Romney and Mosquito Creeks, the Munson Test Area, and the southern part of the Perryman Test Area). Shoreline erosion, although a moderate to severe problem at APG, is localized and not caused by past or current operations; that is, most shoreline erosion at the installation is natural. Natural shoreline erosion and accretion occur primarily along the bay shoreline of Spesutie Island and the windward shore of APG's Southern Peninsula. Shoreline stabilization projects to reduce wave energy have been undertaken in localized areas and have been very effective.

Chemical contamination of soil is localized and associated with areas of past operations. Because of the small areas of the associated sites (measured in acres), the overall chemical effects on APG's Northern Peninsula are small. The DoD's Installation Restoration Program (IRP), established in 1990, is engaged in an ongoing study and cleanup of environmental contaminants at APG.

4.6.1.3 Prime Farmland

High quality farmland is of major importance in meeting the nation's short- and long-range needs for food and fiber. Prime farmland, as defined by the USDA, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. Although the NRCS identified soil map units on APG that may be considered prime farmland due to the physical and chemical properties of the soil, since this soil occurs within the bounds of an active military installation (*i.e.*, "built-up land"), it does not meet the USDA definition and, therefore, no prime farmland is found at APG.





**Table 4.6.1
Acreage and Proportionate Extent of the Soil at APG**

Map Symbol	Soil Map Unit Name	Acreage	Percent
BeA	Beltsville silt loam, 0 to 2% slopes	199	0.9
BeB	Beltsville silt loam, 2 to 5% slopes	1,874	5.0
BeC	Beltsville silt loam, 5 to 10% slopes	99	0.3
BU	Beltsville-Udorthents-Urban land complex, 0 to 5% slopes	244	0.7
Ch	Chicone silt loam	16	-
Cd	Codorus loam	732	2.0
Co	Corsica loam	522	1.4
Ek	Elkton silk loam	1,284	3.4
Fa	Fallsington sandy loam	1,232	3.3
HbA	Hambrook sandy loam, 0 to 2% slopes	624	1.7
HbB	Hambrook sandy loam, 2 to 5% slopes	651	1.7
HbC	Hambrook sandy loam, 5 to 10% slopes	146	0.4
HbE	Hambrook sandy loam, 10 to 60% slopes	90	0.2
HU	Hambrook-Udorthents-Urban land complex, 0 to 10% slopes	117	0.3
In	Indiantown mucky silt loam	622	1.7
Kn	Kentuck silt loam	175	0.5
Kj	Klej loamy sand	20	-
Le	Lenape mucky peat	2,331	6.2
Lo	Longmarsh sandy loam	343	0.9
Ma	Manahawkin muck	93	0.3
MpA	Mattapex silt loam, 0 to % slopes	4,516	12.1
MpB	Mattapex silt loam, 2 to 5% slopes	1,382	3.7
MpC	Mattapex silt loam, 5 to 10% slopes	90	0.2
MU	Mattapex-Udorthants-Urban land complex, 0 to 2% slopes	836	2.2
MwA	Mattapex silt loam, cratered	292	0.8
NnA	Nassawango silt loam, 0 to 2% slopes	705	1.9
NnB	Nassawango silt loam, 2 to 5% slopes	274	0.7
NnC	Nassawango silt loam, 5 to 10% slopes	43	-
Ot	Othello silt loam	63	0.2
Po	Pone mucky load	375	1.0
Pk	Puckum muck	3,030	8.1
RE	Romney and Elkton soil, crated	311	0.8
RoA	Romney silt loam	6,661	17.8
Ud	Udorthents loamy, 0 to 10% slopes	3,228	8.6

**Table 4.6.1
Acreage and Proportionate Extent of the Soil at APG (Continued)**

Map Symbol	Soil Map Unit Name	Acreage	Percent
Ur	Urban load-Udorthents complex, 0 to 10% slopes	1,300	3.5
WdA	Woodstown sandy loam, 0 to 2% slopes	2,733	7.3
WdB	Woodstown sandy loam, 2 to 5% slopes	752	2.0
WdC	Woodstown sandy loam, 5 to 10% slopes	58	0.2
Ze	Zekiah loam	523	1.4
Water		187	0.5
TOTAL		38,773	100.0

Source: USDA NRCS 1998

4.6.2 Consequences

4.6.2.1 Alternative 1 - No Action Alternative

Direct Impacts. Under the No Action Alternative, APG would not implement the Preferred Alternative. Therefore, the Army would not implement any related renovation or construction at APG. No direct impacts to geology or soil differing from the baseline condition would be expected. The Preferred Alternative is congressionally mandated; therefore, the No Action Alternative is not feasible.

Indirect Impacts. No indirect impacts to geology or soil differing from the baseline condition would be expected.

4.6.2.2 Alternative 2 - Preferred Alternative

Direct Impacts. Short-term impacts would occur as a result of soil disturbance associated with renovation activities in the cantonment area. Soil would be disturbed by compaction from vehicles and renovation activities such as vegetative clearing. Soil disturbance has a potential to result in erosion and increase in total sediment loads in stormwater runoff. Renovation of facilities would result in minimal amounts of bare soil exposure for short durations of time; whereas, new construction would result in higher amounts of soil exposed over a greater amount of time. Nearly 3.3 million SF of new space is required for the Preferred Alternative. New construction on APG's Southern Peninsula would increase the amounts of ground clearing and soil disturbance, and short-term impacts to soil would be higher than renovation alone. Soil erosion that would occur as a result of increased run-off associated with the additional impervious surface would be a long-term impact to the site.

The development and design of the Preferred Alternative projects is an on-going process. Of the BRAC projects listed in Table 2.2.3, only the development and design of the C4ISR complex had advanced to a stage where building footprints and preliminary site plans were available when this EIS was prepared. When the process advances to the point where building footprints and site plans are available for other project sites, APG will comply with all applicable regulatory procedures and requirements to the extent practicable for military construction. The change in impervious surface resulting from the construction of the C4ISR complex is shown below.

Proposed impervious surface of C4ISR complex and associated paving	4,304,106 SF
Existing impervious surface at C4ISR complex development area	3,353,911 SF
Net increase in impervious surface of C4ISR complex and associated paving	950,195 SF

No direct impacts to the geology and topography of APG's Northern Peninsula area are foreseen.

Indirect Impacts. No indirect impacts to geology and soil are anticipated.

Environmental impacts to soil would be minimized through the use of BMPs and standard construction practices. Mulching, silt fences, sediment traps, straw berms, temporary cover crops, and other erosion control BMPs would reduce soil erosion at the site. Erosion controls detailed in NRCS Critical Area standards and those required by the State of Maryland stormwater discharge permits for construction sites, as well as other BMPs, would be used, where applicable, to reduce erosion and protect the water quality of receiving streams. Although BMPs are not 100 percent effective in preventing sediment run off, APG would ensure that the construction contractor complies with established stormwater and sediment and erosion control plans and regulations.

4.7 WATER RESOURCES

4.7.1 Affected Environment

The description of water resources in this section is taken predominantly from the FY2005 Installation Action Plan for Aberdeen Proving Ground (APG 2004) and the *Aberdeen Proving Grounds Prefinal Mission Environmental Impact Statement* (USACE Baltimore 2003a). Floodplain information was obtained from the Federal Emergency Management Agency (FEMA) mapping available on the Maryland State website at www.mde.state.md.us.

4.7.1.1 Surface Water

APG is located in the low-lying Atlantic Coastal Plain Province adjacent to the upper reach of Chesapeake Bay (USACE Baltimore 2003a). Broad flat plains and marshes, with occasional low hills, characterize the topography of APG. Surface elevations range from below mean sea level to 60 feet above mean sea level. Surface drainage at APG is to the Chesapeake Bay, including the Bush and Gunpowder River estuaries, or creeks that discharge to these water bodies. About 37,000 acres of APG, close to one-half of its total area, is composed of surface water bodies, including the Chesapeake Bay, rivers, and creeks. Surface waters on APG tend to be shallow and sluggish, with tidal estuaries forming the mouths of the waterways, and marshes bordering their shorelines. The creeks and streams in the Aberdeen area are Abbey Creek, Back Creek, Bridge Creek, Church Creek, Cod Creek, Delph Creek, Dipple Creek, Little Romney Creek, Mosquito Creek, Romney Creek, Swan Creek, and Woodrest Creek. The creeks and streams on APG's Southern Peninsula are Boone Creek, Canal Creek, Cooper's Creek, King's Creek, Lauderick Creek, Monk's Creek, Reardon Inlet, Swaderick Creek, Watson Creek, and Wright Creek.

The upper Chesapeake Bay, including the vicinity of APG, receives over 90 percent of its freshwater inflow from the Susquehanna River, with a drainage basin comprising about 27,500 square miles (USACE Baltimore 2003a). The Chesapeake Bay is the largest estuary in the United States (Chesapeake Bay Program 2006) and has three salinity zones, from low (oligohaline), moderate (mesohaline) to high (polyhaline) concentrations. The brackish estuarine waters at APG range from tidal freshwater to oligohaline to mesohaline salinities with salinity concentrations of up to about 12 parts per thousand (USACE Baltimore 2003a). The average depth of the Chesapeake Bay is about 15 feet in the vicinity of APG. The average depth of estuarine waters at APG is about 7 feet (mean low tide) and rarely exceeds 15 feet.

Areas associated with the Preferred Alternative on APG's Northern Peninsula drain to Romney Creek and Swan Creek. Several smaller tributaries to Romney Creek are located adjacent and within several of the Preferred Alternative development areas. The nearest Preferred Alternative development area is about 1,200 feet from Swan Creek. Areas associated with the Preferred Alternative on APG's Southern Peninsula drain to Canal Creek and Gunpowder River for locations west and northwest of the Weide Army Heliport, and Kings Creek and Bush River for the proposed action development area east of the Weide Army Heliport.

Past activities have affected surface water quality within APG boundaries and the vicinity. Organic constituents have been detected in surface water in many areas, but at concentrations below applicable water quality criteria except in Watson Creek and the Gunpowder River (USACE Baltimore 2003a).

Detailed descriptions of Maryland's CZMA, the Critical Area Act, and federal consistency requirements are provided in Section 4.2.1.4 and Section 4.8.

Potable water for APG is discussed in Section 4.12.1.1.

4.7.1.2 Hydrogeology/Groundwater

Unconsolidated sediments such as clay, silt, sand, and gravel underlie the Atlantic Coastal Plain Province. The Potomac Group (Cretaceous Age) contains the primary water-bearing formations within the Atlantic Coastal Plain; the Patuxent formation and the Patapsco formation. The primary water-bearing formation in the APG region within the Atlantic Coastal Plain is the Patuxent formation (USACE Baltimore 2003a). The Patapsco formation contains beds of sand and gravels that also yield large quantities of water. The Patapsco is often in direct hydrologic contact with the Chesapeake Bay, making brackish water intrusion a potential problem. Groundwater flow is generally slow and in a southeasterly direction.

Ten City of Aberdeen wells and eight Harford County wells are located in the vicinity of the North Peninsula western boundary (USACE Baltimore 2004a). Four of the Harford County wells are located on the western boundary, and four of the City of Aberdeen wells are located within the installation boundary. The four on-post City of Aberdeen wells (referred to as CAP-7, CAP-8, CAP-9, and CAP-10) are operated by the City of Aberdeen and are located within the vicinity of the Rodman Laboratory, near Deer Creek Loop. Well CAP-7 appears to be within the footprint of Preferred Alternative development at Rodman Laboratory. In addition, the vicinity of Rodman Laboratory is located within the City of Aberdeen Source Water Protection Area.

APG operates about 24 wells in the North Peninsula training area and two wells in the South Peninsula training area (APG 2007a). These wells are permitted as residential wells with the Harford County Department of Health. Monthly monitoring is conducted for bacterial parameters, nitrate, and turbidity. Water sample analysis for CWA drinking water parameters was conducted during the well permitting process several years ago. No water exceedances were identified.

A number of contaminants have been identified in the groundwater at APG, ranging from inorganic chemicals to VOCs (USACE Baltimore 2003a). A number of chemicals have also been identified in offsite groundwater sources; however, the concentrations of these materials are below respective regulatory limits.

Groundwater resources at APG have been categorized into 12 study areas. These land areas are defined based on past Comprehensive Environmental Response, Compensation, and Liability Act activities (USACE Baltimore 2003a). The Preferred Alternative locations lie within three of these study areas. However, the proposed construction locations are not located within IRP site boundaries with ongoing remediation activities as discussed in Section 4.13.1.3. Each study area and corresponding groundwater description, including potential contaminants of concern, are described below (APG 2004).

Western Boundary/Fire Training Area

The Western Boundary/Fire Training Area comprises 11,225 acres on the northern portion of APG's Northern Peninsula. This area includes three operable units (OU), two of which address groundwater concerns. OU1 addresses contaminated groundwater in the southwestern portion of the Western Boundary Study Area near the Harford County and City of Aberdeen production wells, and OU2 addresses groundwater near the PAAF Landfill and City of Aberdeen wells located north of the landfill. Perchlorate, an explosive compound, has been detected in several of the City of Aberdeen wells and filters were installed on four of the wells (APG 2006f).

Investigation activities at OU1 confirmed trichloroethylene (TCE) contamination of two Harford County wells. A carbon treatment system was installed on APG in 1993 to treat TCE-contaminated groundwater from the two wells. A ROD was signed in July 2000, requiring construction of a new treatment plant with the capability to treat all county production wells. The new off-site plant, designed in accordance with the ROD, was completed in October 2003.

Other Aberdeen Areas

The Other Aberdeen Areas study site consists of about 16,673 acres, and includes landfills, dumps, pesticide and polychlorinated biphenyl (PCB) spill areas, waste oil and battery storage areas, washracks, training areas, contaminated sediments from wastewater discharge areas, disposal pits, burn areas, surface impoundments, and waste water treatment plants. Contaminants of potential concern in this area are PCBs, heavy metals, chlorinated volatile organic compounds (CVOC), solvents, pesticides, propellants, explosive chemicals, and petroleum/oil/lubricants.

Canal Creek

The 1,735-acre Canal Creek study area is located on the northern section of APG's Southern Peninsula. Two major contaminant plumes were found in the study area, and groundwater contamination is widespread in two of the three aquifers: the surficial aquifer and the Canal Creek aquifer (USACE Baltimore 2003a). Compounds detected in exceedance of groundwater guidelines include VOCs, CVOCs, metals, nerve agent degradation compounds, and chemical agent materials. There is a groundwater treatment plant operating within the Canal Creek study area.

Bush River Study Area

The 396-acre Bush River study area is located on APG's Southern Peninsula, just east of the Canal Creek study area and adjacent to Bush River. The surficial aquifer on the southern Bush River peninsula is a complex sequence of interconnected sand, clay, and silt. The aquifer is separated into a lower and upper section in several locations by laterally discontinuous silt and clay layers. A large clay layer defines the lower boundary of the aquifer (APG 2004).

Ninety-four monitoring wells have been installed in this area to assess possible groundwater contaminants. The main compounds detected in exceedance of groundwater guidelines include VOCs and CVOCs.

4.7.1.3 Floodplains

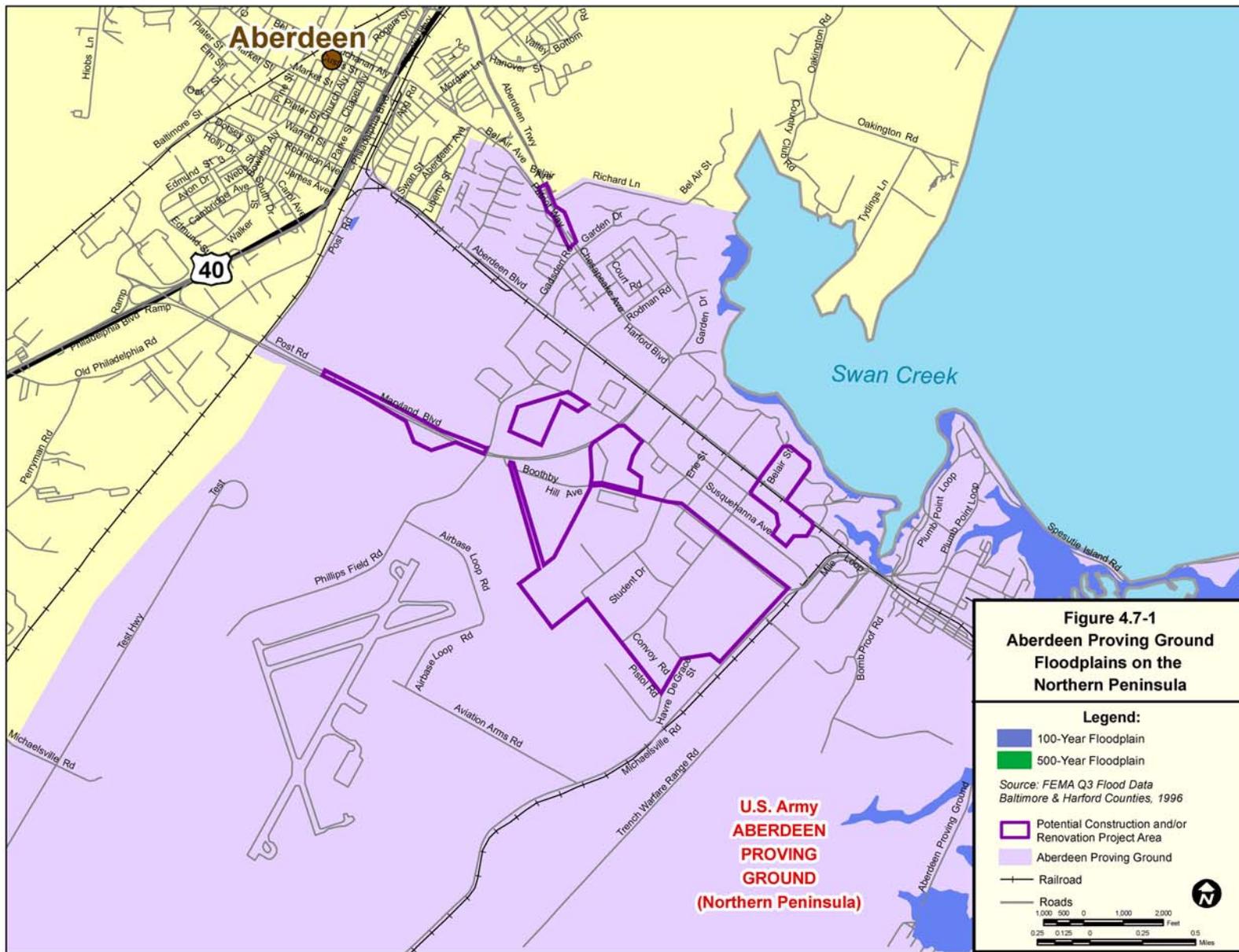
The 100-year floodplain, which has a 1 percent chance of being exceeded in any one year, is normally used for assessing the potential impact of human activities in the floodplain. When a critical action is involved, defined as an action for which even a slight chance of flooding has a great impact, the floodplain to be used for impact assessment is the 500-year floodplain (44 CFR Part 9). Critical actions include those that produce, use, or store highly volatile, flammable, explosive, or toxic materials. Floodplain management regulations require such project facilities to be located outside the applicable floodplain to minimize floodplain impacts.

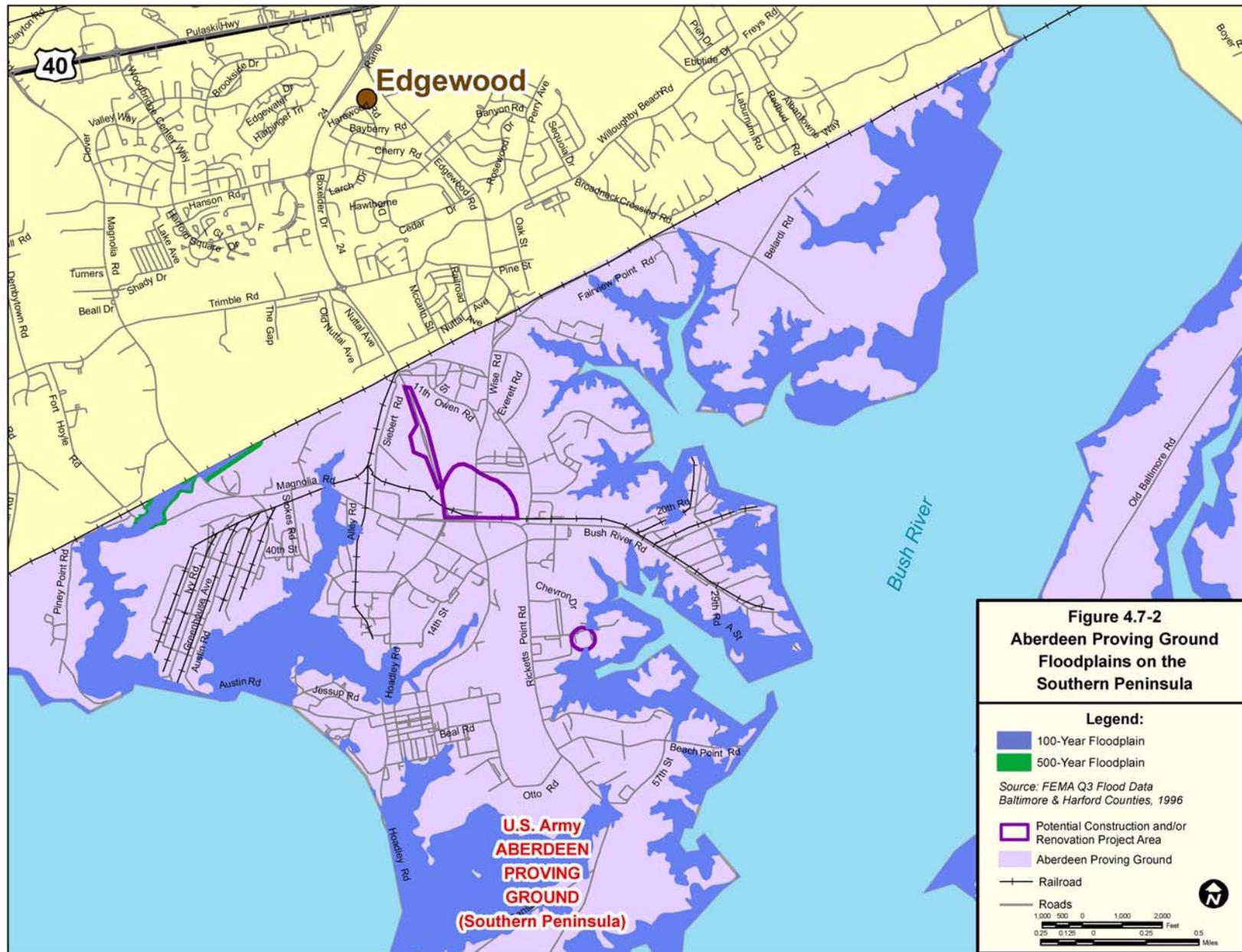
According to FEMA floodplain maps, the portion of APG bordering the Chesapeake Bay, Bush River, and Gunpowder River are prone to flooding. However, no project areas located on APG's Northern Peninsula are within the 100-year or 500-year floodplain (Figures 4.7-1 and 4.7-2).

4.7.2 Consequences

4.7.2.1 Alternative 1 - No Action Alternative

Direct Impacts. Under the No Action Alternative, APG would not implement the Preferred Alternative. Therefore, the Army would not implement any related renovation or construction at APG. No direct





impacts to water resources differing from the baseline condition would be expected. The Preferred Alternative is congressionally mandated; therefore, the No Action Alternative is not feasible.

Indirect Impacts. No indirect impacts to water resources differing from the baseline condition would occur.

4.7.2.2 *Alternative 2 - Preferred Alternative*

Direct Impacts. The Preferred Alternative would have no direct impacts on water resources. No surface water bodies exist within the boundaries of the Preferred Alternative development areas under this alternative. No direct impacts to surface waters are expected as a result of project activities within these parcels, as no construction will occur within the floodplains. A discussion on potential stormwater impacts is presented in Section 4.12.1.3. Direct impacts related to contaminated groundwater are not anticipated since use or contact with groundwater is not anticipated under the Preferred Alternative.

Indirect Impacts. The Preferred Alternative would have short-term indirect adverse effects on water resources. Stormwater runoff from proposed construction activities may discharge to the Bush and Gunpowder Rivers. The combination of replacing old buildings with new construction, renovation of existing space, and implementation of BMPs would minimize impacts to water resources. About one-half of the building space requirements under the Preferred Alternative would be addressed with new construction/demolition and renovation (*i.e.*, zero net gain/loss in impervious surface area associated with these portions of the Preferred Alternative). The associated increase in impervious surfaces from new construction in previously undeveloped areas would potentially increase stormwater runoff and reduce groundwater recharge. However, compliance with Stormwater Pollution Prevention Plans and Source Water Protection Plans (where applicable), NRCS Critical Area standards, “General Performance Standards” outlined in the Maryland Stormwater Design Manual and COMAR 26.17.02, as well as implementation of other BMPs (refer to Section 4.15), would reduce stormwater and groundwater recharge impacts (refer to Section 4.12.2.2.3 for additional discussions on stormwater).

Vapor intrusion may occur with new construction in areas contaminated with volatile compounds. A soil vapor assessment and design considerations may be warranted for locations overlying groundwater plumes or contaminated soil.

4.8 BIOLOGICAL RESOURCES

Significance Determinations

The following thresholds have been used in this document to determine if an impact to biological resources would be significant:

- Federal Threatened or Endangered Species – Under the federal Endangered Species Act, take or jeopardy of a species listed as endangered or threatened, or proposed for listing. Under Section 9 of the ESA, the “take” of species listed as threatened or endangered under the ESA is prohibited, unless the take is incidental to otherwise lawful activities. Under Section 7 of the ESA, “jeopardize” means to engage in any action that would be expected to reduce appreciably the likelihood of the survival and recovery of a listed species by reducing its reproduction, numbers, or distribution.
- Migratory Birds – Under the federal Migratory Bird Treaty Act, take (wounding, killing) of migratory birds, eggs, or occupied nests.
- Terrestrial Vegetation – Under the Maryland Forest Conservation Act or Critical Area Act, any forest vegetation clearing not consistent with the Acts.
- Wetlands – USACE has authority for evaluating wetlands impacts not avoidable under Section 404 of the CWA.

- Nontidal Wetlands – Under the Maryland Nontidal Wetlands Protection Act and federal EO 11990, Protection of Wetlands, any nontidal wetlands losses for which a practicable alternative exists or have not first been avoided and minimized.
- Wildlife – Under the Maryland Critical Area Act, any activity within the 1,000-foot Critical Area that is not consistent with the wildlife habitat and anadromous fish propagation waters protection criteria of the Critical Area Act. Any activity within the 1,000-foot Critical Area not consistent with the rare species protection criteria of the Critical Area Act.

4.8.1 Affected Environment

4.8.1.1 Vegetation

4.8.1.1.1 Overview of Vegetation and Land Cover

Aberdeen Proving Ground encompasses over 72,000 acres, 46 percent of which consists of open estuarine waters of the Chesapeake Bay and its tributaries (see Section 4.7 for a detailed description of surface waters at APG). The remaining acreage includes a variety of uplands (35%) and wetlands (19%) as listed in the National Wetlands Inventory (NWI), as shown on Figures 4.2-2 and 4.2-3. The NWI system, which was originally developed for wildlife inventory purposes, predated the USACE 1987 Wetlands Delineation Manual, which is used for jurisdictional and regulatory purposes. The NWI system focuses on water indicators and landscape location, and does not require that wetlands possess all three criteria specified in the USACE's manual and regulatory program (hydrology indicators, hydric soil, and wetlands vegetation).

Upland areas are dominated by forest vegetation (13,000 acres), but also include maintained lawn/landscaped areas, fields, and developed areas (buildings and roads). Both tidal (estuarine intertidal) and non-tidal (palustrine) wetlands are present, including over 5,300 acres of forested wetlands. In contrast to much of the Chesapeake Bay watershed, the total forested acreage at APG has more than doubled since 1917 because the Army has allowed former agricultural lands to become forested through natural ecological succession (APG 1997).

4.8.1.1.2 Terrestrial Vegetation

The Preferred Alternative development areas are located primarily in previously developed portions of the installation. More than three-quarters of the total Preferred Alternative development areas consist of existing development (*i.e.*, buildings, parking lots, and roads), lawn, frequently mowed field, and scattered landscape trees and shrubs. To the extent possible, all building renovations and new construction under the Preferred Alternative would be sited in these areas lacking natural vegetation communities. Mixed hardwood forests occur in some of Preferred Alternative development areas. Common tree species include southern red oak, white oak, sweetgum, red maple, yellow poplar, Virginia pine, and American holly. Common shrubs include spicebush, highbush blueberry, and Japanese honeysuckle (invasive). Ground cover includes eastern hayscented fern and Japanese stilt-grass (invasive). Forested areas would be avoided as specific building plans and site layouts are developed.

The Maryland DNR is working to identify those undeveloped lands most critical to the state's long-term ecological health. These lands, referred to as Maryland's green infrastructure, provide the natural foundation needed to support diverse plant and animal populations, and enable valuable natural processes to take place, like filtering water and cleaning the air. Maryland DNR identified the state's Green Infrastructure Assessment as a scoping issue. Maryland's statewide Green Infrastructure Assessment has identified and mapped green infrastructure "hubs," which consist of large blocks of undeveloped forest, and "corridors" that connect the hubs. A majority of APG is mapped as a green infrastructure hub. The Green Infrastructure Assessment also provides an ecological ranking system over the entire state. The installation as a whole represents the largest block of the highest ranking, ecologically valuable green infrastructure in the northeast quadrant of the state. The forests in the Preferred Alternative development areas are highly

fragmented by existing development. Consequently, their ecological value is considered lower than the large undeveloped and unfragmented forests at the installation.

4.8.1.1.3 *Submerged Aquatic Vegetation*

Submerged aquatic vegetation (SAV) is a diverse group of rooted aquatic plants found in shallow water areas of the Chesapeake Bay. This group of plants performs a number of irreplaceable ecological functions, which range from chemical cycling and physical modification of the water column and sediments, to providing food and shelter for commercial, recreational, and ecologically important organisms. Since the 1960s, well over half of the SAV has disappeared from the Bay waters. Declining water quality, disturbance of SAV beds, and alteration of shallow water habitat all contributed to the decline. This decline of SAV is commonly identified as one of the major ecological issues facing the Bay.

Many shallow water areas around APG provide suitable physical habitat for SAV. The Virginia Institute of Marine Sciences (VIMS) conducts annual aerial surveys to photograph and map SAV in the Bay. Aberdeen Proving Ground supports this effort with ground surveys used in conjunction with the photography interpretation. These surveys indicate that SAV abundance has increased in recent years in the vicinity of APG (VIMS 2006). The dominant species of SAV in the area are Eurasian watermilfoil and hydrilla, neither of which is native to the Chesapeake Bay. Other species present include wild celery and possibly water stargrass (APG 2005g).

4.8.1.2 *Wildlife*

4.8.1.2.1 *Mammals*

Suitable habitat for more than 40 mammal species occurs at APG, and about 24 species have been reliably recorded from the site. Among the more common species are the red fox, white-tailed deer, eastern cottontail rabbit, muskrat, gray squirrel, striped skunk, groundhogs, and beaver (APG 1997). Coyotes, river otters, bats, and small mammals, such as the white-footed mouse, short-tailed shrew, meadow vole, pine vole, and chipmunk, are also present at the installation. As is the case throughout much of Maryland, white-tailed deer at APG are overpopulated, which results in human/deer conflicts (*e.g.*, vehicle collisions) and impacts to natural and ornamental vegetation resulting from over browsing. Over browsing of native ground cover plants in forested areas is also thought to accelerate infestations of the invasive plant Japanese stilt-grass (APG 2006h). The 5000 block contains a large enough population of white-tailed deer that hunting is allowed there.

The Preferred Alternative development areas are built up and maintained, and lack high quality habitat for the mammals found at APG. Use of these areas is expected to be limited to species that are tolerant of and/or adapted to developed landscapes and frequent human activity (*e.g.*, gray squirrel).

4.8.1.2.2 *Birds*

Nearly 250 species of birds may occur at APG during some portion of the year (APG 1997) and at least 108 species of land birds have been documented at the installation (APG 2001a). The installation is located in the upper Chesapeake Bay and Atlantic Flyway, a major bird migratory route. Coupled with its diverse habitats and large expanses of undeveloped land, APG's location makes it particularly important for a number of bird groups, including waterfowl, colonial water birds, raptors, neotropical migrants, and FIDS.

The installation provides breeding, foraging, and wintering habitat for many of the 29 species of waterfowl that use the Bay. Waterfowl known to breed at APG include mallards, black ducks, wood ducks, blue-winged teal, hooded mergansers, and Canada geese. As a participant in the North American Waterfowl Management Plan, the Army has established the APG Waterfowl Sanctuary System, which includes about 600 acres of important nesting and feeding areas that are closed to waterfowl hunting (APG 1997). Open water, tidal marshes, riparian forests, beaver ponds, and ephemeral pools within hardwood forests are important waterfowl habitats at APG.

Some of the colonial water bird species expected to occur at APG, at least seasonally, include the great blue heron, great egret, snowy egret, little blue heron, green heron, and black-crowned night heron. Only the great blue heron and green heron are known to have nested in or near APG since the 1980s. Two great blue heron rookeries occur on APG, one at the headwaters of Romney Creek and one on Pooles Island (APG 1997). Important colonial water bird habitats at APG include tidal marshes and other wetlands, shallow waters along shorelines, and riparian forests isolated from human disturbance (rookery habitat).

The more common raptor species that occur at APG include the American kestrel, eastern screech owl, great horned owl, barred owl, turkey vulture, black vulture, osprey, red-tailed hawk, and bald eagle (see discussion of bald eagle in Section 4.8.1.3.1). Collectively, these raptors use a variety of forested, open upland, and open water habitats at the installation for nesting, roosting, and foraging.

An inventory of land birds at APG in 1995 and 1996 identified over 50 neotropical birds, which are species that breed in North America and winter south of the United States. Population declines throughout North America have been reported for nearly one-third of the species of neotropical migrants. A number of neotropical migrants associated with forest edges, thickets, and early successional forest growth were abundant at APG. The most common species in this group were the common yellowthroat, indigo bunting, eastern towhee, gray catbird, and white-eyed vireo. Wild turkeys have made a recovery since their reintroduction in the early 1990s. The only area-sensitive grassland birds observed with any regularity were the grasshopper sparrow and eastern meadowlark. Frequently mowed fields were found to have little or no conservation value for neotropical migrants or other land birds. The survey found two neotropical migrants, the common nighthawk and hooded warbler, which had not been previously reported as breeding at APG (APG 2001a).

Population declines have also been reported throughout North America for many FIDS, some of which are also neotropical migrants. Some of the FIDS documented at APG include wood thrush, American redstart, worm-eating warbler, Kentucky warbler, hooded warbler, scarlet tanager, hairy woodpecker, and pileated woodpecker. Black-throated green warblers have also been documented at APG during migration. Large pole-mature forests provide valuable FIDS habitat on APG, especially large blocks of contiguous forests (100 acres or greater) and wide riparian forests (300 feet or greater).

The Preferred Alternative development areas are built up and maintained, and lack high quality habitat for birds, including waterfowl, colonial water birds, neotropical migrants, and FIDS. Use of these areas is expected to be limited to species tolerant of and/or adapted to developed landscapes and frequent human activity (*e.g.*, American robin, European starling, blue jay, American crow, and sparrows).

4.8.1.2.3 *Reptiles and Amphibians*

More than 40 species of reptiles and amphibians may occur at APG. Most of the species inhabit streams, ponds, wetlands, and forests. The most abundant amphibian species are bullfrog, green frog, northern cricket frog, northern spring peeper, southern leopard frog, American toad, and red-backed salamander. Common reptile species include spotted turtle, eastern mud turtle, common snapping turtle, eastern box turtle, black rat snake, northern water snake, and eastern garter snake (APG 1997).

The Preferred Alternative development areas are built up and maintained, and lack high quality habitat for reptiles and amphibians. Use of these areas is expected to be limited to species that are tolerant of and/or adapted to developed landscapes and frequent human activity (*e.g.*, American toad).

4.8.1.2.4 *Aquatic Animals*

The aquatic habitats in and around APG include estuarine waters, tidal and non-tidal creeks, beaver ponds, ponds in non-tidal freshwater marshes, and man-made permanent and seasonally flooded ponds. This section focuses on aquatic animals in APG's estuarine waters and tidal creeks (Gunpowder River, Bush River, and Swan Creek) because they could potentially be affected by the Preferred Alternative. As discussed in Section 4.7, these areas are tidal freshwater aquatic habitats (salinity less than 0.5 parts per

thousand [ppt]) in the upper reaches and brackish water (salinity of about 5 ppt, depending on precipitation and tide) near the Chesapeake Bay.

A survey conducted in 1996 indicated that the benthic macrofaunal community in the Bush River and its tributaries are characterized as being composed of species typically found in the tidal freshwater to low salinity regimes. Common animals identified included a clam, aquatic worms, and midge larvae. The benthic community in Gunpowder River and Swan Creek are expected to be similar (IT Corporation 2001).

Blue crabs, which are very important to the Bay from a socioeconomic and ecological perspective, occur in APG waters. Blue crabs are found from the mouth of the Chesapeake Bay to tidal fresh areas. There are distinct differences in the ranges of males and females. During the summer months, males are found from freshwater to the polyhaline zone (waters with salinities of 18 to 30 ppt), although they occur in the greatest numbers in salinities of 3 to 15 ppt. Maximum numbers of females occur down Bay at salinities of 10 ppt to ocean salinities. Mating can occur in lower salinity waters, but spawning (release of larvae by the female) occurs near the mouth of the Bay (Blue Crab Archives 2006). Blue crab distribution and abundance in the immediate vicinity of APG is likely limited by the low salinity regime. Blue crabs do not spawn in APG waters.

Relatively few oysters are expected to be found in APG waters because they grow best in waters with salinity values greater than 12 ppt.

About 50 fish species have been recorded from or could reasonably be expected to occur in APG waters, including several species of high commercial and recreational importance. Commercial food fishing contributes about 3 million dollars annually to the local economy. The principal freshwater fish that occur in APG waters include the largemouth bass, pumpkinseed, bluegill, yellow perch, catfish, and carp. Anadromous fish (live in saltwater and migrate to freshwater to spawn) that could be found in APG waters include the American shad, hickory shad, alewife, blueback herring, striped bass, white perch, Atlantic sturgeon, and shortnose sturgeon. APG waters provide spawning and/or nursery areas for some of these species, including the striped bass. The American eel is common in the area and is the only catadromous species (migrate from freshwater to saltwater to spawn) found in North America. Marine species such as bluefish are occasionally reported from APG waters, but would only be expected to be found during periods when low flows from tributaries reduce freshwater input, allowing higher salinities to occur (APG 1997).

None of the waters in the immediate vicinity of APG are classified as Essential Fish Habitat by the National Marine Fisheries Service (NMFS).

4.8.1.3 Federal and Maryland Threatened and Endangered Species

Overview

The Department of the Army requested informal consultation with U.S. Fish and Wildlife Service (USFWS) under the ESA. The Army's request and the USFWS response are included in Appendix C. The ESA, administered by the USFWS and NMFS, provides federal protection for all species designated as threatened or endangered. The USFWS is responsible for management of land and freshwater species, while the NMFS is responsible for marine and anadromous species. The Maryland Nongame and Endangered Species Act lists protected species as endangered, threatened, or in need of conservation. The state act is administered by Maryland DNR, Natural Heritage Program.

The USFWS and the Maryland DNR were contacted to obtain a list of federal-listed threatened and endangered species known to occur in Harford County, Maryland. Numerous surveys and inventories have been conducted at APG to determine the presence of protected species (APG 2001a). Table 4.8.1 provides a list of threatened and endangered species documented at the installation.

Rare plant surveys were conducted at the installation in 1998–1999 (APG 2001a). No federally listed plants were identified. Although several plants considered rare in Maryland have been documented at the

installation, none are known or expected to occur in the Preferred Alternative development areas based on existing development, current maintenance regimes, and lack of suitable habitat.

Table 4.8.1 Threatened and Endangered Animals Known to Occur at Aberdeen Proving Ground, Maryland

Common Name	Scientific Name	Federal Status	State Status
Bald eagle	<i>Haliaeetus leucocephalus</i>	Threatened	Threatened
Shortnose sturgeon	<i>Acipenser brevirostrum</i>	Endangered	Endangered
Least bittern	<i>Ixobrychus exilis</i>	None	In Need of Conservation
Nashville warbler	<i>Vermivora ruficapilla</i>	None	In Need of Conservation
Sedge wren	<i>Cistothorus platensis</i>	None	Endangered
Black rail	<i>Laterallus jamaicensis</i>	None	In Need of Conservation
Henslow's sparrow	<i>Ammodramus henslowii</i>	None	Threatened

4.8.1.3.1 Bald Eagle

Bald Eagle Status

The USFWS originally listed the bald eagle as an endangered species in 1967 under the Endangered Species Protection Act of 1966 and subsequently under the ESA of 1973. The primary reason cited for the original listing was broad-scale population declines linked to dichloro-diphenyl-trichloroethane (DDT) and associated reproductive failure. Since the ban on DDT in 1972 and formal listing under the ESA, bald eagle populations have increased dramatically, and in 1995 the bald eagle was down listed from endangered to its current threatened status. In July 1999 the USFWS published a proposed rule to remove the bald eagle from the list of endangered and threatened wildlife based on information which indicated that the eagle had recovered. On February 16, 2006, the public comment period on the proposed delisting was reopened with new information. No formal action on delisting has occurred as of December 2006 (USFWS 2006a). If the bald eagle is delisted, it will continue to be protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. Critical habitat has not been designated for the bald eagle.

Bald Eagle Nesting

Aberdeen Proving Ground is located in the upper Chesapeake Bay bald eagle concentration area and supports breeding, migratory, and wintering bald eagle populations. The APG breeding population has increased from one known pair in 1997 to 24 pairs in 2003. It has been growing exponentially with an average doubling time of 5.9 years, which is a faster rate than the Bay population as a whole. The installation currently supports about 7 percent of the documented Maryland breeding population, and roughly 3 percent of the population documented in the broader Bay (APG 2005b).

Breeding bald eagles occupy territories they will typically defend against intrusion by other eagles. In addition to the active nest, a territory may include one or more alternative nests that are built or maintained by eagles but not used for nesting in a given year. Bald eagles exhibit high nest site fidelity, and nesting territories are often used year after year (USFWS 2006a). Currently, about 35 nesting sites (active and inactive) are scattered throughout the relatively undeveloped, forested portions of APG. Based on geographic information system (GIS) mapping, roughly 70 percent of the existing nests are located within 1,640 feet of a tidal shoreline. Those nests located farther than 1,640 feet from the shoreline are within 278 feet of a large wetland.

A recent bald eagle nest was established in the vicinity of the Preferred Alternative development area for the C4ISR complex. An access road for the complex is proposed to run just inside a bald eagle 500-meter protection zone. Limitations on activities within protection zones are outlined in APG's Endangered Species Management Plan for the Bald Eagle (APG 2001b). In general, however, the Preferred Alternative development areas are not considered suitable bald eagle nesting habitat due to existing development, human activity, minimal forest cover, and distances to shorelines and large wetlands.

Bald Eagle Communal Roosts

The Chesapeake Bay, including APG, is an area of convergence for post-nesting and sub-adult bald eagles from breeding populations in the southeast and northeast. In late spring and early summer, eagles migrate north from Florida and other southeastern states to spend the summer months in the Bay, while eagles from northeastern Canada and the United States migrate to the area during late fall and early winter. Surveys show that APG is often the site with the highest summer and winter eagle populations in the upper Chesapeake Bay (APG 2005g).

Non-breeding eagles within concentration areas are typically very gregarious, and birds often form communal roosts (areas where eagles gather and perch overnight) where several to several hundred individuals roost together within a relatively confined space. Communal roosts are typically positioned near major foraging areas (large bodies of open water), isolated from human disturbance, contain suitable substrate for roosting, positioned in areas protected from harsh weather, and have a clear movement corridor between the roost and primary foraging areas. Several communal roosts were identified at APG during the 1980s. Known existing locations of communal roosts include Mosquito Creek, Romney Creek, and Woodcrest Creek. Collectively, use of these roost sites exhibited a seasonal pattern with summer and winter peaks that correspond to the influx of migrants from southern and northern populations, respectively. Since the 1980s, there has been no attempt to survey for new communal roosts. Recent observations suggest that a previously unknown roost site may have formed on Watson Creek on APG's Southern Peninsula. Many areas on the installation contain suitable communal roosting habitat.

No communal roosts are known to exist closer than 1 mile of the Preferred Alternative development areas. The Woodcrest Creek roost is over 1 mile to the southeast of the Preferred Alternative development area on APG's Northern Peninsula. The Romney Creek roost is over 2 miles northeast of the Preferred Alternative development area on APG's Southern Peninsula. No habitat within the Preferred Alternative development areas is suitable roosting habitat.

Bald Eagle Foraging

All tidal waters at APG provide potential foraging habitat for bald eagles. The most intensively used foraging areas are generally isolated from human disturbance, have an abundant supply of prey (fish and waterfowl), and contain suitable trees for perching along the shoreline. Potential foraging areas in the general vicinity of the Preferred Alternative development areas include Swan Creek on APG's Northern Peninsula and the Gunpowder River and Kings Creek on APG's Southern Peninsula. Existing development, human activity, and limited forested buffers along these portions of Swan Creek and the Gunpowder River likely limit foraging habitat quality. Relatively large forested buffers exist along Kings Creek, increasing its quality as foraging habitat.

Bald Eagle Management and Management Issues

The Army manages and protects bald eagles at APG in accordance with the ESA, Army Regulations, and the APG Endangered Species Management Plan (ESMP) for Bald Eagles (APG 2001b). Management is conducted in cooperation with the USFWS and Maryland DNR. Key components of the ESMP include population monitoring and implementation of protection measures for nesting sites, communal roosts, and foraging areas. These protection measures are detailed in the ESMP and are summarized below:

- Nest Sites – A single buffer with a 1,640-foot radius around the nest is employed with a total exclusion policy during the breeding season (December 15 to June 15).
- Communal Roost Sites – The current recommended management protocol for APG calls for a buffer zone of 1,640 feet around known roost sites with activity restrictions.
- Foraging Areas – The current recommended management protocol for APG calls for a recreational boating buffer of 656 feet along shorelines known to be preferred foraging areas.

A recent increase in bald eagle mortalities at APG led the Army to request formal ESA consultation with the USFWS. As of the end of calendar year 2004, 53 bald eagle mortalities had been discovered within APG boundaries since the first recorded mortality in 1985. From 1985 through 2001, the total number of mortalities discovered annually ranged from zero to four and the median was one. Seven mortalities were discovered in 2002, and 15 were discovered in both 2003 and 2004. The leading direct causes of bald eagle deaths have been electrocution and trauma resulting from contact with electrical infrastructure. APG has installed visible spheres and luminescent flappers along power lines to minimize mid-line strikes, and over 400 perch excluders to reduce the potential for electrocutions. The Army prepared and submitted a Biological Assessment (BA) to the USFWS in January 2005 pursuant to the ESA Section 7(c)(1). The BA evaluated the potential effects of activities at APG on the bald eagle (APG 2005g). The USFWS issued its Biological Opinion in December 2006, in response to APG's submittal, finding that "...actions at APG are not likely to jeopardize the continued existence of the bald eagle." (USFWS 2006c). APG initiated informal ESA Section 7 consultation for the present Preferred Alternative with the USFWS in a letter dated September 5, 2006 (see Appendix C) and received USFWS concurrence (see Appendix C). Consideration of the potential impacts of the Preferred Alternative is included in the Biological Opinion.

4.8.1.3.2 *Shortnose Sturgeon*

Shortnose sturgeon live in both freshwater and low-salinity estuarine water (Murdy, *et al.* 1997). They are most often found in tidal rivers (Jones, *et al.* 1978). Shortnose sturgeon were found historically in the Potomac and Susquehanna Rivers and may have occurred in other major Chesapeake Bay tributaries. In recent years, shortnose sturgeon were found in the upper Chesapeake Bay and lower Susquehanna River (Murdy, *et al.* 1997). During the winter, shortnose sturgeon are found in estuarine waters at depths exceeding 30 feet; they concentrate in river channels in the spring. Spawning occurs in the middle reaches of large tidal rivers (Jones, *et al.* 1978).

In 1996, the USFWS instituted a sturgeon reward program where fishermen would receive a monetary reward for notifying the Maryland Fisheries Resource Office of any Atlantic or shortnose sturgeon caught. Data provided by the reward program, current as of June 4, 2005, indicate that 11 shortnose sturgeon, two of which were potential juveniles, have been captured in APG waters since 1996. The most recent catch in APG waters was March 11, 2005, at the mouth of Romney Creek. Although adults and juveniles may be found in the waters of APG, no data on population dynamics exist. Very little is known about their migratory patterns and use of spawning habitat in the upper Chesapeake Bay. Currently, there is no indication that shortnose sturgeon spawn in APG waters or that potentially suitable spawning habitat is present in APG waters (NMFS 1998). Critical habitat has not been designated for the shortnose sturgeon.

4.8.1.3.3 *Least Bittern*

The least bittern usually breeds in freshwater marshes. The nest, which is constructed by both adults out of dead and live plant stems, is a platform with a shallow hollow. It is placed about 1 foot above water, usually on the base of dried plants (CT DEP 2006a). No nesting, breeding, foraging, or other types of habitat for this species occur in or near the Preferred Alternative development areas.

4.8.1.3.4 *Nashville Warbler*

Nashville warbler habitat includes second-growth deciduous or mixed forest with shrubby undergrowth (Cornell 2006). No nesting, breeding, foraging, or other types of habitat for this species occur in or near the Preferred Alternative development areas. Although the adjacent forest may provide habitat for this species, no clearing of forest is proposed.

4.8.1.3.5 *Sedge Wren*

Sedge wrens inhabit the damp margins of wetlands dominated by grasses and sedges, wet meadows, wet pastures, and other damp grassland habitats. Along the Atlantic Coast, they also frequent coastal marshes, but prefer grassy habitats in freshwater or in brackish situations where salinity levels are low. Sedge wrens prefer habitats that are intermittently flooded or have damp soil (Sauer, *et al.* 2005). Nesting, breeding, foraging, or other types of habitat for this species may occur in or near the Preferred Alternative development areas.

4.8.1.3.6 *Black Rail*

Black rails nest in or along the edge of marshes, usually in tall grass in open habitat. The nest is a deep cup of finely woven, soft grass, sedges, or other available vegetation. It is usually concealed in a clump of green grass, with grasses arched over it so it is hidden from above (CT DEP 2006b). Nesting, breeding, foraging, or other types of habitat for this species may occur in or near the Preferred Alternative development areas.

4.8.1.3.7 *Henslow's Sparrow*

During the breeding season, Henslow's sparrows have very specific habitat requirements. They are mostly found in fallow fields supporting tall, dense grassy and weedy cover with a high density of standing dead vegetation as well as scattered bushes or very small trees (Sauer, *et al.* 2005). No nesting, breeding, foraging, or other types of habitat for this species occur in or near the Preferred Alternative development areas.

4.8.1.4 *Wetlands and Wetlands Vegetation*

The topographic relief of APG is fairly low, ranging from 0 to 70 feet above mean sea level, with a relatively shallow water table. Consequently, APG contains many and varied wetlands, as identified in the NWI. Wetlands mapping and classification conducted using 1998 color infrared aerial photographs indicate that the installation contains 10,948 acres of tidal and non-tidal wetlands. Extensive tidal marshes are found along the Bay and its tributaries, and non-tidal wetlands are scattered throughout the installation along drainages, in many natural depressions, and on poorly drained soil. It should be noted that this wetlands mapping is based on interpretation of aerial photography and limited ground truthing, and is suitable for general planning purposes. Detailed field delineation of wetlands in accordance with USACE methods is necessary in the Preferred Alternative development areas to accurately identify, classify, and map jurisdictional wetlands for regulatory permitting requirements. The APG wetlands manager indicates that the acreage identified through field delineation is often substantially higher than the acreage identified through aerial photography interpretation (APG 2006h). This is particularly true for non-tidal wetlands, which are more difficult to identify using aerial photo interpretation.

Existing APG wetlands mapping indicates that about 75 acres of non-tidal wetlands, a majority of which are forested, occur in the Preferred Alternative development areas. Tidal wetlands do not occur in the Preferred Alternative development areas.

4.8.1.5 *Management Programs (Regulatory Environment)*

Following is a summary of the federal, state, and Department of Army regulations affecting biological resources within the context of this EIS. This regulatory discussion is organized based on the biological resource areas addressed in this section.

4.8.1.5.1 *Terrestrial Vegetation*

Maryland's federally approved CZMP incorporates implementation of the Maryland Forest Conservation Act and Maryland Chesapeake Bay Critical Area Act (Critical Area Act). In accordance with the federal Coastal Zone Management Act, the Preferred Alternative must be consistent with the CZMP. Detailed descriptions of the CZMA, Maryland's CZMP, the Critical Area Act, and federal consistency requirements are provided in Section 4.2.1.5.

The Forest Conservation Act was passed in 1991 to protect the state's forest resources during development. It requires a forest stand delineation to identify forest resources, specimen trees, and sensitive areas so that impacts can be directed away from priority areas. A forest conservation plan is also required to outline how priority forested areas will be retained and to establish thresholds for clearing, afforestation, and reforestation. Forest replacement is typically required for all forest cleared, and protective measures are required for stand edges and specimen trees. Long-term protective instruments are required to ensure that the retained area will remain forested. In addition, the Critical Area Act includes provisions that limit tree clearing within the 1,000-foot Critical Area and the 100-foot Critical Area buffer, and requires replacement of cleared forest.

4.8.1.5.2 *Wildlife*

The Migratory Bird Treaty Act is the primary legislation in the United States established to conserve migratory birds. The Act prohibits take (wounding, killing, *etc.*) of migratory birds, including eggs and occupied nests, even when such activities are unintentional. Executive Order 13186 *Responsibilities of Federal Agencies to Protect Migratory Birds* directs federal agencies to design migratory bird habitat and population conservation measures into agency plans and planning processes; evaluate the effects of actions and agency plans on migratory birds; and develop and use practices that will lessen the amount of unintentional take. The Bald and Golden Eagle Protection Act provides specific protection to bald eagles, which are also currently protected under the ESA.

The Critical Area Act includes criteria for identification and protection of important wildlife habitat within the 1,000-foot Critical Area, including colonial water bird nesting sites, historic waterfowl staging and concentration areas, FIDS habitat, and anadromous fish propagation waters.

4.8.1.5.3 *Threatened and Endangered Species*

The ESA requires that all federal agencies conserve species listed as threatened or endangered. Conservation, as defined by the ESA, means the use of all methods and procedures necessary to bring any listed species to the point where protection pursuant to the ESA is no longer necessary. An endangered species is "...in danger of extinction throughout all or a significant portion of its range,..." a threatened species "...is likely to become an endangered species within the foreseeable future,..." and a candidate is a species "...for which the Service has sufficient information on their biological status and threats to propose them as endangered or threatened under the ESA, but for which development of a listing regulation is precluded by other higher priority listing activities."

The ESA specifically requires agencies not to "take" or "jeopardize" the continued existence of any endangered or threatened species, or to destroy or adversely modify designated critical habitat. The "take" of species listed as threatened or endangered under the ESA is prohibited, unless the take is incidental to otherwise lawful activities. Under Section 9 of the ESA, to "take" a listed species includes to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct. Under Section 7 of the ESA, "jeopardize" means to engage in any action that would be expected to reduce appreciably the likelihood of the survival and recovery of a listed species by reducing its reproduction, numbers, or distribution. Federal agencies are required to consult with the USFWS and/or NMFS for actions that may affect listed species.

Maryland also maintains a list of endangered and threatened species and species in need of conservation in accordance with the Maryland Nongame and Endangered Species Conservation Act. The Critical Area Act includes criteria for identification and protection of state listed species and their habitat within the 1,000-foot Critical Area.

4.8.1.5.4 Wetlands

A wetland is an area inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions, commonly known as hydrophytic vegetation. Under the authority of the CWA, the USACE regulates activities such as construction in waters of the United States, which include some wetlands. MDE also regulates activities in wetlands under authority of the Tidal Wetlands Protection Act and the Nontidal Wetlands Protection Act. Applicants proposing to conduct a regulated activity in wetlands or a 25-foot buffer around them must submit a joint federal/state permit application to MDE and obtain a state wetlands permit, a state water quality certification, and a federal Section 404 permit. Applicants must demonstrate that the proposed action is water-dependent or has no practicable alternative and that the regulated activity will first avoid and then minimize impacts to nontidal wetlands. Wetlands that will be lost must be mitigated (*i.e.*, new wetlands must be created or existing wetlands restored or enhanced).

In addition, EO 11990 *Protection of Wetlands*, directs federal agencies to provide leadership and take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities. Federal agencies must also avoid undertaking or providing assistance for new construction located in wetlands unless the head of the agency finds that: (1) there is no practicable alternative to such construction, and (2) the proposed action includes all practicable measures to minimize harm to wetlands that may result from such use.

4.8.1.5.5 Sikes Act and Army Regulations

The Sikes Act requires the DoD to carry out a program to provide for the conservation and rehabilitation of natural resources on military installations. Installations with significant natural resources must develop and implement an Integrated Natural Resources Management Plan (INRMP) in cooperation with the USFWS and state natural resources management agencies. APG has developed and maintains an INRMP. Army Regulation 200-3, *Natural Resources - Land, Forest, and Wildlife Management*, prescribes current Army policies, procedures, and standards for the conservation, management, and restoration of land and renewable natural resources.

4.8.2 Consequences

4.8.2.1 Alternative 1 – No Action Alternative

Under the No Action Alternative, APG would not implement the Preferred Alternative. Baseline conditions for biological resources would not change under the No Action Alternative. The No Action Alternative would not result in additional effects to biological resources. The Preferred Alternative is congressionally mandated; therefore, the No Action Alternative is not feasible.

4.8.2.2 Alternative 2 – Preferred Alternative

Direct Impacts Terrestrial Vegetation, Wetlands, and Submerged Aquatic Vegetation

With implementation of the Preferred Alternative, there would be short-term and long-term direct impacts to terrestrial vegetation. Vegetation within the footprint of new development would be permanently lost, while vegetation within the area of disturbance would be temporarily disturbed or destroyed. A majority of the vegetation affected would consist of lawn, maintained field, and landscape trees and shrubs. A forest stand delineation would be conducted and a forest conservation plan would be prepared during the design process, in accordance with APG policies and the Maryland Forest Conservation Act. Impacts to forest

vegetation would be avoided and minimized by siting new development outside of forested areas. No vegetation clearing would occur in the 100-foot Critical Area buffer. The delineation and plan would be reviewed and approved by the APG forester and would become part of the coastal consistency determination package. Any individual forest trees or landscape trees taken down under the Preferred Alternative would be replaced on a one-to-one basis.

Temporarily disturbed areas would be vegetated and landscaped following construction in accordance with project-specific landscape plans. Only regionally native trees and shrubs suitable for the site would be planted. All tree preservation, tree removal, and tree planting activities would be coordinated with the APG forester. In addition, any development within the 1,000-foot Critical Area would conform to the 10 percent rule, which requires new construction or redevelopment to improve water quality by 10 percent from predevelopment levels by using stormwater management or landscaping.

C4ISR	12-15 acres
ATEC	0-1 acres
ARL	0-1 acres
<u>Route 715 Gate</u>	<u>0-1 acres</u>
Northern Peninsula Total	12-18 acres

On APG's Southern Peninsula, the area of potential wetlands impact by project is estimated to be:

JPEO	2-3 acres
<u>Route 24 Gate</u>	<u>1-2 acres</u>
Southern Peninsula Total	3-5 acres

As building designs and site layouts are prepared, jurisdictional delineations will be conducted for the Preferred Alternative development sites as necessary.

The identification and location of jurisdictional wetlands, as regulated by USACE under Section 404 of the CWA, is physically determined through a process known as a jurisdictional determination. The method of performing a jurisdictional determination employs a multi-parameter approach defined in Technical Report Y-87-1, Corps of Engineers Wetlands Delineation Manual, dated January 1987, and supplemental guidance. It generally requires positive evidence of hydrophytic vegetation, hydric soil, and wetlands hydrology for a determination that an area is a regulated wetlands.

The jurisdictional determination process establishes a line that separates and identifies regulated wetlands areas from non-wetlands (upland) areas not regulated by the USACE. It is essential in making an application for a permit from the USACE to determine if work would occur in wetlands or navigable waters of the United States. MDE also regulates activities in wetlands under authority of the Tidal Wetlands Protection Act and the Nontidal Wetlands Protection Act. The Code of Maryland, Section 26, Department of the Environment, Subtitle 23, Nontidal Wetlands, describes permit application and processing.

Upon receipt of a completed joint application, MDE assigns the application a tracking number, acknowledges receipt of the application, and reviews the proposed work to determine if the work is authorized under a category of activities in the Maryland State Programmatic General Permit (MDSPGP-3). For minor, non-controversial work that meets the impact limits and activity-specific conditions for any of the Category I activities, MDE includes a copy of the USACE MDSPGP-3 authorization with the State authorization. For activities or work that do not qualify for Category I authorization, MDE forwards the application to USACE for concurrent review.

USACE initially reviews the project to determine if it can still be authorized under the MDSPGP-3 under another category. If so, USACE completes its review of the project and notifies MDE that USACE authorization can be granted under the MDSPGP-3 with any necessary special conditions. If during its initial review, USACE concludes that the project will have more than minimal environmental impacts, it

does not qualify for MDSPGP-3 authorization and must undergo the USACE Individual Permit review. USACE will initiate the Individual Permit process. Department of the Army Individual Permit decisions are made in compliance with the 404(b)(1) guidelines after determination that the project is not contrary to the public interest.

No construction or other activities would occur in aquatic habitats (SAV) or within the 100-foot Critical Area buffer. Therefore, the Preferred Alternative would not directly affect these resources. Operation of the newly constructed and renovated facilities would have no direct effects on terrestrial vegetation, wetlands, or SAV because activities would occur indoors at these facilities.

Indirect Impacts Terrestrial Vegetation, Wetlands, and Submerged Aquatic Vegetation

There would be localized indirect short- and long-term effects. Construction activities would increase the potential for soil erosion and transport of sediments to terrestrial, wetlands, and aquatic habitats down gradient of the Preferred Alternative development areas (see Section 4.7.2.2). Transport and deposition of sediments to these habitats could smother existing vegetation and increase the potential for invasive plant infestations. Sediments increase surface water turbidity and block sunlight to aquatic vegetation, which can limit photosynthesis and growth. Construction of new facilities would also increase impervious surfaces, which decrease groundwater infiltration, increase stormwater runoff volume, and increase pollutant and nutrient loadings to surface water. Changes in groundwater infiltration and stormwater runoff rates could alter wetland hydrology and effect their structure and long-term function. Increases in nutrient loadings can cause algal blooms, which block sunlight and reduce SAV photosynthesis and growth.

All development projects disturbing 1 acre or more would be required to obtain a National Pollution Discharge Elimination System (NPDES) permit for stormwater discharges from construction activities and implement a stormwater pollution prevention plan to control runoff and minimize erosion during construction. In addition, stormwater management facilities would be constructed to maximize on-site infiltration of stormwater and decrease runoff volume and pollutant loadings. Implementation of these practices would minimize short- and long-term indirect effects of the Preferred Alternative to terrestrial vegetation, wetlands, and SAV.

Direct Impacts to Wildlife

There would be direct short-term and long-term disturbances to wildlife. These effects would be limited to the sites where construction occurs and adjacent areas. The Preferred Alternative development areas are likely to contain animals such as black rat snakes, spring peepers, gray tree frogs, and eastern box turtles. These species have relatively small home ranges and are able to exist in the patches of forest and wetlands found in the Preferred Alternative development areas. These populations are likely to be affected by the Preferred Alternative. Wildlife would be exposed to increased human interaction in areas of APG that have not had a notable human presence recently. Noise and human activities associated with construction could disturb wildlife using the sites or adjacent habitat.

Indirect Impacts to Wildlife

Impacts to water quality and aquatic life are expected to be short-term. Therefore, any indirect effects to terrestrial wildlife resulting from impacts to water quality and/or aquatic life, if realized, would be short-term. Effects of the action on water quality and aquatic life could indirectly affect certain terrestrial wildlife species (*e.g.*, fish-eating birds) by reducing the availability of prey species. Increased water turbidity from construction runoff in foraging areas could make it more difficult for wildlife to spot and capture fish. Short-term indirect effects may occur due to sediment runoff, sedimentation, and noise.

Direct Impacts to Aquatic Life

The Preferred Alternative would take place on terrestrial sites. The Preferred Alternative would not result in direct disturbance of aquatic habitats. Therefore, no direct effects to aquatic life would occur.

Indirect Impacts to Aquatic Life

Temporary impacts and indirect impacts may occur due to sediment runoff and sedimentation. Best management practices would be implemented to minimize soil erosion and transport of sediments to aquatic habitats down gradient of the Preferred Alternative development areas. Therefore, any short- and long-term indirect effects to aquatic life would be negligible.

Direct and Indirect Impacts to Bald Eagles

APG initiated informal ESA Section 7 consultation for the Preferred Alternative with the USFWS in a letter dated September 5, 2006. For ESA compliance purposes, in its December 27, 2006 Biological Opinion (BO) (USFWS 2006c), USFWS determined that "...electrical infrastructure and military activities occurring within 1 mile of forested habitat and foraging areas at APG will continue to adversely impact bald eagles despite the implementation of visual deterrents and other avoidance measures such as monitoring. However, the USFWS concludes in its BO, that actions at APG are not likely to jeopardize the continued existence of the bald eagle (USFWS 2006c). In addition, the BO states, "No critical habitat has been designated for this species therefore, none will be affected."(USFWS 2006c). Although the BO primarily considers the ongoing activities at APG in its determination, the potential impacts of the Preferred Alternative are also taken into account. The USFWS BO is included in Appendix C of this EIS.

The Preferred Alternative development areas lack habitat considered suitable for bald eagle nesting, foraging, and communal roosting. Therefore, the Preferred Alternative would not result in loss of bald eagle habitat or disturbance of bald eagle nests or communal roosts.

Shoreline and open water areas in the general vicinity of the Preferred Alternative development areas are likely used by bald eagles for foraging. In addition, bald eagles are expected to fly occasionally over the Preferred Alternative development areas and might occasionally be found loafing or perching in the general area. Noise and human activities associated with construction could elicit a flushing response in bald eagles if they are in the immediate area, causing them to move to other habitat in the immediate area. The likelihood of flushing eagles is limited based on the transient use of the areas and distance to adjacent foraging habitat. If eagles were flushed, the process of moving to other areas would not be expected to stress the birds because suitable habitat is abundant in surrounding areas.

The Preferred Alternative would not result in any notable changes to current range, testing area, airfield, or military field training operations. Activities associated with new facilities would be conducted primarily as indoor operations. Outside operations would be minimal and of short duration (*i.e.*, movement of personnel to and from the buildings). Therefore, routine human activities associated with the new facilities would have no direct or indirect effect on bald eagles.

Various types of communications equipment (*e.g.*, antennas, satellite dishes, radar) would be installed in APG's Northern Peninsula development area. With the exception of the Joint Satellite Communications Engineering Center (JSEC), all communications equipment would be installed on the rooftops of existing or new buildings. If bald eagles were to come into direct contact with this equipment, they would experience trauma and could be electrocuted by certain types of equipment. The buildings supporting the communications equipment are expected to be two to four stories tall, and the JSEC antennae would be ground-based. Under normal conditions, it is expected that bald eagles would not fly near these large objects. In addition, appropriate measures would be taken to increase the visibility of the communications equipment to deter eagles from coming into contact with potentially dangerous equipment. No communal roosts are located nearby, so the possibility of large numbers of eagles being present in the area during low light conditions is unlikely.

Direct and Indirect Impacts to the Shortnose Sturgeon

The Preferred Alternative does not include in-water construction activities and would not result in direct disturbance to aquatic habitats. Therefore, no direct effects to the shortnose sturgeon would occur. Effects

of the Preferred Alternative on water quality and aquatic life would not indirectly affect the shortnose sturgeon. USFWS has focused its compliance efforts on the species addressed in its BOs. ESA Section 7 consultation has not been determined to be necessary for the shortnose sturgeon.

Direct and Indirect Impacts to State Listed Threatened and Endangered Species

State-listed species are not known or expected to occur in the Preferred Alternative development areas based on existing development, current maintenance regimes, and lack of suitable habitat. Therefore, the Preferred Alternative would not affect state-listed species.

Cumulative Impacts

The Preferred Alternative would result in an increase in the cumulative impacts to biological resources. Because the impacts would be related primarily to construction activities impacts would be short-term. Cumulative impacts of potential concern for biological resources at and near APG include loss of forest vegetation (and associated wildlife habitat), loss of wetlands (and associated wildlife habitat), loss of suitable bald eagle habitat, and increased human disturbance of bald eagles. These resources have been and will continue to be subjected to various pressures associated with past, present, and future actions at and in the vicinity of APG. As discussed above, the Preferred Alternative would occur in portions of the installation that are currently developed, and the Preferred Alternative includes appropriate measures to avoid and minimize loss of forest vegetation and wetlands. In addition, the Preferred Alternative would not result in loss of bald eagle habitat or consequential disturbance to bald eagles.

Summary of Best Management Practices and Permitting/Consultation Requirements for Biological Resources

The Preferred Alternative includes a variety of BMPs and permitting/consultation requirements that would be implemented to avoid and minimize effects to biological resources.

Terrestrial Vegetation

- New development would be sited in areas that are not forested to the extent possible.
- A forest stand delineation would be conducted and a forest conservation plan would be prepared in accordance with APG policies and the Maryland Forest Conservation Act. The delineation and plan would be reviewed and approved by the APG forester and would become part of the coastal consistency determination package. Any forest or landscape trees cleared under the Preferred Alternative would be replaced on a one to one basis.

Wetlands

- Impacts to wetlands would be avoided by siting new development outside of non-tidal wetlands and their associated 25-foot regulatory buffers.
- If impacts to wetlands cannot be avoided, a state tidal and nontidal wetlands permit would be required, as well as a state water quality certification, and a federal Section 404 permit for any regulated activities in wetlands.
- If wetlands losses cannot be avoided, a mitigation plan would be prepared in accordance with MDE requirements and would provide mitigation for unavoidable and necessary losses of wetlands.

Threatened and Endangered Species

- Comply with the terms and conditions and reasonable and prudent measures outlined in the BO.

4.9 CULTURAL RESOURCES

Cultural resources are prehistoric and historic sites, structures, districts, artifacts, or any other physical evidence of human activity considered important to a culture, subculture, or community for traditional, religious, scientific, or any other reason. Cultural resources are discussed here in terms of archaeological sites, including both prehistoric and historical occupations, architectural resources, and locations of concern to Native American groups, including Traditional Cultural Properties.

Procedures for the identification, evaluation, and treatment of cultural resources are contained in a series of federal and state laws and regulations and agency guidelines. Archaeological, architectural, and Native American resources are protected by a variety of laws and their implementing regulations: the National Historic Preservation Act of 1966 as amended in 2000; the Archeological and Historic Preservation Act of 1974; the Archaeological Resources Protection Act of 1979; the American Indian Religious Freedom Act of 1978; the Native American Graves Protection and Repatriation Act of 1990; AR 200-4, Cultural Resource Management; and Army Pamphlet 200-4 (Cultural Resources Management). The Advisory Council further guides treatment of archaeological and architectural resources on Historic Preservation regulations, Protection of Historic Properties (36 CFR 800). Historic properties, as defined by the NHPA, represent the subset of cultural resources listed on, or are eligible for, inclusion on the NRHP.

The Preferred Alternative is sponsored by the Army and involves federal assistance and federal permitting, licensing, or approval (36 CFR 800.16(y)). As a result, the Preferred Alternative is under the purview of Section 106 of the NHPA. Identification of archaeological sites, architectural resources, and Native American resources was conducted according to requirements of 36 CFR 800 for Section 106 of the NHPA. Initiation of the Section 106 process was implemented with the Maryland Historical Trust (the Maryland SHPO). The Area of Potential Effect (APE) was established in coordination with that office. As stipulated in Section 800.8, Section 106 can be coordinated with the requirements of NEPA. Preparation of an Environmental Assessment or Environmental Impact Statement can be sufficient in fulfilling the required determination of effects for Section 106 compliance.

Section 106 of the NHPA governs federal actions that could affect NRHP-eligible properties. Section 106 requires federal agencies to take into account the effects of their undertakings, including licensing and approvals, on NRHP-eligible properties (*e.g.*, historic properties) and to afford the Advisory Council on Historic Preservation and other interested parties a reasonable opportunity to comment.

4.9.1 Affected Environment

To identify cultural resources that could be potentially affected by the Preferred Alternative, the area within which archaeological, architectural, and Native American resources would have the potential to be affected must be determined. As defined by 36 CFR 800.16(d) of Section 106 of the NHPA, the APE represents the "...geographic area or areas within which an undertaking could cause changes in the character or use of historic properties, if any such exists." In delineating the APE, factors taken into account include the elements of the Preferred Alternative, the existence of buildings, vegetation and terrain with respect to potential visual or audible impacts, and construction activities necessary for the Preferred Alternative.

The APE for cultural resources for the Preferred Alternative at APG is the footprint of the Preferred Alternative development areas and any linear corridors representing construction of infrastructure, such as roads and utilities (Figures 1.3-1, 3.2-1, and 3.2-2).

A literature review identified previously recorded archaeological, architectural, and Native American resources and assessed the probability of undiscovered archaeological sites in the APE. Documents were collected from APG's Cultural Resources Management Program office and primarily consisted of the 2001 *Integrated Cultural Resources Management Plan (ICRMP)* (USACE Baltimore 2001), the preliminary DEIS for the EUL of the Lauderick Creek Area (APG 2005g), cultural resources documentation on Preferred

Alternative development areas (R. Christopher Goodwin & Associates 2006), and historical documentation on the World War I Barracks (E4400 Block Buildings) (Dixon 2005).

4.9.1.1 Prehistoric and Historic Background (i.e. Cultural Contexts)

Detailed cultural contexts were developed during preparation of the ICRMP in 1999-2000 and included prehistoric contexts (USACE Baltimore 2001: Appendix A), pre-military historic contexts (USACE Baltimore 2001: Appendix B), and military historic contexts (USACE Baltimore 2001: Appendix C). All contexts were defined by time period. Prehistoric contexts consist of the Paleo-Indian/Early Archaic Period (11,000-6,500 B.C.), Middle Archaic Period (6,500-3,000 B.C.), Late Archaic Period (3,000-1,000 B.C.), Early Woodland Period (1,000-500 B.C.), Middle Woodland Period (500 B.C.-A.D. 900), and Late Woodland and Contact Period (A.D. 900-1638). Pre-military contexts identified were Contact and Settlement Period (1570-1750), Rural Agrarian Intensification (1680-1815), Agricultural-Industrial Transition (1815-1870), and Industrial/Urban Dominance (1870-1930). Military contexts were defined as World War I (1917-1918), Inter-War Period (1919-1939), World War II (1940-1945), and Cold War (1946-1989). Cultural occupations, associated property types and identified properties were discussed for each specific time period. Details are found in the ICRMP (USACE Baltimore 2001).

4.9.1.2 Status of Cultural Resources Inventories and Section 106 Consultations

APG completed a number of cultural resource surveys inventorying and documenting archaeological sites; prepared predictive models for archaeological site location probability, including both nautical and drowned terrestrial resources; surveyed and evaluated World War I, World War II, and Cold War architectural resources; and conducted an ethnohistory to identify Native American resources.

Previous archaeological investigations include Phase I survey (Gardner, *et al.* 1989; Mintz, *et al.* 1993), Phase II NRHP evaluations (Schieppati, *et al.* 2001), and limited Phase III data recovery (Thomas, *et al.* 1999). The majority of the APG has not been inventoried for archaeological resources; however, predictive modeling has been developed for both prehistoric and historic (pre-military) resources. A predictive model for prehistoric resources at APG identified four basic variables: elevation, distance to water, water type, and topographic setting (Westcott and Hoffecker 1997). The key variable appears to be distance to water (</>500 feet) and most of APG has been identified as high probability to contain prehistoric sites. Historic resources (pre-military) modeling was primarily based on road and building locations identified from archival maps. Archeologically sensitive areas of the colonial era include bluffs overlooking the rivers and the bay; well-drained coastal areas; and topographic irregularities between the interior swamps. An assessment of the sensitivity of nautical resources within the waters of APG was based on a review of primary and secondary source data found in a reconnaissance and sensitivity study of the Upper Chesapeake Bay (Polglase, *et al.* 1992). The Upper Chesapeake is considered to have a high potential for notable maritime resources. Drowned terrestrial resources are possible near the shoreline shell middens and bank sites as a result of the documented sea level rise in the Chesapeake Bay during the Paleo Indian/Early Archaic period (Ruppe 1982).

Previous architectural resource investigations include reconnaissance-level architectural surveys to identify and evaluate standing structures, building specific studies, and nationwide historic studies. Reconnaissance-level surveys include: Historic American Buildings Survey/Historic American Engineering Record (HABS/HAER) documentation of architectural resources constructed before 1945 (Grandine, *et al.* 1982); survey of architectural resources constructed before 1951 to update the information contained in the 1982 reconnaissance survey and to include more buildings in the survey (Grandine, *et al.* 1996); and survey of Cold War era (1946-1989) resources in 1997-1998. Building-specific studies such as NRHP evaluations and building management and preservation treatment reports have been conducted for two NRHP-listed structures (the Presbury House (Building E-4630) and the Gunpowder Meeting House (Building E-5715)), buildings at the Chemical Area Storage Yard (Grandine 1998), and a number of individual buildings (Robinson & Associates 1995a, 1995b). In 2005, historical documentation was prepared for the World War I E4400 Block Buildings and Service Buildings at Edgewood Arsenal (Dixon 2005). The architectural

resources at APG contributed to nationwide studies on World War II temporary buildings (Mintz, *et al.* 1993), important World War II structures associated with the Army Materiel Command (Garner 1992; Cannan, *et al.* 1995), and support and utility structures and facilities (1917-1946) (Grandine and Cannan 1995). Detailed information on previous cultural resources investigations is presented in the ICRMP (USACE Baltimore 2001).

In 1999, the USACE, Baltimore District completed an ethnohistory of APG to identify Native American resources and concerns (USACE Baltimore 1999).

Archaeological Resources. Limited archaeological surveys have been conducted, and 24 archaeological sites have been identified in APG's Northern Peninsula (USACE Baltimore 2001: Appendix D). Only three archaeological sites identified on APG's Northern Peninsula are currently considered eligible for the NRHP: 18HA122, a multi-component prehistoric base camp overlooking Swan Creek (Davis and Saul 1995); 18HA19, a Middle Woodland shell midden site with intact subsurface features; and 18HA30, the Old Baltimore Site, a 17th century (1670-1700 A.D.) dwelling that may have functioned as a tavern. Predictive modeling at APG indicates that the majority of APG's Northern Peninsula has a high potential for archaeological sites; additional archaeological sites, some that may be NRHP-eligible, are likely to occur in the following project areas: ARL, ATEC, C4ISR, and Route 715 Gate.

Only five archaeological sites or possible site locations were identified in the APE for APG's Northern Peninsula (Table 4.9.1). One site, 18HA235, was previously evaluated and found not eligible for the NRHP. The remaining four sites represent historic structure locations identified through the predictive modeling for historic archaeological resources; four locations have not been field verified or evaluated for NRHP eligibility. Additional archival research and field reconnaissance was conducted for site P-31 in February 2007 (Watson 2007). Site P-31 has been extensively disturbed from past military activities, including the realignment of Combat Road through the middle of the site, grading and filling associated with landscaping activities on the eastern portion of the site, and tracked vehicle testing on the western portion of the site. Any surficial artifact deposits or features that may have been located in this area have been extensively disturbed, and any deep features (such as wells or privies), if they exist, have been truncated (Watson 2007). It is very unlikely that site P-31 retains any intact archaeological deposits. This site is unlikely to be considered NRHP-eligible due to its lack of physical integrity.

Limited archaeological surveys were conducted and 26 archaeological sites were identified in APG's Southern Peninsula (USACE Baltimore 2001: Appendix D). Only 18HA242, the Quiet Lodge Site, the archeological signature of an extant 18th century building, is considered eligible. Predictive modeling at APG indicates that the majority of APG's Southern Peninsula has a high potential for archaeological sites. Additional archaeological sites, some that may be NRHP-eligible, are likely to occur in the Route 24 Gate project area.

Only one archaeological site HA1856, was identified in the APE for APG's Southern Peninsula (Table 4.9.1). Site HA1856 consists of two concrete pads associated with utilitarian water well pump houses constructed during World War II; although this site is currently unevaluated, it is unlikely to be considered NRHP-eligible because of its lack of research potential.

Table 4.9.1 Archaeological Sites in the APE

Site Designation	Type	Description	NRHP Status	Reference
18HA235	Historic	late 19 th /early 20 th century	Not eligible	Mintz, <i>et al.</i> 1993
P-14	Historic	Agricultural-Industrial Transition (1815- 1870)	Unevaluated	n/a
P-15	Historic	Agricultural-Industrial Transition (1815- 1870)	Unevaluated	n/a
P17	Historic	Industrial-Urban Dominance (1870-1930)	Unevaluated	n/a
P-23	Historic	19 th Century structure location	Unevaluated	Gardner, <i>et al.</i> 1989
P-24	Historic	19 th Century structure location	Unevaluated	Gardner, <i>et al.</i> 1989
P-25	Historic	19 th Century structure location	Unevaluated	Gardner, <i>et al.</i> 1989
P-31	Historic	19 th Century structure location	Unevaluated	Gardner, <i>et al.</i> 1989

Architectural Resources. Over 440 pre-1945 architectural resources were identified on APG's Northern Peninsula (USACE Baltimore 2001: Appendix C). Four historic districts are located in APG's Northern Peninsula: Plumb Point; Main Front; Ordnance School Historic Districts; and the Center of Military History, U.S. Army Ordnance Museum, Outdoor Ordnance Collection. The Pooles Island Lighthouse (Building 816) is listed on the NRHP. Additional individual buildings that may be considered NRHP-eligible include the Malcolm Mitchell House (Building 5650) constructed in 1905; the Post Headquarters Building (Building 310), the Telephone Exchange Building (Building 311), the Precision Machine Shop (Building 315) and the Heating Plant (Building 345) associated with World War I activities; and the H.R. Kent Supersonic Wind Tunnel and Lab (Building 120) constructed in 1944 (USACE Baltimore 2001).

The Ordnance School Historic District, nine World War II permanent buildings, nine World War II temporary buildings, and 45 Cold War era buildings, are located within the APE for APG's Northern Peninsula. The Ordnance School Historic District comprises 21 buildings and structures; 16 permanent buildings of which are contributing elements to the district. Most of the buildings in the historic district were constructed between 1939 and 1945. Two buildings were added in 1955 and are considered non-contributing elements to the district. The Ordnance School Historic District is significant for its role in Army education (Criterion A of the National Register Criteria for Evaluation). Established at the end of the inter-war period, it was the headquarters of ordnance training during World War II. Its buildings also embody the distinctive characteristics of permanent Army construction during the late inter-war period and World War II (Criterion C). The ensemble of permanent buildings that comprise the Ordnance School Historic District presents a cohesive and distinguishable entity within APG. The buildings are united by their design and use as an educational complex. Landscaping further serves to define the district as a cohesive unit. The buildings retain their overall design integrity.

Nine World War II-era buildings have not been evaluated and most likely represent permanent buildings from that time period. The nine World War II temporary buildings located on APG's Northern Peninsula APE are subject to the 1986 Programmatic Agreement (PA) for the demolition of standardized temporary buildings negotiated between the DoD, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers. The stipulations of the PA have been fulfilled; no further consultation under Section 106 of the NHPA is required prior to demolition of these temporary structures.

Forty-five Cold War era buildings (1947-1989) occur in the APE but, with concurrence from the Maryland Historical Trust, are considered not eligible for the NRHP (R. Christopher Goodwin & Associates, Inc. 2006; Dunne 1998).

Over 350 pre-1945 architectural resources were identified on APG's Southern Peninsula (USACE Baltimore 2001: Appendix C), including the World War I Barracks Historic District. The Presbury House and the Gunpowder Meeting House are both listed in the NRHP. Additional individual buildings which may be considered NRHP-eligible include Buildings E-5137, E-5440, E-5452 (World War I industrial chemical plants), Fort Hoyle Riding Hall (Building E-4210), and a World War I ordnance storage building (E-1932).

The World War I Barracks Historic District is located within the APE for APG's Southern Peninsula. The World War I Barracks Historic District comprises about 18 acres and contains 15 World War I-era buildings: 13 permanent Advanced Individual Training barracks, a bakery, and a heating plant. The World War I Barracks Historic District is an important element of the initial establishment of the installation. It housed Army personnel employed to operate the chemical plant facilities (Criterion A). The buildings are rare examples of permanent construction dating from World War I (Criterion C). The barracks and the support structures form a cohesive collection of World War I-era permanent buildings. The consistency in building modifications over the years sustains the visual rhythm of the district without adversely affecting the district's overall integrity. The individual buildings and the district as a whole retain sufficient integrity to convey the area's importance as a permanent cantonment dating from World War I.

4.9.1.3 Native American Resources

Native American resources can include, but are not limited to, archaeological sites, burial sites, ceremonial areas, caves, mountains, water sources, trails, plant habitat or gathering areas, or any other natural area important to a culture for religious or heritage reasons. NRHP-eligible traditional sites are subject to the same regulations, and afforded the same protection, as other types of historic properties.

Many Native American groups either occupied or traveled through the area which is now APG. During the Contact Period (A.D. 1500-1764), the Susquehannocks dominated the area. Groups of Delaware, Mingoes, Massawomans (probably Mohawks), Powhatans, Nanticoke, Piscataway, Senecas, Oneidas, and others mostly likely traveled through the area (USACE Baltimore 1999).

In 1999, the USACE, Baltimore District, completed a final ethnohistory of APG (USACE Baltimore 1999). Comments received from Native American groups during public meetings in 1999 were incorporated into the draft ethnohistory, and additional research, including oral interviews, was conducted. Native American resources identified included two Native American burials on a Late Woodland site (USACE Baltimore 1999) and a traditional use area (hunting grounds) along Deer Creek, northwest of APG.

As part of the preparation of the ICRMP, the APG undertook consultation with the Native American groups identified as having an interest in the land that became APG. The APG requested background information regarding prehistoric, historic, and ethnographic land use, as well as information regarding contemporary Native American values or concerns on APG. Consultation was initiated, and Native Americans have not identified any sacred sites or traditional use areas on APG property (Hayworth 2000).

General consultation with Native American groups (Delaware Tribe; Delaware Tribe of Indians, Oklahoma; Delaware Tribe of Western Oklahoma; Heron Clan, Cayuga Nation; Oneida Nation of New York; Oneida Tribe of Wisconsin; Onondaga Nation of New York; Seneca Nation of New York; Seneca-Cayuga Tribe of Oklahoma; St. Regis Mohawk Tribe; Tonawanda Band of Seneca Indians of New York; and Tuscarora Nation) is ongoing by APG personnel. This consultation is documented by correspondence included in Appendix F.

4.9.2 Consequences

An undertaking is considered to have an effect on a historic property when the undertaking may alter characteristics of the property that may qualify it for inclusion in the NRHP. An effect is considered adverse when it diminishes the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Adverse effects on historic properties would include, but not be limited to:

- Physical destruction, damage, or alteration of all or part of the property;

- Isolation of the property from or alteration of the character of the property's setting when that character contributes to the property's qualification for the NRHP;
- Introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting;
- Neglect of a property resulting in its deterioration or destruction; and
- Transfer, lease, or sale of the property (36 CFR 800.9[b]).

For the purposes of this EIS, a significant impact under NEPA will be defined as an "adverse effect" under Section 106 of the NHPA.

4.9.2.1 Alternative 1 - No Action Alternative

Under the No Action Alternative, APG would not implement the Preferred Alternative. Therefore, the Army would not implement any related renovation or construction at APG. No direct impacts to cultural resources differing from the baseline condition would be expected. Existing conditions and natural degradation of cultural resources will continue. Cultural resources will continue to be managed in accordance with Sections 106 and 110 of the NHPA, AR 200-4, and Army Pamphlet 200-4. No NRHP-eligible cultural resources would be adversely affected because of implementing the No Action Alternative. The Preferred Alternative is congressionally mandated; therefore, the No Action Alternative is not feasible.

4.9.2.2 Alternative 2 - Preferred Alternative

Direct Impacts

Direct impacts to archaeological sites include physical disturbance through surface grading, building excavation and construction, road construction, utility line trenching, use of staging areas for heavy equipment and supplies, borrow pit excavations, and vandalism of archaeological materials from temporary or permanent increased access to sites. Any ground-disturbing action in the area of an NRHP-eligible or potentially eligible archaeological site, or modification to such a site, can affect the physical integrity of that cultural resource. Alteration or destruction of those characteristics or qualities that make a cultural resource potentially eligible for inclusion in the NRHP would be an adverse effect under Section 106 of the NHPA.

Direct impacts to architectural resources include demolition, alteration of architectural traits, structural instability through vibration, short-term audio intrusions during construction, and visual intrusions to historic settings and cultural landscapes. Any visual or audio intrusions to the setting or demolition or alteration of architectural traits, can affect the physical integrity of an NRHP-eligible or potentially eligible architectural resource. Alteration or destruction of those characteristics or qualities that make an architectural resource potentially eligible for inclusion in the NRHP would be an adverse effect under Section 106 of the NHPA.

Direct impacts to Native American resources include destruction of traditional resources, burials, and sacred sites, and plant or animal habitat through ground-disturbing activities and construction of buildings and roads. Audio and visual intrusion may adversely affect the visual and audio landscape or the viewshed of these resources. These types of physical disturbance may disturb or destroy unidentified Native American resources and thus, would be an adverse effect under Section 106 of the NHPA.

Archaeological Resources. Eight unevaluated archaeological sites will be avoided during construction activities based on information provided by APG personnel. Potential adverse effects may occur to any unidentified archaeological resources located in high archaeological probability areas during construction activities if those resources are determined to be NRHP-eligible. Impacts to these archaeological resources would be direct, long-term, and potentially significant.

Architectural Resources. Seven unevaluated World War II-era permanent buildings (5032, 5033, 5035, 5037, 5202, 5204, and 5206) on APG's Northern Peninsula would be demolished and may result in an

adverse effect if these buildings are determined to be NRHP-eligible. One unevaluated World War II permanent building (5038) may be adversely affected if this building is determined NRHP-eligible and non-architecturally compatible design or materials are used in the renovation. Impacts to the eight unevaluated World War II buildings would be direct, long-term, and potentially significant. Five contributing buildings associated with the Ordnance School Historic District (3071, 3072, 3073, 3074, and 3144) would be vacated under the BRAC actions. APG would place the vacated buildings in caretaker status. Building 3062, originally a coal-fired heating plant, is a contributing element to the Ordnance School Historic District. According to APG personnel, heating equipment in Building 3062 may be updated but no external architectural modifications are expected to occur to the building. No direct, significant impacts would occur to the Ordnance School Historic District because of the Preferred Alternative.

The Advanced Individual Training Barracks, which are contributing elements to the World War I Historic District, would be vacated under BRAC actions. APG would place the vacated buildings in caretaker status. No direct, significant impacts would occur to the vacated World War I Historic District because of the Preferred Alternative.

Native American Resources. No known Native American resources would be affected.

Indirect Impacts

Indirect impacts to archaeological sites may include vandalism of archaeological materials from temporary or permanent increased access to sites adjacent to the APE.

Indirect impacts to architectural resources may include structural instability through construction vibration of buildings adjacent to the APE, short-term audio intrusions during construction to buildings adjacent to the APE, and visual intrusions to additional historic settings and cultural landscapes adjacent to the APE.

Indirect impacts to Native American resources may include audio and visual intrusions to resources adjacent to the APE that adversely affect the visual and audio landscape or the viewshed of these resources.

Archaeological Resources. Potential adverse effects may occur to any unidentified archaeological resources adjacent to the APE during construction activities if those resources are determined to be NRHP-eligible. Impacts to these archaeological resources would be indirect, long-term, and potentially significant.

Architectural Resources. Vibration and audio intrusion during construction may adversely affect unevaluated World War II and Cold War buildings adjacent to the APE if these buildings are determined to be NRHP-eligible. Impacts to these buildings would be indirect, short-term, and potentially significant.

Native American Resources. No known Native American resources would be affected.

4.9.2.3 Mitigation Measures

Mitigation measures reduce adverse effects on cultural resources. The preferred mitigation is avoidance. Avoidance preserves the integrity of cultural resources and protects their research potential (*i.e.*, their NRHP eligibility). Avoidance also avoids costs and potential construction delays associated with data recovery.

Archaeological Sites. Historically, data recovery of archaeological sites through professional techniques such as surface collection, mapping, photography, subsurface excavation, technical report preparation and dissemination, has been the standard mitigation measure. Under the revised Section 106 regulations (36CFR800.5(a)(2)(i)), data recovery conducted as mitigation is now considered, in and of itself, an adverse effect.

Because intact prehistoric and historic archaeological resources that may contain sufficient information to be NRHP eligible may occur in the APE in areas designated as high probability for archaeological resources, a Phase I archaeological survey would be required prior to ground disturbing activities. The

Phase I survey may consist of additional archival research (for historic resources), shovel testing, artifact analysis, and report preparation to identify archaeological sites and to determine their extent and integrity.

If intact archaeological sites are identified during Phase I investigations, Phase II cultural resources studies should be designed in consultation with the Maryland Historical Trust, and implemented to determine the NRHP eligibility of the cultural resources. If NRHP-eligible resources occur and cannot be avoided through project redesign, data recovery investigations should be designed in consultation with the Maryland Historical Trust and implemented prior to construction.

Architectural Resources. Architectural studies to determine the NRHP eligibility of the unevaluated architectural resources should be designed in consultation with the Maryland Historical Trust and implemented prior to project activities. If NRHP-eligible resources occur and cannot be avoided through project redesign, Phase III data recovery investigations should be designed in consultation with the Maryland Historical Trust and implemented prior to construction.

Mitigation measures may include, but not be limited to, interpretative displays, renovation using architecturally compatible design and materials, documentation through the HABS/HAER programs administered by the National Park Service, and vegetative screening. Documentation of buildings and structures to the HABS/HAER standards preserve the contextual and architectural information of the resource even if the resource is demolished. Adverse effects caused by audio or visual intrusions to associated historic settings or cultural landscapes of architectural resources may be mitigated by screening the alterations from the resources through landscape design, for example, by planting vegetation such as trees, bushes, or vines consistent with the historic setting and uses of the resource.

4.10 SOCIOECONOMICS

There are three federally issued Executive Orders addressing socioeconomic resources. These include EO 12898, *Federal Actions to address Environmental Justice in Minority and Low-Income Populations*; EO 13084, *Consultation and Coordination with Indian Tribal Governments*; and EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*. The purpose of each of these Executive Orders is to avoid disproportionately high and adverse environmental, economic, social, or health impacts from federal actions and policies on these population groups.

4.10.1 Affected Environment

The APG is located in Harford County, which realizes the greatest social and economic impacts from the installation. These impacts include off-post purchase and rental of housing, purchase of goods and services, and military, DoD civilian, and contractor employment directly and indirectly related to APG. Cecil County, adjacent to Harford County to the east, also realizes substantial impacts from APG. Because they are likely to experience the greatest socioeconomic effects from the Preferred Alternative, Harford County and Cecil County have been identified as a “primary” Region of Influence (ROI) to be evaluated with respect to the Preferred Alternative.

The socioeconomic ROI for APG, as defined by BRAC, consists of the Baltimore-Towson, Maryland Metropolitan Statistical Area (MSA). This MSA comprises the City of Baltimore and the following counties: Anne Arundel, Baltimore, Carroll, Harford, Howard, and Queen Anne’s. To reflect the socioeconomic influence APG has in the region, the ROI has been expanded for this EIS to include Cecil County because it experiences considerable impact from operations at APG. The ROI consisting of these eight jurisdictions will be evaluated as a “secondary” ROI with respect to the Preferred Alternative.

The following sections discuss the existing economic and social conditions of APG and the primary and secondary ROIs with respect to labor force, employment, population, housing, and quality of life.

4.10.1.1 Economic Development

4.10.1.1.1 Regional Economic Activity

As shown in Table 4.10.1, the annual civilian labor force within the secondary ROI was about 1.4 million workers in 2005 (BLS 2006) with total employment estimated at 1.35 million workers (BEA 2006). The average annual unemployment rate in the secondary ROI in 2005 was 4.4 percent, slightly higher than the statewide average for Maryland. The current secondary ROI labor force represents a 3.1 percent increase since 2000, less than the statewide increase of 4.3 percent during the same period. The greatest increase occurred in Baltimore County, with Harford and Howard Counties having the next largest increases. The City of Baltimore, however, experienced almost a 2 percent decrease in its labor force during this same 5-year period.

Table 4.10.1
Annual Civilian Labor Force and Unemployment Rate,
Aberdeen Proving Ground Secondary Region of Influence, 2005¹

County	Increase (percent), 2000-2005	2005 Labor Force	Unemployment Rate (percent)
Anne Arundel	2.8	275,690	3.0
Baltimore	2.6	420,214	4.3
Carroll	8.4	91,269	3.2
Cecil	7.0	49,105	4.5
Harford	6.5	128,233	3.4
Howard	6.1	153,832	3.0
Queen Anne's	9.5	24,927	3.3
City of Baltimore	(1.9)	275,558	7.1
ROI TOTAL	3.1% change 2000-2005	ROI total: 1,418,828	4.4 ²
State of Maryland	4.3	2,935,064	4.1

Source: U.S. Department of Labor, Bureau of Labor Statistics, May 2006 (BLS 2006)

¹Not seasonally adjusted

²Total unemployed divided by total labor force.

() Denotes decrease.

Employment by the major industry sectors by “place of work” for 2004 is shown in Table 4.10.2. Employment by “place of work” reflects workers commuting outside their counties of residence. This results in either (1) employment rates of the in-commuting county exceeding the county labor force, or (2) the labor force of the out-commuting county exceeding county employment. Based on 2000 U.S. Census data county-to-county workflow, Harford County’s labor force substantially exceeded employment within the county.

Total employment within the secondary ROI exceeded 1.6 million in 2004, an increase of 61,500 from 2000. This represents a 4 percent increase during the 5-year period. The majority of the employment increase occurred in Baltimore County and Anne Arundel County, while employment within Harford County also substantially increased. During this period, statewide employment increased by 5 percent. Local and regional employment trends reflect national trends. Services and retail trades experienced the most notable gains, construction employment reflected some gains, and manufacturing remained relatively stable.

The services and government sectors comprise over 60 percent of total employment within the secondary ROI, with retail trade being the third largest employment sector. Federal, state, and local government

employment, including the military, constitutes almost 20 percent of the total employment in Harford County.

4.10.1.1.2 Harford County Economic Development Activity

Harford County is located between the major metropolitan areas of Philadelphia and Baltimore, and is less than 65 miles from Washington, D.C. The MARC and Amtrak provide commuter rail services from Harford County to these metropolitan areas. The central location of Harford County in these metropolitan areas and the availability of commuter rail services contribute to a high percentage of inter-county commuters.

Table 4.10.2
Total Full Time and Part-Time Employment by Industry by Place of Work, Aberdeen Proving Ground Secondary Region of Influence, 2004 (North American Industrial Classification System)

Industry	Region of Influence ¹		Harford County	
	Total	Percent	Total	Percent
Farm Employment	6,115	<1	907	1.0
Forestry, Fisheries	1,811	<1	205	<1
Mining	874	<1	35	<1
Construction	103,279	6.3	8,891	8.2
Manufacturing	84,231	5.1	5,627	5.2
Transportation, Warehousing, Utilities	40,883	2.5	4,505	4.2
Wholesale Trade	48,704	3.0	3,310	3.1
Retail Trade	179,404	10.9	14,806	13.7
Finance, Insurance, Real Estate	142,019	8.7	7,981	7.4
Services	738,085	45.0	41,773	38.8
Government	266,539	16.2	19,496	18.1
TOTAL EMPLOYMENT	1,638,878²	100.0	107,536	100.0

Source: U.S. Department of Commerce, Bureau of Economic Analysis, *Regional Economic Account, May 2006 (BEA 2006)*

Data includes Baltimore-Towson MSA (including Harford County) and Cecil County.

Total employment exceeds total of numbers in column due to non-disclosure of confidential information by some industry sector employers.

Major inter-county worker flow within the secondary ROI is shown in Table 4.10.3. Baltimore County and the City of Baltimore are the major employment destinations for the Harford County labor force. In 2000 about 48 percent of Harford County's labor force commuted outside the county for employment. Baltimore, Baltimore County, Cecil County, and York County, Pennsylvania, are the major sources of worker flow into Harford County. Harford County economic development officials indicate a decrease in its commuting workforce since 2000 due to business expansion and the addition of new employment opportunities within the county. Harford County added about 13,000 jobs within the county during 1999-2004 (BEA 2006).

**Table 4.10.3
Harford County Commuter Workforce Flow, 2000**

Harford County: Out-Commute To:		Harford County: In-Commute From:	
County	Number	County	Number
Baltimore, MD	26,646	Baltimore, MD	6,248
Anne Arundel, MD	2,534	Anne Arundel, MD	649
Cecil, MD	1,643	Cecil, MD	4,441
Howard, MD	1,935	New Castle, DE	333
New Castle, DE	1,003	York, PA	2,201
Prince George's, MD	694	Other	3,921
Other	3,594		
City of Baltimore	15,682	City of Baltimore	1,867
Total	53,731		17,793

Source: U.S. Census Bureau, 2000 Census

APG, Harford Public Schools, and Harford County Government are the largest public employers, with the Upper Chesapeake Health System being the largest private employer (Harford County 2006a). Other major employers in Harford County are shown in Table 4.10.4. Harford County is attracting a growing base of Fortune 500 and high-tech companies, with APG being the technology generator for the area. APG attracts hundreds of private contractors to the surrounding area. With a high-tech workforce and research and development facilities, Harford County utilizes the presence of APG to expand its own resources to transform the area into a high technology center.

Harford County aggressively promotes and pursues new business development and expansion of existing businesses, and provides special incentives and programs for economic development. The county has two state-designated Enterprise Zones – Edgewood/Joppa, and Greater Aberdeen/Havre de Grace. Currently, these two Enterprise Zones encompass over 11,000 acres, and include a number of industrial/business parks. Since its inception, the two Enterprise Zones have contributed more than \$479 million in total capital investment and have cumulatively added 5,000 new full-and part-time jobs to Harford County's economy. The Enterprise Zone program provides local real property and state income tax credits to those companies locating within an Enterprise Zone that meet minimum job creation and capital investment requirements. The Enterprise Zone Program also encourages retention and expansion of existing local industry.

Other economic development programs offered by the Harford County Office of Economic Development include the Higher Education and Applied Technology (HEAT) Center in Aberdeen. The HEAT Center's objective is to support APG and attract new technology businesses. Its incubator program offers business-related facilities and incentives to start-up businesses. The Office of Economic Development, Aberdeen Proving Ground, and the City of Aberdeen have also teamed to promote the Army's Enhanced Use Leasing partnership at APG (Harford County 2006b).

**Table 4.10.4
Major Employers, Harford County, 2005**

Public	Number of Employees
Aberdeen Proving Ground	12,486
Harford County Public Schools	4,573
Harford County Government	1,572
Harford Community College	1,205
Private	Not Applicable
Upper Chesapeake Health System (health)	2,200
Rite Aid Mid Atlantic Distribution Center (pharmaceuticals)	969
Sverdrup Technology, Inc. (engineering/construction)	500
Cytec Engineered Materials (aerospace/aircraft production)	450
Saks Fifth Avenue (apparel distribution)	450
SAIC (information and technology systems)	420
Frito-Lay (snack products)	418
EAI Corporation (R&D/defense contractor)	354
Collins & Aikman (floor coverings)	330
Bechtel National, Inc. (engineering/construction)	300

Source: Harford County Office of Economic Development; Harford County Chamber of Commerce

In May 2004, representatives from the military, technology industry, federal, state, and local officials announced the launch of the Aberdeen Technology Transfer Initiative (ATTI). ATTI is a \$1 million federally funded program designed to increase cooperation between technology companies and the APG. ATTI funds seed technology commercialization efforts, build cooperative partnerships with the installation, and host showcases where businesses can preview new technologies developed at APG.

4.10.1.1.3 Aberdeen Proving Ground Contribution to Regional Economic Activity

Aberdeen Proving Ground is a major contributor to the local, regional, and state economy, with an annual operating budget exceeding \$1 billion. A substantial amount of these economic impacts is due to high-paying jobs that APG creates both directly and indirectly. For example, the average annual APG salary is almost two times greater than the average salary for northeastern Maryland.

The Maryland Department of Business and Economic Development (DBED 2003) conducted an economic impact analysis that considered the impacts of APG on the State of Maryland, northeastern Maryland, and Harford and Cecil Counties. The IMPLAN (Impact Analysis for Planning) economic model was used for this economic impact analysis and is summarized in Table 4.10.5 (MIG 1999). The impact analysis estimates that APG stimulates over \$1.8 billion in economic activity in the State of Maryland, and supports almost 24,000 jobs statewide.

The majority of these effects are realized in Harford County, and to a lesser extent in Cecil County. Annual economic impacts on Harford County and Cecil County are estimated at \$1.1 billion, with the provision of 16,508 jobs. According to the IMPLAN analysis, Harford County residents earn 75 percent of APG's total Maryland payroll, with Harford County businesses receiving 48 percent of APG's total in-state purchases. In addition, it is estimated that over \$10 million is generated annually in local income tax revenues in Harford and Cecil Counties, and about \$7.1 million is realized in annual property tax revenues.

**Table 4.10.5
Economic and Employment Impacts of Aberdeen Proving Ground**

Type of Impact	Direct¹	Secondary²	Total
Impacts on Maryland			
Economic Impacts	\$983,000,000	\$866,000,000	\$1,849,000,000
Employment Impacts	13,256	10,728	23,984
Impacts on NE Maryland			
Economic Impacts	\$686,000,000	\$441,000,000	\$1,127,000,000
Employment Impacts	10,322	6,353	16,685
Impacts on Harford and Cecil Counties			
Economic Impacts	\$686,000,000	\$432,000,000	\$1,118,000,000
Employment Impacts	10,273	6,235	16,508
Local Income Taxes	-	-	\$10,800,000
Estimated Property Taxes³	-	-	\$7,100,000

Source: DBED 2003. Maryland Department of Business and Economic Development, Analysis of the Economic Impact of Aberdeen Proving Ground, May 2003

Direct impacts represent expenditures by APG for payrolls, goods, and contractual services.

Secondary impacts include both indirect and induced effects.

Indirect impacts represent business-to-business purchases by firms and industries supporting the installation.

Induced impacts represent the spending by households receiving income as a result of the direct and secondary economic activity.

Conservative estimate. Actual county property tax receipts are likely to be much higher than the estimate.

4.10.1.2 Demographics

4.10.1.2.1 Regional Population

The population of the secondary ROI increased from about 2,450,000 in 1990 to 2,600,000 in 2000. This was a 7.5 percent increase compared to an approximate 11 percent statewide increase. Howard, Carroll, Cecil, and Harford Counties had the greatest relative growth during this period. The 2005 population estimate of about 2,760,000 is an approximate 5 percent increase since 2000, slightly less than the statewide increase during this period. Population projections for 2015 reflect a continuation of these rates of growth, with the greatest relative increases in Cecil, Harford, Howard, and Queen Anne's Counties. Table 4.10.6 depicts the population distribution and trends within the secondary ROI.

The cities and communities of Aberdeen, Bel Air, Edgewood, and Havre de Grace experience the greatest direct impacts from activities at APG. These communities are within an inverted T-shaped area in Harford County, referred to as the Development Envelope, that encompasses the State Highway 24 and Interstate 95 /U.S. Highway 40 corridors. The Development Envelope is discussed in Section 4.2.1.3.

The socioeconomic environment of these communities and adjacent areas is closely linked to activity levels on the installation since these communities supply a large portion of off-post housing and commercial goods and services. Historically, Aberdeen has provided the majority of the commercial services oriented toward the installation. However, since 1990 the majority of population growth and associated development occurred in Bel Air and its adjacent areas. During the 1990-2000 period, 70 percent of the population growth in Harford County occurred in the Bel Air vicinity, primarily in unincorporated areas. The City of Aberdeen and the community of Edgewood had very modest increases in population during this period. Development trends after 2000 reflect a continuation of this pattern of population growth in Harford County.

**Table 4.10.6
Regional and Local Population Trends, Aberdeen Proving Ground Secondary Region of Influence, 1990-2015**

County/City	2015 Projected Population ¹	2005 Population Estimates ²	Percent Change 1990-2000	2000 Population	1990 Population
Anne Arundel	540,100	510,878	14.6	489,656	427,239
Baltimore	832,900	786,113	9.0	754,292	692,134
City of Baltimore	644,550	641,943	(11.0)	651,154	736,014
Carroll	187,000	168,541	22.3	150,897	123,372
Cecil	121,700	97,796	20.5	85,951	71,347
Harford	268,200	239,259	20.0	218,590	182,132
Howard	308,900	269,457	32.3	247,842	187,328
Queen Anne's	53,850	45,612	19.5	40,563	33,953
ROI Total	2,957,200	2,759,599	7.5	2,638,945	2,453,519
City of Aberdeen	NA	14,305	5.8	13,842	13,087
Town of Bel Air	NA	10,014	13.8	10,080	8,860
Bel Air North CDP ³	NA	NA	73.4	25,798	14,880
Bel Air South CDP	NA	NA	50.3	39,711	26,421
Edgewood CDP	NA	NA	6.1-	25,378	23,903
City of Havre de Grace	NA	11,884	26.5	11,331	8,952
Joppatowne CDP	NA	NA	2.8	11,391	11,084
State of Maryland	6,127,225	5,600,388	10.7	5,296,486	4,781,468

Source: U.S. Department of Commerce, U.S. Census Bureau, 1990 and 2000 U.S. Census; Maryland Department of Planning.

U.S. Census Bureau, Population Division; Maryland Department of Planning, Planning Data Services

Population projections for counties and City of Baltimore are as of July 2005; population projections for towns and cities are as of July 2004
Census Designated Place (CDP) is an area identified by the U.S. Census Bureau for statistical reporting. CDPs are unincorporated communities that lack a separate municipal government, but have concentrations of population.

NA = Current estimates and projections are not available at this geographic level

The dynamics of population change responsible for population growth or decline are natural increase (births minus deaths) and net migration. Net migration is the difference between people moving in (in-migration) and people moving out (out-migration). Table 4.10.7 portrays the relative importance of these two components in the population growth in the secondary ROI during 2000-2005.

Net migration was responsible for 35 percent of the population growth within the secondary ROI from 2000 through 2005. The relative extent of net migration within the secondary ROI was less than that for the State of Maryland. However, if the net out-migration from the City of Baltimore is not considered, internal migration within the secondary ROI accounted for over 60 percent of the population growth during this period. Internal migration accounted for 80 percent or more of the population growth in Queen Anne's, Carroll, and Cecil Counties, while representing almost 70 percent of the growth in Harford County.

4.10.1.2.2 Aberdeen Proving Ground Population

The daytime population consists of military personnel, military family members residing on-post, DoD civilians, and civilian contractors. About two-thirds of the total on-post daytime population is located on APG's Northern Peninsula.

Table 4.10.7
Estimated Components of Population Change, Aberdeen Proving Ground Secondary Region of Influence, 2000-2005

County	Population Change ¹	Natural Change	Net Migration ²	Percent Change Due to Migration
Anne Arundel	21,222	17,326	4,438	20.2
Baltimore	31,821	8,921	23,803	72.7
Carroll	17,644	3,572	14,350	80.0
Cecil	11,845	2,425	9,552	79.8
Harford	20,669	6,749	14,235	67.8
Howard	21,615	11,589	10,376	47.2
Queen Anne's	5,049	720	4,394	85.9
City of Baltimore	(15,339)	8,313	(49,454)	(100.0)
Total	114,526	59,615	31,694	34.7
State of Maryland	303,882	165,707	118,724	41.7

Source: U.S. Census Bureau, Population Division, March 2006. Prepared by the Maryland Department of Planning

Population change represents the difference between the 2000 Census Population and the 2005 population estimates by the Census Bureau. The sum of the natural change and net migration would not equal population change because of the factor of "residual population," which is the result of the procedure used to estimate population at the sub-national level (e.g., county, city) from national estimates. Includes both domestic and international migration.

() Denotes decrease

The current APG military population consists of 2,066 permanent party personnel, and 2,914 trainees/students (ASIP 2006). The APG civilian population is composed of 6,565 DoD civilian employees, 1,159 NAF/other employees; and 3,907 contractors. In addition, there are 2,190 on-post military family members. There are also over 1,000 off-post military family members, and an additional 14,655 military retirees/family members residing off-post within the secondary ROI. Table 4.10.8 provides an inventory of the most current (June 2006) military and civilian populations directly associated with APG.

Table 4.10.8
Aberdeen Proving Ground On-Post Population, June, 2006

Personnel	Number
Permanent Party Military	2,066
Trainees, Students	2,914
DoD Civilians	6,565
NAF/Other	1,159
Contractors	3,907
On-Post Military Family Members	2,190
Total	18,801

Source: APG 2006. Directorate of Planning, Analysis and Integration, Aberdeen Proving Ground; Army Stationing and Installation Plan, June 21, 2006

About 75 percent of the military and civilian/contractor personnel associated with APG reside in Harford County, while 9 percent reside in neighboring Cecil County (APG 2006). The majority of the remaining APG personnel reside in the City of Baltimore or Baltimore County.

4.10.1.3 Housing

4.10.1.3.1 Regional Housing and Household Characteristics

There were 1,082,507 housing units within the secondary ROI according to the 2000 U.S. Census, an increase of about 116,000 units since 1990. This represents a 12 percent increase during the 1990-2000 period. The greatest absolute increase occurred in Baltimore County, while Carroll, Cecil, Harford, and Howard Counties had the greatest relative increases. The number of housing units increased by about 25 percent in each of these four counties. The City of Baltimore registered a decline in housing units during this period. Single-family units comprise the majority of housing units within the secondary ROI, with attached/detached single-family accounting for 80 percent of the housing units in Harford and Cecil Counties. Selected housing characteristics related to occupancy status, median value, vacancy rate, and median household income are shown in Table 4.10.9.

According to the 2000 U.S. Census, the housing vacancy rate in the secondary ROI was about 7 percent, or a total of about 77,000 vacant units. The vacancy rate ranged from a high of 14 percent in the City of Baltimore to 3 percent in Howard County. About 67 percent of the housing units were owner-occupied in 2000, with owner-occupancy rates ranging from 50 percent in the City of Baltimore to over 80 percent in Carroll and Queen Anne's Counties. Median household income in the secondary ROI in 2000 was \$57,065, with median incomes ranging from \$30,000 in the City of Baltimore to \$74,000 in Howard County. Recent estimates (2005) for median household income were \$63,000 for the secondary ROI, with median incomes ranging from \$35,400 in Baltimore City to \$88,600 in Howard County. The median value of owner-occupied units within the secondary ROI was \$126,000 in 2000, with the lowest valued housing in the City of Baltimore and the highest valued in Howard County. Housing values have increased substantially in the secondary ROI since the 2000 U.S. Census.

Table 4.10.9
Housing Characteristics, Aberdeen Proving Ground Secondary Region of Influence, 2000

County/City	Total Housing Units	Percent Vacant	Percent Owner Occupied	Median Value Owner Occupied	Median Rent Renter Occupied	Median Household Income
Anne Arundel	186,937	4.4	75.5	\$156,500	\$700	\$61,768
Baltimore County	313,734	4.4	67.5	\$125,700	\$583	\$50,667
City of Baltimore	300,477	14.1	50.3	\$69,900	\$409	\$30,078
Carroll	54,260	3.2	82.0	\$163,300	\$543	\$60,021
Cecil	34,461	9.3	75.0	\$130,200	\$498	\$50,510
Harford	83,146	4.1	78.0	\$145,500	\$552	\$57,234
Howard	92,818	3.0	73.8	\$198,600	\$798	\$74,167
Queen Anne's	16,674	8.1	83.4	\$160,000	\$520	\$57,037
ROI Total	1,082,507	7.1	67.1	\$126,000	\$575	\$57,065
City of Aberdeen	5,894	7.1	59.0	\$104,900	\$468	\$39,190
Town of Bel Air	4,444	4.7	66.0	\$121,200	\$613	\$44,135
Bel Air North CDP	8,978	2.9	90.2	\$168,100	\$680	\$69,612
Bel Air South CDP	15,267	2.6	80.6	\$142,400	\$584	\$62,064
Edgewood CDP	8,834	6.0	65.6	\$93,100	\$558	\$47,150
City of Havre de Grace	4,904	7.0	56.5	\$121,700	\$437	\$41,218
Joppatowne CDP	4,548	4.0	76.5	\$129,800	\$558	\$57,799

Source: U.S. Department of Commerce, Bureau of the Census, Population and Housing Characteristics, 2000

4.10.1.3.2 Harford County Housing Characteristics

In 2000 there were over 83,000 housing units in Harford County, which was a 25 percent increase from 1990. Single-family units comprised 62 percent of the total housing units. About 4 percent of the units were vacant, with vacancy rates ranging from less than 3 percent in Bel Air North and South to 7 percent in Aberdeen and Havre de Grace. Almost 80 percent of the units were owner-occupied in the county, with owner-occupancy rates ranging from 59 percent in Aberdeen to 90 percent in Bel Air North. The median value of owner-occupied housing in Harford County in 2000 was \$145,500, with median values ranging from \$93,100 in Edgewood to \$168,100 in Bel Air North. The county's median household income in 2000 was \$57,234, with median incomes ranging from \$39,190 in Aberdeen to \$69,612 in Bel Air North. Estimated median household income for Harford County is \$71,450 (MDP 2006a).

Residential development has accelerated in Harford County since 2000. Newer residential developments are concentrated in the Development Envelope. This area has water and sewer service, and includes the municipalities of Aberdeen, Bel Air, and Havre de Grace, and the communities of Abingdon, Edgewood, Joppatowne, Forest Hill, and Belcamp. Since 1990 over 80 percent of the new residential development in Harford County has occurred in this area.

During 2001-2005, over 59,000 housing units were authorized for construction, an average of 12,000 units annually. An average of 2,040 housing units was authorized annually in Harford County, with over 900 units authorized by permit annually in Cecil County. Harford County accounted for 17 percent of the housing units authorized during this time. In addition, over 2,000 housing units were authorized by permit in the municipalities of Aberdeen, Bel Air, and Havre de Grace. There has also been a corresponding increase in commercial and industrial-related development as a result of increased consumer demand and employment opportunities. As a result, total real property assessed valuation in Harford County increased from \$10.8 billion in 1996 to \$16.7 billion in 2005, a 55 percent increase during this 10-year period (Harford County 2006c). This increase reflects residential and non-residential construction that occurred in Harford County during this period. Table 4.10.10 portrays the number of housing units authorized by building permit within the secondary ROI during 2001-2005.

Table 4.10.10
Housing Units¹ Authorized by Building Permit, 2001-2005, Aberdeen Proving Ground Region

Jurisdiction	Total	2005	2004	2003	2002	2001
Baltimore-Towson MSA ²	54,641	11,327	10,282	11,133	10,991	10,908
Baltimore city/county	15,676	3,192	2,843	3,294	2,999	3,348
Cecil County	4,551	743	811	1,089	968	940
Harford County	10,198	2,659	1,836	1,976	1,883	1,844
Regional Total	59,192	12,070	11,093	12,222	11,959	11,848

Source: Maryland Department of Planning, Planning Data Services 2006 (MDP 2006a)

¹Includes single-family and multi-family units.

²Data include Harford County.

Housing prices vary widely throughout Harford County and the surrounding areas. Average prices for single-family homes range from about \$145,000 in the Edgewood area to over \$250,000 in the Bel Air area and \$450,000 in the northwestern portion of the county. Housing prices in Harford County rapidly appreciated in the past few years because of lower mortgage interest rates and increased demand, resulting in rising real estate values and reassessments. According to the Metropolitan Regional Information Systems (MRIS) Real Estate Trend Indicator (MRIS 2006) the median price of single-family homes sold in Harford County in May 2006, was \$249,450, with an average price of \$281,000. This compares to the median price of \$149,900 during the same month in 2000. Thus, housing prices have appreciated by about 66 percent in 6 years, or an annual average rate of 11 percent. During the same 6-year period, the median

price of single-family homes sold in Cecil County appreciated at about the same annual rate with a median price of \$249,000 in May 2006.

In June 2006 there were over 8,000 single-family homes listed for sale in the secondary ROI. Table 4.10.11 portrays the number of single-family homes listed by price range in the City of Baltimore, Baltimore County, Cecil County, and Harford County. There were over 1,210 homes for sale in Harford County, with a median asking price of \$400,000. In addition, there were also 300 attached, semi-detached, duplex, and townhouse units listed for sale in Harford County during this same period.

In 2003 the Harford County Department of Planning and Zoning conducted an inventory of residential and vacant land to assess the residential holding capacity of the Development Envelope for the 2004 Land Use Element Plan. Included in the inventory to estimate the current holding capacity were (1) approved preliminary plans with non-built units; (2) planned units in process; (3) potential capacity of vacant residentially zoned undeveloped land; and (4) municipal vacant land. The analysis indicated a residential development capacity of about 19,000 additional housing units in the Development Envelope. Including the areas outside of the Development Envelope, the Harford County Department of Planning and Zoning estimates a development capacity for about 30,000 housing units in the county (Harford County 2006d). Based on recent housing permits authorized annually, there is sufficient residential development capacity within the Development Envelope for 10 years, and for 15 years when including the entire county. Currently, there are over 5,500 housing units in some stage of the planning approval process in Harford County outside of the corporate limits of the three municipalities. Building permits have been issued for

Table 4.10.11
Single-Family Homes Listed for Sale, June 2006

Price Range	Baltimore, city & county	Harford County	Cecil County
<\$150,000	28	15	21
\$150,000 - \$200,000	139	33	32
\$200,000 - \$250,000	306	56	63
\$250,000 - \$300,000	396	119	124
\$300,000 - \$350,000	287	134	88
\$350,000 - \$400,000	289	159	71
\$400,000 - \$450,000	158	124	70
\$500,000 - \$550,000	122	146	42
> \$500,000	723	424	171
TOTAL	2,448	1,210	682

Source: Metropolitan Regional Information Systems (MRIS) Real Estate, June 2006

about 1,000 of these units. Over 4,000 housing units were recently in some stage of planning or approval within the county's three municipalities, with building permits issued for about 500 of these units.

4.10.1.3.3 Aberdeen Proving Ground Housing

4.10.1.3.3.1 Unaccompanied Enlisted Personnel Housing

There are 3,535 barracks spaces for unaccompanied enlisted personnel on APG. About 75 percent of barracks spaces are located on APG's Northern Peninsula, where housing extends in clusters from Havre De Grace Street to Maryland Boulevard along Susquehanna Avenue. On APG's Southern Peninsula the barracks are located in a compact development in two separate areas – between Beal and Austin Roads

from Wise Road to Otto Road, and at the intersection of Austin and Jessop Roads. Table 4.10.12 portrays the current housing inventory on APG.

Table 4.10.12
Aberdeen Proving Ground On-Post Housing, 2006

Housing Type	Total Units	APG Northern Peninsula	APG Southern Peninsula
Family Housing	1,023	811	212
Permanent Party Barracks Spaces	151	151	0
Trainee Barracks Spaces	3,384	2,438	946
TOTAL	4,558	3,400	1,158

Source: Directorate of Planning, Analysis and Integration, Aberdeen Proving Ground, June 2006

4.10.1.3.3.2 Family Housing

There are 1,023 family housing units in the main family housing areas. About 80 percent of the family housing units are located on APG's Northern Peninsula. Family housing on APG's Northern Peninsula is located in five distinct neighborhoods in a contiguous area on the northern edge of the installation. These neighborhoods include New Chesapeake Gardens, Augusta Court, Bay Side Village, Patriot Village, and the Capehart units east of Patriot Village. Chesapeake Gardens, Augusta Village, and Capehart consist of older housing, while Bay Side Village and Patriot Village are newer housing.

Family housing on APG's Southern Peninsula is located in three separate areas: along the northern edge of the installation and four distinct neighborhoods along Everette Road, Skully Road, Grant Court, and Skippers Point; in the center of the installation east of the airfield; and in the southwestern corner of the post west of the 4400 Block. Housing units for officers are located in Skippers Points. Housing is also located across from USAOC&S buildings 3071, 3072, and 3073, as well as on Plumb Point Loop.

The Department of Business and Economic Development Residential Community Initiative for privatization of family housing is currently programmed for FY2009 at APG. Under this program, the existing family units would undergo a combination of demolition, renovation, and new construction. As of September 2006, the number of units ultimately resulting from the Residential Community Initiative is not known.

About 20 percent (400) of the permanent party military personnel at APG live off-post, with families comprising over 1,000 family members. The majority of off-post military personnel reside in Harford or Cecil Counties.

4.10.1.4 Quality of Life

4.10.1.4.1 Education

4.10.1.4.1.1 On-Post

There are no DoD schools located on APG. Children of military personnel residing on-post attend various public and private schools in the surrounding communities. Several colleges offer extension courses and degrees at APG. Colleges include Cecil Community College, Harford Community College, Central Michigan University, and Florida Institute of Technology.

4.10.1.4.1.2 Off-Post

Public school districts are not a separate taxing authority in the State of Maryland, but rather are funded by the tax revenue of the respective county, and supplemented with state and federal sources. Education constitutes the largest individual expenditure for Harford County government. In FY2005, Harford County

budgeted \$154 million in its General Fund for operating expenses for the County Board of Education in addition to \$12.3 million for Harford Community College. An additional \$123 million was appropriated for capital improvements.

The Harford Public School System is composed of 32 elementary schools, 10 middle schools, and eight high schools. In addition, there is one special school and an alternative education school. As indicated in Table 4.10.13, annual enrollment has exceeded 40,000 students the last 4 years, with enrollments generally increasing annually (MDE 2006a). The majority of enrollment increases in the past several years have been in the elementary grades. The students making up this increase have now reached the age to attend middle and high schools. Enrollment projections indicate that public school enrollment would stabilize over the next 5 years. Harford Public School System's most recent enrollment projections were conducted in June 2006 and did not include BRAC-related enrollment changes.

Table 4.10.13
Enrollment Trends, Harford County and Cecil County Public Schools

School Year	Harford County School District	Cecil County School District
1998/99	38,909	15,550
1999/00	39,334	15,680
2000/01	39,520	15,905
2001/02	39,966	16,095
2002/03	40,252	16,203
2003/04	40,200	16,475
2004/05	40,294	16,535
2005/06	40,288	16,521

Source: Maryland State Department of Education; Cecil County Public Schools Board of Education; Harford County Public Schools Board of Education

The Harford County Public School system built 10 new schools in the past 15 years, and all high schools are currently undergoing or are programmed for a modernization or replacement program. Major capital improvements funded during FY2005 included the new Patterson Middle/High School; modernization of North Harford High School, Aberdeen High School, Edgewood High School, and Bel Air High School and modernization of five elementary schools. The \$60 million Patterson Middle/High School is under construction and scheduled for opening in the fall 2007. It would provide capacity for 1,600 students in grades 6-12. The \$50 million expansion of North Harford High School is also underway. An additional \$15.6 million was appropriated to the Harford Community College for capital improvements in FY2002 (Harford County 2006c)

Current capital facility improvements planned for future construction and programmed for completion in 2010-2011 include:

- Construction of a new elementary school;
- Deerfield Elementary School modernization;
- Joppatowne Elementary School modernization;
- Bel Air High School replacement;
- Edgewood High School replacement; and
- Aberdeen High School addition.

This capital facilities program reflects improvements planned before the latest BRAC round, and does not include additional facility requirements that may be necessary to accommodate additional post-BRAC enrollment demands on the school system.

Although not applicable to APG, current Maryland law states that preliminary plans for new residential developments cannot be approved in elementary and secondary school districts where the full-time enrollment exceeds or is projected to exceed 105 percent of the school capacity within 3 years. In 2005, six of the elementary schools and seven of the middle and high schools were at or above 105 percent capacity.

In 2006, the Board of Education completed and approved a redistricting plan. As a result, school attendance boundaries for the secondary schools were changed and adjusted to reflect individual schools' current and projected enrollments to alleviate overcrowding. The redistricting plan becomes effective in September 2007.

There are 29 Cecil County public schools consisting of 17 elementary schools, six middle schools, and five high schools in addition to one Career and Technology School. Total enrollment during the 2005/2006 school year was 16,521, a 4 percent increase since 2000 as indicated in Table 4.10.13. Current enrollment capacity is exceeded at the elementary school level with nine of the 17 schools over capacity. Enrollment capacity is also currently exceeded at four of the six middle schools, while current enrollment is below capacity at the five high schools.

Current funded school capital facility projects include the Elkton High School addition/renovation; Perryville Middle School addition/renovation; expansion of Calvert Elementary School; and construction of kindergarten classrooms at six schools. The scheduled completion date for the Elkton High School and Perryville Middle School improvements is early 2008. Cecil County Government appropriated over \$58 million for the school district's operating budget in FY2005 (Cecil County 2006). The school district is requesting State funds for the renovation of one elementary school, and is resubmitting a request for state funding for a new high school.

There are numerous universities and colleges offering post-secondary education in the secondary ROI. Harford Community College had a full-and part-time enrollment during FY2005 of 7,607 students. Harford Community College coordinates the academic programs and maintains the Higher Education and Conference Center at HEAT. Cecil Community College is located in Cecil County near the town of North East. Other major colleges and universities in the secondary ROI include:

- Johns Hopkins University;
- University of Maryland;
- Loyola University;
- Towson University;
- University of Delaware;
- College of Notre Dame of Maryland;
- Goucher College; and
- Villa Julie College.

4.10.1.4.2 *Health and Medical Facilities*

4.10.1.4.2.1 On-Post

On-post health/medical facilities and services are provided by the Kirk U.S. Army Health Clinic (KUSAHC). KUSAHC includes the primary facility on APG's Northern Peninsula, and a satellite clinic on APG's Southern Peninsula. Dental clinics are co-located at both facilities. KUSAHC provides a variety of ambulatory health and medical services. These services include limited multi-specialty ambulatory care

and acute care medical services to an estimated 70,000 eligible beneficiaries, urgent care treatment, and occupational health care to federal civilian employees, occupational health and industrial hygiene support to APG tenants and other support activities, and medical support to the chemical and nuclear missions at APG.

4.10.1.4.2.2 Off-Post

There is an array of hospitals and medical centers in the secondary ROI. Hospitals and medical centers closest to APG include (1) Upper Chesapeake Medical Center and Campus in Bel Air; (2) Harford Memorial Hospital in Havre de Grace; and (3) Union Hospital in Elkton in Cecil County. The majority of other off-post medical facilities within the secondary ROI are located in Baltimore, including the following major hospitals and medical centers:

- Greater Baltimore Medical Center;
- Baltimore Veterans Administration Medical Center;
- Johns Hopkins Hospital and School of Medicine;
- University of Maryland Medical Center; and
- St. Joseph Medical Center.

4.10.1.4.3 Law Enforcement

4.10.1.4.3.1 On-Post

The APG Directorate of Law Enforcement and Security (DLES) is responsible for providing law enforcement and related support services to APG and its tenants. DLES plans, coordinates, executes, and administers APG's law enforcement, crime prevention and physical security programs, and conducts investigations in accordance with Army regulations. Under the Uniform Code of Military Justice, military authorities have off-post jurisdiction over offenses committed by military personnel. The military law enforcement authorities coordinate their off-post activities with local law enforcement authorities on a case-by-case basis.

4.10.1.4.3.2 Off-Post

The Harford County Sheriff's Office is located in Bel Air, and provides law enforcement for all of Harford County, including aiding law enforcement officials in the county's three municipalities. The municipalities of Aberdeen, Bel Air, and Havre de Grace each have their own police department. The County Sheriff's Office is responsible for law enforcement and patrolling all unincorporated communities in the county. The County Sheriff's Office has a Police Services Bureau, Investigative Services Bureau, and a Correctional Services Bureau. The Police Services Bureau is comprised of the Criminal Patrol Division and Patrol Special Operations Division. The Patrol Division has a current authorized strength of 120 personnel split between the county's northern and southern precincts. The Correctional Services Bureau is responsible for the operation of the Harford County Detention Center in Bel Air.

Each of Harford County's three municipalities has an individual Police Department. The City of Aberdeen Police Department consists of about 50 employees and is supported by a police auxiliary. The department consists of four divisions: Patrol, Criminal Investigations, Canine (K-9), and Special Weapons and Tactics. The Patrol Division is divided into three squads, each including a sergeant, corporal, and seven officers. The Criminal Investigations Division consists of five officers, one of whom is assigned to the Harford County Joint Narcotics Task Force.

The town of Bel Air Police Department has a total of 43 employees, 32 of whom are sworn officers and 13 are non-sworn officers. The Department responds to over 12,000 service calls annually. The Police Department provides patrol, traffic control, criminal investigations, K-9 patrol, and educational services and parking enforcement in the City. The Patrol Division consists of 22 officers who provide full police

service to the community. The Criminal Investigation Division consists of three personnel who investigate criminal offenses, while a fourth member is assigned to the Harford County Joint Narcotics Task Force.

The City of Havre de Grace Police Department consists of 27 sworn officers, 10 civilian and technical support personnel, and drug detection and K-9 patrol. The Department occupies a 10,000 SF facility constructed in 2001.

4.10.1.4.4 *Fire Protection*

4.10.1.4.4.1 On-Post

Fire protection and emergency medical services on APG are provided by the Fire and Emergency Services Division. The APG Fire Department is responsible for fire, rescue, and emergency medical services on the installation. APG Fire and Emergency Services consist of 60 personnel, including seven fire inspectors. There are 20 fire/EMS personnel per 24-hour shift, or 10 personnel at each station per shift. The Fire and Emergency Services Division has the following equipment split between the two active stations:

- two ladder trucks;
- three engines;
- one tanker;
- four medic units;
- two to three hazardous material response units; and
- three rescue boats.

A new Emergency Services Facility was recently constructed on APG's Northern Peninsula and consolidated the Fire Department, Law Enforcement, and the Kirk Army Ambulance Section into one facility. APG's Southern Peninsula also has a fire station, and there is an unmanned station at PAAF.

APG has mutual aid agreements on an "as needed" basis with all Harford County volunteer fire companies under a contract with the Harford County Volunteer Fire and Ambulance Association (APG 2006k).

4.10.1.4.4.2 Off-Post

Eleven volunteer fire companies provide Harford County's fire protection services. Three of the companies consist of fire departments associated with the municipalities of Aberdeen, Bel Air, and Havre de Grace. One company solely provides countywide emergency medical services.

The nearest off-post fire companies to APG include the Joppa-Magnolia Volunteer Fire Company and Abingdon Volunteer Fire Company, which provide service to the community of Edgewood and APG's Southern Peninsula. The nearest fire station to APG's Southern Peninsula is about 1.5 miles from Maryland Gate 24. The station on Willoughby Beach Road is within 2 miles of the Edgewood Gate and is currently being replaced with a new/rebuilt station.

The Aberdeen Fire Department has four stations. The station on East Bel Air Avenue is within 1 mile of APG. Station #3, which is also within 1 mile of APG, is being replaced with a new station.

Other volunteer fire companies in proximity to APG include the Level Volunteer Fire Company and the Susquehanna Hose Company in Havre de Grace.

The Division of Emergency Operations is the primary calling center for 911 emergency services in Harford County. The Division is responsible for (1) fire and EMS communications; (2) Harford County Sheriff's Office communications; (3) hazardous materials response team; and (4) dispatching all fire, emergency medical, and rescue equipment for the volunteer fire and ambulance companies.

The Harford County General Fund for operating expenditures funds fire protection and 911 emergency communications in Harford County. In FY2005, the County budgeted almost \$4 million in operating funds

for the county's volunteer fire companies, and \$4.1 million for 911 emergency communications. In addition, \$35.2 million was appropriated for capital improvements from the county's Capital Projects Funds (Harford County 2006c). Harford County government provides about 45 percent of the funding for the volunteer fire companies, with the remaining funding derived from fundraising events/activities, supplemented with State and federal grant money.

4.10.1.4.5 Recreation

4.10.1.4.5.1 On-Post

Army Morale, Welfare, and Recreation provides recreational activities on APG. There is a wide variety of on-post indoor and outdoor recreational facilities available to military personnel and their dependents, and to civilian employees on a space-available basis. The Army Ordnance Museum and the golf courses are the only on-post recreational facilities open to the public.

Major indoor facilities include:

- three gymnasiums;
- two recreation centers;
- arts and crafts;
- automotive crafts;
- two health and fitness centers;
- bowling center; and
- movie theater.

Major outdoor recreational facilities include:

- three golf courses;
- horse boarding facility;
- four boat docks;
- tennis courts;
- numerous athletic fields and multi-purpose courts;
- running tracks;
- skeet and trap range;
- fitness trail; and
- picnic and camping areas.

Hunting, fishing, and trapping are other recreational activities on the installation. Recreational boating is also available, but restricted to certain hours of the day.

4.10.1.4.5.2 Off-Post

Harford County offers 6,850 acres of protected open space and 6,626 acres of state parkland for use and enjoyment by the public. In addition, there are water-related recreational resources offered by Chesapeake Bay. Harford County is home to nine golf courses, including the Bulle Rock Golf Course in Havre de Grace. Ripken Stadium is home to the Aberdeen Ironbirds baseball team, a Class A affiliate of the Baltimore Orioles. Other special attractions and recreational pursuits include Swan Harbor Farm; Steppingstone Museum in Susquehanna State Park; the Ladew Topiary Gardens, and Liriodendron; and the Ma and Pa Heritage Corridor Bike and Hike Trail.

Harford County contains 103 regional, state, and local parks, each offering a venue of various activities. Susquehanna State Park, located along the Susquehanna River valley, offers a wide variety of outdoor recreational activities, including boating, fishing, camping, hunting, canoeing, hiking, and other activities. Other major State parks include Rocks State Park and Gunpowder Falls State Park.

Each municipality in Harford County also has a Parks and Recreation Department and recreational facilities. Aberdeen has seven parks, while Bel Air and Havre de Grace have seven and nine parks, respectively. There are six recreation complexes in the county where indoor and outdoor recreational activities are available. In addition, there are multiple fitness, walking, and biking trails in various parks and in undeveloped nature areas.

There are 20 recreation councils in Harford County that join with the County Department of Parks and Recreation in providing recreational programs, organizing special events, and in proposing the acquisition of land and development of park facilities. The Parks and Recreation Department has a \$194 million proposed Capital Improvements Program (2006-2020) for land acquisition, regional parks and special facilities improvements, site specific projects, waterway improvement projects, and miscellaneous projects (Harford County 2006e).

4.10.1.5 Environmental Justice

The following discussion of environmental justice has been developed to address two Presidential EOs: EO 12898 *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations* and EO 13084 *Consultation and Coordination with Indian Tribal Governments*.

On February 11, 1994, President Clinton issued EO 12898, the purpose of which was to avoid the disproportionate placement of adverse environmental, economic, social, or health impacts from federal actions and policies on minority and low-income populations or communities. An element emanating from this EO was the creation of an Interagency Federal Working Group on Environmental Justice composed of the heads of 17 federal departments and agencies, including the Army. Each department or agency is to develop a strategy and implementation plan for addressing environmental justice.

It is the Army's policy to comply fully with EO 12898 by incorporating environmental justice concerns in decision-making processes supporting Army policies, programs, projects, and activities. In this regard, the Army ensures that it would identify, disclose, and respond to potential adverse social and environmental impacts on minority and/or low-income populations within the area affected by a proposed Army action.

The initial step in this process is identification of minority and low-income populations that might be affected by implementation of the Preferred Alternative. For environmental justice considerations, these populations are defined as individuals or groups of individuals subject to an actual or potential health, economic, or environmental threat arising from existing or proposed Federal actions and policies. Low-income, or the poverty threshold, is defined as the aggregate annual mean income for a family of four in 2003 correlating to \$18,660. The 2005 poverty threshold for a family of four was \$19,806.

Table 4.10.14 provides statistics that characterize the minority and low-income populations in the secondary ROI.

On May 14, 1998, President Clinton issued EO 13084, which recognized the unique legal relationship the U.S. Government has with Indian tribal governments as set forth in the Constitution of the United States, treaties, statutes, EOs, and court decisions. Since the formation of the Union, the United States has recognized Indian tribes as domestic dependent nations under its protection. In treaties, our nation guaranteed the rights of Indian tribes to self-government. As domestic dependent nations, Indian tribes exercise inherent sovereign powers over their members and territories. The United States continues to work with Indian tribes on a government-to-government basis to address issues concerning Indian tribal self-government, trust resources, and Indian tribal treaty and other rights.

Table 4.10.14
Minority and Low-Income Populations, Aberdeen Proving Ground Secondary Region of Influence

County/City	Total Population (2000)	Percent Minority Population (2000)	Median Household Income in Dollars (2003)	Persons Below Poverty (2003)	Percent Persons Below Poverty (2003)
Anne Arundel	489,656	18.8	\$70,950	30,858	6.2
Baltimore	754,292	25.7	\$56,050	58,475	7.6
City of Baltimore	651,154	68.4	\$33,100	120,092	19.6
Carroll	150,897	4.4	\$69,750	8,084	5.0
Cecil	85,951	6.7	\$55,250	7,312	7.7
Harford	218,590	13.2	\$65,400	14,914	6.4
Howard	247,842	25.7	\$82,300	12,480	4.7
Queen Anne's	40,563	11.0	\$64,150	2,697	6.0
ROI, Total/Average	2,638,945	31.8	\$57,065	254,912	9.6
City of Aberdeen	13,842	35.1	\$39,190	1,614	11.9
Town of Bel Air	10,080	7.2	\$44,135	598	6.3
Bel Air North CDP	25,798	5.1	\$69,612	447	1.7
Bel Air South CDP	39,711	8.5	\$62,064	1,049	2.6
Edgewood CDP	25,378	31.9	\$47,150	2,407	10.3
City of Havre de Grace	11,331	20.8	\$41,218	1,126	10.1
Joppatowne CDP	11,391	15.1	\$57,799	554	4.9
State of Maryland	5,296,486	36.0	\$59,400	480,448	8.8

The EO also notes that government agencies should establish regular and meaningful consultation and collaboration with Indian tribal governments in the development of regulatory practices on federal matters that uniquely affect their communities to reduce the imposition of unfunded mandates and streamline the application process for and increase the availability of waivers to Indian tribal governments. Specifically, the EO requires that government agencies, to the extent possible, be guided by the principles of respect for Indian tribal self-government and sovereignty, tribal treaty and other rights. Effective processes are required to permit elected officials and other representatives of Indian tribal governments to provide meaningful and timely input in the development of regulatory policies on matters that uniquely affect their communities.

It is the Army's policy to comply fully with EO 13084 by incorporating Indian tribal concerns in decision-making processes supporting Army policies, programs, projects, and activities. In this regard, the Army ensures it would identify, disclose, and respond to potential adverse social and environmental impacts on tribal populations within the area affected by a proposed Army action.

4.10.1.6 Protection of Children

On April 21, 1997, President Clinton issued EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*. This EO recognized that a growing body of scientific knowledge demonstrates that children may suffer disproportionately from environmental health risks and safety risks. These risks arise because children's bodily systems are not fully developed; because they eat, drink, and breathe more in proportion to their body weight; because their size and weight can diminish protection from standard safety features; and because their behavior patterns can make them more susceptible to accidents. Based on these

factors, President Clinton directed each federal agency to make it a high priority to identify and assess environmental health risks and safety risks that might disproportionately affect children. President Clinton also directed each federal agency to ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health or safety risks.

It is the Army's policy to comply fully with EO 13045 by incorporating these concerns in decision-making processes supporting Army policies, programs, projects, and activities. In this regard, the Army ensures it would identify, disclose, and respond to potential adverse social and environmental impacts on children within the area affected by a proposed Army action.

4.10.2 Consequences

The level of impact determination for each of the EO provisions is based on proportion of any of the population groups denoted in the EOs in the potentially affected general population. An impact could be considered disproportionate if the relative percentage of a specific population group within a defined area exceeds the relative share of that population group within a larger surrounding area or statewide basis.

4.10.2.1 Alternative 1 - No Action Alternative

Direct Impacts. Under the No Action Alternative, APG would not implement the Preferred Alternative. Therefore, the Army would not implement any related renovation or construction at APG. No direct impacts to socioeconomics differing from the baseline condition would be expected. The Preferred Alternative is congressionally mandated; therefore, the No Action Alternative is not feasible.

Indirect Impacts. There would be no indirect socioeconomic impacts under the No Action Alternative.

4.10.2.2 Alternative 2 - Preferred Alternative

The extent to which military, DoD civilian, and contractor personnel would relocate to the primary and secondary ROIs is unknown. Consequently, the "maximum scenario" was assumed in estimating the socioeconomic impacts. Under this scenario, it is assumed that all military, DoD civilian, and contractor personnel associated with the relocating activities and organizations would move to the secondary ROI. It is also assumed that the current off-post residency distribution of APG personnel would be reflected in the residency of relocating personnel, *i.e.*, that about 75 percent of the incoming personnel would reside in Harford County; about 10 percent in Cecil County; and the remainder in other portions of the secondary ROI.

Several population changes in military, DoD civilian, and contractor personnel would occur at APG with the Preferred Alternative. These changes include the net loss of 3,171 permanent party military/students/trainees, and a net gain of 7,574 civilian (direct hire) and contractor personnel (ASIP 2006). In addition, there would be a net decrease of 576 on-post military family members. This results in an overall net gain of 3,827 in the on-post population, including military family members.

APG's Northern Peninsula population would increase by about 4,700 people, while APG's Southern Peninsula would lose about 885 people. These population changes include on-post family members of military personnel.

Primary Region of Influence

For the purposes of this analysis, it was assumed that the residency of incoming personnel will reflect the residency pattern of current APG employees. Accordingly, it was assumed that 85 percent of the relocating personnel will choose to reside in Harford and Cecil Counties, with the remaining 15 percent relocating to other locations in the secondary ROI.

The Economic Impact Forecast System (EIFS) model was used to assess the socioeconomic impacts of the Preferred Alternative for both the primary and secondary ROI. The EIFS model runs were completed for three different scenarios based on the length of time over which the personnel relocations would occur.

Scenarios of 1-year, 2-year, and 3-year periods over which the personnel relocations would be completed were evaluated. These different scenarios were used to assess the potential annual impact of the personnel relocations on population, employment, income, and business sales volume. Appendix D contains the EIFS reports on the primary and secondary ROIs.

The EIFS model includes a Rational Threshold Value (RTV) profile used in conjunction with the forecast models to assess the impacts of an activity for a specific geographic area. For each of four variables (sales volume, employment, income, and population) the current time-series data available from the United States Bureau of Economic Analysis are calculated along with the annual change, deviation from the average annual change, and the percent deviation for each of these variables, which then defines a threshold for significant annual regional economic impacts for a variable. Within the EIFS model, the RTV is calculated for each of these variables when assessing the regional economic impacts of a specific proposed action. If the RTV for a particular variable associated with the impacts of a proposed action exceeds the maximum annual historic deviation for that variable, then the economic impacts are considered significant. If the RTV for a variable is less than the maximum annual historic deviation for that variable, then the regional economic impacts are experienced within the region, but are not considered significant.

Table 4.10.15 portrays the estimated direct, indirect, and total annual impacts of the Preferred Alternative on business sales, personal income, employment, and population for each of the scenarios of personnel relocation to Harford and Cecil Counties. The employment and income multiplier for the primary ROI is 2.77. This multiplier means that for each \$1 spent or invested in the primary ROI, an additional \$2.77 is spent or invested directly or indirectly as a result of the circulation of the initial \$1. The multiplier is a default value generated by EIFS and is determined specifically for the ROI.

It is noted that, because they cannot be quantified at this time to provide EIFS model input, any increases in APG expenditures for installation operations (*e.g.*, services, supplies, utilities, *etc.*) as a result of the Preferred Alternative were not considered in the EIFS impact assessment. Although the magnitude of such increases is unknown at this time, it is assumed they would contribute additional local and regional economic benefits. Table 4.10.15 also portrays the indirect impacts on business volume, income, and employment as a result of the initial direct impacts of change in operations.

Table 4.10.15 portrays the RTV associated with each potential economic impact. The weighted positive/negative annual historic deviations (RTVs) for each economic variable are:

- sales volume (+11.60/-8.19 percent);
- income (+10.79/-4.53 percent);
- employment (+4.58/-3.75 percent); and
- population (+1.90/-0.70 percent).

As indicated in Table 4.10.15, annual impacts would vary dependent on the length of time over which the personnel relocations would occur. The degree of impact decreases if the relocation of personnel occurs over a longer time rather than if confined to only a 1-year time period.

Table 4.10.15
Estimated Annual Economic Impacts Resulting From Preferred Alternative,
Aberdeen Proving Ground Primary Region of Influence

Variable	Direct Impacts	Indirect Impacts	Total	Maximum Annual Historic Deviation of RTV	RTV ¹
Annual Operations Impacts, Net Change²					
7,574 personnel relocations over a 1-year period³					
Sales (Business Volume)	\$467,787,800	\$862,272,700	\$1,330,059,500	+11.50/-8.19%	20.80%
Income	\$539,329,000	\$147,862,000	\$687,191,000	+10.79/-4.53%	9.51%
Employment	6,448	4,171	11,035	+4.58/-3.75%	9.40%
Off-post Population	n/a	n/a	16,030	+1.90/-0.70%	5.16%
7,574 personnel relocations over a 2-year period (3,787 annually)					
Sales (Business Volume)	\$243,579,800	\$431,136,400	\$674,716,200	+11.50/-8.19%	10.41%
Income	\$302,960,000	\$81,358,000	\$384,318,000	+10.79/-4.53%	5.29%
Employment	5,060	2,253	7,313	+4.58/-3.75%	6.27%
Off-Post Population	n/a	n/a	8,015	+1.90/-0.70%	2.74%
7,574 personnel relocations over a 3-year period (2,524 annually)					
Sales (Business Volume)	\$162,408,000	\$287,462,100	\$449,870,100	+11.50/-8.19	6.94%
Income	\$202,000,000	\$54,245,840	\$256,245,800	+10.79/-4.53%	3.52%
Employment	3,374	1,502	4,876	+4.58/-3.75%	4.18%
Off-Post Population	n/a	n/a	5,344	+1.90/-0.70%	1.83%

Source: Economic Impact Forecast System, U.S. Army Corps of Engineers, Construction Engineering Research Laboratory

¹ Rational Threshold Value

² 2006 Dollars

³ Represents net gains after loss of 3,171 military personnel during first year of realignment.

Net change denotes net benefits after deducting impacts of outgoing personnel from impacts of incoming personnel

The relocation of personnel over a 1-year period would result in significant impacts in business sales volume, employment, and population in the primary ROI. The positive RTV, or threshold of significance, is exceeded for these three economic variables. In addition, the RTV for personal income impacts almost equals the maximum positive RTV for this economic variable.

Personnel relocation over 2 years would result in significant impacts to employment and population. If the personnel relocations are distributed over 3 years; however, none of these economic variables would have significant impacts. However, the RTVs for employment and population closely approach the maximum respective RTV for these two economic variables for a 3-year period of personnel relocation.

If the incoming relocating personnel maintain the current residency distribution of APG personnel, Harford County would absorb 15,000 people. This represents a 6 percent increase in the current estimated county population. Assuming a 2-3 year period for personnel relocation, the annual increase in population would be 5,000-7,500. Harford County's annual population increase during 2000-2005 was about 4,200 people. Because there is a direct relationship between population impacts and subsequent impacts on housing demand and school facilities, such impacts could be lessened with personnel relocation taking place over 2-3 years.

There could be a substantial increase in housing demand in the primary ROI. This demand could be significant if the relocation of personnel occurs over 1 or 2 years. The potential demand would be greatest in Harford County, and would be in addition to the demands placed on housing by increasing migration into the county. In this scenario there could be demand for about 5,500 housing units in Harford County, and almost 1,000 units in Cecil County. In June 2006, there were about 1,200 single-family homes listed for sale in Harford County. Currently, there are over 5,500 housing units in some stage of the planning approval/construction process in the unincorporated portion of Harford County. There are over 3,000 such units in Cecil County. Harford County's Development Envelope and the remainder of the county have a development capacity for an additional 30,000 housing units (Harford County 2006d). During 2000-2005, Harford County authorized permits for about 2,000 housing units annually. Thus, the maximum potential additional housing demand resulting from the Preferred Alternative in Harford County could be equivalent to almost 3 years of approved units at the recent annual rate of housing unit authorization. According to the Maryland Department of Planning (MDP 2006b), the greatest pressure will be meeting the demand for high cost/quality housing inside the respective "Development Envelopes," or the Priority Funding Areas/sewer areas where demand is expected to be highest.

The majority of the children of APG personnel attend the Harford County Public School System, with some students also attending private schools within the county. The Harford County Public School System has experienced annual increases in enrollment because of increased residential development and migration into the county during the last decade. The Harford County Public School System currently has a major capital improvement program in progress with the replacement and construction of three new high schools, and construction and modernization of several elementary schools. Annual enrollment projections conducted without considering the Preferred Alternative indicate a continuation of increases in enrollment. Currently, enrollment capacity is being exceeded in many of the system's schools. Assuming a continuation of the existing residency distribution of APG personnel by incoming personnel, there could be a potential for an additional 5,500-6,000 students in the Harford County Public School System. This would represent almost a 15 percent increase over the current enrollment.

The Cecil County Public School System has also experienced annual increases in student enrollment as a result of increased residential development and in-migration. Currently, enrollment capacity is exceeded at more than one-half of the elementary and middle schools. Enrollment projections based solely on birth rates indicate a stabilization of this trend of increasing enrollments. Based on the current residency distribution of APG personnel, a potential enrollment increase of 500-750 students could result from the Preferred Alternative.

With potential population increases in Harford and Cecil Counties, there would be a corresponding increase in demand for medical and health related facilities and personnel. An increased demand in law enforcement facilities, services, and personnel would also be expected commensurate with the increase in population. The Harford County Sheriff's Office would most likely experience the greatest additional service demands because the majority of new development is occurring, and expected to continue to occur, in the unincorporated portions of the county.

The potential influx of relocated personnel would result in additional demands on the provision of fire services and EMS, especially in Harford County. New fully equipped stations and additional personnel could be required to meet these additional demands.

There could be short-term impacts on off-post housing depending upon the length of time over which the relocations occur and the numbers of personnel relocating. These potential impacts could result in escalation of housing prices resulting from increased demand and housing shortages. Infrastructure and resources in some local areas or communities could be temporarily overburdened. Increased enrollments could result in short-term indirect impacts on the local school districts in respect to inadequate facilities and personnel resources. The degree of impact would be dependent partially on the length of time the anticipated enrollment increase from the relocating personnel occurs. Long-term indirect beneficial

impacts would occur because of expansion and modernization of existing facilities and construction of new facilities.

Secondary Region of Influence

Direct Impacts and Indirect Impacts. The Preferred Alternative would result in direct short-term beneficial economic impacts in the regional and local economy during construction activities. The Preferred Alternative would result in long-term economic impacts from the relocation of personnel. Employment generated by construction activities and increased on-post operations would result in wages paid, an increase in business sales volume, and increased expenditures for local and regional services, materials and supplies.

Facility construction under the Preferred Alternative consists of a combination of maximum renovation and use of existing facilities and new construction. Under the Preferred Alternative about 1.8 million SF of existing space on APG would be renovated and 1.8 million SF would be new construction. Most of the renovated space would be on APG's Northern Peninsula, with the exception of 100,000 SF on APG's Southern Peninsula. The estimated total annual construction cost of about \$ 187 million (2006 dollars) for the construction of the new facilities was used as the EIFS input for change in capital costs. The construction cost was pro-rated over an anticipated construction period of 2.5 years to estimate annual impacts.

Table 4.10.16 portrays the estimated direct, indirect, and total annual economic impacts of construction activities on sales (business) volume, income, and employment. These impacts would be realized annually over the length of the construction period. The increase in sales volume, income and employment includes capital expenditures, income and labor directly associated with the construction activity. Appendix D contains the EIFS Report on impacts of the construction activities associated with the Preferred Alternative.

Table 4.10.16
Estimated Annual Economic Impacts Resulting From Construction,
Aberdeen Proving Ground Secondary Region of Influence

Variable	Direct Impacts	Indirect Impacts	Total	Maximum Annual Historic Deviation	RTV ¹
Annual Construction Impacts²					
Sales (Business Volume)	\$187,000,000	\$740,520,000	\$927,520,000	+11.57/-4.80%	0.78%
Income	\$36,211,120	\$143,396,100	\$179,607,220	+10.51/-4.54%	0.25%
Employment	817	3,237	4,054	+2.97/-3.10%	0.27%

Source: Economic Impact Forecast System, U.S. Army Corps of Engineers, Construction Engineering Research Laboratory

¹Rational Threshold Value

²2006 Dollars

Table 4.10.17 portrays the estimated direct, indirect, and total annual economic impacts of the Preferred Alternative on off-post sales (business) volume, income, and employment not directly related to installation operations. It is noted that, because they cannot be quantified at this time to provide EIFS model input, any increases in APG expenditures for installation operations (*e.g.*, services, supplies, utilities, *etc.*) as a result of the Preferred Alternative were not considered in the EIFS impact assessment. Although the magnitude of such increases is unknown at this time, it is assumed they would contribute additional local and regional economic benefits.

Table 4.10.17
Estimated Annual Economic Impacts Resulting From Operations,
Aberdeen Proving Ground Secondary Region of Influence

Variable	Direct Impacts	Indirect Impacts	Total	Maximum Annual Historic Deviation	RTV ¹
Annual Operations Impacts, Net Change²					
Sales (Business Volume)	\$467,787,800	\$1,852,439,000	\$2,320,226,800	+11.57/-4.80%	1.95%
Income	\$539,329,000	\$358,710,800	\$898,039,800	+10.51/-4.54%	1.25%
Employment	6,448	8,098	14,546	+2.97/-3.10%	0.98%
Off-post Population	Not applicable	Not applicable	18,859	+1.02/-0.46%	0.73%

Source: Economic Impact Forecast System, U.S. Army Corps of Engineers, Construction Engineering Research Laboratory

¹Rational Threshold Value

²2006 Dollars. Net change denotes net benefits after deducting impacts of outgoing personnel from impacts of incoming personnel.

Table 4.10.17 also portrays the indirect impacts on business volume, income, and employment as a result of the initial direct impacts of change in operations. The employment and income multiplier for the ROI is 4.96. This multiplier means that for each \$1 spent or invested in the ROI, an additional \$3.96 is spent or invested directly or indirectly because of the circulation of the initial \$1. The multiplier is a default value generated by EIFS and is determined specifically for the ROI.

Table 4.10.17 portrays the RTV associated with each economic impact resulting from the change in installation operations under the Preferred Alternative. The regional maximum positive/negative maximum annual historic deviations for each economic variable are:

- sales volume (+11.57/-4.80 percent);
- income (+10.51/-4.54 percent);
- employment (+2.97/-3.10 percent); and
- population (+1.02/-0.46 percent).

As indicated in Table 4.10.17, the values for sales volume, income, and employment are below the maximum positive RTV for the ROI. The value for the resulting population increase approaches the RTV for this variable. For these reasons, there would be long-term beneficial economic impacts on regional business sales, income, employment, and population. These impacts could tend to be concentrated in Harford County. Long-term indirect beneficial impacts would be realized on a regional scale through an enhanced tax base and subsequent increased tax revenues for expansion of community infrastructure and public services. Associated supporting commercial facilities and additional employment opportunities, personal income, and tax revenues would be expected to accompany or follow the increased population and housing base. Other long-term indirect impacts would result from an increased demand on community and public services, such as fire protection, EMS, police protection, health and medical services, and recreational resources.

Direct long-term impacts would occur to both on-post and off-post population in the secondary ROI. Day-time population on APG would increase by an estimated 4,700 positions, or an almost 40 percent increase from the current population level. Population losses would result from the departure of personnel associated with the USAOC&S; AEC; military band; and military family members. The major increase in population would result from relocation of the C4ISR activities.

There could be an increase in off-post population as a result of the Preferred Alternative. Assuming the “maximum scenario,” off-post population could increase by about 20,000 people in the secondary ROI.

This projection is based on the assumption that 70 percent of the relocating civilian and contractor personnel are married with 1.5 children per family. The EIFS model estimates an increase of about 19,000 people. An increase of 20,000 people represents less than 1 percent of the current estimated population of the secondary ROI. However, this absolute increase is almost equivalent to the annual average population increase (24,000) in the secondary ROI during the last 5 years. It is anticipated that this potential increase in population would occur over a 2-3 year period, thus somewhat softening the annual impact.

The relocation of military personnel associated with the Preferred Alternative would result in the vacancy of some on-post family housing and barracks spaces. The family housing units are currently programmed for the Residential Community Initiative program in FY2009. Excess units would be demolished, renovated, and/or replaced with new construction. Some of the excess barracks spaces resulting from the departure of unaccompanied students/trainees would be renovated and converted into office and administrative space.

Assuming the “maximum scenario,” there could be an additional demand for 7,500 housing units if all incoming personnel relocate to the secondary ROI. Depending upon choice of location by the incoming personnel, some communities could be more substantially affected than others. The majority of the incoming personnel would be potential home buyers, and would choose or prefer higher cost/quality housing (MDP 2006b). New housing development would require corresponding investments in supporting infrastructure (*e.g.*, water, sewer) and public services.

There could be impacts on some public school systems within the secondary ROI under the “maximum scenario.” There is a potential for almost 8,000 additional students assuming that 70 percent of the incoming personnel are married with an average of 1.5 children per family. Under the assumption that only 50 percent are married with 1.5 children per family, there would be an additional 5,600 potential students if all relocated to the secondary ROI. This increase in student enrollment could result in a lack of adequate facilities and personnel in some public school districts, or individual schools. Additional investment could be required for capital facilities, teaching staff, and support personnel, transportation, and other costs associated with expanded enrollments.

With potential population increases in the secondary ROI, there would be a commensurate increase in demand for medical and health related facilities and personnel.

An increased demand in law enforcement facilities, services, and personnel would be expected commensurate with the increase in population. The existing fire service personnel and apparatus on APG appear to be adequate to provide service to the additional facilities considering that there may be less demand for service calls resulting from the departure of some on-post units (APG 2006k).

The potential influx of relocated personnel would result in additional demands on the provision of off-post fire services and EMS in the secondary ROI. New fully equipped stations and additional personnel could be required to meet these additional demands.

The secondary ROI is well served by park and recreational facilities. There are a diverse array of recreational pursuits and activities within the ROI. Water-related recreational activities associated with the Chesapeake Bay and Susquehanna River add an extra dimension to recreational enjoyment within the region. On-post recreational facilities would experience a moderate increase in use as the result of the gain of military personnel under the Preferred Alternative.

There could be short-term impacts on off-post housing depending upon the length of the time period over which the relocations occur and the actual magnitude of personnel movement. These potential impacts could result in some localized escalation of housing prices resulting from increased demand and housing shortages. Infrastructure and resources in some local areas or communities could be temporarily over-taxed. Increased enrollments could result in short-term indirect impacts on the local school districts in respect to inadequate facilities and personnel resources. The magnitude of impact would be dependent

partially upon the length of time the anticipated enrollment increase from the relocating personnel occurs. Long-term indirect beneficial impacts would occur as a result of expansion and modernization of existing facilities and construction of new facilities.

There are no anticipated socioeconomic impacts related to environmental justice or Indian tribal government issues. There could be a beneficial impact on minority groups with potential employment associated with construction activity. Some potential short-term effects on the protection of children could be expected. Because construction sites can be enticing to children, construction activity could be an increased safety risk. Therefore, during construction, safety measures as stated in 29 CFR 13. 1926, *Safety and Health Regulations for Construction*, and AR 385-10, *Army Safety Program*, would be followed to protect the health and safety of all residents on APG as well as construction workers. As safety measures, barriers and “no trespassing” signs would be placed around the perimeter of construction sites to deter children from playing in these areas, and construction vehicles and equipment would be secured when not in use. These measures would reduce the potential for injuries to children.

There is a potential for indirect long-term impacts on minority and/or low-income populations resulting from the Preferred Alternative.

4.11 TRANSPORTATION

This section describes the current APG and regional transportation system, providing a baseline status of transportation conditions against which to measure the potential impact of current and future impacts on transportation systems as a result of the Preferred Alternative. Available information on transportation activities is utilized, most notably the traffic data found in the *Draft BRAC Facilities, Infrastructure, and Environmental / HTRW Planning Study* (USACE Baltimore 2006) (*Draft Planning Study*).

The Maryland Department of Planning produced the *Maryland BRAC Report* (MDP, 2006b) which analyzed the possible regional transportation impacts likely to occur from the BRAC realignments at the four military installations in Maryland. In this study, the primary performance measure for intersections was the Level of Service (LOS) value. LOS values of E and F are considered as “unacceptable.” For this EIS, significant impacts arise at an intersection that is evaluated at LOS E or F because of the Preferred Alternative.

This section identifies the potential influence of the Preferred Alternative on the traffic and transportation system in and around APG and Harford County. Included is a description of access routes to and from the installation, internal road system, air transport services, railroads, and marine access. This network serves as the primary methods and routes used for the transport of APG employees and the receipt, shipment, and transfer of commercial materials, hazardous materials and waste, and ordnance.

4.11.1 Affected Environment

APG is located in the northeast section of the state and is geographically separated by the Bush River into APG’s Northern and Southern Peninsulas. A well-developed transportation network that includes a major interstate highway, state and federal highways, county roads, passenger and freight rail lines, international airports, and the navigable waters of the Chesapeake Bay serves APG. The majority of trips into and out of APG are carried out by personal automobiles, followed by small trucks or government owned vehicles. With the increase in the numbers of contractor and government civilian workers under the Preferred Alternative, automobile traffic volume will increase. This section focuses on the potential impacts on the APG regional roadway network from the increased automobile traffic. For the purposes of this analysis, the transportation ROI is defined as the “secondary ROI” discussed in Section 4.10.1. The ROI consists of the Baltimore-Towson, Maryland MSA. This MSA comprises the City of Baltimore and the following counties: Anne Arundel, Baltimore, Carroll, Harford, Howard, and Queen Anne’s. To better reflect the influence APG has in the region, the ROI has been expanded for this EIS to include Cecil County because it experiences considerable impact from operations at APG.

It is important to note that the *Draft Planning Study* included a related action in its assessment of traffic impacts: construction of the Maryland Boulevard Enhanced Use Lease. This EUL action is separate and distinct from the Preferred Alternative. The environmental impacts of the Maryland Boulevard EUL on resources other than traffic are evaluated under the Cumulative Impact Section of this EIS. The on-post and off-post evaluations in this section also include the Maryland Boulevard EUL in the predicted traffic volume as presented in Table 4.11.1.

Table 4.11.1 Maryland Boulevard Enhanced Use Lease Trip Generation Estimates

Parcel	Daily	AM Peak			PM Peak		
		Total	In	Out	Total	In	Out
Office	10,829	1,499	1,334	165	1,316	184	1,132
R&D	12,720	2,106	1,748	358	1,716	257	1,459
TOTAL	41,153	6,008	5,170	838	5,532	716	4,816

Source: USACE Baltimore 2006

4.11.1.1 Off-Post Roadways and Existing Traffic Conditions

Interstate 95 (I-95), located about 3 miles from APG and extending southwest-northeast, is a major regional freeway that links APG to Baltimore and Washington, D.C. to the west, and Philadelphia to the east (Figure 1.1-1). U.S. Route 40 (Pulaski Highway) generally parallels I-95 and is situated closer to APG than the interstate (Figures 4.11-1 and 4.11-2). Both of these major arteries pass through portions of Baltimore, Harford, and Cecil Counties. Major state highways serving the installation area include MD 24 (Emmorton Road), MD 755 (Edgewood Road), Hanson Road, Trimble Road, and MD 152 (Magnolia Road), which serve the western part of Harford County and APG's Southern Peninsula (Figure 4.11-1).

The roadways supporting access to APG's Northern Peninsula (Figure 4.11-2) include MD 22 (Aberdeen Thruway), which link the towns of Aberdeen, Churchville, and Bel Air, MD 132A (Beards Hill Road), MD 132 (Bel Air Avenue), MD 462 (Paradise Road), US 40, and MD 715 (Short Lane – inside the APG perimeter, it is also known as Maryland Boulevard). Virtually all commuters traveling to and from work at APG use these roadways that directly or indirectly connect to major roads such as I-95, Pulaski Highway, and MD 7 (Philadelphia Road). At present there are no bike or pedestrian facilities leading to and from APG.

Several off-post intersections near APG were evaluated to capture traffic patterns, particularly on routes that provide direct access to one or more security gate. The off-post intersections are along Maryland 24 and Maryland 755 (Edgewood Road) on the Southern Peninsula, and Maryland 715 (Maryland Boulevard), W. Bel Air Avenue, and Maryland 22 (Aberdeen Thruway) on the Northern Peninsula (Figures 4.11-1 and 4.11-2).

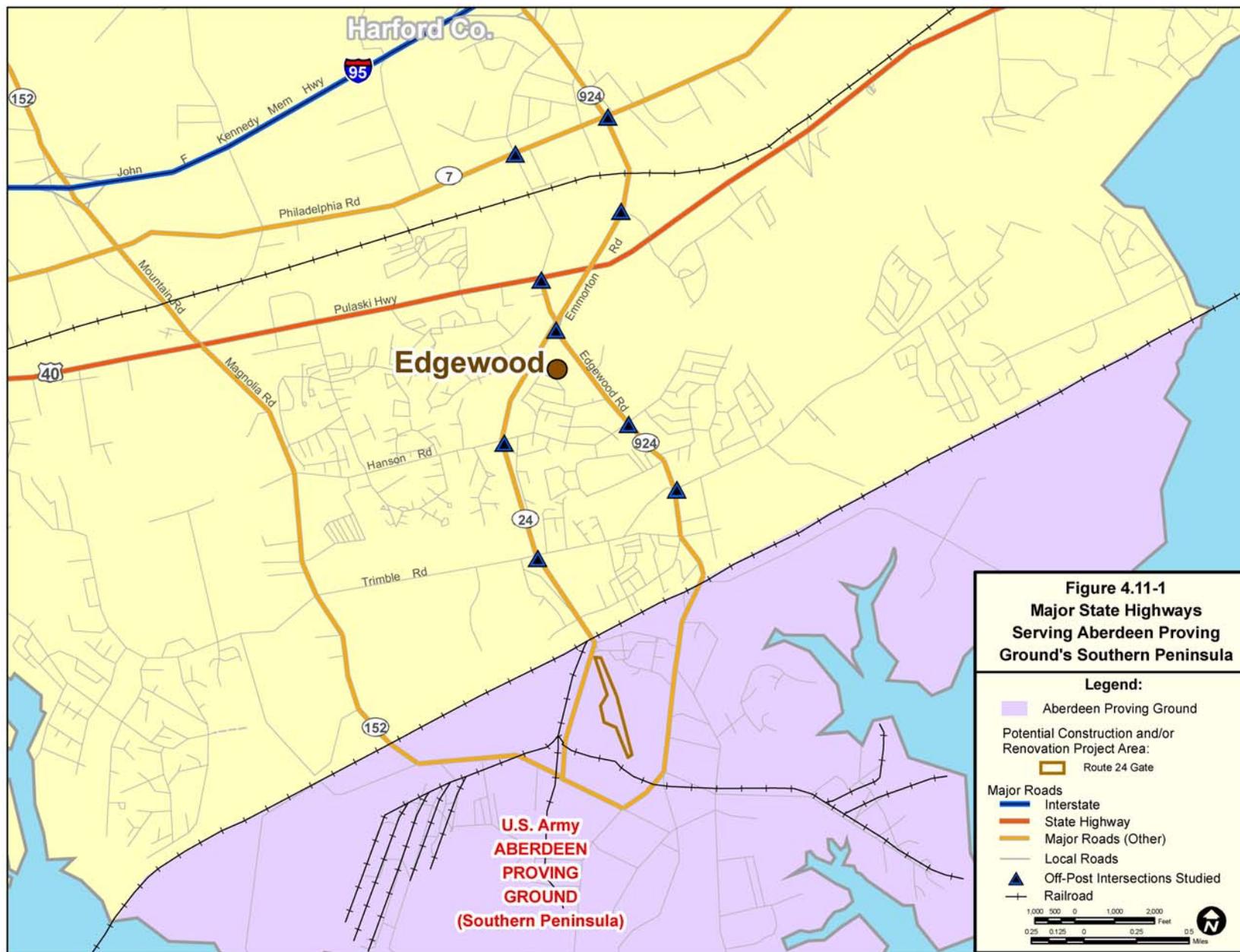
Data to survey off-post traffic patterns for Harford County's network of highways and roads was downloaded in July 2006 from the Maryland State Highway Administration website at <http://www.sha.state.md.us/tmsreports>. For the purposes of this EIS only morning and afternoon (AM and PM) peak data were compiled. Finally, field visits collected lane configuration data for all related intersections. On-post traffic volume and LOS values are taken from the *Draft Planning Study*.

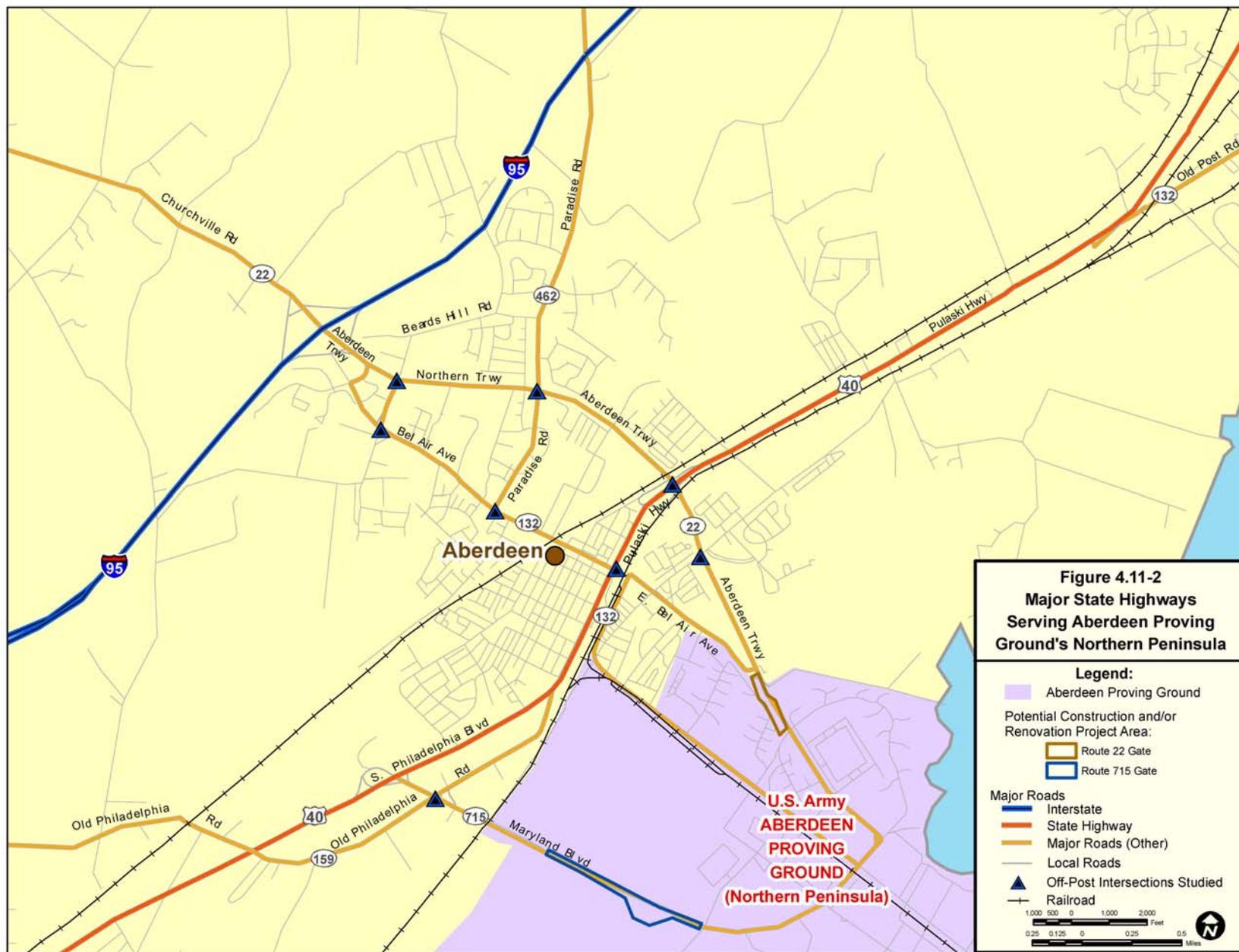
Level of service analysis is a procedure used to estimate the traffic-carrying ability of roadway facilities over a range of defined operating conditions. It provides the public with an easy evaluation of traffic operations along roads and at intersections. Traffic operations are expressed as a level of service from LOS A to LOS F, with LOS A representing very good operations and LOS F representing intersection failure. Different methods are used to derive LOS for signalized and unsignalized intersections, and there

is no direct correlation between signalized and unsignalized LOS values. The methods used to determine LOS are described by the Department of Transportation Research Board's Highway Capacity Manual (TRB 2000). Evaluations of off-post intersections LOS were conducted using the Critical Lane Volume (CLV) method, a mathematical evaluation of the number of vehicle movements through a signalized intersection. The method applies a lane use factor to all through volumes on each intersection approach and then sums the opposing lefts to each approach to calculate a numerical value for the CLV. The LOS rating that corresponds to a CLV numerical range and a description of traffic conditions within each LOS category is shown in Table 4.11.2.

Table 4.11.2 Levels of Service and Critical Lane Volume Definitions

Level of Service	CLV Summation	Description of Traffic
A	1,000 or less	Represents free flow. Individual users are virtually unaffected by the presence of others in the traffic stream. Freedom to select desired speeds and maneuver within the traffic stream is extremely high. Average signal delay at intersections is less than 5 seconds.
B	1,001 to 1,150	Is in the range of stable flow, but the presence of other users in the traffic stream begins to be noticeable. Freedom to select desired speeds is relatively unaffected, but there is a slight decline in the freedom to maneuver from LOS A. Average signal delay at intersections is less than 15 seconds.
C	1,151 to 1,300	Is in the range of stable flow, but marks the beginning of the range of flow in which the operation of individual users becomes affected by interactions with others in the traffic stream. The selection of speed is now affected by the presence of others, and maneuvering within the traffic stream requires substantial vigilance on the part of the user. Average signal delay at intersections is less than 25 seconds.
D	1,301 to 1,450	Represents high density, but stable flow. Speed and freedom to maneuver are severely restricted. Small increases in traffic volume will generally cause operational problems at this level. Average signal delay at intersections is less than 40 seconds.
E	1,451 to 1,600	Represents operating conditions at or near capacity level. All speeds are reduced to a low, but relatively uniform value. Freedom to maneuver within the traffic stream is extremely difficult, and it is accomplished by forcing a vehicle or pedestrian to "give way" to accommodate such maneuvers. Operations at this level are usually unstable, because small increases in flow or minor perturbations within the traffic stream will cause breakdowns. Average signal delay at intersections is less than 60 seconds. The Maryland Department of Planning considers LOS E unacceptable.
F	1,601 or more	Is used to define forced or breakdown flow. Queues form; operations within the queue are characterized by stop-and-go waves, and they are extremely unstable. Average signal delay at intersections exceeds 60 seconds. The Maryland Department of Planning considers LOS F unacceptable.





The direct impacts from a decrease in LOS (*i.e.*, increase in traffic at an intersection) are quantified in the calculations. The indirect effects from an increase in traffic are more subjective and are further affected by the driver's perception of change, the amount of change over time, and other quality of life intangibles (commute time, delays at lights, interference with short-trip logistics).

For signalized intersections, LOS is computed for the overall intersection, each approach, and each lane group in the approach. An overall intersection LOS D or better is generally considered an acceptable condition in urban areas. In some situations, short periods of LOS E for the overall intersection and a few traffic movements at LOS F can also be considered reasonable. Some Maryland local governments consider higher CLVs to result in an acceptable "level of service." In the city of Frederick, acceptable CLVs may be as high as 1,472, and in some areas of Montgomery County as high as 1,800.

(<http://www.cityoffrederick.com/departments/Planning/traffic%20impact%20study%20guidelines.htm> and http://www.mc-mncppc.org/transportation/latr_guidelines/LATR_guidelines.pdf). No LOS is provided for main street through-traffic or right turning traffic at unsignalized intersections, as there are no traffic-impeding structural conflicts, and the method used to measure traffic flow assumes unimpeded movement.

For unsignalized intersections, each stop- or yield-controlled approach is assigned its own LOS rating, according to the average delay experienced by vehicles on that approach. However, an LOS rating is not assigned to the intersection as a whole. Unsignalized intersection LOS is associated with different numerical average delays than signalized intersections.

The CLV utilizes peak hour turning movement counts, intersection geometry, lane assignments, and special operating characteristics. The CLV method is a useful transportation planning tool for quickly evaluating the feasibility of an intersection or capacity improvement, and evaluating those that are clearly not achievable. For this reason, the LOS values assigned by this method are used to determining impacts resulting from changes from the proposed APG activities.

A third evaluative tool is the Volume to Capacity ratio (V/C). A calculated ratio of less than 1.0 indicates that the intersection is performing according to its geometric design. A ratio greater than 1.0 indicates that the intersection is operating over capacity and may experience substantial delays with some queuing.

The following sections define the intersections and present the existing conditions included in this EIS. Detailed figures showing traffic counts, turning movements and LOS assignments are provided in Appendix G. The appendix figures show AM and PM peak traffic volumes for each through and turning lane with the PM volume enclosed in parentheses. Other figures, using the same mapping, show the corresponding resultant AM and PM LOS values based on these volumes.

- The following off-post intersections on the Northern Peninsula were evaluated for this EIS.
- Aberdeen Thruway (MD 22) at Beards Hill Road (MD 132A)
- Aberdeen Thruway (MD 22) at Paradise Road (MD 462)
- Aberdeen Thruway (MD 22) at US 40
- Aberdeen Thruway (MD 22) at Post Road
- W. Bel Air Ave (MD 132) at Beards Hill Road (MD 132A)
- W. Bel Air Ave (MD 132) at Paradise Road (MD 462)
- W. Bel Air Ave (MD 132) at US 40
- Short Lane (Maryland Boulevard) (MD 715) at Old Philadelphia Road

The results in Table 4.11.3 show that under existing conditions, all intersections on routes with direct connections to APG's Northern Peninsula operate with AM Peak LOS A and PM Peak LOS C or better.

For all intersections the V/C ratios are well below 0.85, which indicates the intersections are operating under capacity and delays are negligible.

The following off-post intersections on the Southern Peninsula were evaluated for this EIS.

- Edgewood Road (MD 755) at Philadelphia Road (MD 7)
- Edgewood Road (MD 755) at US 40
- Edgewood Road (MD 755) at Emmorton Road (MD 24)
- Edgewood Road (MD 755) at Hanson Road
- Edgewood Road (MD 755) at Willoughby Beach Road
- Emmorton Road (MD 24) at Philadelphia Road (MD 7)
- Emmorton Road (MD 24) at Ramp to US 40
- Emmorton Road (MD 24) at Hanson Road
- Emmorton Road (MD 24) at Trimble Road

Table 4.11.3
Level of Service Values at Selected Off Post Intersections
Existing Traffic Conditions

Level of Service - Off Post Intersections	Existing Conditions	
	AM Peak	PM Peak
Northern Peninsula		
Aberdeen Thruway (MD 22) at Beards Hill Road (MD 132A)	A	C
Aberdeen Thruway (MD 22) at Paradise Road (MD 462)	A	B
Aberdeen Thruway (MD 22) at US 40	A	C
Aberdeen Thruway (MD 22) at Post Road	A	C
W. Bel Air Ave (MD 132) at Beards Hill Road (MD 132A)	A	A
W. Bel Air Ave (MD 132) at Paradise Road (MD 462)	A	A
W. Bel Air Ave (MD 132) at US 40	A	A
Short Lane (Maryland Boulevard) (MD 715) at Old Philadelphia Road	A	A
Southern Peninsula		
Edgewood Road (MD 755) at Philadelphia Road (MD 7)	A	A
Edgewood Road (MD 755) at US 40	A	C
Edgewood Road (MD 755) at Emmorton Road (MD 24)	C	E
Edgewood Road (MD 755) at Hanson Road	B	A
Edgewood Road (MD 755) at Willoughby Beach Road	A	D
Emmorton Road (MD 24) at Philadelphia Road (MD 7)	B	D
Emmorton Road (MD 24) at Ramp to US 40	A	A
Emmorton Road (MD 24) at Hanson Road	D	C
Emmorton Road (MD 24) at Trimble Road	B	B

Table 4.11.3 shows AM and PM peak existing LOS calculations for the off-post intersections providing access to APG's Southern Peninsula. The results show the intersections performed slightly better during

the AM peak hours compared to the PM peak hours. During the AM peak all intersections operate at LOS D (Hanson Road) or better and V/C ratios are below 0.85, which indicate that the intersections are operating under capacity and delays are negligible. The intersection of Edgewood Road and Willoughby Beach Road showed a PM Peak LOS E, indicating it is operating at or near capacity.

During the PM peak, the intersection of Edgewood Road and Emmorton Road operates at LOS E and V/C ratio greater than 1.0, which indicates that the intersection is operating over capacity and experiencing substantial delays from queuing. Conditions at Philadelphia Road (MD 7) and Emmorton Road show that the intersection is operating at LOS D. This intersection is operating near its capacity with relatively minor delays. All other intersections on APG's Southern Peninsula operate at LOS C or better. Queues at either gate on APG's Southern Peninsula are considered negligible (less than 400 feet).

4.11.1.2 Installation Transportation Existing Conditions

The on-post road system consists of over 300 miles of paved roads. APG's Northern Peninsula, accessed by three gates, experiences a larger share of on-post daily traffic than APG's Southern Peninsula. The Harford Gate (located on post on the Aberdeen Thruway – MD 22) provides direct access to the post via MD 22 (Aberdeen Thruway/Harford Boulevard). The Maryland Gate can be directly accessed from MD 715 (Short Lane also known as Maryland Boulevard). The Aberdeen Gate provides only limited access from Bel Air Boulevard (MD 132) in the town of Aberdeen and from U.S. 40. Harford, Maryland, and Aberdeen Boulevards are the major arteries serving the Aberdeen area. Harford Boulevard and Plumb Point Loop access the on-post family housing areas.

APG's Southern Peninsula can also be accessed through three gates. Access to the Edgewood Gate (also known as the Wise Road Gate) is via Edgewood Road (MD 755). The Main Gate (also known as the Hoadley Road Gate) is directly accessed via Emmorton Road (MD 24). Magnolia Road (MD 152) provides only limited access to the post.

On-post traffic data were provided by the *Draft Planning Study*, using Synchro, a software package designed to analyze the capacity and operations of intersections. It calculated existing LOS for the current conditions, including the flashing operation of the intersections of Maryland Boulevard with Bush River Road and Boothby Hill Avenue.

On-Post Northern Peninsula Intersections Evaluated:

The existing turning movement volumes at seven key intersections are provided in Appendix G. Data show hourly variations in the traffic entering the Maryland Boulevard Gate and Harford Boulevard Gate with the highest volume being between 6AM and 8AM. Afternoon volumes were highest between 4PM and 5PM.

Traffic volumes were evaluated using an automated traffic recorder (ATR) counts that indicate a low volume (0.6%) of trucks passing through the gates. Trucks are supposed to use the Maryland Boulevard Gate; however, some trucks were counted at the Harford Boulevard Gate as well. At the Maryland Boulevard Gate, about 98 percent of the entering vehicles were passenger cars, with most of the non-passenger vehicles being small trucks. At the Harford Boulevard Gate, over 99 percent of the vehicles were passenger cars and all but a few of the remaining vehicles were small trucks.

The results of this LOS analysis are shown in Table 4.11.4. The AM LOS at currently signaled intersections range from B (Maryland Boulevard at Susquehanna Avenue and at Harford Boulevard) to LOS D at Maryland Boulevard at Aberdeen Boulevard. The PM LOS at currently signaled intersections range from B (Maryland Boulevard at Susquehanna Avenue), LOS C at Maryland Boulevard and Harford Boulevard, to LOS D at Maryland Boulevard at Aberdeen Boulevard. Appendix G provides more detailed LOS values for AM and PM for all lanes at signaled intersections.

On-Post Southern Peninsula Intersections Evaluated

On-post existing traffic volumes for APG's Southern Peninsula are provided in Appendix G, including turning movement counts at four intersections on APG's Southern Peninsula. The total entering volumes at the gates were 5,160 vehicles at the Hoadley Road Gate and 1,900 vehicles at the Wise Road Gate. The peak hour volume occurred between 7AM and 8AM at both gates, with a volume of 1,060 and 410, respectively. Truck volumes were included in the ATR counts and indicate a low volume of trucks. At both the Hoadley Road and Wise Road Gates, over 99 percent of the entering vehicles were passenger cars, with most of the non-passenger vehicles being small trucks.

The LOS evaluated for the current conditions are shown in Table 4.11.4. Based on this analysis, all intersections are operating at LOS A.

Table 4.11.4
Level of Service Values at Selected On-Post Intersections
Existing Traffic Conditions

	Existing Conditions	
	AM Peak	PM Peak
Northern Peninsula		
Maryland Boulevard at Deer Creek Loop (flashing signal)	N/A	N/A
Maryland Boulevard at Boothby Hill Avenue (flashing signal)	N/A	N/A
Maryland Boulevard at Susquehanna Avenue (signaled)	B	B
Maryland Boulevard at Aberdeen Boulevard (signaled)	D	D
Maryland Boulevard at Harford Boulevard (signaled)	B	C
Southern Peninsula		
Magnolia Road at Hoadley Road (signaled)	A	A
Magnolia Road at Wise Road (signaled)	A	A
Hoadley Road at Austin Road (signaled)	A	A

4.11.1.3 Public Transportation

4.11.1.3.1 Railroads

4.11.1.3.1.1 Off-Post

Amtrak and MARC lines provide passenger rail service to APG and its environs. The Amtrak line parallels the post boundary in Harford County and has a terminal in the town of Aberdeen. Amtrak operates daily service to Washington, D.C. and New York City, while MARC provides daily commuter service to Baltimore and Washington, D.C.

Amtrak offers high-speed rail service called the Acela Express, as well as regular passenger trains, along the Northeast Corridor from Washington, D.C. to Boston. In Harford County, Amtrak stops only at the railway station in Aberdeen. Norfolk Southern and CSX operate freight rail service along the Northeast Corridor. Amtrak also operates the MARC Penn Line, which provides rush hour service between Washington and Perryville, Maryland, during the week. A commuter rail station is located just off-post adjacent to the APG boundary, west of Edgewood Road. MARC uses this station to provide commuter service to Baltimore and Washington, D.C.

MARC rail provides regional rail service from the Aberdeen and Edgewood stations. The Average Daily Boarding for the year ending June 30, 2006 shows that the majority of passengers are southbound passengers, *i.e.*, those boarding in Aberdeen/Edgewood and riding toward Baltimore, BWI Airport, and Washington DC. From the Aberdeen Station, the average daily passengers boarding MARC trains is 123:

from the Edgewood Station, the average daily passenger boarding is 238. Northbound passengers exiting the MARC rail at either Aberdeen or Edgewood Stations average two or three passengers daily.

4.11.1.3.1.2 On-Post

Norfolk Southern provides freight rail service in the APG area. The Norfolk Southern lines share a corridor with Amtrak and have interchange access to both APG's Northern and Southern Peninsulas.

4.11.1.3.2 Transit Access

Transit access near APG is provided primarily by the commuter rail stations described above; however there is no transit access from the MARC stations into APG work areas. In addition, Harford County Transit operates four bus routes around APG's Southern Peninsula. Three of the buses (Route 2, 2a, and 5) stop at a Park and Ride lot located along MD 24, just south of the intersection with Edgewood Road near I-95. Only Route 2 connects to APG's Southern Peninsula and does not have a direct connection to the Edgewood MARC Station or into APG. It does, however serve the housing area along McCann Street at a rate of once an hour. In addition, the Maryland Transit Administration operates two commuter buses to and from Baltimore via U.S. Route 40. Harford County Transit offers no bus routes that transport employees into APG's Southern Peninsula.

Harford County provides fixed-route and demand-response transportation services to the general public, senior citizens, and individuals with disabilities. The service, Harford Transit, operates three fixed routes that link Havre de Grace, Aberdeen, Joppatowne, Edgewood, Fallston, and Bel Air. Services also connect with MARC Aberdeen Station and the MTA 410/411/412 Commuter buses. Harford Transit also provides reverse commute services through JARC, connecting Baltimore City and County residents with employment centers along the Route 40 corridor.

There are no existing scheduled transit alternatives available to transport employees from the MARC stations or bus stations into APG's Northern Peninsula or Southern Peninsula work areas.

4.11.1.4 Air Transportation

Commercial and passenger air service is available through airports in the Baltimore (Baltimore-Washington International), Washington, D.C. (Reagan National and Dulles), and Philadelphia (Philadelphia International) metropolitan areas.

APG has an airfield located on APG's Northern Peninsula and a heliport located on APG's Southern Peninsula; neither are available for commercial or civilian access. Both helicopter and fixed-wing aircraft utilize PAAF. Located in the secured area south of Ruggles Golf Course, the PAAF has one 8,300-foot and two 5,000-foot hard surfaced runways, one 35-foot by 35-foot helipad, three ramps totaling 43,750 SF, and three bomb ramps totaling 518,000 SF. Weide Army Heliport, formerly Weide Army Airfield, is used exclusively for helicopters. Weide Army Heliport is operated by the Maryland Army National Guard.

4.11.1.5 Marine Access

Restricted water access to APG's Northern Peninsula is provided at two docking facilities along the shoreline in Spesutie Narrows. One is located southeast of PAAF near Building 429, and the other is located at the mouth of Spesutie Narrows at the end of Mulberry Road. Access to the Chesapeake Bay from Spesutie Narrows is via a 12-foot deep shipping channel marked with lights and maintained by the U.S. Coast Guard. Access to APG's Southern Peninsula from the Bay is via piers on Lauderick Creek and the Bush River northwest of Tapler Point.

4.11.2 Consequences

Determination of Impacts

The transportation impact analysis considered existing conditions at off-post and on-post locations for APG's Northern and Southern Peninsulas. The existing traffic and transportation performance conditions data along with those resulting from the Preferred Alternative were used as the basis for analyzing the alternatives.

Much of the on-post and gate traffic impact information is drawn directly from the *Draft Planning Study*. The study analyzed potential impacts resulting from the Preferred Alternative, and included predicted traffic volumes for the Maryland Boulevard EUL project, an APG project unrelated to this BRAC EIS. Data was collected on-post in November 2005 and in January 2006 for traffic volumes, the number of lanes, lane assignments, free flow movements, and traffic control information for key intersections and the APG gates. The report also used land use information on the Preferred Alternative to develop trip generations for future alternative comparisons. Data from the report were used to analyze potential off-post impacts on roadways leading to APG, since this was a specific concern identified during the scoping process.

The land use assumptions included in the *Draft Planning Study* were used to develop the projections for new trips generated by the Preferred Alternative. The number of trips generated by the Preferred Alternative was calculated according to *Trip Generation*, 7th Edition (Institute of Transportation Engineers 2000). Trip generation rates were assigned to APG based on site population, travel characteristics, and existing land use.

These projected new trips were then distributed throughout the defined road network on-post, off-post, and at the gates for both AM and PM peaks to determine any impacts to the performance of the transportation system. Trip distribution from the *Draft Planning Study* was then evaluated to assess impacts resulting from the Preferred Alternative.

APG will experience a net increase in personnel, construction of new buildings, and renovation of existing infrastructure because of the Preferred Alternative. Accordingly, this analysis highlights the traffic conditions at intersections on-post. Off-post intersections were chosen based upon their proximity to APG, the history of existing traffic volume, and the availability of recent traffic data from the SHA. The projected AM and PM peak trips were added to the existing traffic volumes either provided by the *Draft Planning Study* or from recent counts provided by the SHA. An analysis using the CLV method for off-post conditions assessed traffic increases due to the increase in employment at APG and the resultant LOS changes.

Absent any structural (additional lanes, new signals, intersection enhancements) or non-structural (signalization changes) improvements, even without the Preferred Alternative, the APG ROI will experience traffic changes as the population increases. The Preferred Alternative (and the Maryland Boulevard EUL) would greatly increase AM and PM peak traffic at localized on-post and off-post intersections. The increased traffic volumes entering the installation, being processed by security, and proceeding to their work location, can be expected to result in degraded LOS at many intersections currently experiencing AM or PM conflicts. The LOS analysis is an objective method to measure the impact, and the qualitative changes experienced by drivers under these LOS conditions are described in Table 4.11.2.

A change from LOS B under current conditions to a predicted LOS C would be noticed by most drivers; however, the increased queuing times may not present a major change in commuting time. By contrast, a LOS change from C to D is likely to be noticed. At LOS D, small changes in volume on any given day may result in longer queues and signal timing delays. These types of impacts may result in longer commute times, or the occasional major delay created by accidents due to volume. These "quality of life" impacts, though real, are subjective, vary from person to person, are localized within small sections of the

transportation ROI, and are more difficult to characterize in an EIS. Nonetheless, they are real and acknowledged in this EIS.

4.11.2.1 *Alternative 1 - No Action Alternative*

Under the No Action Alternative, APG would not implement the Preferred Alternative. Under the No Action Alternative there would be no change in traffic volumes or impacts to the transportation system. There is adequate capacity provided at APG. Roads operate at acceptable levels of service and are projected to continue at acceptable levels in the No Action Alternative. The Preferred Alternative is congressionally mandated; therefore the No Action Alternative is not feasible.

4.11.2.2 *Alternative 2 - Preferred Alternative*

Traffic impacts associated with the Preferred Alternative have been assessed by evaluating traffic operations for on-post and gate operations and off-post roads that provide access to APG.

The *Draft Planning Study* (USACE Baltimore 2006) identifies the on-post and gate impacts projected to occur as a result of the Preferred Alternative on APG's Northern Peninsula.

Being a planning document, the *Draft Planning Study* also evaluated three different operational planning scenarios and assumptions that would optimize intersection and signal improvements to reduce the overall impact of the anticipated changes to on-post traffic from the Maryland Boulevard EUL as well as the Preferred Alternative. This EIS evaluates the potential impacts from the on-post scenario that includes engineering, signalization improvements, and geometric changes to affected on-post intersections. Details of all scenarios are provided in the *Draft Planning Study*; however, the potential impacts from the three scenarios are not sufficiently different to warrant separate analyses in this EIS.

This EIS evaluated off-post predicted impacts at the selected intersections with no changes to the existing configurations. No additional structural or non-structural changes were considered in determining the off-post LOS changes. Suggested intersection improvements are discussed in Section 4.11.3.

Direct Impacts

Northern Peninsula – On Post

The first step in the analysis process identified additional trips generated on-post and at the gates due to the Preferred Alternative (USACE Baltimore 2006). The Preferred Alternative would result in an increase of employees on APG's Northern Peninsula at the new research and development facilities and office areas. This increase in employment is projected to increase the number of vehicle trips. The increased numbers are shown in Table 4.11.5.

Table 4.11.5 Preferred Alternative – Northern Peninsula Trip Generation Estimates

Parcel	Daily	AM Peak			PM Peak		
		Total	In	Out	Total	In	Out
C4ISR Facilities	2,634	390	335	55	382	38	344
Renovated Admin	2,079	307	264	43	301	30	271
New Campus	9,149	1,352	1,163	189	1,327	133	1,194
East of Building 2207	3,250	277	255	22	393	59	334
Bldg 4600	200	33	30	3	41	6	35
Bldgs 4401 and 4402	292	44	41	4	55	8	47
TOTAL	17,604	2,404	2,088	316	2,499	274	2,225

Source: USACE Baltimore 2006

The trips generated by the development were distributed throughout the roadway network. According to the ATR counts at the gates, existing patterns show an approximate 50 percent split between the use of the two gates on Harford Boulevard and Maryland Boulevard, and this split between the gates is assumed to continue. It is assumed that the main entrance for the New Campus was on Boothby Hill Avenue opposite Darlington Street, and that a new signal would be installed at this location.

Appendix G provides details on the predicted off-post trips generated by the Preferred Alternative, the corresponding new traffic volume (existing plus Preferred Alternative traffic), and the resulting LOS for off-post intersections (including turning movements) in APG's Northern Peninsula.

Table 4.11.6 compares the existing and predicted LOS values for on-post intersections. All on-post intersections on Maryland Boulevard leading to/from the Harford Gate would experience the greatest impact. Both Deer Creek Loop and Boothby Hill Avenue would exhibit LOS C during AM peak. For the PM peak, these intersections will experience LOS F, deemed to be a significant impact. Since these intersections are currently unsignaled, there is no corresponding existing LOS for comparison. The PM peak LOS at Maryland Boulevard and Harford Boulevard would change from LOS C to LOS D. V/C ratios are well above 1.0, which represent excessive demand and insufficient capacity. In turn, all intersections are expected to experience substantial delays and queues. This worsening of nearby intersections would be a direct result of the Preferred Alternative.

Current plans call for roadway and intersection improvements on-post to reduce traffic impacts (USACE Baltimore 2006). Roadway improvements include:

- Two additional lanes on Boothby Hill Avenue with a utility corridor on the northern edge of the roadway.
- Two additional lanes on Darlington Avenue between Maryland Boulevard and Boothby Hill Avenue to provide additional egress access for PM peak flow.
- A new four lane segment of Combat Drive between the Maryland Boulevard and Boothby Hill Avenue intersection to carry traffic to the new C4ISR campus. Potential impacts to wetlands are described in Section 4.8.

Intersection improvements including new or revised signalization, increased/enhanced turning lanes, and structural changes to the intersection geometry are proposed for six intersections including (USACE Baltimore 2006):

- Harford Boulevard at Maryland Boulevard
- Aberdeen Boulevard at Maryland Boulevard
- Susquehanna Avenue at Maryland Boulevard
- Boothby Hill Avenue at Maryland Boulevard
- Deer Creek Loop at Maryland Boulevard
- Boothby Hill Avenue at Darlington Avenue

**Table 4.11.6
Level of Service Values at Selected On-Post Intersections
Existing Traffic Conditions and Predicted Conditions**

	Existing Conditions		Preferred Alternative	
	AM Peak	PM Peak	AM Peak	PM Peak
Northern Peninsula				
Maryland Boulevard at Deer Creek Loop (flashing signal)	N/A	N/A	C	F
Maryland Boulevard at Boothby Hill Avenue (flashing signal)	N/A	N/A	C	F
Maryland Boulevard at Susquehanna Avenue (signaled)	B	B	B	C
Maryland Boulevard at Aberdeen Boulevard (signaled)	D	D	C	C
Maryland Boulevard at Harford Boulevard (signaled)	B	C	C	D
Southern Peninsula				
Magnolia Road at Hoadley Road (signaled)	A	A	B	A
Magnolia Road at Wise Road (signaled)	A	A	B	A
Hoadley Road at Austin Road (signaled)	A	A	A	A

Northern Peninsula – Off Post

With the Preferred Alternative, the off-post traffic network adjacent to APG's Northern Peninsula would experience increases in traffic volume at certain intersections. Table 4.11.7 provides a comparison of existing LOS with predicted LOS at selected intersections. All the intersections along the Aberdeen Thruway (MD 22) would experience a decline in LOS at both AM and PM peak times. The MD 22 intersections with Post Road and US 40 would experience the greatest increase in volume. The AM peak at MD 22 and Paradise Road falls from LOS A to LOS E with the Preferred Alternative, a significant impact. The PM peak LOS at these intersections would fall from LOS C under existing conditions to a predicted LOS F with the Preferred Alternative deemed to be a significant impact.

Implementing the Proposed Alternative would result in significant adverse impacts to the transportation system with respect to congestion and increased travel time to both APG's Northern and Southern Peninsulas. These effects would lead to reduced employee productivity, higher commuting costs, and degradation of quality of life. These effects would not be limited to personnel at APG. Through commuters and the local community would also be affected.

These conditions are likely to result in increased queuing time at all these intersections leading to the Harford Gate. Increased queuing would result in impacts to localized air quality from queued vehicles. Noise from the queued vehicles, although minor, would persist for longer periods in the AM and PM peak hours. Impacts to quality of life issues (time spent commuting) and safety are coincident with longer commute times.

The intersection of Short Lane (MD 715) and Old Philadelphia road would experience a decline in LOS from the existing LOS A to LOS C. This is likely due to the increased traffic from the Maryland Boulevard EUL complex in addition to the increased staff from the Preferred Alternative.

Absent any structural and/or non-structural improvements to the off-post roadway and intersection network, the direct impacts described above would be considered permanent.

**Table 4.11.7
Level of Service Values at Selected Off Post Intersections
Existing Traffic Conditions and Predicted Conditions**

	Existing Conditions		Preferred Alternative	
	AM Peak	PM Peak	AM Peak	PM Peak
Northern Peninsula				
Aberdeen Thruway (MD 22) at Beards Hill Road (MD 132A)	A	C	C	D
Aberdeen Thruway (MD 22) at Paradise Road (MD 462)	A	B	E	D
Aberdeen Thruway (MD 22) at US 40	A	C	D	F
Aberdeen Thruway (MD 22) at Post Road	A	C	D	F
W. Bel Air Ave (MD 132) at Beards Hill Road (MD 132A)	A	A	A	A
W. Bel Air Ave (MD 132) at Paradise Road (MD 462)	A	A	A	A
W. Bel Air Ave (MD 132) at US 40	A	A	B	A
Short Lane (Maryland Boulevard) (MD 715) at Old Philadelphia Road	A	A	C	C
Southern Peninsula				
Edgewood Road (MD 755) at Philadelphia Road (MD 7)	A	A	A	A
Edgewood Road (MD 755) at US 40	A	C	A	C
Edgewood Road (MD 755) at Emmorton Road (MD 24)	C	E	C	F
Edgewood Road (MD 755) at Hanson Road	B	A	B	A
Edgewood Road (MD 755) at Willoughby Beach Road	A	D	A	C
Emmorton Road (MD 24) at Philadelphia Road (MD 7)	B	D	B	D
Emmorton Road (MD 24) at Ramp to US 40	A	A	A	A
Emmorton Road (MD 24) at Hanson Road	D	C	C	C
Emmorton Road (MD 24) at Trimble Road	B	B	B	B

Southern Peninsula – On Post

Impacts to on-post traffic were analyzed for APG's Southern Peninsula. Table 4.11.8 shows the projected new vehicle trips generated by the Preferred Alternative.

The Preferred Alternative would result in the generation of 1,430 daily trips from the development of primarily office uses, and a projected employment increase of 419 employees (USACE Baltimore 2006). The on-post traffic analyses (USACE Baltimore 2006) indicated minimal effects on APG's Southern Peninsula resulting from the Preferred Alternative. Traffic was distributed 75 percent to the Main Gate on Hoadley Road, and 25 percent to the Wise Road gate. While some movements would change the LOS from existing conditions, most would continue to operate at LOS A or LOS B. Appendix G provides details on the predicted traffic volumes and the LOS determinations, including turning movements.

Table 4.11.8 Preferred Alternative – Southern Peninsula Trip Generation Estimates

Parcel	Daily	AM Peak			PM Peak		
		Total	In	Out	Total	In	Out
Magnolia & Wise Roads Area	2387	219	201	18	306	46	260
Kings Creek Area	160	28	28	2	34	5	29
Austin Road Area	-1117	-122	-113	-10	-165	-25	-140
TOTAL	1430	124	114	10	175	26	149

Source: USACE Baltimore District 2006

Table 4.11.6 provides a comparison of existing LOS with predicted LOS at selected intersections. The overall intersection operations at Magnolia Road and Hoadley Road (Edgewood Road MD 755) would change from LOS A to LOS B during the AM peak hours as would overall level of service at Magnolia Road and Wise Road.

On APG's Southern Peninsula, structural modifications to the Hoadley Gate (MD 24) are planned to reduce AM peak impacts.

Southern Peninsula – Off Post

The evaluation of off-post impacts to the roadway network proximal to APG's Southern Peninsula from trips associated with the Preferred Alternative included analysis of additional trips added to the roadway network, the resulting new traffic volume of baseline flow, plus the new volume. These results were calculated by using the trip generation rate and the existing gate access patterns (USACE Baltimore 2006). Appendix G provides details on the predicted traffic volumes and the LOS determinations.

Table 4.11.7 provides a comparison of existing LOS with predicted LOS at selected off-post intersections. Based on the AM Peak LOS results, all intersections would operate at LOS C or better, with virtually no noticeable change in LOS from existing to predicted conditions.

The greatest impact would be to the PM peak at the intersection of Emmorton Road (MD 24) and Edgewood Road (MD 755), which would decrease from an existing unacceptable LOS E to LOS F under the Preferred Alternative. This location would experience extremely high southbound left-turn volume leading to high V/C ratio values and high probability for conflicts. It also demonstrates that this intersection is capacity-constrained and changes may be necessary. All other intersections demonstrate no major changes in LOS from the existing conditions to the predicted conditions.

With the Preferred Alternative, the off-post traffic network adjacent to APG's Southern Peninsula would continue to experience increases in traffic volume at certain intersections. With the potential for increased queuing time at these intersections, other direct impacts would also likely. Increased queuing would result in impacts to localized air quality from queued vehicles. Noise from the queued vehicles, although minor, would persist for longer period in the AM and PM peak hours. Impacts to quality of life issues (time spent commuting) and safety are coincident with longer commute times.

Absent any structural and/or non-structural improvements to the off-post roadway and intersection network, the direct impacts described above are considered permanent.

Indirect Impacts

With the Preferred Alternative, the off-post traffic network would experience increased traffic volumes and queuing times at certain intersections. As traffic commuting time increases, there would be indirect impacts to quality of life issues and safety.

4.11.3 Transportation Network Mitigation

The Preferred Alternative will result in adverse significant impacts to the regional transportation network as the BRAC actions are implemented at APG. The timing of the impacts will depend upon the schedule for construction of new facilities and renovation of existing facilities that are needed to implement the mission.

The Army understands that planning and funding the upgrades to the evolving regional transportation and transit networks to meet future demands from all sources is critical to meet its future Mission. With this Preferred Alternative, the Army acknowledges that the BRAC actions will have significant impacts to the regional transportation network, and recognizes that participating in the planning process for regional transportation is a necessary business practice.

The Army is committed to participation with state and regional agencies to address long-term off-post impacts resulting from the Preferred Alternative and to evaluate alternatives that will facilitate increased use of mass transit by APG employees.

In this section, the Army discusses: (1) planned structural improvements being designed into the C4ISR complex on APG's Northern Peninsula to mitigate transportation impacts; (2) Army and Maryland recommendations to study, plan, evaluate, or redesign the roadway networks, and transit that may result in additional mitigations; (3) mitigation measures that the Army agrees to implement to address the impacts from this Preferred Alternative; and finally, (4) this section provides information on one federal funding source that may be available to implement transportation network improvements.

Planned Structural Improvements

The Army is in the early design phase of the C4ISR portion of the Preferred Alternative on APG's Northern Peninsula. Accompanying this design is a traffic analysis on the ability of the existing roadway network proximate to the proposed C4ISR complex to manage peak AM and PM traffic flow. Preliminary evaluations have identified on-post transportation system improvements, including:

- Convert on-post signal at Maryland Boulevard and Deer Creek Loop/Bush River Road and Maryland Boulevard and Boothby Hill Avenue (two intersections operated as one) from flashing to normal operation. These intersections will be reengineered and constructed to facilitate AM and PM peak flow.
- Install new signal at Darlington Street and Boothby Hill Avenue (meets the peak hour warrant). This intersection will be reengineered and constructed to facilitate AM and PM peak flow.
- Widen Boothby Hill Avenue from two to four travel lanes between Maryland Boulevard and Darlington Street to accommodate the increase in volumes and the turning lanes at the intersections. East of Darlington Street, Boothby Hill Avenue could remain as a two-lane section. However, a three-lane section with a center left turn lane (with short left-turn lanes at intersections) would allow left turning vehicles to get out of the way of through traffic. This would reduce the delay for through vehicles and reduce the potential for rear-end accidents. This roadway segment will be reengineered and constructed to facilitate AM and PM peak flow.

Recommendations to Study, Plan, Evaluate, or Redesign the Roadway Networks

The regional transportation network is subject of ongoing and planned studies. Two studies, one conducted by the USACE Baltimore (USACE Baltimore 2006), the second by the Maryland Department of Planning (MDP 2006b), directly address potential BRAC impacts. Their recommendations are presented below as potential mitigations to reduce the impacts of the Preferred Alternative.

USACE Draft Planning Study Recommendations

The USACE *Draft Planning Study* suggests transportation improvement measures that could be employed by SHA and local communities to reduce the overall on-post and off-post traffic impacts. These transportation system recommendations are presented in this EIS as having potential to mitigate impacts resulting from the Preferred Alternative. They are provided as recommendations identified by planners to improve regional traffic conditions.

For APG's Northern Peninsula, the on-post include:

- Utilize the Aberdeen Gate for incoming only traffic during AM peak.
- Utilize the Aberdeen Gate for outgoing only traffic during PM peak.
- Enhance interconnected signals and optimize timings.

- Make geometric changes to provide an overall LOS E or better, while accepting an occasional LOS F for an individual movement.
- Re-route traffic onto Rodman Road to remove the Maryland Boulevard EUL traffic from Maryland Boulevard.
- Re-open the Aberdeen Boulevard gate for the AM (incoming only) and PM (outgoing only) peak periods to reduce traffic volumes at the Harford and Maryland Gates and improve overall operations. Even if the gates are designed to accommodate these volumes, having only two gates may not be desirable. If there were to be an accident at one of the gates that prohibited entry, the other gate would be overwhelmed. Having an operational third gate would be beneficial.
- Increase the number of processing stations at the gates to accommodate the increased traffic through the gates. Most of those coming in would be on-post civilians prepared with proper identification, which would allow a higher throughput at the gates.
- Promote or require flex-time operations. A strong ride-sharing program could also help reduce the peak hour traffic volumes. A remote parking facility, with a shuttle bus to the post, may also be feasible.

For APG's Northern Peninsula, the off-post traffic network mitigations include:

- Improve intersections on APG's Northern Peninsula along the Aberdeen Thruway at Post Road and at the ramps to/from U.S. 40. Under the Preferred Alternative, the roadway will become more congested approaching these intersections, particularly during afternoon peak conditions. The demand is anticipated to exceed capacity where a noticeable reduction in operating conditions maybe realized. Suggested improvement measures include widening the roadway approaching these two intersections or re-time signals in an effort to provide more capacity and restore operating conditions to a minimum of LOS E.

For APG's Southern Peninsula, the off-post traffic network improvement suggestions include:

- Provide additional capacity at the intersection of Emmorton Road and Edgewood Road as congestion would be expected to worsen under the Preferred Alternative. Intersection improvements may provide additional capacity to the southbound left-turn movement since the turn volume is sufficient to meet the requirements of a double left-turn. Due to the proximity of the two intersections, the positive impacts from the current roadway improvements at US 40 and Edgewood Road may be reduced if improvements are not constructed at Emmorton Road and Edgewood Road. In addition, optimization of signal phasing and timing may be prudent in mitigating the expected impacts.

Maryland Department of Planning BRAC Study

Roadway Recommendations

The Maryland Department of Planning BRAC study (MDP 2006b) provides a number of findings and recommendations relative to APG. These include the following roadway and mass transit findings.

- Continue to study I-95. Interstate 95 is the major north-south limited access artery in the APG region. Studied in sections, I-95 exhibits a variety of LOS values from B to E, depending upon time of day and day of the week. Maintenance of I-95 capacity is critical to the growth of the region. The Maryland Transportation Authority is currently conducting a project planning study for I-95 from north of MD 43 to north of MD 22 (Section 200). One of the alternatives under consideration, the Express Toll Lane Alternative (ETL), includes ETLs from north of MD 43 to MD 543. It is

important that this effort is coordinated with local officials to ensure any interchange redesign will be able to accommodate both planned growth and additional demand associated with BRAC.

- Study a connection from Short Lane/Maryland Blvd (MD 715) to Woodley Road. Such a connection would improve access to the planned growth area on the Perryman Peninsula, and improve operations on the area road network.
- Study Aberdeen Thruway/Churchville Road (MD 22) from APG to Fountain Green Road (MD 543). Given the amount of general development and BRAC-related growth planned for the corridor, MD 22 should be studied with an emphasis on movement between APG and Bel Air.
- Study Short Lane/Maryland Blvd (MD 715) from US 40 to Aberdeen Thruway (MD 22). Given the amount of general development and BRAC-related growth planned for the corridor, which accommodates movements similar to those of MD 22, MD 715 should be studied with an emphasis on the planned relocation of the main access gate of APG.
- Study Philadelphia Road (MD 7) between US 40 and Riverside Parkway (MD 543). Congestion surpassed an acceptable LOS due to both residential and commercial development as evidenced with programmed growth and BRAC-related activities.
- Study Creswell Road (MD 543) between US 40 and Aberdeen Thruway (MD 22). Increased congestion is forecasted in the MD 543 corridor. While the entire corridor from US 40 to MD 22 should be studied, emphasis should be placed on the sections between US 40 and I-95.
- Study Magnolia Road (MD 152) from I-95 to base access at Edgewood. The Edgewood area is forecasted to experience general growth and BRAC-related employment expansion. Given the proximity of MD 152 to Edgewood, it is recommended for investigation.
- Study Superior Street (MD 155) between US 40 and I-95. In response to increased residential development in and around Havre de Grace (*i.e.*, Bulle Rock – a mixed-use development), this corridor may require future improvement.

Transit Recommendations

As discussed in the EIS, existing use of regional transit ridership by APG employees is minimal and has inconsequential benefits to existing transportation issues. The Maryland Department of Planning views regional transit planning as a major alternative to highway commuting. Transit benefits the region by reducing traffic volume and improving air quality. Maryland has made a number of recommendations for development of alternatives and improving access to regional transit. The Army agrees that evaluating these and other transit alternatives would benefit both APG employees and regional residents by reducing vehicular use for daily commuting. These transit recommendations include:

- Improve regional bus and/or rail service to serve commuters to APG from Baltimore and points south.
- With one trip northbound from Baltimore during the morning peak and one trip southbound to Baltimore during the evening peak, commuting from the south via regional rail is now feasible but limited. MTA should explore increased mid-day service, and explore opportunities to eliminate operational limitations to providing improved MARC service. Coordination and cooperation from Amtrak and CSX is imperative.

- Continue ongoing feasibility studies for a new Aberdeen South MARC station and a new rail storage, operations and maintenance facility.
- Explore expanded MARC service in conjunction with development of a Middle River multi-modal station to serve existing and planned development in Middle River and Dundalk.
- Explore expanded commuter rail service into Cecil County, and to points north, through inter-regional coordination with the Delaware Department of Transportation (DelDOT) and the Wilmington Area Planning Council (WILMAPCO). Maryland Department of Transportation (DOT) should take a lead role with regard to such activities.
- Expand local bus service in the US 40 corridor. Utilize a combination of the current Harford Transit Route 6, and the proposed Harford Transit Route 8 to serve stops between Edgewood and Havre de Grace with 1-hour weekday peak and non-peak headways. Investigate extension of Route 6 to reach similar communities south of Edgewood and to Joppa, perhaps in coordination with the Harford County Transit Job Access Reverse Commute (JARC) service, Bus 7. An extension of the proposed Harford Transit Route 8 into Cecil County to Elkton would accommodate an efficient, toll-free transfer to/from points north, including a connection with DelDOT DART Bus 65 service, and a subsequent connection to the Southeastern Pennsylvania Transportation Authority regional commuter rail service.
- Develop proximate and efficient transfer to base grounds from the existing and the proposed new Aberdeen MARC stations. Explore a secure shuttle distribution service on and off post that would utilize current technologies to help reduce dwell times. Improve and/or develop bicycle and pedestrian access at the station, between the station and base, and at the secure transfer point to on-base circulator service.

Planned Mitigation

The Army will provide mitigation for on- and off-post impacts resulting from the Preferred Alternative. To mitigate on-post impacts, APG entry/exit gates will be re-engineered to accommodate the proposed vehicular volume resulting from the BRAC action. The gates will be expanded to decrease queuing times, enhance security, and accelerate visitor processing. The gates will be engineered to avoid wetlands and forested fringe habitats where possible, and manage stormwater runoff. Re-engineering of the gates will benefit off-post roads by facilitating a more efficient flow of AM traffic onto the post.

On APG's Northern Peninsula, major new construction for a C4ISR campus will direct large volumes of employee vehicles into a confined area. Without mitigation, both AM and PM peak LOS will become worse. The Army will mitigate these predicted LOS impacts by designing and constructing structural improvements to a number of intersections, turn lanes, and varying work-hour signal timing.

Although off-post transportation mitigation planning is the primary responsibility of state and regional agencies, the Army recognizes that participation in regional transportation planning will benefit all regional transportation stakeholders. The Army is committed to participate in regional planning studies that focus on the roadway network affected by implementation of the Preferred Alternative.

In conjunction with the regional participation, the Army is committed to evaluate mass transit options that could serve APG. Congress recently changed Public Law 109-59, amending Title 31 US Code (Section)1344 to allow federal agencies to pay for a shuttle service for its employees from their place of work to a "mass transit facility" such as a MARC rail station or regional bus hub. If ultimately selected as mitigation, this service would be limited to DoD employees only.

Funding Sources

The Defense Access Roads (DAR) program, authorized in 23 U.S.C. 210, provides a means by which the federal government may pay its fair share of the cost of highway improvements needed for adequate highway service to defense and defense-related installations. Administered jointly with the Federal Highway Administration, the DAR program provides a means for DoD to work with state and local authorities who execute the projects. Funding for DAR projects is obtained through Military Construction Program funds appropriated by Congress. APG is committed to coordinate with MDOT to identify future transportation projects that may be funded under the DAR program to mitigate the traffic impacts due to BRAC implementation.

4.12 UTILITIES

Regulatory Environment

A summary of applicable federal, state, and Department of Army regulations is presented below. This regulatory discussion is organized based on the resource areas addressed in this section.

- Clean Water Act Regulations (33 CFR 320-330, 335-338; 40 CFR 104-140, 230-233, 401-471);
- DoD Directive 4165.60, Solid Waste Management - Collection, Disposal, Resource Recovery and Recycling Program;
- Safe Drinking Water Act Regulations (40 CFR 141-149); and
- Maryland Department of Environment Regulation of Water Supply, Sewage Disposal, and Solid Waste (COMAR Title 26, Subchapter 4).

Significance Determination

Utility system elements have fixed maximum capacities, above which point system performance can be negatively affected. Major impacts would result if the increased loads to the utility systems resulted in substantial impact to system performance, such as negatively affecting the local municipalities water treatment system, power loss, or pressure loss. Significant impacts would include exceedances of drinking water standards for potable water or exceedance of discharge permit levels for wastewater.

4.12.1 Affected Environment

Aberdeen Proving Ground is located in Harford County, Maryland. Harford County and the Cities of Aberdeen and Edgewood, Maryland, provide several services to the installation. Many utility services for APG have been or are in the process of being privatized. Six utility services were evaluated under this section, including:

- Potable Water System;
- Wastewater System;
- Stormwater System;
- Energy Sources;
- Communications; and
- Solid Waste.

4.12.1.1 Potable Water System

4.12.1.1.1 Northern Peninsula

The City of Aberdeen owns and operates the water system supplying APG's Northern Peninsula (Aberdeen 2001). The City of Aberdeen and APG water systems are separate. APG contracts for water service through an annual Cost of Service agreement with the City. The potable water system is scheduled for upgrade and modernization in accordance with a multi-year capital improvement plan between the City and APG.

The water system for APG's Northern Peninsula was constructed in the 1940s and was transferred to City ownership in December 1999. The distribution system is constructed of a variety of materials and consists of about 107 miles of pipe (Harford County 2005). Potable water for APG is provided from a withdrawal point located on Deer Creek. Raw water is pumped from the Deer Creek pumping station to the Chapel Hill water treatment plant (WTP). The Deer Creek pumping station has a design capacity of about 4 million gallons per day (MGD). Treatment operations at the Chapel Hill WTP include standard mixing, flocculation, sedimentation, and filtration processes. Final chemical treatment is conducted prior to storage in the facility's 1.6 million gallon clear well. Finished water flows to APG and into the distribution system. Design capacity of the Chapel Hill WTP is 6 MGD. The water system is permitted for a maximum withdrawal rate of 3 MGD (APG 2007b). However, backup supply requirements limit the Northern Peninsula to a supply of 1.5 MGD. The Northern Peninsula used an average of 1.02 MGD in 2006.

APG also operates about 24 wells on APG's Northern Peninsula training area (APG 2007b). These wells are permitted as residential wells with the Harford County Department of Health. Monthly monitoring is conducted for bacterial parameters, nitrate, and turbidity. Water sample analysis for CWA drinking water parameters was conducted during the well permitting process several years ago. No water exceedances were identified.

Ten City of Aberdeen wells and eight Harford County wells are located in the vicinity of the Northern Peninsula western boundary (USACE Baltimore 2004a; USACE Baltimore 2004b). Four of the Harford County wells are located on the western boundary and four of the City of Aberdeen wells are located within the installation boundary. The four on-post City of Aberdeen wells (referred to as CAP-7, CAP-8, CAP-9, and CAP-10) are operated by the City of Aberdeen and are located within the vicinity of the Rodman Laboratory, near Deer Creek Loop. Well CAP-7 appears to be within the footprint of Preferred Alternative development at Rodman Laboratory. To protect the City of Aberdeen and Harford County wells from encroaching contamination, APG has created source water protection areas (SWPA) that cover associated recharge areas on APG's Northern Peninsula. The vicinity of Rodman Laboratory is located within the City of Aberdeen SWPA.

The City of Aberdeen's water supply needs are currently met by the well field along the western APG boundary. The system of wells, pumps, and the associated treatment plant has a maximum supply capacity of 1.98 MGD. The system operates essentially at capacity during peak demand days. The City of Aberdeen potable water requirements are projected to be 2.14 MGD by 2012.

The City, faced with perchlorate contamination in its existing well field, requested approval to withdraw and divert additional water from Deer Creek to supply its own demands (SRBC 2006). The MDE issued a Water Appropriation and Use Permit to the City for a total withdrawal of 4.9 MGD for supply to both APG and the City. The allocation is currently limited to 3.5 MGD until additional emergency backup supply is developed. Harford County owns and maintains water transmission mains which pass through Aberdeen from the County's water plant in Havre de Grace to its distribution system southwest of the City (Aberdeen 2001). The City has a water purchase agreement with the County that allows for purchase of up to 0.5 MGD of water in emergencies (*e.g.*, drought or equipment failure). The water supplied to the City by Harford County is drawn from the Susquehanna River and is processed in Havre de Grace

(Aberdeen 2005). Harford County has a current water supply capacity of 20.5 MGD, with a peak demand of 17.7 MGD (Harford County 2007).

4.12.1.1.2 Southern Peninsula

APG owns and operates its own potable water supply and distribution system for APG's Southern Peninsula (USACE Baltimore 2003a). Potable water is supplied from the Van Bibber impoundment of Winters Run located off post through 87 miles of distribution pipe (Harford County 2005). The Van Bibber WTP has a design capacity of 4 MGD with a storage capacity of 1.3 million gallons. The plant withdraws water from Winters Run under a state water appropriations permit that allows withdrawals up to 2.5 MGD (APG 2006a). Currently, the plant has a demand ranging from 1.0 MGD in winter to 1.3 MGD in summer. There are no SWPAs located on APG's Southern Peninsula. APG operates two wells in APG's Southern Peninsula training area (APG 2007b). These wells are permitted as residential wells with the Harford County Department of Health. Monthly monitoring is conducted for bacterial parameters, nitrate, and turbidity.

APG is not permitted to withdraw water from Winters Run during periods of low stream flows, as is often the case during drought conditions (APG 2005d). During past droughts, potable water was supplied by Harford County, although no formal agreement is in place for this supply (Harford County 2007). Water from Harford County is supplied as potable water and is directly supplied to the water distribution system without any further treatment (APG 2005h).

There is one ground storage tank and seven elevated storage tanks on APG's Southern Peninsula. The ground storage tank has a capacity of 1,750,000 gallons. The reservoir is not only the main water storage facility for APG's Southern Peninsula, but also provides static pressure for the distribution system on APG's Southern Peninsula.

Only two of the seven elevated storage tanks are in service. The other tanks have been out of service for a number of years and are not necessary to support the water system on APG's Southern Peninsula.

All potable water supplied to APG's Southern Peninsula is via the 10-, 14-, and 24-inch lines. The potable water distribution system is interconnected at various locations to create a looped distribution network. Most of the lines were installed in the 1940s, and only minor additions or upgrades have been made to the system since then. The system is considered to be in poor to average condition with some sections of lines considered to be in unacceptable condition.

4.12.1.2 Wastewater System

4.12.1.2.1 Northern Peninsula

APG's Northern Peninsula wastewater flow includes domestic waste from base housing, barrack facilities, and offices, with a major portion of industrial flow from the various development and testing facilities that are a core mission of the APG. The wastewater treatment plant (WWTP) for APG's Northern Peninsula is operated by the City of Aberdeen under a privatization agreement similar to that of the WTP (APG 2006a). The WWTP discharges into Spesutie Narrows. The WWTP was recently upgraded to include a biological nutrient removal system and now has a maximum capacity of 6 MGD and an average flow capacity of 3 MGD (APG 2006c). The WWTP was designed to meet Enhanced Nutrient Reduction standards under the Chesapeake Bay Restoration Act. The average daily flow is about 1.0 MGD (APG 2007b). Peak flows of up to 2.5 MGD have been observed during severe rain events because of stormwater cross connections. APG has completed infiltration and inflow studies and has completed a majority of repairs related to identified deficiencies. Repair efforts are now focusing primarily on stormwater cross connections. Water use and wastewater generation rates differed by less than 8 percent in 2006. Monthly discharge monitoring results indicate one exceedance for nitrogen in September 2005 (12.5 milligrams per liter [mg/L] versus permitted monthly average of 7.0 mg/L) (USEPA Enviro Facts website, Facility Detail Report, accessed on 12 June 2007 at:

http://oaspub.epa.gov/enviro/fii_query_dtl_disp_program_facility?pgm_sys_id_in=MD0021237&pgm_sys_acrnm_in=PCS).

APG's Northern Peninsula collection and conveyance is composed of miles of gravity mains, force mains, and sewer pump stations. Gravity collection to the WWTP is augmented by one large sewage pump station that services base housing located on the western portion of the post. Additionally, over 50 small sewage pump stations service individual areas in far-reaching locations of APG's Northern Peninsula. Locations not serviced by gravity mains or pump stations have sewage holding tanks that are periodically drained and the contents emptied at a central collection point that flows to the WWTP.

APG has an NPDES permit for 10 outfalls associated with discharges of cooling water, vehicle wash racks, and artillery shell-loading operations (APG 2005d). Outfall discharges are monitored in accordance with permit requirements. Active discharge points and the corresponding receiving waters are the vehicle and aircraft wash rack and stormwater (Sod Run), noncontact cooling water (Dipper Creek), and noncontact cooling water (Woodrest Creek).

4.12.1.2.2 Southern Peninsula

APG owns and operates a WWTP that serves APG's Southern Peninsula (APG 2005d). The WWTP has a capacity of 2.8 MGD (permitted to 3 MGD) and discharges to the Bush River (APG 2006a). The WWTP treats an average of 0.9 MGD in winter and 1.1 MGD in summer. APG is evaluating system privatization options and plans to transfer ownership of this WWTP to a private entity in the near future. The wastewater treatment system includes about 44 miles of collection lines and lift stations with force mains (APG 2005c). Some of the outlying facilities have septic tanks and leach fields (Harford County 2005).

A majority of the wastewater lines was installed in the early 1940s (APG 2005c). The WWTP was originally constructed for primary treatment, with several upgrades in more recent years to include secondary treatment and a chemical feed system. The WWTP plant use trickling filters for secondary treatment and a tertiary treatment (chemical addition) to remove phosphorus. The WWTP is not designed to remove nitrogen, but there is incidental removal during the secondary treatment operation.

Overflows and bypasses have been a recurring problem at APG's Southern Peninsula WWTP, with local news articles reporting three releases during 2005.

4.12.1.3 Stormwater System

Stormwater in developed areas of APG is managed by a series of catch basins and storm sewers. In less developed areas, stormwater runoff is carried by drainage swales (APG 1997). Stormwater discharge at APG is covered under the NPDES General Permit for Discharges from State and Federal Small Municipal Separate Storm Sewer Systems Number MDR 055501 (APG website <http://www.apg.army.mil/apghome/sites/directorates/ece/StormDrain/APG.htm>). This General Permit requires six BMPs:

- Public education and outreach;
- Illicit discharge detection and elimination;
- Public involvement and participation;
- Construction site runoff control;
- Post construction stormwater management; and
- Pollution prevention and good housekeeping.

APG's public outreach efforts include dissemination of information about stormwater pollution, APG's efforts and ideas about what each member of the APG community can do to prevent and control stormwater pollution. This information is disseminated through APG media such as the *APG News* and APG website.

APG is in the process of implementing an illicit discharge detection and elimination program. The other four elements (public involvement and participation, construction site runoff control, post construction stormwater management, and pollution prevention and good housekeeping BMPs) are already in place at APG.

Past activities at APG affected surface runoff by converting undeveloped land surface to impervious area and by modification of drainage patterns, as well as through surface water impacts from site contamination (APG 1997). Ongoing studies and remedial activities continue to reduce impacts from the latter.

The Army has been an active participant in nutrient reduction efforts coordinated by the USEPA Chesapeake Bay Program (CBP) (APG 2005e). The CBP has recognized nutrient pollution as one of the most serious threats to the health of the Bay and has identified nitrogen and phosphorus as the major pollutants of concern. Elevated concentrations of nitrogen and phosphorus change the structure and impair the function of the Bay ecosystem.

The USEPA's Total Maximum Daily Load (TMDL) program gives the USEPA regulatory authority to limit or cap loads for various pollutants for water bodies identified on each state's List of Impaired Surface Waters (303(d) list). Most areas of the Chesapeake Bay are currently identified as impaired on the 303(d) list. If water quality is not restored to warrant delisting of these waters by 2010, then the USEPA will assign TMDLs to regulate pollution. The CBP partners, including the Army, have been working to voluntarily reduce (with a goal of 40%) nutrient loadings to the Bay by 2010 to negate the need for costly, regulatory-driven control measures. The primary program objective is to correct the nutrient- and sediment-related problems in the Chesapeake Bay and its tidal tributaries sufficiently to remove the Bay and the tidal portions of its tributaries from the list of impaired waters under the CWA by 2010.

Nutrient loadings can be addressed through the development of a nutrient management plan. Section 15.20.06.-02 of the COMAR defines a nutrient management plan as "a plan...to manage the amount, placement, timing, and application of animal manure, fertilizer, biosolids, or other plant nutrients in order to protect water quality and maintain the productivity of the soil." (APG 2005e)

APG's 2005 Nutrient Management Plan (APG 2005e) has been developed in accordance with Section 319 of the CWA, guidance from the 1995 Presidential Memorandum on Environmentally and Economically Beneficial Landscape Practices on Federal Landscaped Grounds, and the APG INRMP.

APG's Nutrient Management Plan indicates that in addition to BMPs required by federal and state regulations, APG protects water quality by implementing soil and sedimentation control measures around construction sites and vegetated riparian buffers around streams and within wetland areas. The Nutrient Management Plan also recommends the adoption of additional BMPs to prevent or reduce soil erosion and stormwater runoff to include erect a structure to contain solid manure collected from stables; expand use of conservation landscaping designs within the installation; ensure all future stormwater control structures include low impact development techniques; and initiate a street-sweeping program.

4.12.1.4 Energy Sources

4.12.1.4.1 Natural Gas

Baltimore Gas and Electric (BGE) supplies the Aberdeen area with gas from its main lines in Harford County via an 8-inch line that runs on-post near Maryland Boulevard at the Harford Electric Substation (USACE Baltimore 2003a). This line can supply up to 900,000 cubic feet per hour of natural gas. Many of the boilers on-post are fired by fuel oil. These facilities could be retrofitted with dual-fuel capable

boilers and connected into the gas system by BGE, which would then operate and maintain the gas lines. Limited gas service is available on APG's Southern Peninsula.

4.12.1.4.2 *Steam*

APG's Southern Peninsula is served by a central heating plant system (USACE Baltimore 2003a). High-pressure steam is purchased from the Harford County Resource Recovery Facility and delivered through a distribution system to APG's Southern Peninsula central heating plants.

4.12.1.4.3 *Electricity*

Electrical service for APG is supplied from BGE's Perryman Island Power Plant (USACE Baltimore 2003a). The Perryman Island Power Plant supplies the Aberdeen Area's Harford substation with up to 190,000 kilovolt-amps (KVA), and APG's Southern Peninsula's Magnolia substation with 30,000 KVA. APG has sufficient incoming power capacity to support the power requirements from the Preferred Alternative. APG's Directorate of Installation Operations (DIO) is responsible for providing the post with utilities and the management of the Energy Conservation Program. As part of a partnering effort, BGE is managing and performing energy efficient lighting retrofits for APG's interior lighting systems and helping APG meet its commitment to the USEPA Green Lights Program. The USEPA's goal is to reduce pollution by reducing the amount of fuel oil and nuclear fuel used to produce electricity.

4.12.1.5 *Communications*

Communications systems at APG are managed by the DOIM, with communications systems maintained under private contract (APG 2002b). The communications system at APG consists of 188 miles of copper line and 192 miles of fiber optic line (Harford County 2005).

4.12.1.6 *Solid Waste*

The Environmental Compliance Division of the Directorate of Safety, Health, and Environment (DSHE), handles solid waste and recycling issues (USACE Baltimore 2003a). Army installations must comply with AR 420-49, Solid and Hazardous Waste Management, which addresses collection, storage, processing, and disposal of solid waste. APG maintains an Integrated Solid Waste Management Program that encompasses source reduction, resource recovery resource reuse, recycling, and disposal, and has developed a Solid Waste Management Plan that incorporates solid waste projections for 10 years into the future.

Solid waste at APG is produced through diverse activities and land uses. Residential, commercial, institutional, industrial, testing, and construction activities produce an assortment of waste. In an ongoing effort to prevent pollution and reduce waste disposal costs, APG handles each type of waste differently. Waste that does not get disposed is sorted and collected for recycling and reuse. Solid waste disposal and recycling programs at APG are managed through the coordinated efforts of several directorates.

Aberdeen Proving Ground produces waste ranging from office paper to demolition debris. APG methods for handling and disposing wastes include:

Incineration. Most of APG's residential, commercial, and industrial waste is incinerated at the Harford County Waste to Energy Facility (HWEF). The HWEF accepts 360 tons of municipal waste from Harford County per day. The waste is incinerated to produce electricity and steam (USACE Baltimore 2003a). After collection by an APG Directorate of Installation Operations contractor, solid waste is transported to the HWEF where it is incinerated, or burned, in a waste-to-energy plant. The steam is used to heat APG's Southern Peninsula buildings located near the plant. The HWEF is currently operating at full capacity. Harford County is currently working with the Northeast Maryland Solid Waste Disposal Authority to develop additional capacity for waste disposal and energy production at the facility.

Ash is disposed at the Harford Waste Disposal Center on Scarborough Road in the northern portion of the County (Harford County 2004). This state-of-the-art facility is projected to handle the County's landfill needs for decades. Because the Harford Waste Disposal Center is reaching its permitted capacity, the

County is actively pursuing permitting for expansion of the landfill. MRICD operates a new medical waste incinerator for its medical waste. Medical waste produced elsewhere at the installation, including at KUSAHC, is collected and incinerated at an off-site facility under a private contract.

Recycling. APG has several recycling, reuse, and waste reduction programs that minimize the amount of solid waste incinerated and landfilled. These programs also help APG comply with federal and state laws and Army policies that call for reducing the disposal of solid and hazardous waste. APG's residential, commercial, institutional, and industrial activities all participate in these programs. Recycling is now mandatory under APG's Integrated Solid Waste Management Plan. The recycling programs capture waste streams that include plastic, glass, metal (brass, steel, copper, aluminum, and silver), paper, cardboard, used oil, antifreeze, tires, batteries, textiles, and appliances.

Construction and Demolition Debris. Large volumes of debris are produced from construction/demolition (CD) activities at the installation. In 1996, APG disposed of more than 7,000 tons of CD debris. This is more than all other waste streams combined. Some CD debris, including CD containing asbestos, is considered hazardous and must be disposed as hazardous waste. Most CD debris at APG consists of land-clearing debris: rock, dirt, steel, plaster, concrete, bricks, asphalt, insulation, shingles, asbestos, carpet, piping, wood, and glass.

Due to the high cost of landfilling, APG is exploring opportunities to reuse and recycle CD debris and to employ deconstruction practices. In addition, APG has instituted a "green building" policy, which among other things, calls for use of building design and construction practices that generate the least amount of waste during construction. This requires designers and builders to determine the exact amount of material needed to do the job before ordering bulk quantities.

4.12.2 Consequences

4.12.2.1 *Alternative 1 - No Action Alternative*

Under the No Action Alternative, APG would not implement the Preferred Alternative. Therefore, the Army would not implement any related renovation or construction at APG. No direct impacts to utilities differing from the baseline condition would be expected. The Preferred Alternative is congressionally mandated, however, and the No Action Alternative is not feasible.

Direct Impacts. No change in activities, personnel, or operating space means there would be no effect on current operation of the potable water, wastewater, or stormwater systems, energy use, communications, or solid waste management.

Indirect Impacts. No indirect impacts are anticipated as a result of the No Action Alternative.

4.12.2.2 *Alternative 2 - Preferred Alternative*

The Preferred Alternative would be implemented through a combination of new construction and renovation and reuse of existing facilities to accommodate incoming missions. The Preferred Alternative would result in a net gain of about 5,350 positions in APG's Northern Peninsula and a net loss of about 925 positions in APG's Southern Peninsula. Section 2 provides details on construction for the Preferred Alternative.

4.12.2.2.1 *Direct Impacts*

Potable Water System

The potential impact of the Preferred Alternative is about a 26 percent increase over the baseline use rate for APG's Northern Peninsula and about a 4 percent decrease for APG's Southern Peninsula. Sufficient excess design capacity exists to cover the water requirement increase in APG's Northern Peninsula. The reduction in water demand for APG's Southern Peninsula would offset some of the operational deficiency of the water supply system.

Tables 4.12.1 shows the estimated potable water demand under the Preferred Alternative.

Table 4.12.1
Estimated Potable Water Demand for the Preferred Alternative

Potable Water Requirements	Average Demand (MGD)
APG Northern Peninsula	
Baseline APG Northern Peninsula Demand	1.02
Additional Demand from Preferred Alternative ¹	0.27
Net Projected Potable Water Demand by 2012	1.29
APG Southern Peninsula	
Baseline APG Southern Peninsula Demand	1.30
Additional demand from Preferred Alternative ²	-0.05
Net Projected Potable Water Demand by 2012	1.25

¹~5,350 additional staff using 50 gallons per day.

²Loss of ~925 staff using 50 gallons per day.

Note: Usage rates based on MDE guidance (MDE 2006a) values for residence and factory workers. The Preferred Alternative rate includes the factory worker rate plus a 15-gallon per day, per person allowance for laboratory/research activities.

Wastewater System

The potential impact of the Preferred Alternative is about a 10 percent over baseline conditions. Sufficient excess design capacity exists on both the Northern and Southern Peninsulas to cover this increase; however, the current physical condition of many facilities is such that upgrades may be required to provide the projected flow.

Table 4.12.2 shows the estimated wastewater generation under the Preferred Alternative.

Table 4.12.2
Estimated Wastewater Flow for the Preferred Alternative

Wastewater Requirements	Flow (MGD)
APG Northern Peninsula	
APG Northern Peninsula Baseline Generation	1.00
Additional Wastewater from Preferred Alternative ¹	0.27
Net Projected Wastewater Generation by 2012	1.27
APG Southern Peninsula	
APG Southern Peninsula Baseline Generation	1.10
Additional Wastewater from Preferred Alternative ²	-0.05
Net Projected Wastewater Generation by 2012	1.05

¹~5,350 new staff generating 50 gallons per day.

²Loss of ~925 staff generating 50 gallons per day.

Note: Usage rates based on MDE guidance (MDE 2006)

Stormwater System

During construction, the grading of building sites and installation of utilities and roads would cause short-term, localized disturbance of soil. The primary environmental consequences of soil disturbance would be the potential for erosion and sedimentation of adjacent waterways. To minimize soil erosion and sedimentation, demolition and construction activities best management plans would be implemented. In addition, erosion and sediment control plans consistent with requirements of State of Maryland regulations, including the *Maryland Erosion and Sediment Control Guidelines for State and Federal Projects* (MDE 2004b) would be developed and implemented. The MDE would have to approve the erosion and sediment control plan before any site work could begin.

Long-term impacts would result from construction activities associated with the Preferred Alternative resulting in an increase of nearly 2,300,000 gross SF area (renovation and demolition would reduce this value) of impervious surface compared to the approximately 14,000,000 SF (USACE Baltimore 2003a) currently existing. The net change in SF of impervious surface would increase from 15 to 25 percent over baseline conditions. This increased impervious area would result in higher rates of runoff during storm events compared to existing conditions. To minimize the effects, the installation would be required to prepare a Stormwater Management Plan in accordance with Maryland regulations, including the *Maryland Stormwater Management Guidelines for State and Federal Projects* (MDE 2001). New construction would also require compliance with “General Performance Standards” outlined in the *Maryland Stormwater Design Manual*, and redevelopment would require compliance with a stormwater construction permit (for land disturbance of 1 or more acres) COMAR 26.17.02, including a 20 percent reduction in impervious surfaces or equivalent implementation of BMPs (MDE 2000).

It should be noted that the Preferred Alternative follows closely with Maryland’s Smart Growth policy (*i.e.*, concentrating development where it currently exists). To reduce the effects of development, the Army also encourages use of low-impact development for all retrofit and new construction. Low-impact development includes site design elements that would minimize stormwater runoff, including bioretention ponds, vegetated filter strips, permeable pavement, infiltration trenches, rain barrels, and vegetated roofs.

Energy Sources

Heating fuel systems would be installed as part of new construction and expanded or replaced as necessary for renovations. Corresponding new and upgraded heating systems would be more energy efficient. Combined with ongoing energy conservation efforts, increased fuel use with new construction under the Preferred Alternative would be minimized. Sufficient capacity exists to accommodate the Preferred Alternative.

A second 34.5 kV line would be installed along Maryland Boulevard on APG’s Northern Peninsula. The new and existing 34.5 kV lines would be placed underground. As would be the case for heating fuel, new and upgraded electric equipment would be more energy efficient. Combined with ongoing energy conservation efforts, increased electric use with new construction under the Preferred Alternative would be minimized. Sufficient capacity exists to accommodate the development under the Preferred Alternative.

Communications

New and upgraded communications systems and lines would be installed as part of the Preferred Alternative. Incoming units have major requirements for communications capability, computing capacity, and data transfer. To accommodate the Preferred Alternative, the DOIM would make major upgrades to existing equipment and lines, construction of new communication corridors, and upgrades to fiber optic electronics and capacity.

Solid Waste

Short-term increases in the volume of solid waste generated would occur from construction, demolition, and renovation activities. Table 4.12.3 shows the approximate volumes generated by the Preferred Alternative based on type of construction activity.

Table 4.12.3
Estimated Solid Waste Volume Generation Factors for Preferred Alternative

Construction Activity	Factor in (tons/SF)	Square Feet in Activity	Tons of Waste Generated
New Construction	0.002	1,850,000	3,700
Demolition	0.046	626,647	28,826
Renovation	0.0035	1,800,000	6,300
Total Waste Volume Generated			38,826

Source: USACE 1976

Based on these factors, about 38,826 tons of solid waste would be generated over a 4- to 5-year period from construction, demolition, and renovation for the Preferred Alternative. Assuming attainment of the Army's 40 percent diversion rate target, and that a major portion of the remaining waste goes to the APG HWEF, impacts from increased construction-related solid waste are anticipated.

Routine solid waste generation would also increase with the proposed increase in personnel. Harford County is currently working to increase the capacity of relevant solid waste disposal facilities. The availability of those facilities is dependent on regulatory approval and adequate funding. Fort Monmouth, representing a majority of the incoming personnel, generated about 2,048 tons of solid waste and 1,800 tons of recyclables in 2004 (Monmouth 2005). Ongoing pollution prevention initiatives and diversion/recycling efforts would minimize increases under the Preferred Alternative.

4.12.2.2.2 *Indirect Impacts*

Regional data indicate sufficient utility capacity for the project growth under the Preferred Alternative. Increased solid waste generation by increased off-post residential and non-residential development would result in a long-term impact the regional solid waste disposal system. Improved wastewater treatment facilities and ongoing energy conservation and pollution prevention efforts would minimize impacts to the vicinity of the installation.

4.13 HAZARDOUS AND TOXIC SUBSTANCES

Regulatory Environment

Primary elements of this resource area include hazardous materials, hazardous waste, Installation Restoration Program and Compliance sites, unexploded ordnance (UXO), lead-based paint, asbestos, pesticides, and radiation. A summary of applicable federal, state, and Department of Army regulations is presented below. This regulatory discussion is organized based on the resource areas addressed in this section.

- AR 200-5, Pest Management.
- DoD Directive 4140.25M, Procedures for the Management of Petroleum Products.
- DoD Directive 4150.7, Pest Management Program.
- DoD Directive 5030.41, Oil and Hazardous Substances Pollution Prevention and Contingency Program.

- Resource Conservation and Recovery Act Regulations (40 CFR 240-281).
- Toxic Substances Control Act (40 CFR, Subchapter R)
- Hazardous Waste Regulations (40 CFR Parts 260 through 279)
- Superfund Amendments and Reauthorization Act (Public Law 99-499)
- Spill Prevention, Control, and Countermeasure Rule (40 CFR Part 112)
- Occupational Safety & Health Administration Hazardous Waste Operations and Emergency Response standard (29 CFR 1910.120 and 1926.65)
- DoD Directive 4145.26M DoD Contractors' Safety Manual for Ammunition and Explosives, July 1997
- Explosives Safety Policy for Real Property Containing Conventional Ordnance and Explosives "Army Specific" HQDA Letter 385-00-2, 30 June 2000
- Comprehensive Environmental Response, Compensation and Liability Act
- DoD Directive 6055.9, DoD Explosives Safety Board and Component Explosives Safety Responsibilities, July 29, 1996, Chapter 12 "Real Property Contaminated with Ammunition, Explosives or Chemical Agents"
- Title 26 of the Code of Maryland Regulations.

Significance Determinations

Numerous federal, state, and local regulations govern the handling, storage, and disposal of waste and hazardous materials. The primary objective of the regulations is to protect public health and the environment. A significant impact would result if the use of hazardous materials or generation of hazardous waste resulted in a violation of any of the laws cited above.

4.13.1 Affected Environment

4.13.1.1 Uses of Hazardous Materials

A number of APG research, development, and testing programs require the use of hazardous materials. The goal of APG is to reduce the use of selected toxic chemicals and hazardous substances as well as the generation of hazardous and radioactive waste through the identification of proven substitutes and established facility management practices, including pollution prevention (APG 2004a). Pollution prevention is the preferred approach to environmental management at APG (APG 2004b). APG's Hazardous Materials Management Policy and Hazardous Materials Management Procedures Manual provides the baseline hazardous materials requirements for all Garrison, tenant activities, and contractors. Activities can adopt the Installation Plan and Policies without additions, or incorporate requirements that may be unique to their own operations

Reporting of hazardous chemical storage quantities and locations is required under the Emergency Planning and Community Right-to-Know Act of 1987. The automated Hazardous Inventory Tracking System (HITS) tracks all Installation hazardous material inventories. HITS provides current inventories on all hazardous materials used and stored on-site. The HAZMART provides both onsite and virtual pharmacy services for all activities. Ultimately, all information amassed through both physical inventory and virtual HAZMART is transmitted to the HAZMART where it is verified before it becomes an actual part of the inventory or reference database.

4.13.1.2 Hazardous Waste Treatment, Storage and Disposal

APG is a large quantity generator (APG 2006d). A wide variety of waste materials are generated, with much of the hazardous waste generated from the RDT&E activities performed by tenants and ongoing site

remediation activities. Major hazardous waste-generating activities at APG include: the Edgewood Chemical Biological Center, Aberdeen Test Center, Army Research Laboratory, and the Medical Research Institute for Chemical Defense (APG 2006e). Most of APG's recurring hazardous waste streams are associated with research laboratory activities. A majority of permitted facilities at APG are covered under a single permit, the A-190. APG is in the process of modifying its A-190 permit to include two interim status open detonation units and one open burn unit (APG 2006i).

Another modification is currently pending for a Sample Receipt Facility (SRF) which will be permitted for hazardous waste container/tank storage and treatment. The SRF mission is similar to that of the chemical transfer facility (CTF) (APG 2006i). However, the facility will also have the capacity to safely handle potentially explosive samples.

In addition to the permitted facilities, APG operates up to 20 90-day storage facilities and over 200 satellite accumulation sites.

The hazardous waste management activities authorized by A-190 permit include the following:

Thermal Treatment Facility – The thermal treatment facility closed in 1999. Sampling done to support the closure found arsenic present above health-based levels. This permit requires APG to maintain an excavation advisory for the site that would warn workers of the potential presence of arsenic above health-based levels.

Treatment, Storage, and Disposal Facility – The treatment, storage, and disposal facility (TSDF) provides storage for waste generated on the installation that cannot be shipped from a 90-day storage area to an off-site TSDF. It also provides storage capacity for waste generated at seven offsite properties owned by APG.

Chemical Transfer Facility – The CTF provides container and tank storage and treatment associated with research, characterization of unknowns, laboratory operations, and the handling of suspect chemical warfare materiel.

N-Field Storage Facility – The N-Field Storage Facility is used to store suspect chemical, smoke, and biological munitions recovered primarily from APG ranges. The munitions are stored until they can be further characterized and treated in accordance with applicable regulations and permits.

Aberdeen Chemical Agent Neutralization Facility (ACANF) – The ACANF was built to destroy the mustard agent stockpile at APG and replaced the Aberdeen Chemical Agent Disposal Facility, which the MDE permitted February 22, 1999. The ACANF used the same chemical process to destroy the mustard agent stockpile as MDE permitted for the Aberdeen Chemical Agent Disposal Facility. The ACANF is no longer operating and is now undergoing closure, which should be completed in the first half of 2007 (APG 2006i).

Bush River Area Storage Bay (BRASB) – The BRASB stores hazardous waste containing no free liquids generated by the operation and closure activities of the ACANF. The waste is subsequently treated in the Supplemental Decontamination Unit or shipped to an off-site hazardous waste treatment facility (TSDF). The BRASB is scheduled to close in 2007.

Major waste-generating activities at APG include (APG 2004a):

- RDT&E laboratory and range facilities.
- Weapons cleaning and repair.
- Fueling and lubricating operations.
- Vehicle cleaning and aircraft washing operations.

- Maintenance activities such as battery and tire replacements, brake repair, cleaning and testing electronic components, plant equipment renovations, facility grounds operations, structural modifications and janitorial services.
- Radiator flushing and parts washing processes.
- Mechanical work such as engine overhauling or aircraft turbine repair.
- Large-scale and small-scale painting processes.
- Metal fabrication.
- Pest management applications.
- IRP remediation activities.
- Expired shelf-life hazardous materials.

Hazardous waste generators at APG are required to provide chemical characterization and quantity information for proper disposal of hazardous waste (APG 2006d). Once approved, the waste may be moved to a 90-day temporary storage site. The Installation Environmental Coordinator reviews the records prior to approval of shipment to an off-site commercial TSDF. When shipped, all materials are transported in U.S. Department of Transportation-approved containers provided by the contractor. An on-site TSDF is located on APG's Southern Peninsula; however, off-site TSDFs are more commonly used.

APG uses an Automated Hazardous Waste Tracking System (HWTS) for waste tracking and reporting. The HWTS is used by all on-post generators for hazardous waste submittals (APG 2006e). APG typically generates between 300,000 and 500,000 pounds of hazardous waste annually. Actual annual numbers are often much higher and can fluctuate greatly when including remediation waste streams, or large single-event projects such as the recent destruction of mustard agent stockpile by way of hot water hydrolysis.

4.13.1.3 Installation Restoration Program Sites and Compliance Sites

APG participates in the IRP, established in 1978 by the DoD. The DoD developed the IRP to identify, evaluate, and clean up contamination from past operations on military bases worldwide. The IRP is designed to ensure DoD compliance with federal and state regulations that protect the environment. APG prepared an Installation Action Plan (IAP) and updates it annually. The IAP defines IRP requirements and proposes an implementation plan to address future investigation and remedial efforts at the IRP sites. Two hundred and fifty-two sites have been identified at the APG. Of these sites, 149 are considered "Response Complete," requiring no further action. Under current funding, all remedies would be incorporated at the APG by the end of 2012 and completed by the end of 2034 (APG 2005a).

No IRP sites with on-going remedial actions are located within the project areas included in the Preferred Alternative.

In addition to the IRP, the APG updates a Compliance-Related Cleanup (CC) IAP for storage tanks that do not affect groundwater off-post and UXO exposed by erosion. These contaminants are not covered as part of the IRP. To date, 21 CC sites have been documented. Under current funding, all remedies would be in place for the CCs by the end of 2008 and completed by the end of 2013 (APG 2005k). Two CC sites are located within the Preferred Alternative development areas:

Building 5042 – CCAPG05042. In 1990 and 1991, three underground storage tanks (UST) were removed from the Building 5042 area, which serves as a training machine shop. Free product (gasoline) was found in one of four monitoring wells installed since the removal of the USTs. Groundwater is approximately 10 feet below the ground surface. A passive bailer was installed in the well with free product. Once product has been sufficiently removed, closure sampling will be conducted until case closure is approved by MDE. At that time, the wells will be abandoned.

Building E-4261 – CCAPG4261. Building E-4261 served as a gas station from 1961 through 1989. Leaking USTs were discovered during tank removal activities in 1992. A thermally enhanced air sparging system was installed in 1999 and operated until 2001, when MDE authorized system shut down. Once the well meets cleanup goals, closure sampling will be conducted until case closure is approved by MDE. At that time, the wells will be abandoned.

4.13.1.4 Special Hazards

4.13.1.4.1 Unexploded Ordnance

Unexploded ordnance is present at a number of locations throughout APG for several reasons: by accident, from burial for disposal, from use of a site as a target area, or from missing the target area at firing ranges (USACE Baltimore 2003a). The vast majority of UXO on land is found within 2 feet of the surface. These UXO objects slowly migrate to the surface as a result of freeze-thaw cycles. Larger projectiles and bombs can be found at greater depth (10–20 feet). In addition to UXO on APG land areas, many are also present in the sediment of nearby water bodies. Estimates of UXO quantities on land include one million live rounds and four million inert rounds in range areas, and about four million live rounds and 16 million inert projectiles in nearby water bodies. To minimize the risk of UXO detonation, all areas suspected of having UXO are subject to specific digging clearance procedures and physical security measures preventing access. All UXO clearance activities are conducted under *APG Specification for General Contracts, Section 02010, Perform Unexploded Ordnance Detection, Preliminary Identification and Removal Coordination* (August 2006).

Eighteen Military Munitions Response Program (MMRP) sites were identified at APG (APG 2004). Sites covered under the MMRP and within or near to Preferred Alternative development areas include:

5400 Area - The 5400 Area in APG's Northern Peninsula has been identified as the Block 5400 Demolition Training Area. Background information indicates the Ordnance School and Training Center used this area until the mid-1950s for training and that up to 100-pound "bare charges of TNT" were permitted for demolishing 75mm projectiles (probably containing TNT). Although no site-specific records of UXO findings were identified for the 5400 Block, digging permits are required.

4.13.1.4.2 Lead-Based Paint

The APG Lead Program is managed by the Installation Safety Division, DSHE, which oversees all worker protection and housing issues (USACE Baltimore 2003a). APG's Directorate of Installation Operations manages lead remediation work and lead sampling and survey data. Lead-based paint (LBP) associated with housing was addressed by an x-ray fluorescence survey conducted in the early 1990s and a Lead Hazard Screen Assessment in 1997. Non-housing buildings are investigated in response to employee requests or for renovation projects, or any occurrence that would disturb paint (*e.g.*, maintenance or demolition).

The APG Lead Hazard Management Plan (LHMP) was developed to minimize exposure of all building occupants and contractors working in buildings to lead and lead dust (APG 2006f). This program provides for maintenance and inspection procedures involving residential buildings and other structures in general, with specific provisions for military housing units, child care facilities, and construction, renovation, or demolition activities. An emphasis is placed on managing the material in place. The LHMP establishes procedures that follow applicable federal, state, and Army regulations to manage and control lead hazards. The LHMP assumes that painted surfaces in or on facilities constructed prior 1978 contain LBP unless documented testing or historical data indicate otherwise. Construction and renovation activities are required to comply with worker awareness and protection requirements presented in 29 CFR 1926.62.

A majority of buildings covered under the Preferred Alternative likely contain LBP (APG 2005i).

4.13.1.4.3 *Asbestos*

The Asbestos Management Program (AMP) was developed as a responsible alternative to asbestos removal through implementing procedures to control exposure to asbestos containing material (ACM) (APG 2006g). Surveying and inspections are done on an as needed basis and as funding permits. The principal objective of the AMP is to minimize exposure of building occupants and contractors working in the building to asbestos fibers. To accomplish this objective, the AMP includes work practices to:

- 1) Maintain ACM in good condition.
- 2) Ensure proper clean up of asbestos fibers.
- 3) Prevent further release of asbestos fibers.
- 4) Monitor the condition of ACM.
- 5) Implement a Work Permit System.

Asbestos abatement is performed whenever asbestos-containing materials are affected by repair, construction, renovation, or demolition activities. The APG asbestos management team is responsible for ensuring compliance in accordance with APG's AMP, as well as applicable federal, state, and Army regulations.

4.13.1.4.4 *Pesticides*

APG's Directorate of Installation Operations is responsible for the Pest Management Program at APG (USACE Baltimore 2003a). The APG Pest Management Program details, identifies, and assigns priorities to the pests and their destructive effects so decisions can be made for any particular level of protection. Program priorities are: 1) control disease vectors and reservoirs of medical importance; 2) control real property pests; 3) control of stored product pests; 4) control general household and nuisance pests; 5) control ornamental and turf pests; 5) control miscellaneous pests; 6) control quarantine pests; 7) control weeds; 8) carcass disposal; and 9) golf course pest control activities. The Secretary of Defense mandated that installations reduce pesticide usage 50 percent by the year 2000, and APG has met this target.

The current program to reduce pesticide usage is managed by the APG Entomologist who is responsible for implementing the APG Pest Management Plan (PMP). The contents of the APG PMP apply to all activities and individuals working, residing, or otherwise conducting business on APG (APG 2005j). The PMP is updated yearly with oversight by DoD-certified Pest Control Technicians and Pest Management Service contractors.

At no time would pest management operations be done in a manner that would cause harm to personnel or the environment. APG practices integrated pest management. Non-chemical control efforts are used to the fullest extent possible before pesticide controls are used or applied.

4.13.1.4.5 *Radiation*

A number of ionizing and non-ionizing radiation sources are used at APG daily in research, development, testing and training missions (USACE Baltimore 2003a). As a result of the extensive use of radioactive material, especially depleted uranium (DU), APG generates thousands of cubic feet of radioactive waste each year. The main sources of radioactive materials on APG include DU test ranges in indoor ranges, outdoor ranges, and materials storage and waste handling facilities. Other sources include sealed source radioisotopes, small amounts of tracer isotopes, X-ray sources, DU-contaminated armor plate, and sources and materials associated with former operations. Other minor sources on APG are gun sights, instrument dials, and smoke detectors. Tenants at APG conduct their own monitoring and assessment activities, and are responsible for fully complying with NRC licensing rules. Other radioactive materials are used in laboratory research. Fourteen licenses from the Nuclear Regulatory Commission have been issued to

organizations at APG. In addition, other Army Commodity Commands are issued licenses for fielded items of supply.

No waste storage areas are located in the vicinity of the Preferred Alternative development areas. An aerial radiation survey did not identify radiation exposure rates above background levels in the vicinity of the project areas (Argonne National Laboratory 2002).

Seven categories of radio equipment are expected to be located at APG under the Preferred Alternative (APG 2006j). All of these categories are currently in use at APG.

- High Frequency - These radios are used for long-range, secure communications and can be fixed, vehicle-mounted or personnel systems. Power output ranges from 1 Watt (W) to 1 kW. These radios can present a risk of radio frequency (RF) burn if antenna contact is made during operation. Precautions necessary to prevent physical contact, including standard RF warning labels, will generally also protect against RF radiation overexposure.
- Very High Frequency - These radios are used for communications with power output ranges from 10 to 50 W. This radio equipment can also presents a risk of RF burn with antenna contact. Precautions necessary to prevent physical contact, including standard RF warning labels, will generally also protect against RF radiation overexposure.
- Ultra High Frequency -These radios are used for navigation and communication. Power output ranges from 0.4 to 100W. Most radios are line-of-sight and use higher gain antennas, which can cause an RF burn if touched. Precautions necessary to prevent physical contact, including standard RF warning labels, will generally also protect against RF radiation overexposure.
- Satellite Communications (SATCOM) - SATCOM terminals are used for long-range communication and range in power from 0.25 W to 5 kW. SATCOM systems generally have specified elevation angles for use. This equipment can pose an RF shock/burn risk. If the antenna is located close to ground level, the region in front of the antenna may need to be controlled so as to prevent access to the main beam. These control zones can be up to 1.6 km in length and need to be labeled appropriately. Many systems have to be registered as RF inventory items and Standard Operating Procedures must be published and posted. SATCOM systems should be positioned so that buildings and other elevated structures are not within the main beam. Limiting the output power can be an effective means to prevent RF overexposure and if full power settings are used warning signals should inform personnel within the vicinity.
- Mobile Subscriber Equipment - These radios have power outputs of 1 to 20 W. Physical contact with any bare metal/wire surface of active antenna elements in some systems can cause an RF shock or burn. Since the antennas are mounted either on the roof of the vehicle or on antenna masts, operating personnel will seldom be within physical contact range of the antennas. A standard RF warning label should be attached on or near the antenna with a message alerting personnel to the potential for RF shock or burn.
- Radio Detection and Ranging - These systems are used for locating artillery, mortar and moving targets on the ground. These systems generally present the highest risk for RF radiation overexposure. Controlled areas are defined in system operational manuals and depend on the mode of use: broad-scan, narrow-scan, or fixed beam.
- Anechoic Chambers - The radio frequency energy is radiated inside the chamber, and access to the chamber should be controlled and monitored.

4.13.2 Consequences

4.13.2.1 *Alternative 1 - No Action Alternative*

Under the No Action Alternative, APG would not implement the Preferred Alternative. Therefore, the Army would not implement any related renovation or construction at APG. Hazardous waste would be managed in the same manner as it is currently managed. The Preferred Alternative is congressionally mandated; therefore, the No Action Alternative is not feasible.

4.13.2.2 *Alternative 2 - Preferred Alternative*

Direct Impacts

Hazardous Materials - Incoming organizations under the Preferred Alternative, particularly laboratory and testing operations, would likely increase hazardous materials usage at APG. However, implementation of Hazardous Materials Management Plans to achieve hazardous materials reduction goals would limit hazardous materials use growth to the extent practical. This would result in a negligible long-term adverse impact.

Hazardous Waste - Many APG programs that involve training, research, and development (including laboratory activities), and testing generate hazardous waste. Incoming organizations under the Preferred Alternative, particularly laboratory and testing operations, would likely increase hazardous waste generation at APG. Preliminary hazardous waste generation estimates for incoming are at 25,000 to 30,000 pounds on a recurring basis, representing the potential for about 6 to 8 percent annual increase to APG's hazardous waste generation quantities. This potential increase would not impact APG's large quantity generator status. In addition, implementation of Hazardous Materials Management Plans to achieve hazardous materials reduction goals would limit hazardous waste generation growth to the extent practical. Some of the buildings that would be demolished or renovated under the Preferred Alternative may be contaminated. These materials could include, but would not be limited to, PCBs, mercury, exotic military agents, and industrial chemicals and explosives. Any such materials would be transported off-post to appropriate permitted treatment facilities through coordination with DSHE, manifested, and entered into the installation HWTS. It is expected that prior to turn-in of a building for disposal, the tenant would ensure that no hazardous materials or waste containers remain. This would result in a negligible long-term adverse impact.

Installation Restoration Program Sites and Compliance Sites - Buildings 5042 and E-4261 contain CC sites and are within the Preferred Alternative development area. Any activities taking place in or around these buildings would be conducted in a manner to not affect the remedial activities at those sites. IRP and CC sites would continue to be remediated in accordance with the IAP. No impacts are expected for these sites since stringent remediation protocols are already incorporated with the sites.

UXO - Construction activities near the 5400 Area and on APG's Southern Peninsula would require UXO avoidance or clearance under the Preferred Alternative. Clearance activities may require removal and destruction/disposal of UXO materials. This would result in a minor long-term beneficial impact with the UXO clearance of select land areas.

LBP - It is anticipated that buildings to be demolished or renovated under the Preferred Alternative contain LBP. Compliance with federal and state LBP regulations, including implementation of work protection precautions, would limit concerns associated with LBP. A long-term beneficial impact would result with the permanent removal of LBP.

Asbestos - It is anticipated that building demolition or renovations under the Preferred Alternative would involve asbestos. Asbestos inspections would be conducted prior to demolition or renovation activities, and regulated ACM would be removed and disposed in an off-post permitted facility in accordance with regulatory and DoD protocol. A minor long-term beneficial impact would result with the permanent removal of ACM.

Pesticides – A slight increase in pesticide use based on increased population would result in negligible long-term adverse impacts.

Radiation – Radiological equipment/material use and waste generation would increase under the Preferred Alternative. With the implementation of the latest safety construction standards, the potential impacts associated with the varying alternatives would be negligible. It is anticipated that these future activities would maintain compliance with licensing requirements resulting in negligible long-term adverse impacts.

No impacts are anticipated from the additional use of radio frequency equipment. The areas of APG categorized as controlled and uncontrolled environments would be identified when locations of specific RF emitters has been determined. If exposure levels are monitored and maintained as per DoD guidance, the potential for hazards to human health should be kept within acceptable limits.

Indirect Impacts

No indirect impacts are anticipated.

4.14 CUMULATIVE EFFECTS SUMMARY

4.14.1 Introduction

The cumulative impact analysis evaluates the incremental effects of implementing either of the alternatives when added to past, present, and reasonably foreseeable future Army actions at APG and the actions of other parties in the surrounding area, where applicable. The cumulative impact analysis has been prepared at a level of detail that is reasonable and appropriate to support an informed decision by the Army in selecting a preferred alternative. The cumulative impact discussion is presented according to the alternatives listed.

Cumulative Impact Analysis Area. The cumulative impact analysis area includes the area that has the potential to be affected by implementation of the Preferred Alternative at APG. This includes the installation and the area near the installation boundary and varies by the resource category being considered:

Land Use. The cumulative impact analysis area for land use is defined by the installation boundary and the counties adjacent to the installation. The greatest direct and indirect impacts of the Preferred Alternative are expected to occur within this area, and anticipated to be most concentrated in the communities neighboring the installation.

Aesthetics and Visual Resources. The cumulative impact analysis area for aesthetics and visual resources includes all areas within the installation and areas from which the installation is visible.

Air Quality. The cumulative impact analysis area for air quality is defined by the installation boundary and the counties adjacent to the installation. The greatest direct and indirect impacts of the Preferred Alternative are expected to occur within this area, and anticipated to be most concentrated on the installation and in the communities neighboring the installation.

Noise. The cumulative impact analysis area for noise includes all areas within the boundaries of the installation and any areas off-post that would be affected by a change in the current noise contours generated by the installation.

Geology and Soil. The cumulative impact analysis area for geology and soil, including topography, is defined by the installation boundary.

Water Resources. The cumulative impact analysis area for biological resources includes the installation and the watersheds that drain the installation. This analysis area includes physiographic and surface drainage, surface water, surface water quality, groundwater, floodplains, and stormwater.

Biological Resources. The cumulative impact analysis area for biological resources includes the installation and the watersheds that drain the installation.

Cultural Resources. The cumulative impact analysis area for cultural resources includes all areas within the boundaries of the installation and any areas off-post that would be affected by a change in the historic quality of the region.

Socioeconomic Environment. The cumulative impact analysis area for the socioeconomic environment is the secondary ROI.

Transportation. The cumulative impact analysis area for transportation is defined by the installation boundary and the roadways in the surrounding communities that serve APG.

Utilities. The cumulative impact analysis area for utilities is defined by the installation boundary and the service areas of the public utilities that serve APG.

Hazardous and Toxic Substances. The cumulative impact analysis area for hazardous and toxic materials includes all areas within the installation boundaries and the watersheds that drain the installation.

Table 4.14.1 summarizes the approximate area of habitat that could potentially be affected in Preferred Alternative development areas.

Table 4.14.1 Summary of Habitat Potentially Affected in Preferred Alternative Development Areas

Habitat Type	Acres Potentially Affected in the Preferred Alternative Project Areas								
	C4ISR1	A TEC	ARL	ARI	JPEO	MRICD	Gate at Route 222	Gate at Route 7152	Gate at Route 242
Wetlands, Emergent Non-Tidal Wetlands	10-12	0-1	0-1	0	0	0	0	0-1	0
Wetlands, Forested Non-Tidal Wetlands	2-3	0	0	0	2-3	0	0	0	1-2
Wetlands, Total	12-15	0-1	0-1	0	2-3	0	0	0-1	1-2
Forest	8.1	0	0	0	23.5	2.5	0	4	2
Streams (Linear Feet)	0	0	0	0	0	0	0	0	0

Source: USACE 2007b

¹ includes infrastructure and approach roads

² includes infrastructure and intersection improvements

Table 4.14.2 shows all impacts, including cumulative impacts from the Preferred Alternative and other reasonably foreseeable actions. The key components of the cumulative impact analysis include:

Table 4.14.2 Summary of Environmental Consequences at Aberdeen Proving Ground, Maryland

Resource Category		Impact Category							Discussion	Best Management Practices	Mitigation Measures if Needed
		Significant	Direct	Indirect	Cumulative	Temporary	Short-Term	Long-Term			
Land Use	No Action Alternative								No impacts to land use are anticipated.	Follow procedures in the Master Plan and APG 2025 Strategy Plan for land use planning.	None
	Preferred Alternative										
Aesthetics and Visual Resources	No Action Alternative		✓		✓			✓	Under the No Action Alternative, long-term impacts would include the continued deterioration of older buildings. Under the Preferred Alternative, the direct and cumulative impacts would be similar. Long-term beneficial impacts would include renovation and demolition of deteriorated and dilapidated structures. Temporary impacts would result from construction activities, and long-term impacts would occur to natural vistas due to building height and overall square footage required for new construction.	Utilize landscaping to reduce construction-related short-term impacts.	None
	Preferred Alternative		✓	✓	✓	✓		✓			
Air Quality	No Action Alternative								Under the Preferred Alternative, direct impacts include temporary and short-term impacts due to increased construction and operation emissions, and long-term impacts would occur due to increases in emissions from daily operations. Indirect impacts include temporary impacts due to increased contractor and off-post emissions. Cumulative impacts include short term impacts associated with fugitive dust from on- and off-post construction and increased use of privately owned and government owned vehicles.	Use dust suppression techniques to reduce particulate releases from construction sites.	None
	Preferred Alternative		✓	✓	✓	✓	✓	✓			

Table 4.14.2 Summary of Environmental Consequences at Aberdeen Proving Ground, Maryland (Continued)

Resource Category		Impact Category								Discussion	Best Management Practices	Mitigation Measures if Needed
		Significant	Direct	Indirect	Cumulative	Temporary	Short-Term	Long-Term	Permanent			
Noise	No Action Alternative									Temporary impacts from noise would occur under Preferred Alternative. During construction, renovation, and demolition there would be temporary, localized noise impacts associated with increased traffic volumes and the operation of construction equipment and machinery, power tools, and the delivery of construction materials. Indirect noise impacts would occur to wildlife.	Avoid high noise propagation activities when weather conditions are unfavorable. Maintain vegetative buffers to reduce noise transmission.	None
	Preferred Alternative			✓	✓							
Geology and Soil	No Action Alternative									Temporary and short-term impacts on soil would occur under Preferred Alternative. Soil would be disturbed by renovation activities such as compaction from vehicles and vegetative clearing, and by construction and demolition activities such as grading, vegetation clearing, and excavating during construction of the new facilities. Increased impervious surfaces would result in permanent impacts to the soil. There is the potential for cumulative impacts to the soil through implementation of Preferred Alternative construction projects and related projects on and off post.	Use dust suppression techniques to reduce particulate releases from construction sites. Implement erosion prevention and reduction management practices at construction sites.	None
	Preferred Alternative		✓		✓	✓	✓		✓			

Table 4.14.2 Summary of Environmental Consequences at Aberdeen Proving Ground, Maryland (Continued)

Resource Category		Impact Category								Discussion	Best Management Practices	Mitigation Measures if Needed
		Significant	Direct	Indirect	Cumulative	Temporary	Short-Term	Long-Term	Permanent			
Water Resources	No Action Alternative									<p>No direct impacts to water resources would occur. Under the Preferred Alternative, indirect impacts include temporary impacts due to run-off from soil disturbance and related construction and demolition. Long-term impacts would occur due to increases in impervious surfaces, which could lead to an increase in stormwater runoff and reduce groundwater recharge. Portions of the Preferred Alternative footprint encroaches on the storm water protection area for the City of Aberdeen. Cumulative impacts from the Preferred Alternative include short-term impacts related to construction on- and off-post.</p>	<p>Utilize erosion control measures to reduce surface water runoff from construction sites Implement water retention basins into office park designs. Compliance with Stormwater Pollution Prevention Plans (where applicable). NRCS Critical Area standards, "General Performance Standards" outlined in the Maryland Stormwater Design Manual and Code of Maryland Regulations (COMAR) 26.17.02, would reduce stormwater and groundwater recharge impacts.</p>	None
	Preferred Alternative			✓	✓	✓		✓				
Biological Resources	No Action Alternative									<p>Under the Preferred Alternative, direct impacts include short- and long-term impacts to isolated or jurisdictional wetlands from the possible loss of 15-23 acres of wetlands. Indirect impacts include short- and long-term impacts on terrestrial and aquatic vegetation, wetlands, and aquatic vegetation and wildlife due to increased erosion and sedimentation. Cumulative impacts include long-term impacts on regional wetlands from ongoing and future activities at APG and continued growth in the surrounding region.</p>	<p>Maintain compliance with APG forest delineation and conservation plans. Impacts to wetlands will be subject to permitting and mitigation requirements.</p>	<p>Replace lost wetlands in accordance with permit requirements and mitigation plans approved by USACE and Maryland Department of the Environment.</p>
	Preferred Alternative		✓	✓	✓	✓	✓	✓	✓			

Table 4.14.2 Summary of Environmental Consequences at Aberdeen Proving Ground, Maryland (Continued)

Resource Category		Impact Category								Discussion	Best Management Practices	Mitigation Measures if Needed
		Significant	Direct	Indirect	Cumulative	Temporary	Short-Term	Long-Term	Permanent			
Cultural Resources	No Action Alternative	✓	✓							<p>Under the Preferred Alternative, demolition or renovation of eight WWII buildings could result in potentially significant permanent impacts if these buildings are determined to be eligible for inclusion on the National Register of Historic Places (NRHP). Indirect impacts include potentially significant temporary impacts due to vibration, audio intrusion, and other disturbance to unidentified NRHP-eligible resources adjacent to the area of potential effect. Potentially significant, permanent cumulative impacts to archaeological sites and architectural resources would occur from construction, on-post and off-post, in undisturbed areas; renovation, and/or demolition of NRHP-listed or NRHP-eligible buildings or structures from other APG and regional projects. Disturbance or destruction of these cultural resources would further diminish the regional archaeological record decreasing the potential of its overall research contribution. In addition, the loss of NRHP-listed or NRHP-eligible buildings and districts would undermine the historic quality of the region.</p>	<p>Buildings vacated by APG tenants should be placed in caretaker status to preserve structural and cultural integrity.</p> <p>Avoid vibratory impacts near culturally sensitive sites.</p> <p>Continue to coordinate with State Historic Preservation Officer (SHPO) in accordance with Section 106 of the National Historic Preservation Act.</p>	<p>Conduct Phase I archaeological survey to identify sites; conduct Phase II archaeological testing and architectural surveys to evaluate for NRHP eligibility; coordinate with SHPO to identify subsequent mitigation measures for NRHP-eligible resources.</p> <p>Implement mitigation measures for affected NRHP-eligible resources, as designed in consultation with the SHPO.</p>
	Preferred Alternative	✓	✓			✓			✓			

Table 4.14.2 Summary of Environmental Consequences at Aberdeen Proving Ground, Maryland (Continued)

Resource Category		Impact Category								Discussion	Best Management Practices	Mitigation Measures if Needed
		Significant	Direct	Indirect	Cumulative	Temporary	Short-Term	Long-Term	Permanent			
Socio-economics	No Action Alternative									<p>The relocation of personnel over a 1-year period would result in significant impacts in business sales volume, employment, and population in the primary ROI. Personnel relocation over 2 years would result in significant impacts to employment and population in the primary ROI. If the personnel relocations are distributed over 3 years, however, none of these economic variables would have significant impacts. Housing demand in the primary ROI could experience a significant impact if the relocation of personnel occurs over 1 or 2 years.</p> <p>Direct short-term beneficial economic impacts would be realized by the regional and local economy during the construction phase of Preferred Alternative. In addition, direct long-term economic impacts would be realized from the increase in operations and associated personnel. Other direct impacts include those on schools, housing, and other social programs. The magnitude of the impacts will depend upon regional planning efforts to minimize impacts on schools and social services.</p> <p>Beneficial cumulative impacts would be in the form of increased business volume, income, and employment associated with construction activities and increased on-post operations in combination with other non-BRAC proposed on-post actions and construction projects.</p>	None	None
	Preferred Alternative	✓	✓	✓	✓	✓	✓	✓	✓			

Table 4.14.2 Summary of Environmental Consequences at Aberdeen Proving Ground, Maryland (Continued)

Resource Category		Impact Category								Discussion	Best Management Practices	Mitigation Measures if Needed
		Significant	Direct	Indirect	Cumulative	Temporary	Short-Term	Long-Term	Permanent			
Trans- potation	No Action Alternative		✓		✓					Continued cumulative impacts would result under the No Action Alternative from continued regional traffic growth.	Manage on and off-post AM and PM peak traffic congestion by implementing flex work hours and staggered openings. Encourage car pools. Modify affected intersections with structural and non-structural modifications to enhance traffic flow at peak times.	The Army will provide mitigation for on- and off-post impacts resulting from the Preferred Alternative. To mitigate on-post impacts, APG entry/exit gates will be re-engineered to accommodate the increased vehicular volume. On APG's Northern Peninsula, traffic impacts from the new C4ISR campus will be mitigated by designing and constructing structural improvements to a number of intersections, turn lanes, and varying work-hour signal timing. The Army is committed to participate in regional planning studies that focus on the roadway network affected by implementation of the Preferred Alternative. For regional transit development, the Army is
	Preferred Alternative	✓	✓	✓	✓	✓	✓	✓	Direct impacts to transportation would result under Preferred Alternative. Without structural improvements to affected intersections, the Preferred Alternative will result in significant impacts at selected intersections leading to access to APG's Northern Peninsula. The Preferred Alternative will result in one intersection leading to access to APG's Southern Peninsula with existing unacceptable Level of Service to experience a further decrease in Level of Service, additional temporary impacts to transportation can be expected from traffic congestion due to construction equipment entering and leaving the Preferred Alternative development sites. Long-term direct, indirect and cumulative impacts to local and regional roadway network would result from the increased APG and dependent population. Without structural improvements to affected intersections, impacts would be permanent.			

Table 4.14.2 Summary of Environmental Consequences at Aberdeen Proving Ground, Maryland (Continued)

Resource Category		Impact Category								Discussion	Best Management Practices	Mitigation Measures if Needed
		Significant	Direct	Indirect	Cumulative	Temporary	Short-Term	Long-Term	Permanent			
												<p>committed to work with the state and regional agencies to evaluate mass transit options that could serve APG, including, for example, a shuttle service for its employees from their place of work to a "mass transit facility."</p> <p>The Army is committed to coordinate with MDOT to identify future transportation projects that may be funded under the Defense Access Roads (DAR) program, authorized in 23 U.S.C. 210, to mitigate the traffic impacts due to BRAC implementation.</p>

Table 4.14.2 Summary of Environmental Consequences at Aberdeen Proving Ground, Maryland (Continued)

Resource Category		Impact Category								Discussion	Best Management Practices	Mitigation Measures if Needed
		Significant	Direct	Indirect	Cumulative	Temporary	Short-Term	Long-Term	Permanent			
Utilities	No Action Alternative							✓		Under the No Action Alternative, continued degradation of APG utility infrastructure would produce long-term impacts. Under the Preferred Alternative, impacts to solid waste disposal capacity would occur from facility demolition. All utilities have sufficient capacity to accommodate the Preferred Alternative, but all will be upgraded to meet operational & safety standards. Cumulative impacts under the Preferred Alternative include a long-term beneficial impact on the installation core infrastructure. Existing regional solid waste disposal system does not have adequate capacity to address the long-term impacts of the Preferred Alternative. Additional capacity within this system is dependent on regulatory approval & adequate funding.	Design for energy efficient use of heating, ventilation and air conditioning. Implement Leadership in Energy and Environmental Design (LEED) building design criteria.	None
	Preferred Alternative		✓	✓	✓	✓			✓			
Hazardous and Toxic Substance	No Action Alternative									Under the Preferred Alternative, direct impacts include long-term impacts associated with increases in the use of hazardous and radiological materials and hazardous and radiological waste production. Long-term beneficial impacts would occur due to the removal and disposal of lead-based paint and asbestos containing materials from demolished buildings. Indirect impacts include short- and long-term impacts to soil, groundwater, and/or surface water should accidental hazardous and toxic substance spills be insufficiently contained or improperly identified, and allowed to migrate to the surrounding media. Cumulative impacts include the long-term potential for short-term impacts due to hazardous and toxic spills because of on- and off-post activities.	Identify asbestos containing materials prior to renovation for appropriate disposal. Provide oil waste recovery systems for construction equipment. All new structures will be constructed to meet current hazardous material handling, storage, and disposal requirements.	None
	Preferred Alternative		✓	✓			✓	✓				

Cumulative Impact Analysis Area. The cumulative impact analysis area includes the area that has the potential to be affected by implementation of the Preferred Alternative at APG. This includes the installation and the area near the installation boundary and varies by the resource category being considered:

Land Use. The cumulative impact analysis area for land use is defined by the installation boundary and the counties adjacent to the installation. The greatest direct and indirect impacts of the Preferred Alternative are expected to occur within this area, and anticipated to be most concentrated in the communities neighboring the installation.

Aesthetics and Visual Resources. The cumulative impact analysis area for aesthetics and visual resources includes all areas within the installation and areas from which the installation is visible.

Air Quality. The cumulative impact analysis area for air quality is defined by the installation boundary and the counties adjacent to the installation. The greatest direct and indirect impacts of the Preferred Alternative are expected to occur within this area, and anticipated to be most concentrated on the installation and in the communities neighboring the installation.

Noise. The cumulative impact analysis area for noise includes all areas within the boundaries of the installation and any areas off-post that would be affected by a change in the current noise contours generated by the installation.

Geology and Soil. The cumulative impact analysis area for geology and soil, including topography, is defined by the installation boundary.

Water Resources. The cumulative impact analysis area for biological resources includes the installation and the watersheds that drain the installation. This analysis area includes physiographic and surface drainage, surface water, surface water quality, groundwater, floodplains, and stormwater.

Biological Resources. The cumulative impact analysis area for biological resources includes the installation and the watersheds that drain the installation.

Cultural Resources. The cumulative impact analysis area for cultural resources includes all areas within the boundaries of the installation and any areas off-post that would be affected by a change in the historic quality of the region.

Socioeconomic Environment. The cumulative impact analysis area for the socioeconomic environment is the secondary ROI.

Transportation. The cumulative impact analysis area for transportation is defined by the installation boundary and the roadways in the surrounding communities that serve APG.

Utilities. The cumulative impact analysis area for utilities is defined by the installation boundary and the service areas of the public utilities that serve APG.

Hazardous and Toxic Substances. The cumulative impact analysis area for hazardous and toxic materials includes all areas within the installation boundaries and the watersheds that drain the installation.

Past and Present Actions. Past actions are defined as actions within the cumulative impact analysis areas under consideration that occurred before November 2005 (the environmental baseline for this EIS). These include past actions at APG and past demographic, land use, and development trends in the areas that surround the installation.

In most cases, the characteristics and results of these past and present actions are described in the Affected Environment sections under each of the resource categories covered in this EIS. Past and present actions identified and considered in the analysis of cumulative impacts are listed below. These actions are grouped to indicate those that are anticipated on-post and those that are anticipated off-post.

Past and present on-post actions include:

- Current mission activities and operations at APG.
- Funded construction projects at APG.
- Current resource management programs, land use activities and development projects that are being implemented by other governmental agencies and the private sector (where they can be identified) within the cumulative impact analysis areas.
- Administrative actions required for the proper command and control of personnel involved in governmental, service contract, and inter-service and intra-service agreement supported functions.
- Construction, alteration, repair, rehabilitation and maintenance of buildings, structures, site improvements, and utility systems, as required. These actions would ensure that assets are capable of meeting the facility requirements including: changing training standards, mission requirements, educational initiatives and programs, administrative organizations, and weapons systems. Construction activities included in the consideration of past and present actions consist of the existing facilities at APG, construction projects currently in progress, and those funded for construction.
- Grounds maintenance at APG, as necessary, to ensure the long-term viability of plant growth, reduce pest and insect infestations, reduce the potential for inadvertent power outages caused by trees and tree limbs falling onto power lines, and maintain a professional, military appearance.
- Continued morale, welfare, and recreation activities at APG.

Past and present off-post actions include:

- Airspace use and flight altitude instruction during training missions;
- Past development and land use patterns within the APG region that comprise the affected environment as described in this EIS and are considered as part of the environmental baseline conditions;
- Continued urban encroachment from the areas surrounding APG, such as the city of Aberdeen and the Edgewood Community; and
- Development of additional supporting industrial and commercial land uses, primarily along the major transportation routes across the area.

Reasonably Foreseeable Future Actions. Reasonably foreseeable future actions are mainly limited to those that have been approved and that can be identified and defined with respect to timeframe and location. Reasonably foreseeable future actions that have been identified and considered in the analysis of cumulative impacts, both on-post and off-post are listed below.

Reasonably foreseeable future on-post actions include:

- Update of the Installation Real Property Master Plan to include planning for future actions using much of the existing “Aberdeen Proving Ground Strategy 2025” as a reference. Recently completed components of this strategy include:
 - Installation Design Guide;
 - Capital Investment Strategy for UPH/FCG 72111;
 - APG Cultural Resource Program/Historic Building Surveys;
 - Community Mall Area Wide Development Plans;

- Long Range Analysis;
- Land Use Assessment;
- APG Neighborhood Revitalization Plan;
- Gate Safety, Traffic and Force Protection Study; and
- Space Utilization – PAT Report.
- Implementation of the Maryland Boulevard EUL.
- Implementation of the Lauderick Creek EUL.
- Consolidation of industrial and maintenance activities in one central area.
- Continuation of past and present actions as discussed above. It is anticipated that other military missions and future training activities at APG will remain relatively constant into the foreseeable future.
- Continuation of present management actions, and the modification of these management actions, as necessary, to ensure compliance with regulations.
- Building or system renewals or replacements, construction of new buildings or systems, expansions and improvements in existing buildings, and street and road improvements would continue as needed to fulfill mission requirements at APG that are not included in the Preferred Alternative.

Reasonably foreseeable future off–post actions include:

- Continuation of present management actions within the surrounding civilian community and the continuation of existing civilian development trends.
- Continued civilian encroachment around the APG installation.
- Continued development along the interstates, highways, and roads around the installation.
- Development occurring in Harford County, Maryland in the Edgewood/Joppa and the Greater Aberdeen/Havre de Grace Enterprise Zones.

4.14.2 Potential Cumulative Impacts

4.14.2.1 Alternative 1 - No Action Alternative

No additional support facilities would be developed for new operations. Existing on-going mission activities at APG would continue at historical intensity and frequency. Under the No Action Alternative there would be no cumulative impacts since the proposed facilities and operations would not occur.

4.14.2.2 Alternative 2 - Preferred Alternative

Cumulative impacts under the Preferred Alternative by resource category are:

Land Use. There would be no cumulative impacts to land use under the Preferred Alternative since all projects constructed on-post would be compatible with existing uses and the APG 2025 Strategy Plan. The projects would represent a reuse of existing functional land use areas through renovation of existing facilities and/or construction in areas consistent with the facilities use.

Aesthetics and Visual Resources. Cumulative long-term beneficial impacts would result from renovation and demolition of deteriorated and dilapidated structures under the Preferred Alternative in combination with implementation of elements of the APG 2025 Strategy Plan.

There would be short-term cumulative impacts to aesthetics and visual resources under the Preferred Alternative. Construction activities taking place under the Preferred Alternative as well as those conducted under other initiatives would result in a temporary impact. All projects under the Preferred Alternative would be developed in compliance with Master Planning guidelines. Additionally, the projects under the Preferred Alternative are located within the cantonment areas or previously disturbed areas on the installation.

Air Quality. Based on results of the conformity analysis, only $PM_{2.5}$ did not exceed the allowable threshold levels and as such, a general conformity determination would be required for NO_x , VOCs, and CO for the Baltimore region. Renovation activities would result in 50 percent lower emissions than construction activities on APG. There is the potential for short-term cumulative impacts to air quality associated with the Preferred Alternative. The potential increases in short-term fugitive dust from on- and off-post construction activities may combine with dust and particulate matter generated through training activities and other previously approved construction projects on-post. These emissions would accumulate with other pollutants from adjacent and regional activities. Increased traffic emissions from the increase in privately owned vehicles and government-owned vehicles would also occur.

Noise. The construction, renovation activities, and operations of the incoming organization and activities would result in cumulative noise impacts. If any areas are at the upper limits of an NZ I or NZ II area, any additional noise would result in a cumulative impact if the additional noise causes an increase to the next Noise Zone.

Geology and Soil. Future development projects in the surrounding communities, when combined with installation renovation and construction projects, have the potential for cumulative short-term impacts to soil. These impacts could include soil erosion, removal, and compaction. All projects under the Preferred Alternative would be on previously developed or disturbed land, and BMPs as described in Section 4.6.2.2, would be implemented.

Water Resources. Run-off from soil disturbance from renovation and construction projects under the Preferred Alternative combined with soil disturbance from construction projects in surrounding communities would have cumulative short-term impacts on downstream water resources. Actions occurring on the installation are required to meet existing management plans, standard operating procedures, as well as local, state, and federal standards. Groundwater recharge rates would be impacted with the increase in impervious surface area. Implementation of BMPs and compliance with Source Water Protection Plans would minimize impacts to groundwater recharge, particularly to potable water supplies.

Biological Resources. Because the renovation activities under the Preferred Alternative would be located within or adjacent to the existing cantonment areas or in previously disturbed areas, the Preferred Alternative would have a negligible contribution to short-term cumulative impacts to biological resources. Development within the surrounding community would continue. Consequently, there would be a potential for long-term cumulative impacts to biological resources due to loss or degradation of habitat. This loss of habitat could cause displacement of some individuals of a species from their existing off-post habitats.

Cultural Resources. Under the Preferred Alternative there could be cumulative potentially significant adverse, long-term impacts. Construction, on-post and off-post, in undisturbed areas, renovation, and/or demolition of NRHP-listed or NRHP-eligible buildings or structures unrelated to the Preferred Alternative may result in significant adverse long-term effects to archaeological sites and architectural resources. Disturbance or destruction of these cultural resources would further diminish the regional archaeological record decreasing the potential of its overall research contribution. In addition, the loss of or NRHP-listed or NRHP-eligible buildings and districts would undermine the historic quality of the region.

Actions occurring on the installation are required to comply with the existing ICRMP, standard operating procedures, permit requirements, as well as local, state, and federal standards. If any cultural resources are found during demolition, renovation, or construction activities, APG would follow existing laws and regulations protecting cultural resources to mitigate significant impacts.

Socioeconomics. Housing and other development in the surrounding communities, when combined with on-post development would result in long-term beneficial cumulative economic impacts. Beneficial cumulative impacts would be in the form of increased business volume, income, and employment associated with construction activities and increased on-post operations in combination with other on- and off-post actions. Beneficial cumulative economic impacts would be realized by the regional and local economy during both the construction and operations phases of the Preferred Alternative.

Employment generated by construction activities would result in additional indirect wages paid, an increase in indirect business sales volume, and indirect expenditures for local and regional services, materials and supplies. These impacts would be beneficial because the development would increase the tax base and tax revenues, improve housing and other support facilities within the surrounding communities. Other cumulative socioeconomic impacts include an increase in school enrollment and increased demand on public services.

The Preferred Alternative, in combination continuing off-post private development in the secondary ROI, would result in short-term and long-term cumulative economic impacts in the ROI. Long-term cumulative impacts are expected as a result of the effects of BRAC actions at four military installations in Maryland (MDP 2006b).

Off-post development within the primary ROI, and especially in Harford County, has been accelerating in respect to housing units authorized, supportive commercial development, and required expansion of infrastructure and public services. Significant cumulative impacts are expected.

Transportation. Short-term cumulative impacts can be expected from traffic congestion due to construction equipment entering and leaving the installation construction sites associated with the Preferred Alternative combined with other construction activities on the installation. Long-term traffic congestion would result from increased military, civilian, and contractor personnel assigned to the installation. The projected increase of more than 4,400 additional commuters would have a significant cumulative impact on traffic congestion.

Utilities. Implementation of renovation projects under the Preferred Alternative, which include updates and continued expansion of the utilities, would have a long-term cumulative beneficial impact on the installation when combined with updates to utilities on non-BRAC projects and off-post utility improvements, and would offset cumulative load impacts. The Maryland Boulevard EUL project would result in additional 5,385 tons of solid waste from new construction and demolition activities. However, as is the case under the Preferred Alternative, solid waste diversion efforts on non-BRAC projects would minimize waste generation impacts associated with new construction and increased personnel. Increased water use and wastewater generation under the Maryland Boulevard EUL would be about equivalent to the increase under the Preferred Alternative (about 0.2 MGD). The system capacities and proposed system upgrades are sufficient to accommodate the corresponding additional loads.

Hazardous and Toxic Substances. Abatement activities and UXO clearance associated with construction activities under the Preferred Alternative and other construction projects on the installation or in adjacent areas would result in cumulative beneficial impacts since hazards would be permanently addressed. Although increases in activities resulting under the Preferred Alternative and under non-BRAC activities would likely result in an additional increase in hazardous materials use and waste generation, continued implementation of pollution prevention initiatives would partially offset increases.

4.15 MITIGATION AND BEST MANAGEMENT PRACTICES SUMMARY

As discussed in Sections 4.2 through 4.14, with the exception of potentially significant impacts to cultural resources assets at APG, socioeconomic resources, and traffic, no significant adverse or significant beneficial impacts have been identified or would be anticipated as a result of implementing the Preferred Alternative.

4.15.1 Mitigation Measures

Mitigation measures are discussed as part of this EIS to reduce the potential impact to cultural and historic resources at APG and traffic.

Implementing the Proposed Alternative would result in significant adverse impacts to the transportation system with respect to congestion and increased travel time to both APG's Northern and Southern Peninsulas. These effects would lead to reduced employee productivity, higher commuting costs, and degradation of quality of life. These effects would not be limited to personnel at APG. Through commuters and the local community would also be affected. Numerous regional organizations are involved in the assessment and mitigation of transportation impacts from the BRAC actions at four military installations in Maryland (MDP 2006b). Reduction of these impacts will require coordinated efforts between regional agencies to evaluate and maintain roadway integrity, intersection optimization, and roadway improvements. Planners have identified transportation system recommendations to improve regional traffic conditions. These recommendations are presented in the EIS as neither Best Management Practices nor Army mitigation for potential impacts resulting from the Preferred Alternative. Recommendations are provided as additional information complementary to regional transportation planning efforts.

Historically, data recovery of archaeological sites through professional techniques such as surface collection, mapping, photography, subsurface excavation, technical report preparation and dissemination, has been the standard mitigation measure. Data recovery of archaeological information is now considered, in and of itself, an adverse effect under the revised Section 106 regulations (36CFR800.5(a)(2)(i)). Data recovery investigations should be designed in consultation with the Maryland Historical Trust and implemented prior to construction.

The preferred mitigation is avoidance. Avoidance preserves the integrity of cultural resources and protects their research potential (*i.e.*, their NRHP eligibility). Avoidance also avoids costs and potential construction delays associated with data recovery.

Mitigation measures may also include renovation using architecturally compatible design and materials, documentation through the HABS/HAER programs administered by the National Park Service. Documentation of buildings and structures to the HABS/HAER standards preserve the contextual and architectural information of the resource even if the resource is demolished. Adverse effects caused by audio or visual intrusions to associated historic settings or cultural landscapes of architectural resources may be mitigated by screening the alterations from the resources through landscape design, for example, by planting vegetation such as trees, bushes, or vines consistent with the historic setting and uses of the resource.

Wherever reasonable and possible to do so, unavoidable impacts would be mitigated under consultation with the appropriate agencies. In accordance with 40 CFR 1508.20 (a – e) and 32 CFR Part 651.15, these measures are designed to mitigate in the following ways:

- Avoiding impacts altogether by not taking a certain action or parts of an action;
- Minimizing impacts by limiting the degree or magnitude of the action and its implementation;
- Rectifying impacts by repairing, rehabilitating, or restoring the affected environment;

- Reducing or eliminating impacts over time by preservation and maintenance operations during the life of the action;
- Compensating for impacts by replacing or providing substitute resources or environments.

4.15.2 Best Management Practices

Best Management Practices would be implemented in association with the Preferred Alternative. APG has identified a number of BMPs in its ongoing environmental program. BMPs will be implemented in association with APG construction projects (including the proposed construction activities in this EIS). These BMPs are carried out as part of APG's pro-active environmental stewardship, rather than as a response to potential impacts. APG would work with governmental agencies to comply with the respective regulations and avoid impacts wherever possible. During the development and design of projects, meetings are held to facilitate compliance. Representatives from the following organizations are typically involved in these meetings: APG, USACE, U.S. Fish and Wildlife Service, USEPA, MDE, Maryland Department of Natural Resources, the Maryland Historical Trust, and private sector companies. In addition, the USACE regulatory office holds joint evaluation meetings to discuss pending wetland permits and other CWA, Section 404 issues.

Best Management Practices are effective, practical, structural, or nonstructural methods which prevent or reduce the movement of sediment, nutrients, pesticides and other pollutants from the land to surface or ground water, or which otherwise protect water quality from potential adverse effects of silvicultural activities. These practices are developed to achieve a balance between water quality protection and the production of wood crops within natural and economic limitations. A thorough understanding of BMPs and the flexibility in their application are of vital importance in selecting BMPs which offer site specific control of potential nonpoint source pollution. With each situation encountered at various sites, there may be more than one correct BMP for reducing or controlling potential nonpoint source pollution. Care must also be taken to select BMPs that are practical and economical while maintaining both water quality and the effective land use of adjacent grounds. Effective control or reduction of non-point source loads will require implementation of best management practices or BMPs in the watershed. BMPs may involve efforts to change land-use practices or watershed activities in ways that reduce material exports, or the construction and operation of features that retain materials or reduce the rate at which they are transported from the watershed. The type of BMP implemented would reflect APG conditions (*e.g.*, geology and soil, topography, climate, and hydrology), and the nature of the sources of the polluting materials.

In the APG cantonment areas, impervious surfaces are a major determinant in non-point source loading from occupied areas. Implementation of the preferred alternative and the attendant construction of buildings, roads, and parking lots increase the degree of imperviousness. The relationship between degree of imperviousness and runoff (often expressed as a runoff coefficient or the fraction of precipitation that runs off a site) is well-established, with the volume of runoff from a 1-hectare (about 2.5 acres) paved parking lot (runoff coefficient of 0.95) is 16 times greater than the runoff volume from an undeveloped meadow (runoff coefficient of 0.06) (USACE 2002).

In addition to reducing infiltration of precipitation, impervious surfaces accumulate materials, including soil and grit, organic waste, nutrients, oil and grease, and contaminants, that are washed to streams and storm sewers during runoff events. Studies show that impervious surfaces can greatly increase material loads to water resources.

BMPs for reducing impacts on watersheds follow two strategies: reducing or preventing runoff and resultant pollutant loading, and treating runoff water. Limiting the amount of impervious surface is a prime consideration for reducing runoff and the resulting loss of pollutants. This often involves the inclusion of infiltration features (infiltration trenches or basins) in landscape designs, limitations in the use of curbs on streets and driveways, and parking lot designs that include pervious, vegetated areas.

Additional considerations include “housekeeping” or the routine removal of debris accumulating on roads, driveways, and parking areas.

Collecting or controlling runoff offers the opportunity to treat stormwater before it is introduced to water resources. Retaining water in permanent or temporary ponds or retention basins allows for material losses due to increased sedimentation, as well as reduced erosion rates, increased infiltration, and reduced rates of water delivery to receiving streams and wetlands. The creation of wetlands or the management of existing wetlands features, including vegetated riparian strips along water courses or vegetated infiltration features, can greatly reduce runoff rates while retaining significant quantities of nutrients and sediments.

Construction BMPs for controlling dust at construction sites generally stabilize exposed surfaces and minimize activities that suspend or track dust particles. Dust control practices that can be applied to site conditions with heavily traveled and disturbed areas include wet suppression (watering), chemical dust suppression, gravel asphalt surfacing, temporary gravel construction entrances, equipment wash-out areas, and haul truck covers. Permanent or temporary vegetation and mulching can be employed for areas of occasional or no construction traffic. Preventive measures would include minimizing surface areas to be disturbed, limiting onsite vehicle traffic to 15 mph, and controlling the number and activity of vehicles on a site at any given time.

Transportation BMPs to manage on and off-post AM and PM peak traffic congestion by implementing flex work hours and staggered openings. Encourage car pools. Modify affected intersections with structural and non-structural modifications to enhance traffic flow at peak times.

Because modeling of traffic noise has not been performed, noise barriers in specific locations cannot be suggested. Traffic noise barriers have, however, proven to be an effective noise mitigation tool and may warrant consideration in the future following subsequent impact analysis along nearby controlled access roadways. As a general rule, noise decreases by about 6 dBA with every doubling of the distance from the source (Bell 1982). Noise can be attenuated by minimizing noise generated at the source, by using barriers that block or absorb the noise along its path of propagation, or by a combination of these measures. Existing barriers such as rolling terrain or buildings would minimize noise impacts beyond these barriers.

Lower impact development could be achieved through implementation of Leadership in Energy and Environmental Design (LEED) building design criteria. In a January 5, 2006 memorandum, the Assistant Secretary of the Army for Installations and Environment announced that the Army will transition from the Sustainable Project Rating Tool to the LEED Green Building Rating System effective with the FY2008 Military Construction Program. The LEED Green Building Rating System is a voluntary, consensus-based national standard for developing high-performance, sustainable buildings. Based on well-founded scientific standards, LEED emphasizes and promotes a whole-building approach to sustainability and state of the art strategies in five key areas of human and environmental health: sustainable site development, water savings, energy efficiency, materials selection and indoor environmental quality.

These BMPs are summarized in Table 4.15.1.

Table 4.15.1 Best Management Practices and Applicable Resource Categories

Best Management Practice	Land Use	Aesthetics & Visual	Air Quality	Noise	Soils	Water	Biological	Cultural	Socioeconomics	Transportation	Utilities	Hazardous & Toxic Substances
Surface Landscaping		X			X	X	X					X
ACM present in any renovation project would first be identified as such and would then be abated in accordance with federal, state, and Army standards to avoid potential public health impacts due to the release of asbestos fibers.			X			X						X
Dust suppression techniques for fugitive dust sources.		X	X									
Utilization of air curtain destructors or related equipment for open-burning activities.			X									
Consolidated use of contractor vehicles during construction, demolition, and renovation activities			X									
Erosion Control Measures including but not limited to mulching, silt fences, sediment traps, straw berms, temporary cover crops, stormwater retention/recharge basins, and sediment retention ponds.					X	X	X					X
Use of porous pavements for parking areas and hardstands.					X	X	X					X
Avoid conducting high noise-producing operations when weather conditions favor propagation.				X			X	X				
Conduct a forest stand delineation and prepare a forest conservation plan in accordance with procedures specified by the Maryland Forest Conservation.		X	X	X	X	X	X					X
Long-term protective instruments (<i>i.e.</i> , lease provisions, easements) would be required to ensure that retained areas remain forested.		X	X	X	X	X	X					X
Develop and implement management programs to protect and conserve forest interior dwelling species (FIDS) habitat and maintain corridors of existing forest vegetation to provide effective connections between wildlife habitat areas.		X	X	X	X	X	X					X
Maximize development in non-forested areas.		X	X	X	X	X	X					X

Table 4.15.1 Best Management Practices and Applicable Resource Categories (Continued)

Best Management Practice	Land Use	Aesthetics & Visual	Air Quality	Noise	Soils	Water	Biological	Cultural	Socioeconomics	Transportation	Utilities	Hazardous & Toxic Substances
If forest loss or disturbance is unavoidable, concentrate development in – (1) the perimeter of the forest (<i>i.e.</i> , within 300 feet of the existing forest edge); (2) thin strips of upland forest less than 300 feet wide; (3) small isolated forests less than 50 acres in size; (4) portions of the forest with low quality FIDS habitat (<i>i.e.</i> , areas that are already heavily fragmented, relatively young, exhibit low structural diversity, <i>etc.</i>).		X	X	X	X	X	X					X
To protect rare species, APG would continue the informal consultation process to work with the USFWS on project design and conservation measures to avoid and minimize adverse effects. If adverse effects cannot be completely avoided through the informal consultation process, APG would initiate formal consultation with the USFWS by submitting a written request and a complete initiation package, including a Biological Assessment.							X					
Hazardous and Toxic substance BMPs include but are not limited to preventive maintenance (<i>e.g.</i> , drip pans), increased frequency of inspections, containment and consolidation of construction debris and residues, and incorporation of spill prevention, control, and countermeasures plans for potential releases.			X		X	X	X					X
Manage on and off-post AM and PM peak traffic congestion by implementing flex work hours and staggered openings. Encourage car pools. Modify affected intersections with structural and non-structural modifications to enhance traffic flow at peak times.										X		

4.16 UNAVOIDABLE ADVERSE ENVIRONMENTAL IMPACTS

4.16.1 Alternative 1 - No Action Alternative

Under the No Action Alternative, APG would not implement the Preferred Alternative. Organizations presently assigned to APG would continue to train at and operate from the post. The Army would not implement any renovation or construction associated with the Preferred Alternative. No unavoidable adverse environmental impacts are anticipated to occur to any of the resource categories discussed in this

EIS. It is noted that for the No Action Alternative, maintenance of current conditions is not feasible, since the Proposed Action is congressionally mandated.

4.16.2 Alternative 2 – Preferred Alternative

Implementation of the Preferred Alternative would have unavoidable environmental impacts from renovation activities. These activities would cause impacts to air quality, the noise environment, soil, water quality, increased runoff and erosion, transportation, and use of hazardous materials. Renovation and construction activities would occur within cantonment areas that are largely developed and, therefore, impacts to biological resources would be minimal.

Unavoidable impacts to the noise environment would occur under the Preferred Alternative. During construction, renovation, and demolition there would be short-term, localized noise impacts associated with increased traffic volumes and the operation of construction equipment and machinery, power tools, and the delivery of construction materials.

Unavoidable impacts to soil would occur under the Preferred Alternative. In the short-term, soil would be disturbed by activities such as grading, vegetation clearing, and excavating during construction of the new facilities.

Unavoidable impacts to air quality would include increased short-term construction and emissions, and long-term impacts from increases in emissions from daily operations.

Unavoidable indirect impacts to water resources could occur due to run-off from soil disturbance from construction and demolition conducted under the Preferred Alternative. Unavoidable indirect impacts would occur due to increases in impervious surfaces which could lead to an increase in stormwater runoff and reduce groundwater recharge.

Unavoidable impacts to transportation can be expected from traffic congestion due to construction equipment entering and leaving construction sites on the installation. The Preferred Alternative would result in additional employees traveling to and from the installation. Unavoidable impacts to transportation both on- and off-post can be expected from additional trips generated by the additional employees.

Unavoidable long-term impacts would be associated with increases in the use of hazardous and radiological materials and hazardous and radiological waste production.

4.17 IRREVERSIBLE OR IRRETRIEVABLE COMMITMENTS OF RESOURCES

Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that use of these resources would have on future generations. Irreversible effects primarily result from consumption or destruction of a specific, non-renewable resource (*e.g.*, fossil fuels and minerals), and those resources that are renewable only over long time spans, such as soil productivity or forest health. A resource commitment is considered *irretrievable* when the consumption or use of the resource is neither renewable nor recoverable for use by future generations. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action (*e.g.*, extinction of a threatened or endangered species).

4.17.1 Alternative 1 – No Action Alternative

The No Action Alternative would not result in any irreversible or irretrievable commitment of resources.

4.17.2 Alternative 2 - Preferred Alternative

With implementation of the Preferred Alternative, most resource commitments are neither irreversible nor irretrievable. Most impacts would be short term, or longer lasting but minimal. Those limited resources that may involve a possible irreversible or irretrievable commitment are discussed below.

Cultural resources are nonrenewable, and disturbance of such resources is an irreversible impact. Preservation of cultural resources is possible by avoiding impacts to the resources. Data recovery of cultural resources that are eligible for listing on the NRHP may be a necessary mitigation measure; however, data recovery is an irreversible use, effectively eliminating options for future preservation or study of the resource on site. Access to previously inaccessible areas could lead to vandalism of both known and undiscovered cultural resources, thereby rendering them irretrievable.

Under the Preferred Alternative, renovation and construction of on-post facilities would require consumption of materials typically associated with interior renovations (*e.g.*, wiring, insulation, windows, *etc.*) and construction (*e.g.*, concrete, sand, bricks, steel, *etc.*). An undetermined amount of energy to conduct renovations, construction, and operations of these facilities would be expended and irreversibly lost. All construction debris would be recycled or reused where practicable.

Renovation and construction, however, could result in irreversible or irretrievable commitments of resources if land development either physically eliminated threatened or endangered plant or animal species or if subsequent secondary impacts from land development resulted in degradation of natural resources adjacent to committed developed areas.

4.18 SHORT-TERM USES OF MAN'S ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Short-term uses of the biophysical components of man's environment include construction-related disturbances and direct impacts associated with an increase in population and activity that occurs over a period of less than 5 years. Long-term uses of man's environment include those impacts occurring over a period of more than 5 years, including permanent resource loss.

Several kinds of activities could result in short-term resource uses that compromise long-term productivity. Filling of wetlands or loss of other especially important habitats, conversion of prime or unique farmlands to nonagricultural use, and consumptive use of high-quality water at nonrenewable rates are examples of actions that affect long-term productivity.

The BRAC Commission has directed the realignment and relocation of a number of agencies and related functions/activities to APG to improve the ability of the nation to respond rapidly to military challenges of the 21st century. The Army must carry out the congressionally mandated Preferred Alternative at APG to achieve the objectives for which Congress established the BRAC process. To enable implementation of the Preferred Alternative, the Army would provide necessary facilities to support the changes in force structure. This Preferred Alternative would facilitate long-term productivity and sustainability of APG as a military installation by utilizing it for its planned use.

Under the Preferred Alternative, renovation and construction would have temporary effects on air quality, water quality, wetlands, stormwater runoff, noise, traffic circulation and roadways, energy consumption, and aesthetics. In addition, short-term disturbances of previously undisturbed sensitive biological habitats by the construction of new facilities could cause long-term reductions in biological productivity.

SECTION 5.0 FINDINGS AND CONCLUSIONS

Direct, indirect, and cumulative impacts of the No Action Alternative and the Preferred Alternative have been considered. Direct significant impacts have been identified for Socioeconomics and Transportation. No significant beneficial or significant impacts have been identified for Land Use, Aesthetics and Visual Resources, Air Quality, Noise, Geology and Soil, Water Resources, Biological Resources, Utilities, and Hazardous and Toxic Substances.

Results from the EIFS economic impact model have demonstrated direct significant impacts to Socioeconomics factors when the Primary Region of Influence is Harford and Cecil counties. When the Secondary Region of Influence (the City of Baltimore and Anne Arundel, Baltimore, Carroll, Harford, Howard, and Queen Anne Counties) is evaluated, these socioeconomic factors are not considered to be significant.

A drop in the LOS at certain intersections leading to APG's Northern Peninsula will result in significant impacts to transportation. One intersection in the Southern Peninsula roadway network already at unacceptable LOS E will drop to unacceptable LOS F.

Potential significant impacts to Cultural Resources have been identified. Disturbance or destruction of certain previously unidentified sites and unevaluated buildings during renovation and construction activities would result in an adverse effect to these cultural resources. Impacts to these cultural resources would be direct, long-term, and significant.

For realignment actions directed by the BRAC Commission, it should be noted that for the No Action Alternative, maintenance of current conditions is not feasible, since the realignment actions are required to be implemented by the BRAC legislation.

This EIS was conducted in accordance with the requirements of NEPA, the Council on Environmental Quality regulations implementing NEPA (40 CFR 1500), and Environmental Analysis of Army Actions (32 CFR 651). On the basis of the findings of the EIS and after careful review of the potential impacts, the preparers have determined that implementation of the Preferred Alternative, conducted in a manner consistent with applicable regulatory requirements, would result in significant impacts to socioeconomic factors, transportation, and potential significant impacts to cultural resources. Mitigation measures are proposed as part of this EIS to reduce the potential impact to cultural resources at APG.

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SECTION 6.0 LIST OF PREPARERS

Name		Education and Experience	Primary Responsibilities
Tom	Abrams	B.S. Environmental Science; 21 years experience in hazardous waste investigation and remediation, asbestos, lead-based paint, NEPA studies, and environmental compliance	Land Use; Water Resources; Utilities; Hazardous and Toxic Substances
Donald	Beisel	B.S. Geography; M.A. Geography; 28 years of experience in community/urban planning, environmental planning, and socioeconomic studies	Socioeconomics
Doug	Bice	M.S. Environmental/Occupational Health; B.S. Occupational Safety; A.S. Environmental Studies; 20 years experience in environmental and occupational health	Air Quality; Aesthetics and Visual Resources
Susan	Bupp	M.A. Anthropology; B.A. Anthropology; 30 years extensive experience in all phases of prehistoric and historical archaeological projects; Section 106 compliance and NEPA documentation	Cultural Resources
Mark	Collins	B.S. Environmental Science; 21 years experience in natural resources management, environmental planning, and ecological surveys	Biological Resources
Dawn	DeMartino	B.S. Earth System Science (Geology); 10 years experience in environmental investigation, assessment, and compliance	Public Scoping; technical review, editing, and quality assurance
Virginia	Flynn	M.S. Plant Ecology; B.S. Horticulture; 11 years experience in biological surveys, natural resource management, ecological restoration, and environmental impact assessment	Geology and Soil
Richard	Hall	M.S. Zoology; B.S. Environmental Biology, 29 years of experience in environmental investigation, assessment, and impact studies	Technical Review, Editing, and Quality Assurance
Donna	MacDonald	B.A. Anthropology; 24 years of experience in administrative procedures to include automated document preparation	Formatting and Quality Assurance
Will	Kerr, Jr.	M.A. Urban and Regional Planning; B.A. Political Science; 16 years experience in NEPA compliance, environmental impact analysis, and documentation	Noise
Sherrie	Keenan	B.A. Journalism; 30 years experience in business writing/editing; including DoD environmental documents in compliance with NEPA-CEQ guidelines	Editing and Quality Assurance
Ken	Mobley	M.S. Public Policy and Management; B.A. Political Science; 15 years of experience as a transportation planner	Transportation
Leo	Montroy	PhD Biology; 35 years experience in diverse environmental planning including assessment of ecological habitats, major weapons systems acquisition, firing range assessment, and unexploded ordnance	Project Manager

Name		Education and Experience	Primary Responsibilities
Cecil	Niles	B.S. Civil Engineering; 6 years experience in traffic engineering	Transportation
Randy	Norris	M.U.P. Urban and Regional Planning/Environmental Planning; B.S. Plant and Soil Science; 16 years experience in environmental impact assessment, NEPA document preparation and environmental planning	Technical review, editing, and quality assurance
Darrel	Sisk, Jr.	M.S. Architectural Engineering; B.E.D. Environmental Design; 17 years experience in civil engineering, military planning, and environmental planning and impact assessment	Key participant in description of Preferred Alternative, alternatives formulation, and related environmental analyses

SECTION 7.0 DISTRIBUTION LIST

Notification of availability of the EIS was provided to the individuals identified in Table 7.1. Notification was made via email to those with an email address listed in Table 7.1. Notification was made via United States Postal Service (USPS) priority mail to those without an email address listed in Table 7.1 and to those that requested priority mail notification in addition to email notification.

This distribution list was used to distribute notices and information, as appropriate, throughout the EIS process. The list includes members of the general public who expressed interest in prior environmental documents prepared by APG and the Army, special interest groups; federal, state, and local agencies, and elected officials; public repositories (libraries); and local media outlets (newspapers). This list was maintained and updated throughout the APG BRAC EIS process, and any additional individuals or organizations that express interest in the process were added.

Table 7.1 APG BRAC EIS Notification Distribution List

Last Name	First Name	Organization Name	Address	City	State	Postal Code	Email Address
		District Office	105 S. Philadelphia Blvd	Aberdeen	MD	21001	
		Harford County Council, District C	212 South Bond Street	Bel Air	MD	21014	
Altman	Lauri	Harford Mall	696A Bel Air Road	Bel Air	MD	21014	lauri_altman@cblproperties.com
Arguto	Bill	USEPA, Region 3 EA30	1650 Arch Street	Philadelphia	PA	19103-2029	
Bair	Albert	Abington Volunteer Fire Department	3306 Abingdon Rd	Abingdon	MD	21009	cbafc@aol.com
Bane	Jesse	Harford County Sheriff's Office	P.O. Box 150	Bel Air	MD	21014	banej@harfordsheriff.org
Barber	Pat		3493 Albantowne Way	Edgewood	MD	21040	alizarin4@aol.com
Bargerhuff	Kirk	USACE	696 Virginia Road	Concord	MA	01742	Kirk.E.Bargerhuff@ nae02.usace.army.mil
Barrett	Catherine		6711 Columbia Gateway Dr	Columbia	MD	27104	catherine.barrett@copt.com
Benjamin	Steve		20-C Owens Landing Court	Perryville	MD	21903	steveb@aol.com
Benjamin	Steve	APG					steven.h.benjamin@atc.army.mil
Bennett	Katie		1018 Hazel Lane	Bel Air	MD	21014	kbennett@theaegis.com
Birchfield	Larry		400 Colleran Rd	Aberdeen Proving Ground	MD	21005	larry.birchfield@atc.army.mil
Bittner	Rita	Office of Economic Development	223 South Main Street	Bel Air	MD	21014	rbittner@harfordcountymd.gov

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Bloomquist	Judy	Friends of Harford County, Inc.	1009 Morrison Blvd.	Havre de Grace	MD	21078	Comments@friendsofharford.com
Boutin	Charles		37 N. Philadelphia Blvd Suite 3	Aberdeen	MD	21001	
Boyd	Edwin	World Trade Center	401 E. Pratt Street 19th Floor	Baltimore	MD	21202	dboyd@mdot.state.md.us
Bruce	Morita		507 Millwood Drive	Fallston	MD	21047	moritabruce@comcast.net
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Burch	Diane						pdburch@harfordcountymd.gov
Burchfield	Don		2019 Nultal Avenue	Edgewood	MD	21040	mechanic@edgewoodgarage.com
Caplan	Audra	Harford County Public Library	1221-A Brass Mill Road	Belcamp	MD	21017	caplan@hcplonline.info
Carey	David	Board of Bel Air Town Commissioners	39 Hickory Avenue	Bel Air	MD	21014	dec@lawbrown.com
Carnaggio	Denise	Office of Economic Development	220 South Main Street	Bel Air	MD	21014	dbcarnaggio@harfordcountymd.gov
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Cassilly	Robert	Harford County Council (District C)	212 S. Bond Street	Bel Air	MD	21014	
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Crist	Ernest	Harford County Emergency Management	2220 Ady Road	Forest Hill	MD	21050	elcrist@co.ha.md.us
Crush	Lee						crush@hcplonline.info
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Dawson	Frank	Department of Natural Resources, Tawes State Office	580 Taylor Avenue	Annapolis	MD	21401-2397	
Decker	Barry		347 Mt. Royal Avenue	Aberdeen	MD	21001	bdeckerapg@earthlink.net
Desai	Naren	APG DSHE					narendra.desai@us.army.mil
Dillon	Robert	Joppa Magnolia Civic Association	104 Fort Hoyle Road	Magnolia	MD	21085	
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Last Name	First Name	Organization Name	Address	City	State	Postal Code	Email Address
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SECTION 8.0 REFERENCES

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SECTION 9.0 PERSONS CONSULTED

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Steve	Benjamin	APG – Range Control Officer
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David	Carter	APG – DIO
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Greg	Grabous	APG – DIO
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Ray	McDermott	APG – DIO
Michelle	Millay	APG – DIO
Ash	Narula	APG – DIO
Dennis	Overbay	APG – DIO
Abdul	Sheikh	APG – DIO
Jeff	Smith	APG – DIO
Roger	Stoflet	APG – DIO
Dan	Wheeler	APG – DIO, Contractor
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Indra	Batra	APG – DSHE, Contractor
Amy	Burgess	APG – DSHE, Contractor
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Narendra	Desai	APG – DSHE
Christy	Donhauser	APG – DSHE, Contractor
Mark	Gallihue	APG – DSHE
Don	Green	APG – DSHE (formerly)
Karen	Jobes	APG – DSHE
Bud	Keesee	APG – DSHE
Hazoor	Khan	APG – DSHE
Bob	Krause	APG – DSHE
William	Kuhfahl	APG – DSHE
Rurik	Loder	APG – DSHE
Andrew	Murphy	APG – DSHE
John	Paul	APG – DSHE
Bob	Solyan	APG – DSHE
Ken	Stachiw	APG – DSHE
Steve	Wampler	APG – DSHE

First Name	Last Name	Organization
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Matt	Wiherle	APG – DSHE
John	Wrobel	APG – DSHE
Mansoor	Zikai	APG – DSHE
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Nancy	Collins	APG – Plans, Analysis, and Integration Office (PAIO)
Ferrel	Dreisbach	APG – PAIO
Katie	Hall	APG – PAIO
Judith	Wettig	APG – PAIO
Dick	Wakeling	APG – Office of The Judge Advocate General
Joe	Kaffl	APG – Operations Security
Wilber	Townsend	APG – Physical Security
George	Mercer	APG – Public Affairs
Jim	Walter	APG – Site Safety
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Sue	Holtham	BRAC NEPA Support Team
Neil	Robison	BRAC NEPA Support Team
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Dan	Johnson	Federal Highway Administration, Environmental Program Manager
Craig	Ward	Frederick Ward Associates
Gary	Nemeth	General Physics Corporation
Denice	Carnaggio	Harford County
Jacqueline	Ludwig	Harford County
David	Jennings	IMCOM-NE
Michael	Smith	LCOR
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Bruce	Gray	MDE, Office of Planning and Preliminary Engineering, Deputy Director
Randy	Schneider	National Oceanic and Atmospheric Administration, N/ORM3
Steve	Kokkinakis	National Oceanic and Atmospheric Administration, SSMC3 (PPI)
Ren	Serey	State of Maryland Critical Area Commission Chesapeake and Atlantic Coastal Bays Executive Director

First Name	Last Name	Organization
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J. Rodney	Little	State of Maryland Historic Preservation Office, Director
Mike	Eck	U.S. Army Environmental Center
David	Howlett	U.S. Army Environmental Law Division
Bill	Arguto	U.S. Environmental Protection Agency, Region 3 Environmental Review Coordinator
Craig	Koppie	U.S. Fish & Wildlife Service, Chesapeake Bay Program
John	Wolfen	U.S. Fish & Wildlife Service, Chesapeake Bay Program
Lloyd	Woosley	United States Geological Survey, Chief Environmental Affairs Program
James	Gerhart	United States Geological Survey, Water Science Center, Director
Nathan	Barcom	USACE – Baltimore District
Robert	Gore	USACE – Baltimore District
David	Hand	USACE – Baltimore District
Vance	Hobbs	USACE – Baltimore District
Woody	Francis	USACE – Baltimore District
Thomas	Kretzschmar	USACE – Baltimore District
Kevin	Lubke	USACE – Baltimore District (formerly)
Jon	Romeo	USACE – Baltimore District
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SECTION 10.0 ACRONYMS AND ABBREVIATIONS

A		CDC	Child Development Center
ACANF	Aberdeen Chemical Agent Neutralization Facility	CDNL	C-weighted Day-Night Average Sound Level
ACM	Asbestos-containing Material	CE-LCMC	Communications-Electronics Life Cycle Management Command
ADNL	A-weighted Day-Night Average Sound Level	CEQ	Council on Environmental Quality
AEC	Army Environmental Command	CERDEC	Communications-Electronics Research Development and Engineering Center
AGL	Above Ground Level	CFR	Code of Federal Regulations
AMP	Asbestos Management Plan	CLV	Critical Lane Volume
APE	Area of Potential Effect	CO	carbon monoxide
APG	Aberdeen Proving Ground	COMAR	Code of Maryland Regulations
APZ	Accident Potential Zone	CTF	Chemical Transfer Facility
AR	Army Regulation	CVOC	Chlorinated Volatile Organic Compounds
ARI	Army Research Institute	CWA	Clean Water Act
ARL	Army Research Laboratory	CZ	Clear Zone
ARPA	Archaeological Resources Protection Act	CZMA	Coastal Zone Management Act
ATC	Aberdeen Test Center	CZMP	Coastal Zone Management Program
ATEC	Army Test Evaluation Command		
ATR	Automated Traffic Recorder	D	
ATTI	Aberdeen Technology Transfer Initiative	DA	Department of the Army
B		DAR	Defense Access Road
BA	Biological Assessment	dB	Decibel
BGE	Baltimore Gas and Electric	dBA	A-weighted Sound Level
BMP	Best Management Practice	dBC	C-weighted Sound Level
BO	Biological Opinion	DBED	Department of Business and Economic Development
BRAC	Base Realignment and Closure	dBP	Unweighted Peak Sound
BRASB	Bush River Area Storage Bay	DDT	dichloro-diphenyl-trichloroethane
C		DEIS	Draft Environmental Impact Statement
CC	Compliance-related Cleanup	DENIX	Defense Environmental Network and Information Exchange
C/D	construction/demolition	DIO	Directorate of Installation Operations
C4ISR	Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance	DLES	Directorate of Law Enforcement and Security
CAA	Clean Air Act	DNR	Department of Natural Resources
CBD	Chemical Biological Defense	DA	Department of the Army
CBP	Chesapeake Bay Program		
CC	Compliance-Related Cleanup		

DoD	Department of Defense	HWEF	Harford County Waste to Energy Facility
DOIM	Directorate of Information Management	HEAT	Higher Education and Applied Technology
DOT	Department of Transportation	HITS	Hazardous Inventory Tacking System
DSHE	Directorate of Safety, Health, and Environment	HWTS	Hazardous Waste Tracking System
DTRA	Defense Threat Reduction Agency		
DU	Depleted Uranium		
E		I	
ECBC	Edgewood Chemical and Biological Defense Center	IAP	Installation Action Plan
ECRD	Environmental Conservation and Restoration Division	ICRMP	Integrated Cultural Resources Management Plan
EIFS	Economic Impact Forecast System	ICUZ	Installation Compatible Use Zone
EIS	Environmental Impact Statement	IDG	Installation Design Guide
ENMP	Environmental Noise Management Program	IMPLAN	Impact Analysis for Planning
EO	Executive Order	INRMP	Integrated Natural Resources Management Plan
ESA	Endangered Species Act	IRP	Installation Restoration Program
ESMP	Endangered Species Management Plan	ISEC	Information Systems Engineering Command
EUL	Enhanced Use Lease	J	
F		JARC	Job Access Reverse Commute
°F	Fahrenheit	JPEO-CBD	Joint Program Executive Office for Chemical Biological Defense
FEIS	Final Environmental Impact Statement	JSEC	Joint Satellite Communications Engineering Center
FEMA	Federal Emergency Management Agency	K	
FICUN	Federal Interagency Committee on Urban Noise	K-9	Canine
FIDS	Forest Interior Dwelling birds	KUSAHC	Kirk U.S. Army Health Clinic
FY	Fiscal Year	KVA	kilovolt-amps
G		L	
GIS	Global Information System	LBP	Lead-Based Paint
H		LEED	Leadership in Energy and Environmental Design
HABS	Historic American Buildings Survey	LHMP	Lead Hazard Management Plan
HAER	Historic American Engineering Record	L_{eq}	Energy-equivalent noise level over an averaging period
HAP	Hazardous Air Pollutant	LOS	Level of Service
		LUPZ	Land Use Planning Zone

M		OB	open burn
MARC	Maryland Rail Commuter Services	OD	open detonation
MDE	Maryland Department of the Environment	OU	Operable Unit
		P	
MDSPGP	Maryland State Programmatic General Plan	PA	Programmatic Agreement
		PAAF	Philips Army Airfield
MDOT	Maryland Department of Transportation	Pb	lead
		PCB	Polychlorinated Biphenyl
MGD	million gallons per day	PM ₁₀	particular matter equal to or less than 10 microns
mg/L	milligram per liter		
mm	millimeter	PM _{2.5}	particular matter equal to or less than 2.5 microns
MMRP	Military Munitions Response Program	PMP	Pest Management Plan
MRICD	Medical Research Institute of Chemical Defense	ppt	parts per thousand
MRIS	Metropolitan Regional Information System	Q	
MSA	Metropolitan Statistical Area	R	
		R&D	research and development
N		RCRA	Resource Conservation and Recovery Act
NAAQS	National Ambient Air Quality Standards	RDA	Research and Development and Acquisition
NAF	Nonappropriated Funds	RDT&E	research, development, testing and evaluation
NCA	Noise Control Act	RF	radio frequency
NEPA	National Environmental Policy Act	ROD	record of decision
NHPA	National Historic Preservation Act	ROI	Region of Influence
NMFS	National Marine Fisheries Service	RTV	Rational Threshold Value
NO ₂	nitrogen dioxide	S	
NOA	Notice of Availability	SATCOM	satellite communications
NOI	Notice of Intent	SAV	Submerged Aquatic Vegetation
NO _x	nitrogen oxide	SDWA	Safe Drinking Water Act
NPDES	National Pollution Discharge Elimination System	SF	Square Feet
NRCS	Natural Resources Conservation Service	SHA	State Highway Administration
NRHP	National Register of Historic Places	SHPO	State Historic Preservation Office
NWI	National Wetlands Inventory	SIP	State Implementation Plan
NZ	Noise Zone	SO ₂	sulphur dioxide
O		SRF	sample receipt facility
O ₃	ozone	SWPA	Source Water Protection Area
		T	

TCE	Trichloroethylene
TCP	Traditional Cultural Property
TMDL	Total Maximum Daily Load
TPY	tons per year
TSCA	Toxic Substances Control Act
TSDF	Treatment, Storage, and Disposal Facility

U

USACE	U.S. Army Corps of Engineers
USAGAPG	U.S. Army Garrison Aberdeen Proving Ground
USAOC&S	U.S. Army Ordnance Center and School
USC	United States Code
USDA	U.S. Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USPS	U.S. Postal Service
UST	Underground Storage Tank
UXO	Unexploded Ordnance

V

V/C	Volume to Capacity Ratio
VIMS	Virginia Institute of Marine Sciences
VOC	Volatile Organic Compounds
VTD	Vehicle Technology Directorate

W

WMA	Water Management Administration
WRAIR	Walter Reed Army Institute of Research
WTP	Water Treatment Plant
WWTP	Wastewater Treatment Plant

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